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Appendix table 1-1.
Proportion of high school graduates earning credits in science courses, by sex: 1982, 1987, 1990, and 1994
(Percentages)

Year of graduation and sex	Any science	Survey science	Biology	AP/honors biology	Chemistry	AP chemistry	Physics	AP/honors physics
1982 graduates								
All	96.5 (0.3)	62.1 (1.2)	76.6 (0.8)	9.7 (0.5)	31.1 (0.8)	3.0 (0.4)	14.4 (0.5)	1.1 (0.1)
Male	96.3 (0.3)	63.6 (1.4)	74.5 (0.9)	9.0 (0.5)	32.2 (1.2)	3.5 (0.5)	19.1 (1.0)	1.5 (0.2)
Female	96.7 (0.3)	60.8 (1.3)	78.6 (1.1)	10.3 (0.8)	30.2 (0.7)	2.4 (0.5)	10.2 (0.4)	0.7 (0.1)
1987 graduates								
All	99.1 (0.2)	61.3 (3.1)	87.9 (1.0)	9.5 (0.8)	43.8 (1.1)	3.3 (0.4)	19.3 (0.9)	1.7 (0.3)
Male	98.8 (0.2)	61.8 (3.0)	86.3 (1.2)	9.4 (0.8)	44.3 (1.3)	3.9 (0.5)	24.1 (1.0)	2.5 (0.4)
Female	99.3 (0.1)	60.7 (3.3)	89.5 (0.8)	9.6 (1.0)	43.2 (1.2)	2.7 (0.3)	14.7 (0.9)	0.9 (0.2)
1990 graduates								
All	99.4 (0.1)	68.1 (1.8)	91.1 (1.0)	10.1 (1.0)	48.9 (1.3)	3.5 (0.5)	21.6 (0.8)	2.0 (0.4)
Male	99.1 (0.3)	69.6 (1.9)	89.6 (1.1)	9.3 (1.0)	47.7 (1.4)	4.1 (0.5)	25.4 (0.9)	2.5 (0.5)
Female	99.7 (0.1)	66.7 (1.9)	92.4 (0.9)	10.8 (1.2)	50.0 (1.3)	2.9 (0.5)	18.0 (0.9)	1.6 (0.3)
1994 graduates								
All	99.6 (0.1)	71.2 (2.0)	93.4 (1.0)	11.8 (0.9)	55.7 (1.1)	4.0 (0.5)	24.6 (0.8)	2.7 (0.3)
Male	99.5 (0.2)	72.6 (2.0)	92.0 (1.1)	10.9 (0.9)	52.8 (1.1)	4.1 (0.6)	27.1 (1.0)	3.4 (0.4)
Female	99.8 (0.1)	69.9 (2.1)	94.7 (0.9)	12.7 (1.1)	58.5 (1.2)	3.7 (0.5)	22.2 (0.9)	2.0 (0.3)

AP = advanced placement

NOTE: Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates,* NCES 97-260 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-1.

Appendix table 1-2.
Proportion of high school graduates earning credits in science courses, by race/ethnicity: 1982, 1987, 1990, and 1994
(Percentages)

Year of graduation and race/ethnicity	Any science	Survey science	Biology	AP/honors biology	Chemistry	AP chemistry	Physics	AP/honors physics
1982 graduates								
White	96.9 (0.3)	61.6 (1.4)	78.6 (1.0)	10.9 (0.7)	34.4 (0.9)	3.3 (0.5)	16.5 (0.6)	1.2 (0.2)
Asian/Pacific Islander	95.9 (1.3)	40.9 (5.1)	83.7 (2.2)	17.5 (2.9)	52.8 (4.4)	5.8 (1.3)	34.8 (3.4)	3.4 (1.0)
Black	97.1 (0.5)	67.8 (1.8)	73.0 (1.9)	6.0 (1.3)	22.3 (1.5)	1.6 (0.6)	7.6 (0.8)	0.9 (0.4)
Hispanic	93.5 (1.1)	63.3 (1.6)	68.6 (2.1)	4.8 (0.7)	15.6 (1.0)	1.4 (0.4)	5.6 (0.6)	0.4 (0.1)
Native American	91.6 (4.9)	58.1 (7.7)	67.4 (7.0)	3.2 (1.8)	26.2 (7.0)	0.9 (0.9)	8.2 (3.1)	0.0 (0.0)
1987 graduates								
White	99.2 (0.2)	60.7 (3.6)	88.8 (1.1)	9.6 (0.9)	46.7 (1.2)	3.4 (0.4)	20.6 (1.0)	1.7 (0.3)
Asian/Pacific Islander	99.6 (0.3)	44.8 (5.2)	92.1 (1.3)	23.6 (4.4)	70.2 (3.7)	15.4 (2.5)	46.9 (4.2)	6.2 (1.4)
Black	99.0 (0.3)	71.8 (3.8)	84.6 (1.8)	5.2 (0.7)	28.4 (1.8)	1.1 (0.3)	9.7 (1.1)	0.4 (0.1)
Hispanic	99.1 (0.3)	66.9 (3.2)	85.5 (1.5)	7.6 (1.1)	29.1 (1.5)	2.2 (0.6)	9.9 (1.1)	0.8 (0.3)
Native American	99.1 (0.7)	67.3 (3.3)	90.9 (1.9)	13.0 (3.6)	26.4 (2.0)	0.6 (0.3)	8.4 (2.4)	1.4 (0.5)
1990 graduates								
White	99.4 (0.2)	67.6 (2.0)	91.3 (1.1)	10.5 (1.0)	51.4 (1.4)	3.7 (0.6)	23.1 (0.9)	2.1 (0.4)
Asian/Pacific Islander	99.6 (0.2)	56.7 (7.1)	90.4 (2.7)	13.4 (4.0)	63.6 (4.0)	7.7 (1.9)	38.4 (3.5)	5.9 (2.6)
Black	99.5 (0.2)	75.3 (3.1)	91.1 (2.2)	7.7 (1.9)	40.0 (2.2)	2.5 (0.9)	14.5 (1.9)	0.7 (0.3)
Hispanic	99.1 (0.3)	72.0 (3.5)	90.1 (1.4)	6.7 (1.3)	38.1 (2.9)	1.1 (0.4)	13.2 (1.3)	1.0 (0.4)
Native American	98.7 (1.2)	69.4 (5.8)	89.4 (4.7)	3.8 (2.0)	34.9 (4.6)	4.4 (2.6)	14.5 (3.8)	0.5 (0.5)
1994 graduates								
White	99.8 (0.1)	72.4 (2.3)	94.2 (1.2)	12.4 (1.1)	58.2 (1.1)	4.3 (0.6)	26.1 (1.0)	2.7 (0.4)
Asian/Pacific Islander	99.4 (0.4)	62.0 (4.5)	91.5 (1.4)	18.2 (3.1)	69.2 (4.8)	7.7 (1.5)	44.4 (3.7)	6.7 (1.5)
Black	99.8 (0.1)	71.7 (3.7)	91.8 (2.1)	7.7 (1.0)	43.7 (2.7)	2.1 (0.7)	15.0 (1.2)	1.8 (0.4)
Hispanic	99.3 (0.2)	69.7 (3.1)	93.7 (0.6)	11.0 (1.1)	46.0 (2.8)	2.5 (0.6)	16.1 (1.4)	1.9 (0.5)
Native American	99.7 (0.3)	79.0 (5.1)	91.8 (2.1)	6.2 (2.9)	41.3 (5.4)	0.6 (0.6)	10.3 (2.8)	0.3 (0.3)

AP = advanced placement

NOTE: Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates,* NCES 97-260 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-2.

Appendix table 1-3.

Trends in average scale scores on the National Assessment of Educational Progress in science, by age, sex, and race/ethnicity: 1969-96, selected years

	All students	Males	Females	Difference, male vs. female	Whites	Blacks	Difference, white vs. black	Hispanics	Difference, white vs. Hispanic
Age 9									
1970	225 (1.2)	228 (1.3)	223 (1.2)	5 (1.8)	236 (0.9)	179 (1.9)	57 (2.1)	NA	NA
1973	220 (1.2)	223 (1.3)	218 (1.2)	4 (1.8)	231 (0.9)	177 (1.9)	55 (2.1)	NA	NA
1977	220 (1.2)	222 (1.3)	218 (1.2)	5 (1.8)	230 (0.9)	175 (1.8)	55 (2.0)	192 (2.7)	38 (2.8)
1982	221 (1.8)	221 (2.3)	221 (2.0)	0 (3.0)	229 (1.9)	187 (3.0)	42 (3.6)	189 (4.2)	40 (4.6)
1986	224 (1.2)	227 (1.4)	221 (1.4)	6 (2.0)	232 (1.2)	196 (1.9)	36 (2.2)	199 (3.1)	33 (3.3)
1990	229 (0.8)	230 (1.1)	227 (1.0)	3 (1.5)	238 (0.8)	196 (2.0)	41 (2.1)	206 (2.2)	31 (2.4)
1992	231 (1.0)	235 (1.2)	227 (1.0)	8 (1.6)	239 (1.0)	200 (2.7)	39 (2.9)	205 (2.8)	34 (3.0)
1994	231 (1.2)	232 (1.3)	230 (1.4)	2 (1.9)	240 (1.3)	201 (1.7)	39 (2.2)	201 (2.7)	39 (3.0)
1996	230 (1.2)	232 (1.8)	228 (1.4)	4* (2.3)	239 (1.4)	201 (2.6)	38 (3.0)	207 (2.5)	33 (2.9)
Age 13									
1970	255 (1.1)	257 (1.3)	253 (1.2)	4 (1.8)	263 (0.8)	215 (2.4)	49 (2.5)	NA	NA
1973	250 (1.1)	252 (1.3)	247 (1.2)	5 (1.8)	259 (0.8)	205 (2.4)	53 (2.5)	NA	NA
1977	247 (1.1)	251 (1.3)	244 (1.2)	7 (1.7)	256 (0.8)	208 (2.4)	48 (2.5)	213 (1.9)	43 (2.1)
1982	250 (1.3)	256 (1.5)	245 (1.3)	11 (2.0)	257 (1.1)	217 (1.3)	40 (1.7)	226 (3.9)	32 (4.0)
1986	251 (1.4)	256 (1.6)	247 (1.5)	9 (2.2)	259 (1.4)	222 (2.5)	38 (2.9)	226 (3.1)	33 (3.4)
1990	255 (0.9)	259 (1.1)	252 (1.1)	7 (1.6)	264 (0.9)	226 (3.1)	38 (3.2)	232 (2.6)	33 (2.7)
1992	258 (0.8)	260 (1.2)	256 (1.0)	4 (1.6)	267 (1.0)	224 (2.7)	43 (2.9)	238 (2.6)	30 (2.8)
1994	257 (1.0)	259 (1.2)	254 (1.2)	5 (1.7)	267 (1.0)	224 (4.2)	43 (4.3)	232 (2.4)	34 (2.6)
1996	256 (1.0)	261 (1.1)	252 (1.3)	9* (1.7)	266 (1.2)	226 (2.2)	40 (2.5)	232 (2.5)	34 (2.7)
Age 17									
1969	305 (1.0)	314 (1.2)	297 (1.1)	17 (1.6)	312 (0.8)	258 (1.5)	54 (1.7)	NA	NA
1973	296 (1.0)	304 (1.2)	288 (1.1)	16 (1.6)	304 (0.8)	250 (1.5)	54 (1.7)	NA	NA
1977	290 (1.0)	297 (1.2)	282 (1.1)	15 (1.6)	298 (0.7)	240 (1.5)	57 (1.7)	262 (2.2)	35 (2.3)
1982	283 (1.2)	292 (1.4)	275 (1.3)	17 (1.9)	293 (1.0)	235 (1.7)	58 (2.0)	249 (2.3)	44 (2.5)
1986	289 (1.4)	295 (1.9)	282 (1.5)	13 (2.4)	298 (1.7)	253 (2.9)	45 (3.3)	259 (3.8)	38 (4.1)
1990	290 (1.1)	296 (1.3)	285 (1.6)	10 (2.1)	301 (1.1)	253 (4.5)	48 (4.6)	262 (4.4)	40 (4.5)
1992	294 (1.3)	299 (1.7)	289 (1.5)	19 (2.2)	304 (1.3)	256 (3.2)	48 (3.5)	270 (5.6)	34 (5.8)
1994	294 (1.6)	300 (2.0)	289 (1.7)	11 (2.6)	306 (1.5)	257 (3.1)	49 (3.5)	261 (6.7)	45 (6.9)
1996	296 (1.2)	300 (1.7)	292 (1.4)	8 (2.2)	307 (1.2)	260 (2.3)	47 (2.6)	269 (3.0)	38* (3.2)

* = average scale score difference in 1996 is significantly lower than in first year listed; NA = not available

NOTES: Scale scores range from 0 to 300 for every grade level. Standard errors are shown in parentheses.

SOURCE: J. Campbell, C. Reese, C. O'Sullivan, and J. Dossey, *NAEP 1994: Trends in Academic Progress* (Washington, DC: National Center for Education Statistics, 1996).

See figure 1-3.

Appendix table 1-4.
Grade 8 average scale scores on the National Assessment of Educational Progress in science, by state and race/ethnicity: 1996

State	All students		White		Asian/Pacific Islander		Black		Hispanic		Native American	
	Average scale score	Percentage of students	Average scale score	Percentage of students	Average scale score	Percentage of students	Average scale score	Percentage of students	Average scale score	Percentage of students	Average scale score	Percentage of students
Nation	148 (0.9)	100.0	159 (1.1)	68 (0.4)	150 (3.3)	2 (0.3)	120 (1.2)	15 (0.3)	127 (1.8)	12 (0.3)	148 (4.2)	2 (0.3)
Alabama	139 (1.6)	100.0	151 (1.5)	61 (1.9)	NA	NA	117 (1.8)	33 (1.9)	107 (7.6)	4 (0.4)	NA	NA
Alaska	153 (1.3)	100.0	162 (1.2)	66 (1.6)	152 (3.8)	7 (1.0)	*	4 (0.6)	137 (4.6)	7 (0.8)	129 (3.4)	16 (1.4)
Arizona	145 (1.6)	100.0	157 (1.3)	57 (1.9)	NA	NA	124 (3.3)	4 (0.6)	129 (2.1)	31 (1.6)	121 (8.6)	6 (1.5)
Arkansas	144 (1.3)	100.0	154 (1.5)	73 (1.9)	NA	NA	116 (2.5)	20 (1.7)	122 (5.8)	4 (0.6)	NA	NA
California	138 (1.7)	100.0	156 (1.7)	38 (2.1)	148 (3.6)	13 (1.4)	121 (3.4)	7 (1.0)	121 (1.9)	39 (1.8)	NA	NA
Colorado	155 (0.9)	100.0	162 (0.8)	70 (1.3)	155 (4.8)	3 (0.5)	142 (2.2)	5 (0.8)	135 (2.3)	20 (1.2)	142 (4.3)	3 (0.4)
Connecticut	155 (1.3)	100.0	165 (1.0)	75 (1.4)	163 (3.7)	3 (0.4)	121 (4.4)	10 (1.3)	122 (2.6)	11 (0.9)	NA	NA
Delaware	142 (0.8)	100.0	152 (0.8)	64 (1.2)	NA	NA	122 (1.8)	26 (1.0)	116 (4.1)	7 (0.7)	NA	NA
Florida	142 (1.6)	100.0	155 (1.5)	55 (2.1)	NA	NA	119 (2.7)	20 (2.0)	129 (2.2)	22 (2.0)	NA	NA
Georgia	142 (1.4)	100.0	155 (1.2)	56 (2.3)	NA	NA	122 (1.4)	36 (2.4)	128 (4.2)	5 (0.4)	NA	NA
Hawaii	135 (0.7)	100.0	146 (1.8)	17 (0.7)	138 (1.1)	54 (1.3)	128 (4.4)	3 (0.4)	121 (1.8)	22 (0.8)	NA	NA
Indiana	153 (1.4)	100.0	158 (1.3)	81 (1.8)	NA	NA	125 (3.3)	11 (1.4)	139 (2.1)	5 (0.7)	NA	NA
Iowa	158 (1.2)	100.0	160 (1.1)	91 (1.0)	NA	NA	131 (3.6)	3 (0.6)	140 (4.6)	3 (0.5)	NA	NA
Kentucky	147 (1.2)	100.0	151 (1.1)	86 (0.9)	NA	NA	127 (2.7)	9 (0.8)	113 (6.2)	3 (0.4)	NA	NA
Louisiana	132 (1.6)	100.0	148 (1.3)	55 (1.8)	NA	NA	113 (2.1)	37 (1.7)	104 (5.7)	6 (0.6)	NA	NA
Maine	163 (1.0)	100.0	164 (0.9)	92 (0.7)	NA	NA	*	1 (0.2)	141 (4.6)	3 (0.5)	NA	NA
Maryland	145 (1.5)	100.0	160 (1.4)	56 (2.0)	161 (3.6)	4 (0.6)	124 (1.4)	32 (2.1)	121 (4.1)	6 (0.6)	NA	NA
Massachusetts	157 (1.4)	100.0	163 (1.2)	81 (1.7)	152 (7.3)	4 (0.8)	126 (3.3)	6 (1.0)	126 (3.9)	8 (0.7)	NA	NA
Michigan	153 (1.4)	100.0	161 (1.4)	76 (2.0)	NA	NA	122 (2.4)	15 (1.9)	134 (4.9)	4 (0.4)	NA	NA
Minnesota	159 (1.3)	100.0	162 (1.2)	86 (1.9)	152 (9.7)	4 (0.9)	130 (4.4)	4 (0.8)	134 (5.3)	4 (0.6)	NA	NA
Mississippi	133 (1.4)	100.0	149 (1.2)	50 (2.1)	NA	NA	119 (1.4)	44 (1.9)	105 (3.8)	6 (0.6)	NA	NA
Missouri	151 (1.2)	100.0	158 (1.0)	78 (1.5)	NA	NA	120 (2.8)	13 (1.3)	130 (5.0)	5 (0.6)	NA	NA
Montana	162 (1.2)	100.0	166 (0.9)	83 (1.9)	NA	NA	*	1 (0.1)	147 (2.7)	5 (0.5)	139 (2.7)	10 (1.7)
Nebraska	157 (1.0)	100.0	161 (0.9)	85 (1.2)	NA	NA	130 (3.1)	5 (0.6)	134 (3.1)	7 (0.9)	NA	NA
New Mexico	141 (1.0)	100.0	159 (1.0)	38 (1.5)	NA	NA	*	3 (0.4)	130 (1.1)	51 (1.5)	126 (2.4)	8 (0.6)
New York	146 (1.6)	100.0	161 (1.4)	60 (2.6)	155 (5.4)	5 (0.9)	120 (1.9)	17 (2.0)	116 (2.7)	16 (1.2)	NA	NA
North Carolina	147 (1.2)	100.0	157 (1.1)	65 (2.0)	NA	NA	126 (1.4)	27 (1.3)	123 (3.6)	4 (0.5)	136 (4.1)	3 (1.4)
North Dakota	162 (0.8)	100.0	164 (0.8)	92 (0.8)	NA	NA	*	1 (0.2)	137 (4.5)	4 (0.4)	137 (6.9)	3 (0.7)
Oregon	155 (1.6)	100.0	158 (1.4)	82 (1.5)	157 (3.3)	4 (0.5)	*	2 (0.5)	133 (3.7)	8 (1.0)	142 (7.9)	4 (0.8)
Rhode Island	149 (0.8)	100.0	155 (0.9)	77 (0.8)	142 (3.1)	4 (0.4)	130 (2.8)	5 (0.5)	118 (1.8)	12 (0.5)	NA	NA
South Carolina	139 (1.5)	100.0	153 (1.6)	51 (1.9)	NA	NA	122 (1.6)	40 (1.9)	122 (4.1)	6 (0.6)	NA	NA
Tennessee	143 (1.8)	100.0	151 (1.7)	77 (1.5)	NA	NA	117 (3.1)	17 (1.5)	104 (6.2)	3 (0.5)	NA	NA
Texas	145 (1.8)	100.0	161 (1.2)	48 (1.9)	157 (3.6)	3 (0.5)	127 (2.4)	12 (1.3)	129 (2.7)	36 (2.1)	NA	NA
Utah	156 (0.8)	100.0	159 (0.7)	87 (1.0)	143 (3.2)	3 (0.4)	*	1 (0.2)	133 (2.9)	8 (0.7)	NA	NA
Vermont	157 (1.0)	100.0	159 (0.9)	90 (0.9)	NA	NA	*	1 (0.3)	136 (3.4)	4 (0.5)	NA	NA
Virginia	149 (1.6)	100.0	158 (1.4)	64 (2.0)	165 (3.2)	5 (0.6)	126 (2.3)	24 (1.9)	132 (4.2)	5 (0.6)	NA	NA
Washington	150 (1.3)	100.0	156 (1.1)	74 (1.9)	149 (3.3)	7 (0.9)	127 (4.2)	4 (0.7)	125 (3.5)	10 (1.1)	130 (4.3)	4 (0.6)
West Virginia	147 (0.9)	100.0	149 (0.9)	90 (0.7)	NA	NA	127 (3.2)	4 (0.5)	122 (4.3)	3 (0.3)	NA	NA
Wisconsin	160 (1.7)	100.0	165 (1.1)	83 (1.5)	NA	NA	115 (5.3)	6 (1.1)	141 (4.6)	6 (0.7)	NA	NA
Wyoming	158 (0.6)	100.0	161 (0.6)	84 (0.8)	NA	NA	*	1 (0.2)	140 (1.9)	11 (0.6)	138 (2.5)	4 (0.4)

* = sample size insufficient to permit reliable estimates; NA = not available

NOTES: Scale scores range from 0 to 300. Idaho, Illinois, Kansas, Nevada, New Hampshire, New Jersey, Ohio, Oklahoma, Pennsylvania, and South Dakota did not participate in the assessment. Standard errors are shown in parentheses. National results are based on the national assessment samples, not on aggregated state assessment program samples.

SOURCE: C. O'Sullivan, C. Reese, and J. Mazzeo, *NAEP 1996 Science Report Card for the Nation and the States* (Washington, DC: National Center for Education Statistics, 1997).

See figure 1-4.

Appendix table 1-5.
Overall mean and average percentage correct on grade 4 TIMSS science assessment, by country and content area: 1994-95

Country	Mean	All science content areas	Earth science	Life science	Physical science	Environmental issues/nature of science
All countries	**524**	59 0.1	57 0.1	64 0.1	57 0.2	51 (0.2)
Australia	562 (2.9)	66 (0.5)	61 (0.6)	72 (0.5)	63 (0.7)	63 (0.8)
Austria	565 (3.3)	66 (0.7)	62 (0.8)	72 (0.7)	64 (0.8)	54 (1.0)
Canada	549 (3.0)	64 (0.6)	62 (0.6)	68 (0.6)	61 (0.7)	56 (0.7)
Cyprus	475 (3.3)	51 (0.5)	48 (0.7)	55 (0.5)	50 (0.7)	42 (1.0)
Czech Republic	557 (3.1)	65 (0.5)	64 (0.6)	71 (0.5)	62 (0.7)	56 (0.9)
England and Wales	551 (3.3)	63 (0.6)	61 (0.6)	68 (0.6)	60 (0.8)	56 (1.0)
Greece	497 (4.1)	54 (0.8)	52 (0.9)	61 (0.9)	49 (0.9)	43 (1.2)
Hong Kong	533 (3.7)	62 (0.7)	61 (0.6)	68 (0.7)	60 (0.8)	50 (1.1)
Hungary	532 (3.4)	62 (0.6)	62 (0.7)	66 (0.6)	59 (0.8)	50 (0.9)
Iceland	505 (3.3)	55 (0.7)	55 (0.7)	60 (0.8)	52 (0.7)	47 (1.2)
Iran	416 (3.9)	40 (0.7)	38 (0.7)	44 (0.7)	40 (0.9)	26 (0.9)
Ireland	539 (3.3)	61 (0.6)	60 (0.8)	66 (0.6)	57 (0.7)	55 (0.9)
Israel	505 (3.6)	57 (0.8)	51 (0.8)	61 (0.9)	55 (0.9)	51 (1.3)
Japan	574 (1.8)	70 (0.3)	66 (0.4)	73 (0.3)	70 (0.4)	62 (0.6)
Kuwait	401 (3.1)	39 (0.5)	36 (0.6)	45 (0.6)	37 (0.5)	25 (0.7)
Latvia	512 (4.9)	56 (0.8)	57 (1.0)	60 (0.8)	54 (0.9)	46 (1.2)
Netherlands	557 (3.1)	67 (0.5)	61 (0.6)	73 (0.5)	65 (0.6)	61 (0.9)
New Zealand	531 (4.9)	60 (0.9)	57 (0.9)	66 (0.9)	57 (1.1)	54 (1.2)
Norway	530 (3.6)	60 (0.6)	60 (0.6)	67 (0.7)	55 (0.7)	53 (0.9)
Portugal	480 (4.0)	50 (0.7)	50 (0.8)	54 (0.8)	49 (0.9)	39 (1.0)
Scotland	536 (4.2)	60 (0.8)	58 (0.9)	65 (0.8)	57 (0.8)	53 (1.2)
Singapore	547 (5.0)	64 (0.8)	58 (0.8)	70 (0.8)	64 (0.8)	53 (1.1)
Slovenia	546 (3.3)	64 (0.7)	64 (0.7)	68 (0.7)	61 (0.8)	54 (0.8)
South Korea	597 (1.9)	74 (0.4)	72 (0.5)	76 (0.4)	75 (0.5)	70 (0.8)
Thailand	473 (4.9)	49 (0.9)	48 (0.9)	52 (0.8)	46 (1.0)	48 (1.4)
United States	565 (3.1)	66 (0.5)	64 (0.7)	71 (0.6)	60 (0.6)	65 (0.8)

TIMSS = Third International Mathematics and Science Study

NOTE: Standard errors are shown in parentheses.

SOURCE: M. Martin, I. Mullis, A. Beaton, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

See figure 1-5.

Appendix table 1-6.
Overall mean and average percentage correct on grade 8 TIMSS science assessment, by country and content area: 1994-95

Country	Mean	All science content areas	Earth science	Life science	Physics	Chemistry	Environmental issues/ nature of science
All countries	**516**	56 (0.1)	55 (0.1)	59 (0.1)	55 (0.1)	51 (0.2)	53 (0.2)
Australia	545 (3.9)	60 (0.7)	57 (0.8)	63 (0.8)	60 (0.7)	54 (0.9)	62 (1.0)
Austria	558 (3.7)	61 (0.7)	62 (0.8)	65 (0.7)	62 (0.7)	58 (1.1)	55 (0.9)
Belgium (Flemish)	550 (4.2)	60 (1.1)	62 (1.2)	64 (1.1)	61 (1.1)	51 (1.3)	58 (1.5)
Belgium (French)	471 (2.8)	50 (0.7)	50 (0.9)	55 (0.9)	51 (0.7)	41 (0.8)	46 (1.0)
Bulgaria	565 (5.3)	62 (1.0)	58 (1.2)	64 (1.0)	60 (1.0)	65 (1.7)	59 (1.5)
Canada	531 (2.6)	59 (0.5)	58 (0.6)	62 (0.6)	59 (0.4)	52 (0.7)	61 (0.7)
Colombia	411 (4.1)	39 (0.8)	37 (0.8)	44 (0.9)	37 (0.8)	32 (1.0)	40 (1.1)
Cyprus	463 (1.9)	47 (0.4)	46 (0.6)	49 (0.5)	46 (0.4)	45 (0.6)	46 (0.8)
Czech Republic	574 (4.3)	64 (0.8)	63 (1.2)	69 (0.8)	64 (0.7)	60 (1.2)	59 (1.1)
Denmark	478 (3.1)	51 (0.6)	49 (0.7)	56 (0.7)	53 (0.7)	41 (0.8)	47 (1.0)
England and Wales	552 (3.3)	61 (0.6)	59 (0.8)	64 (0.8)	62 (0.6)	55 (0.8)	65 (1.0)
France	498 (2.5)	54 (0.6)	55 (0.8)	56 (0.8)	54 (0.5)	47 (0.9)	53 (0.9)
Germany	431 (4.8)	58 (1.0)	57 (1.0)	63 (1.1)	57 (1.0)	54 (1.3)	51 (1.3)
Greece	497 (2.2)	52 (0.5)	49 (0.6)	54 (0.6)	53 (0.5))	51 (0.5)	51 (1.0)
Hong Kong	522 (4.7)	58 (1.0)	54 (1.0)	61 (1.0)	58 (0.9)	55 (1.0)	55 (1.3)
Hungary	554 (2.8)	61 (0.6)	60 (0.8)	65 (0.7)	60 (0.6)	60 (0.8)	53 (0.8)
Iceland	494 (4.0)	52 (0.9)	50 (1.2)	58 (1.0)	53 (0.9)	42 (0.8)	49 (1.0)
Iran	470 (2.4)	47 (0.6)	45 (0.6)	49 (0.6)	48 (0.7)	52 (0.8)	39 (1.1)
Ireland	538 (4.5)	58 (0.9)	61 (1.0)	60 (1.1)	56 (0.8)	54 (1.0)	60 (1.1)
Israel	524 (5.7)	57 (1.1)	55 (1.1)	61 (1.1)	57 (1.1)	53 (1.5)	52 (1.6)
Japan	571 (1.6)	65 (0.3)	61 (0.4)	71 (0.4)	67 (0.3)	61 (0.5)	60 (0.7)
Kuwait	430 (3.7)	43 (0.9)	43 (1.0)	45 (1.1)	43 (0.7)	40 (1.5)	39 (1.3)
Latvia	485 (2.7)	50 (0.6)	48 (0.8)	53 (0.7)	51 (0.7)	48 (0.8)	47 (1.0)
Lithuania	476 (3.4)	49 (0.7)	46 (0.9)	52 (0.9)	51 (0.7)	48 (0.9)	40 (1.0)
Netherlands	560 (5.0)	62 (1.0)	61 (1.4)	67 (1.4)	63 (0.9)	52 (0.9)	65 (1.6)
New Zealand	525 (4.4)	58 (0.8)	56 (0.9)	60 (1.0)	58 (0.7)	53 (1.1)	59 (1.2)
Norway	527 (1.9)	58 (0.4)	61 (0.6)	61 (0.5)	57 (0.4)	49 (0.6)	55 (0.8)
Portugal	480 (2.3)	50 (0.6)	50 (0.7)	53 (0.6)	48 (0.5)	50 (0.9)	45 (0.8)
Romania	486 (4.7)	50 (0.8)	49 (1.0)	55 (1.0)	49 (0.8)	46 (1.0)	42 (1.0)
Russian Federation	538 (4.0)	58 (0.8)	58 (0.8)	62 (0.7)	57 (0.9)	57 (1.3)	50 (0.8)
Scotland	517 (5.1)	55 (1.0)	52 (1.0)	57 (1.1)	57 (0.8)	51 (1.3)	57 (1.4)
Singapore	607 (5.5)	70 (1.0)	65 (1.1)	72 (1.0)	69 (0.8)	69 (1.2)	74 (1.1)
Slovak Republic	544 (3.2)	59 (0.6)	60 (0.7)	60 (0.6)	61 (0.6)	57 (0.8)	53 (0.9)
Slovenia	560 (2.5)	62 (0.5)	64 (0.7)	65 (0.6)	61 (0.6)	56 (0.9)	59 (0.9)
South Africa	326 (6.6)	27 (1.3)	26 (1.1)	27 (1.3)	27 (1.4)	26 (1.4)	26 (1.3)
South Korea	565 (1.9)	66 (0.3)	63 (0.5)	70 (0.4)	65 (0.5)	63 (0.6)	64 (0.8)
Spain	517 (1.7)	56 (0.4)	57 (0.5)	58 (0.5)	55 (0.4)	51 (0.7)	53 (0.6)
Sweden	535 (3.0)	59 (0.6)	62 (0.7)	63 (0.7)	57 (0.5)	56 (0.7)	52 (0.8)
Switzerland	522 (2.5)	56 (0.5)	58 (0.6)	59 (0.6)	58 (0.5)	50 (0.7)	51 (0.8)
Thailand	525 (3.7)	57 (0.9)	56 (1.0)	66 (0.9)	54 (0.7)	43 (1.2)	62 (1.1)
United States	534 (4.7)	58 (1.0)	58 (1.0)	63 (1.1)	56 (0.8)	53 (1.2)	61 (1.0)

TIMSS = Third International Mathematics and Science Study

NOTE: Standard errors are shown in parentheses.

SOURCE: A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996).

See figure 1-6.

Appendix table 1-7.
Average percentage correct on TIMSS science assessment, by country, grade, and sex: 1994-95

Country	Grade 4		Grade 8	
	Boys	Girls	Boys	Girls
Australia	67 (0.6)[a]	65 (0.6)	61 (1.0)	59 (0.8)
Austria	67 (0.9)[a]	64 (0.7)	63 (0.8)	60 (0.8)
Belgium (Flemish)	NP	NP	62 (1.7)	59 (1.5)
Belgium (French)	NP	NP	52 (1.0)	49 (0.7)
Canada	64 (0.7)	63 (0.6)	60 (0.6)	58 (0.6)
Colombia	NP	NP	40 (1.4)	37 (0.8)
Cyprus	51 (0.7)	50 (0.6)	46 (0.4)	47 (0.6)
Czech Republic	67 (0.6)[a]	64 (0.7)	67 (0.8)[a]	61 (1.1)
Denmark	NP	NP	54 (0.6)[a]	48 (0.8)
England and Wales	64 (0.8)	63 (0.6)	63 (1.0)	60 (0.7)
France	NP	NP	55 (0.7)[a]	52 (0.7)
Germany	NP	NP	59 (1.2)	57 (1.0)
Greece	54 (1.0)	53 (1.0)	54 (0.6)	50 (0.6)
Hong Kong	63 (0.8)[a]	61 (0.7)	60 (1.1)	55 (1.1)
Hungary	63 (0.8)[a]	60 (0.7)	63 (0.7)	59 (0.7)
Iceland	56 (0.8)[a]	54 (0.8)	53 (1.2)	51 (0.9)
Iran	41 (1.0)	39 (0.9)	49 (0.8)	45 (0.8)
Ireland	61 (0.7)	61 (0.8)	60 (1.3)	57 (1.0)
Israel	58 (1.1)	57 (0.8)	61 (1.2)	54 (1.1)
Japan	70 (0.4)[a]	69 (0.4)	67 (0.5)	64 (0.4)
Latvia	55 (0.9)	57 (1.0)	52 (0.8)	48 (0.6)
Lithuania	NP	NP	51 (0.8)	47 (0.8)
Netherlands	70 (0.7)[a]	65 (0.7)	64 (1.2)	60 (1.1)
New Zealand	59 (1.2)	61 (0.9)	60 (1.0)	56 (1.0)
Norway	61 (0.8)	60 (0.7)	59 (0.6)	56 (0.4)
Portugal	50 (0.9)	50 (0.8)	52 (0.7)	48 (0.6)
Romania	NP	NP	51 (0.9)	49 (0.9)
Russian Federation	NP	NP	60 (0.9)	57 (0.7)
Scotland	61 (0.9)	60 (0.8)	57 (1.2)	53 (0.9)
Singapore	65 (0.9)	64 (1.0)	71 (1.2)	69 (1.1)
Slovak Republic	NP	NP	62 (0.6)	57 (0.7)
Slovenia	64 (0.7)	63 (0.8)	64 (0.6)	59 (0.7)
South Africa	NP	NP	28 (1.8)	25 (1.2)
South Korea	75 (0.5)[a]	73 (0.5)	67 (0.5)	64 (0.5)
Spain	NP	NP	58 (0.5)	54 (0.5)
Sweden	NP	NP	60 (0.6)	57 (0.6)
Switzerland	NP	NP	58 (0.6)	54 (0.5)
Thailand	49 (1.2)	49 (0.8)	57 (0.9)	58 (1.0)
United States	67 (0.6)[a]	65 (0.6)	59 (1.0)	57 (1.0)

NP = did not participate in grade 4 assessment; TIMSS = Third International Mathematics and Science Study.

NOTE: Standard errors are shown in parentheses.

[a]Difference between the sexes is statistically significant at the 0.05 level, adjusted for multiple comparisons.

SOURCES: A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and M. Martin, I. Mullis, A. Beaton, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

Appendix table 1-8.
Proportion of high school graduates earning credits in mathematics courses, by sex: 1982, 1987, 1990, and 1994
(Percentages)

Year of graduation and sex	Any mathematics	Basic math	General math	Applied math	Prealgebra	Algebra 1	Algebra 2	Geometry	Calculus	AP calculus	Advanced math—other
1982 graduates											
All	98.6 (0.1)	6.2 (0.5)	29.5 (1.1)	8.8 (0.4)	18.0 (0.8)	54.3 (0.9)	35.6 (0.8)	45.8 (0.8)	4.7 (0.4)	1.5 (0.3)	13.2 (0.8)
Male	98.9 (0.2)	7.4 (0.5)	32.3 (1.2)	10.1 (0.6)	17.5 (1.2)	52.7 (1.0)	35.9 (1.1)	45.4 (0.8)	5.2 (0.5)	1.6 (0.3)	14.8 (1.1)
Female	98.4 (0.2)	5.1 (0.7)	26.9 (1.2)	7.7 (0.6)	18.5 (0.8)	55.8 (1.2)	35.3 (0.9)	46.2 (1.2)	4.2 (0.4)	1.4 (0.3)	11.7 (0.7)
1987 graduates											
All	99.8 (0.1)	8.5 (0.7)	21.1 (1.3)	14.4 (1.0)	18.2 (1.2)	64.1 (1.1)	46.1 (1.6)	59.8 (1.0)	6.0 (0.4)	3.3 (0.4)	20.5 (1.1)
Male	99.8 (0.1)	9.2 (0.8)	23.1 (1.5)	15.3 (1.2)	17.9 (1.2)	62.3 (1.2)	44.8 (1.8)	58.9 (1.2)	7.4 (0.5)	3.8 (0.5)	22.2 (1.3)
Female	99.7 (0.1)	7.8 (0.8)	19.1 (1.1)	13.6 (1.0)	18.4 (1.2)	65.8 (1.1)	47.5 (1.7)	60.5 (1.0)	4.6 (0.4)	2.7 (0.4)	19.0 (1.2)
1990 graduates											
All	99.9 (0.0)	8.0 (0.7)	19.6 (1.5)	16.1 (1.2)	23.3 (1.4)	64.0 (1.6)	49.6 (1.3)	63.2 (1.4)	6.5 (0.5)	4.1 (0.4)	20.3 (1.2)
Male	99.9 (0.1)	8.9 (0.8)	21.6 (1.7)	17.0 (1.3)	23.5 (1.5)	61.4 (1.6)	47.7 (1.4)	62.1 (1.6)	7.5 (0.6)	5.0 (0.6)	21.4 (1.4)
Female	99.9 (0.1)	7.1 (0.7)	17.8 (1.4)	15.2 (1.2)	23.0 (1.4)	66.4 (1.8)	51.5 (1.5)	64.3 (1.4)	5.6 (0.4)	3.4 (0.4)	19.3 (1.1)
1994 graduates											
All	99.9 (0.0)	4.8 (0.5)	16.1 (1.0)	13.7 (1.0)	23.2 (1.0)	66.6 (1.4)	57.9 (1.5)	70.1 (1.4)	9.2 (0.5)	6.9 (0.5)	24.7 (0.8)
Male	99.9 (0.0)	5.7 (0.6)	18.2 (1.1)	14.8 (1.1)	24.4 (1.1)	64.7 (1.5)	54.5 (1.5)	67.9 (1.5)	9.4 (0.6)	7.1 (0.6)	24.0 (1.0)
Female	99.9 (0.0)	3.9 (0.4)	14.2 (1.1)	12.7 (0.9)	22.1 (1.1)	68.4 (1.5)	61.1 (1.6)	72.2 (1.4)	9.1 (0.6)	6.8 (0.5)	25.3 (1.0)

AP = advanced placement

NOTE: Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates,* NCES 97-260 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-7.

Appendix table 1-9.
Proportion of high school graduates earning credits in mathematics courses, by race/ethnicity: 1982, 1987, 1990, and 1994
(Percentage)

Year of graduation and race/ethnicity	Any mathematics	Basic math	General math	Applied math	Prealgebra	Algebra 1	Algebra 2	Geometry	Calculus	AP calculus	Advanced math–other
1982 graduates											
White	98.8 (0.2)	4.5 (0.4)	25.0 (1.1)	7.8 (0.6)	17.3 (0.9)	58.2 (1.0)	39.5 (0.9)	51.3 (1.0)	5. 5 (0.4)	1.8 (0.3)	4.2 (0.6)
Asian/Pacific Islander	100.0 (0.0)	4.9 (1.6)	17.1 (3.5)	9.6 (2.1)	15.5 (3.4)	55.5 (5.4)	55.8 (4.2)	64.9 (4.7)	12.8 (2.7)	5.5 (1.7)	5.6 (1.8)
Black	99.3 (0.3)	13.6 (2.1)	46.6 (3.1)	13.3 (1.5)	22.3 (2.1)	43.1 (1.8)	24.2 (2.0)	29.3 (1.8)	1.3 (0.4)	0.3 (0.1)	2.7 (0.5)
Hispanic	97.2 (0.5)	9.4 (1.2)	43.2 (2.1)	11.2 (1.2)	18.5 (1.3)	42.6 (1.5)	20.1 (1.4)	25.7 (1.4)	1.7 (0.3)	0.4 (0.1)	3.2 (0.4)
Native American	99.6 (0.5)	7.4 (4.2)	41.4 (5.2)	7.3 (3.3)	22.1 (5.8)	33.6 (6.5)	19.1 (4.5)	33.5 (7.2)	4.0 (2.2)	0.1 (0.1)	5.5 (3.0)
1987 graduates											
White	99.8 (0.1)	6.5 (0.6)	18.1 (1.3)	14.3 (1.3)	16.5 (1.3)	66.2 (1.3)	50.7 (1.6)	63.1 (1.2)	5.7 (0.4)	2.7 (0.3)	4.1 (1.2)
Asian/Pacific Islander	100.0 (0.0)	4.9 (1.3)	14.2 (3.1)	9.7 (1.3)	13.4 (2.8)	63.7 (2.5)	66.1 (4.7)	81.4 (2.5)	29.6 (4.1)	23.7 (4.7)	5.1 (1.4)
Black	99.8 (0.1)	17.1 (2.7)	37.9 (2.7)	18.4 (1.8)	23.2 (1.7)	54.6 (1.3)	30.0 (1.7)	42.3 (2.0)	2.2 (0.3)	1.4 (0.3)	2.1 (0.6)
Hispanic	99.9 (0.1)	21.0 (1.9)	29.3 (3.5)	15.6 (1.8)	27.9 (2.1)	53.6 (1.8)	27.6 (2.0)	39.7 (1.7)	3.6 (0.7)	2.6 (0.6)	2.1 (0.7)
Native American	99.3 (0.8)	7.2 (1.6)	37.2 (4.7)	29.9 (4.4)	40.0 (7.6)	61.4 (2.2)	23.8 (2.6)	43.5 (4.0)	0.4 (0.4)	0.4 (0.4)	4.7 (0.9)
1990 graduates											
White	99.9 (0.1)	5.8 (0.6)	17.5 (1.8)	15.0 (1.1)	21.8 (1.6)	64.1 (1.9)	53.1 (1.6)	65.5 (1.5)	6.9 (0.5)	4.2 (0.5)	5.0 (1.4)
Asian/Pacific Islander	99.9 (0.2)	8.4 (2.6)	14.7 (1.8)	13.0 (3.5)	16.4 (2.7)	63.3 (3.1)	60.9 (5.0)	70.7 (2.8)	18.5 (3.3)	15.6 (2.8)	2.6 (1.1)
Black	99.9 (0.1)	14.3 (1.9)	28.4 (2.3)	21.3 (2.7)	26.7 (2.3)	64.7 (2.4)	40.6 (2.8)	55.8 (2.6)	2.7 (0.5)	1.2 (0.3)	1.9 (1.0)
Hispanic	99.8 (0.1)	15.3 (2.7)	28.6 (3.0)	19.1 (3.7)	35.3 (3.2)	64.3 (2.7)	35.1 (2.6)	53.2 (2.8)	3.8 (0.7)	3.0 (0.6)	1.6 (0.7)
Native American	100.0 (0.0)	11.1 (3.0)	28.9 (7.0)	20.7 (4.6)	33.8 (6.5)	60.7 (8.5)	47.1 (5.4)	54.8 (3.1)	4.1 (2.7)	2.9 (2.5)	2.9 (1.2)
1994 graduates											
White	99.9 (0.0)	3.7 (0.5)	14.4 (1.2)	13.2 (1.2)	22.2 (1.1)	67.7 (1.6)	61.6 (1.6)	72.4 (1.6)	9.5 (0.6)	7.3 (0.6)	4.6 (1.0)
Asian/Pacific Islander	100.0 (0.0)	4.0 (0.9)	17.5 (2.8)	11.4 (3.1)	18.0 (3.5)	63.0 (2.1)	66.2 (5.0)	75.7 (3.8)	23.6 (3.2)	21.1 (2.9)	5.5 (1.6)
Black	100.0 (0.0)	7.3 (1.3)	27.0 (2.9)	17.5 (2.0)	27.3 (2.5)	65.0 (2.8)	44.0 (2.4)	58.2 (3.1)	3.8 (0.6)	2.0 (0.4)	1.5 (0.3)
Hispanic	99.9 (0.1)	8.4 (1.1)	16.2 (1.8)	16.4 (1.7)	34.0 (2.9)	69.9 (1.3)	49.6 (1.8)	68.8 (1.7)	6.0 (0.5)	4.6 (0.5)	3.0 (0.7)
Native American	100.0 (0.0)	5.4 (1.5)	19.1 (3.4)	13.8 (2.9)	39.5 (8.2)	68.9 (4.9)	42.2 (6.8)	60.0 (4.4)	3.8 (1.2)	2.2 (1.4)	2.9 (1.6)

AP = advanced placement

NOTE: Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, *The 1994 High School Transcript Study Tabulations: Comparative Data on Credits Earned and Demographics for 1994, 1990, 1987, and 1982 High School Graduates,* NCES 97-260 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-8.

Appendix table 1-10.
Student achievement levels on the National Assessment of Educational Progress in mathematics, by grade, sex, race/ethnicity, and region: 1990, 1992, and 1996

Student grade, sex race/ethnicity, and region	Percentage at or above level 2						Percentage at or above level 3					
	1990		1992		1996		1990		1992		1996	
Grade 4												
All students	50	(1.4)	59	(1.0)	64[a,b]	(1.2)	13	(1.2)	18	(1.0)	21[a,b]	(0.9)
Male	51	(1.7)	60	(1.1)	65	(1.6)	13	(1.5)	19	(1.1)	24	(1.1)
Female	49	(1.9)	57	(1.6)	63	(1.6)	12	(1.3)	16	(1.3)	19	(1.1)
White	59	(1.7)	70	(1.2)	76	(1.4)	16	(1.6)	23	(1.4)	28	(1.2)
Asian/Pacific Islander	65	(5.4)	75	(3.2)	73	(5.0)	23	(5.6)	30	(4.5)	26	(5.3)
Black	19	(2.4)	23	(1.8)	32	(3.2)	1	(0.6)	3	(0.7)	5	(1.4)
Hispanic	31	(2.6)	35	(2.1)	41	(2.4)	5	(1.1)	5	(1.1)	8	(1.0)
Native American	44	(8.3)	43	(4.8)	52	(2.7)	5	(2.6)	10	(3.6)	8	(2.5)
Northeast	51	(4.2)	63	(2.7)	70	(2.9)	14	(3.4)	23	(2.5)	26	(1.6)
Southeast	40	(2.9)	48	(2.2)	55	(2.9)	8	(1.6)	11	(1.2)	16	(2.4)
Central	55	(2.7)	66	(2.8)	75	(2.6)	14	(1.6)	21	(1.7)	27	(2.1)
West	54	(3.2)	59	(2.1)	58	(2.8)	15	(2.3)	17	(2.2)	18	(1.7)
Grade 8												
All students	52	(1.4)	58	(1.1)	62[a,b]	(1.1)	15	(1.1)	21	(1.0)	24[a]	(1.1)
Male	52	(1.9)	57	(1.4)	62	(1.7)	17	(1.5)	21	(1.3)	25	(1.5)
Female	52	(1.5)	58	(1.4)	63	(1.3)	14	(1.1)	21	(1.2)	23	(1.2)
White	61	(1.6)	69	(1.3)	74	(1.3)	19	(1.3)	27	(1.2)	31	(1.4)
Asian/Pacific Islander	71	(5.8)	76	(4.6)	–	–	32	(5.8)	40	(6.8)	–	–
Black	22	(2.4)	21	(2.0)	28	(2.8)	5	(1.0)	2	(0.7)	4	(0.9)
Hispanic	32	(3.1)	34	(1.9)	39	(2.5)	5	(1.3)	6	(0.8)	9	(1.6)
Native American	33	(10.2)	39	(5.8)	51	(6.2)	6	–	7	(3.1)	13	(5.0)
Northeast	59	(4.0)	57	(3.5)	67	(3.1)	20	(2.7)	23	(2.5)	27	(3.7)
Southeast	43	(2.6)	50	(1.8)	56	(3.2)	12	(2.1)	15	(1.2)	18	(1.8)
Central	57	(2.5)	66	(2.7)	69	(3.4)	15	(1.3)	25	(2.4)	29	(2.5)
West	50	(2.6)	58	(2.5)	59	(2.2)	15	(2.1)	21	(1.9)	22	(1.9)
Grade 12												
All students	58	(1.6)	64	(1.1)	69[a,b]	(1.3)	12	(0.9)	15	(0.8)	16[a]	(1.1)
Male	60	(1.8)	65	(1.3)	70	(1.4)	15	(1.4)	17	(1.0)	18	(1.3)
Female	56	(1.8)	63	(1.3)	69	(1.5)	9	(0.9)	13	(1.0)	14	(1.2)
White	66	(1.8)	72	(1.3)	79	(1.3)	14	(1.1)	18	(0.9)	20	(1.3)
Asian/Pacific Islander	75	(5.8)	81	(4.3)	81	(4.3)	23	(7.1)	30	(5.6)	33	(6.3)
Black	27	(2.7)	34	(2.6)	38	(3.3)	2	(0.8)	2	(0.5)	4	(1.0)
Hispanic	36	(3.9)	45	(2.0)	50	(3.6)	4	(1.1)	6	(0.9)	6	(1.1)
Native American	–	–	–	–	34	(16.0)	–	–	–	–	3	†
Northeast	64	(3.1)	66	(2.0)	72	(2.9)	16	(1.9)	18	(1.5)	21	(2.1)
Southeast	47	(3.9)	55	(2.1)	58	(2.6)	6	(0.8)	10	(1.1)	11	(1.5)
Central	62	(3.5)	70	(2.6)	77	(3.6)	13	(1.7)	17	(1.4)	20	(2.8)
West	57	(3.2)	64	(1.7)	69	(2.4)	12	(2.5)	14	(1.6)	14	(1.7)

– = results omitted by source; † = standard error estimate cannot be accurately determined

NOTES: At grade 4, level 2 performance corresponds to average scale scores of 214-248 and level 3 to scores of 249-281. At grade 8, level 2 corresponds to scores of 262-298 and level 3 to scores of 299-332. At grade 12, level 2 corresponds to scores of 288-335 and level 3 to scores of 336-366. Significance levels are reported here only by grade. Race/ethnicity data are based only on those students who indicated their race/ethnicity. Standard errors are shown in parentheses.

[a]Statistically significant difference from 1990.

[b]Statistically significant difference from 1992.

SOURCE: C. Reese, K. Miller, J. Mazzeo, and J. Dossey, *NAEP 1996 Mathematics Report Card for the Nation and the States* (Washington, DC: National Center for Education Statistics, 1997).

See figure 1-10.

Appendix table 1-11.
Grade 8 student achievement levels on the National Assessment of Educational Progress in mathematics, by state and race/ethnicity: 1990, 1992, and 1996

State	Percentage of all students: At or above level 3		Percentage of all students: At or above level 2		Percentage of white students: At or above level 3		Percentage of white students: At or above level 2		Percentage of black students: At or above level 3		Percentage of black students: At or above level 2		Percentage of Hispanic students: At or above level 3		Percentage of Hispanic students: At or above level 2	
1990																
Nation	19	1.2	57	1.4	24	1.6	67	1.6	6	1.3	27	3.1	6	1.6	36	3.1
Alabama	12	0.8	47	1.6	16	1.1	59	1.6	3	0.7	23	2.3	4	1.8	20	4.4
Arizona	16	1.1	55	1.8	23	1.5	69	1.6	6	3.2	35	5.3	5	1.0	34	2.4
Arkansas	12	1.0	51	1.3	16	1.2	63	1.6	1	0.6	19	1.1	4	2.8	21	6.3
California	16	1.3	51	1.6	24	2.1	68	1.9	3	1.8	23	3.1	4	0.9	30	2.2
Colorado	22	1.0	64	1.1	27	1.4	73	1.2	2	1.7	28	6.8	6	1.5	40	2.4
Connecticut	26	1.1	66	1.3	31	1.3	75	1.2	5	2.0	33	3.6	5	2.2	30	3.3
Delaware	19	0.9	55	1.3	24	1.2	63	2.0	6	1.2	34	2.2	8	3.5	35	6.7
Florida	15	0.1	49	1.4	19	1.5	61	1.9	3	0.9	22	2.0	10	1.5	37	3.1
Georgia	17	1.3	53	1.5	25	1.8	68	1.6	5	0.8	30	2.0	5	2.2	26	3.7
Hawaii	14	0.8	45	1.0	20	2.7	58	2.6	*		*		5	1.6	23	3.5
Idaho	23	1.4	70	1.2	25	1.6	73	1.3	*		*		7	2.7	42	4.9
Indiana	21	1.2	63	1.6	23	1.2	68	1.5	3	1.4	31	4.5	10	2.8	33	4.7
Iowa	30	1.5	76	1.1	32	1.7	78	1.1	*		*		11	3.6	48	5.7
Kentucky	14	0.9	51	1.8	15	1.1	54	2.0	3	1.5	31	3.5	1	1.2	18	4.6
Louisiana	8	1.0	39	1.7	12	1.6	54	2.0	2	0.5	18	1.9	3	1.6	19	4.1
Maryland	20	1.2	56	1.7	27	1.6	70	1.9	5	1.1	29	2.6	8	1.8	30	3.4
Michigan	20	1.4	60	1.4	24	1.5	69	1.4	1	0.9	18	1.8	6	2.7	35	4.2
Minnesota	29	1.2	74	1.3	30	1.3	77	1.2	10	3.4	30	6.0	6	2.6	33	7.4
Nebraska	30	1.4	74	1.1	33	1.5	79	1.2	4	3.4	25	5.2	6	2.9	49	6.8
New Hampshire	25	1.2	71	1.6	26	1.2	72	1.6	*		*		11	4.6	48	7.4
New Jersey	25	1.3	65	1.6	31	1.9	77	1.7	6	1.4	31	2.6	7	1.7	33	2.7
New Mexico	13	0.9	51	1.3	23	2.0	72	1.7	*		*		5	0.8	38	1.8
New York	19	1.0	57	1.7	26	1.5	72	1.3	4	1.1	26	4.1	6	1.9	30	4.3
North Carolina	11	0.8	44	1.4	16	1.2	58	1.9	3	0.9	23	1.9	1	1.0	12	3.9
North Dakota	34	2.0	81	1.6	36	2.0	85	1.3	*		*		8	4.5	42	7.5
Ohio	19	1.2	60	1.4	21	1.2	66	1.4	2	1.2	22	3.2	6	3.0	28	7.2
Oklahoma	17	1.3	59	1.6	20	1.5	66	1.8	2	1.1	25	3.0	6	2.5	40	5.8
Pennsylvania	21	1.5	63	2.0	25	1.3	70	1.3	3	2.5	29	4.6	4	2.0	20	4.3
Rhode Island	18	1.0	55	0.9	21	1.2	61	1.0	2	1.4	20	4.2	2	0.9	21	3.7
Texas	16	1.0	52	1.7	26	1.8	71	1.7	3	1.0	23	2.6	6	0.9	36	2.1
Virginia	21	1.6	58	1.6	25	2.0	67	1.7	5	1.1	32	2.5	10	3.7	34	5.0
West Virginia	12	0.9	49	1.2	13	0.9	51	1.2	4	3.3	23	6.1	5	2.7	24	5.3
Wisconsin	29	1.5	72	1.7	32	1.6	79	1.5	4	2.1	24	6.1	8	2.7	42	5.7
Wyoming	24	1.0	71	1.3	26	1.1	74	1.3	*		*		10	2.7	50	3.5

Appendix table 1-11.
Grade 8 student achievement levels on the National Assessment of Educational Progress in mathematics, by state and race/ethnicity: 1990, 1992, and 1996

State	Percentage of all students: At or above level 3		Percentage of all students: At or above level 2		Percentage of white students: At or above level 3		Percentage of white students: At or above level 2		Percentage of black students: At or above level 3		Percentage of black students: At or above level 2		Percentage of Hispanic students: At or above level 3		Percentage of Hispanic students: At or above level 2	
							1992									
Nation	23	1.1	61	1.2	30	1.4	73	1.4	3	0.8	26	2.2	7	0.9	37	2.1
Alabama	12	1.1	44	2.0	19	1.5	59	2.1	1	0.4	19	2.1	1	1.4	15	4.6
Arizona	19	1.4	61	1.8	26	1.8	74	1.7	6	2.9	42	7.8	7	1.4	40	3.6
Arkansas	13	1.0	50	1.7	17	1.1	61	1.8	2	0.9	18	2.2	5	1.6	23	4.7
California	20	1.4	55	2.0	30	2.2	73	2.1	3	1.4	26	5.0	6	1.1	34	2.2
Colorado	26	1.3	69	1.3	31	1.5	77	1.2	6	2.8	33	5.8	10	1.3	48	2.6
Connecticut	30	1.1	69	1.4	38	1.3	81	1.2	5	1.3	32	4.8	6	1.4	32	3.1
Delaware	18	1.1	57	1.2	25	1.5	69	1.5	4	1.2	31	2.7	5	2.8	33	3.7
Florida	18	1.3	55	1.9	26	1.8	70	1.8	4	0.9	27	2.7	7	1.4	40	4.3
Georgia	16	1.0	53	1.5	23	1.6	69	1.8	4	0.9	29	2.1	5	2.7	27	8.6
Hawaii	16	0.8	51	1.2	22	2.4	62	2.4	*		*		5	1.4	34	3.5
Idaho	27	1.2	73	1.1	29	1.2	76	1.1	*		*		9	2.2	46	4.5
Indiana	24	1.3	66	1.5	27	1.5	70	1.6	5	1.9	34	3.9	11	3.8	46	8.0
Iowa	37	1.4	81	1.2	39	1.4	83	1.3	*		*		15	3.4	53	5.7
Kentucky	17	1.1	57	1.3	18	1.2	61	1.3	5	1.7	30	3.9	5	3.0	26	6.2
Louisiana	10	1.2	42	2.0	16	1.7	59	2.3	2	0.6	22	2.2	2	1.5	21	3.8
Maine	31	1.9	77	1.3	32	2.0	79	1.2	*		*		*		*	
Maryland	24	1.3	59	1.5	34	1.8	74	1.7	4	1.4	30	2.5	6	2.1	33	4.1
Massachusetts	28	1.4	68	1.5	31	1.6	74	1.6	8	2.7	35	5.3	5	1.8	30	4.5
Michigan	23	1.7	63	1.6	29	2.0	75	1.6	2	0.7	22	2.8	11	3.5	44	5.7
Minnesota	37	1.2	79	1.2	39	1.2	81	1.2	*		*		8	2.8	48	6.7
Mississippi	8	0.8	38	1.5	16	1.4	59	1.9	1	0.5	19	1.4	1	0.9	12	3.2
Missouri	24	1.3	68	1.6	27	1.4	75	1.4	4	1.3	30	3.1	11	3.6	38	6.4
Nebraska	32	1.9	75	1.2	35	2.0	81	1.2	2	1.3	25	8.1	12	3.4	47	5.9
New Hampshire	30	1.5	77	1.0	31	1.4	78	1.0	*		*		13	5.6	56	7.1
New Jersey	28	1.4	67	1.8	36	2.0	82	1.3	5	1.4	32	3.8	7	1.9	41	4.3
New Mexico	14	1.0	54	1.4	23	1.8	72	1.6	*		*		6	0.8	40	1.8
New York	24	1.6	62	2.3	32	2.0	78	1.4	4	1.6	25	5.2	8	2.1	38	4.9
North Carolina	15	1.0	53	1.5	20	1.2	63	1.6	4	0.8	29	2.8	7	4.2	28	6.1
North Dakota	36	1.7	82	1.3	37	1.7	84	1.3	*		*		*		*	
Ohio	22	1.4	64	2.0	26	1.6	72	2.0	4	1.0	24	3.0	7	2.6	38	5.6
Oklahoma	21	1.2	65	2.0	24	1.2	72	2.2	3	1.1	28	5.2	11	3.6	46	5.4
Pennsylvania	26	1.5	67	1.7	29	1.4	73	1.4	6	4.1	28	5.0	8	3.9	38	5.6
Rhode Island	20	1.3	62	1.2	23	1.5	69	1.4	4	3.3	32	4.9	3	1.4	22	4.3
South Carolina	18	1.1	53	1.2	27	1.7	70	1.2	4	0.9	30	1.6	2	1.2	21	4.0
Tennessee	15	1.2	53	1.8	18	1.4	62	1.5	3	1.0	21	3.1	2	1.8	23	5.8
Texas	21	1.4	58	1.5	32	2.2	76	1.8	7	1.5	33	3.0	8	1.0	40	1.9
Utah	27	1.1	72	1.3	29	1.2	75	1.3	*		*		9	2.1	47	3.9
Virginia	23	1.2	62	1.6	28	1.4	71	1.6	6	1.3	35	3.3	13	4.1	50	4.4
West Virginia	13	0.9	53	1.5	13	1.0	55	1.5	5	2.4	31	6.5	2	1.5	19	6.3
Wisconsin	32	1.4	76	1.9	36	1.4	81	1.5	10	5.2	38	9.2	6	2.2	43	6.7
Wyoming	26	1.0	73	1.3	28	1.1	77	1.1	*		*		11	2.5	53	4.1

Appendix table 1-11.
Grade 8 student achievement levels on the National Assessment of Educational Progress in mathematics, by state and race/ethnicity: 1990, 1992, and 1996

State	Percentage of all students: At or above level 3	Percentage of all students: At or above level 2	Percentage of white students: At or above level 3	Percentage of white students: At or above level 2	Percentage of black students: At or above level 3	Percentage of black students: At or above level 2	Percentage of Hispanic students: At or above level 3	Percentage of Hispanic students: At or above level 2
				1996				
Nation	23 (1.1)	61 (1.5)	30 (1.5)	73 (1.5)	4 (0.9)	27 (2.9)	8 (1.6)	37 (2.5)
Alabama	12 (1.8)	45 (2.6)	18 (2.7)	63 (3.2)	1 (0.5)	17 (2.0)	6 (2.6)	23 (5.0)
Alaska	30 (1.6)	68 (2.3)	37 (1.9)	77 (2.2)	*	*	13 (4.9)	44 (8.1)
Arizona	18 (1.2)	57 (1.9)	25 (1.7)	72 (1.8)	5 (2.7)	34 (6.2)	6 (1.1)	35 (2.6)
Arkansas	13 (1.0)	52 (1.8)	17 (1.3)	62 (1.8)	2 (0.9)	17 (2.9)	*	*
California	17 (1.5)	51 (2.1)	28 (2.3)	71 (2.0)	2 †	25 (4.4)	5 (0.8)	32 (2.4)
Colorado	25 (1.3)	67 (1.3)	31 (1.4)	76 (1.2)	8 (3.6)	40 (4.8)	10 (1.5)	43 (3.1)
Connecticut	31 (1.5)	70 (1.4)	37 (1.6)	80 (1.4)	4 (1.5)	29 (3.8)	8 (1.9)	37 (2.5)
Delaware	19 (1.0)	55 (1.3)	24 (1.4)	66 (1.8)	4 (1.2)	27 (4.2)	8 (3.2)	36 (5.5)
Florida	17 (1.3)	54 (2.1)	26 (1.9)	72 (2.3)	3 (1.1)	21 (2.2)	8 (1.6)	39 (2.6)
Georgia	16 (1.8)	51 (2.0)	24 (2.6)	68 (2.1)	3 (0.8)	24 (1.7)	10 (4.2)	36 (6.6)
Hawaii	16 (0.9)	51 (1.5)	22 (3.5)	62 (3.3)	*	*	7 (1.6)	33 (3.1)
Indiana	24 (1.7)	68 (2.0)	27 (1.8)	74 (1.9)	2 (1.0)	31 (4.4)	10 (3.1)	44 (7.6)
Iowa	31 (1.8)	78 (1.4)	33 (1.8)	79 (1.4)	11 (4.1)	38 (6.9)	12 (5.0)	57 (6.3)
Kentucky	16 (1.2)	56 (1.6)	17 (1.3)	60 (1.6)	2 †	31 (4.0)	*	*
Louisiana	7 (1.1)	38 (2.0)	12 (1.6)	56 (1.8)	2 (0.5)	17 (2.0)	2 †	24 (4.6)
Maine	31 (1.7)	77 (1.5)	32 (1.7)	78 (1.6)	*	*	*	*
Maryland	24 (2.3)	57 (2.2)	34 (2.8)	75 (1.9)	4 (1.0)	26 (2.2)	14 (3.7)	36 (5.2)
Massachusetts	28 (1.8)	68 (2.3)	32 (2.1)	75 (2.0)	8 (3.3)	35 (5.4)	5 (2.2)	26 (5.5)
Michigan	28 (1.8)	67 (2.1)	34 (1.9)	77 (1.7)	5 (2.0)	29 (4.6)	12 (4.6)	37 (5.2)
Minnesota	34 (1.8)	75 (1.5)	37 (1.9)	79 (1.4)	6 (3.5)	33 (7.1)	19 (6.4)	49 (7.7)
Mississippi	7 (0.8)	36 (1.3)	13 (1.6)	56 (1.9)	1 (0.3)	16 (1.3)	3 (1.7)	11 (2.9)
Missouri	22 (1.4)	64 (2.0)	25 (1.6)	70 (2.1)	4 (1.7)	26 (4.7)	10 (4.3)	48 (8.2)
Montana	32 (1.5)	75 (1.7)	36 (1.5)	79 (1.5)	*	*	12 (4.1)	52 (6.5)
Nebraska	31 (1.5)	76 (1.1)	34 (1.6)	80 (1.1)	7 (3.3)	40 (4.5)	7 (2.8)	44 (5.6)
New Mexico	14 (1.1)	51 (1.6)	28 (1.8)	72 (2.0)	*	*	6 (1.2)	38 (1.9)
New York	22 (1.5)	61 (2.0)	31 (1.8)	77 (1.8)	4 (1.8)	32 (4.0)	6 (1.4)	30 (3.6)
North Carolina	20 (1.3)	56 (1.8)	28 (1.6)	69 (1.8)	5 (1.0)	31 (2.5)	7 (2.8)	41 (5.6)
North Dakota	33 (1.5)	77 (1.2)	35 (1.5)	80 (1.1)	*	*	13 (4.9)	55 (8.5)
Oregon	26 (1.6)	67 (1.7)	29 (1.7)	70 (1.6)	*	*	13 (3.7)	46 (5.3)
Rhode Island	20 (1.3)	60 (1.6)	24 (1.5)	67 (1.6)	7 (3.6)	31 (5.0)	4 (1.4)	27 (5.8)
South Carolina	14 (1.2)	48 (1.7)	22 (2.1)	65 (2.3)	3 (0.6)	28 (1.9)	4 (2.9)	26 (5.6)
Tennessee	15 (1.3)	53 (1.8)	18 (1.5)	62 (2.1)	3 (1.2)	19 (2.9)	6 (2.7)	32 (8.0)
Texas	21 (1.5)	59 (1.8)	33 (1.8)	78 (1.7)	5 (1.7)	31 (4.3)	8 (1.4)	42 (2.6)
Utah	24 (1.3)	70 (1.5)	27 (1.3)	73 (1.3)	*	*	6 (1.8)	45 (4.4)
Vermont	27 (1.4)	72 (1.7)	29 (1.4)	74 (1.6)	*	*	*	*
Virginia	21 (1.2)	58 (2.0)	28 (1.4)	71 (1.8)	4 (0.8)	26 (3.3)	9 (3.4)	44 (7.3)
Washington	26 (1.2)	67 (1.6)	30 (1.4)	74 (1.5)	5 (2.7)	27 (5.4)	10 (2.8)	36 (4.5)
West Virginia	14 (0.9)	54 (1.6)	15 (0.9)	56 (1.7)	2 †	29 (6.3)	7 (4.2)	30 (6.6)
Wisconsin	32 (2.0)	75 (2.0)	36 (2.0)	82 (1.7)	2 †	19 (4.6)	10 (2.9)	45 (6.1)
Wyoming	22 (1.0)	68 (1.2)	24 (1.0)	72 (1.2)	*	*	8 (1.6)	45 (5.0)

* = sample size insufficient to permit reliable estimates; † = standard error estimate cannot be accurately determined

NOTES: At grade 8, level 2 corresponds to scores of 262-298 and level 3 to scores of 299-332. At grade 12, level 2 corresponds to scores of 288-335 and level 3 to scores of 336-366. Idaho, Illinois, Kansas, Nevada, New Hampshire, New Jersey, Ohio, Oklahoma, Pennsylvania, and South Dakota did not participate in the assessment. Standard errors are shown in parentheses. National results are based on the national assessment samples, not on aggregated state assessment program samples.

SOURCE: C. Reese, K. Miller, J. Mazzeo, and J. Dossey, *NAEP 1996 Mathematics Report Card for the Nation and the States* (Washington, DC: National Center for Education Statistics, 1997).

See figure 1-11.

Appendix table 1-12.
Overall mean and average percentage correct on grade 4 TIMSS mathematics assessment, by country and content area: 1994-95

Country	Mean	All mathematics content areas	Whole numbers	Fractions and proportionality	Measurement, estimation, and probability	Data representation, analysis, and probability	Geometry	Patterns, relations, and functions
All countries	529 (5.1)	59 (0.2)	67 (0.2)	49 (0.2)	56 (0.2)	62 (0.2)	64 (0.2)	60 (0.2)
Australia	546 (3.1)	63 (0.6)	67 (0.6)	51 (0.7)	60 (0.7)	67 (0.8)	74 (0.7)	64 (0.9)
Austria	559 (3.1)	65 (0.7)	74 (0.8)	51 (0.8)	69 (0.8)	66 (1.1)	67 (0.8)	64 (1.1)
Canada	532 (3.3)	60 (1.0)	68 (0.9)	48 (1.0)	54 (1.1)	68 (1.4)	72 (1.4)	62 (1.5)
Cyprus	502 (3.1)	54 (0.6)	65 (0.7)	48 (0.7)	48 (0.8)	52 (0.9)	53 (0.9)	55 (1.1)
Czech Republic	567 (3.3)	66 (0.6)	75 (0.6)	53 (0.8)	68 (0.7)	67 (0.9)	71 (0.7)	67 (0.9)
England and Wales	513 (3.2)	57 (0.7)	58 (0.7)	45 (0.8)	52 (0.7)	64 (0.9)	74 (0.8)	55 (1.0)
Greece	592 (4.4)	51 (0.9)	62 (1.0)	42 (1.1)	48 (1.0)	50 (1.2)	53 (1.2)	47 (1.2)
Hong Kong	587 (4.3)	73 (0.9)	79 (0.9)	66 (1.0)	69 (0.9)	76 (1.0)	74 (0.8)	73 (1.2)
Hungary	548 (3.7)	64 (0.8)	76 (0.7)	49 (0.9)	64 (0.9)	60 (1.0)	66 (0.8)	69 (1.1)
Iceland	474 (2.7)	50 (0.8)	56 (0.9)	36 (1.0)	44 (0.9)	58 (1.2)	63 (1.0)	48 (1.4)
Iran	429 (4.0)	38 (0.9)	51 (1.2)	32 (1.0)	36 (0.9)	23 (0.9)	42 (0.9)	40 (1.4)
Ireland	550 (3.4)	63 (0.8)	70 (0.8)	58 (1.0)	56 (0.9)	69 (0.9)	66 (0.8)	64 (1.0)
Israel	531 (3.5)	59 (1.0)	71 (1.0)	48 (1.1)	54 (1.0)	64 (1.2)	62 (1.0)	60 (1.5)
Japan	597 (2.1)	74 (0.4)	82 (0.4)	65 (0.6)	72 (0.5)	79 (0.5)	72 (0.6)	76 (0.6)
Kuwait	400 (2.8)	32 (0.5)	36 (0.5)	25 (0.5)	35 (0.6)	26 (0.6)	36 (0.6)	33 (1.0)
Latvia	525 (4.8)	59 (1.0)	68 (0.9)	44 (1.3)	60 (1.0)	54 (1.3)	67 (1.0)	65 (1.2)
Netherlands	577 (3.4)	69 (0.7)	75 (0.8)	60 (0.9)	70 (0.8)	75 (0.9)	71 (0.8)	65 (1.1)
New Zealand	499 (4.3)	53 (1.0)	57 (1.0)	41 (1.1)	49 (1.1)	61 (1.3)	66 (1.1)	52 (1.2)
Norway	502 (3.0)	53 (0.7)	61 (0.8)	38 (0.7)	56 (0.7)	59 (0.9)	58 (0.9)	50 (1.2)
Portugal	475 (3.5)	48 (0.7)	57 (0.8)	38 (0.7)	49 (0.8)	43 (1.1)	52 (1.0)	47 (1.1)
Scotland	520 (3.9)	58 (0.8)	61 (0.8)	46 (1.0)	53 (0.9)	66 (1.0)	72 (0.8)	57 (1.0)
Singapore	625 (5.3)	76 (0.8)	83 (0.7)	74 (1.0)	67 (1.0)	81 (0.8)	72 (0.8)	76 (0.9)
Slovenia	552 (3.2)	64 (0.6)	74 (0.6)	50 (0.9)	64 (0.9)	64 (1.0)	72 (0.8)	68 (0.8)
South Korea	611 (2.1)	76 (0.4)	88 (0.3)	65 (0.5)	72 (0.5)	80 (0.6)	72 (0.6)	83 (0.7)
Thailand	490 (4.7)	50 (1.1)	58 (1.3)	44 (1.0)	44 (1.0)	56 (1.5)	53 (1.2)	50 (1.3)
United States	545 (3.0)	63 (0.6)	71 (0.7)	51 (0.8)	53 (0.6)	73 (0.9)	71 (0.7)	66 (0.9)

NOTE: Standard errors are shown in parentheses.

SOURCE: I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

See figure 1-12.

Appendix table 1-13.
Overall mean and average percentage correct on grade 8 TIMSS mathematics assessment, by country and content area: 1994-95

Country	Mean	All mathematics content areas	Fractions and number sense	Geometry	Algebra	Data representation, analysis, and probability	Measurement	Proportionality
All countries	513 NR	55 (0.1)	58 (0.1)	56 (0.1)	52 (0.2)	62 (0.1)	51 (0.1)	45 (0.2)
Australia	530 (4.0)	58 (0.9)	61 (0.9)	57 (1.0)	55 (1.0)	67 (0.8)	54 (1.0)	47 (0.9)
Austria	539 (3.0)	62 (0.8)	66 (0.8)	57 (1.0)	59 (0.8)	68 (0.8)	62 (1.0)	49 (0.9)
Belgium (Flemish)	565 (5.7)	66 (1.4)	71 (1.2)	64 (1.5)	63 (1.7)	73 (1.3)	60 (1.3)	53 (1.8)
Belgium (French)	526 (3.4)	59 (0.9)	62 (1.0)	58 (1.0)	53 (1.1)	68 (1.0)	56 (1.0)	48 (0.9)
Bulgaria	540 (6.3)	60 (1.2)	60 (1.4)	65 (1.3)	62 (1.5)	62 (1.1)	54 (1.6)	47 (1.5)
Canada	527 (2.4)	59 (0.5)	64 (0.6)	58 (0.6)	54 (0.7)	69 (0.5)	51 (0.7)	48 (0.7)
Colombia	385 (3.4)	29 (0.8)	31 (0.9)	29 (0.9)	28 (0.9)	37 (1.0)	25 (1.5)	23 (0.9)
Cyprus	474 (1.9)	48 (0.5)	50 (0.6)	47 (0.6)	48 (0.7)	53 (0.6)	44 (0.9)	40 (0.7)
Czech Republic	564 (4.9)	66 (1.1)	69 (1.1)	66 (1.1)	65 (1.3)	68 (0.9)	62 (1.2)	52 (1.3)
Denmark	502 (2.8)	52 (0.7)	53 (0.9)	54 (0.9)	45 (0.7)	67 (0.9)	49 (1.0)	41 (0.8)
England and Wales	506 (2.6)	53 (0.7)	54 (0.8)	54 (1.0)	49 (0.9)	66 (0.7)	50 (0.9)	41 (1.1)
France	538 (2.9)	61 (0.8)	64 (0.8)	66 (0.8)	54 (1.0)	71 (0.8)	57 (0.9)	49 (0.9)
Germany	509 (4.5)	54 (1.1)	58 (1.1)	51 (1.4)	48 (1.3)	64 (1.2)	51 (1.1)	42 (1.3)
Greece	484 (3.1)	49 (0.7)	53 (0.8)	51 (0.7)	46 (0.8)	56 (0.8)	43 (0.9)	39 (1.1)
Hong Kong	588 (6.5)	70 (1.4)	72 (1.4)	73 (1.5)	70 (1.5)	72 (1.3)	65 (1.7)	62 (1.4)
Hungary	537 (3.2)	62 (0.7)	65 (0.8)	60 (0.8)	63 (0.9)	66 (0.7)	56 (0.8)	47 (0.9)
Iceland	487 (4.5)	50 (1.1)	54 (1.2)	51 (1.4)	40 (1.3)	63 (1.1)	45 (1.4)	38 (1.4)
Iran	528 (2.2)	38 (0.6)	39 (0.6)	43 (0.8)	37 (0.8)	41 (0.6)	29 (1.2)	36 (0.8)
Ireland	527 (5.1)	59 (1.2)	65 (1.2)	51 (1.3)	53 (1.3)	69 (1.1)	53 (1.3)	51 (1.2)
Israel	522 (6.2)	57 (1.3)	60 (1.4)	57 (1.4)	61 (1.6)	63 (1.3)	48 (1.6)	43 (1.6)
Japan	605 (1.9)	73 (0.4)	75 (0.4)	80 (0.4)	72 (0.6)	78 (0.4)	67 (0.5)	61 (0.5)
Kuwait	392 (2.5)	30 (0.7)	27 (0.8)	38 (1.0)	30 (1.0)	38 (1.0)	23 (1.0)	21 (0.7)
Latvia	493 (3.1)	51 (0.8)	53 (0.9)	57 (0.8)	51 (0.9)	56 (0.8)	47 (0.9)	39 (0.9)
Lithuania	477 (3.5)	48 (0.9)	51 (1.0)	53 (1.1)	47 (1.2)	52 (1.0)	43 (0.9)	35 (0.9)
Netherlands	541 (6.7)	60 (1.6)	62 (1.6)	59 (1.8)	53 (1.6)	72 (1.7)	57 (1.6)	51 (1.9)
New Zealand	508 (4.5)	54 (1.0)	57 (1.1)	54 (1.1)	49 (1.1)	66 (1.0)	48 (1.2)	42 (1.0)
Norway	503 (2.2)	54 (0.5)	58 (0.6)	51 (0.6)	45 (0.7)	66 (0.6)	51 (0.6)	40 (0.6)
Portugal	454 (2.5)	43 (0.7)	44 (0.7)	44 (0.8)	40 (0.8)	54 (0.7)	39 (0.7)	32 (0.8)
Romania	482 (4.0)	49 (1.0)	48 (1.0)	52 (0.9)	52 (1.3)	49 (1.0)	48 (1.1)	42 (1.2)
Russian Federation	535 (5.3)	60 (1.3)	62 (1.2)	63 (1.4)	63 (1.5)	60 (1.2)	56 (1.5)	48 (1.5)
Scotland	498 (5.5)	52 (1.3)	53 (1.3)	52 (1.4)	46 (1.5)	65 (1.3)	48 (1.6)	40 (1.4)
Singapore	643 (4.9)	79 (0.9)	84 (0.8)	76 (1.0)	76 (1.1)	79 (0.8)	77 (1.0)	75 (1.0)
Slovak Republic	547 (3.3)	62 (0.8)	66 (0.8)	63 (0.8)	62 (0.9)	62 (0.7)	60 (0.9)	49 (1.0)
Slovenia	541 (3.1)	61 (0.7)	63 (0.7)	60 (0.9)	61 (0.8)	66 (0.7)	59 (0.9)	49 (0.8)
South Africa	354 (4.4)	24 (1.1)	26 (1.4)	24 (1.0)	23 (1.1)	26 (1.2)	18 (1.1)	21 (0.9)
South Korea	607 (2.4)	72 (0.5)	74 (0.5)	75 (0.6)	69 (0.6)	78 (0.6)	66 (0.7)	62 (0.6)
Spain	487 (2.0)	51 (0.5)	52 (0.5)	49 (0.6)	54 (0.8)	60 (0.7)	44 (0.7)	40 (0.8)
Sweden	519 (3.0)	56 (0.7)	62 (0.8)	48 (0.7)	44 (0.9)	70 (0.7)	56 (0.9)	44 (0.9)
Switzerland	545 (2.8)	62 (0.6)	67 (0.7)	60 (0.8)	53 (0.7)	72 (0.7)	61 (0.8)	52 (0.7)
Thailand	522 (5.7)	57 (1.4)	60 (1.5)	62 (1.3)	53 (1.7)	63 (1.1)	50 (1.4)	51 (1.5)
United States	500 (4.6)	53 (1.1)	59 (1.1)	48 (1.2)	51 (1.2)	65 (1.1)	40 (1.1)	42 (1.1)

NR = not reported

NOTE: Standard errors are shown in parentheses.

SOURCE: A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996).

See figure 1-13.

Appendix table 1-14.
Average percentage correct on TIMSS mathematics assessment, by country, grade, and sex: 1994-95

Country	Grade 4		Grade 8	
	Boys	Girls	Boys	Girls
Australia	63 (0.7)	63 (0.8)	57 (1.2)	59 (1.1)
Austria	66 (0.9)	64 (0.8)	63 (0.8)	61 (1.2)
Belgium (Flemish)	NP	NP	65 (2.0)	66 (1.9)
Belgium (French)	NP	NP	59 (1.1)	58 (1.0)
Canada	61 (1.1)	60 (1.2)	59 (0.7)	59 (0.6)
Colombia	NP	NP	30 (1.6)	29 (0.9)
Cyprus	55 (0.8)	53 (0.7)	47 (0.6)	48 (0.6)
Czech Republic	67 (0.7)	66 (0.7)	67 (1.0)	64 (1.3)
Denmark	NP	NP	54 (0.8)[a]	50 (0.9)
England and Wales	57 (0.8)	56 (0.9)	53 (1.3)	53 (0.9)
France	NP	NP	62 (0.8)	61 (0.9)
Germany	NP	NP	54 (1.3)	54 (1.2)
Greece	50 (1.2)	51 (0.9)	51 (0.9)	48 (0.7)
Hong Kong	73 (1.1)	73 (0.8)	72 (1.7)	68 (1.7)
Hungary	64 (0.8)	64 (0.9)	61 (0.8)	62 (0.8)
Iceland	50 (1.0)	49 (0.9)	49 (1.3)	50 (1.3)
Iran	39 (1.4)	37 (1.1)	39 (0.8)	36 (0.8)
Ireland	63 (0.9)	64 (0.9)	60 (1.6)	58 (1.4)
Israel	60 (1.1)	59 (1.0)	61 (1.5)	55 (1.5)
Japan	75 (0.5)	74 (0.5)	74 (0.5)	73 (0.4)
Latvia	58 (1.2)	60 (1.1)	52 (1.0)	51 (0.8)
Lithuania	NP	NP	48 (1.1)	49 (1.0)
Netherlands	71 (0.8)[a]	68 (0.8)	61 (1.8)	59 (1.6)
New Zealand	52 (1.3)	54 (0.9)	55 (1.4)	53 (1.3)
Norway	54 (0.9)	53 (0.8)	54 (0.6)	53 (0.6)
Portugal	48 (0.8)	48 (0.8)	44 (0.8)	42 (0.7)
Romania	NP	NP	49 (1.1)	49 (1.0)
Russian Federation	NP	NP	59 (1.4)	61 (1.3)
Scotland	58 (0.9)	58 (0.9)	53 (1.7)	50 (1.3)
Singapore	75 (0.9)	76 (1.0)	79 (1.1)	79 (1.0)
Slovak Republic	NP	NP	63 (0.9)	62 (0.8)
Slovenia	64 (0.7)	65 (0.9)	62 (0.8)	60 (0.7)
South Africa	NP	NP	25 (1.7)	22 (1.0)
South Korea	77 (0.4)[a]	75 (0.5)	73 (0.6)[a]	70 (0.7)
Spain	NP	NP	52 (0.7)	50 (0.7)
Sweden	NP	NP	56 (0.8)	56 (0.8)
Switzerland	NP	NP	63 (0.8)	61 (0.7)
Thailand	49 (1.3)	52 (1.0)	56 (1.4)	58 (1.7)
United States	63 (0.7)	62 (0.7)	53 (1.2)	53 (1.1)

NP = did not participate in grade 4 assessment

NOTE: Standard errors are shown in parentheses.

[a]Difference between the sexes is statistically significant at the 0.05 level, adjusted for multiple comparisons.

SOURCES: A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

Appendix table 1-15.
Students scoring in the top 10th percentile on the TIMSS science and mathematics assessments, by country and grade: 1994-95

Country	Science		Mathematics	
	Grade 4	Grade 8	Grade 4	Grade 8
Australia	14 (0.7)	16 (0.9)	12 (0.7)	11 (0.9)
Austria	10 (0.9)	16 (0.9)	11 (1.1)	11 (0.7)
Belgium (Flemish)	NP	10 (0.8)	NP	17 (1.2)
Belgium (French)	NP	1 (0.2)	NP	6 (0.6)
Bulgaria	NP	21 (1.4)	NP	16 (1.9)
Canada	9 (0.7)	9 (0.6)	7 (0.8)	7 (0.7)
Colombia	NP	0 (0.1)	NP	0 (0.0)
Cyprus	1 (0.1)	1 (0.2)	4 (0.5)	2 (0.3)
Czech Republic	11 (1.0)	19 (1.6)	15 (1.3)	18 (1.9)
Denmark	NP	2 (0.3)	NP	4 (0.5)
England and Wales	13 (1.0)	17 (0.9)	7 (0.7)	7 (0.6)
France	NP	1 (0.2)	NP	7 (0.8)
Germany	NP	11 (1.0)	NP	6 (0.7)
Greece	1 (0.2)	4 (0.4)	3 (0.5)	3 (0.4)
Hong Kong	4 (0.7)	7 (0.8)	18 (1.5)	27 (2.1)
Hungary	5 (0.6)	14 (0.8)	11 (1.1)	11 (0.8)
Iceland	3 (0.4)	2 (0.5)	1 (0.3)	1 (0.3)
Iran	0 (0.1)	1 (0.1)	0 (0.1)	0 (0.0)
Ireland	7 (0.6)	12 (0.9)	10 (0.7)	9 (1.0)
Israel	3 (0.5)	11 (1.2)	6 (0.7)	6 (0.9)
Japan	11 (0.6)	18 (0.6)	23 (0.9)	32 (0.8)
Kuwait	0 (0.1)	0 (0.0)	0 (0.1)	0 (0.0)
Latvia	4 (1.2)	2 (0.3)	6 (1.3)	3 (0.5)
Lithuania	NP	1 (0.3)	NP	1 (0.3)
Netherlands	5 (0.6)	12 (1.1)	13 (1.1)	10 (1.6)
New Zealand	9 (0.9)	11 (0.9)	3 (0.7)	6 (0.8)
Norway	6 (0.6)	7 (0.5)	2 (0.3)	4 (0.4)
Portugal	1 (0.2)	1 (0.1)	1 (0.2)	0 (0.1)
Romania	NP	5 (0.6)	NP	3 (0.4)
Russian Federation	NP	11 (0.8)	NP	10 (0.7)
Scotland	9 (0.8)	9 (1.1)	6 (0.8)	5 (0.9)
Singapore	11 (1.5)	31 (2.3)	39 (2.3)	45 (2.5)
Slovak Republic	NP	12 (0.9)	NP	12 (1.0)
Slovenia	6 (0.7)	14 (0.9)	11 (0.9)	11 (0.7)
South Africa	NP	1 (0.2)	NP	0 (0.0)
South Korea	17 (0.9)	18 (0.8)	26 (1.2)	34 (1.1)
Spain	NP	4 (0.3)	NP	2 (0.2)
Sweden	NP	9 (0.6)	NP	5 (0.5)
Switzerland	NP	7 (0.6)	NP	11 (0.7)
Thailand	0 (0.1)	4 (0.5)	1 (0.2)	7 (1.2)
United States	16 (0.9)	13 (0.8)	9 (0.8)	5 (0.6)

NP = did not participate in grade 4 assessment

SOURCES: A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997). *Science & Engineering Indicators – 1998*

Appendix table 1-16.
Students who report "never or almost never" using computers in science and mathematics courses, by country and grade: 1994-95

Country	Mathematics: Grade 4		Mathematics: Grade 8		Science: Grade 8	
	Percentage of students	Mean TIMSS achievement	Percentage of students	Mean TIMSS achievement	Percentage of students	Mean TIMSS achievement
Australia	66 (4.5)	548 (5.3)	78 (3.2)	531 (5.3)	NA	NA
Austria	98 (1.6)	560 (3.5)	69 (4.5)	551 (5.6)	85 (2.6)	565 (3.1)
Belgium (Flemish)	NA	NA	99 (0.7)	574 (4.6)	98 (1.0)	555 (5.9)
Belgium (French)	NA	NA	95 (2.4)	543 (4.4)	95 (2.0)	483 (3.5)
Canada	58 (4.0)	540 (4.5)	82 (3.5)	533 (2.9)	76 (3.3)	536 (2.9)
Colombia	NA	NA	94 (2.2)	387 (3.8)	95 (2.5)	413 (4.5)
Cyprus	86 (5.1)	508 (4.2)	89 (3.3)	468 (2.9)	92 (1.1)	456 (2.6)
Czech Republic	97 (1.7)	568 (3.3)	74 (5.4)	560 (6.4)	93 (2.0)	573 (4.6)
Denmark	NA	NA	38 (4.5)	500 (4.5)	63 (5.9)	482 (4.4)
England and Wales	NA	NA	53 (3.9)	517 (5.9)	70 (3.3)	567 (6.9)
France	NA	NA	86 (3.2)	541 (3.3)	97 (1.2)	499 (2.5)
Germany	NA	NA	87 (3.1)	510 (5.8)	95 (1.8)	536 (6.2)
Greece	99 (1.4)	495 (4.1)	85 (2.9)	481 (3.3)	93 (3.2)	498 (2.2)
Hong Kong	99 (0.8)	589 (4.3)	90 (3.5)	590 (7.3)	95 (2.5)	523 (5.3)
Hungary	NA	NA	NA	NA	NA	NA
Iceland	NA	NA	NA	NA	73 (6.1)	489 (4.5)
Iran	99 (1.1)	428 (4.1)	93 (5.5)	430 (2.3)	99 (0.5)	469 (2.4)
Ireland	90 (3.2)	549 (3.7)	99 (0.9)	528 (6.0)	96 (1.4)	540 (6.0)
Israel	NA	NA	NA	NA	75 (8.0)	538 (8.3)
Japan	93 (2.3)	598 (2.1)	90 (2.7)	604 (2.5)	84 (2.8)	572 (2.0)
Kuwait	98 (1.3)	401 (3.4)	73 (7.1)	393 (2.9)	78 (7.7)	427 (4.5)
Latvia	95 (2.0)	522 (5.0)	97 (1.6)	490 (3.3)	91 (1.5)	485 (2.6)
Lithuania	NA	NA	94 (1.8)	480 (4.1)	96 (1.1)	477 (4.2)
Netherlands	65 (5.0)	581 (4.9)	NA	NA	85 (2.6)	559 (7.4)
New Zealand	69 (3.8)	499 (4.6)	86(3.1)	506(4.4)	90 (2.7)	526 (4.7)
Norway	80 (3.7)	502 (3.6)	90(2.6)	507(2.7)	96 (1.9)	525 (2.3)
Portugal	98 (1.2)	475 (3.7)	97(1.5)	454(2.6)	99 (0.5)	480 (2.5)
Romania	NA	NA	96 (1.7)	481 (4.4)	94 (1.3)	487 (4.7)
Russian Federation	NA	NA	78 (2.6)	533 (6.8)	88 (1.7)	538 (4.6)
Scotland	NA	NA	NA	NA	NA	NA
Singapore	66 (4.2)	627 (5.7)	92 (2.7)	643 (5.3)	95 (1.5)	606 (5.8)
Slovak Republic	NA	NA	95 (1.5)	543 (3.3)	96 (2.0)	546 (3.9)
Slovenia	92 (2.8)	549 (3.5)	69 (4.5)	539 (4.5)	60 (3.1)	556 (3.5)
South Korea	96 (1.7)	610 (2.2)	96 (1.6)	610 (2.5)	96 (1.7)	566 (2.2)
Spain	NA	NA	89 (3.1)	488 (2.6)	92 (2.7)	519 (2.1)
Sweden	NA	NA	74 (2.9)	519 (4.1)	NA	NA
Switzerland	NA	NA	87 (3.2)	549 (5.6)	78 (4.3)	527 (4.9)
Thailand	96 (2.6)	491 (5.3)	97 (2.0)	528 (7.5)	92 (3.6)	530 (5.3)
United States	60 (4.1)	546 (4.7)	76 (3.1)	502 (5.9)	NA	NA

NA = not available; TIMSS = Third International Mathematics and Science Study

NOTE: Standard errors are shown in parentheses.

SOURCES: A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997); and A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996). A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and M. Martin, I. Mullis, A. Beaton, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

Appendix table 1-17.
Average number of hours per day students report spending on out-of-school TV and study time, by country and grade: 1994-95

Country	Grade 4			Grade 8			
	Time spent:			Time spent:			
	Watching TV or videos	On math homework or studying	On science homework or studying	Watching TV or videos	Studying or doing homework	On math homework or studying	On science homework or studying
Australia	2.0 (0.05)	0.8 (0.02)	0.4 (0.02)	2.4 (0.05)	2.0 (0.04)	0.7 (0.02)	0.5 (0.01)
Austria	1.4 (0.04)	1.0 (0.03)	0.9 (0.03)	1.9 (0.06)	2.4 (0.07)	0.8 (0.02)	0.7 (0.03)
Belgium (Flemish)	NA	NA	NA	2.0 (0.05)	3.4 (0.07)	1.1 (0.03)	0.8 (0.02)
Belgium (French)	NA	NA	NA	1.9 (0.08)	3.0 (0.07)	1.0 (0.02)	0.8 (0.02)
Canada	1.9 (0.04)	0.8 (0.02)	0.6 (0.03)	2.3 (0.04)	2.2 (0.07)	0.7 (0.02)	0.6 (0.02)
Colombia	NA	NA	NA	2.2 (0.07)	4.6 (0.15)	1.3 (0.06)	1.2 (0.06)
Cyprus	1.8 (0.05)	1.1 (0.03)	0.8 (0.03)	2.3 (0.04)	3.6 (0.06)	1.2 (0.02)	0.9 (0.02)
Czech Republic	1.7 (0.04)	0.7 (0.02)	0.6 (0.02)	2.6 (0.05)	1.8 (0.05)	0.6 (0.02)	0.6 (0.02)
Denmark	NA	NA	NA	2.2 (0.06)	1.4 (0.05)	0.5 (0.02)	0.3 (0.02)
England and Wales	2.2 (0.04)	NA	NA	2.7 (0.07)	NA	NA	NA
France	NA	NA	NA	1.5 (0.04)	2.7 (0.05)	0.9 (0.02)	0.6 (0.01)
Germany	NA	NA	NA	1.9 (0.04)	2.0 (0.05)	0.6 (0.02)	0.6 (0.02)
Greece	1.3 (0.04)	1.6 (0.04)	1.3 (0.03)	2.1 (0.04)	4.4 (0.08)	1.2 (0.03)	1.2 (0.03)
Hong Kong	1.5 (0.04)	1.3 (0.03)	0.9 (0.02)	2.6 (0.05)	2.5 (0.06)	0.9 (0.02)	0.6 (0.02)
Hungary	2.3 (0.05)	1.0 (0.03)	1.0 (0.03)	3.0 (0.06)	3.1 (0.06)	0.8 (0.02)	1.1 (0.02)
Iceland	1.2 (0.04)	0.8 (0.02)	0.3 (0.02)	2.2 (0.05)	2.4 (0.07)	0.9 (0.03)	0.6 (0.03)
Iran	1.3 (0.05)	2.3 (0.07)	2.1 (0.06)	1.8 (0.06)	6.4 (0.13)	2.0 (0.05)	1.9 (0.05)
Ireland	1.9 (0.05)	0.8 (0.02)	0.4 (0.02)	2.1 (0.03)	2.7 (0.05)	0.7 (0.02)	0.6 (0.01)
Israel	2.5 (0.06)	1.1 (0.05)	0.9 (0.04)	3.3 (0.10)	2.8 (0.10)	1.0 (0.04)	0.6 (0.03)
Japan	1.9 (0.03)	0.9 (0.02)	0.4 (0.02)	2.6 (0.04)	2.3 (0.04)	0.8 (0.01)	0.6 (0.01)
Kuwait	1.4 (0.03)	1.9 (0.05)	1.8 (0.05)	1.9 (0.07)	5.3 (0.12)	1.6 (0.04)	1.5 (0.05)
Latvia	2.3 (0.07)	1.0 (0.03)	0.8 (0.03)	2.6 (0.05)	2.7 (0.05)	0.9 (0.02)	0.6 (0.02)
Lithuania	NA	NA	NA	2.8 (0.05)	2.7 (0.06)	0.8 (0.02)	0.7 (0.02)
Netherlands	1.7 (0.06)	0.5 (0.03)	0.4 (0.03)	2.5 (0.09)	2.2 (0.04)	0.6 (0.01)	0.6 (0.01)
New Zealand	2.0 (0.06)	0.8 (0.03)	0.5 (0.02)	2.5 (0.05)	2.1 (0.05)	0.7 (0.02)	0.6 (0.01)
Norway	1.7 (0.04)	0.6 (0.02)	0.4 (0.02)	2.5 (0.04)	2.3 (0.04)	0.7 (0.02)	0.6 (0.01)
Portugal	1.5 (0.05)	1.3 (0.03)	1.3 (0.03)	2.0 (0.04)	3.0 (0.05)	1.0 (0.02)	0.9 (0.02)
Romania	NA	NA	NA	1.9 (0.06)	5.0 (0.18)	1.8 (0.07)	1.6 (0.06)
Russian Federation	NA	NA	NA	2.9 (0.05)	2.9 (0.05)	0.9 (0.02)	1.0 (0.02)
Scotland	1.9 (0.06)	0.5 (0.02)	0.3 (0.02)	2.7 (0.05)	1.8 (0.04)	0.6 (0.02)	0.5 (0.01)
Singapore	NA	NA	NA	2.7 (0.05)	4.6 (0.04)	1.4 (0.02)	1.3 (0.02)
Slovak Republic	NA	NA	NA	2.7 (0.05)	2.4 (0.04)	0.7 (0.01)	0.8 (0.02)
Slovenia	1.5 (0.04)	1.0 (0.03)	1.0 (0.03)	2.0 (0.04)	2.9 (0.05)	0.9 (0.02)	1.0 (0.02)
South Korea	1.5 (0.03)	1.0 (0.02)	0.8 (0.02)	2.0 (0.04)	2.5 (0.05)	0.8 (0.02)	0.6 (0.02)
Spain	NA	NA	NA	1.8 (0.05)	3.6 (0.06)	1.2 (0.02)	1.0 (0.02)
Sweden	NA	NA	NA	2.3 (0.04)	2.3 (0.04)	0.7 (0.01)	0.7 (0.01)
Switzerland	NA	NA	NA	1.3 (0.03)	2.7 (0.04)	0.9 (0.02)	0.7 (0.01)
Thailand	1.1 (0.09)	1.0 (0.03)	0.7 (0.03)	2.1 (0.07)	3.5 (0.06)	1.2 (0.03)	1.0 (0.02)
United States	2.0 (0.04)	1.0 (0.03)	0.8 (0.02)	2.6 (0.07)	2.3 (0.04)	0.8 (0.02)	0.6 (0.01)

NA = not available

NOTE: Standard errors are shown in parentheses.

SOURCES: A. Beaton, M. Martin, I. Mullis, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); M. Martin, I. Mullis, A. Beaton, E. Gonzalez, T. Smith, and D. Kelly, *Science Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997); A. Beaton, I. Mullis, M. Martin, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Middle School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1996); and I. Mullis, M. Martin, A. Beaton, E. Gonzalez, D. Kelly, and T. Smith, *Mathematics Achievement in the Primary School Years: IEA's Third International Mathematics and Science Study (TIMSS)* (Chestnut Hill, MA: Boston College, 1997).

See figure 1-16.

Appendix table 1-18.
Grade 8 teachers' beliefs about the nature and teaching of mathematics and science: 1994-95
(Percentages)

Belief	Strongly disagree	Disagree	Agree	Strongly agree	Agree/strongly agree[a]
Mathematics					
Math is primarily an abstract subject	11.7 (2.6)	57.3 (4.6)	28.9 (3.9)	2.2 (0.9)	31.0 (3.9)
Math is primarily a formal way of representing the real world	1.0 (0.8)	19.9 (3.7)	67.9 (3.9)	11.2 (2.4)	79.1 (3.7)
Math is primarily a practical and structured guide for addressing real situations	0.0 (0.0)	11.2 (2.0)	69.5 (3.4)	19.3 (2.7)	88.8 (2.0)
If students are having difficulty, an effective approach is to give them more practice by themselves during the class	20.1 (3.6)	57.6 (4.5)	19.5 (3.2)	2.9 (0.9)	22.4 (3.0)
Some students have a natural talent for math and others do not	3.5 (1.4)	15.0 (2.4)	64.2 (3.8)	17.2 (3.4)	81.4 (2.8)
More than one representation should be used in teaching a math topic	0.0 (0.0)	1.7 (1.0)	46.6 (3.9)	51.7 (3.7)	98.3 (1.0)
Math should be learned as sets of algorithms or rules that cover all possibilities	10.9 (2.4)	53.9 (3.8)	32.6 (3.4)	2.6 (0.9)	35.2 (3.6)
Basic computational skills on the part of the teacher are sufficient for teaching elementary school math	42.3 (3.7)	40.4 (3.6)	11.5 (3.3)	5.8 (1.7)	17.3 (3.8)
A liking for and understanding of students are essential for teaching math	0.8 (0.3)	2.6 (1.0)	40.9 (4.2)	55.7 (4.1)	96.5 (1.1)
Science					
Science is primarily an abstract subject	17.9 (2.1)	63.9 (3.2)	18.1 (3.2)	0.1 (0.1)	18.2 (3.2)
Science is primarily a formal way of representing the real world	1.4 (0.8)	14.3 (2.3)	69.7 (4.3)	14.7 (3.6)	84.3 (2.6)
Science is primarily a practical and structured guide for addressing real situations	0.0 (0.0)	12.0 (2.9)	66.0 (4.6)	22.0 (3.8)	88.0 (2.9)
Some students have a natural talent for science and others do not	6.3 (1.5)	31.8 (3.8)	51.8 (3.7)	10.2 (2.8)	62.0 (3.2)
It is important for teachers to give students prescriptive and sequential directions for science experiments	3.3 (1.3)	20.8 (3.1)	48.9 (5.1)	27.1 (4.0)	75.8 (3.6)
Focusing on rules is a bad idea. It gives students the impression that the sciences are a set of procedures to be memorized	15.3 (2.9)	52.7 (4.8)	26.1 (3.2)	5.9 (2.9)	32.0 (3.7)
If students get into debates in class about ideas or procedures covering the sciences, it can harm their learning	56.5 (3.7)	40.7 (3.8)	0.7 (0.7)	2.1 (1.8)	2.8 (1.9)
Students see a science task as the same task when it is represented in two different ways	4.6 (1.5)	52.6 (3.9)	41.9 (4.2)	0.8 (0.4)	42.8 (4.2)
A liking for and understanding of students are essential for teaching science	1.3 (0.8)	9.1 (2.7)	43.2 (3.6)	46.4 (4.0)	89.6 (2.7)

NOTES: Data reflect the beliefs of grade 8 mathematics and science teachers surveyed as part of the Third International Mathematics and Science Study. Responses are to the question: *"To what extent do you agree or disagree with each of the following statements?"* Standard errors are shown in parentheses. Details may not add to totals because of rounding.

[a]Data in this column reflect the combined categories "Agree" and "Strongly agree."

SOURCE: T. Williams, D. Levine, L. Martin, P. Butler, C. Heid, and J. Haynes, *Mathematics and Science in the Eighth Grade*, report prepared for the National Center for Education Statistics (Rockville, MD: Westat, Inc., 1997).

See figure 1-19.

Appendix table 1-19.
Grade 8 teachers' perceptions of student skills required for success in mathematics and science: 1994-95
(Percentages)

Skill	Not important		Somewhat important		Very important	
Mathematics						
Remember formulas and procedures	3.0	(1.1)	54.0	(3.5)	43.0	(3.5)
Think in sequential manner	0.6	(0.6)	20.0	(2.7)	79.5	(2.8)
Understand concepts	0.0	(0.0)	11.1	(3.0)	88.9	(3.0)
Think creatively	2.0	(0.9)	32.7	(3.8)	65.4	(4.0)
Understand math use in real world	0.0	(0.0)	18.3	(2.7)	81.7	(2.7)
Support solutions	2.4	(2.4)	16.9	(3.3)	80.8	(4.1)
Science						
Remember formulas and procedures	10.8	(2.4)	63.7	(4.1)	25.5	(4.0)
Think in sequential manner	1.3	(0.9)	19.1	(2.5)	79.6	(2.9)
Understand concepts	0.7	(0.7)	15.4	(2.4)	84.0	(2.5)
Think creatively	0.2	(0.2)	26.7	(3.6)	73.0	(3.7)
Understand science use in real world	0.3	(0.3)	20.5	(3.4)	79.2	(3.5)
Support solutions	0.0	(0.0)	13.9	(3.0)	86.1	(3.0)

NOTES: Data reflect the beliefs of grade 8 mathematics and science teachers surveyed as part of the Third International Mathematics and Science Study. Responses are to the statement: *"To be good at mathematics [science] at school, how important do you think it is for students to…?"* Standard errors are shown in parentheses. Details may not add to totals because of rounding.

SOURCE: T. Williams, D. Levine, L. Martin, P. Butler, C. Heid, and J. Haynes, *Mathematics and Science in the Eighth Grade*, report prepared for the National Center for Education Statistics, (Rockville, MD: Westat, Inc., 1997).

See figure 1-20.

Appendix table 1-20.
Requirements for state teacher license: 1996

State	Major in subject field[a]	Written test	Performance assessment[b]
Alabama	No	–	–
Alaska	Yes	–	Yes
Arizona	–	–	–
Arkansas	No	Yes	–
California	Yes[c]	Yes	–
Colorado	Yes[c]	Yes	Yes
Connecticut	Yes[c]	Yes	Yes
Delaware	No	Yes	–
Florida	No	Yes	Yes
Georgia	Yes	Yes	–
Hawaii	Yes	Yes	–
Idaho	Yes	–	–
Illinois	Yes	Yes	–
Indiana	Yes	Yes	–
Iowa	Yes[c]	–	–
Kansas	No	Yes	–
Kentucky	Yes	Yes	Yes
Louisiana	–	–	–
Maine	Yes	Yes	–
Maryland	No	Yes	Yes
Massachusetts	Yes[c]	Yes	–
Michigan	No	Yes	Yes
Minnesota	Yes	Yes	–
Mississippi	Yes	Yes	Yes
Missouri	Yes[c]	Yes	Yes
Montana	No	Yes	–
Nebraska	No	Yes	–
Nevada	Yes	Yes	–
New Hampshire	Yes[c]	–	–
New Jersey	–	–	–
New Mexico	Yes	Yes	–
New York	No	Yes	Yes
North Carolina	No	Yes	Yes
North Dakota	Yes	–	Yes
Ohio	No	Yes	Yes
Oklahoma	No	Yes	–
Oregon	No	Yes	Yes
Pennsylvania	No	Yes	–
Rhode Island	Yes	–	–
South Carolina	Yes	Yes	Yes
South Dakota	Yes	–	Yes
Tennessee	Yes	–	–
Texas	Yes[c]	Yes	–
Utah	Yes	–	–
Vermont	No	–	–
Virginia	Yes[c]	Yes	–
Washington	No	–	Yes
West Virginia	No	Yes	–
Wisconsin	Yes	Yes	Yes
Wyoming	Yes	–	–

– = data not available

[a]A major in education is not accepted. "Yes" denotes that a subject major is required for middle and/or secondary teaching license.

[b]Performance assessment comprises one or more of the following techniques: portfolios, classroom observations, simulated exercises.

[c]A subject major is required for all teachers K-12, not just for middle/secondary teachers.

SOURCE: Council of Chief State School Officers, *Key State Education Policies on K-12 Education: Content Standards, Graduation, Teacher Licensure, Time and Attendance* (Washington, DC: 1996).

Appendix table 1-21.
National trends in science coursetaking at age 17, by sex and race/ethnicity: 1986, 1990, 1992, and 1994

Course and year	Total		Male		Female		White		Black		Hispanic	
	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students	Average NAEP science scale score	Percentage of students
General science												
1986	290 (1.3)[a]	83 (1.3)	298 (1.7)	84 (1.5)	283 (1.6)[a]	82 (1.6)	297 (1.5)[a]	84 (1.6)	257 (2.8)	83 (2.6)	264 (4.5)	82 (3.5)
1990	292 (1.1)	82 (1.3)	298 (1.4)	84 (1.3)	286 (1.4)	81 (1.7)	300 (1.1)[a]	84 (1.4)	258 (4.5)	76 (3.1)	266 (4.8)	82 (4.4)
1992	297 (1.3)[b]	94 (1.0)	301 (1.6)	86 (1.1)	290 (1.5)[b]	83 (1.5)	304 (1.3)[b]	86 (1.0)	259 (3.9)	79 (3.6)	274 (5.4)	79 (3.2)
1994	296 (1.6)[b]	83 (1.3)	302 (2.2)	84 (1.5)	291 (1.8)[b]	82 (1.4)	306 (1.7)[b]	84 (1.5)	259 (3.3)	80 (1.9)	268 (5.1)	77 (2.4)
Biology												
1986	294 (1.5)[a]	88 (1.0)[a]	301 (1.8)	87 (1.1)[a]	287 (1.7)[a]	88 (1.1)[a]	301 (1.8)[a]	89 (1.1)[a]	260 (3.1)	84 (2.7)	265 (3.7)	84 (3.4)
1990	296 (1.0)[a]	89 (0.9)[a]	302 (1.3)	87 (1.1)[a]	290 (1.5)	91 (1.0)	304 (1.0)[a]	90 (0.9)[a]	260 (4.6)	87 (2.2)	270 (5.0)	79 (4.4)
1992	299 (1.1)[b]	92 (0.9)[b]	305 (1.5)	91 (1.2)[b]	293 (1.4)[b]	93 (1.0)[b]	308 (1.1)[b]	93 (1.0)[b]	260 (3.1)	92 (1.9)[b]	276 (4.5)	87 (4.1)
1994	300 (1.2)[b]	93 (0.9)[b]	306 (1.8)	92 (0.9)[b]	294 (1.3)[b]	93 (1.0)[b]	310 (1.3)[b]	94 (0.9)[b]	263 (2.7)	93 (1.8)[b]	273 (6.1)	84 (3.4)
Chemistry												
1986	312 (2.1)	40 (1.6)[a]	319 (2.7)	42 (1.8)[a]	304 (2.2)	39 (2.1)[a]	317 (2.2)[a]	43 (1.8)[a]	275 (6.4)	29 (2.6)[a]	281 (8.7)	24 (2.2)[a]
1990	316 (1.4)	45 (1.5)[a]	324 (1.9)	45 (1.7)	310 (1.7)	45 (1.7)[a]	325 (1.3)[b]	46 (1.7)[a]	280 (7.3)	46 (4.0)[b]	295 (6.0)	31 (4.3)
1992	319 (1.0)[b]	49 (1.7)[b]	325 (1.5)	47 (1.9)	313 (1.5)[b]	51 (2.0)[b]	325 (1.3)[b]	52 (1.8)[b]	282 (3.6)	36 (3.2)[a]	298 (4.1)	36 (5.6)
1994	315 (1.7)	53 (2.1)[b]	322 (2.4)	50 (2.6)[b]	309 (1.9)	55 (2.3)[b]	324 (1.7)[b]	54 (2.5)[b]	278 (3.4)	51 (3.6)[b]	288 (6.3)	41 (3.0)[b]
Physics												
1986	296 (4.7)[a]	11 (0.9)[a]	305 (6.8)	14 (1.3)[a]	282 (3.8)[a]	8 (0.7)[a]	316 (4.4)	10 (0.8)[a]	239 (5.4)[a]	18 (3.5)	257 (17.6)	13 (2.8)
1990	304 (3.7)	14 (1.5)	311 (4.3)	16 (1.8)	295 (4.2)[a]	13 (1.5)[b]	317 (2.6)	13 (1.7)	263 (11.8)	15 (2.7)	253 (18.3)	17 (4.5)
1992	306 (3.9)	14 (1.1)[a]	310 (4.7)	15 (1.0)[a]	302 (4.1)[b]	12 (1.5)	319 (3.5)	13 (1.2)[a]	251 (7.4)	14 (1.9)	282 (11.1)	13 (2.3)
1994	314 (2.9)[b]	18 (1.2)[b]	318 (4.1)	20 (1.5)[b]	310 (3.3)[b]	16 (1.3)[b]	326 (3.2)	18 (1.4)[b]	268 (7.5)[†]	16 (2.0)	*	*

* = sample size insufficient to permit reliable estimates; NAEP = National Assessment of Educational Progress

NOTES: Scale scores range from 0 to 300. Significance tests for extreme percentages (either >90 or <10 percent) should be interpreted with caution. It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within ±2 standard errors of the estimate for the sample. Use the standard error of difference in comparing estimates. Details may not add to totals because of rounding. Standard errors are shown in parentheses.

[a]Statistically significant difference from 1994 at the 0.05 level, adjusted for multiple comparisons.

[b]Statistically significant difference from 1986 at the 0.05 level, adjusted for multiple comparisons.

SOURCE: J. Campbell, C. Reese, C. O'Sullivan, and J. Dossey, *NAEP 1994: Trends in Academic Progress* (Washington, DC: National Center for Education Statistics, 1996).

Appendix table 1-22.
Highest level of mathematics courses taken at age 17, by sex and race/ethnicity: 1978 and 1994

Course and year	Total		Male		Female		White		Black		Hispanic	
	Average NAEP math scale score	Percentage of students	Average NAEP math scale score	Percentage of students	Average NAEP math scale score	Percentage of students	Average NAEP math scale score	Percentage of students	Average NAEP math scale score	Percentage of students	Average NAEP math scale score	Percentage of students
Prealgebra or general mathematics												
1978	267 (0.8)	20 (1.0)[a]	269 (1.0)[a]	21 (1.0)[a]	265 (0.9)	20 (1.1)[a]	272 (0.6)	18 (1.1)[a]	247 (1.6)[a]	31 (1.3)	256 (2.3)[a]	36 (3.1)
1994	272 (1.2)	9 (1.1)	274 (1.8)	11 (1.2)	268 (1.9)	8 (1.2)	275 (1.4)	9 (1.1)	*	*	*	*
Algebra 1												
1978	286 (0.7)	17 (0.6)	289 (0.9)	15 (0.6)	284 (1.0)	18 (0.7)[a]	291 (0.6)	17 (0.6)[a]	264 (1.5)[a]	19 (1.2)	273 (2.8)[a]	19 (2.1)
1994	288 (1.4)	15 (0.9)	289 (1.6)	16 (1.3)	286 (1.9)	14 (0.9)	292 (1.7)	14 (0.9)	275 (3.3)	21 (2.4)	*	*
Geometry												
1978	307 (0.7)[a]	16 (0.6)	310 (1.0)[a]	15 (0.5)	304 (0.8)[a]	18 (0.8)[a]	310 (0.6)[a]	17 (0.7)[a]	281 (1.9)	11 (0.8)[a]	294 (4.4)	12 (1.2)
1994	297 (1.7)	15 (0.8)	301 (2.1)	15 (0.9)	293 (1.8)	15 (1.1)	301 (1.5)	14 (1.0)	283 (3.8)	17 (2.2)	*	*
Algebra 2												
1978	321 (0.7)[a]	37 (1.2)[a]	325 (0.8)[a]	38 (1.2)[a]	318 (0.9)[a]	37 (1.3)[a]	325 (0.6)[a]	39 (1.3)[a]	292 (1.4)	28 (2.1)[a]	303 (2.9)	23 (2.5)[a]
1994	316 (1.0)	47 (1.6)	320 (1.5)	44 (1.9)	313 (1.1)	50 (2.0)	320 (1.0)	48 (1.9)	297 (2.5)	45 (3.4)	304 (4.1)	38 (3.5)
Precalculus or calculus												
1978	334 (1.4)[a]	6 (0.4)[a]	337 (2.0)	7 (0.5)[a]	329 (1.8)[a]	4 (0.4)[a]	338 (1.1)[a]	6 (0.4)[a]	297 (6.5)[a]	4 (0.6)	306 (6.1)	3 (0.9)
1994	340 (2.2)	13 (1.2)	343 (2.6)	13 (1.3)	337 (2.8)	12 (1.5)	344 (2.0)	14 (1.5)	*	*	*	*

* = sample size insufficient to permit reliable estimates

NOTES: It can be said with 95 percent certainty that for each population of interest, the value for the whole population is within ±2 standard errors of the estimate for the sample. Use the standard error of difference in comparing estimates. Details may not add to totals because a small percentage of students reported having taken other mathematics courses. Standard errors are shown in parentheses.

[a]Statistically significant difference between 1994 and the earliest year with available data at the 0.05 level; this is not adjusted for multiple comparisons.

SOURCE: J. Campbell, C. Reese, C. O'Sullivan, and J. Dossey, *NAEP 1994: Trends in Academic Progress* (Washington, DC: National Center for Education Statistics, 1996).

Appendix table 1-23.
Frequency of calculator use in grade 8 mathematics and science classes, by type of activity: 1994-95
(Percentage of teachers reporting)

Activity	Hardly ever		Once or twice a month		Once or twice a week		Every day	
Mathematics								
Checking answers	17.4	(3.3)	10.8	(2.3)	16.4	(3.2)	55.4	(4.6)
Tests and exams	31.0	(3.9)	22.9	(3.7)	21.8	(3.4)	24.3	(4.6)
Routine computation	22.9	(3.6)	8.9	(2.2)	16.1	(3.0)	52.1	(5.1)
Solving complex problems	11.4	(2.5)	12.2	(2.3)	23.0	(3.8)	53.4	(4.7)
Exploring number concepts	23.6	(2.9)	17.6	(3.0)	22.7	(3.9)	36.1	(3.6)
Science								
Checking answers	50.8	(3.4)	29.7	(3.8)	17.2	(3.3)	2.3	(1.2)
Tests and exams	67.7	(3.5)	22.6	(3.0)	6.4	(2.2)	3.3	(1.4)
Routine computation	39.3	(4.0)	33.0	(4.5)	19.7	(3.2)	8.0	(1.8)
Solving complex problems	46.7	(3.7)	35.1	(3.9)	14.4	(3.3)	3.9	(1.3)
Exploring number concepts	68.7	(3.8)	19.6	(3.6)	10.4	(2.7)	1.4	(0.4)

NOTE: Percentages may not total 100 because of rounding. Standard errors are shown in parentheses.

SOURCE: T. Williams, D. Levine, L. Martin, P. Butler, C. Heid, and J. Haynes, *Mathematics and Science in the Eighth Grade,* report prepared for the National Center for Education Statistics (Rockville, MD: Westat, Inc., 1997).

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Appendix table 1-24.
Percentage of public secondary school students taught by teachers without at least a minor in the field, by field and selected classroom characteristics: 1990-91

Characteristic	English	Math	Science			Social studies	
			All sciences	Life science	Physical science	All social studies	History
Total	20.8	26.6	16.5	38.5	56.2	13.4	53.9
Achievement level of class							
Low achievement	28.2	33.7	26.6	48.7	66.7	18.4	60.1
Average achievement	19.0	25.6	15.2	33.7	58.0	12.5	52.1
High achievement	16.3	21.6	9.2	32.0	45.5	11.8	52.6
Type or track of class							
Low-track	24.7	33.5	20.4	42.3	66.8	14.3	55.1
Medium-track	11.8	15.7	9.2*	31.4	42.8	8.9	44.9
High-track	11.2	20.4*	7.2*	20.7	43.0	11.2	51.1
Minority enrollment of class							
Low minority	19.2	22.7	14.6	36.6	56.3	12.3	55.6
Medium minority	19.9	24.2	17.7	42.8	54.1	15.0	52.7
High minority	25.2	36.1	19.6	37.6	58.7	14.3	51.4
Grade level of class							
7th grade	32.2	48.8	31.8	60.4	73.8	23.9	56.3
8th grade	32.9	37.1	23.8	32.9*	75.7	19.7	60.5
9th grade	15.7	18.1	10.7	27.9	61.7	8.7	48.7
10th grade	11.1	16.8	8.9*	29.3	45.7	8.8	51.1
11th grade	11.2	15.9	6.4	23.5*	36.8	6.8	47.0
12th grade	13.9	24.2	13.1*	25.3*	41.0	11.3	62.4

*Coefficient of variation greater than 30 percent.

NOTE: The estimates for life science, physical science, and history represent the proportion of students taught by teachers without at least a minor in *those particular subfields.*

SOURCE: R. Ingersoll, *Out-of-Field Teaching and Educational Equality,* NCES 96-040. (Washington, DC: U.S. Department of Education, 1996).

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Appendix table 1-25.
Percentage of public schools and instructional rooms with Internet access, by school characteristics: 1994-96

Characteristic	Percentage of schools with Internet access			Percentage of instructional rooms with Internet access		
	1994	1995	1996	1994	1995	1996
All public schools	35 (1.5)	50 (1.8)	65 (1.8)	3 (0.3)	8 (0.7)	14 (1.0)
Instructional level						
Elementary	30 (1.9)	46 (2.4)	61 (2.1)	3 (0.4)	8 (1.0)	13 1.5)
Secondary	49 (2.4)	65 (2.7)	77 (1.8)	4 (0.6)	8 (1.0)	16 (1.5)
Percent minority enrollment						
Less than 6 percent	– –	52 (3.3)	65 (3.4)	– –	9 (1.4)	18 (2.4)
6 to 20 percent	– –	58 (4.4)	72 (3.0)	– –	10 (1.5)	18 (2.2)
21 to 49 percent	– –	54 (4.0)	65 (3.2)	– –	9 (2.1)	12 (2.3)
50 percent or more	– –	40 (3.8)	56 (4.6)	– –	3 (1.0)	5 (1.5)
Percent of students eligible for free or reduced-price school lunch						
Less than 11 percent	– –	62 (3.5)	78 (3.6)	– –	9 (1.6)	18 (2.9)
11 to 30 percent	– –	59 (3.6)	72 (3.1)	– –	10 (1.8)	16 (2.0)
31 to 70 percent	– –	47 (2.9)	58 (3.2)	– –	7 (1.6)	14 (1.8)
71 percent or more	– –	31 (4.3)	53 (5.2)	– –	3 (0.9)	7 (1.6)

– = data not available

NOTE: Instructional rooms include classrooms, computer and other labs, and library/media centers. Standard errors are shown in parentheses.

SOURCE: National Center for Education Statistics, "Advanced Telecommunications in U.S. Public Elementary and Secondary Schools, Fall 1996," *Statistics in Brief*, NCES 97-944 (Washington, DC: U.S. Department of Education, 1997).

See figure 1-17.

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Appendix table 1-26.
Proficiency of grade 8 mathematics students, by teachers' backgrounds in mathematics: 1988

Student proficiency level	Teachers have taken calculus or below		Teachers have taken advanced mathematics	
	And have no mathematics education	And have a mathematics education	And have no mathematics education	And have a mathematics education
Unable to perform simple mathematics operations on whole numbers	22	21	17	16
Able to perform simple arithmetic operations on whole numbers	40	43	39	37
Able to perform simple arithmetic operations with decimals, fractions and roots	21	24	21	25
Able to perform simple problem solving	17	13	22	22

SOURCE: B. Chaney, *Student Outcomes and the Professional Preparation of Eighth Grade Teachers in Science and Mathematics*, report prepared for the National Science Foundation (Rockville, MD: Westat, Inc., 1995).

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Appendix table 1-27.

Trends in average scale scores on the National Assessment of Educational Progress in mathematics, by age, sex, and race/ethnicity: 1973-96, selected years

	All students	Males	Females	Difference, male vs. female	Whites	Blacks	Difference, white vs. black	Hispanics	Difference, white vs. Hispanic
Age 9									
1973	219 (0.8)	218 (0.7)	220 (1.1)	-3 (1.3)	225 (1.0)	190 (1.8)	35 (2.1)	202 (2.4)	23 (2.6)
1978	219 (0.8)	217 (0.7)	220 (1.0)	-3 (1.3)	224 (0.9)	102 (1.1)	32 (1.5)	203 (2.2)	21 (2.4)
1982	219 (1.1)	217 (1.2)	221 (1.2)	-4 (1.7)	224 (1.1)	195 (1.6)	29 (2.0)	204 (1.3)	20 (1.7)
1986	222 (1.0)	222 (1.1)	222 (1.2)	0 (1.6)	227 (1.1)	202 (1.6)	25 (2.0)	205 (2.1)	22 (2.3)
1990	230 (0.8)	229 (0.9)	230 (1.1)	-1 (1.6)	235 (0.8)	208 (2.2)	27 (2.4)	214 (2.1)	21 (2.3)
1992	230 (0.8)	231 (1.0)	228 (1.0)	2 (1.4)	235 (0.8)	208 (2.0)	27 (2.2)	212 (2.3)	23 (2.5)
1994	231 (0.8)	232 (1.0)	230 (0.9)	2 (1.4)	237 (1.0)	212 (1.6)	25 (1.8)	210 (2.3)	27 (2.5)
1996	231 (0.8)	233 (1.2)	229 (0.7)	4 (1.4)	237 (1.0)	212 (1.4)	25 (1.8))	215 (1.7)	22 (2.0)
Age 13									
1973	266 (1.1)	265 (1.3)	267 (1.1)	-2 (1.7)	274 (0.9)	228 (1.9)	46 (2.1)	239 (2.2)	35 (2.4)
1978	264 (1.1)	264 (1.3)	265 (1.1)	-1 (1.7)	272 (0.8)	230 (1.9)	42 (2.1)	238 (2.0)	34 (2.1)
1982	269 (1.1)	296 (1.4)	268 (1.1)	1 (1.7)	274 (1.0)	240 (1.6)	34 (1.9)	252 (1.7)	22 (1.9)
1986	269 (1.2)	270 (1.1)	268 (1.5)	2 (1.9)	274 (1.3)	249 (2.3)	24 (2.6)	254 (2.9)	19 (3.2)
1990	270 (0.9)	271 (1.2)	270 (0.9)	2 (1.5)	276 (1.1)	249 (2.3)	27 (2.6)	255 (1.8)	22 (2.1)
1992	273 (0.9)	274 (1.1)	272 (1.0)	2 (1.5)	279 (0.9)	250 (1.9)	29 (2.1)	259 (1.8)	20 (2.0)
1994	274 (1.0)	276 (1.3)	273 (1.0)	3 (1.6)	281 (0.9)	252 (3.5)	29 (3.7)	256 (1.9)	25 (2.1)
1996	274 (0.8)	276 (0.9)	272 (1.0)	4 (1.4)	281 (0.9)	252 (1.3)	29 (1.6)	256 (1.6)	26 (1.9)
Age 17									
1973	304 (1.1)	309 (1.2)	301 (1.1)	8 (1.6)	310 (1.1)	270 (1.3)	40 (1.7)	272 (2.2)	33 (2.5)
1978	300 (1.0)	304 (1.0)	297 (1.0)	7 (1.4)	306 (0.9)	268 (1.3)	38 (1.6)	276 (2.3)	30 (2.4)
1982	299 (0.9)	302 (1.0)	296 (1.0)	6 (1.4)	304 (0.9)	272 (1.2)	32 (1.5)	277 (1.8)	27 (2.0)
1986	302 (0.9)	305 (1.2)	299 (1.0)	5 (1.5)	308 (1.0)	279 (2.1)	29 (2.3)	283 (2.9)	24 (3.0)
1990	305 (0.9)	306 (1.1)	303 (1.1)	3 (1.5)	310 (1.0)	289 (2.8)	21 (3.0)	284 (2.9)	26 (3.1)
1992	307 (0.9)	309 (1.1)	305 (1.1)	4 (1.5)	312 (0.8)	286 (2.2)	26 (2.4))	292 (2.6)	20 (2.8)
1994	306 (1.0)	309 (1.4)	304 (1.1)	4 (1.8)	312 (1.1)	286 (1.8)	27 (2.1)	291 (3.7)	22 (3.9)
1996	307 (1.2)	310 (1.3)	305 (1.4)	5 (1.9)	313 (1.4)	286 (1.7)	27 (2.2)	292 (2.1)	21 (2.5)

NOTES: Scale scores range from 0 to 300 for every grade level. Standard errors are shown in parentheses.

SOURCE: J. Campbell, C. Reese, C. O'Sullivan, and J. Dossey, *NAEP 1994: Trends in Academic Progress* (Washington, DC: National Center for Education Statistics, 1996).

See figure 1-9.

Science & Engineering Incicators – 1988

Appendix table 2-1.
Number of first university degrees and percentage of 24-year-olds who earn first university degrees in S&E, by region/country: Most recent year

Region/country	All first university degrees	Degree fields			24-year-olds			
		Natural sciences[a]	Social sciences[b]	Engineering	Total number	% with first univ. degree	% with NS&E degree	% with soc. sci. degree
Total, three world regions	5,208,205	764,820	642,777	739,051	64,944,472	8.0	2.3	1.0
Asia								
Total	2,043,677	301,877	280,775	343,774	48,543,046	4.2	1.3	0.6
China	325,484	54,394	32,075	148,844	24,413,600	1.3	0.8	0.1
Hong Kong	11,362	2,370	1,233	1,822	92,634	12.3	4.5	1.3
India	750,000	147,036	NA	29,000	15,545,800	4.8	1.1	NA
Indonesia	78,655	11,024	13,959	9,813	3,660,449	2.1	0.6	0.4
Japan	493,277	30,579	200,875	97,392	1,996,800	24.7	6.4	10.1
Malaysia	10,511	1,685	2,198	877	333,180	3.2	0.8	0.7
Singapore	5,599	2,103	1,820	1,676	50,000	11.2	7.6	3.6
South Korea	184,214	31,946	16,955	35,449	890,800	20.7	7.6	1.9
Taiwan	68,274	10,131	4,848	12,107	348,400	19.6	6.4	1.4
Thailand	116,301	10,609	6,812	6,794	1,211,383	9.6	1.4	0.6
Europe								
Total	1,713,423	309,837	138,896	283,530	10,479,620	16.4	5.7	1.3
European Union	982,939	149,180	77,532	132,101	5,674,706	17.3	5.0	1.4
Austria (long)	11,513	1,875	912	1,180	112,935	10.2	2.7	0.8
Belgium (long)	20,484	1,779	5,409	4,505	138,677	14.8	4.5	3.9
Denmark (short)	16,833	625	1,202	2,243	75,298	29.5	6.5	1.9
Denmark (long)	5,395	864	262	1,139				
Finland (short)	4,655	714	NA	2,325	63,174	22.4	9.0	1.3
Finland (long)	9,467	1,433	807	1,219				
France (long)	108,900	21,993	NA	20,562	855,915	12.7	5.0	NA
Germany (short)	71,367	12,224	10,101	25,502	1,354,866	14.5	5.8	1.4
Germany (long)	125,706	25,714	8,596	15,052				
Greece (long)	18,556	2,570	221	1,785	151,822	12.2	2.9	0.1
Ireland (short)	8,174	863	541	414	64,385	21.9	6.3	1.8
Ireland (long)	5,943	1,672	635	1,135				
Italy (short)	6,847	522	1,054	261	897,248	11.5	2.5	1.2
Italy (long)	96,278	12,563	9,371	8,755				
The Netherlands (long)	45,478	3,117	7,588	6,917	228,501	19.9	4.4	3.3
Portugal (short)	3,007	47	7	340	164,199	13.7	2.6	1.6
Portugal (long)	19,495	1,712	2,639	2,128				
Spain (short)	55,819	2,537	NA	6,720	659,319	20.9	3.7	0.9
Spain (long)	82,004	11,267	5,714	4,097				
Sweden (short)	8,126	785	1,141	135	124,567	12.7	3.3	1.1
Sweden (long)	7,644	867	171	2,369				
United Kingdom (short)[c]	251,248	43,437	21,161	23,318	783,800	32.1	8.5	2.7
European Free Trade Assoc.	32,378	2,468	2,485	5,224	176,587	18.3	4.4	1.4
Norway (short)	11,759	162	111	2,177	67,352	22.8	4.4	1.0
Norway (long)	3,620	605	575	NA				
Switzerland (short)	7,098	245	701	2,232	109,235	15.6	4.3	1.6
Switzerland (long)	9,901	1,456	1,098	815				
Central & Eastern Europe	698,106	158,189	58,879	146,205	4,628,327	15.1	6.6	1.3
Albania	3,963	896	165	535	63,583	6.2	2.3	0.3
Bulgaria	21,951	2,003	478	5,823	120,441	18.2	6.5	0.4
Czech Republic	19,566	2,310	354	5,532	154,028	12.7	5.1	0.2
Hungary (short)	7,725	663	NA	2,161	141,334	16.7	4.7	1.9
Hungary (long)	15,890	1,777	2,731	1,994				
Poland	60,224	7,786	4,940	9,680	527,999	11.4	3.3	0.9
Romania	34,240	3,985	287	16,114	374,828	9.1	5.4	0.1
Russia	445,006	127,655	33,236	90,746	2,019,464	22.0	10.8	1.6
Slovak Republic	9,149	1,014	112	3,059	82,430	11.1	4.9	0.1
Turkey	80,392	10,100	16,576	10,561	1,144,220	7.0	1.8	1.4
North America								
Total	1,451,105	153,106	223,106	111,747	5,921,806	24.5	4.5	3.8
Canada	147,001	14,260	26,067	8,482	381,002	38.6	6.0	6.8
Mexico	129,668	9,381	11,727	39,894	1,964,404	6.6	2.5	0.6
United States	1,174,436	129,465	185,312	63,371	3,576,400	32.8	5.4	5.2

Appendix table 2-1.
Number of first university degrees and percentage of 24-year-olds who earn first university degrees in S&E, by region/country: Most recent year

NA = not available; NS&E = natural sciences and engineering

NOTES: Data are compiled from numerous national and international sources, and degree fields may not be strictly comparable. First university degrees in different countries are of different duration and may not be academically equivalent. In European countries, *short* degree programs are three years long; *long* degree programs take four to six years. U.K. data are for 1996. Data for China, Japan, Singapore, South Korea, Taiwan, Austria, Switzerland, and the United States are for 1995. Data for Finland, France, Germany, Italy, Portugal, Sweden, Norway, Bulgaria, Czech Republic, Russia, Slovak Republic, Canada, and Mexico are for 1994. Data for Hong Kong, Belgium, Denmark, Greece, Ireland, the Netherlands, Spain, Albania, Hungary, Poland, Romania, and Turkey are for 1993. Data for Indonesia and Thailand are for 1992. Indian and Malaysian data are for 1990.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences, as well as mathematics and computer sciences.

[b]Social sciences include psychology, sociology, and other social sciences. Japanese social science data also include business administration. Mexican social science data are estimated.

[c]U.K. data include former colleges and polytechnics.

SOURCES: **ASIA: China**—National Research Center for Science and Technology for Development, unpublished tabulations, and UNESCO, *Statistical Yearbook* (Paris: 1996); **Hong Kong**—UNESCO (1996); **India**—Department of Science and Technology, *Research and Development Statistics 1994-95* (New Delhi: 1996); **Indonesia**—UNESCO (1996); **Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **Malaysia**—UNESCO (1996); **Singapore**—National University of Singapore, *Annual Report* (Singapore: 1996); **South Korea**—Ministry of Education, *Statistical Yearbook of Education* (Seoul: 1996); **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996); **Thailand**—UNESCO (1996); **EUROPEAN UNION: Austria**—Austrian Central Statistical Office, unpublished tabulations; **Belgium**—Organisation for Economic Co-operation and Development and Centre for Educational Research and Innovation (OECD/CERI), unpublished tabulations, and UNESCO (1996) (social sciences); **Denmark**—Department of Higher Education, Ministry of Education, unpublished tabulations (1997); **Finland**—Central Statistical Office, unpublished tabulations (1997), and OECD/CERI; **France**—Ministère de l'Éducation Nationale, *Repères et Références Statistiques sur les Enseignements et la Formation* (Vanves, France: 1996); **Germany**—Statistisches Bundesamt Wiesbaden, *Prüfungen an Hochschulen* (Wiesbaden: 1996); **Greece**—National Statistical Service of Greece, unpublished tabulations (1997), and OECD/CERI; **Ireland**—OECD/CERI; **Italy**—Consiglio nazionale delle ricerche, unpublished tabulations (1997); **the Netherlands**—Department for Statistics of Education and Science, Netherlands Central Bureau of Statistics, unpublished tabulations (1997); **Portugal**—OECD/CERI; **Spain**—Estadisticas e Investigaciones Sociales, Instituto National de Estadistica, unpublished tabulations (1997), and OECD/CERI; **Sweden**—Statistics Sweden, unpublished tabulations (1997), and OECD/CERI; **United Kingdom**—Higher Education Statistics Agency, *Students in Higher Education Institutions: 1995/96* (Cheltenham: 1997); **EUROPEAN FREE TRADE ASSOCIATION: Norway**—Institute for Studies in Research and Higher Education, the Norwegian Research Council, unpublished tabulations (1997); **Switzerland**—Swiss Federal Statistical Office, unpublished tabulations (1997); **CENTRAL AND EASTERN EUROPE: Albania**—UNESCO (1996); **Bulgaria**—UNESCO (1996); **Czech Republic**—UNESCO (1996); Hungary—OECD/CERI; **Poland**—UNESCO (1996); **Romania**—UNESCO (1996); **Russia**—UNESCO (1996); **Slovak Republic**—UNESCO (1996); **Turkey**—UNESCO (1996); **NORTH AMERICA: Canada**—UNESCO (1996) and OECD/CERI; **Mexico**—Asociación Nacional de Universidades e Instituciones de Educación Superior, *Anuario Estadístico 1995: Posgrado* (Mexico: 1996); and **United States**—National Science Foundation, Science Resources Studies Division, *Science and Engineering Degrees 1966-94,* NSF 96-321 (Arlington, VA: 1996).

See figures 2-1, 2-2, and 2-4, and text table 2-1.

Appendix table 2-2.
First university degrees in science and engineering awarded in selected Asian countries: 1975-95

	Six-country total	China	India[a]	Japan	Singapore	South Korea	Taiwan
All first university degrees							
1975	973,841	NA	NA	313,072	2,380	NA	29,053
1976	1,044,332	NA	629,336	326,167	2,388	34,725	29,053
1977	1,084,713	NA	651,999	339,819	2,357	37,374	29,685
1978	1,051,837	NA	675,478	356,981	2,422	41,447	30,740
1979	1,055,792	NA	620,247	374,887	2,763	45,964	32,383
1980	989,470	NA	599,795	378,666	2,645	50,973	34,223
1981	1,037,879	NA	522,963	386,057	2,187	56,528	32,214
1982	1,076,178	NA	560,893	382,466	2,395	62,688	33,341
1983	1,112,206	NA	595,288	369,069	2,905	77,272	34,507
1984	1,149,352	NA	628,453	372,247	3,725	90,888	35,714
1985	1,394,768	183,241	646,778	373,302	4,286	118,584	36,885
1986	1,464,453	207,405	678,470	376,260	4,818	137,848	38,567
1987	1,526,336	225,312	699,555	382,655	5,119	149,582	38,929
1988	1,579,580	249,337	724,739	382,828	5,227	161,983	40,205
1989	1,615,295	275,056	740,000	376,688	5,850	166,845	40,856
1990	1,638,655	273,684	750,000	400,103	6,000	165,916	42,952
1991	1,670,080	262,088	750,000	428,079	6,000	175,586	48,327
1992	1,725,220	298,438	750,000	437,878	5,897	178,632	54,375
1993	1,820,632	347,068	750,000	445,774	5,796	208,834	63,160
1994	1,774,418	310,291	750,000	461,898	5,697	183,372	63,160
1995	1,826,848	325,484	750,000	493,277	5,599	184,214	68,274
Natural sciences[b]							
1975	107,673	NA	95,382	7,014	466	3,111	1,700
1976	110,601	NA	98,038	7,483	490	2,713	1,877
1977	113,264	NA	100,768	7,479	335	2,889	1,793
1978	117,006	NA	103,574	7,985	347	3,165	1,935
1979	113,848	NA	99,724	8,248	528	3,468	1,880
1980	116,399	NA	101,455	8,636	573	3,800	1,935
1981	118,357	NA	103,217	8,651	460	4,164	1,866
1982	120,802	NA	105,008	8,710	577	4,562	1,945
1983	123,251	NA	106,831	8,575	663	5,202	1,980
1984	126,699	NA	108,686	9,054	726	6,241	1,992
1985	148,888	8,686	119,979	9,166	854	8,112	2,091
1986	151,327	9,336	122,550	9,435	945	6,913	2,148
1987	159,186	9,115	129,907	9,817	1,012	7,082	2,253
1988	158,975	8,045	130,000	9,895	982	7,673	2,380
1989	164,262	8,153	134,366	9,900	1,166	8,249	2,428
1990	168,941	7,802	139,000	9,866	1,278	8,514	2,481
1991	169,656	6,598	139,000	10,452	1,278	9,703	2,625
1992	170,852	5,580	139,000	10,386	1,281	11,828	2,777
1993	176,626	11,087	139,000	10,757	1,283	11,634	2,865
1994	202,887	36,726	139,000	11,476	1,286	11,443	2,956
1995	205,298	38,029	139,000	12,089	1,289	11,828	3,063

Appendix table 2-2.
First university degrees in science and engineering awarded in selected Asian countries: 1975-95

	Six-country total	China	India[a]	Japan	Singapore	South Korea	Taiwan
Mathematics and computer sciences							
1975	3,690	NA	NA	2,490	NA	NA	1,200
1976	4,263	NA	NA	2,529	NA	398	1,336
1977	4,506	NA	NA	2,755	NA	464	1,287
1978	4,496	NA	NA	2,703	NA	563	1,230
1979	4,857	NA	NA	2,829	NA	683	1,345
1980	5,168	NA	NA	2,918	NA	828	1,422
1981	5,595	NA	NA	3,152	NA	1,005	1,438
1982	5,974	NA	NA	3,045	NA	1,393	1,536
1983	6,447	NA	NA	3,148	NA	1,589	1,710
1984	6,808	NA	NA	3,180	NA	1,918	1,710
1985	16,100	7,764	NA	3,532	NA	2,888	1,916
1986	16,956	8,604	NA	3,379	NA	2,839	2,134
1987	17,777	8,974	NA	3,572	NA	3,149	2,082
1988	22,846	11,115	NA	3,493	NA	5,824	2,414
1989	25,369	13,079	NA	3,395	NA	6,274	2,621
1990	26,456	13,408	NA	3,554	NA	6,676	2,818
1991	28,239	13,847	NA	3,765	NA	7,547	3,080
1992	29,686	14,301	NA	3,790	NA	8,229	3,366
1993	29,097	12,520	NA	4,221	NA	8,502	3,854
1994	17,770	NA	NA	4,574	NA	8,784	4,412
1995	22,067	NA	NA	4,884	NA	12,351	4,832
Agriculture							
1975	16,792	NA	3,966	9,480	NA	2,546	800
1976	18,166	NA	4,623	9,965	NA	2,680	898
1977	19,531	NA	5,388	10,455	NA	2,822	866
1978	21,149	NA	6,280	10,937	NA	2,971	961
1979	23,128	NA	6,280	12,794	NA	3,128	926
1980	22,051	NA	6,599	11,182	NA	3,293	977
1981	23,363	NA	6,934	11,555	NA	3,837	1,037
1982	23,805	NA	7,286	11,016	NA	4,493	1,010
1983	23,902	NA	7,656	10,658	NA	4,603	984
1984	24,520	NA	8,045	11,189	NA	4,327	959
1985	36,140	11,907	8,257	10,928	NA	4,068	980
1986	38,251	13,394	7,414	10,991	NA	5,483	969
1987	40,458	13,850	7,810	11,266	NA	6,395	1,137
1988	42,272	14,615	7,827	10,584	NA	8,050	1,196
1989	42,244	14,531	8,301	10,252	NA	8,027	1,133
1990	43,965	15,014	8,000	11,733	NA	8,005	1,234
1991	42,718	14,542	8,000	12,282	NA	6,586	1,272
1992	42,413	14,085	8,000	12,284	NA	6,628	1,311
1993	47,459	16,994	8,000	13,021	NA	7,843	1,561
1994	48,006	15,445	8,000	13,361	NA	9,281	1,859
1995	49,398	16,365	8,000	14,970	NA	7,767	2,236

Appendix table 2-2.
First university degrees in science and engineering awarded in selected Asian countries: 1975-95

	Six-country total	China	India[a]	Japan	Singapore	South Korea	Taiwan
Social sciences[c]							
1975	137,245	NA	NA	134,645	NA		2,600
1976	143,443	NA	NA	139,258	NA	1,423	2,762
1977	147,682	NA	NA	143,416	NA	1,379	2,887
1978	155,854	NA	NA	151,519	NA	1,452	2,883
1979	162,506	NA	NA	158,023	NA	1,528	2,955
1980	162,909	NA	NA	158,394	NA	1,609	2,906
1981	165,103	NA	NA	160,520	NA	1,694	2,889
1982	164,286	NA	NA	159,450	NA	1,783	3,053
1983	159,327	NA	NA	151,996	NA	4,297	3,034
1984	158,147	NA	NA	151,626	90	3,297	3,134
1985	174,750	13,855	NA	151,072	86	6,472	3,265
1986	178,441	16,515	NA	151,056	91	7,670	3,109
1987	182,845	19,619	NA	150,956	106	8,867	3,297
1988	186,578	22,707	NA	150,819	106	9,619	3,327
1989	186,159	27,713	NA	147,087	102	8,098	3,159
1990	199,707	28,728	NA	157,477	117	10,211	3,174
1991	225,221	32,163	NA	170,721	117	18,483	3,737
1992	236,131	36,009	NA	177,240	232	18,251	4,399
1993	233,751	31,656	NA	179,338	461	17,808	4,487
1994	239,078	29,622	NA	186,586	916	17,376	4,577
1995	256,573	32,075	NA	200,875	1,820	16,955	4,848
Engineering							
1975	92,976	NA	14,073	66,512	236	7,155	5,000
1976	95,838	NA	15,057	68,126	241	7,272	5,142
1977	99,947	NA	16,110	70,431	290	7,858	5,258
1978	104,421	NA	17,237	72,466	240	8,919	5,559
1979	109,356	NA	17,236	75,409	272	10,124	6,315
1980	111,080	NA	18,100	74,737	288	11,492	6,463
1981	116,043	NA	19,007	76,370	323	13,044	7,299
1982	117,198	NA	19,959	74,774	349	14,806	7,309
1983	120,324	NA	20,960	70,824	585	20,636	7,320
1984	123,755	NA	22,010	71,640	585	22,190	7,330
1985	198,734	73,075	21,088	72,560	769	23,539	7,703
1986	214,434	79,556	24,096	74,516	924	27,612	7,730
1987	227,315	87,166	27,057	77,077	907	27,600	7,508
1988	241,800	101,411	27,000	77,503	1,001	26,891	7,994
1989	255,297	112,108	28,927	77,009	1,105	28,141	8,007
1990	257,325	108,729	29,000	81,355	1,220	28,071	8,950
1991	272,295	114,620	29,000	87,397	1,347	30,692	9,239
1992	280,975	120,830	29,000	88,385	1,423	31,800	9,537
1993	283,075	120,831	29,000	88,406	1,503	33,043	10,293
1994	308,867	141,654	29,000	91,184	1,587	34,334	11,108
1995	324,468	148,844	29,000	97,392	1,676	35,449	12,107

NA = not available

[a]Indian data are estimated for 1990-95.

[b]Natural sciences here include physical, earth, atmospheric, oceanographic, and biological sciences.

[c]Social sciences include psychology, sociology, and other social sciences. Japanese social science data also include business administration.

SOURCES: **China**—National Research Center for Science and Technology for Development, unpublished tabulations; **India**—Department of Science and Technology, *Research and Development Statistics 1994-95* (New Delhi:1996); **Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **Singapore**—National University of Singapore, *Annual Report* (Singapore: 1996)*;* **South Korea**—Ministry of Education, *Statistical Yearbook of Education* (Seoul: 1996), Organisation for Economic Co-operation and Development and Centre for Educational Research and Innovation, unpublished tabulations, and UNESCO (1996); and **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996).

Appendix table 2-3.
Population of 20- to 24-year-olds in selected countries/regions: 1975-2010
(Thousands)

	China	India	Western Europe	United States	Japan
1975	89,178	52,885	25,819	19,527	9,189
1976	88,370	54,634	26,075	19,922	8,916
1977	87,569	56,441	26,336	20,244	8,652
1978	86,776	58,308	26,602	20,505	8,395
1979	85,990	60,237	26,872	20,716	8,146
1980	85,211	62,229	27,146	21,584	7,904
1981	89,116	63,681	27,628	21,508	7,959
1982	93,201	65,167	28,121	21,433	8,015
1983	97,472	66,688	28,626	21,358	8,071
1984	101,940	68,244	29,143	21,283	8,127
1985	106,612	69,837	29,672	21,208	8,184
1986	110,434	71,349	29,575	20,700	8,329
1987	114,392	72,893	29,482	20,205	8,477
1988	118,493	74,470	29,391	19,721	8,628
1989	122,740	76,082	29,302	19,249	8,781
1990	127,140	77,729	29,356	18,788	8,937
1991	126,109	79,529	28,732	18,780	9,137
1992	125,086	81,372	28,096	18,771	9,342
1993	124,072	83,256	27,504	18,762	9,551
1994	123,066	85,185	26,937	17,853	9,765
1995	122,068	87,158	26,393	17,626	9,984
1996	116,094	87,594	25,824	17,501	9,664
1997	110,412	88,033	25,255	17,377	9,354
1998	105,008	88,473	24,686	17,254	9,054
1999	99,869	88,916	24,117	17,131	8,763
2000	94,981	89,361	23,548	17,010	8,482
2001	94,112	92,010	23,324	18,068	8,255
2002	93,251	94,738	23,100	18,292	8,035
2003	92,398	97,546	22,876	18,515	7,820
2004	91,553	100,438	22,652	18,739	7,611
2005	90,715	103,415	22,428	18,962	7,408
2006	95,379	104,983	25,482	19,038	7,282
2007	100,284	106,575	28,535	19,113	7,158
2008	105,440	108,190	31,589	19,189	7,036
2009	110,862	109,831	34,642	19,264	6,917
2010	116,562	111,496	37,696	19,340	6,799

SOURCES: U.S. Bureau of the Census, *Current Population Reports,* series P-25, Nos. 519 and 917; and World Bank, Population and Human Resources Department, *Population Projections, 1992-1993 Edition* (Washington, DC).

See figure 2-3.

Appendix table 2-4.
Percentage of 24-year-olds who earn first university degrees in S&E, by sex and region/country: Most recent year

Region/country	All first university degrees	Degree fields			24-year-olds			
		Natural sciences[a]	Social sciences[b]	Engineering	Total number	% with first univ. degree	% with NS&E degree	% with soc. sci. degree
Males								
Asia								
Japan	334,227	22,536	163,517	91,078	1,023,200	32.7	11.1	16.0
South Korea	107,898	18,676	11,667	32,947	462,200	23.3	11.2	2.5
Taiwan	37,647	7,156	2,038	11,317	179,200	21.0	10.3	1.1
European Union								
Austria	6,530	1,189	370	1,069	57,775	11.3	3.9	0.6
Denmark	10,364	1,427	665	876	38,306	27.1	6.0	1.7
Finland	7,203	1,511	292	3,067	32,306	22.3	14.2	0.9
France	57,156	NA	NA	15,319	437,799	13.1	NA	NA
Germany	114,953	19,247	25,314	34,628	693,431	16.6	7.8	3.7
Greece	7,718	1,492	71	1,352	77,784	9.9	3.7	9.1
Ireland	6,712	1,347	433	1,339	33,135	20.3	8.1	1.3
Italy	47,863	6,662	3,944	8,075	457,580	10.5	3.2	0.9
The Netherlands	35,933	4,458	6,610	8,081	115,962	31.0	10.8	5.7
Portugal	8,538	748	902	1,804	83,440	10.2	3.1	1.1
Spain	60,521	8,026	1,688	9,016	338,120	17.9	5.0	0.5
Sweden	7,017	1,032	315	1,946	64,147	10.9	4.6	0.5
United Kingdom[c]	122,767	24,920	9,417	19,844	401,200	30.6	11.2	2.3
European Free Trade Association								
Norway	5,919	450	297	1,786	33,552	17.6	6.7	0.9
Switzerland	5,931	1,116	427	736	54,916	10.8	3.4	0.8
Central & Eastern Europe								
Czech Republic	10,054	1,501	1,196	4,244	80,019	12.6	7.2	1.5
Hungary	10,650	1,674	1,038	3,365	72,903	14.6	6.9	1.4
Poland	29,067	3,772	1,968	8,299	271,111	10.7	4.5	0.7
Turkey	45,557	5,227	8,140	8,010	583,346	7.8	2.3	1.4
North America								
Canada	52,728	7,625	9,835	6,616	193,759	27.2	7.3	5.1
United States	531,146	73,540	52,421	67,125	1,815,831	29.3	6.9	4.2
Females								
Asia								
Japan	159,050	8,043	37,358	3,358	973,600	16.3	1.2	3.8
South Korea	66,088	11,229	4,100	6,314	428,600	15.4	4.1	1.0
Taiwan	30,627	2,975	2,810	790	169,200	18.1	2.2	1.7
European Union								
Austria	5,200	566	529	77	55,160	9.4	1.2	1.0
Denmark	13,042	2,714	871	237	36,992	35.3	8.0	2.4
Finland	6,919	636	515	477	30,868	22.4	3.6	1.7
France	63,086	NA	NA	3,994	418,116	15.1	NA	NA
Germany	82,120	10,261	20,949	3,989	661,435	12.4	2.2	3.2
Greece	10,838	1,078	150	433	74,038	14.6	2.0	0.2
Ireland	7,392	1,188	743	210	31,250	23.7	4.5	2.4
Italy	55,262	6,423	6,481	941	439,668	12.6	1.7	1.5
The Netherlands	33,235	1,427	7,653	1,422	112,539	29.5	2.5	6.8
Portugal	13,964	1,011	1,744	664	80,759	17.3	2.1	2.2
Spain	77,302	5,778	4,026	1,801	321,199	24.1	2.4	1.3
Sweden	8,753	620	997	558	60,420	14.5	1.9	1.7
United Kingdom[c]	128,481	18,517	11,744	3,474	382,600	33.6	5.7	3.1
European Free Trade Association								
Norway	13,104	175	168	466	33,800	38.8	1.9	0.5
Switzerland	3,272	376	495	26	54,319	6.0	0.7	0.9
Central & Eastern Europe								
Czech Republic	9,512	852	1,845	1,316	74,009	12.9	2.9	2.5
Hungary	12,965	766	1,693	790	68,431	18.9	2.3	2.5
Poland	31,157	4,014	2,972	1,381	256,888	12.1	2.1	1.2
Turkey	27,025	4,007	4,374	2,063	560,849	4.8	1.1	0.8
North America								
Canada	70,474	5,533	14,742	1,122	187,243	37.6	3.6	7.9
United States	643,290	55,925	109,056	10,950	1,750,926	36.7	3.8	6.2

Appendix table 2-4.
Percentage of 24-year-olds who earn first university degrees in S&E, by sex and region/country: Most recent year

NA = not available; NS&E = natural sciences and engineering

NOTES: Data from European countries combine short (three-year) and long (four- to six-year) degree programs. Data are compiled from numerous national and international sources, and degree fields may not be strictly comparable. First university degrees in different countries are of different duration and may not be academically equivalent. U.K. data are for 1996. Data for Japan, South Korea, Taiwan, Austria, Switzerland, and the United States are for 1995. Data for Finland, France, Germany, Italy, Portugal, Sweden, Norway, Czech Republic, and Canada are for 1994. Data for Denmark, Greece, Ireland, the Netherlands, Spain, Hungary, Poland, and Turkey are for 1993.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural, as well as mathematics and computer sciences.

[b]Social sciences include psychology, sociology, and other social sciences. Japanese social science data also include business administration.

[c]U.K. data include former colleges and polytechnics.

SOURCES: **ASIA: Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **South Korea**—Ministry of Education, *Statistical Yearbook of Education* (Seoul: 1996); **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996); **EUROPEAN UNION: Austria**—Austrian Central Statistical Office, unpublished tabulations; **Denmark**—Department of Higher Education, Ministry of Education, unpublished tabulations (1997); **Finland**—Central Statistical Office, unpublished tabulations (1997), and Organisation for Economic Co-operation and Development and Centre for Educational Research and Innovation (OECD/CERI), unpublished tabluations; **France**—Ministère de l'Éducation Nationale, *Repères et Références Statistiques sur les Enseignements et la Formation* (Vanves, France: 1996); **Germany**—Statistisches Bundesamt Wiesbaden, *Prüfungen an Hochschulen* (Wiesbaden: 1996); **Greece**—National Statistical Service of Greece, unpublished tabulations (1997), and OECD/CERI; **Ireland**—OECD/CERI; Italy—Consiglio nazionale delle ricerche, unpublished tabulations (1997); **the Netherlands**—Department for Statistics of Education and Science, Netherlands Central Bureau of Statistics, unpublished tabulations (1997); **Portugal**—OECD/CERI; **Spain**—Estadisticas e Investigaciones Sociales, Instituto National de Estadistica, unpublished tabulations (1997), and OECD/CERI; **Sweden**—Statistics Sweden, unpublished tabulations (1997), and OECD/CERI; **United Kingdom**—Higher Education Statistics Agency, *Students in Higher Education Institutions: 1995/96* (Cheltenham: 1997); **EUROPEAN FREE TRADE ASSOCIATION: Norway**—Institute for Studies in Research and Higher Education, the Norwegian Research Council, unpublished tabulations (1997); **Switzerland**—Swiss Federal Statistical Office, unpublished tabulations (1997); **CENTRAL AND EASTERN EUROPE: Czech Republic**—UNESCO (1996); **Hungary**—OECD/CERI; **Poland**—UNESCO (1996); **Turkey**—UNESCO (1996); **NORTH AMERICA: Canada**—UNESCO (1996) and OECD/CERI; and **United States**—National Science Foundation, Science Resources Studies Division, *Science and Engineering Degrees 1966-94,* NSF 96-321 (Arlington, VA: 1996).

Appendix table 2-5.
Share of first university S&E degrees, by sex and country: Most recent year
(Percentages)

Region/country	Natural sciences[a]	Math & comp. sciences	Agricultural sciences	Social sciences[b]	Engineering
			Males		
Asia					
Japan	79	77	68	81	94
South Korea	56	60	63	73	93
Taiwan	73	71	66	42	93
European Union					
Austria	63	78	60	41	94
Denmark	69	16	67	43	79
Finland	49	87	63	36	87
France	NA	63	NA	NA	80
Germany	64	69	60	55	90
Greece	57	58	62	32	76
Ireland	46	63	68	37	86
Italy	46	51	66	38	90
The Netherlands	66	11	77	46	85
Portugal	36	45	47	34	73
Spain	53	67	52	30	83
Sweden	47	77	50	24	78
United Kingdom[c]	50	73	49	46	85
European Free Trade Assoc.					
Norway	54	84	78	43	82
Switzerland	72	88	63	40	93
Central & Eastern Europe					
Czech Republic	47	77	64	39	76
Hungary	66		69	38	81
Poland	33	32	62	40	86
Turkey	50	53	65	65	80
North America					
Canada	52	70	47	40	86
United States	53	65	65	45	85
			Females		
Asia					
Japan	21	23	32	19	6
South Korea	44	40	37	27	7
Taiwan	27	29	34	58	7
European Union					
Austria	37	22	40	59	6
Denmark	31	84	33	57	21
Finland	51	13	37	64	13
France	NA	37	NA	NA	20
Germany	36	31	40	45	10
Greece	43	42	38	68	24
Ireland	54	37	32	63	14
Italy	54	49	34	62	10
The Netherlands	34	89	23	54	15
Portugal	64	55	53	66	27
Spain	47	33	48	70	17
Sweden	53	23	50	76	22
United Kingdom[c]	50	27	51	55	15
European Free Trade Assoc.					
Norway	46	16	22	57	18
Switzerland	28	12	37	60	7
Central & Eastern Europe					
Czech Republic	53	23	36	61	24
Hungary	34		31	62	19
Poland	67	68	38	60	14
Turkey	50	47	35	35	20
North America					
Canada	48	30	53	60	14
United States	47	35	35	55	15

Appendix table 2-5.
Share of first university S&E degrees, by sex and country: Most recent year
(Percentages)

NA = not available

NOTES: Data from European countries combine short (three-year) and long (four- to six-year) degree programs. Data are compiled from numerous national and international sources, and degree fields may not be strictly comparable. First university degrees in different countries are of different duration and may not be academically equivalent. U.K. data are for 1996. Data for Japan, South Korea, Taiwan, Austria, Switzerland, and the United States are for 1995. Data for Finland, France, Germany, Italy, Portugal, Sweden, Norway, Czech Republic, and Canada are for 1994. Data for Denmark, Greece, Ireland, the Netherlands, Spain, Hungary, Poland, and Turkey are for 1993.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, and biological sciences.

[b]Social sciences include psychology, sociology, and other social sciences. Japanese social science data also include business administration.

[c]U.K. data include former colleges and polytechnics.

SOURCES: **ASIA: Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **South Korea**—Ministry of Education, *Statistical Yearbook of Education* (Seoul: 1996); **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996); **EUROPEAN UNION: Austria**—Austrian Central Statistical Office, unpublished tabulations; **Denmark**—Department of Higher Education, Ministry of Education, unpublished tabulations (1997); **Finland**—Central Statistical Office, unpublished tabulations (1997), and Organisation for Economic Co-operation and Development and Centre for Educational Research and Innovation (OECD/CERI), unpublished tabluations; **France**—Ministère de l'Éducation Nationale, *Repères et Références Statistiques sur les Enseignements et la Formation* (Vanves, France: 1996); **Germany**—Statistisches Bundesamt Wiesbaden, *Prüfungen an Hochschulen* (Wiesbaden: 1996); **Greece**—National Statistical Service of Greece, unpublished tabulations (1997), and OECD/CERI; **Ireland**—OECD/CERI; **Italy**—Consiglio nazionale delle ricerche, unpublished tabulations (1997); **the Netherlands**—Department for Statistics of Education and Science, Netherlands Central Bureau of Statistics, unpublished tabulations (1997); **Portugal**—OECD/CERI; **Spain**—Estadisticas e Investigaciones Sociales, Instituto National de Estadistica, unpublished tabulations (1997) and OECD/CERI; **Sweden**—Statistics Sweden, unpublished tabulations (1997), and OECD/CERI; **United Kingdom**—Higher Education Statistics Agency, *Students in Higher Education Institutions: 1995/96* (Cheltenham: 1997); **EUROPEAN FREE TRADE ASSOCIATION: Norway**—Institute for Studies in Research and Higher Education, the Norwegian Research Council, unpublished tabulations (1997); **Switzerland**—Swiss Federal Statistical Office, unpublished tabulations (1997); **CENTRAL AND EASTERN EUROPE: Czech Republic**—UNESCO (1996); **Hungary**—OECD/CERI; **Poland**—UNESCO (1996); **Turkey**—UNESCO (1996); **NORTH AMERICA: Canada**—UNESCO (1996) and OECD/CERI; and **United States**—National Science Foundation, Science Resources Studies Division, *Science and Engineering Degrees 1966-94,* NSF 96-321 (Arlington, VA: 1996).

Appendix table 2-6.
Proportion of first university degrees awarded in S&E, by region/country: Most recent year
(Percentages)

Region/country	Total first univ. degrees	Total S&E	Degree fields			
			Natural sciences[a]	Social sciences[b]	Engineering	Non-S&E
Asia						
China	100	72	17	10	46	28
Hong Kong	100	48	21	11	16	52
India	100	23	20	NA	4	77
Indonesia	100	44	14	18	12	56
Japan	100	67	6	41	20	33
Malaysia	100	45	16	21	8	55
Singapore	100	100	38	33	30	0
South Korea	100	46	17	9	19	54
Taiwan	100	40	15	7	18	60
Thailand	100	21	9	6	6	79
Europe						
European Union						
Austria	100	34	16	8	10	66
Belgium	100	57	9	26	22	43
Denmark	100	29	7	7	15	71
Finland	100	46	15	6	25	54
France	100	32	16	NA	16	68
Germany	100	46	16	9	21	54
Greece	100	25	14	1	10	75
Ireland	100	37	18	8	11	63
Italy	100	32	13	10	9	68
The Netherlands	100	39	7	17	15	61
Portugal	100	31	8	12	11	69
Spain	100	26	14	7	5	74
Sweden	100	35	10	8	16	65
United Kingdom[c]	100	35	17	8	9	65
European Free Trade Association						
Norway	100	24	5	4	14	76
Switzerland	100	39	10	11	18	61
Central & Eastern Europe						
Albania	100	40	23	4	13	60
Bulgaria	100	38	9	2	27	62
Czech Republic	100	42	12	2	28	58
Hungary	100	39	10	12	18	61
Poland	100	37	13	8	16	63
Romania	100	60	12	1	47	40
Russia	100	57	29	7	20	43
Slovak Republic	100	46	11	1	33	54
Turkey	100	46	13	21	13	54
North America						
Canada	100	33	10	18	6	67
Mexico	100	47	7	9	31	53
United States	100	32	10	16	5	68

Appendix table 2-6.
Proportion of first university degrees awarded in S&E, by region/country: Most recent year
(Percentages)

NA = not available

NOTES: Data from European countries combine short (three-year) and long (four- to six-year) degree programs. Data are compiled from numerous national and international sources, and degree fields may not be strictly comparable. U.K. data are for 1996. Data for China, Japan, Singapore, South Korea, Taiwan, Austria, Switzerland, and the United States are for 1995. Data for Finland, France, Germany, Italy, Portugal, Sweden, Norway, Bulgaria, Czech Republic, Russia, Slovakia, Canada, and Mexico are for 1994. Data for Hong Kong, Belgium, Denmark, Greece, Ireland, the Netherlands, Spain, Albania, Hungary, Poland, Romania, and Turkey are for 1993. Data for Indonesia and Thailand are for 1992. Indian and Malaysian data are for 1990.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural, as well as mathematics and computer sciences.

[b]Social sciences include psychology, sociology, and other social sciences. Japanese social science data also include business administration. Mexican social science data are estimated.

[c]U.K. data include former colleges and polytechnics.

SOURCES: **ASIA: China**—National Research Center for Science and Technology for Development, unpublished tabulations, and UNESCO, *Statistical Yearbook* (Paris: 1996); **Hong Kong**—UNESCO (1996); **India**—Department of Science and Technology, *Research and Development Statistics 1994-95* (New Delhi: 1996); **Indonesia**—UNESCO (1996); **Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **Malaysia**—UNESCO (1996); **Singapore**—National University of Singapore, *Annual Report* (Singapore: 1996)*;* **South Korea**—Ministry of Education, *Statistical Yearbook of Education, 1996* (Seoul: 1996); **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996); **Thailand**—UNESCO (1996); **EUROPEAN UNION: Austria**—Austrian Central Statistical Office, unpublished tabulations; **Belgium**—Organisation for Economic Co-operation and Development and Centre for Educational Research and Innovation (OECD/CERI), unpublished tabulations, and UNESCO (1996) (social sciences); **Denmark**—Department of Higher Education, Ministry of Education, unpublished tabulations (1997); **Finland**—Central Statistical Office, unpublished tabulations (1997), and OECD/CERI; **France**—Ministère de l'Éducation Nationale, *Repères et Références Statistiques sur les Enseignements et la Formation* (Vanves, France: 1996); **Germany**—Statistisches Bundesamt Wiesbaden, *Prüfungen an Hochschulen* (Wiesbaden: 1996); **Greece**—National Statistical Service of Greece, unpublished tabulations (1997), and OECD/CERI; **Ireland**—OECD/CERI; **Italy**—Consiglio nazionale delle ricerche, unpublished tabulations (1997); **the Netherlands**—Department for Statistics of Education and Science, Netherlands Central Bureau of Statistics, unpublished tabulations (1997); **Portugal**—OECD/CERI; **Spain**—Estadisticas e Investigaciones Sociales, Instituto National de Estadistica, unpublished tabulations (1997) and OECD/CERI; **Sweden**—Statistics Sweden, unpublished tabulations (1997), and OECD/CERI; **United Kingdom**—Higher Education Statistics Agency, *Students in Higher Education Institutions: 1995/96* (Cheltenham: 1997); **EUROPEAN FREE TRADE ASSOCIATION: Norway**—Institute for Studies in Research and Higher Education, the Norwegian Research Council, unpublished tabulations (1997); **Switzerland**—Swiss Federal Statistical Office, unpublished tabulations (1997); **CENTRAL AND EASTERN EUROPE: Albania**—UNESCO (1996); **Bulgaria**—UNESCO (1996); **Czech Republic**—UNESCO (1996); Hungary—OECD/CERI; **Poland**—UNESCO (1996); **Romania**—UNESCO (1996); **Russia**—UNESCO (1996); **Slovak Republic**—UNESCO (1996); **Turkey**—UNESCO (1996); **NORTH AMERICA: Canada**—UNESCO (1996) and OECD/CERI; **Mexico**—Asociación Nacional de Universidades e Instituciones de Educación Superior, *Anuario Estadístico 1995: Posgrado* (Mexico: 1996); and **United States**—National Science Foundation, Science Resources Studies Division, *Science and Engineering Degrees 1966-94,* NSF 96-321 (Arlington, VA: 1996).

Appendix table 2-7.
Proportion of first university degrees awarded in S&E, by sex and region/country: Most recent year
(Percentages)

Region/country	Total first univ. degrees	Total S&E	Degree fields			
			Natural sciences[a]	Social sciences[b]	Engineering	Non-S&E
Males						
Asia						
Japan	100	83	7	49	27	17
South Korea	100	59	17	11	31	41
Taiwan	100	54	19	5	30	46
European Union						
Austria	100	40	18	6	16	60
Denmark	100	29	14	6	8	71
Finland	100	68	21	4	43	32
Germany	100	69	17	22	30	31
Greece	100	38	19	1	18	62
Ireland	100	46	20	6	20	54
Italy	100	39	14	8	17	61
The Netherlands	100	53	12	18	22	47
Portugal	100	40	9	11	21	60
Spain	100	31	13	3	15	69
Sweden	100	47	15	4	28	53
United Kingdom[c]	100	44	20	8	16	56
European Free Trade Association						
Norway	100	43	8	5	30	57
Switzerland	100	38	19	7	12	62
Central & Eastern Europe						
Czech Republic	100	69	15	12	42	31
Hungary	100	57	16	10	32	43
Poland	100	48	13	7	29	52
Turkey	100	47	11	18	18	53
North America						
Canada	100	46	14	19	13	54
United States	100	43	13	17	12	57
Females						
Asia						
Japan	100	31	5	23	2	69
South Korea	100	33	17	6	10	67
Taiwan	100	21	10	9	3	79
European Union						
Austria	100	23	11	10	1	77
Denmark	100	29	21	7	2	71
Finland	100	24	9	7	7	76
Germany	100	43	12	26	5	57
Greece	100	15	10	1	4	85
Ireland	100	29	16	10	3	71
Italy	100	25	12	12	2	75
The Netherlands	100	32	4	23	4	68
Portugal	100	24	7	12	5	76
Spain	100	15	7	5	2	85
Sweden	100	25	7	11	6	75
United Kingdom[c]	100	26	14	9	3	74
European Free Trade Association						
Norway	100	6	1	1	4	94
Switzerland	100	27	11	15	1	73
Central & Eastern Europe						
Czech Republic	100	42	9	19	14	58
Hungary	100	25	6	13	6	75
Poland	100	27	13	10	4	73
Turkey	100	39	15	16	8	61
North America						
Canada	100	43	13	17	12	57
United States	100	27	8	18	2	73

Appendix table 2-7.
Proportion of first university degrees awarded in S&E, by sex and region/country: Most recent year
(Percentages)

NA = not available

NOTES: Data from European countries combine short (three-year) and long (four- to six-year) degree programs. Data are compiled from numerous national and international sources, and degree fields may not be strictly comparable. U.K. data are for 1996. Data for Japan, South Korea, Taiwan, Austria, Switzerland, and the United States are for 1995. Data for Finland, Germany, Italy, Portugal, Sweden, Norway, Czech Republic, and Canada are for 1994. Data for Denmark, Greece, Ireland, the Netherlands, Spain, Hungary, Poland, and Turkey are for 1993.

[a]Natural sciences here include physical,earth, atmospheric, oceanographic, biological, and agricultural, as well as mathematics and computer sciences.

[b]Social sciences include psychology, sociology, and other social sciences. Japanese social science data also include business administration.

[c]U.K. data include former colleges and polytechnics.

SOURCES: ASIA: **Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **South Korea**—Ministry of Education, *Statistical Yearbook of Education* (Seoul: 1996); **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996); **EUROPEAN UNION: Austria**—Austrian Central Statistical Office, unpublished tabulations; **Denmark**—Department of Higher Education, Ministry of Education, unpublished tabulations (1997); **Finland**—Central Statistical Office, unpublished tabulations (1997), and Organisation for Economic Co-operation and Development and Centre for Educational Research and Innovation (OECD/CERI); **Germany**—Statistisches Bundesamt Wiesbaden, *Prüfungen an Hochschulen* (Wiesbaden: 1996); **Greece**—National Statistical Service of Greece, unpublished tabulations (1997), and OECD/CERI; **Ireland**—OECD/CERI; **Italy**—Consiglio nazionale delle ricerche, unpublished tabulations (1997); **the Netherlands**—Department for Statistics of Education and Science, Netherlands Central Bureau of Statistics, unpublished tabulations (1997); **Portugal**—OECD/CERI; **Spain**—Estadisticas e Investigaciones Sociales, Instituto National de Estadistica, unpublished tabulations (1997) and OECD/CERI; **Sweden**—Statistics Sweden, unpublished tabulations (1997), and OECD/CERI; **United Kingdom**—Higher Education Statistics Agency, *Students in Higher Education Institutions: 1995/96* (Cheltenham: 1997)*;* **EUROPEAN FREE TRADE ASSOCIATION: Norway**—Institute for Studies in Research and Higher Education, the Norwegian Research Council, unpublished tabulations (1997); **Switzerland**—Swiss Federal Statistical Office, unpublished tabulations (1997); **CENTRAL AND EASTERN EUROPE: Czech Republic**—UNESCO (1996); **Hungary**—OECD/CERI; **Poland**—UNESCO, *Statistical Yearbook* (Paris: 1996); **Turkey**—UNESCO (1996); **NORTH AMERICA: Canada**—UNESCO (1996) and OECD/CERI; and **United States**—National Science Foundation, Science Resources Studies Division, *Science and Engineering Degrees 1966-94,* NSF 96-321 (Arlington, VA: 1996).

Appendix table 2-8.
Enrollment in higher education, by Carnegie institution type: 1967-94

	Total	Research I	Research II	Doctorate-granting I	Doctorate-granting II	Comprehensive I	Comprehensive II	Liberal arts I	Liberal arts II	Two-year	Specialized	Other	Not classified
1967	6,963,687	1,510,037	494,527	437,195	354,542	1,661,186	109,412	203,663	411,819	1,426,223	179,824	26,108	149,151
1968	7,571,636	1,564,981	517,844	455,455	389,249	1,813,749	119,881	209,398	431,621	1,709,796	187,216	27,560	144,886
1969	8,066,233	1,644,645	538,934	483,378	410,395	1,935,316	127,467	215,618	443,108	1,912,663	196,120	29,914	128,675
1970	8,649,368	1,748,776	570,365	509,450	436,660	2,071,472	137,127	221,996	452,087	2,180,252	209,689	32,862	78,632
1971	9,025,031	1,717,735	577,538	519,572	457,251	2,160,655	143,124	228,947	464,590	2,435,108	219,362	35,281	65,868
1972	9,297,787	1,768,282	581,139	521,856	466,371	2,183,621	142,270	233,939	464,218	2,609,721	229,938	31,451	64,981
1973	9,694,297	1,771,632	592,051	526,349	479,905	2,249,865	141,812	236,910	477,097	2,872,230	250,810	36,007	59,629
1974	10,321,539	1,826,768	612,510	545,772	497,963	2,324,124	153,182	238,868	494,426	3,272,215	271,148	34,553	50,010
1975	11,290,719	1,921,415	642,703	560,827	532,135	2,464,953	163,672	240,097	541,017	3,837,843	304,401	35,149	46,507
1976	11,121,426	1,893,269	613,142	568,570	526,247	2,415,834	168,445	240,730	551,890	3,755,311	307,760	33,066	47,162
1977	11,418,631	1,877,142	619,941	579,896	543,360	2,474,300	174,612	243,738	573,678	3,926,266	322,060	35,077	48,561
1978	11,393,015	1,864,590	626,213	581,343	542,558	2,452,812	178,964	251,607	579,494	3,910,980	334,133	34,665	35,656
1979	11,707,126	1,903,347	639,287	594,589	547,418	2,462,361	183,554	251,231	603,830	4,103,418	349,810	34,984	33,297
1980	12,234,644	1,947,444	655,874	604,769	570,666	2,531,409	188,971	260,645	633,712	4,404,276	371,265	35,861	29,752
1981	12,517,753	1,961,015	659,114	610,640	578,653	2,564,542	197,462	257,592	644,924	4,598,599	382,729	37,109	25,374
1982	12,588,520	1,933,340	650,946	606,683	582,638	2,570,690	200,403	252,029	651,192	4,671,136	398,091	37,800	33,572
1983	12,633,930	1,957,038	648,369	612,818	589,126	2,592,710	205,689	254,700	668,374	4,640,343	408,837	39,412	16,514
1984	12,400,392	1,952,748	644,056	604,742	591,400	2,576,072	203,725	253,604	656,099	4,456,709	410,765	38,571	11,901
1985	12,411,945	1,959,685	641,723	603,961	589,103	2,589,406	208,603	254,972	656,146	4,452,391	406,794	38,467	10,694
1986	12,670,121	1,988,839	653,298	609,772	590,694	2,629,336	210,267	257,998	657,695	4,598,068	409,389	39,097	25,668
1987	12,925,116	2,013,832	664,997	619,854	601,073	2,675,959	219,167	262,649	665,726	4,736,425	404,257	41,729	19,448
1988	13,205,540	2,029,065	685,731	631,073	608,663	2,738,439	227,937	269,151	693,086	4,840,892	422,184	39,953	19,366
1989	13,621,203	2,046,868	704,842	644,062	623,988	2,831,502	238,431	266,907	716,902	5,069,469	419,901	40,260	18,071
1990	13,871,725	2,078,969	714,180	656,807	634,551	2,882,708	243,690	268,223	730,455	5,145,123	440,214	40,728	36,077
1991	14,527,724	2,094,841	720,127	660,908	643,519	2,961,425	255,272	268,960	757,093	5,590,543	454,819	44,370	75,847
1992	14,657,118	2,089,045	714,126	655,985	649,549	2,962,204	259,253	266,735	781,168	5,658,832	477,202	46,560	96,459
1993	14,477,792	2,078,622	701,058	648,068	644,533	2,941,741	261,163	264,222	791,081	5,498,797	489,342	47,936	111,229
1994	14,449,476	2,079,559	694,454	639,831	650,816	2,924,462	266,854	264,737	797,088	5,442,459	496,522	48,725	143,969
1995	14,432,145	2,080,163	691,292	638,157	659,197	2,921,613	265,523	267,327	809,443	5,406,744	496,508	48,878	147,300

SOURCES: National Center for Education Statistics, Enrollment Survey (Washington, DC: 1995); and National Science Foundation, Science Resources Studies Division, unpublished tabulations.

See figures 2-5 and 2-6.

Appendix table 2-9.
Number of science and engineering degrees, by degree level and institution type: 1995

Institution type	Total degrees	Total S&E	Natural sciences[a]	Math & computer sciences	Social sciences[b]	Engineering	Engineering technology[c]
Bachelor's degrees							
Total	1,174,436	378,148	90,845	38,620	185,312	63,371	16,607
Research I	277,600	125,652	31,638	8,006	55,994	30,014	1,631
Research II	94,638	34,672	8,116	2,236	16,155	8,165	1,194
Doctorate-granting I	81,634	23,697	4,865	2,433	12,513	3,886	1,128
Doctorate-granting II	78,568	27,154	5,319	2,836	12,224	6,775	1,044
Comprehensive I	386,961	100,486	23,782	13,633	53,236	9,835	6,347
Comprehensive II	36,300	8,196	1,886	1,364	4,635	311	708
Liberal arts I	52,036	25,523	7,758	1,738	15,567	460	0
Liberal arts II	114,318	25,156	6,501	4,171	13,474	1,010	1,778
Two-year	1,707	146	50	20	56	20	447
Specialized	43,892	4,779	593	2,008	308	1,870	2,211
Other	4,858	2,477	328	157	967	1,025	17
Not classified	1,924	210	9	18	183	0	102
Master's degrees							
Total	399,428	94,309	14,793	14,495	36,391	28,630	1,577
Research I	122,809	39,502	7,206	5,054	11,916	15,326	382
Research II	33,115	10,916	1,799	1,359	3,556	4,202	34
Doctorate-granting I	39,557	9,025	1,192	1,896	3,691	2,246	169
Doctorate-granting II	30,319	8,726	1,416	1,640	2,902	2,768	102
Comprehensive I	133,128	20,486	2,441	3,844	11,047	3,154	711
Comprehensive II	6,707	519	42	71	366	40	37
Liberal arts I	4,779	1,016	148	22	800	46	0
Liberal arts II	3,624	463	47	8	392	16	28
Specialized	20,708	2,038	465	522	405	646	63
Other	3,917	1,552	37	65	1,264	186	51
Not classified	765	66	0	14	52	0	0
Doctoral degrees							
Total	44,513	25,921	10,219	2,069	7,521	6,112	19
Research I	28,548	17,837	7,504	1,536	4,111	4,686	7
Research II	5,034	2,874	1,161	235	775	703	0
Doctorate-granting I	4,633	2,199	505	194	1,169	331	0
Doctorate-granting II	2,101	1,261	442	95	417	307	0
Comprehensive I	723	224	47	0	132	45	12
Comprehensive II	12	12	3	0	9	0	0
Liberal arts I	167	49	18	5	26	0	0
Liberal arts II	42	15	0	0	15	0	0
Specialized	2,241	641	538	2	68	33	0
Other	985	809	1	2	799	7	0
Not classified	27	0	0	0	0	0	0

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

[c]Engineering technology data are not included in "Total S&E."

SOURCES: National Center for Education Statistics, Completion Survey (Washington, DC: 1995); and National Science Foundation, Science Resources Studies Division, unpublished tabulations.

See figures 2-5 and 2-7.

Appendix table 2-10.
Number of institutions awarding science and engineering degrees, by degree level and institution type: 1995

Institution type	Total institutions	Total S&E	Natural sciences[a]	Math & computer sciences	Social sciences[b]	Engineering	Engineering technology[c]
Bachelor's degrees							
Total	1,810	1,457	1,286	1,296	1,355	398	346
Research I	88	87	87	86	86	78	21
Research II	38	38	38	38	38	34	15
Doctorate-granting I	49	48	45	46	48	24	16
Doctorate-granting II	59	58	58	57	56	40	21
Comprehensive I	438	433	416	421	430	127	155
Comprehensive II	93	93	87	83	91	15	18
Liberal arts I	163	157	153	149	157	21	0
Liberal arts II	462	440	374	362	410	34	59
Two-year	44	11	1	4	5	1	11
Specialized	352	77	18	44	23	18	28
Other	18	13	8	4	10	6	1
Not classified	6	2	1	2	1	0	1
Master's degrees							
Total	1,312	746	474	434	611	265	78
Research I	87	87	87	84	87	79	11
Research II	38	38	38	38	38	33	4
Doctorate-granting I	49	49	46	44	46	20	8
Doctorate-granting II	59	59	55	49	52	36	6
Comprehensive I	437	345	191	187	291	71	40
Comprehensive II	92	28	6	5	17	2	2
Liberal arts I	58	24	11	7	18	2	0
Liberal arts II	158	24	5	1	19	2	2
Specialized	301	69	33	16	20	18	4
Other	31	22	2	2	22	2	1
Not classified	2	1	0	1	1	0	0
Doctoral degrees							
Total	479	329	257	171	258	170	4
Research I	88	88	88	81	87	78	2
Research II	38	38	38	36	36	32	0
Doctorate-granting I	50	50	37	28	48	18	0
Doctorate-granting II	59	56	44	23	39	27	0
Comprehensive I	74	30	13	0	15	8	2
Comprehensive II	2	2	1	0	1	0	0
Liberal arts I	11	5	2	1	4	0	0
Liberal arts II	4	1	0	0	1	0	0
Specialized	127	39	33	1	8	6	0
Other	25	20	1	1	19	1	0
Not classified	1	0	0	0	0	0	0

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

[c]Engineering technology data are not included in "Total S&E."

SOURCES: National Center for Education Statistics, Completion Survey (Washington, DC: 1995); and National Science Foundation, Science Resources Studies Division, unpublished tabulations.

See figure 2-5.

Appendix table 2-11.
Total undergraduate enrollment, by race/ethnicity, citizenship, and sex: 1978-95

Race/ethnicity and citizenship	1978	1980	1982	1984	1986	1988	1990	1992	1993	1994	1995
All students											
Total	9,808,815	9,821,513	10,205,475	10,081,336	10,952,167	11,453,788	12,011,657	12,693,778	12,482,813	12,417,701	12,399,826
White	7,872,635	7,827,035	8,060,213	7,635,957	8,406,100	8,737,576	9,232,090	9,388,226	9,101,085	8,905,614	8,806,202
Asian	206,065	225,422	280,062	296,123	384,004	431,053	491,134	620,463	642,893	683,131	700,828
Black	968,059	968,481	956,510	860,322	982,214	1,002,515	1,125,591	1,282,732	1,292,621	1,319,262	1,336,052
Hispanic	501,053	523,021	582,726	547,837	691,621	741,814	840,370	1,032,817	1,064,348	1,120,929	1,167,472
Native American	71,891	70,553	74,123	66,120	81,356	84,108	95,135	110,879	112,727	117,856	120,728
Foreign citizen	170,517	201,034	212,999	200,146	199,921	202,815	227,337	258,661	269,139	270,909	268,544
Males											
Total	4,814,322	4,723,979	4,910,480	4,787,658	5,078,768	5,192,254	5,396,557	5,644,113	5,547,126	5,484,342	5,467,370
White	3,884,778	3,785,209	3,881,826	3,635,294	3,908,642	3,979,958	4,165,862	4,195,726	4,067,289	3,958,270	3,918,342
Asian	108,261	117,574	148,969	156,947	201,591	221,673	250,287	308,564	318,289	335,737	342,084
Black	416,816	407,497	400,746	352,703	396,749	395,359	440,209	496,123	500,194	503,381	507,380
Hispanic	244,149	244,444	270,386	250,043	313,108	329,866	371,232	453,488	467,155	490,827	505,162
Native American	33,481	31,621	33,589	29,498	35,592	35,501	39,692	46,572	47,233	48,920	50,223
Foreign citizen	116,583	134,864	143,000	132,496	127,364	122,320	129,275	143,640	146,966	147,207	144,179
Females											
Total	4,994,493	5,097,534	5,294,995	5,293,678	5,873,399	6,261,534	6,615,100	7,049,665	6,935,687	6,933,359	6,932,456
White	3,987,857	4,041,826	4,178,387	4,000,663	4,497,458	4,757,618	5,066,228	5,192,500	5,033,796	4,947,344	4,887,860
Asian	97,804	107,848	131,093	139,176	182,413	209,380	240,847	311,899	324,604	347,394	358,744
Black	551,243	560,984	555,764	507,619	585,465	607,156	685,382	786,609	792,427	815,881	828,672
Hispanic	256,904	278,577	312,340	297,794	378,513	411,948	469,138	579,329	597,193	630,102	662,310
Native American	38,410	38,932	40,534	36,622	45,764	48,607	55,443	64,307	65,494	68,936	70,505
Foreign citizen	53,934	66,170	69,999	67,650	72,557	80,495	98,062	115,021	122,173	123,702	124,365

SOURCES: National Center for Education Statistics (NCES), *Digest of Education Statistics* (Washington, DC: U.S. Government Printing Office, 1994); NCES, *Trends in Racial/Ethnic Enrollment in Higher Education: Fall 1982 Through Fall 1995* (Washington, DC: U.S. Government Printing Office, 1997); and NCES, unpublished tabulations.

Science & Engineering Indicators – 1998

Appendix table 2-12.
Undergraduate enrollment in engineering and engineering technology programs: 1979-96

Enrollment	1979	1981	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Engineering programs																
Total students	366,299	420,402	441,205	429,499	420,864	407,657	392,198	385,412	378,277	380,287	379,977	382,525	375,944	367,298	363,315	356,177
Total full time	340,488	387,577	406,144	394,635	384,191	369,520	356,998	346,169	338,529	338,842	339,397	344,126	337,817	328,463	325,489	317,772
Freshman	103,724	115,280	109,638	105,249	103,225	99,238	95,453	98,009	95,420	94,346	93,002	93,427	88,875	85,047	86,299	85,375
Sophomore	78,594	87,519	89,515	83,946	79,627	76,195	73,317	71,030	71,267	72,204	71,257	71,644	69,974	68,177	67,981	66,475
Junior	74,928	86,633	91,233	89,509	84,875	80,386	77,085	73,761	70,483	72,666	73,516	74,871	73,449	71,753	68,894	67,190
Senior	77,823	92,414	109,036	109,695	110,305	107,773	104,003	97,614	94,465	92,989	94,683	98,235	98,214	96,523	95,226	92,213
Fifth year	5,419	5,731	6,722	6,236	6,159	5,928	7,140	5,755	6,894	6,637	6,939	5,949	7,305	6,963	7,089	6,519
Total part time	25,811	32,825	35,061	34,864	36,673	38,137	35,200	39,243	39,748	41,445	40,580	38,399	38,127	38,835	37,826	38,405
Total schools	286	286	292	289	297	311	316	320	323	328	336	337	336	337	337	335
ABET-accredited schools[a]	239	250	258	258	264	270	277	281	284	289	303	309	310	315	316	317
Engineering technology programs																
Total students	NA	191,152	163,226	157,897	123,571	137,390	128,501	131,704	127,687	123,217	127,135	124,736	106,976	107,275	105,809	105,345
Total full time	NA	134,444	112,745	111,446	83,038	90,536	80,600	79,624	76,179	72,390	75,340	73,245	65,581	66,457	63,929	62,330
First year	NA	65,893	53,032	46,806	34,389	39,177	32,685	33,477	32,225	30,178	31,302	30,543	24,824	24,574	25,665	26,583
Second year	NA	40,774	33,799	31,716	23,293	25,612	22,906	21,852	21,627	20,586	20,815	21,081	19,962	20,997	18,863	17,267
Other years assoc.	NA	872	925	1,165	466	657	1,404	1,760	1,810	1,603	2,221	2,336	2,564	3,121	2,007	2,780
BA of engineering tech Third and later years	NA	26,905	24,989	31,759	24,890	25,090	23,605	22,535	20,517	20,023	21,002	19,285	18,231	17,765	17,394	15,700
Total part time	NA	56,708	50,481	46,451	40,533	46,854	47,901	52,080	51,508	50,827	51,795	51,491	41,395	40,818	41,880	43,015
Total schools	NA	NA	NA	NA	200	257	291	310	286	303	302	298	263	294	289	285

NA = not available

[a]Schools with at least one curriculum accredited by the Accreditation Board of Engineering and Technology (ABET).

SOURCE: American Association of Engineering Societies, Engineering Workforce Commission, *Engineering and Technology Enrollments, Fall 1979-1996* (Washington, DC: 1996), unpublished tabulations.

Science & Engineering Indicators – 1998

Appendix table 2-13.
Engineering enrollment, by attendance pattern: 1979-96

	Undergraduate			Graduate		
	Total	Full time	Part time	Total	Full time	Part time
			Number			
1979	366,299	340,488	25,811	67,152	41,384	25,768
1980	397,344	365,117	32,227	72,585	44,335	28,250
1981	420,402	387,577	32,825	77,600	47,782	29,818
1982	435,330	403,390	31,940	81,999	50,410	31,589
1983	441,205	406,144	35,061	91,040	57,366	33,674
1984	429,499	394,635	34,864	93,165	57,277	35,888
1985	420,864	384,191	36,673	95,505	60,641	34,864
1986	407,657	369,520	38,137	107,196	67,333	39,863
1987	392,198	356,998	35,200	110,778	69,343	41,435
1988	385,412	346,169	39,243	112,007	69,226	42,781
1989	378,277	338,529	39,748	114,048	68,967	45,081
1990	380,287	338,842	41,445	117,834	72,456	45,378
1991	379,977	339,397	40,580	123,497	74,568	48,929
1992	382,525	344,126	38,399	128,854	78,651	50,203
1993	375,944	337,817	38,127	128,081	78,885	49,196
1994	367,298	328,463	38,835	122,242	74,596	47,646
1995	363,315	325,489	37,826	118,506	72,215	46,291
1996	356,177	317,772	38,405	113,063	70,129	42,934
			Percent			
1979	100.0	93.0	7.0	100.0	61.6	38.4
1980	100.0	91.9	8.1	100.0	61.1	38.9
1981	100.0	92.2	7.8	100.0	61.6	38.4
1982	100.0	92.7	7.3	100.0	61.5	38.5
1983	100.0	92.1	7.9	100.0	63.0	37.0
1984	100.0	91.9	8.1	100.0	61.5	38.5
1985	100.0	91.3	8.7	100.0	63.5	36.5
1986	100.0	90.6	9.4	100.0	62.8	37.2
1987	100.0	91.0	9.0	100.0	62.6	37.4
1988	100.0	89.8	10.2	100.0	61.8	38.2
1989	100.0	89.5	10.5	100.0	60.5	39.5
1990	100.0	89.1	10.9	100.0	61.5	38.5
1991	100.0	89.3	10.7	100.0	60.4	39.6
1992	100.0	90.0	10.0	100.0	61.0	39.0
1993	100.0	89.9	10.1	100.0	61.6	38.4
1994	100.0	89.4	10.6	100.0	61.0	39.0
1995	100.0	89.6	10.4	100.0	60.9	39.1
1996	100.0	89.2	10.8	100.0	62.0	38.0

SOURCE: American Association of Engineering Societies, Engineering Workforce Commission, *Engineering and Technology Enrollments, Fall 1979-1996* (Washington, DC: 1996), unpublished tabulations.

Appendix table 2-14.
Undergraduate enrollment in engineering, by sex, race/ethnicity, and citizenship: 1979-96

		Sex		Race/ethnicity and citizenship						
						Underrepresented minorities				
	Total	Male	Female	White	Asian	Total	Black	Hispanic	Native American	Foreign citizen
					Number					
1979	366,299	321,868	44,431	302,566	12,243	28,729	15,842	12,068	819	22,761
1981	420,402	361,133	59,269	343,649	15,815	34,353	18,911	14,359	1,083	26,585
1983	441,205	372,374	68,831	354,329	23,007	37,432	19,698	16,462	1,272	26,437
1984	429,499	362,800	66,699	340,374	25,449	37,557	19,204	17,075	1,278	26,119
1985	420,864	354,612	66,252	323,899	28,767	39,657	19,819	18,598	1,240	28,541
1986	407,657	344,999	62,658	315,861	30,201	37,240	18,459	17,586	1,195	24,355
1987	392,198	331,917	60,281	296,749	32,795	38,640	19,142	18,253	1,245	24,014
1988	385,412	325,024	60,388	288,415	34,051	40,389	20,405	18,700	1,284	22,557
1989	378,277	318,067	60,210	281,948	33,360	41,338	21,013	19,007	1,318	21,631
1990	380,287	319,506	60,781	288,732	30,898	41,169	20,833	18,873	1,463	19,488
1991	379,977	316,719	63,258	271,906	37,803	48,692	24,563	22,441	1,688	21,576
1992	382,525	316,460	66,065	270,942	38,480	51,517	25,722	23,863	1,932	21,586
1993	375,944	309,412	66,532	263,073	37,835	52,437	25,920	24,586	1,931	22,599
1994	367,298	300,643	66,655	256,287	37,009	52,188	24,994	25,216	2,028	21,764
1995	363,315	296,029	67,286	249,896	38,329	53,670	25,569	25,998	2,103	21,420
1996	356,177	288,559	67,618	243,270	37,873	53,801	24,922	26,483	2,396	21,233
					Percent					
1979	100.0	87.9	12.1	82.6	3.3	7.8	4.3	3.3	0.2	6.2
1981	100.0	85.9	14.1	81.7	3.8	8.2	4.5	3.4	0.3	6.3
1983	100.0	84.4	15.6	80.3	5.2	8.5	4.5	3.7	0.3	6.0
1984	100.0	84.5	15.5	79.2	5.9	8.7	4.5	4.0	0.3	6.1
1985	100.0	84.3	15.7	77.0	6.8	9.4	4.7	4.4	0.3	6.8
1986	100.0	84.6	15.4	77.5	7.4	9.1	4.5	4.3	0.3	6.0
1987	100.0	84.6	15.4	75.7	8.4	9.9	4.9	4.7	0.3	6.1
1988	100.0	84.3	15.7	74.8	8.8	10.5	5.3	4.9	0.3	5.9
1989	100.0	84.1	15.9	74.5	8.8	10.9	5.6	5.0	0.3	5.7
1990	100.0	84.1	16.0	75.9	8.1	10.8	5.5	5.0	0.4	5.1
1991	100.0	83.4	16.6	71.6	9.9	12.8	6.5	5.9	0.4	5.7
1992	100.0	82.7	17.3	70.8	10.1	13.5	6.7	6.2	0.5	5.6
1993	100.0	82.3	17.7	70.0	10.1	13.9	6.9	6.5	0.5	6.0
1994	100.0	81.9	18.1	69.8	10.1	14.2	6.8	6.9	0.6	5.9
1995	100.0	81.5	18.5	68.8	10.5	14.8	7.0	7.2	0.6	5.9
1996	100.0	79.4	18.6	67.0	10.4	14.8	6.9	7.3	0.7	5.8

SOURCE: American Association of Engineering Societies, Engineering Workforce Commission, *Engineering and Technology Enrollments, Fall 1979-1996* (Washington, DC: 1996), unpublished tabulations.

See figure 2-10.

Appendix table 2-15.
Proportion of freshmen intending to major in science and engineering, by field, sex, and race/ethnicity: 1976-96
(Percentages)

Field and sex	1976	1978	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
All freshmen	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
White students																			
Total intending S&E majors	31.4	30.2	30.3	29.9	31.3	31.4	30.9	29.8	27.8	27.0	26.5	29.0	28.4	30.2	30.2	31.1	31.0	30.3	32.2
Natural sciences[a]	13.2	9.6	8.5	8.0	7.4	7.7	8.1	7.7	6.9	6.5	6.6	6.9	7.5	8.5	9.2	10.0	11.9	12.0	11.6
Math & comp. sciences	2.3	2.6	3.1	4.7	5.9	5.7	3.8	3.1	2.5	2.2	2.1	2.3	2.2	2.1	2.1	2.4	2.3	2.5	2.7
Social sciences[b]	7.3	7.7	7.3	6.3	6.4	6.5	8.0	8.3	8.2	9.7	9.6	10.5	9.9	9.0	9.5	9.4	8.9	8.5	9.0
Engineering	8.6	10.3	11.4	10.9	11.6	11.5	11.0	10.7	10.2	8.6	8.2	9.3	8.8	10.6	9.4	9.3	7.9	7.3	8.9
Males intending S&E majors	41.7	39.3	40.6	40.5	41.5	42.5	41.0	38.7	35.9	34.0	33.7	36.6	35.3	37.5	37.4	38.2	37.5	36.8	38.8
Natural sciences[a]	16.6	11.8	10.4	10.2	9.9	10.0	9.6	9.4	8.2	7.9	8.5	8.2	9.0	8.7	10.4	11.0	12.7	12.7	11.5
Math & comp. sciences	2.7	3.0	3.7	5.6	6.6	6.6	4.9	4.0	3.3	3.2	3.0	3.4	3.0	3.0	2.9	3.5	3.5	4.2	4.3
Social sciences[b]	7.5	6.7	6.5	5.5	5.1	5.9	6.6	6.7	6.2	7.2	7.4	8.2	7.8	7.0	7.6	7.6	7.5	6.6	6.8
Engineering	14.9	17.8	20.0	19.2	19.9	20.0	19.9	18.6	18.2	15.7	14.8	16.8	15.5	18.8	16.5	16.1	13.8	13.3	16.2
Females intending S&E majors	20.9	21.1	20.1	21.0	21.6	21.7	21.3	21.6	20.1	21.0	20.6	22.9	22.5	24.1	24.1	24.9	25.6	25.3	26.5
Natural sciences[a]	9.4	7.7	6.2	6.1	5.3	5.7	6.2	6.2	5.7	5.2	5.1	6.0	6.0	8.4	8.2	9.1	11.0	11.6	11.5
Math & comp. sciences	1.9	2.2	2.6	3.9	5.3	4.9	2.7	2.1	1.8	1.3	1.4	1.3	1.6	1.3	1.3	1.1	1.2	1.1	1.2
Social sciences[b]	7.7	8.7	8.2	7.4	7.5	7.4	9.6	10.2	10.0	12.3	11.7	12.8	11.9	11.3	11.5	11.1	10.4	10.4	10.9
Engineering	1.9	2.5	3.1	3.6	3.5	3.7	2.8	3.1	2.6	2.2	2.4	2.8	3.0	3.1	3.1	3.6	3.0	2.2	2.9
Asian students																			
Total intending S&E majors	49.8	45.9	48.4	47.6	49.8	50.1	48.7	51.1	46.2	47.2	44.7	43.1	42.9	44.2	43.7	42.9	44.9	40.6	42.9
Natural sciences[a]	20.3	16.1	11.9	12.7	13.3	15.0	15.2	15.9	14.5	15.1	14.6	11.9	12.8	14.7	16.1	16.2	16.4	15.3	16.2
Math & comp. sciences	3.8	4.1	5.0	6.1	7.3	7.5	5.4	3.2	4.2	3.9	3.3	2.7	3.5	3.6	2.5	2.9	4.2	4.6	4.9
Social sciences[b]	7.9	6.5	5.9	5.7	6.2	6.1	6.5	7.7	6.9	8.5	9.8	9.3	9.7	8.5	8.5	9.1	8.0	7.3	7.7
Engineering	17.8	19.2	25.6	23.1	23.0	21.5	21.6	24.3	20.6	19.7	17.0	19.2	16.9	17.4	16.6	14.7	16.3	13.4	14.1
Males intending S&E majors	60.3	55.2	59.3	58.3	59.6	59.8	59.9	60.0	56.2	55.5	52.8	51.8	52.3	54.1	51.3	50.8	52.6	48.5	50.1
Natural sciences[a]	20.9	15.8	13.5	13.2	14.7	16.9	16.3	15.7	14.9	14.5	15.5	13.1	14.4	15.5	16.3	16.3	16.3	15.1	15.0
Math & comp. sciences	3.8	4.0	3.8	5.4	5.7	6.6	5.5	3.1	4.4	4.6	3.9	3.1	4.7	4.8	3.6	4.1	5.8	6.5	7.3
Social sciences[b]	5.9	5.0	4.0	3.4	4.3	3.9	5.1	6.5	4.2	5.4	6.9	5.6	6.6	5.8	5.7	6.5	5.0	4.7	4.8
Engineering	29.7	30.4	38.0	36.3	34.9	32.4	33.0	34.7	32.7	31.0	26.5	30.0	26.6	28.0	25.7	23.9	25.5	22.2	23.0
Females intending S&E majors	38.3	36.7	34.7	36.3	40.0	39.5	37.4	40.4	36.2	37.8	36.2	34.7	33.8	34.6	36.2	34.9	36.4	33.7	35.3
Natural sciences[a]	19.6	16.5	10.1	11.9	11.7	12.9	14.0	16.2	14.3	15.5	13.7	11.4	11.1	14.3	15.7	15.8	16.7	15.8	17.0
Math & comp. sciences	3.7	4.3	6.5	7.0	9.1	8.4	5.4	3.3	4.1	3.2	2.8	2.4	2.4	2.4	1.6	1.9	2.4	2.7	2.5
Social sciences[b]	10.0	8.0	7.6	7.9	8.7	8.1	7.6	8.6	9.7	11.5	13.1	13.5	12.8	11.2	11.4	11.4	10.7	9.7	10.4
Engineering	5.0	7.9	10.5	9.5	10.5	10.1	10.4	12.3	8.1	7.6	6.6	7.4	7.5	6.7	7.5	5.8	6.6	5.5	5.4
Black students																			
Total intending S&E majors	31.7	30.7	30.4	30.7	33.3	31.5	28.9	30.4	27.9	30.7	31.1	31.2	31.4	35.3	37.1	37.7	35.6	35.5	36.2
Natural sciences[a]	8.9	5.7	4.7	5.0	5.3	5.3	5.8	5.8	4.8	5.1	4.7	5.7	5.3	6.4	7.8	8.9	8.8	10.4	10.0
Math & comp. sciences	1.5	2.6	4.7	6.8	8.3	9.0	6.9	7.0	4.5	4.4	4.0	4.4	4.5	5.0	4.7	4.8	4.5	5.3	5.5
Social sciences[b]	14.7	14.1	10.7	9.0	8.3	8.4	8.7	8.1	10.2	10.7	14.3	11.9	12.7	11.6	11.9	11.1	12.7	11.2	11.6
Engineering	6.6	8.3	10.3	9.9	11.4	8.8	7.5	9.5	8.4	10.5	8.1	9.2	8.9	12.3	12.7	12.9	9.6	8.6	9.1

Appendix table 2-15.
Proportion of freshmen intending to major in science and engineering, by field, sex, and race/ethnicity: 1976-96
(Percentages)

Field and sex	1976	1978	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Males intending S&E majors	34.2	33.1	34.8	35.9	38.5	35.7	33.5	34.8	31.8	35.0	34.1	34.2	32.8	39.7	41.8	42.8	38.1	37.7	37.2
Natural sciences[a]	10.4	6.0	5.0	5.7	5.8	6.2	6.3	5.8	5.0	5.3	5.7	5.2	5.7	6.0	7.7	8.5	8.1	9.4	7.7
Math & comp. sciences	1.6	3.2	4.8	7.0	8.0	8.9	7.4	7.8	4.9	5.3	4.2	5.3	5.0	5.0	5.0	5.7	5.0	6.6	6.9
Social sciences[b]	9.6	8.4	6.5	6.0	5.4	5.3	7.0	5.3	7.1	6.9	9.7	7.7	7.4	7.4	8.0	7.4	8.0	6.2	6.2
Engineering	12.6	15.5	18.5	17.2	19.3	15.3	12.8	15.9	14.8	17.5	14.5	16.0	14.7	21.3	21.1	21.2	17.0	15.5	16.4
Females intending S&E majors	24.0	23.3	23.4	24.3	27.2	25.5	23.4	25.0	23.0	25.8	26.7	27.5	28.0	30.7	32.1	32.8	30.4	31.5	32.1
Natural sciences[a]	7.5	5.8	4.4	4.8	4.9	4.3	5.6	5.9	4.4	4.7	4.1	5.8	5.6	6.8	8.0	9.5	8.9	10.7	10.5
Math & comp. sciences	1.4	2.3	4.6	6.6	8.5	9.1	6.6	6.5	4.3	3.8	3.8	4.0	4.1	5.0	4.5	4.2	4.2	4.5	4.7
Social sciences[b]	12.8	12.0	9.7	8.3	7.9	7.9	7.5	7.7	10.0	11.3	14.8	12.3	13.3	12.3	12.7	11.5	12.4	11.8	12.4
Engineering	2.3	3.2	4.7	4.6	5.9	4.2	3.7	4.9	4.3	6.0	4.0	5.4	5.0	6.6	6.9	7.6	4.9	4.5	4.5
Hispanic students																			
Total intending S&E majors	32.0	27.2	35.1	34.3	32.9	34.1	32.2	36.5	34.7	34.1	30.5	32.6	33.4	30.0	33.4	34.2	37.8	37.2	35.0
Natural sciences[a]	11.6	6.8	8.9	9.3	6.8	8.4	8.1	8.8	8.6	8.2	6.8	7.3	7.4	7.4	8.8	9.4	10.2	11.0	9.9
Math & comp. sciences	1.7	2.0	3.1	3.5	5.2	4.7	6.1	3.4	2.5	2.1	2.1	2.2	2.3	2.6	2.4	2.0	2.6	2.6	2.9
Social sciences[b]	10.6	9.4	10.4	7.4	9.0	8.3	7.8	11.5	11.4	12.5	12.6	12.8	12.8	9.7	12.0	12.5	13.6	12.5	12.1
Engineering	8.1	9.0	12.7	14.1	11.9	12.7	10.2	12.8	12.2	11.3	9.0	10.3	10.9	10.3	10.2	10.3	11.4	11.1	10.1
Males intending S&E majors	39.5	34.0	41.3	41.7	39.8	40.3	41.7	44.3	41.7	40.7	35.4	38.7	39.0	34.8	37.6	38.7	42.1	41.4	41.2
Natural sciences[a]	14.0	7.8	9.4	9.0	7.9	8.8	9.0	9.9	8.7	8.7	7.5	7.8	8.9	7.4	9.2	9.8	10.4	9.1	9.9
Math & comp. sciences	2.6	3.3	2.7	4.0	5.1	5.5	7.7	4.6	3.0	2.5	2.7	2.8	2.7	3.6	3.2	2.8	4.0	3.9	4.3
Social sciences[b]	8.6	6.9	8.1	5.1	7.3	6.4	7.7	8.4	8.0	10.1	9.3	9.9	7.9	6.8	8.1	9.4	9.1	8.2	8.8
Engineering	14.3	16.0	21.1	23.6	19.5	19.6	17.3	21.4	22.0	19.4	15.9	18.2	19.5	17.0	17.1	16.7	18.6	20.2	18.2
Females intending S&E majors	24.0	21.0	30.0	26.9	26.6	28.7	24.5	30.0	29.0	29.0	26.7	28.2	28.9	25.7	29.6	29.6	34.7	32.0	30.1
Natural sciences[a]	8.9	6.1	8.7	9.4	5.6	8.0	7.4	7.8	8.6	7.9	6.1	7.0	6.2	7.9	8.5	8.7	10.2	11.1	9.6
Math & comp. sciences	0.9	0.9	3.5	2.9	5.4	4.0	4.8	2.2	2.1	1.8	1.7	1.7	2.1	1.7	1.6	1.2	1.6	1.4	1.9
Social sciences[b]	12.8	11.9	12.4	9.2	10.5	10.3	7.9	14.1	14.2	14.7	15.3	15.3	16.2	12.4	15.3	15.3	17.2	16.0	14.6
Engineering	1.4	2.1	5.4	5.4	5.1	6.4	4.4	5.9	4.1	4.6	3.6	4.2	4.4	3.7	4.2	4.4	5.7	3.5	4.0
Native American students																			
Total intending S&E majors	30.5	32.0	34.0	26.8	27.7	26.1	27.1	26.4	29.6	30.7	30.8	32.7	30.9	30.3	30.9	30.8	30.0	29.8	32.2
Natural sciences[a]	13.7	9.3	7.6	6.6	6.7	6.7	9.2	6.9	7.8	8.4	7.4	6.5	10.7	8.4	9.1	9.5	9.4	11.3	11.8
Math & comp. sciences	2.5	2.2	3.9	3.0	4.6	4.7	3.6	3.3	2.3	2.6	2.3	1.8	1.6	2.4	2.0	2.4	2.4	2.5	3.3
Social sciences[b]	7.8	10.2	9.2	7.0	5.9	5.9	6.6	9.5	9.5	9.7	12.6	13.9	10.6	9.6	10.6	10.6	10.3	9.6	10.2
Engineering	6.5	10.3	13.3	10.2	10.5	8.8	7.7	6.7	10.0	10.0	8.5	10.5	8.0	9.9	9.2	8.3	6.8	6.4	6.9
Males intending S&E majors	39.4	38.1	41.5	39.2	34.2	35.2	33.2	32.6	39.7	39.9	37.3	39.1	35.9	36.6	37.6	36.5	34.1	36.3	38.5
Natural sciences[a]	17.2	11.8	9.9	8.8	6.9	9.7	9.9	10.3	9.8	11.0	9.5	8.5	12.3	8.4	9.6	11.7	10.0	11.8	11.6
Math & comp. sciences	3.4	1.9	4.8	4.7	6.1	5.1	3.5	4.6	3.0	3.4	3.4	2.0	2.2	3.3	3.0	2.8	3.5	4.3	5.7
Social sciences[b]	7.0	7.5	7.5	6.2	2.7	5.6	5.8	6.3	9.5	7.3	8.5	11.4	7.4	6.7	9.2	8.3	8.1	7.3	7.8
Engineering	11.8	16.9	19.3	19.5	18.5	14.8	14.0	11.4	17.4	18.2	15.9	17.2	14.0	18.2	15.8	13.7	12.5	12.9	13.4
Females intending S&E majors	21.8	25.9	26.7	15.6	22.4	18.8	22.1	20.6	21.4	23.8	25.6	28.1	26.8	25.5	25.6	26.5	26.5	25.2	27.5
Natural sciences[a]	10.6	6.9	5.3	4.5	6.7	4.6	9.0	3.9	5.9	6.7	5.7	5.2	9.1	8.5	8.5	7.8	10.1	11.0	11.7
Math & comp. sciences	1.6	2.6	3.2	1.5	3.1	4.4	3.7	2.1	1.8	1.9	1.4	1.5	1.3	1.7	1.2	2.1	1.5	1.2	1.6
Social sciences[b]	8.5	12.8	11.3	7.7	8.9	6.1	7.4	12.1	9.5	11.4	16.1	15.6	13.0	11.9	11.8	12.2	12.1	11.2	11.7
Engineering	1.1	3.6	6.9	1.9	3.7	3.7	2.0	2.5	4.2	3.8	2.4	5.8	3.4	3.4	4.1	4.4	2.8	1.8	2.5

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

SOURCE: University of California at Los Angeles, Higher Education Research Institute, *Survey of the American Freshman: National Norms* (Los Angeles: 1995), unpublished tabulations.

Appendix table 2-16.
Race/ethnicity of freshmen intending to major in science and engineering, by selected fields: 1976-96
(Percentages)

Field/subfield	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
White freshmen intending S&E majors																					
All S&E fields	87.6	87.1	87.9	86.2	85.9	87.4	85.2	85.7	85.9	84.1	84.1	83.1	80.2	81.9	78.9	76.9	78.9	79.1	76.7	76.5	76.7
Physical sciences	89.5	90.5	91.4	89.9	90.0	89.9	87.9	89.5	89.0	85.1	87.4	87.3	87.7	86.0	86.5	82.5	83.8	82.6	80.3	82.7	81.2
Biological sciences	88.8	89.4	89.0	88.1	88.3	87.8	85.8	85.2	84.2	83.8	82.7	81.8	79.9	80.8	77.8	76.2	78.4	78.6	77.8	76.6	76.4
Social sciences	84.0	83.1	83.5	83.3	83.4	87.0	84.7	84.8	85.4	87.2	84.4	85.0	80.5	83.6	78.2	77.8	80.0	80.1	77.7	77.6	77.7
Engineering	88.8	88.0	89.2	86.7	86.1	87.5	85.8	87.3	87.8	83.4	84.1	81.6	80.2	81.1	79.3	76.1	77.2	77.3	73.8	74.3	76.0
Asian freshmen intending S&E majors																					
All S&E fields	1.8	1.8	1.8	2.2	2.2	2.0	2.5	2.8	2.7	4.4	4.6	4.8	5.2	4.8	5.3	6.0	5.8	5.7	7.9	7.0	6.8
Physical sciences	2.3	2.7	2.3	2.8	2.3	2.8	3.6	3.5	4.0	6.1	5.4	5.0	5.5	4.4	5.4	5.8	5.9	5.5	8.0	6.8	6.6
Biological sciences	2.1	2.1	2.3	2.2	2.5	2.5	3.2	4.2	3.9	6.6	7.1	7.7	8.6	7.0	7.7	9.2	8.4	8.1	9.8	8.6	8.5
Social sciences	0.9	1.0	1.0	0.9	1.1	1.1	1.6	1.4	1.6	2.5	2.5	2.8	3.4	3.1	3.7	4.2	3.8	4.5	5.0	4.8	4.6
Engineering	2.4	2.4	2.2	3.1	2.9	2.7	3.0	3.4	3.5	5.7	5.8	6.0	6.4	6.4	6.4	6.7	6.9	6.3	10.5	8.9	8.0
Black freshmen intending S&E majors																					
All S&E fields	8.5	8.6	8.2	9.1	9.7	8.6	10.4	9.7	9.5	9.4	8.6	9.6	11.6	10.3	12.1	13.2	11.2	11.4	11.1	11.5	11.7
Physical sciences	6.3	5.0	4.7	5.8	6.0	5.6	6.9	6.0	5.6	7.7	5.3	5.7	5.3	7.2	5.3	8.6	7.2	9.0	8.7	8.1	9.1
Biological sciences	6.9	6.2	6.3	6.7	7.0	7.1	8.9	7.9	9.5	6.8	6.8	7.6	8.1	9.0	10.2	10.0	8.9	9.2	8.4	10.6	10.3
Social sciences	12.5	12.8	12.7	12.7	12.4	10.1	10.7	11.9	11.4	8.9	10.3	9.7	13.0	10.2	14.1	13.7	11.5	10.9	12.1	11.5	12.8
Engineering	6.8	7.3	6.7	7.7	8.7	7.6	9.4	7.6	7.0	8.5	7.4	9.8	10.1	9.4	10.6	13.4	12.2	12.7	11.0	10.9	10.7
Hispanic freshmen intending S&E majors																					
All S&E fields	1.3	1.9	1.4	2.0	1.6	1.3	1.8	1.3	1.2	1.6	2.1	1.9	2.3	2.3	2.5	2.7	4.1	5.9	7.1	7.6	8.0
Physical sciences	1.3	0.6	1.1	1.5	1.2	1.3	1.0	0.7	1.2	1.0	1.2	1.4	1.7	1.7	1.8	2.1	2.6	2.9	4.0	2.8	3.4
Biological sciences	1.9	1.9	1.9	2.2	1.9	2.6	2.0	1.8	1.9	1.8	2.2	2.2	2.7	2.2	2.5	2.8	4.2	5.9	4.1	4.5	4.6
Social sciences	1.8	2.6	2.0	2.6	2.1	1.4	2.0	1.5	1.2	1.5	2.1	1.9	2.5	2.4	2.7	2.9	4.9	7.5	5.6	6.1	5.8
Engineering	1.1	1.5	1.3	1.6	1.3	1.3	1.7	1.3	1.1	1.5	2.1	1.9	2.2	2.2	2.5	2.5	3.9	5.3	5.3	5.9	5.1
Native American freshmen intending S&E majors																					
All S&E fields	0.9	0.7	0.7	0.8	0.8	0.9	0.9	1.0	0.9	0.9	0.9	1.0	0.9	1.0	1.3	1.7	1.8	1.8	2.1	2.1	2.3
Physical sciences	1.2	0.5	0.6	1.0	0.6	0.8	0.9	1.3	0.6	0.8	1.1	1.1	0.8	0.9	2.1	1.5	1.5	1.3	2.1	2.2	2.9
Biological sciences	1.0	0.8	0.7	0.7	0.8	0.8	1.0	1.1	1.5	1.2	1.0	1.1	1.0	0.9	1.6	1.8	1.8	1.9	2.0	2.3	2.3
Social sciences	1.0	0.8	0.8	0.8	0.9	1.1	0.9	1.4	0.6	0.9	1.0	1.0	0.9	1.2	1.3	1.9	1.8	2.3	2.2	2.5	2.2
Engineering	0.7	0.5	0.6	0.7	0.7	0.9	0.9	0.9	0.7	0.6	0.9	1.0	0.8	1.0	1.1	1.5	1.6	1.5	1.7	1.8	1.8

NOTE: Details may not add to totals because students may check more than one race/ethnicity, e.g., white and Hispanic.

SOURCE: University of California at Los Angeles, Higher Education Research Institute, *Survey of the American Freshman: National Norms* (Los Angeles: 1997), unpublished tabulations.

See figure 2-9.

Appendix table 2-17.
Freshmen reporting need for remedial work in science or mathematics, by intended major, sex, and race/ethnicity: 1995
(Percentages)

Sex, race/ethnicity	All S&E majors needing remedial work in:		Physical science majors needing remedial work in:		Biological science majors needing remedial work in:		Social science majors needing remedial work in:		Engineering majors needing remedial work in:		Non-S&E majors needing remedial work in:	
	Science	Math	Science	Math	Science	Math	Science	Math	Science	Math	Science	Math
All students	9.5	21.2	6.2	13.0	9.7	22.0	10.5	27.5	9.0	14.3	10.9	25.0
Male	7.6	16.4	5.3	11.3	13.2	25.2	7.0	20.2	8.3	13.9	8.4	20.8
Female	11.4	26.6	7.6	15.5	10.8	24.4	12.8	32.2	12.2	15.5	12.7	28.0
White	6.8	17.8	4.4	11.1	6.8	19.1	8.5	24.2	5.7	10.3	9.0	22.0
Asian	15.9	20.6	11.1	10.2	15.4	20.3	20.0	26.9	14.8	18.1	22.8	25.7
Black	20.2	41.8	23.0	39.9	23.8	41.8	16.1	47.5	19.0	31.1	18.8	47.1
Hispanic	21.6	38.3	10.4	20.7	19.9	36.3	20.0	41.2	25.9	34.1	18.1	37.0
Native American	12.0	29.8	5.7	9.8	13.6	33.7	10.9	36.3	14.3	17.8	12.5	39.1

SOURCE: University of California at Los Angeles, Higher Education Research Institute, *Survey of the American Freshman: National Norms* (Los Angeles: 1997), unpublished tabulations.

See figure 2-8.

Appendix table 2-18.
Earned associate degrees, by field and sex: 1975-95

Field	1975	1977	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
All students																			
All degrees	362,969	409,942	407,471	405,710	420,910	440,000	461,888	457,851	459,087	451,258	440,816	441,093	440,375	459,048	486,297	508,704	519,098	546,574	544,094
S&E	NA	NA	NA	NA	NA	NA	23,796	28,095	26,486	25,267	23,130	21,520	19,733	19,810	19,352	22,722	23,420	25,581	24,228
Natural sciences[a]	NA	NA	NA	NA	NA	NA	5,013	4,990	4,321	3,924	3,694	3,818	3,712	3,996	4,112	4,585	4,787	5,484	5,456
Math & comp. sci.	NA	NA	NA	NA	NA	NA	10,707	13,696	13,680	11,567	9,953	9,575	8,846	8,600	8,640	10,376	10,275	10,634	10,410
Social sciences[b]	NA	NA	NA	NA	NA	NA	4,803	4,852	4,562	4,487	4,894	4,231	4,440	4,809	4,087	5,046	5,832	6,619	6,077
Engineering	NA	NA	NA	NA	NA	NA	3,273	4,557	3,923	5,289	4,589	3,896	2,735	2,405	2,513	2,715	2,526	2,844	2,285
Engineering tech.	30,906	38,588	41,716	43,696	52,478	58,574	51,317	50,671	53,667	49,880	49,815	49,646	48,342	46,938	45,106	40,592	40,946	42,414	39,190
Males																			
All degrees	191,855	212,120	193,696	185,329	190,152	198,698	208,830	204,517	204,325	197,955	192,227	191,912	187,125	192,433	200,043	208,856	213,263	222,247	219,704
S&E	NA	NA	NA	NA	NA	NA	13,145	15,689	14,695	14,403	13,152	12,266	10,607	10,568	10,360	12,063	12,103	13,023	12,461
Natural sciences[a]	NA	NA	NA	NA	NA	NA	2,959	2,927	2,460	2,173	2,113	2,151	1,965	2,195	2,278	2,605	2,686	2,948	2,978
Math & comp. sci.	NA	NA	NA	NA	NA	NA	5,395	7,007	7,128	6,015	5,297	5,028	4,563	4,431	4,438	5,187	5,123	5,384	5,434
Social sciences[b]	NA	NA	NA	NA	NA	NA	1,876	1,713	1,606	1,588	1,650	1,617	1,671	1,825	1,411	1,911	2,098	2,217	2,071
Engineering	NA	NA	NA	NA	NA	NA	2,915	4,042	3,501	4,627	4,092	3,470	2,408	2,117	2,233	2,360	2,196	2,474	1,978
Engineering tech.	29,108	34,957	36,749	37,847	45,329	50,823	45,521	45,068	47,946	44,340	44,158	44,053	42,766	41,435	39,777	35,666	36,129	36,899	34,196
Females																			
All degrees	171,114	197,822	213,775	220,381	230,758	241,302	253,058	253,334	254,762	253,303	248,589	249,181	253,250	266,615	286,254	299,848	305,835	324,327	324,390
S&E	NA	NA	NA	NA	NA	NA	10,651	12,406	11,791	10,864	9,978	9,254	9,126	9,242	8,992	10,659	11,317	12,558	11,767
Natural sciences[a]	NA	NA	NA	NA	NA	NA	2,054	2,063	1,861	1,751	1,581	1,667	1,747	1,801	1,834	1,980	2,101	2,536	2,478
Math & comp. sci.	NA	NA	NA	NA	NA	NA	5,312	6,689	6,552	5,552	4,656	4,547	4,283	4,169	4,202	5,189	5,152	5,250	4,976
Social sciences[b]	NA	NA	NA	NA	NA	NA	2,927	3,139	2,956	2,899	3,244	2,614	2,769	2,984	2,676	3,135	3,734	4,402	4,006
Engineering	NA	NA	NA	NA	NA	NA	358	515	422	662	497	426	327	288	280	355	330	370	307
Engineering tech.	1,798	3,631	4,967	5,849	7,149	7,751	5,796	5,603	5,721	5,540	5,657	5,593	5,576	5,503	5,329	4,926	4,817	5,515	4,994

NA = not available

NOTE: Data on associate degrees are not available for broad science and engineering fields before 1983.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

SOURCES: National Center for Education Statistics, Earned Degrees and Completion Surveys (Washington, DC: 1995), unpublished tabulations; and National Science Foundation, Science Resources Studies Division, unpublished tabulations.

See figure 2-5.

Science & Engineering Indicators – 1998

Appendix table 2-19.
Earned associate degrees, by field and race/ethnicity: 1977-95

Field	1977	1979	1981	1985	1987	1989	1990	1991	1992	1993	1994	1995
All students												
All degrees	409,942	407,471	420,910	459,087	440,816	440,375	459,048	486,297	508,704	519,098	546,574	544,094
Science and engineering	NA	NA	NA	25,957	22,167	19,479	19,406	19,154	22,361	23,118	25,172	23,644
Natural sciences[a]	NA	NA	NA	4,691	3,950	3,952	4,286	4,430	4,859	5,090	5,793	5,790
Math and computer sciences	NA	NA	NA	13,679	9,953	8,846	8,600	8,640	10,346	10,255	10,532	10,230
Social sciences[b]	NA	NA	NA	3,664	3,676	3,949	4,118	3,574	4,441	5,248	6,019	5,348
Engineering	NA	NA	NA	3,923	4,588	2,732	2,402	2,510	2,715	2,525	2,828	2,276
Engineering technology	38,244	40,891	51,661	51,579	47,434	46,180	44,739	42,595	38,015	38,473	39,889	36,956
Whites												
All degrees	342,382	331,173	339,183	355,422	345,546	330,557	343,629	376,869	388,049	392,637	419,962	408,126
Science and engineering	NA	NA	NA	18,133	16,169	13,898	13,684	13,842	15,487	15,631	17,809	16,310
Natural sciences[a]	NA	NA	NA	3,548	3,078	3,231	3,458	3,574	3,878	3,989	4,493	4,326
Math and computer sciences	NA	NA	NA	10,255	7,360	6,044	5,704	6,054	6,631	6,515	7,133	6,809
Social sciences[b]	NA	NA	NA	2,070	2,496	2,637	2,752	2,347	2,892	3,241	4,050	3,524
Engineering	NA	NA	NA	2,260	3,235	1,986	1,770	1,867	2,086	1,886	2,133	1,651
Engineering technology	33,109	33,662	40,804	40,934	37,383	33,584	31,699	33,792	28,242	28,442	31,457	27,737
Asians												
All degrees	7,174	7,617	8,757	10,165	11,329	11,761	12,687	15,069	15,369	16,280	18,555	20,976
Science and engineering	NA	NA	NA	828	1,051	834	851	842	1,118	1,108	1,283	1,353
Natural sciences[a]	NA	NA	NA	86	112	120	179	220	253	228	304	331
Math and computer sciences	NA	NA	NA	511	464	401	411	388	548	528	566	603
Social sciences[b]	NA	NA	NA	47	106	119	110	88	132	216	229	267
Engineering	NA	NA	NA	184	369	194	151	146	185	136	184	152
Engineering technology	781	1,132	1,641	1,570	1,989	1,663	1,499	1,496	1,311	1,358	1,258	1,387
Blacks												
All degrees	33,176	34,985	35,330	35,861	33,858	32,185	32,882	37,854	38,721	41,260	45,597	45,923
Science and engineering	NA	NA	NA	1,653	1,766	1,460	1,540	1,631	1,809	1,963	2,069	2,033
Natural sciences[a]	NA	NA	NA	160	198	125	153	149	161	178	206	276
Math and computer sciences	NA	NA	NA	938	961	828	876	921	1,093	1,004	1,120	1,060
Social sciences[b]	NA	NA	NA	407	358	387	423	435	420	580	564	549
Engineering	NA	NA	NA	148	249	120	88	126	135	201	179	148
Engineering technology	1,990	2,022	2,903	3,395	3,100	2,829	2,648	3,030	2,445	2,698	3,197	2,932
Hispanics												
All degrees	19,808	20,710	22,088	22,783	22,804	23,475	24,569	29,019	30,253	33,015	35,557	38,499
Science and engineering	NA	NA	NA	1,380	1,635	1,453	1,289	1,463	1,773	2,152	2,329	2,316
Natural sciences[a]	NA	NA	NA	248	281	236	215	232	238	300	404	425
Math and computer sciences	NA	NA	NA	676	620	609	591	677	918	1,086	1,074	1,131
Social sciences[b]	NA	NA	NA	330	365	432	385	401	485	613	703	599
Engineering	NA	NA	NA	126	369	176	98	153	132	153	148	161
Engineering technology	1,644	1,799	2,219	2,084	2,359	2,232	2,298	2,411	2,317	2,398	2,478	2,687

Appendix table 2-19.
Earned associate degrees, by field and race/ethnicity: 1977-95

Field	1977	1979	1981	1985	1987	1989	1990	1991	1992	1993	1994	1995
Native Americans												
All degrees	2,499	2,336	2,584	2,953	3,049	3,102	3,290	3,772	3,874	4,213	4,879	5,352
Science and engineering	NA	NA	NA	163	195	182	202	257	247	315	419	410
Natural sciences[a]	NA	NA	NA	45	49	44	38	66	58	73	125	123
Math and computer sciences	NA	NA	NA	56	49	67	84	91	69	116	116	124
Social sciences[b]	NA	NA	NA	51	70	59	68	79	106	118	160	142
Engineering	NA	NA	NA	11	27	12	12	21	14	8	18	21
Engineering technology	204	191	285	267	219	257	168	232	175	210	263	260
Foreign citizens												
All degrees	3,331	4,554	6,645	6,426	4,485	5,969	5,937	6,977	8,027	9,024	10,169	9,911
Science and engineering	NA	NA	NA	616	408	461	362	368	520	637	707	707
Natural sciences[a]	NA	NA	NA	74	81	97	75	73	109	138	157	177
Math and computer sciences	NA	NA	NA	313	177	205	169	171	251	284	282	298
Social sciences[b]	NA	NA	NA	73	30	76	48	56	80	137	179	156
Engineering	NA	NA	NA	156	120	83	70	68	80	78	89	76
Engineering technology	393	585	1,055	680	575	533	467	526	504	380	414	412

NA = not available

NOTES: Data on associate degrees are not available for broad science and engineering fields before 1983. Data by racial/ethnic group were collected on a biennial schedule until 1990. Data by racial/ethnic group are collected by broad field of study only; therefore, these data cannot be adjusted to the exact field taxonomies used by the National Science Foundation.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

SOURCES: National Center for Education Statistics, Earned Degrees and Completion Surveys (Washington, DC: 1995), unpublished tabulations; and National Science Foundation, Science Resources Studies Division, unpublished tabulations.

Appendix table 2-20.
Earned bachelor's degrees, by field and sex: 1975-95

Field	1975	1977	1979	1981	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
All bachelor's degree recipients																	
All degrees	931,663	928,228	931,340	946,877	980,679	986,345	990,877	1,000,204	1,003,532	1,006,033	1,030,171	1,062,151	1,107,997	1,150,072	1,179,278	1,183,141	1,174,436
Science and engineering	313,555	303,798	303,162	306,792	317,875	324,483	332,422	335,460	331,526	322,482	322,821	329,094	337,675	355,265	366,035	373,261	378,148
Natural sciences	87,199	93,179	90,120	84,062	79,315	76,475	75,429	72,499	68,724	64,734	62,860	62,652	65,189	71,269	77,312	83,791	90,845
Physical	16,001	16,937	17,257	17,446	16,197	15,831	16,270	15,784	15,464	14,255	14,148	13,425	13,678	13,875	14,188	14,655	14,897
Earth/atm/ocean	4,877	5,653	6,082	6,694	7,298	7,925	7,576	6,076	4,689	3,554	3,181	2,776	2,728	3,201	3,503	3,868	4,478
Biological & agricultural	66,321	70,589	66,781	59,922	55,820	52,719	51,583	50,639	48,571	46,925	45,531	46,451	48,783	54,193	59,621	65,268	71,470
Math/computer sciences	23,385	20,729	20,670	26,406	37,239	45,777	54,388	58,583	56,442	50,877	46,277	42,369	40,194	39,889	39,433	39,185	38,620
Mathematics	18,346	14,303	11,901	11,173	12,557	13,342	15,267	16,388	16,515	15,981	15,314	14,674	14,784	14,931	14,853	14,632	13,851
Computer sciences	5,039	6,426	8,769	15,233	24,682	32,435	39,121	42,195	39,927	34,896	30,963	27,695	25,410	24,958	24,580	24,553	24,769
Social and behavioral sciences	163,147	148,533	138,903	132,607	128,651	126,078	125,033	127,558	131,935	136,717	146,737	159,368	170,105	182,166	186,585	187,273	185,312
Psychology	51,436	47,794	43,012	41,364	40,825	40,375	40,237	40,937	43,195	45,378	48,954	54,018	58,893	64,033	67,251	69,768	72,601
Social sciences	111,711	100,739	95,891	91,243	87,826	85,703	84,796	86,621	88,740	91,339	97,783	105,350	111,212	118,133	119,334	117,505	112,711
Engineering	39,824	41,357	53,469	63,717	72,670	76,153	77,572	76,820	74,425	70,154	66,947	64,705	62,187	61,941	62,705	63,012	63,371
Chemical engineering	3,420	3,986	6,442	7,639	8,550	9,192	8,941	7,411	6,114	4,654	4,187	3,834	3,728	4,123	4,899	5,636	6,391
Civil engineering	8,289	8,898	10,583	11,331	10,747	10,351	9,730	9,223	8,746	8,131	8,015	7,992	8,083	8,920	9,788	10,603	11,329
Electrical engineering	10,246	10,018	12,440	15,040	19,205	21,541	23,668	26,112	26,791	25,942	24,318	2 3,015	21,520	20,256	19,598	18,241	17,579
Industrial engineering	2,583	2,264	2,804	3,878	3,824	4,020	4,009	4,255	4,313	4,259	4,121	4,041	3,820	4,029	3,584	3,453	3,519
Mechanical engineering	7,089	7,927	10,360	13,573	16,031	17,040	17,200	16,586	15,723	15,331	15,217	14,693	14,263	14,352	14,708	15,297	15,141
Other engineering	8,197	8,264	10,840	12,256	14,313	14,009	14,024	13,233	12,738	11,837	11,089	11,130	10,773	10,261	10,128	9,782	9,412
Engineering technology	8,589	9,864	10,906	13,567	18,663	20,225	20,533	20,928	20,577	20,447	20,098	19,150	18,294	17,118	17,022	16,703	16,607
Males																	
All degrees	508,424	499,121	481,394	474,336	483,395	486,750	486,660	490,143	485,003	481,236	487,566	495,867	508,952	525,395	537,536	537,061	531,146
Science and engineering	210,741	198,805	193,247	190,977	194,538	199,262	203,464	204,771	199,981	191,549	189,338	189,082	189,328	195,779	200,315	202,284	202,217
Natural sciences	63,977	65,378	60,047	53,430	48,379	46,482	45,447	43,405	40,589	36,930	36,009	35,157	36,206	38,939	42,316	45,600	48,474
Physical	12,990	13,560	13,358	13,137	11,586	11,175	11,434	11,088	10,792	9,673	9,777	9,106	9,253	9,289	9,424	9,588	9,605
Earth/atm/ocean	4,050	4,479	4,695	5,028	5,450	5,991	5,715	4,722	3,629	2,707	2,380	2,001	1,946	2,177	2,453	2,665	2,954
Biological & agricultural	46,937	47,339	41,994	35,265	31,343	29,316	28,298	27,595	26,168	24,550	23,852	24,050	25,007	27,473	30,439	33,347	35,915
Math/computer sciences	14,729	13,241	13,249	16,672	22,749	27,797	32,921	35,841	34,871	32,112	29,682	27,184	25,700	25,693	25,483	25,397	25,066
Mathematics	10,646	8,354	6,943	6,392	7,059	7,428	8,231	8,772	8,833	8,569	8,264	7,863	7,804	7,945	7,854	7,864	7,360
Computer sciences	4,083	4,887	6,306	10,280	15,690	20,369	24,690	27,069	26,038	23,543	21,418	19,321	17,896	17,748	17,629	17,533	17,706
Social and behavioral sciences	93,056	80,873	71,363	64,221	60,392	59,559	58,770	59,843	61,500	63,132	66,888	72,009	74,900	78,842	79,792	78,678	76,256
Psychology	24,333	20,692	16,649	14,447	13,228	12,949	12,815	12,691	13,399	13,584	14,291	15,399	16,155	17,130	18,029	18,749	19,638
Social sciences	68,723	60,181	54,714	49,774	47,164	46,610	45,955	47,152	48,101	49,548	52,597	56,610	58,745	61,712	61,763	59,929	56,618
Engineering	38,979	39,313	48,588	56,654	63,018	65,424	66,326	65,682	63,021	59,375	56,759	54,732	52,522	52,305	52,724	52,609	52,421
Chemical engineering	3,273	3,534	5,387	6,274	6,761	7,115	6,848	5,805	4,574	3,522	3,017	2,745	2,564	2,854	3,335	3,953	4,367
Civil engineering	8,116	8,413	9,534	10,100	9,263	8,928	8,388	7,994	7,550	6,960	6,841	6,730	6,803	7,395	8,009	8,619	9,031
Electrical engineering	10,116	9,750	11,781	13,940	17,283	19,252	20,936	22,885	23,227	22,418	21,130	20,148	18,757	17,801	17,339	15,990	15,409
Industrial engineering	2,524	2,115	2,376	3,111	2,824	2,949	2,842	2,974	2,929	3,014	2,860	2,835	2,723	2,890	2,547	2,439	2,493
Mechanical engineering	7,005	7,685	9,740	12,422	14,546	15,228	15,399	14,876	13,996	13,567	13,537	12,978	12,673	12,791	13,076	13,554	13,441
Other engineering	7,945	7,816	9,770	10,807	12,341	11,952	11,913	11,148	10,745	9,894	9,374	9,296	9,002	8,574	8,418	8,054	7,680
Engineering technology	8,054	9,173	9,942	12,032	16,529	18,052	18,278	18,734	18,429	18,337	17,999	17,113	16,329	15,314	15,114	14,877	14,704

Appendix table 2-20.
Earned bachelor's degrees, by field and sex: 1975-95

Field	1975	1977	1979	1981	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
								Females									
All degrees	423,239	429,107	449,946	472,541	497,284	499,595	504,217	510,061	518,529	524,797	542,605	566,284	599,045	624,677	641,742	646,080	643,290
Science and engineering	102,814	104,993	109,915	115,815	123,337	125,221	128,958	130,689	131,545	130,933	133,483	140,012	148,347	159,486	165,720	170,977	175,931
Natural sciences	23,222	27,801	30,073	30,632	30,936	29,993	29,982	29,094	28,135	27,804	26,851	27,495	28,983	32,330	34,996	38,191	42,371
Physical	3,011	3,377	3,899	4,309	4,611	4,656	4,836	4,696	4,672	4,582	4,371	4,319	4,425	4,586	4,764	5,067	5,292
Earth/atm/ocean	827	1,174	1,387	1,666	1,848	1,934	1,861	1,354	1,060	847	801	775	782	1,024	1,050	1,203	1,524
Biological & agricultural	19,384	23,250	24,787	24,657	24,477	23,403	23,285	23,044	22,403	22,375	21,679	22,401	23,776	26,720	29,182	31,921	35,555
Math/computer sciences	8,656	7,488	7,421	9,734	14,490	17,980	21,467	22,742	21,571	18,765	16,595	15,185	14,494	14,196	13,950	13,788	13,554
Mathematics	7,700	5,949	4,958	4,781	5,498	5,914	7,036	7,616	7,682	7,412	7,050	6,811	6,980	6,986	6,999	6,768	6,491
Computer sciences	956	1,539	2,463	4,953	8,992	12,066	14,431	15,126	13,889	11,353	9,545	8,374	7,514	7,210	6,951	7,020	7,063
Social and behavioral sciences	70,091	67,660	67,540	68,386	68,259	66,519	66,263	67,715	70,435	73,585	79,849	87,359	95,205	103,324	106,793	108,595	109,056
Psychology	27,103	27,102	26,363	26,917	27,597	27,426	27,422	28,246	29,796	31,794	34,663	38,619	42,738	46,903	49,222	51,019	52,963
Social sciences	42,988	40,558	41,177	41,469	40,662	39,093	38,841	39,469	40,639	41,791	45,186	48,740	52,467	56,421	57,571	57,576	56,093
Engineering	845	2,044	4,881	7,063	9,652	10,729	11,246	11,138	11,404	10,779	10,188	9,973	9,665	9,636	9,981	10,403	10,950
Chemical engineering	147	452	1,055	1,365	1,789	2,077	2,093	1,606	1,540	1,132	1,170	1,089	1,164	1,269	1,564	1,683	2,024
Civil engineering	173	485	1,049	1,231	1,484	1,423	1,342	1,229	1,196	1,171	1,174	1,262	1,280	1,525	1,779	1,984	2,298
Electrical engineering	130	268	659	1,100	1,922	2,289	2,732	3,227	3,564	3,524	3,188	2,867	2,763	2,455	2,259	2,251	2,170
Industrial engineering	59	149	428	767	1,000	1,071	1,167	1,281	1,384	1,245	1,261	1,206	1,097	1,139	1,037	1,014	1,026
Mechanical engineering	84	242	620	1,151	1,485	1,812	1,801	1,710	1,727	1,764	1,680	1,715	1,590	1,561	1,632	1,743	1,700
Other engineering	252	448	1,070	1,449	1,972	2,057	2,111	2,085	1,993	1,943	1,715	1,834	1,771	1,687	1,710	1,728	1,732
Engineering technology	535	691	964	1,533	2,134	2,173	2,255	2,194	2,148	2,110	2,099	2,037	1,965	1,804	1,908	1,826	1,903

SOURCES: National Center for Education Statistics, Earned Degrees and Completion Surveys (Washington, DC: 1995), unpublished tabulations; and National Science Foundation, Science Resources Studies Division, unpublished tabulations.

See figures 2-11 and 2-12 and text table 2-5.

Appendix table 2-21.
Earned bachelor's degrees, by field, race/ethnicity, and citizenship: 1977-95

Field and race/ethnicity	1977	1979	1981	1985	1987	1989	1991	1993	1994	1995
Total										
All degrees	928,228	931,340	946,877	990,877	1,003,532	1,030,171	1,107,997	1,179,278	1,183,141	1,174,436
Science and engineering	337,834	334,632	337,739	342,970	343,070	337,431	356,785	388,435	395,380	399,809
Natural sciences[a]	98,342	96,186	90,254	75,670	68,929	63,073	65,401	77,395	83,903	91,026
Math and computer sciences	20,729	20,670	26,406	54,388	56,442	46,277	40,194	39,347	38,889	38,421
Social sciences[b]	169,086	154,976	145,684	135,341	143,276	161,134	189,004	209,023	209,626	207,032
Engineering	49,677	62,800	75,395	77,571	74,423	66,947	62,186	62,670	62,962	63,330
Engineering technology	NA	NA	NA	20,533	20,577	20,098	18,294	16,987	16,654	16,542
U.S. citizens and permanent residents										
All degrees	910,835	911,637	923,906	950,118	948,563	980,064	1,052,610	1,122,276	1,123,862	1,110,512
Science and engineering	329,351	324,750	324,724	325,172	319,963	317,950	335,424	366,357	372,858	375,745
Natural sciences[a]	96,268	94,101	88,001	72,860	65,632	60,423	62,117	73,571	80,096	86,688
Math and computer sciences	20,138	19,926	25,172	50,904	51,449	42,245	36,549	35,864	35,283	34,709
Social sciences[b]	166,852	152,720	143,165	131,499	135,722	154,321	180,423	199,948	200,256	197,120
Engineering	46,093	58,003	68,386	69,909	67,160	60,961	56,335	56,974	57,223	57,228
Engineering technology	NA	NA	NA	19,120	19,359	18,942	17,080	16,109	16,161	15,992
White, all degrees	807,857	802,665	807,509	826,356	819,477	840,326	892,363	931,603	918,124	892,785
Science and engineering	292,802	287,126	284,166	281,394	272,090	266,862	278,190	297,171	297,616	294,773
Natural sciences[a]	88,308	85,403	78,778	63,592	55,898	50,580	51,113	59,577	64,291	68,700
Math and computer sciences	18,110	17,633	22,013	43,484	42,446	33,998	28,998	27,824	26,905	25,875
Social sciences[b]	144,312	131,439	122,519	113,326	117,255	132,203	152,917	164,917	161,733	156,472
Engineering	42,072	52,651	60,856	60,992	56,491	50,081	45,162	44,853	44,687	43,726
Engineering technology	NA	NA	NA	16,673	16,541	16,156	14,279	13,245	12,909	12,616
Asian, all degrees	13,907	15,542	18,908	25,562	31,921	37,573	41,725	50,587	54,675	59,295
Science and engineering	6,203	7,171	9,145	13,323	16,934	19,138	20,552	24,504	26,420	29,128
Natural sciences[a]	1,935	2,227	2,406	2,880	3,641	3,973	4,670	6,364	7,228	8,677
Math and computer sciences	479	587	1,061	2,929	3,489	3,287	2,925	3,160	3,173	3,330
Social sciences[b]	2,578	2,499	2,612	3,032	4,214	5,803	6,737	8,573	9,503	10,336
Engineering	1,211	1,858	3,066	4,482	5,590	6,075	6,220	6,407	6,516	6,785
Engineering technology	0	0	0	542	807	839	768	768	720	727
Black, all degrees	58,700	60,301	60,729	57,563	55,103	56,837	65,009	76,667	82,316	85,287
Science and engineering	19,552	18,827	18,895	17,040	17,230	17,385	19,987	24,421	26,289	27,528
Natural sciences[a]	3,416	3,541	3,561	3,096	2,870	2,756	3,026	3,794	4,169	4,528
Math and computer sciences	1,073	1,159	1,371	2,913	3,654	3,249	2,808	3,178	3,390	3,493
Social sciences[b]	13,678	12,352	11,514	8,992	8,391	9,313	11,924	14,872	16,071	16,662
Engineering	1,385	1,775	2,449	2,039	2,315	2,067	2,229	2,577	2,659	2,845
Engineering technology	0	0	0	1,277	1,269	1,208	1,227	1,132	1,249	1,319
Hispanic, all degrees	27,043	29,719	33,167	36,391	38,196	41,361	49,027	57,845	62,683	66,691
Science and engineering	9,628	10,432	11,312	12,031	12,419	13,327	15,351	18,442	20,529	22,190
Natural sciences[a]	2,271	2,634	2,958	2,979	2,964	2,849	3,010	3,468	3,970	4,276
Math and computer sciences	435	495	688	1,380	1,696	1,568	1,695	1,566	1,678	1,843
Social sciences[b]	5,632	5,748	5,846	5,485	5,205	6,349	8,080	10,447	11,738	12,420
Engineering	1,290	1,555	1,820	2,187	2,554	2,561	2,566	2,961	3,143	3,651
Engineering technology	0	0	0	525	664	634	731	853	813	883
Native American, all degrees	3,328	3,410	3,593	4,246	3,866	3,967	4,486	5,574	6,064	6,454
Science and engineering	1,166	1,194	1,206	1,384	1,290	1,238	1,344	1,819	2,004	2,126
Natural sciences[a]	338	296	298	313	259	265	298	368	438	507
Math and computer sciences	41	52	39	198	164	143	123	136	137	168
Social sciences[b]	652	682	674	664	657	653	765	1,139	1,211	1,230
Engineering	135	164	195	209	210	177	158	176	218	221
Engineering technology	0	0	0	103	78	105	75	111	98	115

Appendix table 2-21.
Earned bachelor's degrees, by field, race/ethnicity, and citizenship: 1977-95

Field and race/ethnicity	1977	1979	1981	1985	1987	1989	1991	1993	1994	1995
Foreign citizens										
All degrees	15,744	17,853	22,631	29,258	28,592	26,457	29,657	32,371	34,227	37,012
Science and engineering	8,297	9,798	12,966	14,071	13,677	12,323	12,724	13,802	13,929	14,754
Natural sciences[a]	2,042	2,061	2,251	2,132	1,786	1,744	1,941	2,330	2,114	2,262
Math and computer sciences	583	741	1,233	2,879	3,233	2,678	2,615	2,756	2,835	2,888
Social sciences[b]	2,098	2,232	2,519	2,870	2,769	2,829	3,586	4,211	4,440	4,794
Engineering	3,574	4,764	6,963	6,190	5,889	5,072	4,582	4,505	4,540	4,810
Engineering technology	NA	NA	NA	1,277	986	659	712	441	493	550

NA = not available

NOTES: Data by racial/ethnic group were collected on a biennial schedule until 1990 and annually thereafter. Data by racial/ethnic group are collected by broad fields of study only; therefore, these data cannot be adjusted to the exact field taxonomies used by the National Science Foundation.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

SOURCE: National Science Foundation, Science Resources Studies Division, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1977-94, NSF 96–329* (Arlington, VA: 1996).

See text table 2-5.

Appendix table 2-22.
Semesters of postsecondary math courses taken, by type of college and major: 1991-94
(Percentages)

Postsecondary education/major	Number of math courses taken					N
	0	1 to 2	3 to 4	5 +	Median	
Total	16	47	28	9	2	1,530
Some community college education	34	50	14	2	1	352
Some college/university education	16	59	24	2	2	316
Associate degree	26	46	21	7	2	121
Bachelor's degree	7	41	37	15	3	741
Students with some community college education						
Science, math, engineering, or other technical	15	35	44	6	2	48
Health	21	56	19	4	1	52
Social science	41	47	12	0	1	17
Education	17	53	27	3	2	30
Other major	18	62	15	5	2	137
Not reported/no major	50	42	7	1	0	191
Students with some college/university education						
Science, math, engineering, or other technical	3	40	44	13	3	40
Health	11	59	27	3	2	37
Social science	6	75	16	3	2	32
Education	23	54	23	0	2	22
Other major	12	60	27	1	2	102
Not reported/no major	29	61	9	0	1	85
Students with bachelor's degree or higher						
Science	1	39	45	15	3	78
Math, engineering, or other technical	2	8	37	53	5	87
Health	7	44	36	13	2	62
Social science	7	52	33	8	2	121
Education	5	34	51	10	3	88
Other major	9	48	33	10	2	298

NOTES: Only respondents enrolled in or graduated from a community college, college, or university degree program are included in this analysis. Respondents who are not in any educational program, are still in high school or a GED program, or are in a vocational or trade school program are not included. The four categories of postsecondary education are (1) some community college education (but no degree), (2) some college or university education (but no degree), (3) associate degree, and (4) bachelor's degree or higher. Postsecondary education data from the Longitudinal Study of American Youth were collected during years four (1991), five (1992), and seven (1994) of the study. Those data collection points represent the first, second, and fourth postsecondary years. Thus, a student who graduated from high school in the usual time sequence could have completed a baccalaureate at the time of the last data collection point.

SOURCE: J.D. Miller, Longitudinal Study of American Youth, special tabulations, 1997.

Appendix table 2-23.
Semesters of postsecondary science courses taken, by type of college and major: 1991-94
(Percentages)

Postsecondary education/major	Number of science courses taken					N
	0	1 to 2	3 to 4	5 +	Median	
Total	25	31	23	21	2	1,529
Some community college education	55	27	13	5	0	352
Some college/university education	30	40	19	11	1	315
Associate degree	39	30	18	13	2	120
Bachelor's degree	6	31	30	33	3	742
Students with some community college education						
Science, math, engineering, or other technical	30	26	33	11	2	47
Health	16	33	20	31	3	51
Social science	35	29	24	12	2	17
Education	30	43	24	3	2	33
Other major	58	27	13	2	0	137
Not reported/no major	66	25	6	3	0	189
Students with some college/university education						
Science, math, engineering, or other technical	15	28	32	25	3	40
Health	8	29	24	39	4	38
Social science	24	38	38	0	2	29
Education	29	47	14	10	2	21
Other major	27	53	15	5	1	101
Not reported/no major	51	33	11	5	0	87
Students with bachelor's degree or higher						
Science	0	3	5	92	10	79
Math, engineering, or other technical	5	17	30	48	4	86
Health	0	6	15	79	7	62
Social science	7	33	37	23	3	120
Education	2	29	43	26	3	89
Other major	8	47	33	12	2	298

NOTES: Only respondents enrolled in or graduated from a community college, college, or university degree program are included in this analysis. Respondents who are not in any educational program, are still in high school or a GED program, or are in a vocational or trade school program are not included. The four categories of postsecondary education are (1) some community college education (but no degree), (2) some college or university education (but no degree), (3) associate degree, and (4) bachelor's degree or higher. Postsecondary education data from the Longitudinal Study of American Youth were collected during years four (1991), five (1992), and seven (1994) of the study. Those data collection points represent the first, second, and fourth postsecondary years. Thus, a student who graduated from high school in the usual time sequence could have completed a baccalaureate at the time of the last data collection point.

SOURCE: J.D. Miller, Longitudinal Study of American Youth, special tabulations, 1997.

Appendix table 2-24.
Graduate enrollment in science and engineering, by field and sex: 1975-95

Field	1975	1977	1979	1981	1983	1985	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total															
Science & engineering	303,190	311,816	319,171	332,086	347,065	358,126	373,355	375,287	382,769	397,159	412,708	430,797	436,233	431,758	423,922
Natural sciences[a]	95,489	101,221	100,871	100,617	102,979	104,074	104,963	105,529	107,301	109,364	112,474	116,699	119,489	120,833	120,451
Math & computer sciences	25,307	25,160	26,721	32,318	40,691	47,332	50,559	51,304	51,729	54,031	54,562	56,675	56,298	53,857	52,018
Social sciences[b]	119,851	114,716	112,652	121,462	116,538	110,515	111,412	113,880	115,625	119,696	126,139	132,096	139,388	143,565	144,008
Engineering	68,271	68,685	71,728	79,555	91,119	95,991	103,953	102,829	104,043	107,625	113,576	118,035	116,881	113,060	107,529
Males															
Science & engineering	NA	233,862	229,860	232,209	240,525	247,464	256,158	254,011	256,861	263,407	271,853	280,465	279,476	272,420	263,058
Natural sciences[a]	0	76,073	72,945	70,721	70,711	70,745	70,685	69,869	70,263	70,800	71,753	73,754	74,086	73,878	72,591
Math & computer sciences	0	19,482	20,376	23,628	28,877	34,417	36,948	37,334	37,756	39,633	39,994	41,659	41,188	39,170	37,582
Social sciences[b]	0	73,322	70,687	66,051	59,625	57,391	57,535	57,103	58,399	60,021	62,245	64,250	65,013	64,366	63,508
Engineering	NA	64,985	65,852	71,809	81,312	84,911	90,990	89,705	90,443	92,953	97,861	100,802	99,189	95,006	89,377
Females															
Science & engineering	NA	77,954	89,311	99,877	106,540	110,662	117,197	121,276	125,908	133,752	140,855	150,332	156,757	159,338	160,864
Natural sciences[a]	0	25,148	27,926	29,896	32,268	33,329	34,278	35,660	37,038	38,564	40,721	42,945	45,403	46,955	47,860
Math & computer sciences	0	5,678	6,345	8,690	11,814	12,915	13,611	13,970	13,973	14,398	14,568	15,016	15,110	14,687	14,436
Social sciences[b]	0	43,428	49,164	53,545	52,651	53,338	56,345	58,522	61,297	66,118	69,851	75,138	78,552	79,642	80,416
Engineering	NA	3,700	5,876	7,746	9,807	11,080	12,963	13,124	13,600	14,672	15,715	17,233	17,692	18,054	18,152

NA = not available

NOTE: For detailed statistical tables on graduate enrollments, see SRS home page <<http://www.nsf.gov/sbe/srs/stats.htm>>, Fall 1995 Supplementary Data Releases: Trends in Graduate Enrollment, 1975-1995.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

SOURCE: National Science Foundation, Science Resources Studies Division, *Graduate Students and Postdoctorates in Science and Engineering, Fall 1995,* NSF 97-312 (Arlington, VA: 1997).

See figures 2-13 and 2-14.

Appendix table 2-25.
Graduate enrollment in science and engineering, by field, race/ethnicity, and citizenship: 1983-95

Field and race/ethnicity	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total													
Science & engineering	347,014	349,875	358,201	368,212	373,425	375,287	382,769	397,159	412,708	430,797	436,233	431,758	423,922
Natural sciences[a]	102,968	103,547	103,990	105,541	104,974	105,529	107,301	109,364	112,474	116,699	119,489	120,833	120,451
Math & computer sciences	40,713	42,985	47,341	49,316	50,575	51,304	51,729	54,031	54,562	56,675	56,298	53,857	52,018
Social sciences[b]	112,236	110,647	110,808	111,499	113,939	115,625	119,696	126,139	132,096	139,388	143,565	144,008	143,924
Engineering	91,097	92,696	95,982	101,856	103,937	102,829	104,043	107,625	113,576	118,035	116,881	113,060	107,529
U.S. citizens													
Total S&E	276,784	277,682	281,388	284,231	284,631	281,672	284,686	294,339	304,073	321,281	330,447	329,391	325,135
Natural sciences[a]	84,700	84,712	83,663	82,854	80,562	79,431	79,242	79,521	81,148	84,893	88,164	89,852	90,653
Math & computer sciences	30,306	31,532	34,499	35,448	35,669	35,895	35,352	36,561	36,306	38,043	38,210	36,696	35,484
Social sciences[b]	98,173	96,644	95,978	96,018	97,831	98,743	102,746	108,831	114,386	121,750	126,459	126,778	126,956
Engineering	63,605	64,794	67,160	69,911	70,569	67,603	67,346	69,426	72,233	76,595	77,614	76,065	72,042
White, S&E	224,705	224,705	224,705	224,705	224,705	229,037	229,694	238,492	243,608	253,516	257,009	255,976	246,776
Natural sciences[a]	74,337	74,046	71,971	71,713	69,100	68,737	68,110	68,736	69,472	71,328	72,552	74,134	73,332
Math & computer sciences	23,823	24,040	25,511	26,053	26,806	27,479	26,560	27,897	26,921	27,745	27,373	26,245	24,425
Social sciences[b]	77,963	75,787	76,129	76,930	79,157	80,492	83,531	88,652	92,431	97,047	99,633	99,566	96,906
Engineering	48,582	48,582	48,582	48,582	48,582	52,329	51,493	53,207	54,784	57,396	57,451	56,031	52,113
Asian, S&E	9,353	10,172	12,000	12,775	14,572	15,188	15,693	17,156	18,139	21,762	24,149	26,457	26,015
Natural sciences[a]	2,378	2,526	2,712	2,761	3,043	3,478	3,604	3,928	4,267	5,035	6,162	6,568	6,740
Math & computer sciences	1,666	1,816	2,491	2,770	3,235	3,438	3,430	3,710	3,724	4,363	4,592	5,302	5,227
Social sciences[b]	1,903	2,018	1,992	2,130	2,436	2,362	2,648	2,831	3,032	3,872	4,396	4,786	4,930
Engineering	3,406	3,812	4,805	5,114	5,858	5,910	6,011	6,687	7,116	8,492	8,999	9,801	9,118
Black, S&E	10,903	10,711	10,462	10,470	10,429	11,191	11,775	12,774	13,691	15,449	17,147	17,665	18,366
Natural sciences[a]	1,980	2,000	1,982	1,845	1,817	1,972	2,093	2,184	2,302	2,711	3,042	3,007	3,286
Math & computer sciences	971	960	1,031	1,151	1,210	1,261	1,311	1,496	1,617	1,687	1,903	1,888	1,879
Social sciences[b]	6,574	6,306	6,062	6,022	5,986	6,458	6,755	7,308	7,747	8,677	9,643	9,987	10,329
Engineering	1,378	1,445	1,387	1,452	1,416	1,500	1,616	1,786	2,025	2,374	2,559	2,783	2,872
Hispanic, S&E	8,811	8,681	8,613	8,660	8,823	9,098	9,436	10,159	11,045	12,248	13,386	13,284	14,089
Natural sciences[a]	1,919	1,892	2,092	2,118	2,071	2,228	2,386	2,375	2,552	2,726	3,075	2,933	3,200
Math & computer sciences	615	585	750	723	817	844	847	916	980	1,082	1,114	1,006	1,060
Social sciences[b]	4,836	4,713	4,290	4,217	4,205	4,307	4,496	4,982	5,389	5,977	6,503	6,488	6,998
Engineering	1,441	1,491	1,481	1,602	1,730	1,719	1,707	1,886	2,124	2,463	2,694	2,857	2,831
Native American S&E	911	830	736	743	783	918	860	1,054	1,120	1,244	1,312	1,383	1,524
Natural sciences[a]	224	206	167	196	183	216	180	255	251	282	318	336	403
Math & computer sciences	53	71	79	52	76	71	74	64	62	99	100	79	125
Social sciences[b]	454	361	368	365	401	488	484	583	622	686	683	726	765
Engineering	180	192	122	130	123	143	122	152	185	177	211	242	231
Unknown, S&E	22,101	24,179	25,825	23,961	21,160	16,240	17,228	14,704	16,470	17,062	17,444	14,626	18,365
Natural sciences[a]	3,862	4,042	4,819	4,221	4,348	2,800	2,869	2,043	2,304	2,811	3,015	2,874	3,692
Math & computer sciences	3,178	4,060	4,637	4,699	3,525	2,802	3,130	2,478	3,002	3,067	3,128	2,176	2,768
Social sciences[b]	6,443	7,459	7,145	6,354	5,646	4,636	4,832	4,475	5,165	5,491	5,601	5,225	7,028
Engineering	8,618	8,618	9,224	8,687	7,641	6,002	6,397	5,708	5,999	5,693	5,700	4,351	4,877

Appendix table 2-25.
Graduate enrollment in science and engineering, by field, race/ethnicity, and citizenship: 1983-95

Field and race/ethnicity	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
							Foreign citizens						
Total S&E	70,230	72,193	76,813	83,981	88,794	93,615	98,083	102,820	108,635	109,516	105,786	102,367	98,787
Natural sciences[a]	18,268	18,835	20,327	22,687	24,412	26,098	28,059	29,843	31,326	31,806	31,325	30,981	29,798
Math & computer sciences	10,407	11,453	12,842	13,868	14,906	15,409	16,377	17,470	18,256	18,632	18,088	17,161	16,534
Social sciences[b]	14,063	14,003	14,830	15,481	16,108	16,882	16,950	17,308	17,710	17,638	17,106	17,230	16,968
Engineering	27,492	27,902	28,822	31,945	33,368	35,226	36,697	38,199	41,343	41,440	39,267	36,995	35,487

NOTE: For detailed statistical tables on graduate enrollments, see SRS home page <<http://www.nsf.gov/sbe/srs/stats.htm>>, Fall 1995 Supplementary Data Releases: Trends in Graduate Enrollment, 1975-1995.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

SOURCE: National Science Foundation, Science Resources Studies Division, *Graduate Students and Postdoctorates in Science and Engineering Fall 1995,* NSF 97-312 (Arlington, VA: 1997).

See figure 2-14.

Appendix table 2-26.
Doctoral degrees awarded in science and engineering in selected Asian countries: 1975-95

Country	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Natural sciences[a]																					
Total	2,162	2,399	2,706	2,863	3,120	3,268	3,390	3,523	3,665	3,899	4,017	3,992	4,015	4,326	4,295	4,237	4,381	4,547	5,141	5,752	6,304
China	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	33	27	52	165	141	209	252	304	479	755	1,191
India	1,484	1,651	1,837	2,044	2,261	2,385	2,516	2,654	2,800	2,954	2,892	2,922	2,814	3,038	3,044	2,976	2,950	2,950	3,386	3,505	3,505
Japan	676	717	843	782	814	822	791	762	774	807	860	820	837	881	876	835	892	1,009	934	1,081	1,135
S. Korea	NA	29	22	30	41	55	75	102	83	124	212	201	277	207	192	170	225	202	244	296	358
Taiwan	2	2	4	7	4	6	8	5	8	14	20	22	35	35	42	47	62	82	97	115	115
Mathematics and computer sciences																					
Total	0	0	0	0	1	1	1	3	4	2	27	23	45	162	201	188	226	249	169	194	224
China	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	23	10	31	75	78	89	95	101	0	0	NA
India	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Japan	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
S. Korea	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	73	105	75	99	106	124	145	169
Taiwan	0	0	0	0	1	1	1	3	4	2	4	13	14	14	18	24	32	42	45	49	55
Agriculture																					
Total	674	870	934	912	962	1,098	1,153	1,185	1,240	1,404	1,372	1,355	1,444	1,696	1,689	1,629	1,814	1,797	1,742	1,911	2,048
China	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1	0	8	55	56	20	37	68	94	131	182
India	289	328	372	422	480	517	558	601	648	698	575	576	583	712	688	703	715	715	611	572	572
Japan	381	490	518	442	430	527	529	521	515	614	697	646	715	746	734	719	870	824	816	952	1,008
S. Korea	NA	48	40	43	45	48	52	55	60	77	89	105	110	155	175	154	156	151	172	196	223
Taiwan	4	4	4	5	7	5	15	8	17	15	10	28	28	28	36	33	36	39	48	60	63
Social sciences[b]																					
Total	91	123	124	113	106	108	111	131	153	152	193	215	273	305	338	369	467	544	597	695	775
China	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	1	0	26	23	36	47	61	90	134	198
India	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Japan	84	85	88	88	76	76	76	93	97	90	127	136	149	167	177	183	200	243	249	278	301
S. Korea	NA	31	23	23	24	24	25	25	41	39	50	52	102	90	97	107	189	217	222	227	232
Taiwan	7	7	13	2	6	8	10	13	15	23	16	26	22	22	41	43	31	23	36	56	44
Engineering																					
Total	1,130	1,242	1,195	1,323	1,408	1,417	1,494	1,566	1,590	1,634	2,239	2,447	2,645	3,212	3,621	3,860	4,165	4,630	4,586	5,260	6,327
China	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	68	89	127	476	726	715	767	823	1,040	1,313	1,659
India	136	135	135	134	176	179	182	185	189	192	511	509	603	575	586	574	629	629	323	348	348
Japan	986	1,079	1,043	1,166	1,195	1,186	1,236	1,278	1,290	1,291	1,404	1,493	1,547	1,717	1,774	1,967	2,094	2,362	2,278	2,501	3,009
S. Korea	NA	20	14	20	29	42	60	87	97	120	197	273	270	346	415	439	466	552	659	786	938
Taiwan	8	8	3	3	8	10	15	15	14	31	59	83	98	98	120	165	209	264	287	312	373

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, and biological sciences.

[b]Social sciences include psychology, sociology, and other social sciences. Japanese social science data also include business administration.

SOURCES: **China**—National Research Center for Science and Technology for Development, unpublished tabulations, and UNESCO, *Statistical Yearbook* (Paris: 1996); **India**—Department of Science and Technology, *Research and Development Statistics 1994-95* (New Delhi: 1996); **Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **South Korea**—Ministry of Education, *Statistical Yearbook of Education* (Seoul: 1996); and **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996).

Appendix table 2-27.
Earned master's degrees, by field and sex: 1975-95

Field	1975	1977	1979	1981	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total master's degree recipients																	
All degrees	293,651	318,241	302,075	296,798	290,931	285,462	287,213	289,829	290,532	300,091	311,050	324,947	338,498	354,207	370,973	389,008	399,428
Science and engineering	63,198	67,397	64,226	64,366	67,716	68,564	70,562	71,831	72,603	73,655	76,425	77,788	78,368	81,107	86,425	91,411	94,309
Natural sciences	14,831	15,360	15,443	14,349	14,380	14,231	13,972	13,910	13,400	13,184	13,218	12,928	12,682	13,232	13,474	14,367	14,793
Physical	4,298	3,641	3,650	3,366	3,285	3,544	3,605	3,649	3,574	3,708	3,876	3,805	3,777	3,922	3,965	4,263	4,241
Earth/atm/ocean	1,503	1,659	1,777	1,876	1,959	1,982	2,160	2,234	2,051	1,920	1,819	1,596	1,499	1,425	1,397	1,418	1,483
Biological & agricultural	9,030	10,060	10,016	9,107	9,136	8,705	8,207	8,027	7,775	7,556	7,523	7,527	7,406	7,885	8,112	8,686	9,069
Math/computer sciences	6,637	6,496	6,101	6,787	8,160	8,939	9,989	11,241	11,808	12,600	12,829	13,327	12,956	13,320	14,100	14,350	14,495
Mathematics	4,338	3,698	3,046	2,569	2,839	2,749	2,888	3,171	3,327	3,434	3,430	3,684	3,632	3,665	3,751	3,804	3,932
Computer sciences	2,299	2,798	3,055	4,218	5,321	6,190	7,101	8,070	8,481	9,166	9,399	9,643	9,324	9,655	10,349	10,546	10,563
Social & behavioral sciences	26,563	29,529	27,403	26,779	26,290	25,249	25,629	25,584	25,325	25,145	26,635	27,538	28,717	29,537	31,187	33,977	36,391
Psychology	7,104	8,320	8,031	8,039	8,439	8,073	8,481	8,363	8,165	7,925	8,652	9,308	9,802	9,852	10,412	11,572	13,132
Social sciences	19,459	21,209	19,372	18,740	17,851	17,176	17,148	17,221	17,160	17,220	17,983	18,230	18,915	19,685	20,775	22,405	23,259
Engineering	15,167	16,012	15,279	16,451	18,886	20,145	20,972	21,096	22,070	22,726	23,743	23,995	24,013	25,018	27,664	28,717	28,630
Chemical engineering	1,078	1,179	1,276	1,406	1,545	1,798	1,814	1,641	1,386	1,322	1,321	1,205	1,025	1,145	1,220	1,287	1,369
Civil engineering	3,268	3,606	3,165	3,428	3,504	3,551	3,542	3,281	3,267	3,134	3,296	3,213	3,404	3,755	4,438	4,918	5,168
Electrical engineering	3,471	3,788	3,596	3,902	4,819	5,519	5,649	6,147	6,895	7,455	7,849	8,009	7,942	8,274	8,828	8,870	8,743
Industrial engineering	1,687	1,609	1,502	1,631	1,432	1,557	1,463	1,653	1,728	1,816	1,823	1,834	2,039	2,370	2,745	2,882	2,873
Mechanical engineering	2,032	2,094	2,012	2,419	2,683	2,964	3,272	3,256	3,380	3,513	3,703	3,630	3,680	3,826	4,169	4,277	4,368
Other engineering	3,631	3,736	3,728	3,665	4,903	4,756	5,232	5,118	5,414	5,486	5,751	6,104	5,923	5,648	6,264	6,483	6,109
Engineering technology	371	505	496	532	622	694	816	925	883	980	1,135	1,194	1,188	1,278	1,555	1,547	1,577
Males																	
All degrees	162,115	168,210	153,772	147,431	145,114	143,998	143,716	143,932	141,655	145,403	149,399	154,025	156,895	162,299	169,753	176,762	179,198
Science and engineering	49,410	50,899	46,614	45,505	46,718	47,033	48,232	48,611	48,759	49,820	50,845	51,230	50,441	52,157	55,454	57,970	58,518
Natural sciences	11,709	11,633	11,223	10,222	9,814	9,513	9,290	9,133	8,652	8,562	8,383	8,052	7,794	8,118	8,181	8,539	8,730
Physical	3,645	2,981	2,971	2,691	2,600	2,698	2,775	2,736	2,684	2,817	2,836	2,754	2,703	2,834	2,794	3,030	2,958
Earth/atm/ocean	1,309	1,433	1,467	1,470	1,515	1,517	1,639	1,717	1,531	1,433	1,337	1,218	1,116	1,057	1,006	994	1,032
Biological & agricultural	6,755	7,219	6,785	6,061	5,699	5,298	4,876	4,680	4,437	4,312	4,210	4,080	3,975	4,227	4,381	4,515	4,740
Math/computer sciences	4,871	4,730	4,469	4,939	5,672	6,174	6,941	7,713	8,011	8,759	8,833	9,176	8,709	9,199	9,773	10,128	10,130
Mathematics	2,910	2,398	1,989	1,692	1,859	1,795	1,877	2,055	2,026	2,057	2,060	2,208	2,146	2,219	2,219	2,311	2,353
Computer sciences	1,961	2,332	2,480	3,247	3,813	4,379	5,064	5,658	5,985	6,702	6,773	6,968	6,563	6,980	7,554	7,817	7,777
Social & behavioral sciences	18,035	19,222	16,580	15,222	14,101	13,301	13,273	13,069	12,796	12,581	12,968	13,276	13,282	13,491	13,930	15,009	15,660
Psychology	4,059	4,316	3,688	3,371	3,254	2,980	3,064	2,937	2,838	2,599	2,814	3,025	2,994	2,929	2,928	3,287	3,735
Social sciences	13,976	14,906	12,892	11,851	10,847	10,321	10,209	10,132	9,958	9,982	10,154	10,251	10,288	10,562	11,002	11,722	11,925
Engineering	14,795	15,314	14,342	15,122	17,131	18,045	18,728	18,696	19,300	19,918	20,661	20,726	20,656	21,349	23,570	24,294	23,998
Chemical engineering	1,051	1,110	1,156	1,230	1,369	1,590	1,529	1,401	1,143	1,107	1,092	1,013	852	914	996	1008	1063
Civil engineering	3,161	3,421	2,951	3,112	3,122	3,136	3,128	2,908	2,792	2,721	2,851	2,693	2,864	3,120	3,607	3,965	4,123
Electrical engineering	3,413	3,654	3,453	3,681	4,484	5,081	5,154	5,508	6,178	6,642	6,933	7,018	7,008	7,229	7,777	7,721	7,539
Industrial engineering	1,631	1,534	1,374	1,465	1,226	1,279	1,236	1,374	1,409	1,492	1,465	1,493	1,603	1,898	2,190	2,346	2,361
Mechanical engineering	2,012	2,039	1,939	2,292	2,517	2,765	3,044	3,002	3,133	3,218	3,377	3,276	3,320	3,455	3,769	3,860	3,918
Other engineering	3,527	3,556	3,469	3,342	4,413	4,194	4,637	4,503	4,645	4,738	4,943	5,233	5,009	4,733	5,231	5,394	4,994
Engineering technology	281	389	371	380	519	580	674	710	678	738	892	888	888	971	1,172	1,164	1,136

Appendix table 2-27.
Earned master's degrees, by field and sex: 1975–95

Field	1975	1977	1979	1981	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Females																	
All degrees	131,536	150,031	148,303	149,367	145,817	141,464	143,497	145,897	148,877	154,688	161,651	170,922	181,603	191,908	201,220	212,246	220,230
Science and engineering	13,788	16,498	17,612	18,861	20,998	21,531	22,330	23,220	23,844	23,835	25,580	26,558	27,927	28,950	30,971	33,441	35,791
Natural sciences	3,122	3,727	4,220	4,127	4,566	4,718	4,682	4,777	4,748	4,622	4,835	4,876	4,888	5,114	5,293	5,828	6,063
Physical	653	660	679	675	685	846	830	913	890	891	1,040	1,051	1,074	1,088	1,171	1,233	1,283
Earth/atm/ocean	194	226	310	406	444	465	521	517	520	487	482	378	383	368	391	424	451
Biological & agricultural	2,275	2,841	3,231	3,046	3,437	3,407	3,331	3,347	3,338	3,244	3,313	3,447	3,431	3,658	3,731	4,171	4,329
Math/computer sciences	1,766	1,766	1,632	1,848	2,488	2,765	3,048	3,528	3,797	3,841	3,996	4,151	4,247	4,121	4,327	4,222	4,365
Mathematics	1,428	1,300	1,057	877	980	954	1,011	1,116	1,301	1,377	1,370	1,476	1,486	1,446	1,532	1,493	1,579
Computer sciences	338	466	575	971	1,508	1,811	2,037	2,412	2,496	2,464	2,626	2,675	2,761	2,675	2,795	2,729	2,786
Social & behavioral sciences	8,528	10,307	10,823	11,557	12,189	11,948	12,356	12,515	12,529	12,564	13,667	14,262	15,435	16,046	17,257	18,968	20,731
Psychology	3,045	4,004	4,343	4,668	5,185	5,093	5,417	5,426	5,327	5,326	5,838	6,283	6,808	6,923	7,484	8,285	9,397
Social sciences	5,483	6,303	6,480	6,889	7,004	6,855	6,939	7,089	7,202	7,238	7,829	7,979	8,627	9,123	9,773	10,683	11,334
Engineering	372	698	937	1,329	1,755	2,100	2,244	2,400	2,770	2,808	3,082	3,269	3,357	3,669	4,094	4,423	4,632
Chemical engineering	27	69	120	176	176	208	285	240	243	215	229	192	173	231	224	279	306
Civil engineering	107	185	214	316	382	415	414	373	475	413	445	520	540	635	831	953	1045
Electrical engineering	58	134	143	221	335	438	495	639	717	813	916	991	934	1,045	1,051	1,149	1,204
Industrial engineering	56	75	128	166	206	278	227	279	319	324	358	341	436	472	555	536	512
Mechanical engineering	20	55	73	127	166	199	228	254	247	295	326	354	360	371	400	417	450
Other engineering	104	180	259	323	490	562	595	615	769	748	808	871	914	915	1,033	1,089	1,115
Engineering technology	90	116	125	152	103	114	142	215	205	242	243	306	300	307	383	383	441

SOURCES: National Center for Education Statistics, Earned Degrees and Completion Surveys (Washington, DC: 1995), unpublished tabulations; and National Science Foundation, Science Resources Studies Division, unpublished tabulations.

Appendix table 2-28.
Earned master's degrees, by field, race/ethnicity, and citizenship: 1977-95

Field and race/ethnicity	1977	1979	1981	1985	1987	1989	1991	1993	1994	1995
					Total					
All degrees	318,241	302,075	296,798	287,213	290,532	311,050	338,498	370,973	389,008	399,428
Science and engineering	63,779	59,684	59,598	64,726	66,774	70,333	72,828	81,415	86,080	88,431
Natural sciences[a]	16,234	16,350	15,332	14,045	13,461	13,260	12,713	13,462	14,340	14,770
Math and computer sciences	6,496	6,101	6,787	9,989	11,808	12,829	12,956	14,251	14,529	14,522
Social sciences[b]	24,798	21,723	20,763	19,757	19,448	20,509	23,152	26,044	28,504	30,522
Engineering	16,251	15,510	16,716	20,935	22,057	23,735	24,007	27,658	28,707	28,617
Engineering technology	NA	NA	NA	816	883	1,135	1,188	1,555	1,547	1,577
					U.S. citizens and permanent residents					
All degrees	300,334	281,811	273,184	254,401	246,939	263,166	285,260	310,449	324,203	331,744
Science and engineering	55,963	50,846	49,340	50,751	50,330	51,491	52,849	57,720	61,769	63,323
Natural sciences[a]	14,437	14,410	13,411	11,676	10,721	10,352	9,408	9,809	10,384	10,871
Math and computer sciences	5,760	5,099	5,342	7,385	8,179	8,370	8,527	8,789	8,868	8,823
Social sciences[b]	23,071	19,920	18,785	17,230	15,990	17,089	19,365	21,747	24,237	25,817
Engineering	12,695	11,417	11,802	14,460	15,440	15,680	15,549	17,375	18,280	17,812
Engineering technology	NA	NA	NA	596	712	909	959	1,175	1,256	1,268
White, all degrees	266,109	249,401	241,255	223,649	216,807	230,322	247,524	265,668	273,913	277,437
Science and engineering	50,420	45,748	43,967	43,982	43,360	43,945	44,513	47,975	50,711	51,417
Natural sciences[a]	13,405	13,282	12,411	10,559	9,623	9,262	8,300	8,504	8,859	9,242
Math and computer sciences	5,256	4,625	4,708	6,176	6,729	6,818	6,705	6,818	6,665	6,547
Social sciences[b]	20,315	17,759	16,701	15,061	14,171	15,033	16,873	18,733	20,718	21,807
Engineering	11,444	10,082	10,147	12,186	12,837	12,832	12,635	13,920	14,469	13,821
Engineering technology	NA	NA	NA	526	581	802	830	1,041	994	982
Asian, all degrees	5,145	5,519	6,304	7,805	8,129	10,174	11,070	13,169	14,559	15,906
Science and engineering	1,749	1,929	2,170	3,285	3,455	4,100	4,310	4,846	5,422	5,683
Natural sciences[a]	388	469	365	450	464	545	532	615	698	802
Math and computer sciences	198	253	376	779	962	1,072	1,203	1,303	1,461	1,478
Social sciences[b]	426	357	350	505	379	491	567	668	820	831
Engineering	737	850	1,079	1,551	1,650	1,992	2,008	2,260	2,443	2,572
Engineering technology	NA	NA	NA	25	46	40	60	40	46	55
Black, all degrees	21,041	19,422	17,152	13,960	13,173	13,455	15,857	18,897	20,936	22,954
Science and engineering	2,321	2,003	1,801	1,742	1,784	1,652	2,090	2,554	2,849	3,339
Natural sciences[a]	351	382	351	290	301	238	261	310	347	383
Math and computer sciences	200	136	137	233	280	257	383	406	474	498
Social sciences[b]	1,530	1,239	1,053	889	800	802	1,048	1,274	1,439	1,793
Engineering	240	246	260	330	403	355	398	564	589	665
Engineering technology	NA	NA	NA	37	42	55	47	61	72	85

Appendix table 2-28.
Earned master's degrees, by field, race/ethnicity, and citizenship: 1977-95

Field and race/ethnicity	1977	1979	1981	1985	1987	1989	1991	1993	1994	1995
Hispanic, all degrees	7,071	6,470	7,439	7,730	7,781	8,133	9,684	11,371	13,177	13,905
Science and engineering	1,325	1,001	1,237	1,514	1,584	1,585	1,736	2,092	2,514	2,585
Natural sciences[a]	245	227	251	332	310	266	281	334	436	392
Math and computer sciences	91	61	102	149	183	178	213	240	244	273
Social sciences[b]	738	498	599	687	579	673	774	937	1115	1209
Engineering	251	215	285	346	512	468	468	581	719	711
Engineering technology	NA	NA	NA	6	17	10	19	25	37	40
Native American, all degrees	968	999	1,034	1,257	1,049	1,082	1,125	1,344	1,618	1,542
Science and engineering	148	165	165	228	147	209	200	253	273	299
Natural sciences[a]	48	50	33	45	23	41	34	46	44	52
Math and computer sciences	15	24	19	48	25	45	23	22	24	27
Social sciences[b]	62	67	82	88	61	90	103	135	145	177
Engineering	23	24	31	47	38	33	40	50	60	43
Engineering technology	NA	NA	NA	2	26	2	3	8	3	6
Foreign citizens										
All degrees	17,345	19,427	22,058	26,952	28,264	32,123	37,611	44,109	46,506	48,756
Science and engineering	7,805	8,544	9,749	12,506	13,045	15,143	17,049	20,150	20,879	21,321
Natural sciences[a]	1,797	1,895	1,864	2,178	2,132	2,504	2,856	3,145	3,411	3,299
Math and computer sciences	736	937	1,368	2,394	2,903	3,418	3,878	4,917	5,007	5,036
Social sciences[b]	1,727	1,752	1,954	2,240	2,229	2,474	2,795	2,969	3,104	3,290
Engineering	3,545	3,960	4,563	5,694	5,781	6,747	7,520	9,119	9,357	9,696
Engineering technology	NA	NA	NA	124	127	131	172	279	291	309

N/A = not available

NOTES: Data by racial/ethnic group were collected on a biennial schedule until 1990 and annually thereafter. Data by racial/ethnic group are collected by broad fields of study only; therefore, these data cannot be adjusted to the exact field taxonomies used by the National Science Foundation.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

SOURCE: National Science Foundation, Science Resources Studies Division, *Science and Engineering Degrees, by Race/Ethnicity of Recipients: 1977-94,* NSF 96-329 (Arlington, VA: 1996).

See text table 2-8.

Appendix table 2-29.
Graduate enrollment in engineering, by citizenship: 1985-96

Citizenship	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Total enrollment	95,505	107,196	110,778	112,007	114,048	117,834	123,497	128,854	128,081	122,242	118,506	113,063
U.S. citizens & permanent residents	69,930	77,895	78,609	76,579	77,133	78,687	81,948	84,831	85,435	82,325	80,153	74,403
Foreign students	25,575	29,301	32,169	35,428	36,915	39,147	41,549	44,023	42,646	39,917	38,353	38,660

NOTES: Data include full-time and part-time students. The schools surveyed by the Engineering Workforce Commission for engineering enrollments are slightly different from those surveyed by the National Science Foundation for graduate enrollments in all fields of science and engineering; therefore, numbers of students reported are slightly different.

SOURCE: American Association of Engineering Societies, Engineering Workforce Commission, *Engineering and Technology Enrollments, Fall 1979-1996* (Washington, DC: 1997), unpublished tabulations.

See figure 2-15.

Appendix table 2-30.
Earned doctoral degrees, by field and sex: 1975-95

Field	1975	1977	1979	1981	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total doctoral degree recipients																	
All degrees	32,952	31,716	31,239	31,356	31,281	31,337	31,297	31,902	32,370	33,501	34,326	36,067	37,522	38,856	39,771	41,017	41,610
Science and engineering	18,799	18,008	17,872	18,257	18,635	18,748	18,935	19,437	19,894	20,933	21,731	22,867	24,019	24,673	25,441	26,202	26,515
Natural sciences	8,103	7,676	7,817	7,995	8,194	8,336	8,436	8,483	8,655	9,172	9,185	9,763	10,159	10,435	10,529	11,079	11,024
Physical	3,076	2,721	2,674	2,627	2,814	2,851	2,934	3,120	3,238	3,350	3,261	3,524	3,625	3,780	3,699	3,977	3,840
Earth/atm/ocean	625	689	642	583	624	608	599	559	602	695	723	738	815	794	771	824	778
Biological & agricultural	4,402	4,266	4,501	4,785	4,756	4,877	4,903	4,804	4,815	5,127	5,201	5,501	5,719	5,861	6,059	6,278	6,406
Math/computer sciences	1,147	964	979	960	987	993	998	1,128	1,190	1,264	1,471	1,597	1,839	1,927	2,026	2,021	2,188
Mathematics	1,147	933	769	728	701	698	688	729	740	749	859	892	1,039	1,058	1,146	1,118	1,190
Computer sciences	0	31	210	232	286	295	310	399	450	515	612	705	800	869	880	903	998
Social & behavioral sciences	6,538	6,720	6,582	6,774	6,673	6,506	6,335	6,450	6,337	6,310	6,532	6,613	6,806	6,873	7,188	7,280	7,296
Psychology	2,751	2,990	3,091	3,358	3,347	3,257	3,118	3,126	3,173	3,074	3,208	3,281	3,250	3,263	3,419	3,380	3,419
Social sciences	3,787	3,730	3,491	3,416	3,326	3,249	3,217	3,324	3,164	3,236	3,324	3,332	3,556	3,610	3,769	3,900	3,877
Engineering	3,011	2,648	2,494	2,528	2,781	2,913	3,166	3,376	3,712	4,187	4,543	4,894	5,215	5,438	5,698	5,822	6,007
Chemical engineering	396	329	315	317	392	409	504	531	584	685	712	658	691	725	737	725	708
Civil engineering	361	336	302	358	397	408	391	429	477	531	538	553	575	594	624	684	656
Electrical engineering	714	667	611	549	625	660	716	806	779	1,010	1,137	1,276	1,405	1,483	1,543	1,673	1,731
Mechanical engineering	487	372	366	360	379	427	513	536	657	715	760	884	875	987	1,030	1,015	1,024
Materials engineering	272	248	236	234	268	271	303	305	392	374	380	440	489	485	535	539	588
Other engineering	781	696	664	710	720	738	739	769	823	872	1,016	1,083	1,180	1,164	1,229	1,186	1,300
Males																	
All degrees	25,751	23,858	22,302	21,464	20,748	20,638	20,553	20,595	20,938	21,682	21,813	22,962	23,652	24,436	24,658	25,211	25,277
Science and engineering	15,870	14,775	14,128	14,056	13,920	13,956	14,044	14,270	14,582	15,271	15,622	16,498	17,088	17,593	17,789	18,283	18,242
Natural sciences	6,960	6,530	6,436	6,409	6,360	6,483	6,452	6,426	6,484	6,779	6,649	7,101	7,320	7,413	7,311	7,713	7,534
Physical	2,812	2,477	2,382	2,318	2,441	2,452	2,467	2,610	2,710	2,783	2,642	2,863	2,946	3,010	2,919	3,149	2,962
Earth/atm/ocean	595	630	584	527	529	502	491	464	490	560	575	597	636	606	611	641	608
Biological & agricultural	3,553	3,423	3,470	3,564	3,390	3,529	3,494	3,352	3,284	3,436	3,432	3,641	3,738	3,797	3,781	3,923	3,964
Math/computer sciences	1,038	837	833	822	838	841	859	959	1,000	1,087	1,208	1,329	1,523	1,602	1,624	1,648	1,737
Mathematics	1,038	811	650	616	588	583	582	608	615	628	704	734	840	853	882	882	925
Computer sciences	0	26	183	206	250	258	277	351	385	459	504	595	683	749	742	766	812
Social & behavioral sciences	4,913	4,834	4,427	4,396	4,065	3,870	3,765	3,734	3,628	3,504	3,597	3,589	3,497	3,646	3,678	3,735	3,658
Psychology	1,878	1,902	1,831	1,885	1,750	1,626	1,577	1,527	1,475	1,393	1,408	1,368	1,254	1,335	1,331	1,278	1,247
Social sciences	3,035	2,932	2,596	2,511	2,315	2,244	2,188	2,207	2,153	2,111	2,189	2,221	2,243	2,311	2,347	2,457	2,411
Engineering	2,959	2,574	2,432	2,429	2,657	2,762	2,968	3,151	3,470	3,901	4,168	4,479	4,748	4,932	5,176	5,187	5,313
Chemical engineering	391	319	306	306	369	382	463	470	524	620	632	580	608	612	643	612	599
Civil engineering	356	328	298	348	384	383	371	408	459	501	484	504	534	544	570	604	580
Electrical engineering	698	646	600	527	612	645	681	768	747	962	1,070	1,192	1,326	1,368	1,418	1,526	1,558
Mechanical engineering	483	366	361	354	371	412	487	518	640	686	731	846	818	942	973	946	961
Materials engineering	267	238	228	217	238	245	271	281	347	341	335	391	412	424	457	456	494
Other engineering	764	677	639	677	683	695	695	706	753	791	916	966	1,050	1,042	1,115	1,043	1,121

Appendix table 2-30.
Earned doctoral degrees, by field and sex: 1975-95

Field	1975	1977	1979	1981	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
								Females									
All degrees	7,201	7,858	8,937	9,892	10,533	10,699	10,744	11,307	11,432	11,819	12,513	13,105	13,870	14,420	15,113	15,806	16,333
Science and engineering	2,929	3,233	3,744	4,201	4,715	4,792	4,891	5,167	5,312	5,662	6,109	6,369	6,931	7,080	7,652	7,919	8,273
Natural sciences	1,143	1,146	1,381	1,586	1,834	1,853	1,984	2,057	2,171	2,393	2,536	2,662	2,839	3,022	3,218	3,366	3,490
Physical	264	244	292	309	373	399	467	510	528	567	619	661	679	770	780	828	878
Earth/atm/ocean	30	59	58	56	95	106	108	95	112	135	148	141	179	188	160	183	170
Biological & agricultural	849	843	1,031	1,221	1,366	1,348	1,409	1,452	1,531	1,691	1,769	1,860	1,981	2,064	2,278	2,355	2,442
Math/computer sciences	109	127	146	138	149	152	139	169	190	177	263	268	316	325	402	373	451
Mathematics	109	122	119	112	113	115	106	121	125	121	155	158	199	205	264	236	265
Computer sciences	0	5	27	26	36	37	33	48	65	56	108	110	117	120	138	137	186
Social & behavioral sciences	1,625	1,886	2,155	2,378	2,608	2,636	2,570	2,716	2,709	2,806	2,935	3,024	3,309	3,227	3,510	3,545	3,638
Psychology	873	1,088	1,260	1,473	1,597	1,631	1,541	1,599	1,698	1,681	1,800	1,913	1,996	1,928	2,088	2,102	2,172
Social sciences	752	798	895	905	1,011	1,005	1,029	1,117	1,011	1,125	1,135	1,111	1,313	1,299	1,422	1,443	1,466
Engineering	52	74	62	99	124	151	198	225	242	286	375	415	467	506	522	635	694
Chemical engineering	5	10	9	11	23	27	41	61	60	65	80	78	83	113	94	113	109
Civil engineering	5	8	4	10	13	25	20	21	18	30	54	49	41	50	54	80	76
Electrical engineering	16	21	11	22	13	15	35	38	32	48	67	84	79	115	125	147	173
Mechanical engineering	4	6	5	6	8	15	26	18	17	29	29	38	57	45	57	69	63
Materials engineering	5	10	8	17	30	26	32	24	45	33	45	49	77	61	78	83	94
Other engineering	17	19	25	33	37	43	44	63	70	81	100	117	130	122	114	143	179

SOURCE: National Science Foundation, Science Resources Studies Division, *Selected Data on Science and Engineering Doctorate Awards: 1995,* NSF 96-303 (Arlington, VA: 1996).

See figure 2-16.

Appendix table 2-31.
Earned doctoral degrees by field, race/ethnicity, and citizenship: 1977-95

Field and race/ethnicity	1977	1979	1981	1983	1985	1987	1989	1991	1992	1993	1994	1995
						Total[a]						
All degrees	31,716	31,239	31,356	31,281	31,297	32,370	34,326	37,522	38,856	39,771	41,017	41,610
Science and engineering	18,008	17,872	18,257	18,635	18,935	19,894	21,731	24,019	24,673	25,441	26,202	26,515
Natural sciences[b]	7,676	7,817	7,995	8,194	8,436	8,655	9,185	10,159	10,435	10,529	11,079	11,024
Math and computer sciences	964	979	960	987	998	1,190	1,471	1,839	1,927	2,026	2,021	2,188
Social sciences[c]	6,720	6,582	6,774	6,673	6,335	6,337	6,532	6,806	6,873	7,188	7,280	7,296
Engineering	2,648	2,494	2,528	2,781	3,166	3,712	4,543	5,215	5,438	5,698	5,822	6,007
						U.S. citizens and permanent residents						
All degrees	27,487	26,784	26,341	25,634	24,694	24,562	25,026	27,418	27,956	28,675	30,877	31,910
Science and engineering	14,881	14,711	14,654	14,518	14,065	14,055	14,591	15,909	15,940	16,570	18,184	18,961
Natural sciences[b]	6,427	6,604	6,640	6,706	6,634	6,450	6,628	7,058	7,037	7,091	8,103	8,352
Math and computer sciences	769	778	713	664	631	671	824	969	996	1,099	1,200	1,388
Social sciences[c]	5,886	5,712	5,830	5,666	5,206	5,021	4,910	5,408	5,387	5,683	5,828	5,885
Engineering	1,799	1,617	1,471	1,482	1,594	1,913	2,229	2,474	2,520	2,697	3,053	3,336
White, all degrees	23,654	22,396	22,470	22,251	21,306	21,122	21,570	23,179	23,599	24,027	24,585	24,608
Science and engineering	12,875	12,314	12,573	12,671	12,169	12,052	12,501	13,323	13,326	13,735	13,890	13,879
Natural sciences[b]	5,598	5,620	5,771	5,981	5,903	5,663	5,800	6,111	6,019	5,950	3,016	5,974
Math and computer sciences	671	658	610	569	527	548	688	774	803	886	880	988
Social sciences[c]	5,177	4,879	5,099	4,993	4,551	4,383	4,287	4,601	4,624	4,874	4,866	4,831
Engineering	1,429	1,157	1,093	1,128	1,188	1,458	1,726	1,837	1,880	2,025	2,020	2,086
Asian, all degrees	910	1,102	1,073	1,042	1,070	1,168	1,268	1,531	1,761	2,012	3,545	4,300
Science and engineering	745	884	827	780	809	925	986	1,180	1,344	1,610	2,989	3,666
Natural sciences[b]	342	377	344	359	346	369	403	474	559	686	1,481	1,857
Math and computer sciences	42	55	56	54	50	67	76	123	138	156	259	346
Social sciences[c]	112	146	142	120	132	162	146	178	196	241	382	432
Engineering	249	306	285	247	281	327	361	405	451	527	867	1,031
Black, all degrees	1,191	1,112	1,110	1,005	1,043	910	962	1,160	1,113	1,277	1,274	1,455
Science and engineering	342	347	346	338	374	319	366	459	407	468	496	557
Natural sciences[b]	85	84	89	84	100	95	105	111	106	135	149	168
Math and computer sciences	9	12	11	6	10	13	9	19	9	14	21	16
Social sciences[c]	233	231	227	219	230	186	219	274	243	269	272	302
Engineering	15	20	19	29	34	25	33	55	49	50	54	71
Hispanic, all degrees	489	547	529	608	634	708	694	867	909	973	1,029	1,055
Science and engineering	203	234	240	284	296	357	382	492	513	542	548	568
Natural sciences[b]	76	84	93	86	107	138	157	191	208	226	254	232
Math and computer sciences	12	12	5	7	18	15	15	21	20	23	20	21
Social sciences[c]	91	114	126	162	149	170	163	220	214	227	208	238
Engineering	24	24	16	29	22	34	47	60	71	66	66	77

Appendix table 2-31.
Earned doctoral degrees by field, race/ethnicity, and citizenship: 1977-95

Field and race/ethnicity	1977	1979	1981	1983	1985	1987	1989	1991	1992	1993	1994	1995
Native American, all degrees	66	81	85	82	96	115	94	132	149	120	142	148
Science and engineering	31	29	28	30	41	53	53	56	69	43	64	69
Natural sciences[b]	14	6	8	13	21	20	25	27	26	17	24	26
Math and computer sciences	1	1	1	1	0	3	2	1	4	2	3	2
Social sciences[c]	15	19	15	15	19	23	19	22	28	22	31	31
Engineering	1	3	4	1	1	7	7	6	11	2	6	10
Temporary residents												
Total, all degrees	3,448	3,587	3,940	4,498	5,227	5,612	6,648	9,312	9,953	9,934	9,406	8,806
Science and engineering	2,675	2,689	2,983	3,412	4,047	4,468	5,391	7,642	8,092	8,113	7,521	6,992
Natural sciences[c]	1,079	1,046	1,140	1,273	1,517	1,704	1,975	2,936	3,213	3,191	2,815	2,502
Math and computer sciences	170	181	226	281	327	445	524	846	876	865	791	747
Social sciences[c]	651	645	675	688	784	787	952	1,226	1,260	1,273	1,262	1,220
Engineering	775	817	942	1,170	1,419	1,532	1,940	2,634	2,743	2,784	2,653	2,523
Citizenship unknown												
Total, all degrees	781	868	1,075	1,149	1,376	2,196	2,652	792	947	1,162	734	894
Science and engineering	452	472	620	705	823	1,371	1,749	468	641	758	497	562
Natural sciences[b]	170	167	215	215	285	501	582	165	185	247	161	170
Math and computer sciences	25	20	21	42	40	74	123	24	55	62	30	53
Social sciences[c]	183	225	269	319	345	529	670	172	226	232	190	191
Engineering	74	60	115	129	153	267	374	107	175	217	116	148

[a]Data include all doctorates awarded to U.S. citizens and permanent residents, temporary residents, and persons whose citizenship is unknown.

[b]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[c]Social sciences include psychology, sociology, and other social sciences.

SOURCE: National Science Foundation, Science Resources Studies Division, *Selected Data on Science and Engineering Doctorate Awards: 1995,* NSF 96-303 (Arlington, VA: 1996).

Appendix table 2-32.
Earned doctoral degrees in science and engineering, by region/country: Most recent year

Region/country	All doctoral degrees	All S&E doctoral degrees	Degree field				
			Natural sciences[a]	Math & computer sciences	Agriculture	Social sciences[b]	Engineering
Total, three world regions	155,733	89,818	37,229	6,830	5,829	15,663	24,267
Asia							
Total	32,087	15,678	6,304	224	2,048	775	6,327
China	4,364	3,230	1,191	NA	182	198	1,659
India	9,369	4,425	3,505	NA	572	NA	348
Japan	13,044	5,453	1,135	NA	1,008	301	3,009
South Korea	4,462	1,920	358	169	223	232	938
Taiwan	848	650	115	55	63	44	373
Europe							
Total	78,791	45,647	20,120	4,386	2,576	7,030	11,535
European Union	60,364	33,488	16,769	2,856	1,764	4,736	7,363
Austria	1,634	851	268	98	123	105	257
Denmark	333	257	137	0	34	33	53
Finland	1,882	757	245	86	54	147	225
France	9,801	8,575	3,738	1,129	84	2,197	1,427
Germany	22,404	10,128	6,077	616	573	699	2,163
Greece	932	367	128	44	36	66	93
Ireland	344	252	156	21	13	11	51
Italy	3,603	1,432	640	NA	175	226	391
The Netherlands	2,405	1,308	516	NA	155	264	373
Spain	5,193	1,794	1,109	88	104	194	299
Sweden	2,072	1,255	399	172	62	148	474
United Kingdom	9,761	6,512	3,356	602	351	646	1,557
European Free Trade Associaton	4,304	2,009	814	135	172	347	541
Norway	500	169	7	5	42	8	107
Switzerland	3,804	1,840	807	130	130	339	434
Central Europe	14,123	10,150	2,537	1,395	640	1,947	3,631
Czech Republic	118	108	35	7	1	21	44
Russia	14,005	10,042	2,502	1,388	639	1,926	3,587
North America							
Total	44,855	28,493	10,805	2,220	1,205	7,858	6,405
Canada	3,356	2,027	689	183	117	490	548
Mexico	488	259	120	15	10	79	35
United States	41,011	26,207	9,996	2,022	1,078	7,289	5,822

N/A = not available

NOTES: Data are compiled from numerous national and international sources, and degree fields may not be strictly comparable. U.K. data are for 1996. Data for China, Japan, South Korea, Taiwan, Austria, Switzerland, and the United States are for 1995. Data for Finland, France, Germany, Italy, Sweden, Norway, Czech Republic, Russia, Canada, and Mexico are for 1994. Data for Denmark, Greece, Ireland, the Netherlands, and Spain are for 1993. Indian data are for 1991. Japanese data include "thesis" doctorates called Ronbun Hakase, earned by employees in industry.

[a]Natural sciences here include physical, earth, atmospheric, oceanographic, and biological sciences.

[b]Social sciences include psychology, sociology, and other social sciences.

SOURCES: **ASIA: China**—National Research Center for Science and Technology for Development, unpublished tabulations, and UNESCO, *Statistical Yearbook* (Paris: 1996); **India**—Department of Science and Technology, *Research and Development Statistics 1994–95* (New Delhi: 1996); **Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **South Korea**—Ministry of Education, *Statistical Yearbook of Education* (Seoul: 1996)*;* **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996); **EUROPEAN UNION: Austria**—Austrian Central Statistical Office, unpublished tabulations; **Denmark**—Department of Higher Education, Ministry of Education, unpublished tabulations (1997); **Finland**—Central Statistical Office, unpublished tabulations (1997), and OECD/CERI; **France**—Ministère de l'Éducation Nationale, *Repères et Références Statistiques sur les Enseignements et la Formation* (Vanves, France: 1996); **Germany**—Statistisches Bundesamt, *Prüfungen an Hochschulen* (Wiesbaden); **Greece**—National Statistical Service of Greece, unpublished tabulations (1997), and OECD/CERI; **Ireland**—OECD/CERI; **Italy**—Consiglio nazionale delle ricerche, unpublished tabulations (1997); **the Netherlands**—Department for Statistics of Education and Science, Netherlands Central Bureau of Statistics, unpublished tabulations (1997); **Spain**—Estadisticas e Investigaciones Sociales, Instituto National de Estadistica, unpublished tabulations (1997) and OECD/CERI; **Sweden**—Statistics Sweden, unpublished tabulations (1997), and OECD/CERI; **United Kingdom**—Higher Education Statistical Agency, *Students in Higher Education Institutions, 1995/96* (Cheltenham: 1997); **EUROPEAN FREE TRADE ASSOCIATION: Norway**—Institute for Studies in Research and Higher Education, the Norwegian Research Council, unpublished tabulations (1997); **Switzerland**—Swiss Federal Statistical Office, unpublished tabulations (1997); **CENTRAL AND EASTERN EUROPE: Czech Republic**—UNESCO (1996); **Russia**—UNESCO (1996); **NORTH AMERICA: Canada**—UNESCO (1996) and OECD/CERI; **Mexico**—Asociación Nacional de Universidades e Instituciones de Educación Superior, *Anuario Estadístico 1995: Posgrado* (Mexico: 1996); and **United States**—National Science Foundation, Science Resources Studies Division, *Science and Engineering Degrees 1966-94,* NSF 96-321 (Arlington, VA: 1996).

Appendix table 2-33.
Proportion of NS&E doctoral degrees earned by foreign students in selected countries: 1995 or most current year
(Percentages)

Country	Foreign doctoral recipients	
	Natural sciences	Engineering
United States	40.5	57.9
United Kingdom	28.5	49.1
France	29.1	34.2
Germany	7.9	15.8
Japan	22.1	32.2

NOTE: Data for Germany and Japan are for 1994.

NS&E = natural sciences and engineering

SOURCES: **France**—Ministère de l'Éducation Nationale, *Repères et Références Statistiques sur les Enseignements et la Formation* (Vanves, France: 1996); **Germany**—Statistiches Bundesamt, *Prüfungen an Hochschulen* (Wiesbaden); **Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: Annual Series); **United Kingdom**—Higher Education Statistical Agency, unpublished tabulations; **United States**—National Science Foundation, Science Resources Studies Division, *Selected Data on Science and Engineering Doctorate Awards, 1995,* NSF 96-303 (Arlington, VA: 1996).

See figure 2-17. *Science & Engineering Indicators – 1998*

Appendix table 2-34.
Foreign students enrolled in U.S. universities from 12 major places of origin, by educational level and major field of study: 1995-96

Country	Total all fields	Educational level	Number of students surveyed[a]	Percentage in S&E fields				Percentage in non-S&E fields	
				Natural sciences	Math & computer sciences	Social sciences	Engineering	Business management	Other
Japan	45,531	Undergraduate	32,034	4.5	3.7	15.9	3.1	19.6	53.2
		Graduate	7,819	7.3	3.4	24.7	7.4	17.2	40.0
China	39,613	Undergraduate	4,851	6.8	14.8	4.1	10.4	27.6	36.3
		Graduate	32,512	32.6	13.1	5.9	24.9	8.9	14.6
South Korea	36,231	Undergraduate	16,333	5.8	7.1	6.3	8.0	21.7	51.1
		Graduate	15,045	15.1	7.0	11.2	18.7	12.1	35.9
Taiwan	32,702	Undergraduate	11,522	3.7	8.2	4.2	9.6	33.3	41.0
		Graduate	18,904	12.0	10.1	6.7	24.2	19.4	27.6
India	31,743	Undergraduate	6,049	7.9	14.9	5.8	21.5	25.0	24.9
		Graduate	25,593	13.2	17.1	4.2	41.3	11.7	12.5
Canada	23,005	Undergraduate	12,987	7.8	2.2	14.5	6.1	13.3	56.1
		Graduate	8,851	9.9	1.5	15.5	4.6	6.7	61.8
Malaysia	14,015	Undergraduate	11,630	3.2	6.8	3.8	33.8	33.7	18.7
		Graduate	1,956	8.6	11.0	11.6	20.1	24.2	24.5
Indonesia	12,820	Undergraduate	9,325	2.7	5.5	2.9	21.6	48.8	18.5
		Graduate	2,947	10.2	6.5	10.6	22.0	35.7	15.0
Thailand	12,165	Undergraduate	3,599	3.6	8.0	4.6	15.0	32.7	36.1
		Graduate	7,347	7.6	5.2	5.6	19.5	47.7	14.4
Hong Kong	12,018	Undergraduate	9,055	3.6	8.6	6.0	14.5	40.8	26.5
		Graduate	2,348	12.1	12.5	10.9	16.5	22.3	25.7
Germany	9,017	Undergraduate	3,662	7.6	4.2	10.8	5.1	24.1	48.2
		Graduate	4,304	18.1	7.7	13.0	12.3	17.9	31.0
Mexico	8,687	Undergraduate	5,079	5.0	4.4	6.9	14.4	26.1	43.2
		Graduate	3,070	21.4	7.1	14.7	19.3	14.8	22.7

NOTE: Data Include foreign students in all levels of U.S. higher education.

[a]The numbers of foreign students surveyed by level and field of study do not equal the total numbers of foreign students in all fields from each country. Many universities were unable to respond to the detailed questions posed by the survey regarding the level and major field of study for their registered foreign students.

SOURCES: Institute of International Education (IIE), *Open Doors, 1995-96: Report on International Education Exchange* (New York: 1996); and IIE, *Profiles 1995-96, Detailed Analyses of the Foreign Student Population* (New York), unpublished tabulations.

Appendix table 2-35.
Earned doctoral degrees, by field and citizenship: 1986-95

Field	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total[a]										
All degrees	31,902	32,370	33,501	34,326	36,067	37,522	38,856	39,771	41,017	41,610
Science and engineering	19,437	19,894	20,933	21,731	22,867	24,019	24,673	25,441	26,202	26,515
Natural sciences[b]	8,483	8,655	9,172	9,185	9,763	10,159	10,435	10,529	11,079	11,024
Math and computer sciences	1,128	1,190	1,264	1,471	1,597	1,839	1,927	2,026	2,021	2,188
Social sciences[c]	6,450	6,337	6,310	6,532	6,613	6,806	6,873	7,188	7,280	7,296
Engineering	3,376	3,712	4,187	4,543	4,894	5,215	5,438	5,698	5,822	6,007
U.S. citizens										
All degrees	23,086	22,984	23,291	23,400	24,905	25,561	25,977	26,420	27,129	27,603
Science and engineering	13,022	12,966	13,369	13,467	14,166	14,624	14,558	14,929	15,162	15,460
Natural sciences[b]	6,139	6,070	6,282	6,225	6,505	6,585	6,501	6,461	6,642	6,595
Math and computer sciences	568	588	626	731	723	851	876	921	930	1,038
Social sciences[c]	4,932	4,750	4,681	4,647	4,981	5,102	5,072	5,319	5,375	5,445
Engineering	1,383	1,558	1,780	1,864	1,957	2,086	2,109	2,228	2,215	2,382
Non-U.S. citizens										
All degrees	6,709	7,190	7,817	8,274	9,791	11,169	11,932	12,189	13,154	13,113
Science and engineering	5,154	5,557	6,066	6,515	7,768	8,927	9,474	9,754	10,543	10,493
Natural sciences[b]	1,896	2,084	2,333	2,378	2,974	3,409	3,749	3,821	4,276	4,259
Math and computer sciences	478	528	567	617	797	964	996	1,043	1,061	1,097
Social sciences[c]	1,065	1,058	1,079	1,215	1,331	1,532	1,575	1,637	1,715	1,660
Engineering	1,715	1,887	2,087	2,305	2,666	3,022	3,154	3,253	3,491	3,477
Non-U.S. citizens with permanent visas										
All degrees	1,433	1,578	1,622	1,626	1,698	1,857	1,979	2,255	3,748	4,307
Science and engineering	994	1,089	1,130	1,124	1,197	1,285	1,382	1,641	3,022	3,501
Natural sciences[b]	321	380	429	403	437	473	536	630	1,461	1,757
Math and computer sciences	83	83	86	93	102	118	120	178	270	350
Social sciences[c]	247	271	249	263	269	306	315	364	453	440
Engineering	343	355	366	365	389	388	411	469	838	954
Non-U.S. citizens with temporary visas										
All degrees	5,276	5,612	6,195	6,648	8,093	9,312	9,953	9,934	9,406	8,806
Science and engineering	4,160	4,468	4,936	5,391	6,571	7,642	8,092	8,113	7,521	6,992
Natural sciences[b]	1,575	1,704	1,904	1,975	2,537	2,936	2,741	3,191	2,815	2,502
Math and computer sciences	395	445	481	524	695	846	876	865	791	747
Social sciences[c]	818	787	830	952	1,062	1,226	1,260	1,273	1,262	1,220
Engineering	1,372	1,532	1,721	1,940	2,277	2,634	2,743	2,784	2,653	2,523

Appendix table 2-35.
Earned doctoral degrees, by field and citizenship: 1986-95

Field	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
					Citizenship unknown					
All degrees	2,107	2,196	2,393	2,652	1,371	792	947	1,162	734	894
Science and engineering	1,261	1,371	1,498	1,749	933	468	641	758	497	562
Natural sciences[b]	448	446	557	582	284	165	185	247	161	170
Math and computer sciences	82	74	71	123	77	24	55	62	30	53
Social sciences[c]	453	529	550	670	301	172	226	232	190	191
Engineering	278	267	320	374	271	107	175	217	116	148

[a]Data include all doctorates awarded to U.S. citizens and permanent residents, temporary residents, and persons whose citizenship is unknown.

[b]Natural sciences here include physical, earth, atmospheric, oceanographic, biological, and agricultural sciences.

[c]Social sciences include psychology, sociology, and other social sciences.

SOURCE: National Science Foundation, Science Resources Studies Division, *Selected Data on Science and Engineering Doctorate Awards: 1995,* NSF 96-303 (Arlington, VA: 1996).

See figure 2-17.

Appendix table 2-36.
Total S&E doctoral degrees earned by Asian students from Asian and U.S. universities: 1975-95

	Asian universities	U.S. universities
1975	4,057	NA
1976	4,634	NA
1977	4,959	NA
1978	5,211	NA
1979	5,597	NA
1980	5,892	991
1981	6,149	1,031
1982	6,408	1,168
1983	6,652	1,339
1984	7,091	1,531
1985	7,848	1,761
1986	8,032	1,889
1987	8,422	2,218
1988	9,701	2,511
1989	10,144	2,872
1990	10,283	4,008
1991	11,053	4,911
1992	11,767	5,406
1993	12,235	5,628
1994	13,812	6,229
1995	15,678	6,352

NA = not available

NOTE: Asian countries comprise China, India, Japan, South Korea, and Taiwan. Asian students in U.S. universities include those on either temporary or permanent visas.

SOURCES: **China**—National Center for Science and Technology for Development, unpublished tabulations, 1997; **India**—Department of Science and Technology, *Research and Development Statistics 1994-95* (New Delhi: 1996); **Japan**—Ministry of Education, Science, and Culture (Monbusho), *Monbusho Survey of Education* (Tokyo: annual series); **South Korea**—Ministry of Education, *Statistical Yearbook of Education, 1996* (Seoul: 1996)*;* **Taiwan**—Ministry of Education, *Educational Statistics of the Republic of China* (Taipei: 1996); **United States**—National Science Foundation, Science Resources Studies Division (NSF/SRS), *Selected Data on Science and Engineering Doctorate Awards: 1995,* NSF 96-303 (Arlington, VA: 1996); and NSF/SRS, *Science and Engineering Doctorates: 1960-84* (Washington, DC: n.d.).

See figure 2-18. *Science & Engineering Indicators – 1998*

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region /country of origin	1990					1991					1992					1993				
	Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
All fields																				
Asia	5,224	2,390	45.8	1,727	33.1	6,252	3,596	57.5	2,268	36.3	6,938	4,375	63.1	2,525	36.4	7,136	4,397	61.6	2,367	33.2
China	1,225	725	59.2	502	41.0	1,919	1,523	79.4	920	47.9	2,238	1,980	88.5	1,080	48.3	2,416	2,134	88.3	1,077	44.6
Taiwan	1,149	477	41.5	314	27.3	1,321	635	48.1	367	27.8	1,431	702	49.1	364	25.4	1,456	584	40.1	304	20.9
Japan	186	73	39.2	55	29.6	164	66	40.2	45	27.4	172	74	43.0	46	26.7	182	66	36.3	43	23.6
South Korea	1,259	367	29.2	272	21.6	1,396	454	32.5	285	20.4	1,474	464	31.5	272	18.5	1,409	462	32.8	236	16.7
India	881	586	66.5	470	53.3	924	689	74.6	518	56.1	1,072	880	82.1	609	56.8	1,139	920	80.8	577	50.7
Other	524	162	30.9	114	21.8	528	229	43.4	133	25.2	551	275	49.9	154	27.9	534	231	43.3	130	24.3
Europe	1,097	540	49.2	411	37.5	1,329	740	55.7	534	40.2	1,332	809	60.7	544	40.8	1,461	842	57.6	552	37.8
Greece	137	67	48.9	50	36.5	185	96	51.9	66	35.7	168	94	56.0	58	34.5	199	116	58.3	78	39.2
United Kingdom	172	119	69.2	90	52.3	207	142	68.6	101	48.8	216	161	74.5	117	54.2	230	169	73.5	120	52.2
Germany	169	85	50.3	65	38.5	181	109	60.2	80	44.2	189	116	61.4	72	38.1	250	148	59.2	91	36.4
Italy	88	35	39.8	24	27.3	115	56	48.7	44	38.3	99	51	51.5	29	29.3	101	43	42.6	31	30.7
France	94	41	43.6	30	31.9	107	55	51.4	40	37.4	116	63	54.3	42	36.2	136	62	45.6	40	29.4
Spain	73	27	37.0	24	32.9	103	52	50.5	39	37.9	91	57	62.6	41	45.1	100	54	54.0	34	34.0
Other	364	166	45.6	128	35.2	431	230	53.4	164	38.1	453	267	58.9	185	40.8	445	250	56.2	158	35.5
N./S. America	1,099	434	39.5	329	29.9	1,293	599	46.3	434	33.6	1,302	615	47.2	393	30.2	1,279	589	46.1	382	29.9
Canada	419	191	45.6	153	36.5	511	241	47.2	187	36.6	509	260	51.1	191	37.5	486	239	49.2	176	36.2
Mexico	130	47	36.2	32	24.6	156	71	45.5	51	32.7	149	49	32.9	27	18.1	162	66	40.7	35	21.6
Argentina	78	32	41.0	24	30.8	73	46	63.0	33	45.2	101	47	46.5	28	27.7	68	37	54.4	25	36.8
Brazil	129	22	17.1	18	14.0	149	49	32.9	33	22.1	163	46	28.2	22	13.5	181	44	24.3	26	14.4
Chile	56	23	41.1	15	26.8	70	25	35.7	20	28.6	65	35	53.8	25	38.5	64	30	46.9	17	26.6
Colombia	46	24	52.2	18	39.1	64	33	51.6	19	29.7	54	29	53.7	14	25.9	47	21	44.7	17	36.2
Peru	28	14	50.0	12	42.9	40	27	67.5	16	40.0	42	27	64.3	19	45.2	48	27	56.3	17	35.4
Other	213	81	38.0	57	26.8	230	107	46.5	75	32.6	219	122	55.7	67	30.6	223	125	56.1	69	30.9

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region/country of origin	1994 Total Ph.D. recipients	1994 Plan to stay in U.S. No.	1994 Plan to stay in U.S. %	1994 Firm plans to stay in U.S. No.	1994 Firm plans to stay in U.S. %	1995 Total Ph.D. recipients	1995 Plan to stay in U.S. No.	1995 Plan to stay in U.S. %	1995 Firm plans to stay in U.S. No.	1995 Firm plans to stay in U.S. %	1996 Total Ph.D. recipients	1996 Plan to stay in U.S. No.	1996 Plan to stay in U.S. %	1996 Firm plans to stay in U.S. No.	1996 Firm plans to stay in U.S. %
All fields															
Asia	7,903	5,100	64.5	2,654	33.6	8,014	5,407	67.5	2,827	35.3	8,179	5,593	68.4	3,491	42.7
China	2,772	2,548	91.9	1,223	44.1	2,979	2,744	92.1	1,341	45.0	3,201	2,896	90.5	1,788	55.9
Taiwan	1,576	654	41.5	322	20.4	1,485	669	45.1	293	19.7	1,404	653	46.5	344	24.5
Japan	235	95	40.4	57	24.3	233	102	43.8	69	29.6	245	104	42.4	67	27.3
South Korea	1,475	522	35.4	267	18.1	1,306	466	35.7	244	18.7	1,260	441	35.0	270	21.4
India	1,289	1,049	81.4	662	51.4	1,425	1,179	82.7	746	52.4	1,500	1,264	84.3	882	58.8
Other	556	232	41.7	123	22.1	586	247	42.2	134	22.9	569	235	41.3	140	24.6
Europe	1,506	902	59.9	597	39.6	1,644	1,033	62.8	656	39.9	1,611	1,038	64.4	711	44.1
Greece	188	85	45.2	60	31.9	197	111	56.3	60	30.5	152	85	55.9	57	37.5
United Kingdom	219	156	71.2	97	44.3	222	167	75.2	116	52.3	206	154	74.8	107	51.9
Germany	257	167	65.0	113	44.0	306	194	63.4	120	39.2	246	150	61.0	102	41.5
Italy	108	57	52.8	30	27.8	116	60	51.7	33	28.4	102	48	47.1	31	30.4
France	132	77	58.3	45	34.1	117	65	55.6	36	30.8	102	58	56.9	38	37.3
Spain	113	59	52.2	43	38.1	102	64	62.7	50	49.0	120	84	70.0	58	48.3
Other	489	301	61.6	209	42.7	584	372	63.7	241	41.3	683	459	67.2	318	46.6
N./S. America	1,368	641	46.9	405	29.6	1,326	620	46.8	384	29.0	1,426	672	47.1	450	31.6
Canada	490	239	48.8	174	35.5	524	278	53.1	171	32.6	505	269	53.3	190	37.6
Mexico	178	67	37.6	37	20.8	162	57	35.2	34	21.0	180	72	40.0	41	22.8
Argentina	68	45	66.2	33	48.5	77	38	49.4	26	33.8	91	60	65.9	39	42.9
Brazil	202	60	29.7	33	16.3	175	48	27.4	32	18.3	262	66	25.2	46	17.6
Chile	54	19	35.2	14	25.9	50	20	40.0	11	22.0	42	14	33.3	10	23.8
Colombia	59	35	59.3	14	23.7	56	24	42.9	15	26.8	54	27	50.0	18	33.3
Peru	42	30	71.4	16	38.1	39	23	59.0	14	35.9	45	31	68.9	21	46.7
Other	275	146	53.1	84	30.5	243	132	54.3	81	33.3	247	133	53.8	85	34.4

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region /country of origin	1990					1991					1992					1993				
	Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
Science & engineering																				
Asia	4,380	2,113	48.2	1,521	34.7	5,280	3,189	60.4	1,995	37.8	5,786	3,784	65.4	2,165	37.4	5,996	3,879	64.7	2,078	34.7
China	1,150	687	59.7	478	41.6	1,792	1,428	79.7	861	48.0	2,044	1,808	88.5	990	48.4	2,227	1,975	88.7	1,008	45.3
Taiwan	1,012	451	44.6	299	29.5	1,123	581	51.7	340	30.3	1,240	640	51.6	329	26.5	1,213	530	43.7	282	23.2
Japan	147	60	40.8	48	32.7	125	50	40.0	35	28.0	132	51	38.6	28	21.2	132	43	32.6	27	20.5
South Korea	971	307	31.6	226	23.3	1,107	390	35.2	243	22.0	1,123	373	33.2	220	19.6	1,118	394	35.2	201	18.0
India	709	467	65.9	371	52.3	752	554	73.7	408	54.3	860	703	81.7	485	56.4	932	759	81.4	462	49.6
Other	391	141	36.1	99	25.3	381	186	48.8	108	28.3	387	209	54.0	113	29.2	374	178	47.6	98	26.2
Europe	802	383	47.8	288	35.9	971	524	54.0	385	39.6	947	547	57.8	376	39.7	1,083	593	54.8	404	37.3
Greece	125	65	52.0	48	38.4	168	90	53.6	62	36.9	149	82	55.0	49	32.9	174	101	58.0	68	39.1
United Kingdom	104	73	70.2	53	51.0	134	91	67.9	66	49.3	139	101	72.7	75	54.0	157	113	72.0	86	54.8
Germany	123	59	48.0	46	37.4	118	67	56.8	51	43.2	124	67	54.0	44	35.5	164	86	52.4	55	33.5
Italy	63	23	36.5	15	23.8	86	37	43.0	30	34.9	73	37	50.7	25	34.2	76	30	39.5	23	30.3
France	65	25	38.5	16	24.6	67	28	41.8	21	31.3	77	31	40.3	20	26.0	93	29	31.2	17	18.3
Spain	40	11	27.5	11	27.5	59	26	44.1	19	32.2	45	27	60.0	20	44.4	63	27	42.9	21	33.3
Other	282	127	45.0	99	35.1	339	185	54.6	136	40.1	340	202	59.4	143	42.1	356	207	58.1	134	37.6
N./S. America	786	312	39.7	236	30.0	909	438	48.2	328	36.1	909	435	47.9	277	30.5	900	415	46.1	282	31.3
Canada	252	121	48.0	99	39.3	296	162	54.7	127	42.9	304	171	56.3	132	43.4	285	164	57.5	131	46.0
Mexico	104	34	32.7	21	20.2	128	58	45.3	45	35.2	115	39	33.9	22	19.1	139	54	38.8	30	21.6
Argentina	65	28	43.1	22	33.8	62	39	62.9	29	46.8	86	39	45.3	22	25.6	53	26	49.1	17	32.1
Brazil	98	17	17.3	13	13.3	118	35	29.7	25	21.2	133	37	27.8	18	13.5	151	34	22.5	19	12.6
Chile	50	18	36.0	12	24.0	54	21	38.9	17	31.5	48	25	52.1	18	37.5	52	24	46.2	15	28.8
Colombia	40	21	52.5	16	40.0	49	24	49.0	13	26.5	37	20	54.1	9	24.3	35	11	31.4	10	28.6
Peru	22	10	45.5	8	36.4	35	23	65.7	15	42.9	31	22	71.0	15	48.4	34	21	61.8	12	35.3
Other	155	63	40.6	45	29.0	167	76	45.5	57	34.1	155	82	52.9	41	26.5	151	81	53.6	48	31.8

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region/country of origin	1994 Total Ph.D. recipients	1994 Plan to stay in U.S. No.	1994 Plan to stay in U.S. %	1994 Firm plans to stay in U.S. No.	1994 Firm plans to stay in U.S. %	1995 Total Ph.D. recipients	1995 Plan to stay in U.S. No.	1995 Plan to stay in U.S. %	1995 Firm plans to stay in U.S. No.	1995 Firm plans to stay in U.S. %	1996 Total Ph.D. recipients	1996 Plan to stay in U.S. No.	1996 Plan to stay in U.S. %	1996 Firm plans to stay in U.S. No.	1996 Firm plans to stay in U.S. %
Science & engineering															
Asia	6,594	4,500	68.2	2,352	35.7	6,763	4,812	71.2	2,514	37.2	6,941	5,002	72.1	3,153	45.4
China	2,529	2,343	92.6	1,141	45.1	2,752	2,545	92.5	1,245	45.2	2,952	2,689	91.1	1,684	57.0
Taiwan	1,297	593	45.7	296	22.8	1,240	615	49.6	275	22.2	1,153	596	51.7	320	27.8
Japan	182	79	43.4	51	28.0	155	63	40.6	48	31.0	165	71	43.0	44	26.7
South Korea	1,143	436	38.1	230	20.1	1,000	388	38.8	210	21.0	977	368	37.7	237	24.3
India	1,065	871	81.8	536	50.3	1,206	1,003	83.2	632	52.4	1,276	1,084	85.0	753	59.0
Other	378	178	47.1	98	25.9	410	198	48.3	104	25.4	418	194	46.4	115	27.5
Europe	1,098	638	58.1	446	40.6	1,199	740	61.7	487	40.6	1,173	735	62.7	513	43.7
Greece	166	75	45.2	54	32.5	174	98	56.3	57	32.8	133	76	57.1	51	38.3
United Kingdom	131	90	68.7	59	45.0	134	102	76.1	77	57.5	119	86	72.3	61	51.3
Germany	196	124	63.3	93	47.4	208	124	59.6	83	39.9	171	103	60.2	75	43.9
Italy	83	42	50.6	21	25.3	81	37	45.7	22	27.2	77	34	44.2	22	28.6
France	96	51	53.1	30	31.3	83	38	45.8	23	27.7	69	31	44.9	22	31.9
Spain	58	23	39.7	20	34.5	51	29	56.9	24	47.1	66	41	62.1	28	42.4
Other	368	233	63.3	169	45.9	468	312	66.7	201	42.9	538	364	67.7	254	47.2
N./S. America	955	462	48.4	302	31.6	862	417	48.4	276	32.0	989	484	48.9	322	32.6
Canada	275	160	58.2	123	44.7	273	173	63.4	119	43.6	277	182	65.7	130	46.9
Mexico	142	49	34.5	29	20.4	128	45	35.2	26	20.3	158	59	37.3	32	20.3
Argentina	56	37	66.1	28	50.0	49	22	44.9	17	34.7	67	43	64.2	27	40.3
Brazil	157	45	28.7	26	16.6	137	39	28.5	28	20.4	207	53	25.6	37	17.9
Chile	42	14	33.3	11	26.2	38	14	36.8	7	18.4	36	12	33.3	8	22.2
Colombia	48	28	58.3	9	18.8	45	15	33.3	10	22.2	42	20	47.6	13	31.0
Peru	32	20	62.5	12	37.5	26	16	61.5	10	38.5	30	21	70.0	14	46.7
Other	203	109	53.7	64	31.5	166	93	56.0	59	35.5	172	94	54.7	61	35.5

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region /country of origin	1990					1991					1992					1993				
	Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
Natural sciences																				
Asia	2,200	1,172	53.3	890	40.5	2,610	1,776	68.0	1,186	45.4	2,958	2,198	74.3	1,362	46.0	3,025	2,225	73.6	1,303	43.1
China	763	474	62.1	357	46.8	1,229	997	81.1	652	53.1	1,423	1,271	89.3	763	53.6	1,508	1,348	89.4	751	49.8
Taiwan	458	221	48.3	153	33.4	421	247	58.7	152	36.1	504	291	57.7	175	34.7	514	270	52.5	164	31.9
Japan	58	31	53.4	25	43.1	46	25	54.3	17	37.0	50	26	52.0	17	34.0	48	17	35.4	15	31.3
South Korea	407	168	41.3	134	32.9	422	187	44.3	132	31.3	418	192	45.9	127	30.4	402	195	48.5	125	31.1
India	319	220	69.0	180	56.4	304	225	74.0	174	57.2	365	307	84.1	220	60.3	382	315	82.5	200	52.4
Other	195	58	29.7	41	21.0	188	95	50.5	59	31.4	198	111	56.1	60	30.3	171	80	46.8	48	28.1
Europe	422	203	48.1	159	37.7	542	301	55.5	227	41.9	507	291	57.4	206	40.6	599	332	55.4	232	38.7
Greece	50	27	54.0	22	44.0	69	42	60.9	32	46.4	66	36	54.5	24	36.4	77	46	59.7	30	39.0
United Kingdom	54	40	74.1	31	57.4	75	54	72.0	45	60.0	70	48	68.6	37	52.9	95	69	72.6	55	57.9
Germany	76	35	46.1	25	32.9	82	45	54.9	37	45.1	78	42	53.8	30	38.5	100	49	49.0	32	32.0
Italy	34	11	32.4	9	26.5	45	23	51.1	17	37.8	43	19	44.2	13	30.2	44	16	36.4	13	29.5
France	27	9	33.3	5	18.5	37	16	43.2	9	24.3	40	16	40.0	11	27.5	49	15	30.6	11	22.4
Spain	18	4	22.2	4	22.2	37	15	40.5	9	24.3	16	12	75.0	8	50.0	30	20	66.7	15	50.0
Other	163	77	47.2	63	38.7	197	106	53.8	78	39.6	194	118	60.8	83	42.8	204	117	57.4	76	37.3
N./S. America	419	157	37.5	118	28.2	514	245	47.7	189	36.8	503	232	46.1	153	30.4	470	225	47.9	165	35.1
Canada	130	61	46.9	49	37.7	154	93	60.4	76	49.4	163	91	55.8	72	44.2	140	87	62.1	73	52.1
Mexico	65	19	29.2	12	18.5	80	35	43.8	26	32.5	69	25	36.2	16	23.2	84	31	36.9	19	22.6
Argentina	42	17	40.5	13	31.0	34	21	61.8	18	52.9	45	18	40.0	12	26.7	31	16	51.6	13	41.9
Brazil	44	10	22.7	8	18.2	66	14	21.2	11	16.7	79	19	24.1	9	11.4	75	16	21.3	10	13.3
Chile	22	9	40.9	6	27.3	33	16	48.5	12	36.4	24	18	75.0	13	54.2	34	17	50.0	12	35.3
Colombia	27	12	44.4	10	37.0	26	10	38.5	6	23.1	22	10	45.5	3	13.6	21	6	28.6	5	23.8
Peru	11	4	36.4	4	36.4	18	9	50.0	6	33.3	12	8	66.7	6	50.0	12	8	66.7	7	58.3
Other	78	25	32.1	16	20.5	103	47	45.6	34	33.0	89	43	48.3	22	24.7	73	44	60.3	26	35.6

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region/country of origin	1994 Total Ph.D. recipients	1994 Plan to stay in U.S. No.	1994 Plan to stay in U.S. %	1994 Firm plans to stay in U.S. No.	1994 Firm plans to stay in U.S. %	1995 Total Ph.D. recipients	1995 Plan to stay in U.S. No.	1995 Plan to stay in U.S. %	1995 Firm plans to stay in U.S. No.	1995 Firm plans to stay in U.S. %	1996 Total Ph.D. recipients	1996 Plan to stay in U.S. No.	1996 Plan to stay in U.S. %	1996 Firm plans to stay in U.S. No.	1996 Firm plans to stay in U.S. %
Natural sciences															
Asia	3,359	2,571	76.5	1,473	43.9	3,447	2,715	78.8	1,525	44.2	3,604	2,843	78.9	1,852	51.4
China	1,665	1,554	93.3	834	50.1	1,802	1,671	92.7	883	49.0	1,960	1,810	92.3	1,162	59.3
Taiwan	509	266	52.3	154	30.3	502	290	57.8	140	27.9	462	259	56.1	155	33.5
Japan	59	34	57.6	23	39.0	51	25	49.0	19	37.3	54	28	51.9	21	38.9
South Korea	473	242	51.2	152	32.1	414	220	53.1	147	35.5	430	208	48.4	146	34.0
India	474	389	82.1	251	53.0	499	417	83.6	281	56.3	520	454	87.3	316	60.8
Other	179	86	48.0	59	33.0	179	92	51.4	55	30.7	178	84	47.2	52	29.2
Europe	631	371	58.8	275	43.6	675	405	60.0	282	41.8	697	460	66.0	327	46.9
Greece	84	36	42.9	26	31.0	87	43	49.4	30	34.5	64	34	53.1	20	31.3
United Kingdom	74	51	68.9	37	50.0	68	51	75.0	39	57.4	59	44	74.6	32	54.2
Germany	115	69	60.0	53	46.1	129	72	55.8	51	39.5	114	70	61.4	52	45.6
Italy	41	18	43.9	9	22.0	49	20	40.8	13	26.5	39	21	53.8	15	38.5
France	53	28	52.8	19	35.8	47	21	44.7	16	34.0	32	12	37.5	8	25.0
Spain	35	15	42.9	13	37.1	33	19	57.6	16	48.5	37	25	67.6	19	51.4
Other	229	154	67.2	118	51.5	262	179	68.3	117	44.7	352	254	72.2	181	51.4
N./S. America	515	265	51.5	184	35.7	483	246	50.9	166	34.4	521	258	49.5	176	33.8
Canada	153	99	64.7	75	49.0	130	91	70.0	65	50.0	145	96	66.2	73	50.3
Mexico	84	30	35.7	21	25.0	86	31	36.0	17	19.8	94	34	36.2	17	18.1
Argentina	35	21	60.0	16	45.7	29	11	37.9	7	24.1	45	31	68.9	21	46.7
Brazil	82	26	31.7	15	18.3	77	27	35.1	22	28.6	108	23	21.3	16	14.8
Chile	23	9	39.1	7	30.4	23	12	52.2	6	26.1	19	9	47.4	7	36.8
Colombia	28	15	53.6	6	21.4	21	10	47.6	6	28.6	20	11	55.0	8	40.0
Peru	10	7	70.0	5	50.0	12	8	66.7	6	50.0	11	6	54.5	4	36.4
Other	100	58	58.0	39	39.0	105	56	53.3	37	35.2	79	48	60.8	30	38.0

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region /country of origin	1990					1991					1992					1993				
	Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
Social sciences																				
Asia	573	179	31.2	128	22.3	668	263	39.4	160	24.0	705	283	40.1	152	21.6	762	328	43.0	166	21.8
China	59	34	57.6	23	39.0	86	63	73.3	31	36.0	113	94	83.2	44	38.9	176	140	79.5	61	34.7
Taiwan	78	22	28.2	12	15.4	105	40	38.1	25	23.8	99	29	29.3	11	11.1	107	25	23.4	13	12.1
Japan	72	24	33.3	19	26.4	50	18	36.0	12	24.0	57	19	33.3	8	14.0	61	20	32.8	11	18.0
South Korea	204	36	17.6	26	12.7	251	55	21.9	33	13.1	268	50	18.7	28	10.4	232	38	16.4	13	5.6
India	76	36	47.4	29	38.2	91	57	62.6	43	47.3	90	61	67.8	43	47.8	102	76	74.5	53	52.0
Other	84	27	32.1	19	22.6	85	30	35.3	16	18.8	78	30	38.5	18	23.1	84	29	34.5	15	17.9
Europe	175	88	50.3	65	37.1	229	126	55.0	97	42.4	238	149	62.6	102	42.9	247	124	50.2	85	34.4
Greece	18	10	55.6	6	33.3	29	12	41.4	8	27.6	24	15	62.5	8	33.3	29	18	62.1	11	37.9
United Kingdom	35	23	65.7	15	42.9	44	27	61.4	15	34.1	52	39	75.0	27	51.9	44	28	63.6	19	43.2
Germany	32	19	59.4	17	53.1	28	18	64.3	14	50.0	28	15	53.6	7	25.0	41	23	56.1	16	39.0
Italy	15	6	40.0	3	20.0	29	12	41.4	11	37.9	20	14	70.0	10	50.0	22	7	31.8	5	22.7
France	11	4	36.4	3	27.3	11	6	54.5	6	54.5	12	5	41.7	5	41.7	12	3	25.0	2	16.7
Spain	14	6	42.9	6	42.9	18	10	55.6	9	50.0	23	12	52.2	10	43.5	25	5	20.0	4	16.0
Other	50	20	40.0	15	30.0	70	41	58.6	34	48.6	79	49	62.0	35	44.3	74	40	54.1	28	37.8
N./S. America	199	80	40.2	62	31.2	225	97	43.1	72	32.0	246	119	48.4	69	28.0	251	107	42.6	72	28.7
Canada	81	38	46.9	34	42.0	88	37	42.0	27	30.7	95	53	55.8	40	42.1	103	51	49.5	40	38.8
Mexico	14	5	35.7	2	14.3	26	13	50.0	10	38.5	30	9	30.0	2	6.7	28	9	32.1	5	17.9
Argentina	11	5	45.5	5	45.5	16	9	56.3	5	31.3	27	12	44.4	5	18.5	12	4	33.3	1	8.3
Brazil	23	2	8.7	1	4.3	18	6	33.3	5	27.8	23	9	39.1	5	21.7	30	10	33.3	6	20.0
Chile	17	5	29.4	3	17.6	13	3	23.1	3	23.1	14	5	35.7	3	21.4	13	3	23.1	2	15.4
Colombia	5	4	80.0	2	40.0	12	6	50.0	4	33.3	6	4	66.7	2	33.3	6	2	33.3	2	33.3
Peru	5	3	60.0	1	20.0	10	7	70.0	5	50.0	14	9	64.3	6	42.9	12	6	50.0	2	16.7
Other	43	18	41.9	14	32.6	42	16	38.1	13	31.0	37	18	48.6	6	16.2	47	22	46.8	14	29.8

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region/country of origin	1994 Total Ph.D. recipients	1994 Plan to stay in U.S. No.	1994 Plan to stay in U.S. %	1994 Firm plans to stay in U.S. No.	1994 Firm plans to stay in U.S. %	1995 Total Ph.D. recipients	1995 Plan to stay in U.S. No.	1995 Plan to stay in U.S. %	1995 Firm plans to stay in U.S. No.	1995 Firm plans to stay in U.S. %	1996 Total Ph.D. recipients	1996 Plan to stay in U.S. No.	1996 Plan to stay in U.S. %	1996 Firm plans to stay in U.S. No.	1996 Firm plans to stay in U.S. %
Social sciences															
Asia	845	408	48.3	204	24.1	841	389	46.3	197	23.4	829	379	45.7	216	26.1
China	208	186	89.4	81	38.9	177	150	84.7	69	39.0	191	154	80.6	88	46.1
Taiwan	118	21	17.8	9	7.6	122	30	24.6	9	7.4	116	27	23.3	6	5.2
Japan	77	33	42.9	22	28.6	74	32	43.2	25	33.8	79	35	44.3	19	24.1
South Korea	241	51	21.2	26	10.8	242	48	19.8	17	7.0	221	41	18.6	22	10.0
India	111	80	72.1	50	45.0	135	97	71.9	59	43.7	131	91	69.5	61	46.6
Other	90	37	41.1	16	17.8	91	32	35.2	18	19.8	91	31	34.1	20	22.0
Europe	224	124	55.4	82	36.6	244	148	60.7	101	41.4	266	139	52.3	91	34.2
Greece	24	8	33.3	5	20.8	26	13	50.0	7	26.9	22	13	59.1	9	40.9
United Kingdom	42	27	64.3	15	35.7	46	33	71.7	26	56.5	50	35	70.0	24	48.0
Germany	52	36	69.2	29	55.8	42	29	69.0	22	52.4	41	23	56.1	15	36.6
Italy	31	19	61.3	10	32.3	23	12	52.2	7	30.4	30	10	33.3	6	20.0
France	11	7	63.6	4	36.4	12	5	41.7	2	16.7	11	5	45.5	2	18.2
Spain	14	6	42.9	6	42.9	12	8	66.7	7	58.3	21	10	47.6	5	23.8
Other	50	21	42.0	13	26.0	83	48	57.8	30	36.1	91	43	47.3	30	33.0
N./S. America	239	103	43.1	67	28.0	209	101	48.3	68	32.5	253	124	49.0	82	32.4
Canada	86	40	46.5	30	34.9	102	55	53.9	38	37.3	87	55	63.2	36	41.4
Mexico	28	8	28.6	4	14.3	16	5	31.3	3	18.8	27	10	37.0	7	25.9
Argentina	14	10	71.4	7	50.0	13	7	53.8	6	46.2	14	5	35.7	2	14.3
Brazil	26	8	30.8	6	23.1	14	6	42.9	3	21.4	32	11	34.4	9	28.1
Chile	11	2	18.2	1	9.1	7	0	0.0	0	0.0	9	2	22.2	1	11.1
Colombia	8	6	75.0	3	37.5	14	2	14.3	1	7.1	15	6	40.0	2	13.3
Peru	12	4	33.3	3	25.0	9	3	33.3	2	22.2	14	11	78.6	8	57.1
Other	54	25	46.3	13	24.1	34	23	67.6	15	44.1	55	24	43.6	17	30.9

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region /country of origin	1990					1991					1992					1993				
	Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.		Total Ph.D. recipients	Plan to stay in U.S.		Firm plans to stay in U.S.	
		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%		No.	%	No.	%
Engineering																				
Asia	1,607	762	47.4	503	31.3	2,002	1,150	57.4	649	32.4	2,123	1,303	61.4	651	30.7	2,209	1,326	60.0	609	27.6
China	328	179	54.6	98	29.9	477	368	77.1	178	37.3	508	443	87.2	183	36.0	543	487	89.7	196	36.1
Taiwan	476	208	43.7	134	28.2	597	294	49.2	163	27.3	637	320	50.2	143	22.4	592	235	39.7	105	17.7
Japan	17	5	29.4	4	23.5	29	7	24.1	6	20.7	25	6	24.0	3	12.0	23	6	26.1	1	4.3
South Korea	360	103	28.6	66	18.3	434	148	34.1	78	18.0	437	131	30.0	65	14.9	484	161	33.3	63	13.0
India	314	211	67.2	162	51.6	357	272	76.2	191	53.5	405	335	82.7	222	54.8	448	368	82.1	209	46.7
Other	112	56	50.0	39	34.8	108	61	56.5	33	30.6	111	68	61.3	35	31.5	119	69	58.0	35	29.4
Europe	205	92	44.9	64	31.2	200	97	48.5	61	30.5	202	107	53.0	68	33.7	237	137	57.8	87	36.7
Greece	57	28	49.1	20	35.1	70	36	51.4	22	31.4	59	31	52.5	17	28.8	68	37	54.4	27	39.7
United Kingdom	15	10	66.7	7	46.7	15	10	66.7	6	40.0	17	14	82.4	11	64.7	18	16	88.9	12	66.7
Germany	15	5	33.3	4	26.7	8	4	50.0	0	0.0	18	10	55.6	7	38.9	23	14	60.9	7	30.4
Italy	14	6	42.9	3	21.4	12	2	16.7	2	16.7	10	4	40.0	2	20.0	10	7	70.0	5	50.0
France	27	12	44.4	8	29.6	19	6	31.6	6	31.6	25	10	40.0	4	16.0	32	11	34.4	4	12.5
Spain	8	1	12.5	1	12.5	4	1	25.0	1	25.0	6	3	50.0	2	33.3	8	2	25.0	2	25.0
Other	69	30	43.5	21	30.4	72	38	52.8	24	33.3	67	35	52.2	25	37.3	78	50	64.1	30	38.5
N./S. America	168	75	44.6	56	33.3	170	96	56.5	67	39.4	160	84	52.5	55	34.4	179	83	46.4	45	25.1
Canada	41	22	53.7	16	39.0	54	32	59.3	24	44.4	46	27	58.7	20	43.5	42	26	61.9	18	42.9
Mexico	25	10	40.0	7	28.0	22	10	45.5	9	40.9	16	5	31.3	4	25.0	27	14	51.9	6	22.2
Argentina	12	6	50.0	4	33.3	12	9	75.0	6	50.0	14	9	64.3	5	35.7	10	6	60.0	3	30.0
Brazil	31	5	16.1	4	12.9	34	15	44.1	9	26.5	31	9	29.0	4	12.9	46	8	17.4	3	6.5
Chile	11	4	36.4	3	27.3	8	2	25.0	2	25.0	10	2	20.0	2	20.0	5	4	80.0	1	20.0
Colombia	8	5	62.5	4	50.0	11	8	72.7	3	27.3	9	6	66.7	4	44.4	8	3	37.5	3	37.5
Peru	6	3	50.0	3	50.0	7	7	100.0	4	57.1	5	5	100.0	3	60.0	10	7	70.0	3	30.0
Other	34	20	58.8	15	44.1	22	13	59.1	10	45.5	29	21	72.4	13	44.8	31	15	48.4	8	25.8

Appendix table 2-37.
Foreign doctoral recipients from U.S. universities who plan to stay in the United States, by field and region/country of origin: 1990-96

Region/country of origin	1994 Total Ph.D. recipients	1994 Plan to stay in U.S. No.	1994 Plan to stay in U.S. %	1994 Firm plans to stay in U.S. No.	1994 Firm plans to stay in U.S. %	1995 Total Ph.D. recipients	1995 Plan to stay in U.S. No.	1995 Plan to stay in U.S. %	1995 Firm plans to stay in U.S. No.	1995 Firm plans to stay in U.S. %	1996 Total Ph.D. recipients	1996 Plan to stay in U.S. No.	1996 Plan to stay in U.S. %	1996 Firm plans to stay in U.S. No.	1996 Firm plans to stay in U.S. %
Engineering															
Asia	2,390	1,521	63.6	675	28.2	2,475	1,708	69.0	792	32.0	2,508	1,780	71.0	1,085	43.3
China	656	603	91.9	226	34.5	773	724	93.7	293	37.9	801	725	90.5	434	54.2
Taiwan	670	306	45.7	133	19.9	616	295	47.9	126	20.5	575	310	53.9	159	27.7
Japan	46	12	26.1	6	13.0	30	6	20.0	4	13.3	32	8	25.0	4	12.5
South Korea	429	143	33.3	52	12.1	344	120	34.9	46	13.4	326	119	36.5	69	21.2
India	480	402	83.8	235	49.0	572	489	85.5	292	51.0	625	539	86.2	376	60.2
Other	109	55	50.5	23	21.1	140	74	52.9	31	22.1	149	79	53.0	43	28.9
Europe	243	143	58.8	89	36.6	280	187	66.8	104	37.1	210	136	64.8	95	45.2
Greece	58	31	53.4	23	39.7	61	42	68.9	20	32.8	47	29	61.7	22	46.8
United Kingdom	15	12	80.0	7	46.7	20	18	90.0	12	60.0	10	7	70.0	5	50.0
Germany	29	19	65.5	11	37.9	37	23	62.2	10	27.0	16	10	62.5	8	50.0
Italy	11	5	45.5	2	18.2	9	5	55.6	2	22.2	8	3	37.5	1	12.5
France	32	16	50.0	7	21.9	24	12	50.0	5	20.8	26	14	53.8	12	46.2
Spain	9	2	22.2	1	11.1	6	2	33.3	1	16.7	8	6	75.0	4	50.0
Other	89	58	65.2	38	42.7	123	85	69.1	54	43.9	95	67	70.5	43	45.3
N./S. America	201	94	46.8	51	25.4	170	70	41.2	42	24.7	215	102	47.4	64	29.8
Canada	36	21	58.3	18	50.0	41	27	65.9	16	39.0	45	31	68.9	21	46.7
Mexico	30	11	36.7	4	13.3	26	9	34.6	6	23.1	37	15	40.5	8	21.6
Argentina	7	6	85.7	5	71.4	7	4	57.1	4	57.1	8	7	87.5	4	50.0
Brazil	49	11	22.4	5	10.2	46	6	13.0	3	6.5	67	19	28.4	12	17.9
Chile	8	3	37.5	3	37.5	8	2	25.0	1	12.5	8	1	12.5	0	0.0
Colombia	12	7	58.3	0	0.0	10	3	30.0	3	30.0	7	3	42.9	3	42.9
Peru	10	9	90.0	4	40.0	5	5	100.0	2	40.0	5	4	80.0	2	40.0
Other	49	26	53.1	12	24.5	27	14	51.9	7	25.9	38	22	57.9	14	36.8

NOTES: Data Include foreign doctoral recipients with either permanent or temporary visas. Doctoral recipients who "plan to stay" think that they will locate in the United States; those with "firm plans" have a postdoctoral research appointment or academic, industrial, or other firm employment in the United States.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Earned Doctorates, unpublished tabulations, 1997.

See figure 2-19.

Appendix table 2-38.
1990-91 Foreign doctoral recipients from U.S. universities working in the United States, by degree field and place of origin: 1992-95

Degree field and place of origin	Foreign doctoral recipients	Percent working in the United States			
		1992	1993	1994	1995
Total S&E fields	13,878	45	48	49	47
China	2,779	75	81	87	88
India	1,235	76	76	7	79
Japan	227	18	23	25	13
South Korea	1,912	17	14	13	11
Taiwan	1,824	46	48	45	42
England	142	48	55	55	59
Germany	177	30	2:	34	35
Greece	240	39	43	40	41
Canada	417	35	41	44	46
Mexico	194	26	28	28	30
Physical sciences	4,156	52	54	55	53
China	1,235	78	84	88	90
India	357	70	73	76	73
Japan	57	23	32	32	8
South Korea	496	23	18	18	16
Taiwan	460	51	47	45	43
England	49	53	58	55	60
Germany	94	32	31	39	41
Greece	72	47	56	52	49
Canada	116	37	46	46	49
Mexico	48	22	32	30	30
Life sciences	2,729	38	42	46	45
China	652	64	72	86	85
India	158	71	61	73	73
Japan	31	23	32	32	8
South Korea	268	20	19	16	11
Taiwan	288	37	47	38	33
England	29	38	50	57	65
Germany	32	20	20	24	24
Greece	27	38	38	34	43
Canada	110	30	38	43	46
Mexico	73	20	18	21	25
Social sciences	2,188	27	28	28	28
China	133	64	70	69	69
India	135	53	55	56	54
Japan	99	15	16	19	14
South Korea	424	8	7	7	7
Taiwan	160	28	25	21	21
England	44	38	47	47	49
Germany	32	34	38	34	34
Greece	30	33	25	25	21
Canada	119	34	37	42	41
Mexico and Brazil	31	20	23	23	23
Engineering	4,805	52	54	55	53
China	759	80	87	91	91
India	585	86	87	89	89
Japan	40	17	20	23	20
South Korea	724	18	14	11	10
Taiwan	916	50	53	51	48
England	20	73	73	73	73
Germany	19	33	26	26	26
Greece	111	36	40	38	41
Canada	72	43	42	43	49
Mexico	42	44	44	42	42

NOTES: Data are for foreign doctoral recipients with temporary visas only. Physical sciences include mathematics and computer sciences.Social sciences include psychology, sociology, and other social sciences.

SOURCE: M.G. Finn, *Stay Rates of Foreign Doctorate Recipients From U.S. Universities, 1995* (Oak Ridge, TN: Oak Ridge Institute for Science and Education, 1997).

See text table 3-17.

Appendix table 2-39.
Postdoctoral appointments in science and engineering, by citizenship status: 1988-95

Field	1988	1989	1990	1991	1992	1993	1994	1995
All postdoctoral appointments								
Total, all surveyed fields[a]	26,083	27,878	29,515	30,800	32,682	34,263	36,301	35,379
Total, science and engineering fields	19,687	20,864	21,770	22,808	23,825	24,599	25,727	25,995
Total sciences	18,002	18,952	19,831	20,565	21,474	22,165	23,137	23,367
Total engineering	1,685	1,912	1,939	2,243	2,351	2,434	2,590	2,628
To U.S. citizens								
Total, all surveyed fields[a]	14,392	14,826	15,090	15,097	15,764	16,684	17,939	18,002
Total, science and engineering fields	10,423	10,654	10,651	10,775	11,154	11,591	12,433	12,778
Total sciences	9,838	10,003	10,043	10,130	10,393	10,750	11,429	11,791
Total engineering	585	651	608	645	761	841	1,004	987
To non-U.S. citizens								
Total, all surveyed fields[a]	11,691	13,052	14,425	15,703	16,918	17,579	18,362	17,377
Total, science and engineering fields	9,264	10,210	11,119	12,033	12,671	13,008	13,294	13,217
Total sciences	8,164	8,949	9,788	10,435	11,081	11,415	11,708	11,576
Total engineering	1,100	1,261	1,331	1,598	1,590	1,593	1,586	1,641

[a]Survey includes all science, engineering, and health fields.

SOURCE: National Science Foundation, Science Resources Studies Division, *Graduate Students and Postdoctorates in Science and Engineering, Fall 1995,* NSF 97-312 (Arlington, VA: 1997).

Appendix table 2-40.
Foreign-born S&E faculty in U.S. higher education, by teaching field and region of origin: 1993

Region of origin	Total S&E	Physical sciences	Life sciences	Math & computer sciences	Social sciences	Engineering
			Number			
Total S&E faculty	242,812	37,693	59,654	45,545	72,910	27,010
U.S. origin	193,606	29,550	51,382	33,122	62,522	17,029
Foreign origin	49,206	8,143	8,273	12,423	10,388	9,980
Asia	22,608	3,630	4,081	5,702	3,868	5,327
Europe	11,693	2,815	2,202	2,900	2,085	1,692
North America	2,206	330	473	261	958	185
Central America	671	25	188	59	139	261
Caribbean	747	128	134	87	366	32
South America	2,621	128	298	408	813	964
Africa	2,621	128	298	408	813	964
Oceania	499	40	103	115	140	101
Abroad, not specified	6,462	1,000	308	2,356	1,589	1,210
			Percent			
Total S&E faculty	100.0	100.0	100.0	100.0	100.0	100.0
U.S. origin	79.7	78.4	86.1	72.7	85.8	63.1
Foreign origin	20.3	21.6	13.9	27.3	14.2	36.9
Asia	9.3	9.6	6.8	12.5	5.3	19.7
Europe	4.8	7.5	3.7	6.4	2.9	6.3
North America	0.9	0.9	0.8	0.6	1.3	0.7
Central America	0.3	0.1	0.3	0.1	0.2	0.0
Caribbean	0.3	0.3	0.2	0.2	0.5	0.1
South America	0.6	0.1	0.7	1.1	0.5	0.8
Africa	1.1	0.3	0.5	0.9	1.1	3.6
Oceania	0.2	0.1	0.2	0.3	0.2	0.4
Abroad, not specified	2.7	2.7	0.5	5.2	2.2	4.5

NOTES: Data include scientists and engineers whose first job is in S&E postsecondary teaching at four-year college and universities in the United States. Data exclude scientists and engineers who teach in S&E fields in two-year or community colleges, or who teach as a secondary job.

SOURCE: National Science Foundation, Science Resources Studies Division, SESTAT database, unpublished tabulations.

See figure 2-20 and text table 2-11.

Science & Engineering Indicators – 1998

Appendix table 2-41.
Foreign-born female S&E faculty in U.S. higher education, by teaching field and region of origin: 1993

Region of origin	Total S&E	Physical sciences	Life sciences	Math & computer sciences	Social sciences	Engineering
Total foreign-born female S&E faculty	9,897	1,712	2,400	2,346	2,777	662
Asia	4,509	873	1,118	1,157	1,061	300
Europe	1,899	368	547	398	405	181
North America	368	29	185	7	138	9
Central America	49	0	8	8	29	4
Caribbean	225	24	85	0	116	0
South America	333	27	160	19	28	99
Africa	260	10	81	77	66	26
Oceania	123	0	9	0	105	9
Abroad, not specified	2,131	381	207	680	829	34

NOTES: Data include scientists and engineers whose first job is in S&E postsecondary teaching at four-year college and universities in the United States. Data exclude scientists and engineers who teach in S&E fields in two-year or community colleges, or who teach as a secondary job.

SOURCE: National Science Foundation, Science Resources Studies Division, SESTAT database, unpublished tabulations.

Science & Engineering Indicators – 1998

Appendix table 2-42.
Major places of origin for foreign-born S&E faculty in U.S. higher education, by field: 1993

Place of origin	Total S&E	Physical sciences	Life sciences	Math & computer sciences	Social sciences	Engineering
Total S&E faculty	242,812	37,693	59,654	45,545	72,910	27,010
		Total				
Total S&E faculty from major places of origin	23,762	4,706	3,754	5,394	4,589	5,319
India	5,696	597	796	1,648	1,032	1,6237
China	4,263	970	773	1,261	386	873
United Kingdom	3,149	1,076	476	380	487	730
Taiwan	2,491	507	350	688	234	712
Canada	2,206	330	473	260	958	185
South Korea	2,163	511	311	426	571	344
Germany	1,604	410	400	236	553	5
Iran	1,369	113	101	268	269	618
Greece	821	192	74	227	99	229
		Female				
Total S&E faculty from major places of origin	4,316	984	1,152	947	939	294
India	1,168	125	241	423	274	105
China	1,031	371	309	212	52	87
United Kingdom	251	57	87	23	73	11
Taiwan	638	214	128	228	65	3
Canada	368	29	185	7	138	9
South Korea	201	30	16	14	141	0
Germany	289	64	105	30	90	0
Iran	143	17	7	10	98	11
Greece	227	77	74	0	8	68

NOTES: Data include scientists and engineers whose first job is in S&E postsecondary teaching at four-year college and universities in the United States. Data exclude scientists and engineers who teach in S&E fields in two-year or community colleges, or who teach as a secondary job.

SOURCE: National Science Foundation, Science Resources Studies Division, SESTAT database, unpublished tabulations.

See text table 2-11.

Science & Engineering Indicators – 1998

Appendix table 2-43.
S&E doctoral degrees earned by Asian students at U.S. universities, by place of origin: 1986-95

Place of origin	Cumulative 1986-95	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total	44,931	2,139	2,473	2,762	3,099	4,315	5,239	5,725	5,943	6,549	6,687
China	14,088	198	293	480	620	1,150	1,793	2,045	2,227	2,531	2,751
Hong Kong	952	73	87	81	93	94	121	109	109	95	90
India	7,554	469	503	520	536	711	752	861	933	1,065	1,204
Japan	1,276	111	83	104	106	147	125	132	132	182	154
South Korea	8,821	402	549	621	753	979	1,114	1,126	1,123	1,150	1,004
Taiwan	10,276	709	790	786	857	1,012	1,127	1,242	1,213	1,301	1,239
Thailand	956	109	95	98	76	111	93	87	77	97	113
Other Asia	1,008	68	73	72	58	111	114	123	129	128	132

NOTE: Data include foreign students with either temporary or permanent visas.

SOURCE: National Science Foundation, Science Resources Studies Division, *Selected Data on Science and Engineering Doctorate Awards: 1995,* NSF 96-303 (Arlington, VA: 1996).

See text table 2-12.

Science & Engineering Indicators – 1998

Appendix table 3-1.
Number, education and employment status, and median income of 1993 and 1994 bachelor's and master's degree recipients, by degree field: 1995

Degree field	Graduates (thousands)[a]	Full-time student	Not full-time student: Employed in S&E occupation	Not full-time student: Employed in non-S&E occupation	Not full-time student: Unemployed	Median salary[b]
Bachelor's degree recipients						
TOTAL SCIENCE & ENGINEERING	700.1	23	19	52	6	25,000
Total science	581.7	25	10	59	6	22,900
Mathematics & computer sciences	69.2	13	32	51	4	30,000
Life sciences	121.6	37	10	47	5	22,000
Physical sciences	33.2	39	27	30	4	25,000
Social sciences	357.8	21	5	67	7	21,000
Total engineering	118.4	15	62	20	4	33,500
Aerospace	4.4	25	43	29	3	30,000
Chemical	9.6	22	58	14	6	37,800
Civil & architectural	18.0	13	68	17	3	30,000
Electrical, electronics, computer & communications	38.6	12	64	21	4	35,000
Industrial	6.4	10	59	28	3	34,000
Mechanical	28.9	13	66	17	4	34,000
Other	12.5	25	50	21	3	32,000
Master's degree recipients						
TOTAL SCIENCE & ENGINEERING	146.3	24	43	28	5	39,000
Total science	99.7	26	32	36	5	35,000
Mathematics & computer sciences	24.3	14	54	28	4	43,200
Life sciences	15.0	36	30	29	5	31,200
Physical sciences	9.7	39	41	16	5	35,000
Social sciences	50.7	27	21	46	6	30,000
Total engineering	46.6	19	65	11	4	44,000
Aerospace	1.7	28	56	14	2	43,600
Chemical	1.8	25	67	5	3	44,000
Civil & architectural	6.1	13	77	7	3	39,500
Electrical, electronics, computer & communications	16.4	21	65	9	5	46,000
Industrial	3.0	9	66	23	2	44,000
Mechanical	7.4	20	67	9	3	43,00
Other	10.1	20	59	16	5	45,000

NOTES: For graduates with more than one eligible degree at the same level (bachelor's/master's), the most recent degree at that level was used. Details may not sum to totals because of rounding. Percentages were calculated on unrounded data. Education and employment status are as of April 1995.

[a]Includes people who received a bachelor's or master's degree in science or engineering from a U.S. college or university between July 1992 and June 1994.

[b]Salary data are provided only for graduates who are employed full time; data for self-employed and full-time students are not included. Median salaries are rounded to the nearest hundred dollars.

SOURCE: National Science Foundation, Science Resources Studies Division, National Survey of Recent College Graduates, 1995.

Appendix table 3-2.
Employed 1993 and 1994 S&E bachelor's and master's degree recipients, by degree field and sector of employment: 1995

Degree field	Total employed (thousands)	Sector of employment (percentages)[a]						
		4-year college & university	Other educational institution	Private for-profit	Self-employed	Private not-for-profit	Federal Government	State & local government
Bachelor's degree recipients								
Total science & engineering	585.6	13	9	59	2	6	4	6
Total science	476.7	14	10	56	3	7	4	7
Total engineering	108.9	11	1	75	2	1	7	4
Master's degree recipients								
Total science & engineering	128.4	23	9	47	2	6	7	6
Total science	86.0	26	12	38	2	9	5	7
Total engineering	42.4	17	1	66	1	1	10	4

NOTES: For graduates with more than one eligible degree at the same level (bachelor's/master's), the most recent degree at that level was used. Details may not sum to totals because of rounding. Percentages were calculated on unrounded data.

[a]This is the sector of employment in which the respondent was working on his or her primary job held on April 15, 1995. People working in four-year colleges and universities or university-affiliated medical schools or research organizations were classified as employed in the "four-year college and university" sector. Those working in elementary, middle, secondary, or two-year colleges or other educational institutions were categorized in the "other educational" sector. Those reporting that they were self-employed but in an incorporated business were classified in the "private for-profit" sector.

SOURCE: National Science Foundation, Science Resources Studies Division, National Survey of Recent College Graduates, 1995.

Science & Engineering Indicators – 1998

Appendix table 3-3.
Employment status of scientists and engineers, by broad occupation and highest degree received: 1995

Occupation	Total	Employed	Unemployed
All degree recipients			
All S&E occupations	3,256,200	3,185,600	70,600
Computer and math scientists	966,200	949,500	16,800
Life scientists	311,500	305,300	6,200
Physical scientists	281,800	274,300	7,500
Social scientists	321,400	317,500	3,900
Engineers	1,375,200	1,339,000	36,200
Bachelor's degree recipients			
All S&E occupations	1,883,400	1,844,000	39,400
Computer and math scientists	635,300	625,000	10,400
Life scientists	123,900	121,500	2,400
Physical scientists	131,000	128,100	2,900
Social scientists	61,600	60,600	1,000
Engineers	931,500	908,800	22,800
Master's degree recipients			
All S&E occupations	915,800	892,700	23,000
Computer and math scientists	273,600	268,000	5,600
Life scientists	65,200	64,000	1,200
Physical scientists	69,800	67,200	2,700
Social scientists	138,000	135,800	2,300
Engineers	369,100	357,900	11,300
Ph.D. degree recipients			
All S&E occupations	425,700	418,300	7,500
Computer and math scientists	54,600	53,800	800
Life scientists	104,500	102,400	2,000
Physical scientists	80,600	78,900	1,800
Social scientists	113,900	113,300	700
Engineers	72,100	69,900	2,200
Other professional degree recipients			
All S&E occupations	31,300	30,600	700
Computer and math scientists	2,700	2,700	–
Life scientists	17,900	17,400	600
Physical scientists	300	200	100
Social scientists	7,900	7,900	–
Engineers	2,500	2,500	–

– = weighted value of less than 50

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

See figure 3-3. *Science & Engineering Indicators – 1998*

Appendix table 3-4.
Number of employed scientists and engineers, by occupation and highest degree received: 1995

Occupation	Total	Bachelor's degree	Master's degree	Ph.D. degree	Other professional degree
All S&E occupations	3,185,600	1,844,000	892,700	418,300	30,600
Computer and math scientists	949,500	625,000	268,000	53,800	2,700
Computer and information scientists	839,600	595,200	219,800	22,100	2,500
Mathematicians	37,900	16,300	14,000	7,600	–
Postsecondary teachers	72,000	13,500	34,200	24,100	200
Life scientists	305,300	121,500	64,000	102,400	17,400
Agricultural scientists	43,400	24,700	9,300	9,300	100
Biological scientists	168,600	69,700	32,800	57,900	8,200
Environmental life scientists	20,100	13,400	5,800	900	–
Postsecondary teachers	73,200	13,600	16,200	34,400	9,000
Physical scientists	274,300	128,100	67,200	78,900	200
Chemists, except biochemists	111,400	65,300	20,200	25,900	100
Earth scientists	70,700	36,100	24,300	10,400	–
Physicists and astronomers	29,000	7,100	7,700	14,100	–
Other physical scientists	17,000	9,300	5,100	2,600	100
Postsecondary teachers	46,200	10,300	9,900	25,900	–
Social scientists	317,500	60,600	135,800	113,300	7,900
Economists	33,100	10,900	15,100	7,000	100
Political scientists	8,900	5,100	2,600	1,200	–
Psychologists	167,200	25,400	88,700	48,200	4,900
Sociologists and anthropologists	16,000	7,800	5,200	3,000	–
S&T historians and other social scientists	12,600	3,800	4,900	3,100	900
Postsecondary teachers	79,700	7,600	19,300	50,800	2,000
Engineers	1,339,000	908,800	357,900	69,900	2,500
Aerospace engineers	72,800	42,600	25,900	4,200	100
Chemical engineers	71,100	46,100	19,200	5,800	–
Civil and architectural engineers	198,900	143,400	51,000	3,900	600
Electrical and related engineers	357,400	241,000	102,000	13,200	1,200
Industrial engineers	69,600	52,400	16,400	800	–
Mechanical engineers	255,100	191,600	55,000	8,100	300
Other engineers	282,800	186,300	79,900	16,400	200
Postsecondary teachers	31,300	5,300	8,400	17,500	–

– = weighted value of less than 50; S&T = science and technology

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

See text table 3-11.

Appendix table 3-5.
Number of employed scientists and engineers, by occupation and degree field: 1995

Occupation	All fields	Math & computer science	Life sciences	Physical sciences	Social sciences	Engineering	Non-S&E fields
All S&E occupations	3,185,600	446,500	297,200	312,900	384,400	1,193,700	550,800
Computer and math scientists	949,500	406,600	21,700	36,900	88,500	145,700	250,000
Computer and information scientists	839,600	345,300	19,100	33,200	80,500	138,000	223,600
Mathematicians	37,900	17,500	1,800	2,300	5,800	3,200	7,200
Postsecondary teachers	72,000	43,900	700	1,400	2,200	4,500	19,300
Life scientists	305,300	1,400	217,100	19,500	14,400	3,800	49,100
Agricultural scientists	43,400	300	33,300	1,600	1,700	500	6,000
Biological scientists	168,600	1,000	120,300	15,000	8,000	2,700	21,500
Environmental life scientists	20,100	–	14,100	400	1,600	100	3,800
Postsecondary teachers	73,200	100	49,400	2,400	3,100	400	17,800
Physical scientists	274,300	4,800	33,400	200,800	7,500	14,200	13,600
Chemists, except biochemists	111,400	1,100	17,700	80,900	1,100	4,600	6,100
Earth scientists	70,700	1,700	4,600	56,300	2,000	4,100	2,000
Physicists and astronomers	29,000	600	700	23,200	100	2,800	1,600
Other physical scientists	17,000	500	6,400	4,500	2,700	1,400	1,500
Postsecondary teachers	46,200	900	4,100	35,900	1,600	1,200	2,400
Social scientists	317,500	1,700	3,500	1,100	253,100	1,700	56,500
Economists	33,100	1,000	700	200	21,900	1,100	8,200
Political scientists	8,900	–	–	–	8,700	–	100
Psychologists	167,200	100	700	300	137,100	200	28,800
Sociologists and anthropologists	16,000	200	500	400	14,200	100	600
S&T historians & other social scientists	12,600	200	600	100	7,900	200	3,600
Postsecondary teachers	79,700	200	1,000	100	63,300	200	15,000
Engineers	1,339,000	32,000	21,500	54,600	20,900	1,028,400	181,700
Aerospace engineers	72,800	2,700	300	4,100	1,000	52,400	12,200
Chemical engineers	71,100	100	900	4,300	–	59,100	6,600
Civil and architectural engineers	198,900	1,000	800	1,800	2,500	175,300	17,500
Electrical and related engineers	357,400	14,900	2,000	12,900	4,500	274,500	48,600
Industrial engineers	69,600	2,100	1,300	3,100	4,500	40,700	18,000
Mechanical engineers	255,100	1,900	600	2,700	700	215,500	33,600
Other engineers	282,800	8,500	15,400	24,400	7,400	184,300	42,800
Postsecondary teachers	31,300	700	200	1,200	200	26,600	2,500

— = weighted value of less than 50; S&T = science and technology

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

See text table 3-12.

Appendix table 3-6.
Employed scientists and engineers, by age group and highest degree received: 1995

Age group	Total	Bachelor's degree	Master's degree	Ph.D. degree	Other professional degree
Total	3,185,600	1,844,000	892,700	418,300	30,600
		Percentages			
Under 25	2.3	3.7	0.6	0.1	0.1
25-29	11.1	14.8	8.2	1.3	2.6
30-34	17.3	19.1	16.2	12.0	9.0
35-39	18.1	18.4	17.9	17.4	20.1
40-44	16.0	15.1	17.4	16.5	16.5
45-49	14.0	12.0	16.3	17.6	20.9
50-54	9.1	7.0	10.8	14.7	8.6
55-59	6.0	4.5	7.1	10.1	6.8
60-64	3.5	3.1	3.4	5.4	7.7
Over 64	2.5	2.4	2.1	5.0	7.8

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

See figure 3-4.

Appendix table 3-7.
Number of employed scientists and engineers, by sector of employment and broad occupation: 1995

Sector	Total	Computer & math scientists	Life scientists	Physical scientists	Social scientists	Engineers
All degree recipients						
Total, all sectors	3,185,600	949,500	305,300	274,300	317,500	1,339,000
Four-year college & university	291,100	41,000	84,300	51,100	71,900	42,800
Other educational institution	275,200	83,000	64,700	28,500	67,600	31,400
Private for-profit	1,970,300	683,200	75,600	138,600	57,600	1,015,300
Self-employed	113,800	23,600	7,400	6,500	42,600	33,800
Private not-for-profit	91,000	27,600	11,000	5,600	33,700	13,200
Federal Government	252,400	53,300	37,700	27,600	17,100	116,600
State & local government	191,700	37,900	24,600	16,400	27,000	85,900
Bachelor's degree recipients						
Total, all sectors	1,844,000	625,000	121,500	128,100	60,600	908,800
Four-year college & university	63,400	10,500	20,500	11,800	10,800	9,800
Other educational institution	85,900	34,700	20,000	8,700	8,400	14,200
Private for-profit	1,324,800	482,800	39,200	78,800	16,100	708,000
Self-employed	48,800	16,000	3,600	3,100	2,800	23,400
Private not-for-profit	41,100	19,500	4,300	2,200	8,700	6,300
Federal Government	150,400	35,100	17,100	12,400	5,700	80,100
State & local government	129,500	26,400	16,800	11,200	8,100	66,900
Master's degree recipients						
Total, all sectors	892,700	268,000	64,000	67,200	135,800	357,900
Four-year college & university	45,800	10,000	6,700	7,000	11,400	10,800
Other educational institution	128,800	39,900	19,900	12,800	42,000	14,200
Private for-profit	524,300	179,400	16,700	32,600	26,100	269,600
Self-employed	39,500	6,200	2,100	2,100	21,000	8,100
Private not-for-profit	31,700	6,500	2,200	1,000	16,900	5,200
Federal Government	70,800	15,400	10,600	7,400	5,600	31,800
State & local government	51,800	10,600	5,900	4,400	12,800	18,200
Ph.D. degree recipients						
Total, all sectors	418,300	53,800	102,400	78,900	113,300	69,900
Four-year college & university	181,300	20,400	56,800	32,400	49,700	22,100
Other educational institution	45,400	8,300	12,900	7,100	14,100	3,000
Private for-profit	114,600	18,700	17,800	27,200	14,900	36,000
Self-employed	23,100	1,500	1,300	1,300	16,900	2,100
Private not-for-profit	16,300	1,600	3,900	2,500	6,700	1,700
Federal Government	28,400	2,500	8,300	7,700	5,600	4,300
State & local government	9,300	900	1,600	700	5,400	700
Other professional degree recipients						
Total, all sectors	30,600	2,700	17,400	200	7,900	2,500
Four-year college & university	600	–	400	–	–	100
Other educational institution	15,100	100	11,900	–	3,100	–
Private for-profit	6,600	2,200	2,000	100	600	1,600
Self-employed	2,300	–	300	–	1,900	100
Private not-for-profit	2,000	–	700	–	1,300	–
Federal Government	2,800	300	1,700	100	300	400
State & local government	1,200	–	300	–	800	100

– = weighted value of less than 50

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

Appendix table 3-8.
Median annual salaries of employed scientists and engineers, by occupation and highest degree received: 1995
(Dollars)

Occupation	Total	Bachelor's degree	Master's degree	Ph.D. degree	Other professional degree
All S&E occupations	50,000	48,000	53,000	58,000	69,000
Computer and math scientists	50,000	49,000	55,000	58,000	63,000
Computer and information scientists	50,000	49,000	57,000	65,000	63,000
Mathematicians	53,000	47,700	55,200	65,000	NA
Postsecondary teachers	41,000	30,000	32,300	50,500	44,000
Life scientists	42,000	35,000	40,000	53,000	100,000
Agricultural scientists	41,000	38,800	36,000	54,000	44,000
Biological scientists	40,000	31,600	40,900	52,000	90,000
Environmental life scientists	40,000	37,000	43,000	59,000	NA
Postsecondary teachers	49,200	28,000	35,000	54,600	100,000
Physical scientists	47,000	40,000	48,000	60,000	24,000
Chemists, except biochemists	47,000	40,000	50,000	64,100	52,000
Earth scientists	45,000	40,000	49,000	62,500	NA
Physicists and astronomers	55,800	42,000	52,000	65,000	NA
Other physical scientists	43,900	37,400	48,000	63,500	24,000
Postsecondary teachers	45,000	15,000	42,000	50,000	17,000
Social scientists	43,000	27,000	39,000	53,000	49,000
Economists	53,500	42,000	59,900	77,000	120,000
Political scientists	33,000	27,200	35,000	61,000	NA
Psychologists	40,000	22,000	37,000	55,000	49,000
Sociologists and anthropologists	32,000	27,000	32,000	50,000	NA
S&T historians and other social scientists	40,000	27,000	39,300	53,700	48,500
Postsecondary teachers	47,000	25,200	36,000	50,000	48,000
Engineers	54,000	50,000	59,000	65,000	50,000
Aerospace engineers	58,000	55,000	60,000	70,000	22,000
Chemical engineers	60,000	55,000	63,000	70,000	NA
Civil and architectural engineers	50,000	48,000	55,000	60,000	50,000
Electrical and related engineers	56,000	52,800	62,000	70,300	53,000
Industrial engineers	50,000	48,000	51,600	66,250	NA
Mechanical engineers	52,000	50,000	56,000	62,000	50,000
Other engineers	53,000	50,000	60,000	65,000	150,000
Postsecondary teachers	54,000	40,000	42,000	60,000	48,000

NA = not available; S&T = science and technology

NOTE: Median annual salaries are for full-time employees only.

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

See figure 3-5.

Appendix table 3-9.
Median annual salaries of employed scientists and engineers, by occupation and degree field: 1995
(Dollars)

Occupation	All fields	Math & computer sciences	Life sciences	Physical sciences	Social sciences	Engineering	Non-S&E fields
All S&E occupations	50,000	50,000	41,000	50,000	45,000	53,500	50,000
Computer & math scientists	50,000	50,000	45,000	55,000	48,500	54,800	49,000
Computer & information scientists	50,000	50,500	45,000	55,000	48,500	54,000	50,000
Mathematicians	53,000	55,000	52,000	55,000	50,000	60,000	49,700
Postsecondary teachers	41,000	42,000	51,500	47,400	35,000	51,000	34,000
Life scientists	42,000	50,000	40,500	40,000	42,000	35,000	48,000
Agricultural scientists	41,000	50,000	40,000	68,000	42,000	37,500	43,000
Biological scientists	40,000	48,700	39,000	37,500	37,000	31,300	45,000
Environmental life scientists	40,000	NA	38,900	45,000	44,500	10,000	37,000
Postsecondary teachers	49,200	60,000	46,800	51,400	48,900	64,000	63,900
Physical scientists	47,000	45,000	37,500	49,200	47,000	48,000	40,000
Chemists, except biochemists	47,000	34,000	35,500	50,000	74,000	44,000	43,000
Earth scientists	45,000	52,000	40,000	47,500	40,000	50,000	38,600
Physicists & astronomers	55,800	58,000	110,000	57,000	52,500	48,000	52,000
Other physical scientists	43,900	39,600	37,400	51,300	47,000	55,800	37,000
Postsecondary teachers	45,000	57,300	34,900	48,000	67,000	43,000	39,000
Social scientists	43,000	41,000	48,200	46,000	42,000	60,000	45,000
Economists	53,500	45,000	60,000	46,000	55,000	67,000	49,300
Political scientists	33,000	NA	28,000	46,000	32,500	NA	40,000
Psychologists	40,000	51,000	30,000	15,500	40,000	NA	40,000
Sociologists & anthropologists	32,000	NA	50,000	50,000	31,700	NA	24,800
S&T historians & other social scientists	40,000	20,000	26,500	53,200	39,300	34,000	46,000
Postsecondary teachers	47,000	80,000	48,200	75,000	46,200	40,000	48,000
Engineers	54,000	54,000	48,500	55,500	47,000	53,500	55,000
Aerospace engineers	58,000	62,900	64,000	67,000	70,000	57,000	58,000
Chemical engineers	60,000	58,000	50,000	59,000	41,000	60,000	65,000
Civil & architectural engineers	50,000	60,000	48,500	48,000	43,000	50,000	55,000
Electrical & related engineers	56,000	53,400	50,000	58,000	65,000	55,900	58,000
Industrial engineers	50,000	51,700	60,000	52,000	47,000	48,400	50,000
Mechanical engineers	52,000	50,000	52,000	53,000	48,000	52,000	54,000
Other engineers	53,000	53,900	45,000	55,000	43,500	53,000	55,000
Postsecondary teachers	54,000	60,000	66,100	63,000	53,500	54,000	42,000

NA = not available; S&T = science and technology

NOTE: Median annual salaries are for full-time employees only.

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

Science & Engineering Indicators – 1998

Appendix table 3-10.
Number of employed scientists and engineers, by occupation, sex, and race/ethnicity: 1995

Occupation	Total	Male	Female	White	Black	Hispanic	Asian/Pacific Islander	Native American
All S&E occupations	3,185,600	2,472,100	713,500	2,673,700	107,500	90,100	304,600	8,000
Computer and math scientists	949,500	674,500	275,000	784,900	39,300	22,800	100,200	1,600
Computer and information scientists	839,600	602,700	236,900	694,100	33,100	20,500	90,400	1,200
Mathematicians	37,900	25,300	12,500	31,600	2,500	600	2,700	100
Postsecondary teachers	72,000	46,500	25,500	59,200	3,600	1,700	7,100	300
Life scientists	305,300	199,400	105,900	257,200	9,700	8,500	29,000	700
Agricultural scientists	43,400	32,300	11,100	37,800	1,500	1,600	2,400	–
Biological scientists	168,600	100,700	67,900	137,100	4,800	4,700	21,500	400
Environmental life scientists	20,100	17,400	2,700	19,500	100	300	–	100
Postsecondary teachers	73,200	49,100	24,100	62,900	3,300	1,900	5,100	100
Physical scientists	274,300	215,200	59,100	232,600	7,800	6,800	26,200	800
Chemists, except biochemists	111,400	82,500	29,000	88,800	5,400	2,300	14,600	400
Earth scientists	70,700	58,100	12,600	64,100	700	2,100	3,500	300
Physicists and astronomers	29,000	25,700	3,300	24,900	300	400	3,300	–
Other physical scientists	17,000	12,400	4,600	15,200	300	600	900	–
Postsecondary teachers	46,200	36,600	9,600	39,600	1,100	1,400	4,000	100
Social scientists	317,500	159,000	158,500	277,900	16,500	9,800	11,800	1,500
Economists	33,100	23,900	9,200	28,200	1,200	1,600	1,900	100
Political scientists	8,900	4,900	4,000	7,200	300	600	800	–
Psychologists	167,200	65,700	101,600	150,200	8,400	4,600	3,100	900
Sociologists and anthropologists	16,000	8,400	7,700	14,600	600	200	600	100
S&T historians and other social scientists	12,600	6,300	6,300	10,600	1,100	300	500	–
Postsecondary teachers	79,700	49,900	29,800	67,200	4,900	2,400	4,700	400
Engineers	1,339,000	1,224,000	115,000	1,121,000	34,200	42,200	137,300	3,400
Aerospace engineers	72,800	68,300	4,500	61,900	1,700	3,000	5,800	300
Chemical engineers	71,100	62,200	8,900	58,600	2,200	2,400	7,900	–
Civil and architectural engineers	198,900	180,900	18,000	164,600	3,600	7,300	22,900	400
Electrical and related engineers	357,400	335,200	22,300	285,400	11,500	12,900	46,700	900
Industrial engineers	69,600	60,600	9,000	60,300	3,100	2,100	3,700	400
Mechanical engineers	255,100	240,300	14,800	218,700	5,600	6,800	22,500	800
Other engineers	282,800	247,500	35,300	248,000	5,600	6,500	22,100	600
Postsecondary teachers	31,300	28,900	2,400	23,500	900	1,100	5,700	100

– = weighted value of less than 50; S&T = science and technology

NOTE: Total includes 1,700 persons whose race/ethnicity category was reported as "other."

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

See figure 3-6 and text table 3-14.

Appendix table 3-11.
Percentage distribution of employed scientists and engineers, by highest degree received, sex, and race/ethnicity: 1995

Occupation	Total	Male	Female	White	Black	Hispanic	Asian/Pacific Islander	Native American
All degree recipients								
All S&E occupations (total number)	3,185,600	2,472,100	713,500	2,673,700	107,500	90,100	304,600	8,000
Computer and math scientists	29.8	27.3	38.5	29.4	36.6	25.3	32.9	20.0
Life scientists	9.6	8.1	14.8	9.6	9.0	9.4	9.5	8.8
Physical scientists	8.6	8.7	8.3	8.7	7.3	7.5	8.6	10.0
Social scientists	10.0	6.4	22.2	10.4	15.3	10.9	3.9	18.8
Engineers	42.0	49.5	16.1	41.9	31.8	46.8	45.1	42.5
Bachelor's degree recipients								
All S&E occupations (total number)	1,844,000	1,465,700	378,300	1,585,200	70,400	54,900	127,600	4,700
Computer and math scientists	33.9	29.9	49.5	33.5	40.6	31.2	36.2	22.9
Life scientists	6.6	5.1	12.3	6.7	6.1	7.7	5.2	6.3
Physical scientists	6.9	6.4	8.9	7.0	7.6	5.5	5.9	10.9
Social scientists	3.3	2.0	8.3	3.1	8.2	3.7	2.0	6.1
Engineers	49.3	56.6	21.1	49.6	37.4	51.9	50.6	53.7
Master's degree recipients								
All S&E occupations (total number)	892,700	660,300	232,400	725,600	25,800	24,000	115,100	1,700
Computer and math scientists	30.0	28.8	33.5	28.9	35.7	18.3	38.4	20.0
Life scientists	7.2	5.5	12.0	7.4	9.8	4.8	5.5	5.5
Physical scientists	7.5	7.8	6.9	7.7	3.9	9.3	6.5	9.6
Social scientists	15.2	8.4	34.5	16.7	23.8	18.6	3.3	24.5
Engineers	40.1	49.6	13.1	39.3		49.0	46.4	40.4
Ph.D. degree recipients								
All S&E occupations (total number)	418,300	324,500	93,800	337,300	9,500	10,200	59,700	1,400
Computer and math scientists	12.9	13.6	10.3	12.3	11.8	13.1	16.0	11.8
Life scientists	24.5	23.2	28.8	24.7	19.8	24.8	24.1	16.1
Physical scientists	18.9	21.4	10.1	19.1	14.4	15.5	18.7	10.8
Social scientists	27.1	21.7	45.6	29.6	43.4	29.9	9.0	50.9
Engineers	16.7	20.0	5.2	14.2	10.6	16.8	32.1	10.4
Other professional degree recipients								
All S&E occupations (total number)	30,600	21,600	9,100	25,500	1,800	1,100	2,200	100
Computer and math scientists	8.8	11.2	3.1	8.3	16.7	–	13.0	–
Life scientists	56.7	60.0	49.0	54.9	58.3	58.2	76.2	54.2
Physical scientists	0.6	0.9	–	0.7	–	–	0.6	–
Social scientists	26.0	16.9	46.8	28.0	25.0	21.9	1.5	45.8
Engineers	8.1	11.0	1.1	8.1	–	19.9	8.7	–

– = weighted value of less than 50

NOTE: Total includes 1,700 persons whose race/ethnicity category was reported as "other."

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

Appendix table 3-12.
Employed scientists and engineers, by sector of employment, sex, and race/ethnicity: 1995

Sector	Total	Male	Female	White	Black	Hispanic	Asian/Pacific Islander	Native American
				Number				
Total, all sectors	3,185,600	2,472,100	713,500	2,673,700	107,500	90,100	304,600	8,000
Four-year college & university	291,100	210,700	80,400	234,100	9,000	9,300	37,800	900
Other educational institution	275,200	167,000	108,200	228,900	15,400	8,800	21,500	500
Private for-profit	1,970,300	1,614,400	355,900	1,663,000	54,800	51,700	195,900	4,300
Self-employed	113,800	77,500	36,300	106,100	1,200	1,800	4,300	400
Private not-for-profit	91,000	52,900	38,100	76,800	3,600	3,000	7,100	500
Federal Government	252,400	204,900	47,500	210,800	13,700	8,800	17,800	1,100
State & local government	191,700	144,700	47,000	154,000	9,800	6,700	20,100	400
				Percentage distribution				
Total, all sectors	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Four-year college & university	9.1	8.5	11.3	8.8	8.4	10.3	12.4	11.6
Other educational institution	8.6	6.8	15.2	8.6	14.3	9.7	7.1	6.8
Private for-profit	61.8	65.3	49.9	62.2	51.0	57.4	64.3	53.2
Self-employed	3.6	3.1	5.1	4.0	1.1	2.0	1.4	4.4
Private not-for-profit	2.9	2.1	5.3	2.9	3.4	3.4	2.3	5.7
Federal Government	7.9	8.3	6.7	7.9	12.8	9.8	5.9	13.2
State & local government	6.0	5.9	6.6	5.8	9.1	7.5	6.6	5.1

NOTE: Total includes 1,700 persons whose race/ethnicity category was reported as "other."

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

See figure 3-7.

Appendix table 3-13.
Median annual salaries of employed scientists and engineers, by occupation, sex, and race/ethnicity: 1995
(Dollars)

Occupation	Total	Male	Female	White	Black	Hispanic	Asian/Pacific Islander	Native American
All S&E occupations	50,000	52,000	42,000	50,400	45,000	47,000	50,000	48,000
Computer and math scientists	50,000	52,000	45,000	50,200	44,000	46,000	50,000	42,900
Computer and information scientists	50,000	52,600	46,100	51,000	45,000	46,500	50,000	48,000
Mathematicians	53,000	55,000	47,700	53,000	50,000	40,000	54,300	42,300
Postsecondary teachers	41,000	45,000	30,000	40,400	39,000	44,000	43,000	42,900
Life scientists	42,000	45,000	34,600	42,600	35,000	37,000	37,000	40,000
Agricultural scientists	41,000	43,000	33,000	42,000	39,000	33,000	40,000	36,000
Biological scientists	40,000	44,000	34,000	40,000	32,000	35,000	36,000	36,900
Environmental life scientists	40,000	41,000	24,000	40,000	45,000	41,000	24,500	54,100
Postsecondary teachers	49,200	53,000	38,000	50,000	35,000	40,000	43,000	75,000
Physical scientists	47,000	50,000	39,600	48,000	42,000	40,000	45,000	32,000
Chemists, except biochemists	47,000	50,000	38,000	48,000	44,000	45,000	44,600	32,000
Earth scientists	45,000	47,500	40,000	46,000	42,000	38,000	40,000	28,500
Physicists and astronomers	55,800	58,000	50,000	58,000	45,000	22,000	47,000	79,500
Other physical scientists	43,900	45,500	43,000	43,900	30,000	30,000	53,000	29,500
Postsecondary teachers	45,000	49,000	35,000	46,000	37,000	45,000	48,000	46,200
Social scientists	43,000	48,000	37,000	43,300	35,000	40,000	45,000	37,000
Economists	53,500	55,500	50,000	52,000	60,000	67,000	60,000	48,000
Political scientists	33,000	34,500	27,200	33,000	20,000	35,000	28,000	NA
Psychologists	40,000	47,000	35,000	40,000	32,000	35,000	32,000	32,000
Sociologists and anthropologists	32,000	38,500	30,000	36,000	32,000	28,500	26,000	12,000
S&T historians and other social scientists	40,000	40,000	42,000	41,500	30,000	32,000	48,000	29,000
Postsecondary teachers	47,000	50,000	40,000	47,800	40,000	42,800	48,000	42,000
Engineers	54,000	55,000	47,000	54,000	48,600	50,000	52,000	53,000
Aerospace engineers	58,000	59,500	49,000	59,000	50,100	50,000	58,000	58,000
Chemical engineers	60,000	60,200	49,700	60,000	60,000	53,000	60,000	41,000
Civil and architectural engineers	50,000	50,000	43,000	50,000	44,000	48,000	51,000	50,000
Electrical and related engineers	56,000	57,000	47,100	57,500	48,000	53,000	52,000	48,000
Industrial engineers	50,000	50,000	45,800	50,000	48,000	45,000	48,000	54,000
Mechanical engineers	52,000	52,500	47,500	52,000	49,000	50,000	52,000	48,000
Other engineers	53,000	54,000	47,000	54,000	48,800	45,000	50,000	50,000
Postsecondary teachers	54,000	55,000	44,300	54,100	53,300	45,000	54,000	60,000

NA = not available; S&T = science and technology

NOTE: Median annual salaries are for full-time employees only.

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

See figures 3-8 and 3-9.

Appendix table 3-14.
Median annual salaries of employed scientists and engineers, by sector of employment, sex, and race/ethnicity: 1995

Sector	Total	Male	Female	White	Black	Hispanic	Asian/Pacific Islander	Native American
Total, all sectors	50,000	52,000	42,000	50,400	45,000	47,000	50,000	48,000
Four-year college & university	44,000	48,000	33,600	45,000	40,000	38,500	38,000	46,200
Other educational institution	41,000	44,000	35,500	42,000	34,000	40,000	38,000	37,000
Private for-profit	53,000	55,000	46,000	54,000	47,000	50,000	52,000	48,000
Self-employed	53,500	55,000	50,000	54,000	100,000	32,000	50,000	50,000
Private not-for-profit	41,300	49,000	32,000	42,000	26,000	35,000	46,000	25,200
Federal Government	52,000	53,000	47,000	52,000	50,000	51,000	51,300	50,000
State & local government	44,000	45,000	37,000	44,000	38,000	42,000	46,700	32,000

NOTE: Median annual salaries are for full-time employees only.

SOURCE: National Science Foundation, Science Resources Studies Division, 1995 SESTAT (Scientists and Engineers Statistics Data System) Surveys of Science and Engineering College Graduates.

Science & Engineering Indicators – 1998

Appendix table 3-15.
Scientists and engineers engaged in R&D, and per 10,000 labor force population, by country: 1979-94

	United States	Japan	Germany[a]	France	United Kingdom	Italy	Canada
Total engaged in R&D (thousands)							
1979	614.5	291.2	116.9	72.9	NA	46.4	NA
1980	651.1	303.2	120.7	74.9	NA	47.0	NA
1981	683.2	311.0	124.7	85.5	127.0	52.1	40.5
1982	711.8	321.0	NA	90.1	128.0	56.7	44.1
1983	751.6	347.4	130.8	92.7	127.0	63.0	45.6
1984	NA	357.4	NA	98.2	129.0	62.0	48.7
1985	801.9	380.3	143.6	102.3	131.0	63.8	52.5
1986	NA	393.0	NA	105.0	134.0	67.8	56.0
1987	877.8	415.6	165.6	109.4	134.0	70.6	58.3
1988	NA	434.6	NA	115.2	137.0	74.8	60.6
1989	924.2	457.5	176.4	120.4	133.0	76.1	62.0
1990	NA	477.9	NA	123.9	133.0	77.9	65.8
1991	960.4	491.1	241.9	129.8	131.0	75.2	65.2
1992	NA	511.4	234.3	141.7	134.0	74.4	73.1
1993	962.7	526.5	229.8	145.9	140.0	74.4	76.6
1994	NA	541.0	NA	149.2	146.0	75.7	NA
Per 10,000 labor force							
1979	57.7	51.3	43.4	31.4	NA	20.8	NA
1980	60.0	53.1	44.3	32.1	NA	20.8	NA
1981	61.9	54.5	44.0	36.3	47.5	22.9	33.8
1982	63.6	55.6	NA	37.9	48.0	24.9	36.8
1983	66.4	59.0	45.7	39.1	47.7	27.3	37.4
1984	NA	60.3	NA	41.1	47.3	26.6	39.3
1985	68.4	63.9	49.7	42.8	47.3	27.1	41.7
1986	NA	65.3	NA	43.7	48.2	28.4	43.7
1987	72.2	68.8	56.4	45.4	47.9	29.4	44.6
1988	NA	70.5	NA	47.6	48.5	30.9	45.4
1989	73.6	73.0	59.2	49.6	46.8	31.4	45.6
1990	NA	74.9	NA	49.9	46.7	31.8	46.4
1991	75.7	75.5	61.5	51.8	46.3	30.6	47.1
1992	NA	77.7	59.3	56.4	46.9	30.2	50.2
1993	74.3	79.6	58.0	57.9	49.2	32.6	52.0
1994	NA	81.4	NA	58.8	51.3	33.3	NA

NA = not available

[a]German data are for West Germany only before 1989.

SOURCE: Organisation for Economic Co-operation and Development, Main Statistics database (Paris: 1997).

See figure 3-13.

Appendix table 3-16.
Total science and engineering jobs: 1996 and projected 2006
(Thousands)

Occupation	1996	2006	Change
TOTAL, ALL OCCUPATIONS	132,353	150,927	18,574
ALL S&E OCCUPATIONS	3,060	4,421	1,361
Scientists	1,678	2,789	1,111
Life scientists	180	221	41
Agricultural and food	24	29	5
Biological	83	103	20
Foresters and conservation	37	43	6
Medical	35	44	9
All other	1	1	0
Computer, mathematical, and operations research	1,028	2,038	1,010
Actuaries	16	16	0
Computer systems analysts, engineers and scientists	933	1,937	1,004
Computer engineers and scientists	427	912	485
Computer engineers	216	451	235
Database administrators, computer support specialists, other	212	461	249
Systems analysts	506	1,025	519
Statisticians	14	14	0
Mathematicians	16	17	1
Operations research analysts	50	54	4
Physical scientists	207	242	35
Chemists	91	108	17
Geologists	47	54	7
Meterologists	7	8	1
Physicists and astronomers	18	17	–1
All other	43	55	12
Social scientists	263	288	25
Economists	51	60	9
Psychologists	143	154	11
Urban and regional planners	29	31	2
All other	41	43	2
Engineers	1,382	1,632	250
Aeronautical and astronautical	53	57	4
Chemical	49	57	8
Civil	196	231	35
Electrical and electronics	367	472	105
Industrial	115	131	16
Mechanical	228	264	36
Metallurgists	18	20	2
Mining	3	3	0
Nuclear	14	14	0
Petroleum	13	11	–2
All other	326	373	47

SOURCE: U.S. Bureau of Labor Statistics, Office of Employment Projections, "National Industry-Occupation Employment Projections 1996-2006" (Washington, DC: U.S. Department of Labor, 1997).

See figure 3-15.

Appendix table 4-1.
Gross domestic product and GDP implicit price deflators: 1960-99

	Gross domestic product (Billions of dollars)		GDP price deflator (1992 = 1.000)	
	Calendar year	Fiscal year	Calendar year	Fiscal year
1960	526.6	518.3	0.233	0.233
1961	544.8	530.4	0.236	0.237
1962	585.2	567.3	0.239	0.239
1963	617.4	599.0	0.242	0.242
1964	663.0	639.8	0.246	0.245
1965	719.1	686.8	0.250	0.249
1966	787.8	752.7	0.257	0.255
1967	833.6	811.9	0.266	0.263
1968	910.6	868.0	0.277	0.273
1969	982.2	948.1	0.290	0.285
1970	1,035.6	1,009.4	0.306	0.300
1971	1,125.4	1,077.4	0.321	0.316
1972	1,237.3	1,177.0	0.335	0.331
1973	1,382.6	1,306.8	0.354	0.345
1974	1,496.9	1,438.1	0.385	0.370
1975	1,630.6	1,554.5	0.422	0.408
1976	1,819.0	1,730.4	0.446	0.437
1977	2,026.9	1,971.4	0.475	0.470
1978	2,291.4	2,212.6	0.509	0.503
1979	2,557.5	2,495.9	0.553	0.545
1980	2,784.2	2,718.9	0.604	0.593
1981	3,115.9	3,049.1	0.661	0.652
1982	3,242.1	3,211.3	0.702	0.698
1983	3,514.5	3,421.9	0.732	0.730
1984	3,902.4	3,812.0	0.759	0.758
1985	4,180.7	4,102.1	0.786	0.784
1986	4,422.2	4,374.3	0.806	0.806
1987	4,692.3	4,605.1	0.831	0.829
1988	5,049.6	4,953.5	0.861	0.858
1989	5,438.7	5,351.8	0.897	0.894
1990	5,743.8	5,684.5	0.936	0.932
1991	5,916.7	5,858.8	0.973	0.972
1992	6,244.4	6,143.2	1.000	1.000
1993	6,553.0	6,470.8	1.026	1.026
1994	6,935.7	6,830.4	1.050	1.050
1995	7,253.8	7,186.9	1.076	1.076
1996	7,574.4	7,484.6	1.100	1.101
1997	7,957.7	7,859.8	1.129	1.129
1998	8,366.5	8,263.5	1.160	1.160
1999	8,790.2	8,681.4	1.191	1.191

NOTES: Data are projected for 1997-99 and are from the Mid-Session Review of the 1997 Budget, July 1996, updated for GDP revisions used in the President's 1998 budget.

SOURCES: U.S. Bureau of Economic Analysis, *Survey of Current Business* (Washington, DC: U.S. Department of Commerce, monthly series); and Office of Management and Budget, unpublished tabulations.

Appendix table 4-2.
Purchasing power parity and market exchange rates, by selected country: 1981-96
(Units of foreign currency per U.S. dollar)

	Purchasing power parities						Market exchange rates	
	Canada	France	Germany	Italy	Japan	United Kingdom	Germany	Japan
1981	1.26	5.62	2.37	878	238	0.519	2.26	221
1982	1.29	5.93	2.32	969	228	0.527	2.43	249
1983	1.30	6.26	2.30	1,073	223	0.534	2.55	238
1984	1.29	6.47	2.26	1,152	221	0.536	2.85	238
1985	1.28	6.62	2.23	1,213	218	0.549	2.94	239
1986	1.28	6.80	2.23	1,276	216	0.553	2.17	169
1987	1.30	6.79	2.20	1,314	210	0.563	1.80	145
1988	1.31	6.74	2.15	1,351	203	0.575	1.76	128
1989	1.32	6.68	2.10	1,376	199	0.590	1.88	138
1990	1.30	6.61	2.09	1,421	195	0.602	1.62	145
1991	1.29	6.53	2.10	1,467	194	0.637	1.66	135
1992	1.27	6.38	2.05	1,450	187	0.612	1.56	127
1993	1.26	6.57	2.10	1,534	184	0.637	1.65	111
1994	1.25	6.64	2.07	1,536	181	0.647	1.62	102
1995	1.23	6.62	2.07	1,589	176	0.670	1.43	94
1996	1.23	6.52	2.20	1,639	177	0.640	NA	NA

NA = not available

SOURCES: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators database (Paris: August 1997); and International Monetary Fund, *International Financial Statistics Yearbook* (Washington, DC: 1996).

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Appendix table 4-3.
U.S. R&D expenditures, by performing sector and source of funds: 1970-97
(Millions of current dollars)

Performing sector:	Total U.S.	Federal Govt.	Industry			Industry FFRDCs	Universities & colleges						U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs
Funding sector:	Total U.S.	Federal Govt.	Total	Federal Govt.	Industry[a]	Federal Govt.	Total	Federal Govt.	Nonfed. govt.	Industry	U&C	Non-profit	Federal Govt.[b]	Total	Federal Govt.	Industry	Non-profit	Federal Govt.
Calendar year[c]																		
1970	26,235	4,154	17,594	7,306	10,288	473	2,376	1,666	228	63	251	168	732	677	410	95	172	230
1971	26,910	4,409	17,829	7,175	10,654	491	2,533	1,742	259	71	282	180	725	709	427	98	184	215
1972	28,661	4,676	19,004	7,469	11,535	548	2,694	1,843	276	77	308	191	769	771	472	101	198	200
1973	30,905	4,837	20,704	7,600	13,104	545	2,919	1,997	298	87	331	206	829	882	566	105	211	190
1974	33,238	5,133	22,239	7,572	14,667	648	3,119	2,096	314	100	380	229	896	995	639	115	241	210
1975	35,565	5,561	23,460	7,878	15,582	727	3,489	2,344	340	116	424	266	1,027	1,076	675	125	276	225
1976	39,314	5,890	26,107	8,671	17,436	890	3,814	2,566	367	127	463	292	1,206	1,162	711	135	316	245
1977	43,233	6,211	28,863	9,523	19,340	962	4,207	2,809	384	147	541	325	1,467	1,248	740	150	358	275
1978	48,582	6,962	32,222	10,107	22,115	1,082	4,810	3,194	429	176	651	361	1,772	1,402	830	165	407	333
1979	55,269	7,471	37,062	11,354	25,708	1,164	5,540	3,723	477	204	760	377	2,013	1,629	985	180	464	390
1980	63,076	7,831	43,228	12,752	30,476	1,277	6,259	4,216	505	250	877	411	2,306	1,700	1,000	200	500	475
1981	72,190	8,605	50,425	14,997	35,428	1,385	6,966	4,620	564	303	1,031	449	2,484	1,788	1,038	225	525	538
1982	80,633	9,501	57,166	17,061	40,105	1,484	7,464	4,823	619	350	1,159	512	2,544	1,950	1,175	250	525	525
1983	89,742	10,830	63,683	19,095	44,588	1,585	8,067	5,100	642	411	1,329	585	2,840	2,138	1,313	275	550	600
1984	101,940	11,916	73,061	21,657	51,404	1,739	8,887	5,589	706	496	1,463	633	3,243	2,470	1,550	325	595	625
1985	114,344	13,093	82,376	25,333	57,043	1,863	9,997	6,226	793	595	1,680	704	3,616	2,736	1,700	375	661	663
1986	119,907	13,504	85,932	26,000	59,932	1,891	11,234	6,870	942	723	1,944	756	3,973	2,835	1,700	425	710	538
1987	125,841	13,588	90,160	28,757	61,403	1,995	12,481	7,556	1,044	811	2,215	855	4,287	2,828	1,569	456	803	501
1988	133,463	14,342	94,893	28,221	66,672	2,122	13,841	8,392	1,135	903	2,441	969	4,581	3,174	1,762	501	911	510
1989	141,550	15,231	99,860	26,359	73,501	2,195	15,303	9,152	1,248	1,028	2,774	1,101	4,756	3,658	2,062	562	1,035	547
1990	151,655	15,671	107,404	25,802	81,602	2,323	16,610	9,785	1,361	1,147	3,096	1,220	4,894	4,117	2,346	625	1,147	636
1991[d]	160,521	15,249	114,675	24,095	90,580	2,277	17,892	10,447	1,478	1,224	3,412	1,333	5,120	4,611	2,679	680	1,252	696
1992	164,932	15,853	116,757	22,369	94,388	2,353	19,099	11,306	1,508	1,300	3,558	1,428	5,259	4,864	2,806	716	1,342	748
1993	165,188	16,532	115,435	20,844	94,591	1,965	20,221	12,129	1,561	1,376	3,646	1,510	5,289	4,997	2,841	737	1,419	749
1994	168,554	16,440	117,392	20,261	97,131	2,202	21,305	12,826	1,588	1,437	3,867	1,585	5,305	5,152	2,899	764	1,489	759
1995	183,013	17,231	129,830	21,178	108,652	2,273	22,303	13,434	1,670	1,516	4,069	1,613	5,405	5,167	2,822	830	1,516	804
1996 prelim.	193,206	16,774	139,579	20,931	118,648	2,273	23,134	13,855	1,736	1,613	4,255	1,676	5,405	5,340	2,871	895	1,575	702
1997 prelim.	205,742	16,450	151,418	20,787	130,631	2,273	24,031	14,285	1,821	1,710	4,457	1,759	5,405	5,520	2,900	967	1,653	644

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[d]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figures 4-2, 4-6, and 4-7.

Appendix table 4-4.
U.S. R&D expenditures, by performing sector and source of funds: 1970-97
(Millions of constant 1992 dollars)

Performing sector:	Total U.S.	Federal Govt.	Industry			Industry FFRDCs	Universities & colleges						U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs
Funding sector:	Total U.S.	Federal Govt.	Total	Federal Govt.	Industry[a]	Federal Govt.	Total	Federal Govt.	Nonfed. govt.	Industry	U&C	Non-profit	Federal Govt.[b]	Total	Federal Govt.	Industry	Non-profit	Federal Govt.
Calendar year[c]																		
1970	85,842	13,590	57,568	23,906	33,663	1,548	7,775	5,452	746	207	820	550	2,394	2,214	1,340	311	563	753
1971	83,719	13,715	55,468	22,322	33,146	1,528	7,879	5,419	804	221	877	558	2,256	2,204	1,327	305	572	669
1972	85,531	13,953	56,713	22,290	34,424	1,635	8,038	5,499	822	228	920	569	2,295	2,299	1,407	301	591	597
1973	87,361	13,672	58,526	21,483	37,042	1,541	8,250	5,644	843	245	934	583	2,343	2,493	1,600	297	596	537
1974	86,273	13,322	57,723	19,654	38,069	1,682	8,095	5,440	815	258	987	594	2,324	2,581	1,657	298	626	545
1975	84,358	13,191	55,645	18,686	36,959	1,724	8,276	5,560	806	274	1,006	630	2,436	2,552	1,601	296	655	534
1976	88,114	13,202	58,514	19,434	39,079	1,995	8,547	5,750	821	285	1,038	655	2,704	2,604	1,594	303	708	549
1977	91,091	13,087	60,813	20,064	40,748	2,027	8,863	5,919	809	309	1,140	685	3,091	2,630	1,560	316	754	579
1978	95,404	13,672	63,276	19,848	43,428	2,125	9,446	6,272	841	345	1,278	709	3,479	2,753	1,630	324	799	653
1979	100,009	13,519	67,064	20,545	46,519	2,106	10,025	6,737	863	369	1,375	682	3,642	2,948	1,782	326	840	706
1980	104,464	12,969	71,593	21,120	50,474	2,115	10,366	6,983	836	414	1,453	681	3,819	2,816	1,656	331	828	787
1981	109,294	13,027	76,343	22,705	53,637	2,097	10,547	6,995	853	458	1,561	680	3,761	2,706	1,571	341	795	814
1982	114,847	13,533	81,423	24,300	57,122	2,114	10,630	6,870	881	499	1,650	730	3,623	2,777	1,674	356	748	748
1983	122,613	14,796	87,009	26,089	60,920	2,166	11,021	6,967	877	561	1,816	800	3,881	2,920	1,793	376	751	820
1984	134,224	15,689	96,199	28,516	67,683	2,290	11,701	7,359	929	653	1,926	834	4,270	3,252	2,041	428	784	823
1985	145,559	16,667	104,864	32,249	72,615	2,372	12,726	7,926	1,009	757	2,139	896	4,603	3,483	2,164	477	842	843
1986	148,786	16,757	106,629	32,262	74,367	2,346	13,940	8,524	1,169	897	2,412	938	4,930	3,518	2,109	527	882	667
1987	151,499	16,359	108,543	34,620	73,923	2,402	15,025	9,096	1,257	976	2,667	1,029	5,161	3,405	1,889	548	967	604
1988	155,002	16,657	110,207	32,775	77,432	2,464	16,075	9,747	1,318	1,048	2,835	1,125	5,320	3,686	2,047	582	1,058	592
1989	157,761	16,975	111,297	29,378	81,919	2,446	17,056	10,200	1,391	1,146	3,092	1,227	5,300	4,077	2,298	626	1,153	610
1990	161,957	16,736	114,700	27,555	87,145	2,481	17,738	10,450	1,454	1,225	3,307	1,303	5,226	4,397	2,505	667	1,224	679
1991[d]	164,940	15,669	117,832	24,758	93,073	2,340	18,385	10,734	1,518	1,257	3,506	1,369	5,261	4,738	2,753	699	1,287	715
1992	164,932	15,853	116,757	22,369	94,388	2,353	19,099	11,306	1,508	1,300	3,558	1,428	5,259	4,864	2,806	716	1,342	748
1993	160,977	16,111	112,492	20,313	92,180	1,915	19,705	11,820	1,521	1,340	3,553	1,471	5,154	4,870	2,769	718	1,382	730
1994	160,592	15,663	111,847	19,304	92,543	2,098	20,298	12,220	1,513	1,369	3,685	1,510	5,054	4,909	2,762	728	1,419	724
1995	170,142	16,019	120,699	19,689	101,011	2,113	20,734	12,489	1,553	1,410	3,783	1,500	5,025	4,804	2,623	772	1,409	747
1996 prelim.	175,610	15,246	126,867	19,025	107,842	2,066	21,027	12,593	1,578	1,466	3,867	1,523	4,913	4,854	2,609	813	1,431	638
1997 prelim.	182,217	14,569	134,105	18,410	115,695	2,013	21,283	12,652	1,612	1,515	3,947	1,557	4,787	4,889	2,569	856	1,464	571

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[c]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figures 4-5, 4-6, 5-1, and 5-2.

Appendix table 4-5.
U.S. R&D expenditures, by source of funds and performer: 1970-97
(Millions of current dollars)

Funding sector:	Total U.S.	Federal Government								Industry				U&Cs	Nonprofit			Nonfed. govt.[a]
Performing sector:	Total U.S.	Total	Federal Govt.	Industry	Industry FFRDCs	U&Cs	U&C FFRDCs[b]	Non-profit	Nonprofit FFRDCs	Total	Industry[c]	U&Cs	Non-profit	U&Cs	Total	Non-profit	U&Cs	U&Cs[a]
Calendar year[d]																		
1970	26,235	14,970	4,154	7,306	473	1,666	732	410	230	10,446	10,288	63	95	251	340	172	168	228
1971	26,910	15,183	4,409	7,175	491	1,742	725	427	215	10,823	10,654	71	98	282	364	184	180	259
1972	28,661	15,976	4,676	7,469	548	1,843	769	472	200	11,713	11,535	77	101	308	389	198	191	276
1973	30,905	16,563	4,837	7,600	545	1,997	829	566	190	13,296	13,104	87	105	331	417	211	206	298
1974	33,238	17,193	5,133	7,572	648	2,096	896	639	210	14,882	14,667	100	115	380	470	241	229	314
1975	35,565	18,437	5,561	7,878	727	2,344	1,027	675	225	15,823	15,582	116	125	424	542	276	266	340
1976	39,314	20,179	5,890	8,671	890	2,566	1,206	711	245	17,698	17,436	127	135	463	608	316	292	367
1977	43,233	21,988	6,211	9,523	962	2,809	1,467	740	275	19,637	19,340	147	150	541	683	358	325	384
1978	48,582	24,279	6,962	10,107	1,082	3,194	1,772	830	333	22,456	22,115	176	165	651	768	407	361	429
1979	55,269	27,100	7,471	11,354	1,164	3,723	2,013	985	390	26,092	25,708	204	180	760	841	464	377	477
1980	63,076	29,857	7,831	12,752	1,277	4,216	2,306	1,000	475	30,926	30,476	250	200	877	911	500	411	505
1981	72,190	33,666	8,605	14,997	1,385	4,620	2,484	1,038	538	35,956	35,428	303	225	1,031	974	525	449	564
1982	80,633	37,113	9,501	17,061	1,484	4,823	2,544	1,175	525	40,705	40,105	350	250	1,159	1,037	525	512	619
1983	89,742	41,362	10,830	19,095	1,585	5,100	2,840	1,313	600	45,274	44,588	411	275	1,329	1,135	550	585	642
1984	101,940	46,319	11,916	21,657	1,739	5,589	3,243	1,550	625	52,225	51,404	496	325	1,463	1,228	595	633	706
1985	114,344	52,493	13,093	25,333	1,863	6,226	3,616	1,700	663	58,013	57,043	595	375	1,680	1,365	661	704	793
1986	119,907	54,475	13,504	26,000	1,891	6,870	3,973	1,700	538	61,079	59,932	723	425	1,944	1,466	710	756	942
1987	125,841	58,254	13,588	28,757	1,995	7,556	4,287	1,569	501	62,669	61,403	811	456	2,215	1,658	803	855	1,044
1988	133,463	59,930	14,342	28,221	2,122	8,392	4,581	1,762	510	68,076	66,672	903	501	2,441	1,880	911	969	1,135
1989	141,550	60,301	15,231	26,359	2,195	9,152	4,756	2,062	547	75,091	73,501	1,028	562	2,774	2,136	1,035	1,101	1,248
1990	151,655	61,456	15,671	25,802	2,323	9,785	4,894	2,346	636	83,374	81,602	1,147	625	3,096	2,367	1,147	1,220	1,361
1991[e]	160,521	60,563	15,249	24,095	2,277	10,447	5,120	2,679	696	92,484	90,580	1,224	680	3,412	2,585	1,252	1,333	1,478
1992	164,932	60,693	15,853	22,369	2,353	11,306	5,259	2,806	748	96,404	94,388	1,300	716	3,558	2,770	1,342	1,428	1,508
1993	165,188	60,350	16,532	20,844	1,965	12,129	5,289	2,841	749	96,704	94,591	1,376	737	3,646	2,928	1,419	1,510	1,561
1994	168,554	60,692	16,440	20,261	2,202	12,826	5,305	2,899	759	99,332	97,131	1,437	764	3,867	3,074	1,489	1,585	1,588
1995	183,013	63,147	17,231	21,178	2,273	13,434	5,405	2,822	804	110,998	108,652	1,516	830	4,069	3,129	1,516	1,613	1,670
1996 prelim.	193,206	62,810	16,774	20,931	2,273	13,855	5,405	2,871	702	121,156	118,648	1,613	895	4,255	3,250	1,575	1,676	1,736
1997 prelim.	205,742	62,745	16,450	20,787	2,273	14,285	5,405	2,900	644	133,308	130,631	1,710	967	4,457	3,411	1,653	1,759	1,821

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Because of limitations in the survey information, data on nonfederal government funding to other performers are not available, and are consequently included in other sectors' support for their own R&D performance. For example, nonfederal government support to nonprofits is included in nonprofits' support for their own R&D (data column 16).

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See text table 4-1 and figures 4-1, 4-2, 4-3, 4-7, 4-8, 5-1, and 5-2.

Appendix table 4-6.
U.S. R&D expenditures, by source of funds and performer: 1970-97
(Millions of constant 1992 dollars)

Funding sector:	Total U.S.	Federal Government								Industry				U&Cs	Nonprofit			Nonfed. govt.[a]
Performing sector:	Total U.S.	Total	Federal Govt.	Industry	Industry FFRDCs	U&Cs	U&C FFRDCs[b]	Non-profit	Nonprofit FFRDCs	Total	Industry[c]	U&Cs	Non-profit	U&Cs	Total	Non-profit	U&Cs	U&Cs[a]
Calendar year[d]																		
1970	85,842	48,982	13,590	23,906	1,548	5,452	2,394	1,340	753	34,181	33,663	207	311	820	1,112	563	550	746
1971	83,719	47,236	13,715	22,322	1,528	5,419	2,256	1,327	669	33,671	33,146	221	305	877	1,131	572	558	804
1972	85,531	47,675	13,953	22,290	1,635	5,499	2,295	1,407	597	34,953	34,424	228	301	920	1,160	591	569	822
1973	87,361	46,821	13,672	21,483	1,541	5,644	2,343	1,600	537	37,584	37,042	245	297	934	1,179	596	583	843
1974	86,273	44,625	13,322	19,654	1,682	5,440	2,324	1,657	545	38,626	38,069	258	298	987	1,220	626	594	815
1975	84,358	43,732	13,191	18,686	1,724	5,560	2,436	1,601	534	37,530	36,959	274	296	1,006	1,284	655	630	806
1976	88,114	45,227	13,202	19,434	1,995	5,750	2,704	1,594	549	39,666	39,079	285	303	1,038	1,363	708	655	821
1977	91,091	46,328	13,087	20,064	2,027	5,919	3,091	1,560	579	41,374	40,748	309	316	1,140	1,440	754	685	809
1978	95,404	47,678	13,672	19,848	2,125	6,272	3,479	1,630	653	44,097	43,428	345	324	1,278	1,509	799	709	841
1979	100,009	49,037	13,519	20,545	2,106	6,737	3,642	1,782	706	47,213	46,519	369	326	1,375	1,521	840	682	863
1980	104,464	49,448	12,969	21,120	2,115	6,983	3,819	1,656	787	51,219	50,474	414	331	1,453	1,509	828	681	836
1981	109,294	50,970	13,027	22,705	2,097	6,995	3,761	1,571	814	54,436	53,637	458	341	1,561	1,475	795	680	853
1982	114,847	52,861	13,533	24,300	2,114	6,870	3,623	1,674	748	57,977	57,122	499	356	1,650	1,477	748	730	881
1983	122,613	56,512	14,796	26,089	2,166	6,967	3,881	1,793	820	61,857	60,920	561	376	1,816	1,551	751	800	877
1984	134,224	60,988	15,689	28,516	2,290	7,359	4,270	2,041	823	68,764	67,683	653	428	1,926	1,617	784	834	929
1985	145,559	66,824	16,667	32,249	2,372	7,926	4,603	2,164	843	73,850	72,615	757	477	2,139	1,737	842	896	1,009
1986	148,786	67,596	16,757	32,262	2,346	8,524	4,930	2,109	667	75,790	74,367	897	527	2,412	1,820	882	938	1,169
1987	151,499	70,131	16,359	34,620	2,402	9,096	5,161	1,889	604	75,447	73,923	976	548	2,667	1,996	967	1,029	1,257
1988	155,002	69,602	16,657	32,775	2,464	9,747	5,320	2,047	592	79,062	77,432	1,048	582	2,835	2,183	1,058	1,125	1,318
1989	157,761	67,207	16,975	29,378	2,446	10,200	5,300	2,298	610	83,691	81,919	1,146	626	3,092	2,380	1,153	1,227	1,391
1990	161,957	65,631	16,736	27,555	2,481	10,450	5,226	2,505	679	89,038	87,145	1,225	667	3,307	2,527	1,224	1,303	1,454
1991[e]	164,940	62,230	15,669	24,758	2,340	10,734	5,261	2,753	715	95,030	93,073	1,257	699	3,506	2,656	1,287	1,369	1,518
1992	164,932	60,693	15,853	22,369	2,353	11,306	5,259	2,806	748	96,404	94,388	1,300	716	3,558	2,770	1,342	1,428	1,508
1993	160,977	58,811	16,111	20,313	1,915	11,820	5,154	2,769	730	94,238	92,180	1,340	718	3,553	2,853	1,382	1,471	1,521
1994	160,592	57,825	15,663	19,304	2,098	12,220	5,054	2,762	724	94,640	92,543	1,369	728	3,685	2,929	1,419	1,510	1,513
1995	170,142	58,706	16,019	19,689	2,113	12,489	5,025	2,623	747	103,192	101,011	1,410	772	3,783	2,909	1,409	1,500	1,553
1996 prelim.	175,610	57,090	15,246	19,025	2,066	12,593	4,913	2,609	638	110,121	107,842	1,466	813	3,867	2,954	1,431	1,523	1,578
1997 prelim.	182,217	55,571	14,569	18,410	2,013	12,652	4,787	2,569	571	118,066	115,695	1,515	856	3,947	3,021	1,464	1,557	1,612

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Because of limitations in the survey information, data on nonfederal government funding to other performers are not available, and are consequently included in other sectors' support for their own R&D performance. For example, nonfederal government support to nonprofits is included in nonprofits' support for their own R&D (data column 16).

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming)

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figures 4-1, 4-4, 5-1, and 5-2.

Appendix table 4-7.
U.S. basic research expenditures, by performing sector and source of funds: 1970-97
(Millions of current dollars)

Performing sector:	Total U.S.	Federal Govt.	Industry			Industry FFRDCs	Universities & colleges						U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs
Funding sector:	Total U.S.	Federal Govt.	Total	Federal Govt.	Industry[a]	Federal Govt.[b]	Total	Federal Govt.	Nonfed. govt.	Industry	U&C	Non-profit	Federal Govt.[c]	Total	Federal Gov't	Industry	Non-profit	Federal Govt.
Calendar year[d]																		
1970	3,567	563	566	122	444	36	1,826	1,309	173	42	190	112	267	311	195	44	72	NA[b]
1971	3,698	582	557	101	456	33	1,941	1,367	193	48	211	123	256	329	207	45	77	NA[b]
1972	3,829	603	554	91	463	39	2,030	1,429	195	54	218	134	257	347	216	47	84	NA[b]
1973	4,051	652	595	96	499	36	2,078	1,471	196	58	217	135	320	371	232	49	90	NA[b]
1974	4,439	715	650	114	536	49	2,217	1,566	200	63	242	146	402	405	245	54	106	NA[b]
1975	4,827	760	677	104	573	53	2,445	1,732	212	72	265	165	457	435	255	60	120	NA[b]
1976	5,291	850	750	116	634	69	2,612	1,883	216	73	272	168	534	477	278	64	135	NA[b]
1977	5,925	943	836	135	701	75	2,883	2,061	227	84	320	192	667	521	301	70	150	NA[b]
1978	6,841	1,044	941	156	785	94	3,255	2,310	251	103	381	210	906	601	351	80	170	NA[b]
1979	7,736	1,112	1,054	161	893	104	3,723	2,648	282	121	450	223	1,050	693	413	85	195	NA[b]
1980	8,651	1,212	1,205	170	1,035	120	4,176	2,961	300	148	522	244	1,167	771	461	95	215	NA[b]
1981	9,741	1,343	1,477	164	1,313	137	4,665	3,296	329	177	602	262	1,284	835	505	105	225	NA[b]
1982	10,658	1,522	1,776	253	1,523	128	4,985	3,438	362	205	679	300	1,366	881	551	115	215	NA[b]
1983	11,859	1,733	2,106	346	1,760	117	5,411	3,618	388	248	803	354	1,536	958	613	125	220	NA[b]
1984	13,176	1,877	2,472	340	2,132	136	5,939	3,958	424	298	878	380	1,709	1,044	656	149	238	NA[b]
1985	14,510	1,947	2,731	358	2,373	131	6,790	4,474	487	366	1,032	432	1,793	1,118	681	172	264	NA[b]
1986	16,885	2,026	3,930	434	3,496	117	7,718	4,994	588	451	1,213	472	1,915	1,179	700	195	284	NA[b]
1987	18,213	2,047	4,181	598	3,583	142	8,518	5,451	650	505	1,380	532	2,086	1,238	707	210	321	NA[b]
1988	19,381	2,116	4,163	656	3,507	337	9,118	5,807	690	549	1,483	589	2,272	1,351	756	230	364	24
1989	21,477	2,309	4,818	986	3,832	398	10,003	6,307	750	618	1,667	661	2,371	1,532	860	258	414	46
1990	22,556	2,319	4,629	869	3,760	499	10,882	6,767	821	692	1,867	736	2,470	1,693	947	287	459	65
1991[e]	26,629	2,378	7,376	1,251	6,125	461	11,831	7,273	904	749	2,089	816	2,657	1,850	1,036	313	501	77
1992	27,044	2,419	6,528	712	5,816	474	12,710	7,886	933	805	2,202	884	2,867	1,980	1,114	329	537	67
1993	28,125	2,623	6,427	466	5,961	492	13,497	8,537	957	843	2,235	925	2,953	2,062	1,155	339	567	72
1994	28,934	2,557	6,514	436	6,078	503	14,267	9,091	970	878	2,361	968	2,944	2,075	1,128	351	596	74
1995	28,642	2,638	5,569	190	5,379	530	14,945	9,547	1,017	923	2,477	982	2,781	2,104	1,116	382	606	74
1996 prelim.	29,574	2,477	6,056	182	5,874	530	15,500	9,837	1,059	984	2,597	1,023	2,781	2,155	1,114	412	630	74
1997 prelim.	31,212	2,687	6,645	178	6,467	530	16,101	10,142	1,113	1,046	2,725	1,075	2,781	2,385	1,279	445	661	83

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[b]For 1953-63, basic research of industry FFRDCs were not separated out from total federal support to the industrial sector for basic research. Thus, the figure for federal support to industry for basic research includes support for basic research at industry FFRDCs for those years. The same is true for basic research by nonprofit FFRDCs in 1953-87, which is included in federal support for basic research at nonprofit institutions for those years.

[c]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figures 4-2 and 4-7.

Appendix table 4-8.
U.S. basic research expenditures, by performing sector and source of funds: 1970-97
(Millions of constant 1992 dollars)

Performing sector:	Total U.S.	Federal Govt.	Industry			Industry FFRDCs	Universities & colleges						U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs
Funding sector:	Total U.S.	Federal Govt.	Total	Federal Govt.	Industry[a]	Federal Govt.[b]	Total	Federal Govt.	Nonfed. govt.	Industry	U&C	Non-profit	Federal Govt.[c]	Total	Federal Gov't	Industry	Non-profit	Federal Govt.
Calendar year[d]																		
1970	11,672	1,841	1,852	399	1,453	118	5,973	4,284	565	136	621	367	873	1016	636	144	236	NA[b]
1971	11,503	1,809	1,733	314	1,419	103	6,039	4,252	601	149	655	382	796	1024	644	140	240	NA[b]
1972	11,428	1,798	1,653	272	1,382	116	6,057	4,263	582	161	651	400	767	1036	645	140	251	NA[b]
1973	11,451	1,843	1,682	271	1,411	102	5,874	4,159	555	163	615	382	903	1047	654	139	254	NA[b]
1974	11,520	1,856	1,687	296	1,391	127	5,755	4,065	519	164	629	378	1044	1051	636	140	275	NA[b]
1975	11,449	1,803	1,606	247	1,359	126	5,799	4,107	503	170	628	391	1085	1032	605	142	285	NA[b]
1976	11,859	1,905	1,681	260	1,421	155	5,854	4,219	483	164	611	377	1197	1068	622	143	303	NA[b]
1977	12,484	1,987	1,761	284	1,477	158	6,075	4,341	478	177	673	405	1405	1098	635	147	316	NA[b]
1978	13,434	2,051	1,848	306	1,542	185	6,391	4,536	492	202	748	413	1779	1181	690	157	334	NA[b]
1979	13,998	2,013	1,907	291	1,616	188	6,737	4,792	510	219	813	404	1899	1253	746	154	353	NA[b]
1980	14,327	2,008	1,996	282	1,714	199	6,915	4,904	497	246	864	405	1932	1277	764	157	356	NA[b]
1981	14,748	2,033	2,236	248	1,988	207	7,063	4,989	498	267	911	397	1944	1264	765	159	341	NA[b]
1982	15,180	2,167	2,530	360	2,169	182	7,100	4,897	516	292	967	428	1946	1255	785	164	306	NA[b]
1983	16,203	2,367	2,877	473	2,405	160	7,392	4,943	530	339	1097	483	2098	1308	837	171	301	NA[b]
1984	17,349	2,471	3,255	448	2,807	179	7,819	5,212	558	393	1157	501	2250	1374	864	197	313	NA[b]
1985	18,472	2,479	3,477	456	3,021	167	8,644	5,695	620	465	1313	550	2282	1423	867	220	337	NA[b]
1986	20,952	2,514	4,877	539	4,338	145	9,577	6,197	730	560	1505	585	2377	1464	869	242	353	NA[b]
1987	21,926	2,465	5,033	720	4,314	171	10,255	6,562	783	608	1661	641	2511	1490	851	252	387	NA[b]
1988	22,508	2,458	4,835	762	4,073	391	10,590	6,744	801	637	1723	684	2638	1569	878	268	423	28
1989	23,937	2,573	5,370	1,099	4,271	444	11,148	7,030	836	688	1857	737	2643	1708	959	288	461	52
1990	24,088	2,476	4,943	928	4,015	533	11,621	7,226	877	739	1994	786	2638	1808	1011	307	490	69
1991[e]	27,362	2,444	7,579	1,285	6,294	474	12,156	7,473	929	770	2146	838	2730	1901	1064	322	515	79
1992	27,044	2,419	6,528	712	5,816	474	12,710	7,886	933	805	2202	884	2867	1980	1114	329	537	67
1993	27,408	2,556	6,263	454	5,809	479	13,152	8,319	932	822	2178	902	2878	2009	1126	330	553	70
1994	27,567	2,436	6,206	415	5,791	479	13,593	8,661	924	836	2250	922	2805	1977	1075	335	568	71
1995	26,628	2,453	5,177	177	5,001	493	13,894	8,875	945	858	2303	913	2585	1956	1038	355	564	69
1996 prelim.	26,881	2,252	5,505	166	5,339	482	14,088	8,941	963	895	2360	929	2528	1959	1013	374	572	68
1997 prelim.	27,643	2,379	5,885	158	5,728	469	14,260	8,983	986	926	2413	952	2463	2112	1133	394	585	74

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[b]For 1953-63, basic research of industry FFRDCs were not separated out from total federal support to the industrial sector for basic research. Thus, the figure for federal support to industry for basic research includes support for basic research at industry FFRDCs for those years. The same is true for basic research by nonprofit FFRDCs in 1953-87, which is included in federal support for basic research at nonprofit institutions for those years.

[c]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

Appendix table 4-9.
U.S. basic research expenditures, by source of funds and performer: 1970-97
(Millions of current dollars)

Funding sector:	Total U.S.	Federal Government								Industry				U&Cs	Nonprofit			Nonfed. govt.[a]
Performing sector:	Total U.S.	Total	Federal Govt.	Industry	Industry FFRDCs	U&Cs	U&C FFRDCs[b]	Non-profit	Nonprofit FFRDCs	Total	Industry[c]	U&Cs	Non-profit	U&Cs	Total	Non-profit	U&Cs	U&Cs[a]
Calendar year[d]																		
1970	3,567	2,491	563	122	36	1,309	267	195	NA[e]	530	444	42	44	190	184	72	112	173
1971	3,698	2,545	582	101	33	1,367	256	207	NA[e]	549	456	48	45	211	200	77	123	193
1972	3,829	2,634	603	91	39	1,429	257	216	NA[e]	564	463	54	47	218	218	84	134	195
1973	4,051	2,806	652	96	36	1,471	320	232	NA[e]	606	499	58	49	217	225	90	135	196
1974	4,439	3,091	715	114	49	1,566	402	245	NA[e]	653	536	63	54	242	252	106	146	200
1975	4,827	3,361	760	104	53	1,732	457	255	NA[e]	705	573	72	60	265	285	120	165	212
1976	5,291	3,729	850	116	69	1,883	534	278	NA[e]	771	634	73	64	272	303	135	168	216
1977	5,925	4,181	943	135	75	2,061	667	301	NA[e]	855	701	84	70	320	342	150	192	227
1978	6,841	4,861	1,044	156	94	2,310	906	351	NA[e]	968	785	103	80	381	380	170	210	251
1979	7,736	5,487	1,112	161	104	2,648	1,050	413	NA[e]	1,099	893	121	85	450	418	195	223	282
1980	8,651	6,091	1,212	170	120	2,961	1,167	461	NA[e]	1,278	1,035	148	95	522	459	215	244	300
1981	9,741	6,728	1,343	164	137	3,296	1,284	505	NA[e]	1,595	1,313	177	105	602	487	225	262	329
1982	10,658	7,258	1,522	253	128	3,438	1,366	551	NA[e]	1,843	1,523	205	115	679	515	215	300	362
1983	11,859	7,961	1,733	346	117	3,618	1,536	613	NA[e]	2,133	1,760	248	125	803	574	220	354	388
1984	13,176	8,676	1,877	340	136	3,958	1,709	656	NA[e]	2,579	2,132	298	149	878	618	238	380	424
1985	14,510	9,384	1,947	358	131	4,474	1,793	681	NA[e]	2,911	2,373	366	172	1,032	696	264	432	487
1986	16,885	10,186	2,026	434	117	4,994	1,915	700	NA[e]	4,142	3,496	451	195	1,213	756	284	472	588
1987	18,213	11,031	2,047	598	142	5,451	2,086	707	NA[e]	4,297	3,583	505	210	1,380	854	321	532	650
1988	19,381	11,968	2,116	656	337	5,807	2,272	756	24	4,286	3,507	549	230	1,483	953	364	589	690
1989	21,477	13,278	2,309	986	398	6,307	2,371	860	46	4,708	3,832	618	258	1,667	1,075	414	661	750
1990	22,556	13,935	2,319	869	499	6,767	2,470	947	65	4,739	3,760	692	287	1,867	1,194	459	736	821
1991[f]	26,629	15,133	2,378	1,251	461	7,273	2,657	1,036	77	7,187	6,125	749	313	2,089	1,317	501	816	904
1992	27,044	15,538	2,419	712	474	7,886	2,867	1,114	67	6,950	5,816	805	329	2,202	1,421	537	884	933
1993	28,125	16,297	2,623	466	492	8,537	2,953	1,155	72	7,143	5,961	843	339	2,235	1,493	567	925	957
1994	28,934	16,732	2,557	436	503	9,091	2,944	1,128	74	7,307	6,078	878	351	2,361	1,563	596	968	970
1995	28,642	16,876	2,638	190	530	9,547	2,781	1,116	74	6,684	5,379	923	382	2,477	1,588	606	982	1,017
1996 prelim.	29,574	16,996	2,477	182	530	9,837	2,781	1,114	74	7,270	5,874	984	412	2,597	1,652	630	1,023	1,059
1997 prelim.	31,212	17,680	2,687	178	530	10,142	2,781	1,279	83	7,957	6,467	1,046	445	2,725	1,736	661	1,075	1,113

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Because of limitations in the survey information, data on nonfederal government funding to other performers are not available, and are consequently included in other sectors' support for their own R&D performance. For example, nonfederal government support to nonprofits is included in nonprofits' support for their own R&D (data column 16).

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]For 1953-63, basic research of industry FFRDCs were not separated out from total federal support to the industrial sector for basic research. Thus, the figure for federal support to industry for basic research includes support for basic research at industry FFRDCs for those years. The same is true for basic research by nonprofit FFRDCs in 1953–87, which is included in federal support for basic research at nonprofit institutions for those years.

[f]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figures 4-7 and 4-8.

Appendix table 4-10.
U.S. basic research expenditures, by source of funds and performer: 1970-97
(Millions of constant 1992 dollars)

Funding sector:	Total U.S.	Federal Government								Industry				U&Cs	Nonprofit			Nonfed. govt.[a]
Performing sector:	Total U.S.	Total	Federal Govt.	Industry	Industry FFRDCs	U&Cs	U&C FFRDCs[b]	Non-profit	Nonprofit FFRDCs	Total	Industry[c]	U&Cs	Non-profit	U&Cs	Total	Non-profit	U&Cs	U&Cs[a]
Calendar year[d]																		
1970	11,672	8,151	1,841	399	118	4,284	873	636	NA[e]	1,733	1,453	136	144	621	603	236	367	565
1971	11,503	7,919	1,809	314	103	4,252	796	644	NA[e]	1,707	1,419	149	140	655	621	240	382	601
1972	11,428	7,861	1,798	272	116	4,263	767	645	NA[e]	1,683	1,382	161	140	651	651	251	400	582
1973	11,451	7,933	1,843	271	102	4,159	903	654	NA[e]	1,712	1,411	163	139	615	637	254	382	555
1974	11,520	8,024	1,856	296	127	4,065	1,044	636	NA[e]	1,695	1,391	164	140	629	653	275	378	519
1975	11,449	7,971	1,803	247	126	4,107	1,085	605	NA[e]	1,672	1,359	170	142	628	676	285	391	503
1976	11,859	8,358	1,905	260	155	4,219	1,197	622	NA[e]	1,728	1,421	164	143	611	680	303	377	483
1977	12,484	8,810	1,987	284	158	4,341	1,405	635	NA[e]	1,801	1,477	177	147	673	721	316	405	478
1978	13,434	9,546	2,051	306	185	4,536	1,779	690	NA[e]	1,900	1,542	202	157	748	747	334	413	492
1979	13,998	9,930	2,013	291	188	4,792	1,899	746	NA[e]	1,988	1,616	219	154	813	756	353	404	510
1980	14,327	10,087	2,008	282	199	4,904	1,932	764	NA[e]	2,117	1,714	246	157	864	761	356	405	497
1981	14,748	10,187	2,033	248	207	4,989	1,944	765	NA[e]	2,414	1,988	267	159	911	738	341	397	498
1982	15,180	10,338	2,167	360	182	4,897	1,946	785	NA[e]	2,625	2,169	292	164	967	734	306	428	516
1983	16,203	10,878	2,367	473	160	4,943	2,098	837	NA[e]	2,914	2,405	339	171	1,097	784	301	483	530
1984	17,349	11,424	2,471	448	179	5,212	2,250	864	NA[e]	3,396	2,807	393	197	1,157	814	313	501	558
1985	18,472	11,946	2,479	456	167	5,695	2,282	867	NA[e]	3,706	3,021	465	220	1,313	886	337	550	620
1986	20,952	12,639	2,514	539	145	6,197	2,377	869	NA[e]	5,140	4,338	560	242	1,505	938	353	585	730
1987	21,926	13,280	2,465	720	171	6,562	2,511	851	NA[e]	5,174	4,314	608	252	1,661	1,028	387	641	783
1988	22,508	13,899	2,458	762	391	6,744	2,638	878	28	4,978	4,073	637	268	1,723	1,107	423	684	801
1988	22,508	13,899	2,458	762	391	6,744	2,638	878	28	4,978	4,073	637	268	1,723	1,107	423	684	801
1989	23,937	14,798	2,573	1,099	444	7,030	2,643	959	52	5,247	4,271	688	288	1,857	1,198	461	737	836
1990	24,088	14,881	2,476	928	533	7,226	2,638	1,011	69	5,061	4,015	739	307	1,994	1,275	490	786	877
1991[f]	27,362	15,549	2,444	1,285	474	7,473	2,730	1,064	79	7,385	6,294	770	322	2,146	1,353	515	838	929
1992	27,044	15,538	2,419	712	474	7,886	2,867	1,114	67	6,950	5,816	805	329	2,202	1,421	537	884	933
1993	27,408	15,882	2,556	454	479	8,319	2,878	1,126	70	6,961	5,809	822	330	2,178	1,455	553	902	932
1994	27,567	15,942	2,436	415	479	8,661	2,805	1,075	71	6,962	5,791	836	335	2,250	1,490	568	922	924
1995	26,628	15,689	2,453	177	493	8,875	2,585	1,038	69	6,214	5,001	858	355	2,303	1,477	564	913	945
1996 prelim.	26,881	15,448	2,252	166	482	8,941	2,528	1,013	68	6,608	5,339	895	374	2,360	1,502	572	929	963
1997 prelim.	27,643	15,659	2,379	158	469	8,983	2,463	1,133	74	7,048	5,728	926	394	2,413	1,538	585	952	986

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Because of limitations in the survey information, data on nonfederal government funding to other performers are not available, and are consequently included in other sectors' support for their own R&D performance. For example, nonfederal government support to nonprofits is included in nonprofits' support for their own R&D (data column 16).

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]For 1953-63, basic research of industry FFRDCs were not separated out from total federal support to the industrial sector for basic research. Thus, the figure for federal support to industry for basic research includes support for basic research at industry FFRDCs for those years. The same is true for basic research by nonprofit FFRDCs in 1953-87, which is included in federal support for basic research at nonprofit institutions for those years.

[f]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figure 4-7.

Appendix table 4-11.
U.S. applied research expenditures, by performing sector and source of funds: 1970-97
(Millions of current dollars)

Performing sector:	Total U.S.	Federal Govt.	Industry			Industry FFRDCs	Universities & colleges						U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs
Funding sector:	Total U.S.	Federal Govt.	Total	Federal Govt.	Industry[a]	Federal Govt.[b]	Total	Federal Govt.	Nonfed. govt.	Industry	U&C	Non-profit	Federal Govt.[c]	Total	Federal Gov't	Industry	Non-profit	Federal Govt.
Calendar year[d]																		
1970	5,742	1,334	3,330	952	2,378	97	439	273	49	17	54	46	215	328	225	33	70	NA[b]
1971	5,817	1,355	3,348	907	2,441	67	487	299	58	19	63	48	213	349	241	34	74	NA[b]
1972	6,098	1,434	3,407	845	2,562	107	571	355	70	19	78	49	223	357	243	35	79	NA[b]
1973	6,662	1,527	3,715	883	2,832	110	719	455	85	25	95	59	215	376	257	36	83	NA[b]
1974	7,312	1,652	4,168	905	3,263	120	765	457	94	30	114	69	184	423	290	40	93	NA[b]
1975	8,048	1,912	4,431	991	3,440	139	892	532	107	36	133	85	211	463	315	43	105	NA[b]
1976	8,964	2,068	4,945	1,033	3,912	167	1,029	590	127	44	161	108	249	506	338	48	120	NA[b]
1977	9,653	2,081	5,424	1,113	4,311	212	1,096	616	131	49	185	116	297	543	355	53	135	NA[b]
1978	10,695	2,242	6,065	1,195	4,870	235	1,215	660	146	58	222	129	324	614	409	55	150	NA[b]
1979	12,073	2,415	6,975	1,305	5,670	250	1,363	750	161	68	257	127	360	710	480	60	170	NA[b]
1980	13,724	2,546	8,175	1,625	6,550	275	1,574	895	168	83	292	137	421	734	489	65	180	NA[b]
1981	16,389	2,731	10,401	2,042	8,359	298	1,750	950	192	103	352	153	422	786	521	75	190	NA[b]
1982	18,261	2,802	11,956	2,593	9,363	367	1,879	983	210	119	393	174	433	825	550	85	190	NA[b]
1983	20,323	2,991	13,513	3,227	10,286	414	2,051	1,088	208	133	431	190	473	880	585	95	200	NA[b]
1984	22,481	2,961	15,218	3,677	11,541	547	2,288	1,208	231	162	479	207	549	918	594	110	214	NA[b]
1985	25,389	3,135	17,625	4,717	12,908	630	2,473	1,280	251	188	532	223	579	947	581	127	238	NA[b]
1986	27,225	3,204	19,131	4,049	15,082	629	2,707	1,362	290	223	599	233	553	1,000	600	144	256	NA[b]
1987	27,819	3,366	19,190	4,037	15,153	623	3,072	1,549	323	251	685	264	532	1,037	593	155	289	NA[b]
1988	29,466	3,362	20,377	3,846	16,531	371	3,647	1,894	365	290	785	312	547	1,097	599	170	328	66
1989	32,304	3,566	22,317	4,324	17,993	374	4,116	2,102	409	337	908	360	602	1,258	695	191	372	70
1990	34,981	3,652	24,399	5,967	18,432	386	4,369	2,147	443	374	1,008	397	689	1,405	780	212	413	81
1991[e]	38,699	4,094	27,013	5,588	21,425	433	4,544	2,176	470	389	1,085	424	927	1,603	921	231	451	86
1992	37,995	4,337	25,660	4,476	21,184	507	4,810	2,375	471	406	1,111	446	940	1,660	933	243	483	81
1993	37,318	4,838	24,251	4,295	19,956	435	5,068	2,500	495	437	1,157	479	962	1,661	900	251	511	103
1994	36,615	5,006	22,988	3,616	19,372	503	5,272	2,565	507	459	1,235	506	981	1,753	957	260	536	112
1995	40,927	5,054	26,919	3,164	23,755	535	5,532	2,687	536	486	1,305	517	979	1,779	951	282	546	129
1996 prelim.	43,353	5,000	29,065	3,125	25,940	535	5,779	2,814	555	515	1,360	535	979	1,883	1,012	304	567	111
1997 prelim.	46,208	5,083	31,663	3,102	28,560	535	5,975	2,869	580	545	1,420	560	979	1,863	940	329	595	110

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources:1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[b]For 1953-63, applied research of industry FFRDCs were not separated out from total federal support to the industrial sector for applied research. Thus, the figure for federal support to industry for applied research includes support for applied research at industry FFRDCs for those years. The same is true for applied research by nonprofit FFRDCs in 1953-87, which is included in federal support for applied research at nonprofit institutions for those years.

[c]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming),

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figures 4-2 and 4-7.

Appendix table 4-12.
U.S. applied research expenditures, by performing sector and source of funds: 1970-97
(Millions of constant 1992 dollars)

Performing sector:	Total U.S.	Federal Govt.	Industry			Industry FFRDCs	Universities & colleges						U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs
Funding sector:	Total U.S.	Federal Govt.	Total	Federal Govt.	Industry[a]	Federal Govt.[b]	Total	Federal Govt.	Nonfed. govt.	Industry	U&C	Non-profit	Federal Govt.[c]	Total	Federal Gov't	Industry	Non-profit	Federal Govt.
Calendar year[d]																		
1970	18,787	4,363	10,896	3,115	7,781	317	1,436	894	161	55	177	150	702	1,073	736	108	229	NA[b]
1970	18,787	4,363	10,896	3,115	7,781	317	1,436	894	161	55	177	150	702	1,073	736	108	229	NA[b]
1971	18,098	4,214	10,416	2,822	7,594	208	1,514	930	180	58	197	148	662	1,084	748	106	230	NA[b]
1972	18,197	4,278	10,167	2,522	7,646	319	1,705	1,060	209	57	233	145	664	1,064	724	104	236	NA[b]
1973	18,831	4,316	10,501	2,496	8,005	311	2,032	1,287	241	69	267	167	607	1,063	726	102	235	NA[b]
1974	18,979	4,288	10,818	2,349	8,469	311	1,985	1,187	245	79	296	178	478	1,098	753	104	241	NA[b]
1975	19,089	4,534	10,510	2,351	8,159	330	2,117	1,262	253	86	315	200	500	1,098	747	102	249	NA[b]
1976	20,091	4,636	11,083	2,315	8,768	374	2,307	1,322	285	98	360	242	558	1,133	756	108	269	NA[b]
1977	20,339	4,384	11,428	2,345	9,083	447	2,310	1,298	276	102	389	244	626	1,144	748	112	284	NA[b]
1978	21,002	4,402	11,910	2,347	9,563	461	2,387	1,296	287	114	436	253	636	1,205	803	108	295	NA[b]
1979	21,847	4,370	12,621	2,361	10,260	452	2,467	1,357	292	123	465	230	651	1,285	869	109	308	NA[b]
1980	22,730	4,217	13,539	2,691	10,848	455	2,607	1,482	278	138	483	226	697	1,215	809	108	298	NA[b]
1981	24,812	4,135	15,747	3,092	12,655	451	2,649	1,438	291	156	532	232	639	1,190	789	114	288	NA[b]
1982	26,010	3,990	17,029	3,693	13,336	523	2,676	1,400	300	169	560	248	616	1,175	783	121	271	NA[b]
1983	27,767	4,087	18,463	4,409	14,054	566	2,803	1,487	285	182	589	259	647	1,202	799	130	273	NA[b]
1984	29,601	3,899	20,037	4,841	15,196	720	3,013	1,591	304	214	631	273	722	1,209	782	145	282	NA[b]
1985	32,320	3,991	22,437	6,005	16,432	802	3,148	1,629	319	240	677	283	738	1,205	740	162	303	NA[b]
1986	33,782	3,976	23,739	5,024	18,714	780	3,359	1,690	360	276	743	289	687	1,241	745	179	317	NA[b]
1987	33,491	4,052	23,103	4,860	18,243	750	3,698	1,864	389	302	825	318	640	1,248	714	186	348	NA[b]
1988	34,222	3,905	23,666	4,467	19,199	431	4,236	2,200	424	337	912	362	635	1,274	695	198	381	76
1989	36,004	3,975	24,873	4,819	20,054	417	4,587	2,343	455	375	1,012	402	671	1,402	774	213	415	78
1990	37,357	3,900	26,056	6,372	19,684	412	4,666	2,293	473	399	1,076	424	736	1,500	832	227	441	87
1991[e]	39,765	4,206	27,757	5,742	22,015	445	4,669	2,236	483	400	1,115	435	952	1,647	946	238	463	89
1992	37,995	4,337	25,660	4,476	21,184	507	4,810	2,375	471	406	1,111	446	940	1,660	933	243	483	81
1993	36,367	4,715	23,633	4,186	19,447	424	4,939	2,436	483	425	1,128	467	938	1,619	877	244	498	100
1994	34,886	4,770	21,902	3,445	18,457	479	5,023	2,444	483	437	1,177	482	935	1,670	912	247	511	106
1995	38,049	4,698	25,026	2,941	22,084	497	5,143	2,498	498	452	1,214	481	911	1,654	884	262	507	120
1996 prelim.	39,404	4,545	26,418	2,840	23,578	486	5,253	2,557	504	469	1,236	487	890	1,711	919	276	515	101
1997 prelim.	40,924	4,502	28,042	2,748	25,295	474	5,291	2,541	514	483	1,258	496	867	1,650	832	291	527	97

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[b]For 1953-63, applied research of industry FFRDCs were not separated out from total federal support to the industrial sector for applied research. Thus, the figure for federal support to industry for applied research includes support for applied research at industry FFRDCs for those years. The same is true for applied research by nonprofit FFRDCs in 1953-87, which is included in federal support for applied research at nonprofit institutions for those years.

[c]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figure 4-7.

Appendix table 4-13.
U.S. applied research expenditures, by source of funds and performer: 1970-97
(Millions of current dollars)

Funding sector:	Total U.S.	Federal Government								Industry				U&Cs	Nonprofit			Nonfed. govt.[a]
Performing sector:	Total U.S.	Total	Federal Govt.	Industry	Industry FFRDCs	U&Cs	U&C FFRDCs[b]	Non-profit	Nonprofit FFRDCs	Total	Industry[c]	U&Cs	Non-profit	U&Cs	Total	Non-profit	U&Cs	U&Cs[a]
Calendar year[d]																		
1970	5,742	3,095	1,334	952	97	273	215	225	NA[e]	2,428	2,378	17	33	54	116	70	46	49
1971	5,817	3,081	1,355	907	67	299	213	241	NA[e]	2,494	2,441	19	34	63	122	74	48	58
1972	6,098	3,206	1,434	845	107	355	223	243	NA[e]	2,616	2,562	19	35	78	128	79	49	70
1973	6,662	3,447	1,527	883	110	455	215	257	NA[e]	2,893	2,832	25	36	95	142	83	59	85
1974	7,312	3,609	1,652	905	120	457	184	290	NA[e]	3,333	3,263	30	40	114	162	93	69	94
1975	8,048	4,100	1,912	991	139	532	211	315	NA[e]	3,519	3,440	36	43	133	190	105	85	107
1976	8,964	4,444	2,068	1,033	167	590	249	338	NA[e]	4,004	3,912	44	48	161	228	120	108	127
1977	9,653	4,674	2,081	1,113	212	616	297	355	NA[e]	4,413	4,311	49	53	185	251	135	116	131
1978	10,695	5,064	2,242	1,195	235	660	324	409	NA[e]	4,983	4,870	58	55	222	279	150	129	146
1979	12,073	5,560	2,415	1,305	250	750	360	480	NA[e]	5,798	5,670	68	60	257	297	170	127	161
1980	13,724	6,251	2,546	1,625	275	895	421	489	NA[e]	6,698	6,550	83	65	292	317	180	137	168
1981	16,389	6,964	2,731	2,042	298	950	422	521	NA[e]	8,537	8,359	103	75	352	343	190	153	192
1982	18,261	7,727	2,802	2,593	367	983	433	550	NA[e]	9,567	9,363	119	85	393	364	190	174	210
1983	20,323	8,779	2,991	3,227	414	1,088	473	585	NA[e]	10,514	10,286	133	95	431	390	200	190	208
1984	22,481	9,536	2,961	3,677	547	1,208	549	594	NA[e]	11,814	11,541	162	110	479	422	214	207	231
1985	25,389	10,922	3,135	4,717	630	1,280	579	581	NA[e]	13,224	12,908	188	127	532	461	238	223	251
1986	27,225	10,398	3,204	4,049	629	1,362	553	600	NA[e]	15,449	15,082	223	144	599	489	256	233	290
1987	27,819	10,699	3,366	4,037	623	1,549	532	593	NA[e]	15,559	15,153	251	155	685	554	289	264	323
1988	29,466	10,684	3,362	3,846	371	1,894	547	599	66	16,992	16,531	290	170	785	640	328	312	365
1988	29,466	10,684	3,362	3,846	371	1,894	547	599	66	16,992	16,531	290	170	785	640	328	312	365
1989	32,304	11,733	3,566	4,324	374	2,102	602	695	70	18,521	17,993	337	191	908	733	372	360	409
1990	34,981	13,702	3,652	5,967	386	2,147	689	780	81	19,018	18,432	374	212	1,008	810	413	397	443
1991[f]	38,699	14,224	4,094	5,588	433	2,176	927	921	86	22,045	21,425	389	231	1,085	875	451	424	470
1992	37,995	13,650	4,337	4,476	507	2,375	940	933	81	21,834	21,184	406	243	1,111	929	483	446	471
1993	37,318	14,033	4,838	4,295	435	2,500	962	900	103	20,643	19,956	437	251	1,157	990	511	479	495
1994	36,615	13,741	5,006	3,616	503	2,565	981	957	112	20,091	19,372	459	260	1,235	1,042	536	506	507
1995	40,927	13,499	5,054	3,164	535	2,687	979	951	129	24,524	23,755	486	282	1,305	1,063	546	517	536
1996 prelim.	43,353	13,576	5,000	3,125	535	2,814	979	1,012	111	26,760	25,940	515	304	1,360	1,102	567	535	555
1997 prelim.	46,208	13,618	5,083	3,102	535	2,869	979	940	110	29,434	28,560	545	329	1,420	1,155	595	560	580

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Because of limitations in the survey information, data on nonfederal government funding to other performers are not available, and are consequently included in other sectors' support for their own R&D performance. For example, nonfederal government support to nonprofits is included in nonprofits' support for their own R&D (data column 16).

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]For 1953-63, applied research of industry FFRDCs were not separated out from total federal support to the industrial sector for applied research. Thus, the figure for federal support to industry for applied research includes support for applied research at industry FFRDCs for those years. The same is true for applied research by nonprofit FFRDCs in 1953-87, which is included in federal support for applied research at nonprofit institutions for those years.

[f]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figures 4-7 and 4-8.

Appendix table 4-14.
U.S. applied research expenditures, by source of funds and performer: 1970-97
(Millions of constant 1992 dollars)

Funding sector:	Total U.S.	Federal Government								Industry				U&Cs	Nonprofit			Nonfed. govt.[a]
Performing sector:	Total U.S.	Total	Federal Govt.	Industry	Industry FFRDCs	U&Cs	U&C FFRDCs[b]	Non-profit	Nonprofit FFRDCs	Total	Industry[c]	U&Cs	Non-profit	U&Cs	Total	Non-profit	U&Cs	U&Cs[a]
Calendar year[d]																		
1970	18,787	10,128	4,363	3,115	317	894	702	736	NA[e]	7,944	7,781	55	108	177	379	229	150	161
1971	18,098	9,585	4,214	2,822	208	930	662	748	NA[e]	7,758	7,594	58	106	197	378	230	148	180
1972	18,197	9,567	4,278	2,522	319	1,060	664	724	NA[e]	7,808	7,646	57	104	233	381	236	145	209
1973	18,831	9,744	4,316	2,496	311	1,287	607	726	NA[e]	8,176	8,005	69	102	267	402	235	167	241
1974	18,979	9,366	4,288	2,349	311	1,187	478	753	NA[e]	8,652	8,469	79	104	296	420	241	178	245
1975	19,089	9,724	4,534	2,351	330	1,262	500	747	NA[e]	8,347	8,159	86	102	315	449	249	200	253
1976	20,091	9,961	4,636	2,315	374	1,322	558	756	NA[e]	8,974	8,768	98	108	360	511	269	242	285
1977	20,339	9,848	4,384	2,345	447	1,298	626	748	NA[e]	9,297	9,083	102	112	389	528	284	244	276
1978	21,002	9,945	4,402	2,347	461	1,296	636	803	NA[e]	9,786	9,563	114	108	436	547	295	253	287
1979	21,847	10,061	4,370	2,361	452	1,357	651	869	NA[e]	10,492	10,260	123	109	465	537	308	230	292
1980	22,730	10,352	4,217	2,691	455	1,482	697	809	NA[e]	11,093	10,848	138	108	483	524	298	226	278
1981	24,812	10,544	4,135	3,092	451	1,438	639	789	NA[e]	12,925	12,655	156	114	532	520	288	232	291
1982	26,010	11,006	3,990	3,693	523	1,400	616	783	NA[e]	13,626	13,336	169	121	560	518	271	248	300
1983	27,767	11,994	4,087	4,409	566	1,487	647	799	NA[e]	14,366	14,054	182	130	589	533	273	259	285
1984	29,601	12,555	3,899	4,841	720	1,591	722	782	NA[e]	15,555	15,196	214	145	631	555	282	273	304
1985	32,320	13,904	3,991	6,005	802	1,629	738	740	NA[e]	16,834	16,432	240	162	677	586	303	283	319
1986	33,782	12,902	3,976	5,024	780	1,690	687	745	NA[e]	19,170	18,714	276	179	743	607	317	289	360
1987	33,491	12,880	4,052	4,860	750	1,864	640	714	NA[e]	18,731	18,243	302	186	825	666	348	318	389
1988	34,222	12,409	3,905	4,467	431	2,200	635	695	76	19,734	19,199	337	198	912	743	381	362	424
1989	36,004	13,077	3,975	4,819	417	2,343	671	774	78	20,642	20,054	375	213	1,012	817	415	402	455
1990	37,357	14,633	3,900	6,372	412	2,293	736	832	87	20,310	19,684	399	227	1,076	865	441	424	473
1991[f]	39,765	14,616	4,206	5,742	445	2,236	952	946	89	22,652	22,015	400	238	1,115	899	463	435	483
1992	37,995	13,650	4,337	4,476	507	2,375	940	933	81	21,834	21,184	406	243	1,111	929	483	446	471
1993	36,367	13,675	4,715	4,186	424	2,436	938	877	100	20,117	19,447	425	244	1,128	965	498	467	483
1994	34,886	13,091	4,770	3,445	479	2,444	935	912	106	19,142	18,457	437	247	1,177	993	511	482	483
1995	38,049	12,550	4,698	2,941	497	2,498	911	884	120	22,799	22,084	452	262	1,214	988	507	481	498
1996 prelim.	39,404	12,339	4,545	2,840	486	2,557	890	919	101	24,323	23,578	469	276	1,236	1,002	515	487	504
1997 prelim.	40,924	12,061	4,502	2,748	474	2,541	867	832	97	26,069	25,295	483	291	1,258	1,023	527	496	514

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Because of limitations in the survey information, data on nonfederal government funding to other performers are not available, and are consequently included in other sectors' support for their own R&D performance. For example, nonfederal government support to nonprofits is included in nonprofits' support for their own R&D (data column 16).

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]For 1953-63, applied research of industry FFRDCs were not separated out from total federal support to the industrial sector for applied research. Thus, the figure for federal support to industry for applied research includes support for applied research at industry FFRDCs for those years. The same is true for applied research by nonprofit FFRDCs in 1953-87, which is included in federal support for applied research at nonprofit institutions for those years.

[f]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figure 4-7.

Appendix table 4-15.
U.S. development expenditures, by performing sector and source of funds: 1970-97
(Millions of current dollars)

Performing sector:	Total U.S.	Federal Govt.	Industry			Industry FFRDCs	Universities & colleges						U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs
Funding sector:	Total U.S.	Federal Govt.	Total	Federal Govt.	Industry[a]	Federal Govt.[b]	Total	Federal Govt.	Nonfed. govt.	Industry	U&C	Non-profit	Federal Govt.[c]	Total	Federal Gov't	Industry	Non-profit	Federal Govt.
Calendar year[d]																		
1970	16,926	2,258	13,698	6,232	7,466	340	112	84	6	5	7	10	251	268	220	18	30	NA[b]
1971	17,395	2,473	13,924	6,167	7,757	391	105	76	7	5	8	9	257	246	194	19	33	NA[b]
1972	18,734	2,640	15,043	6,533	8,510	402	93	59	11	3	12	8	290	267	213	19	35	NA[b]
1973	20,193	2,658	16,394	6,621	9,773	399	122	70	17	5	19	12	295	326	268	20	38	NA[b]
1974	21,488	2,766	17,421	6,553	10,868	479	137	73	20	6	24	15	309	377	314	21	42	NA[b]
1975	22,691	2,890	18,352	6,783	11,569	535	152	80	21	8	27	16	359	403	330	22	51	NA[b]
1976	25,059	2,972	20,412	7,522	12,890	654	173	93	24	10	30	16	424	425	341	23	61	NA[b]
1977	27,655	3,188	22,603	8,275	14,328	675	227	133	26	14	37	17	503	459	359	27	73	NA[b]
1978	31,047	3,676	25,216	8,756	16,460	753	340	224	32	15	48	22	542	520	403	30	87	NA[b]
1979	35,460	3,944	29,033	9,888	19,145	810	454	325	34	15	53	27	603	617	483	35	99	NA[b]
1980	40,701	4,072	33,848	10,957	22,891	882	510	361	37	18	64	30	719	670	525	40	105	NA[b]
1981	46,060	4,530	38,547	12,791	25,756	950	551	375	42	23	77	34	778	704	549	45	110	NA[b]
1982	51,714	5,178	43,434	14,215	29,219	989	599	402	46	26	86	38	745	769	599	50	120	NA[b]
1983	57,560	6,106	48,064	15,522	32,542	1,054	605	393	46	29	95	42	832	900	715	55	130	NA[b]
1984	66,284	7,078	55,371	17,640	37,731	1,056	660	423	51	36	105	46	987	1,133	925	65	143	NA[b]
1985	74,444	8,011	62,020	20,258	41,762	1,102	734	472	55	41	117	49	1,244	1,334	1,100	75	159	NA[b]
1986	75,796	8,275	62,871	21,517	41,354	1,145	809	513	64	49	132	51	1,503	1,193	938	85	171	NA[b]
1987	79,809	8,176	66,789	24,122	42,667	1,230	890	556	71	55	150	58	1,669	1,055	771	91	193	NA[b]
1988	84,614	8,864	70,353	23,719	46,634	1,414	1,076	691	80	64	172	68	1,761	726	407	100	219	420
1989	87,767	9,355	72,725	21,049	51,676	1,423	1,185	742	90	74	199	79	1,781	868	507	112	248	430
1990	94,118	9,700	78,376	18,966	59,410	1,438	1,359	871	97	82	221	87	1,735	1,019	619	125	275	490
1991[e]	95,193	8,778	80,286	17,256	63,030	1,383	1,518	998	103	85	238	93	1,537	1,159	722	136	301	533
1992	99,894	9,098	84,569	17,181	67,388	1,373	1,580	1,045	103	89	244	98	1,452	1,223	758	143	322	599
1993	99,746	9,071	84,757	16,083	68,674	1,039	1,656	1,092	109	96	254	105	1,374	1,275	787	147	340	574
1994	103,005	8,877	87,890	16,209	71,681	1,196	1,765	1,171	111	101	271	111	1,380	1,324	814	153	357	574
1995	113,445	9,539	97,342	17,824	79,518	1,209	1,826	1,201	118	107	287	114	1,645	1,284	754	166	364	600
1996 prelim.	120,281	9,297	104,457	17,624	86,834	1,209	1,855	1,204	122	113	298	118	1,645	1,302	745	179	378	516
1997 prelim.	128,323	8,681	113,111	17,507	95,604	1,209	1,956	1,274	127	120	312	123	1,645	1,272	682	193	397	451

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[b]For 1953-63, development expenditures by industry FFRDCs were not separated out from total federal support to the industrial sector for development. Thus, the figure for federal support to industry for development includes support for development at industry FFRDCs for those years. The same is true for development by nonprofit FFRDCs in 1953-87, which is included in federal support for development at nonprofit institutions for those years.

[c]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources:1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figures 4-2 and 4-7.

Appendix table 4-16.
U.S. development expenditures, by performing sector and source of funds: 1970-97
(Millions of constant 1992 dollars)

Performing sector:	Total U.S.	Federal Govt.	Industry			Industry FFRDCs	Universities & colleges						U&C FFRDCs	Other nonprofit institutions				Nonprofit FFRDCs
Funding sector:	Total U.S.	Federal Govt.	Total	Federal Govt.	Industry[a]	Federal Govt.[b]	Total	Federal Govt.	Nonfed. govt.	Industry	U&C	Non-profit	Federal Govt.[c]	Total	Federal Gov't	Industry	Non-profit	Federal Govt.
Calendar year[d]																		
1970	55,383	7,387	44,820	20,391	24,429	1,112	366	274	21	16	23	33	820	877	720	59	98	NA[b]
1971	54,118	7,692	43,319	19,186	24,133	1,216	327	236	23	14	25	29	798	765	604	59	103	NA[b]
1972	55,906	7,877	44,892	19,496	25,396	1,200	276	175	32	10	35	24	864	797	636	57	104	NA[b]
1973	57,080	7,512	46,342	18,716	27,626	1,128	344	199	47	13	52	33	833	920	756	57	107	NA[b]
1974	55,773	7,178	45,218	17,009	28,209	1,243	355	189	51	16	61	38	802	977	814	55	109	NA[b]
1975	53,820	6,854	43,529	16,089	27,441	1,269	361	190	51	18	64	38	851	956	783	52	121	NA[b]
1976	56,166	6,661	45,749	16,859	28,890	1,466	388	209	53	23	67	36	949	953	764	52	137	NA[b]
1977	58,268	6,717	47,623	17,435	30,188	1,422	478	279	55	30	78	36	1,060	967	756	57	154	NA[b]
1978	60,968	7,219	49,518	17,195	32,323	1,479	668	440	62	29	94	44	1,064	1,020	790	59	171	NA[b]
1979	64,165	7,136	52,535	17,892	34,643	1,466	821	588	61	27	97	48	1,092	1,116	873	63	179	NA[b]
1980	67,408	6,745	56,058	18,147	37,912	1,461	844	597	61	30	106	50	1,190	1,110	869	66	174	NA[b]
1981	69,734	6,859	58,359	19,365	38,994	1,438	834	568	64	34	117	51	1,178	1,065	831	68	167	NA[b]
1982	73,657	7,375	61,864	20,247	41,617	1,409	853	573	66	37	123	54	1,061	1,095	853	71	171	NA[b]
1983	78,644	8,342	65,669	21,208	44,462	1,440	826	538	62	40	129	57	1,136	1,230	977	75	178	NA[b]
1984	87,276	9,320	72,906	23,226	49,680	1,390	869	557	67	47	138	60	1,299	1,492	1,218	86	188	NA[b]
1985	94,767	10,197	78,951	25,788	53,163	1,403	935	601	70	53	149	62	1,583	1,698	1,400	95	202	NA[b]
1986	94,051	10,268	78,013	26,699	51,314	1,421	1,004	637	79	61	163	63	1,865	1,480	1,163	105	212	NA[b]
1987	96,081	9,842	80,407	29,040	51,366	1,481	1,072	669	85	66	181	70	2,010	1,270	928	110	232	NA[b]
1988	98,270	10,295	81,707	27,547	54,160	1,642	1,249	802	93	74	200	79	2,046	843	473	116	254	488
1989	97,819	10,427	81,054	23,460	57,594	1,586	1,320	827	100	82	222	88	1,985	967	565	125	277	480
1990	100,512	10,359	83,700	20,254	63,446	1,536	1,451	931	104	88	236	93	1,853	1,088	661	133	294	523
1991[e]	97,814	9,019	82,496	17,731	64,765	1,421	1,560	1,025	106	88	245	96	1,579	1,191	742	140	309	547
1992	99,894	9,098	84,569	17,181	67,388	1,373	1,580	1,045	103	89	244	98	1,452	1,223	758	143	322	599
1993	97,203	8,840	82,596	15,673	66,923	1,013	1,614	1,064	106	93	248	102	1,339	1,242	767	144	332	560
1994	98,139	8,458	83,738	15,443	68,295	1,140	1,681	1,115	106	96	258	106	1,315	1,261	775	146	341	546
1995	105,466	8,868	90,496	16,570	73,926	1,124	1,697	1,117	109	99	266	106	1,529	1,194	701	154	338	558
1996 prelim.	109,326	8,450	94,944	16,018	78,925	1,099	1,686	1,094	111	103	271	107	1,495	1,183	677	163	343	469
1997 prelim.	113,651	7,688	100,178	15,505	84,673	1,071	1,732	1,128	113	106	276	109	1,457	1,126	604	171	351	400

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[b]For 1953-63, development expenditures by industry FFRDCs were not separated out from total federal support to the industrial sector for development. Thus, the figure for federal support to industry for development includes support for development at industry FFRDCs for those years. The same is true for development by nonprofit FFRDCs in 1953-87, which is included in federal support for development at nonprofit institutions for those years.

[c]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

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Appendix table 4-17.
U.S. development expenditures, by source of funds and performer: 1970-97
(Millions of current dollars)

Funding sector:	Total U.S.	Federal Government								Industry				U&Cs	Nonprofit			Nonfed. govt.[a]
Performing sector:	Total U.S.	Total	Federal Govt.	Industry	Industry FFRDCs	U&Cs	U&C FFRDCs[b]	Non-profit	Nonprofit FFRDCs	Total	Industry[c]	U&Cs	Non-profit	U&Cs	Total	Non-profit	U&Cs	U&Cs[a]
Calendar year[d]																		
1970	16,926	9,384	2,258	6,232	340	84	251	220	NA[e]	7,489	7,466	5	18	7	40	30	10	6
1971	17,395	9,557	2,473	6,167	391	76	257	194	NA[e]	7,781	7,757	5	19	8	42	33	9	7
1972	18,734	10,136	2,640	6,533	402	59	290	213	NA[e]	8,532	8,510	3	19	12	43	35	8	11
1973	20,193	10,310	2,658	6,621	399	70	295	268	NA[e]	9,798	9,773	5	20	19	50	38	12	17
1974	21,488	10,493	2,766	6,553	479	73	309	314	NA[e]	10,895	10,868	6	21	24	57	42	15	20
1975	22,691	10,977	2,890	6,783	535	80	359	330	NA[e]	11,599	11,569	8	22	27	67	51	16	21
1976	25,059	12,006	2,972	7,522	654	93	424	341	NA[e]	12,923	12,890	10	23	30	77	61	16	24
1977	27,655	13,133	3,188	8,275	675	133	503	359	NA[e]	14,369	14,328	14	27	37	90	73	17	26
1978	31,047	14,353	3,676	8,756	753	224	542	403	NA[e]	16,505	16,460	15	30	48	109	87	22	32
1979	35,460	16,053	3,944	9,888	810	325	603	483	NA[e]	19,195	19,145	15	35	53	126	99	27	34
1980	40,701	17,516	4,072	10,957	882	361	719	525	NA[e]	22,949	22,891	18	40	64	135	105	30	37
1981	46,060	19,973	4,530	12,791	950	375	778	549	NA[e]	25,824	25,756	23	45	77	144	110	34	42
1982	51,714	22,128	5,178	14,215	989	402	745	599	NA[e]	29,295	29,219	26	50	86	158	120	38	46
1983	57,560	24,622	6,106	15,522	1,054	393	832	715	NA[e]	32,626	32,542	29	55	95	172	130	42	46
1984	66,284	28,108	7,078	17,640	1,056	423	987	925	NA[e]	37,832	37,731	36	65	105	188	143	46	51
1985	74,444	32,187	8,011	20,258	1,102	472	1,244	1,100	NA[e]	41,878	41,762	41	75	117	208	159	49	55
1986	75,796	33,891	8,275	21,517	1,145	513	1,503	938	NA[e]	41,488	41,354	49	85	132	222	171	51	64
1987	79,809	36,524	8,176	24,122	1,230	556	1,669	771	NA[e]	42,813	42,667	55	91	150	251	193	58	71
1988	84,614	37,277	8,864	23,719	1,414	691	1,761	407	420	46,798	46,634	64	100	172	287	219	68	80
1989	87,767	35,289	9,355	21,049	1,423	742	1,781	507	430	51,862	51,676	74	112	199	327	248	79	90
1990	94,118	33,820	9,700	18,966	1,438	871	1,735	619	490	59,617	59,410	82	125	221	362	275	87	97
1991[f]	95,193	31,207	8,778	17,256	1,383	998	1,537	722	533	63,251	63,030	85	136	238	394	301	93	103
1992	99,894	31,506	9,098	17,181	1,373	1,045	1,452	758	599	67,620	67,388	89	143	244	420	322	98	103
1993	99,746	30,021	9,071	16,083	1,039	1,092	1,374	787	574	68,917	68,674	96	147	254	446	340	105	109
1994	103,005	30,219	8,877	16,209	1,196	1,171	1,380	814	574	71,934	71,681	101	153	271	469	357	111	111
1995	113,445	32,773	9,539	17,824	1,209	1,201	1,645	754	600	79,791	79,518	107	166	287	477	364	114	118
1996 prelim.	120,281	32,239	9,297	17,624	1,209	1,204	1,645	745	516	87,126	86,834	113	179	298	495	378	118	122
1997 prelim.	128,323	31,448	8,681	17,507	1,209	1,274	1,645	682	451	95,917	95,604	120	193	312	520	397	123	127

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Because of limitations in the survey information, data on nonfederal government funding to other performers are not available, and are consequently included in other sectors' support for their own R&D performance. For example, nonfederal government support to nonprofits is included in nonprofits' support for their own R&D (data column 16).

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]For 1953-63, development expenditures by industry FFRDCs were not separated out from total federal support to the industrial sector for applied research. Thus, the figure for federal support to industry for applied research includes support for applied research at industry FFRDCs for those years. The same is true for applied research by nonprofit FFRDCs in 1953-87, which is included in federal support for applied research at nonprofit institutions for those years.

[f]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figure 4-8.

Appendix table 4-18.
U.S. development expenditures, by source of funds and performer: 1970-97
(Millions of constant 1992 dollars)

Funding sector:	Total U.S.	Federal Government								Industry				U&Cs	Nonprofit			Nonfed. govt.[a]
Performing sector:	Total U.S.	Total	Federal Govt.	Industry	Industry FFRDCs	U&Cs	U&C FFRDCs[b]	Non-profit	Nonprofit FFRDCs	Total	Industry[c]	U&Cs	Non-profit	U&Cs	Total	Non-profit	U&Cs	U&Cs[a]
Calendar year[d]																		
1970	55,383	30,704	7,387	20,391	1,112	274	820	720	NA[e]	24,504	24,429	16	59	23	131	98	33	21
1971	54,118	29,733	7,692	19,186	1,216	236	798	604	NA[e]	24,206	24,133	14	59	25	131	103	29	23
1972	55,906	30,248	7,877	19,496	1,200	175	864	636	NA[e]	25,463	25,396	10	57	35	128	104	24	32
1973	57,080	29,144	7,512	18,716	1,128	199	833	756	NA[e]	27,695	27,626	13	57	52	141	107	33	47
1974	55,773	27,235	7,178	17,009	1,243	189	802	814	NA[e]	28,280	28,209	16	55	61	147	109	38	51
1975	53,820	26,036	6,854	16,089	1,269	190	851	783	NA[e]	27,511	27,441	18	52	64	159	121	38	51
1976	56,166	26,908	6,661	16,859	1,466	209	949	764	NA[e]	28,965	28,890	23	52	67	173	137	36	53
1977	58,268	27,670	6,717	17,435	1,422	279	1,060	756	NA[e]	30,275	30,188	30	57	78	190	154	36	55
1978	60,968	28,186	7,219	17,195	1,479	440	1,064	790	NA[e]	32,411	32,323	29	59	94	215	171	44	62
1979	64,165	29,047	7,136	17,892	1,466	588	1,092	873	NA[e]	34,733	34,643	27	63	97	228	179	48	61
1980	67,408	29,009	6,745	18,147	1,461	597	1,190	869	NA[e]	38,008	37,912	30	66	106	224	174	50	61
1981	69,734	30,239	6,859	19,365	1,438	568	1,178	831	NA[e]	39,097	38,994	34	68	117	217	167	51	64
1982	73,657	31,517	7,375	20,247	1,409	573	1,061	853	NA[e]	41,726	41,617	37	71	123	225	171	54	66
1983	78,644	33,641	8,342	21,208	1,440	538	1,136	977	NA[e]	44,577	44,462	40	75	129	235	178	57	62
1984	87,276	37,010	9,320	23,226	1,390	557	1,299	1,218	NA[e]	49,813	49,680	47	86	138	248	188	60	67
1985	94,767	40,973	10,197	25,788	1,403	601	1,583	1,400	NA[e]	53,311	53,163	53	95	149	264	202	62	70
1986	94,051	42,054	10,268	26,699	1,421	637	1,865	1,163	NA[e]	51,480	51,314	61	105	163	275	212	63	79
1987	96,081	43,971	9,842	29,040	1,481	669	2,010	928	NA[e]	51,542	51,366	66	110	181	302	232	70	85
1988	98,270	43,293	10,295	27,547	1,642	802	2,046	473	488	54,351	54,160	74	116	200	333	254	79	93
1989	97,819	39,330	10,427	23,460	1,586	827	1,985	565	480	57,802	57,594	82	125	222	365	277	88	100
1990	100,512	36,117	10,359	20,254	1,536	931	1,853	661	523	63,667	63,446	88	133	236	387	294	93	104
1991[f]	97,814	32,066	9,019	17,731	1,421	1,025	1,579	742	547	64,993	64,765	88	140	245	404	309	96	106
1992	99,894	31,506	9,098	17,181	1,373	1,045	1,452	758	599	67,620	67,388	89	143	244	420	322	98	103
1993	97,203	29,255	8,840	15,673	1,013	1,064	1,339	767	560	67,160	66,923	93	144	248	434	332	102	106
1994	98,139	28,792	8,458	15,443	1,140	1,115	1,315	775	546	68,536	68,295	96	146	258	446	341	106	106
1995	105,466	30,468	8,868	16,570	1,124	1,117	1,529	701	558	74,179	73,926	99	154	266	444	338	106	109
1996 prelim.	109,326	29,303	8,450	16,018	1,099	1,094	1,495	677	469	79,191	78,925	103	163	271	450	343	107	111
1997 prelim.	113,651	27,852	7,688	15,505	1,071	1,128	1,457	604	400	84,950	84,673	106	171	276	460	351	109	113

FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: Data are based on annual reports by performers except for the nonprofit sector; R&D expenditures by nonprofit sector performers have been estimated since 1973 on the basis of a survey conducted in that year. The next updates of these data, covering the years 1953-98, along with technical notes explaining methodological issues of measurement, will be provided in National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming). Data are preliminary for 1996 and 1997.

[a]Because of limitations in the survey information, data on nonfederal government funding to other performers are not available, and are consequently included in other sectors' support for their own R&D performance. For example, nonfederal government support to nonprofits is included in nonprofits' support for their own R&D (data column 16).

[b]Includes R&D expenditures of FFRDCs administered by academic institutions. In 1994, 99 percent of total funds used were from federal sources.

[c]Industry sources of industry R&D expenditures include all nonfederal sources of industry R&D expenditures.

[d]Expenditure levels for academic and Federal Government performers are also in reference to calendar years, which represents a change from previous reporting in *National Patterns of R&D Resources*. These levels are approximations based on fiscal year data. For 1977 and later years, the calendar year approximation is equal to 75 percent of the amount reported in the same fiscal year plus 25 percent of the amount reported in the subsequent fiscal year. For years prior to 1977, the respective percentages are 50 and 50, since earlier fiscal years began on July 1 instead of October 1.

[e]For 1953-63, development expenditures by industry FFRDCs were not separated out from total federal support to the industrial sector for applied research. Thus, the figure for federal support to industry for applied research includes support for applied research at industry FFRDCs for those years. The same is true for applied research by nonprofit FFRDCs in 1953-87, which is included in federal support for applied research at nonprofit institutions for those years.

[f]Due to revisions in survey methodology and sampling of industrial R&D, data for 1991 and subsequent years may not be comparable to data for previous years. See NSF/SRS, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; or NSF/SRS, *National Patterns of R&D Resources: 1998* (Arlington, VA: forthcoming).

SOURCE: NSF/SRS, *National Patterns of R&D Resources* (Arlington, VA: biennial series).

See figure 4-7.

Appendix table 4-19.
Manufacturing and nonmanufacturing R&D expenditures: 1970-95

	All industries			All manufacturing industries			All nonmanufacturing industries		
	Total	Company	Federal	Total	Company	Federal	Total	Company	Federal
				Millions of current dollars					
1970	18,067	10,288	7,779	17,362	10,063	7,299	705	225	480
1971	18,320	10,654	7,666	17,616	10,402	7,214	704	252	452
1972	19,552	11,535	8,017	18,845	11,258	7,587	707	277	430
1973	21,249	13,104	8,145	20,534	12,805	7,729	715	299	416
1974	22,887	14,667	8,220	22,119	14,362	7,757	768	305	463
1975	24,187	15,582	8,605	23,452	15,157	8,295	735	425	310
1976	26,997	17,436	9,561	26,152	16,965	9,187	845	471	374
1977	29,825	19,340	10,485	28,867	18,799	10,068	958	541	417
1978	33,304	22,115	11,189	32,075	21,413	10,662	1,229	702	527
1979	38,226	25,708	12,518	36,686	24,849	11,837	1,540	859	681
1980	44,505	30,476	14,029	42,690	29,439	13,251	1,815	1,037	778
1981	51,810	35,428	16,382	49,904	34,380	15,524	1,906	1,048	858
1982	58,650	40,105	18,545	56,178	38,633	17,545	2,472	1,472	1,000
1983	65,268	44,588	20,680	61,931	42,504	19,427	3,337	2,084	1,253
1984	74,800	51,404	23,396	69,895	48,152	21,743	4,905	3,252	1,653
1985	84,239	57,403	27,196	77,525	52,642	24,883	6,714	4,401	2,313
1986	87,823	59,932	27,891	80,377	55,192	25,185	7,446	4,740	2,706
1987	92,155	61,403	30,752	84,311	56,259	28,052	7,844	5,144	2,700
1988	97,015	66,672	30,343	86,503	59,415	27,088	10,513	7,257	3,256
1989	102,055	73,501	28,554	88,024	63,199	24,826	14,031	10,302	3,729
1990	109,727	81,602	28,125	88,934	65,251	23,683	20,793	16,351	4,442
1991	116,952	90,580	26,372	88,506	67,639	20,867	28,446	22,941	5,505
1992	119,110	94,388	24,722	90,177	71,025	19,152	28,933	23,363	5,570
1993	117,400	94,591	22,809	86,569	69,901	16,669	30,831	24,690	6,140
1994	119,595	97,131	22,463	90,749	73,375	17,373	28,846	23,756	5,090
1995	132,103	108,652	23,451	100,067	81,236	18,831	32,036	27,415	4,620
				Millions of constant 1992 dollars[a]					
1970	59,116	33,663	25,453	56,809	32,927	23,883	2,307	736	1,571
1971	56,995	33,146	23,850	54,805	32,362	22,443	2,190	784	1,406
1972	58,349	34,424	23,925	56,239	33,597	22,642	2,110	827	1,283
1973	60,066	37,042	23,024	58,045	36,197	21,848	2,021	845	1,176
1974	59,405	38,069	21,336	57,412	37,278	20,134	1,993	792	1,202
1975	57,370	36,959	20,410	55,626	35,951	19,675	1,743	1,008	735
1976	60,508	39,079	21,429	58,614	38,024	20,591	1,894	1,056	838
1977	62,840	40,748	22,091	60,821	39,609	21,213	2,018	1,140	879
1978	65,401	43,428	21,972	62,987	42,050	20,937	2,413	1,379	1,035
1979	69,170	46,519	22,651	66,383	44,964	21,419	2,787	1,554	1,232
1980	73,708	50,474	23,235	70,702	48,756	21,946	3,006	1,717	1,289
1981	78,439	53,637	24,802	75,554	52,051	23,503	2,886	1,587	1,299
1982	83,536	57,122	26,414	80,015	55,026	24,990	3,521	2,097	1,424
1983	89,175	60,920	28,255	84,616	58,073	26,543	4,559	2,847	1,712
1984	98,488	67,683	30,805	92,030	63,401	28,629	6,458	4,282	2,176
1985	107,236	73,074	34,620	98,689	67,013	31,676	8,547	5,602	2,944
1986	108,975	74,367	34,609	99,736	68,485	31,251	9,239	5,882	3,358
1987	110,945	73,923	37,022	101,501	67,730	33,772	9,443	6,193	3,251
1988	112,672	77,432	35,240	100,463	69,004	31,460	12,210	8,428	3,781
1989	113,743	81,919	31,824	98,105	70,437	27,669	15,638	11,482	4,156
1990	117,181	87,145	30,036	94,975	69,684	25,292	22,205	17,462	4,744
1991	120,171	93,073	27,098	90,942	69,501	21,441	29,229	23,573	5,657
1992	119,110	94,388	24,722	90,177	71,025	19,152	28,933	23,363	5,570
1993	114,407	92,180	22,228	84,362	68,119	16,244	30,045	24,061	5,983
1994	113,946	92,543	21,402	86,462	69,909	16,552	27,483	22,634	4,850
1995	122,812	101,011	21,802	93,029	75,523	17,507	29,783	25,487	4,295

NOTES: As a result of a new sample design, statistics for 1988-91 have been revised. These statistics now better reflect R&D performance among firms in nonmanufacturing industries and small firms in all industries.

[a]See appendix table 4-1 for GDP implicit price deflators used to convert current dollars to constant 1992 dollars.

SOURCE: National Science Foundation, Science Resources Studies Division, *Research and Development in Industry: 1995* (Arlington, VA: 1998, forthcoming).

Appendix table 4-20.
Total expenditures for industrial R&D (financed by company, federal, and other funds), by industry and size of company: 1985-95
(Millions of current dollars)

Industry and size of company	SIC code	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total		84,239	87,823	92,155	97,015	102,055	109,727	116,952	119,110	117,400	119,595	132,103
Manufacturing		77,525	80,377	84,311	86,503	88,024	88,934	88,506	90,177	86,569	90,749	100,067
Food, kindred, and tobacco products	20,21	D	D	1,206	D	D	D	1,277	1,386	1,345	1,476	1,566
Textiles and apparel	22,23	D	D	D	D	D	D	D	D	D	D	D
Lumber, wood products, and furniture	24,25	147	144	137	D	192	216	D	D	D	D	D
Paper and allied products	26	D	D	D	D	879	1,059	D	D	D	D	D
Chemicals and allied products	28	8,540	8,843	9,635	11,067	12,069	13,291	14,648	15,381	D	D	17,547
Industrial chemicals	281-82,286	3,498	3,552	3,716	4,172	4,451	5,010	5,390	5,165	D	D	D
Drugs and medicines	283	D	3,658	D	4,906	D	D	D	7,944	9,146	9,633	10,215
Other chemicals	284-85,287-89	D	1,633	D	1,989	D	D	D	2,272	D	D	D
Petroleum refining and extraction	13,29	D	D	1,897	1,997	2,180	2,306	2,498	2,277	2,152	1,950	1,760
Rubber products	30	D	D	D	D	D	D	D	D	D	D	D
Stone, clay, and glass products	32	D	950	995	D	D	D	D	D	538	591	448
Primary metals	33	D	D	730	637	686	739	714	522	669	690	593
Ferrous metals and products	331-32,3398-99	D	D	D	253	D	D	D	D	289	D	D
Nonferrous metals and products	333-36	416	458	D	384	D	D	D	D	380	D	D
Fabricated metal products	34	829	895	783	881	904	939	974	1,017	1,158	1,111	1,023
Machinery	35	12,216	D	D	D	D	14,446	14,775	14,938	8,381	8,110	D
Office, computing, and accounting machines	357	D	D	D	D	D	D	D	D	4,950	4,106	D
Other machinery, except electrical	351-56,358-59	D	2,396	2,428	2,682	2,729	D	D	D	3,431	4,004	5,041
Electrical equipment	36	14,432	14,980	15,848	14,128	13,318	13,400	13,415	13,360	13,349	15,338	18,751
Radio and TV receiving equipment	365	D	133	139	149	96	114	D	D	D	D	D
Communication equipment	366	9,397	9,669	10,184	8,427	7,071	5,928	4,787	D	D	D	D
Electronic components	367	3,385	D	4,286	4,133	4,025	3,914	D	3,567	5,311	6,032	D
Other electrical equipment	361-64,369	D	D	1,239	1,419	2,126	3,444	D	D	D	D	D
Transportation equipment	37	D	31,275	34,246	34,775	33,859	31,361	27,428	27,494	27,258	28,087	32,441
Motor vehicles and motor vehicles equipment	371	6,984	D	D	D	D	D	D	D	11,718	D	D
Other transportation equipment	373-75,379	D	D	D	D	D	D	D	D	483	D	D
Aircraft and missiles	372,376	22,231	21,050	24,458	24,168	22,331	20,635	16,629	17,158	15,056	14,260	16,951
Professional and scientific instruments	38	5,013	5,103	5,222	5,530	5,992	7,055	8,705	9,542	10,119	11,441	11,976
Scientific and mechanical measuring instruments	381-82	D	D	D	1,959	2,366	3,346	D	5,156	5,681	6,952	7,146
Optical, surgical, photographic, and other instruments	384-87	D	D	D	3,571	3,626	3,709	D	4,386	4,438	4,489	4,831
Other manufacturing industries	27,31,39	D	382	D	D	D	D	D	D	D	D	D
Nonmanufacturing		6,714	7,446	7,844	10,513	14,031	20,793	28,446	28,933	30,831	28,846	32,036

Appendix table 4-20.
Total expenditures for industrial R&D (financed by company, federal, and other funds), by industry and size of company: 1985-95
(Millions of current dollars)

Industry and size of company	SIC code	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Size												
Fewer than 500 employees		5,866	7,071	7,163	S	7,809	S	13,172	13,557	14,620	13,966	16,662
500 to 999		1,648	1,902	1,725	1,669	1,825	2,154	8,000	7,958	3,230	3,608	4,693
1,000 to 4,999		6,240	7,472	7,262	7,622	7,881	8,411	10,453	11,886	13,334	14,617	16,960
5,000 to 9,999		4,022	4,251	4,501	5,245	5,756	6,746	8,049	8,258	9,135	8,912	9,532
10,000 to 24,999		11,109	10,493	12,043	11,506	10,450	12,486	15,770	15,744	15,421	15,972	17,071
25,000 or more		55,354	56,991	59,461	63,694	68,335	71,030	61,508	61,707	61,659	62,519	67,185

D = data have been withheld to avoid disclosing operations of individual companies; S = imputation of more than 50 percent (for years prior to 1993, data have been withheld); SIC = Standard Industrial Classification

NOTES: As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. As a result of the new sample design, data for 1991 and later years are not directly comparable with data for 1990 and earlier years.

SOURCE: National Science Foundation, Science Resources Studies Division, *Research and Development in Industry: 1995* (Arlington, VA: 1998, forthcoming).

Appendix table 4-21.
Company and other (except federal) funds for industrial R&D performance, by industry and size of company: 1985-95
(Millions of current dollars)

Industry and size of company	SIC code	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total		57,043	59,932	61,403	66,672	73,501	81,602	90,580	94,388	94,591	97,131	108,652
Manufacturing		52,642	55,192	56,259	59,415	63,199	65,251	67,639	71,025	69,901	73,375	81,236
Food, kindred, and tobacco products	20,21	1,136	1,280	1,204	1,173	1,244	1,248	1,277	1,386	1,345	1,476	1,566
Textiles and apparel	22,23	218	246	243	215	S	260	236	261	286	316	381
Lumber, wood products, and furniture	24,25	147	144	137	165	192	216	200	234	196	201	229
Paper and allied products	26	576	538	604	752	879	1,059	1,174	1,182	1,191	1,263	1,404
Chemicals and allied products	28	8,310	8,664	9,445	10,828	11,943	13,168	14,439	15,091	16,658	16,559	17,337
Industrial chemicals	281-82,286	3,281	3,374	3,531	3,939	4,340	4,902	5,225	4,911	5,165	4,780	5,139
Drugs and medicines	283	3,481	3,657	4,095	4,900	5,512	5,917	6,947	7,934	9,132	9,625	10,202
Other chemicals	284-85,287-89	1,548	1,633	1,819	1,989	2,091	2,349	2,267	2,246	2,361	2,154	1,996
Petroleum refining and extraction	13,29	2,194	1,971	1,883	1,975	2,162	2,289	2,487	2,268	2,138	1,939	1,754
Rubber products	30	659	655	596	718	867	1,056	D	1,256	1,059	1,432	1,210
Stone, clay, and glass products	32	825	941	985	697	615	538	455	479	529	553	441
Primary metals	33	730	786	711	620	666	717	706	514	646	672	580
Ferrous metals and products	331-32,3398-99	323	336	249	252	244	231	225	221	272	241	217
Nonferrous metals and products	333-36	407	450	462	368	422	486	481	293	374	431	363
Fabricated metal products	34	780	800	633	718	726	736	748	723	936	868	937
Machinery	35	10,721	10,701	10,577	11,929	13,342	13,575	13,720	13,903	8,295	8,011	9,676
Office, computing, and accounting machines	357	8,418	8,380	8,193	9,347	10,725	10,988	10,419	10,614	4,917	4,078	4,699
Other machinery, except electrical	351-56,358-59	2,303	2,321	2,384	2,582	2,618	2,587	3,301	3,289	3,378	3,933	4,976
Electrical equipment	36	9,271	9,767	10,449	9,975	9,575	9,267	8,865	9,516	11,682	13,537	17,060
Radio and TV receiving equipment	365	350	133	139	149	96	114	D	93	87	64	114
Communication equipment	366	5,174	5,117	5,455	4,798	4,159	3,584	S	3,381	3,954	4,939	3,845
Electronic components	367	2,826	3,357	3,630	3,684	3,655	3,496	3,177	3,320	5,105	5,870	9,628
Other electrical equipment	361-64,369	921	1,160	1,225	1,345	1,664	2,073	D	2,722	2,537	2,664	3,473
Transportation equipment	37	12,092	13,567	13,462	13,910	14,596	14,264	14,858	16,292	16,640	17,695	19,311
Motor vehicles and motor vehicles equipment	371	6,164	7,171	7,167	7,783	8,756	8,594	9,063	9,132	10,659	11,950	13,590
Other transportation equipment	373-75,379	279	330	356	361	337	283	262	289	297	279	232
Aircraft and missiles	372,376	5,649	6,066	5,939	5,766	5,503	5,387	5,533	6,871	5,684	5,466	5,489
Professional and scientific instruments	38	4,622	4,752	4,950	5,339	5,729	6,318	6,840	7,321	7,542	8,058	8,516
Scientific and mechanical measuring instruments	381-82	1,596	1,521	1,598	1,863	2,205	2,696	3,017	3,013	3,196	3,687	3,787
Optical, surgical, photographic, and other instruments	384-87	3,026	3,231	3,352	3,476	3,524	3,621	3,823	4,308	4,346	4,371	4,729
Other manufacturing industries	27,31,39	361	380	380	401	438	541	D	599	758	796	835
Nonmanufacturing		4,401	4,740	5,144	7,257	10,302	16,351	22,941	23,363	24,690	23,756	27,415

Appendix table 4-21.
Company and other (except federal) funds for industrial R&D performance, by industry and size of company: 1985-95
(Millions of current dollars)

Industry and size of company	SIC code	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Size												
Fewer than 500 employees		5,127	6,203	6,200	S	S	S	11,285	11,532	13,006	12,802	14,684
500 to 999		1,531	1,765	1,610	1,748	1,934	2,144	7,819	7,807	3,048	3,426	4,468
1,000 to 4,999		5,249	6,243	6,281	6,820	7,546	8,363	9,403	10,865	12,219	13,533	16,162
5,000 to 9,999		3,350	3,455	3,753	4,075	4,509	4,997	7,233	7,495	8,371	8,087	9,289
10,000 to 24,999		8,366	8,489	9,681	10,512	11,631	12,890	12,397	12,328	12,606	13,625	15,125
25,000 or more		33,420	33,777	33,878	36,785	40,703	45,106	42,443	44,361	45,340	45,658	48,924

D = data have been withheld to avoid disclosing operations of individual companies; S = imputation of more than 50 percent (for years prior to 1993, data have been withheld); SIC = Standard Industrial Classification

NOTES: Company funds include funds for industrial R&D work performed within company facilities from all sources except the Federal Government. The funds may be the companies' own or from outside organizations such as research institutions, universities and colleges, nonprofit organizations, other companies, and state governments. Company-financed R&D not performed within the company is excluded. As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. As a result of the new sample design, data for 1991 and later years are not directly comparable with data for 1990 and earlier years.

SOURCE: National Science Foundation, Science Resources Studies Division, *Research and Development in Industry: 1995* (Arlington, VA: 1998, forthcoming).

See text table 4-3.

Appendix table 4-22.
Federal funds for industrial R&D performance, by industry and size of company: 1985-95
(Millions of current dollars)

Industry and size of company	SIC code	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
Total		27,196	27,891	30,752	30,343	28,554	28,125	26,372	24,722	22,809	22,463	23,451	
Manufacturing		24,883	25,185	28,052	27,088	24,826	23,683	20,867	19,152	16,669	17,373	18,831	
Food, kindred, and tobacco products	20,21	D	D	2	D	D	D	0	0	0	0	0	
Textiles and apparel	22,23	D	D	D	D	D	D	S	D	D	D	D	
Lumber, wood products, and furniture	24,25	0	0	0	D	0	0	D	D	D	D	D	
Paper and allied products	26	D	D	D	D	0	0	D	D	D	D	D	
Chemicals and allied products	28	230	179	190	238	126	123	209	S	D	D	210	S
Industrial chemicals	281-82,286	217	178	185	232	111	109	165	S	D	D	D	
Drugs and medicines	283	D	1	D	6	D	D	D	S	15	8	14	
Other chemicals	284-85,287-89	D	0	D	0	D	D	D	S	D	D	D	
Petroleum refining and extraction	13,29	D	D	14	22	S	S	11	9	14	10	6	
Rubber products	30	D	D	D	D	D	D	D	D	D	D	D	
Stone, clay, and glass products	32	D	9	10	D	D	D	D	D	9	38	6	
Primary metals	33	D	D	19	17	22	D	8	S	23	17	13	
Ferrous metals and products	331-32,3398-99	D	D	D	1	D	D	1	D	17	D	D	
Nonferrous metals and products	333-36	9	8	D	16	D	D	7	D	6	D	D	
Fabricated metal products	34	49	95	150	163	178	203	226	294	222	243	86	
Machinery	35	1,495	D	D	D	D	871	1,055	1,035	86	99	D	
Office, computing, and accounting machines	357	D	D	D	D	D	D	D	D	33	28	D	
Other machinery, except electrical	351-56,358-59	D	75	44	101	112	D	D	D	53	71	64	
Electrical equipment	36	5,161	5,213	5,399	4,153	3,743	4,133	4,550	3,844	1,667	1,801	1,690	
Radio and TV receiving equipment	365	D	0	0	0	0	0	0	D	D	D	D	
Communication equipment	366	4,223	4,552	4,729	3,630	2,911	2,344	D	D	D	D	D	
Electronic components	367	559	D	656	449	369	418	D	247	206	162	D	
Other electrical equipment	361-64,369	D	D	14	74	463	1,371	D	D	D	D	D	
Transportation equipment	36	D	17,708	20,784	20,865	19,262	17,097	12,570	11,202	10,617	10,392	13,130	
Motor vehicles and motor vehicles equipment	371	820	D	D	D	D	D	D	D	D	D	D	
Other transportation equipment	373-75,379	D	D	D	D	D	D	D	D	D	D	D	
Aircraft and missiles	372-376	16,582	14,984	18,519	18,402	16,828	15,248	11,096	S	9,372	8,794	11,462	
Professional and scientific instruments	38	391	351	272	191	263	737	1,865	2,221	2,577	3,384	3,460	S
Scientific and mechanical measuring instruments	381-82	D	D	D	S	S	S	D	2,143	2,484	3,266	3,358	S
Optical, surgical, photographic, and other instruments	384-87	D	D	D	95	101	87	D	78	92	118	102	
Other manufacturing industries	27,31,39	D	2	D	D	D	D	D	61	D	D	D	
Nonmanufacturing industries		2,313	2,706	2,700	3,256	3,729	4,442	5,505	5,570	6,140	5,090	4,620	

Appendix table 4-22.
Federal funds for industrial R&D performance, by industry and size of company: 1985-95
(Millions of current dollars)

Industry and size of company	SIC Code	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
Size													
Fewer than 500 employees		739	868	963	816	901	895	1,887	2,025	1,614	1,164	1,978	
500 to 999		117	137	115	131	117	S	181	151	182	182	225	
1,000 to 4,999		991	1,229	981	1,093	958	881	1,050	S	1,115	1,083	798	
5,000 to 9,999		672	796	748	864	740	257	816	763	764	825	243	
10,000 to 24,999		2,743	2,004	2,362	1,705	1,129	1,526	3,373	3,416	2,816	2,348	1,946	S
25,000 or more		21,934	23,213	25,583	25,734	24,709	24,436	19,065	17,346	16,319	16,862	18,261	

D = data have been withheld to avoid disclosing operations of individual companies; S = imputation of more than 50 percent (for years prior to 1993, data have been withheld);
SIC = Standard Industrial Classification

NOTE: As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries.

SOURCE: National Science Foundation, Science Resources Studies Division, *Research and Development in Industry: 1995* (Arlington, VA: 1998, forthcoming).

Appendix table 4-23.
The 100 leading industrial R&D companies, ranked by size of R&D expenditures in 1996

1996 rank	1986 rank	Company	R&D expenditures (millions)	R&D/net sales (%)
1	1	General Motors	8,900.0	5.6
2	3	Ford Motor	6,821.0	4.6
3	2	IBM	3,934.0	5.2
4	9	Hewlett-Packard	2,718.0	7.1
5	20	Motorola	2,394.0	8.6
6	4	Lucent Technologies[a]	2,056.0	13.0
7	66	TRW[a]	1,981.0	20.1
8	18	Johnson & Johnson	1,905.0	8.8
9	46	Intel	1,808.0	8.7
10	31	Pfizer	1,684.0	14.9
11	12	Chrysler	1,600.0	2.7
12	22	Merck	1,487.3	7.5
13	–	Microsoft	1,432.0	16.5
14	47	American Home Products	1,429.1	10.1
15	5	General Electric	1,421.0	1.8
16	35/63	Bristol Myers Squibb	1,276.0	8.5
17	33	Pharmacia & Upjohn	1,266.0	17.4
18	23	Procter & Gamble	1,221.0	3.5
19	38	Abbott Laboratories	1,204.8	10.9
20	11	Boeing	1,200.0	5.3
21	26	Lilly	1,189.5	16.2
22	26	Texas Instruments	1,181.0	11.9
23	8	United Technologies	1,122.0	4.8
24	10	Digital Equipment	1,062.3	7.3
25	13	Xerox	1,044.0	6.0
26	6	Dupont	1,032.0	2.7
27	7	Eastman Kodak	1,028.0	6.4
28	16	3M	947.0	6.7
29	–	Rhone-Poulenc	882.1	16.3
30	21/51	Lockheed Martin	784.0	2.9
31	15	Dow Chemical	761.0	3.8
32	17	Monsanto	728.0	7.9
33	53	Schering-Plough	722.8	12.8
34	28	Rockwell International	691.0	6.7
35	–	Sun Microsystems, Inc.	657.1	9.3
36	4	AT&T[a]	640.0	1.2
37	75	Apple Computer	604.0	6.1
38	58	Warner-Lambert	554.8	7.7
39	54	ITT Industries	535.2	6.1
40	–	Amgen	528.3	23.6
41	14	Exxon	520.0	0.4
42	–	Seagate Technology	519.1	6.0
43	78	Philip Morris	515.0	0.9
44	–	Applied Materials	481.4	11.6
45	32	NCR	444.0	6.4
46	–	Genentech	434.1	51.3
47	61	Caterpillar	410.0	2.5
48	–	Compaq Computer	407.0	2.2
49	60	Advanced Micro Devices	400.7	20.5
50	–	Cisco Systems	399.3	9.7
51	67	Emerson Electric	398.7	3.6
52	37	Goodyear Tire & Rubber	374.5	2.9
53	–	Chiron	371.1	30.7
54	49	Deere	370.3	3.3

Appendix table 4-23.
The 100 leading industrial R&D companies, ranked by size of R&D expenditures in 1996

1996 rank	1986 rank	Company	R&D expenditure (millions)	R&D/net sales (%)
55	19	McDonnell Douglas	355.0	2.6
56	–	Silicon Graphics	353.5	12.1
57	42	Honeywell	353.3	4.8
58	99	Tandem Computers	345.4	18.2
59	24	AlliedSignal	345.0	2.5
60	25	Unisys	342.9	5.4
61	56	Baxter International	340.0	6.3
62	41	Raytheon	323.3	2.6
63	62	AMP	315.1	5.8
64	–	Novell	275.6	20.0
65	45	Mobil	275.0	0.4
66	73	Eaton	267.0	3.8
67	29	Northrop Grumman	255.0	3.2
68	–	Bay Networks	253.2	12.3
69	–	Automatic Data Processing	249.6	7.0
70	55	PPG Industries	239.1	3.3
71	–	Cummins Engine	235.0	4.5
72	–	Boston Scientific	212.3	14.5
73	–	Genzyme	211.5	40.8
74	–	DSC Communications	210.1	15.2
75	82	Ingersoll-Rand	209.3	3.1
76	–	General Instrument	209.3	7.8
77	83	Kimberly-Clark	207.9	1.6
78	–	Gillette	204.0	2.1
79	–	LSI Logic	200.5	16.2
80	–	Whirlpool	197.0	2.3
81	–	Case	193.0	3.6
82	–	Micron Technology	191.9	5.3
83	86	Corning	191.3	5.2
84	–	RJR Nabisco	191.0	1.1
85	69	FMC	189.4	3.8
86	74	Rohm & Haas	187.0	4.7
87	84	Textron	185.0	2.0
88	–	Eastman Chemical	184.0	3.8
89	48	Chevron	182.0	0.5
90	–	Tellabs	181.9	20.9
91	–	Analog Devices	177.8	14.9
92	–	Storage Technology	176.4	8.7
93	–	Lam Research	173.0	13.6
94	44	Shell Oil	173.0	0.6
95	–	Sybase	172.0	17.0
96	52	Amoco	171.0	0.5
97	72	Alcoa	165.5	1.3
98	–	Johnson Controls	165.0	1.6
99	–	Dana	164.0	2.1
100	64	NYNEX	163.1	1.2

– = company unranked in 1986; X/X = 1986 ranking of each company before merger

[a]Lucent Technologies was split off from ATT in 1996. TRW restated its R&D expenses reported to the Securities and Exchange Commission in 1996 to include *all* "sponsor-supported" R&D, which means that federal R&D funds are now included in the company's total.

SOURCE: Technical Insights, *Inside R&D*, weekly newsletter (Englewood, NJ: John Wiley & Sons, Inc.).

Appendix table 4-24.
Concentration of total, federal, company, and other R&D funds and net sales of R&D-performing companies, by size of R&D program: 1985-95

Companies ranked by size of R&D program	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Percent of total (company, federal, and other) R&D funds											
First 4 (1-4)	18	19	19	18	19	18	16	15	17	15	16
Next 4 (5-8)	12	11	12	12	13	13	8	8	7	8	8
Next 12 (9-20)	17	14	16	17	16	15	12	13	13	14	13
Next 20 (21-40)	13	13	12	12	12	12	11	11	12	13	12
Next 60 (41-100)	16	15	14	15	15	16	15	15	16	15	14
Next 100 (101-200)	9	10	8	8	8	9	12	12	8	9	8
Next 200 (201-400)	5	8	6	7	6	7	6	6	7	7	7
Percent of federal R&D funds											
First 4 (1-4)	29	30	31	31	36	38	14	11	23	26	35
Next 4 (5-8)	15	16	18	18	15	16	21	18	17	19	19
Next 12 (9-20)	27	28	27	27	30	26	21	27	32	32	27
Next 20 (21-40)	16	15	15	15	11	12	15	13	16	13	8
Next 60 (41-100)	7	7	7	6	6	6	13	11	5	7	5
Next 100 (101-200)	2	2	1	3	1	1	3	4	5	2	3
Next 200 (201-400)	0	1	0	0	0	0	2	2	2	1	3
Percent of company and other (except federal) R&D funds											
First 4 (1-4)	23	20	20	21	22	21	17	17	17	16	16
Next 4 (5-8)	7	7	7	7	7	7	7	8	7	7	7
Next 12 (9-20)	12	12	12	12	13	12	10	12	12	12	11
Next 20 (21-40)	12	10	11	12	12	13	10	11	11	11	11
Next 60 (41-100)	18	16	16	16	16	17	16	17	14	14	14
Next 100 (101-200)	10	10	10	10	10	10	15	14	9	9	9
Next 200 (201-400)	7	8	8	8	8	8	7	7	8	8	8
Percent of net sales ranked by size of total R&D funds											
First 4 (1-4)	8	8	7	7	6	8	7	8	8	8	8
Next 4 (5-8)	4	5	5	5	5	4	3	3	3	2	2
Next 12 (9-20)	5	5	5	5	5	5	4	4	4	5	6
Next 20 (21-40)	8	7	7	6	5	5	4	4	4	5	4
Next 60 (41-100)	12	10	11	11	12	12	12	12	11	10	9
Next 100 (101-200)	13	10	8	9	8	9	9	9	8	8	8
Next 200 (201-400)	15	9	12	10	11	12	11	11	10	10	10

NOTES: Companies were ranked individually for each year; therefore, particular companies comprising the size groups may have changed from year to year. As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. See the technical notes for more information.

SOURCE: National Science Foundation, Science Resources Studies Division, *Research and Development in Industry: 1995* (Arlington, VA: 1998, forthcoming).

Appendix table 4-25.
Company and other (except federal) R&D funds as a percentage of net sales for industrial R&D performance, by industry and size of company: 1985-95
(Percentages)

Industry and size of company	SIC code	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total		NA	NA	NA	NA	NA	NA	NA	NA	NA	2.7	2.8
Manufacturing		3.0	3.2	3.1	3.1	3.1	3.1	3.2	3.3	3.1	2.9	2.9
Food, kindred, and tobacco products	20,21	0.6	0.6	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Textiles and apparel	22,23	0.5	0.5	0.4	0.4	0.5	0.6	0.6	0.6	0.6	0.6	0.9
Lumber, wood products, and furniture	24,25	0.8	0.6	0.6	0.6	0.6	0.6	0.9	0.9	0.7	0.6	0.7
Paper and allied products	26	0.8	0.7	0.6	0.8	0.8	1.0	1.1	1.0	1.1	1.0	1.0
Chemicals and allied products	28	4.9	5.1	5.2	5.2	5.4	5.3	5.3	5.4	6.0	5.1	4.7
Industrial chemicals	281-82,286	4.2	4.4	4.4	4.2	4.1	4.4	4.4	4.4	4.4	3.3	3.9
Drugs and medicines	283	8.0	8.4	8.7	8.8	8.9	8.8	8.9	9.6	12.5	10.2	10.4
Other chemicals	284-85,287-89	3.1	3.3	3.3	3.4	3.9	3.4	3.0	2.7	2.7	2.5	1.4
Petroleum refining and extraction	13,29	0.9	1.1	1.0	1.0	0.9	0.9	1.0	0.9	0.9	0.8	0.7
Rubber products	30	1.8	1.7	1.6	1.7	1.9	2.1	2.3	2.3	2.1	2.3	1.6
Stone, clay, and glass products	32	2.3	2.4	2.5	2.0	1.8	1.7	1.6	1.6	1.5	1.5	1.5
Primary metals	33	0.9	1.0	0.9	0.7	0.7	0.8	0.8	0.6	0.7	0.6	0.5
Ferrous metals and products	331-32,3398-99	0.5	0.7	0.6	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.3
Nonferrous metals and products	333-36	1.4	1.5	1.3	1.0	1.0	1.2	1.2	0.7	1.2	0.9	0.7
Fabricated metal products	34	1.4	1.4	1.2	1.1	1.2	1.1	1.2	1.1	1.1	1.0	1.1
Machinery	35	6.7	7.3	7.1	6.8	7.3	7.2	7.5	7.3	4.5	3.8	3.6
Office, computing, and accounting machines	357	12.4	12.4	12.3	11.2	13.1	14.4	14.9	13.7	9.8	7.9	8.1
Other machinery, except electrical	351-56,358-59	2.6	2.9	3.0	2.8	2.6	2.3	2.9	2.9	2.5	2.5	2.4
Electrical equipment	36	4.8	5.1	5.4	5.3	5.2	4.5	4.3	4.0	5.4	5.2	5.4
Radio and TV receiving equipment	365	4.3	3.6	3.2	2.4	1.8	1.6	1.0	0.6	4.0	1.0	1.6
Communication equipment	366	5.4	5.2	5.5	6.1	6.8	6.1	S	7.0	10.1	10.3	8.0
Electronic components	367	8.2	9.2	8.5	8.0	7.7	7.4	7.2	7.0	7.8	7.3	8.0
Other electrical equipment	361-64,369	2.0	2.2	2.6	2.3	2.3	2.2	2.2	2.1	2.3	2.1	2.5
Transportation equipment	37	3.4	3.6	3.4	3.5	3.5	3.4	4.0	4.2	3.9	3.7	3.6
Motor vehicles and motor vehicles equipment	371	3.1	3.3	3.4	3.4	3.7	3.7	4.1	4.0	3.7	3.4	3.6
Other transportation equipment	373-75,379	2.3	2.7	2.5	2.6	2.5	2.1	2.1	2.1	1.9	1.2	0.9
Aircraft and missiles	372,376	3.9	4.0	3.6	3.9	3.3	3.1	4.0	4.7	4.7	5.3	4.2
Professional and scientific instruments	38	8.3	8.2	7.5	7.1	6.8	7.1	7.1	7.2	7.2	6.5	7.3
Scientific and mechanical measuring instruments	381-82	8.4	8.4	8.1	7.6	6.9	6.9	6.3	6.2	6.4	5.8	6.6
Optical, surgical, photographic, and other instruments	384-87	8.1	8.0	7.2	7.1	7.1	7.5	8.0	8.2	7.9	7.2	8.0
Other manufacturing industries	27,31,39	1.0	1.2	1.1	1.0	0.9	0.9	0.8	1.3	1.3	1.1	1.2
Nonmanufacturing[a]		NA	NA	NA	NA	NA	NA	NA	NA	NA	2.2	2.4

Appendix table 4-25.
Company and other (except federal) R&D funds as a percentage of net sales for industrial R&D performance, by industry and size of company: 1985–95
(Percentages)

Industry and size of company	SIC code	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total[a]		NA	NA	NA	NA	NA	NA	NA	NA	NA	2.7	2.8
Fewer than 500 employees		3.4	4.0	3.8	3.7	3.5	3.3	3.2	3.2	3.6	2.5	3.9
500 to 999		2.2	2.2	2.2	1.7	1.7	1.7	2.4	2.7	2.7	2.5	3.0
1,000 to 4,999		2.4	2.4	2.4	2.3	2.1	1.9	2.4	2.7	2.5	2.5	2.6
5,000 to 9,999		1.8	2.0	2.0	2.0	2.1	2.8	2.9	2.8	2.8	2.2	2.0
10,000 to 24,999		2.5	2.6	2.5	2.6	2.5	2.5	3.0	2.6	2.5	2.5	2.0
25,000 or more		3.5	3.7	3.8	3.7	3.7	3.6	3.8	4.0	3.7	3.6	3.1

NA = not available; SIC = Standard Industrial Classification

NOTES: As a result of a new sample design, statistics for 1988-91 have been revised since originally published. These statistics now better reflect R&D performance among firms in the nonmanufacturing industries and small firms in all industries. As a result of the new sample design, data for 1991 and later years are not directly comparable with data for 1990 and earlier years.

[a]Beginning with data from the 1995 survey (in which 1994 data were also collected), this table includes both manufacturing and nonmanufacturing companies. Only manufacturing companies were included in prior years.

SOURCE: National Science Foundation, Science Resources Studies Division, *Research and Development in Industry: 1995* (Arlington, VA: 1998, forthcoming).

See figure 4-11 and text table 4-4.

Appendix table 4-26.
Trends in R&D and federal outlays: FYs 1980, 1990, and proposed 1998

Composition of federal outlays	1980	1990	1998
Billions of current dollars			
Mandatory programs[a]	262.3	568.5	890.1
Net interest	52.5	184.2	249.9
Defense discretionary	134.6	300.1	260.1
R&D outlays	15.0	41.6	38.3
International discretionary	12.8	19.1	19.3
R&D outlays	0.1	0.4	0.3
Domestic discretionary	128.7	181.2	268.0
Nondefense R&D outlays	16.7	23.3	34.0
Total federal outlays	590.9	1,253.1	1,687.5
Total R&D	31.8	65.3	72.7
Percentages			
Total R&D/total federal outlays	5.4	5.2	4.3
Nondefense R&D/total federal outlays	2.8	1.9	2.0
Total R&D/total discretionary	11.5	13.0	13.3
Nondefense R&D/domestic discretionary	13.0	12.9	12.7

[a]These include Social Security, Medicare, Medicaid, and other programs.

SOURCE: American Association for the Advancement of Science, *Research and Development: FY 1998* (Washington, DC: 1997).

See figure 4-12.

Appendix table 4-27.
Federal obligations for R&D and R&D plant, by agency and character of work: FYs 1987-97

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
						Millions of current dollars					
TOTAL R&D											
Total, all agencies	55,254	56,769	61,407	63,560	61,295	65,593	67,314	67,256	68,755	69,077	68,064
Dept. of Agriculture	948	1,017	1,038	1,108	1,237	1,327	1,328	1,400	1,380	1,352	1,369
Dept. of Commerce	402	389	398	438	490	651	656	826	1,136	1,173	1,096
Dept. of Defense	35,232	35,249	37,577	37,268	32,135	36,130	35,849	34,566	34,362	34,284	32,964
Dept. of Education	133	141	159	170	171	169	178	177	178	182	188
Dept. of Energy	4,757	5,036	5,193	5,631	5,983	6,172	6,262	6,048	6,145	5,676	5,895
Dept. of Health & Human Services	6,606	7,158	7,903	8,406	9,756	8,988	10,349	11,022	11,455	11,914	12,185
Dept. of the Interior	404	417	469	509	593	609	619	694	562	565	574
Dept. of Justice	42	43	38	41	49	48	49	45	58	81	94
Dept. of Transportation	325	305	303	367	380	445	545	621	727	641	706
Dept. of the Treasury	27	26	26	26	31	25	17	19	61	64	64
Dept. of Veterans Affairs	210	215	235	238	217	224	236	248	238	276	258
Environmental Protection Agency	348	347	380	420	433	484	495	554	552	457	581
Agency for International Development	218	204	279	335	378	366	382	254	303	247	187
National Aeronautics & Space Administration	3,787	4,330	5,394	6,533	7,280	7,658	8,020	8,296	9,015	9,614	9,204
National Science Foundation	1,471	1,533	1,670	1,690	1,785	1,868	1,882	2,040	2,149	2,142	2,279
Nuclear Regulatory Commission	123	109	115	109	109	119	120	91	88	59	59
Smithsonian Institution	72	75	80	84	98	98	102	124	124	125	137
Tennessee Valley Authority	78	87	63	65	68	97	109	98	93	103	77
All other agencies	73	88	87	125	104	116	116	134	130	122	148
BASIC RESEARCH											
Total, all agencies	8,942	9,474	10,602	11,286	12,171	12,490	13,399	13,553	13,896	14,482	14,732
Dept. of Agriculture	446	481	485	519	558	595	616	606	595	586	608
Dept. of Commerce	26	31	29	31	34	35	37	40	39	38	39
Dept. of Defense	908	877	948	948	994	1,099	1,268	1,222	1,264	1,134	1,146
Dept. of Education	3	4	4	5	9	8	5	6	6	4	3
Dept. of Energy	1,069	1,185	1,411	1,505	1,687	1,736	1,755	1,603	1,634	1,957	2,035
Dept. of Health & Human Services	3,828	4,081	4,388	4,649	5,050	5,059	5,697	5,884	6,061	6,442	6,558
Dept. of the Interior	135	127	189	205	229	231	230	83	55	56	57
Dept. of Justice	8	8	7	9	6	5	5	6	8	8	12
Dept. of Transportation	0	0	0	0	0	1	2	3	47	46	54
Dept. of the Treasury	5	5	3	3	4	4	7	-	-	0	-
Dept. of Veterans Affairs	17	17	17	16	16	16	13	14	12	14	14
Environmental Protection Agency	31	27	51	74	91	110	89	101	70	66	75
Agency for International Development	3	3	3	5	6	6	8	2	2	2	5
National Aeronautics & Space Administration	1,014	1,113	1,417	1,637	1,706	1,738	1,800	1,964	1,978	2,009	1,885
National Science Foundation	1,371	1,433	1,563	1,586	1,676	1,742	1,744	1,871	1,973	1,968	2,090
Nuclear Regulatory Commission	0	0	0	0	0	0	0	0	0	0	0
Smithsonian Institution	72	75	80	84	98	98	102	124	124	125	137
Tennessee Valley Authority	4	3	3	5	2	2	10	9	9	12	0
All other agencies	5	4	4	4	5	6	11	14	17	16	15

Appendix table 4-27.
Federal obligations for R&D and R&D plant, by agency and character of work: FYs 1987-97

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
APPLIED RESEARCH											
Total, all agencies	8,998	9,177	10,164	10,337	11,798	12,001	13,491	13,888	14,678	14,096	14,441
Dept. of Agriculture	473	505	517	542	618	666	636	716	705	686	678
Dept. of Commerce	313	312	322	346	415	561	545	678	853	861	830
Dept. of Defense	2,440	2,362	2,708	2,582	2,724	2,975	3,515	3,040	3,070	2,814	2,716
Dept. of Education	104	107	118	125	123	120	128	131	133	138	140
Dept. of Energy	1,029	1,051	1,021	1,066	1,587	1,676	1,685	1,679	1,826	1,343	1,541
Dept. of Health & Human Services	2,194	2,416	2,700	2,818	3,112	2,887	3,496	3,853	4,015	4,083	4,210
Dept. of the Interior	247	266	253	270	324	340	350	567	477	484	489
Dept. of Justice	12	10	11	11	15	15	21	20	18	19	23
Dept. of Transportation	69	91	121	119	115	156	224	270	324	288	340
Dept. of the Treasury	13	11	13	15	21	17	5	9	49	50	54
Dept. of Veterans Affairs	173	179	197	199	178	185	194	209	206	239	223
Environmental Protection Agency	246	241	223	242	262	294	272	301	331	286	336
Agency for International Development	151	132	216	300	352	294	351	214	270	224	168
National Aeronautics & Space Administration	1,256	1,219	1,461	1,424	1,666	1,491	1,749	1,877	2,068	2,272	2,356
National Science Foundation	99	100	108	103	109	127	138	170	176	174	189
Nuclear Regulatory Commission	123	109	115	109	109	119	120	91	88	59	59
Smithsonian Institution	0	0	0	0	0	0	0	0	0	0	0
Tennessee Valley Authority	14	15	12	17	17	22	18	17	17	19	14
All other agencies	43	53	49	49	52	56	45	45	52	55	77
DEVELOPMENT											
Total, all agencies	37,313	38,119	40,641	41,937	37,327	41,102	40,424	39,815	40,181	40,499	38,890
Dept. of Agriculture	29	31	36	47	61	66	76	77	80	80	82
Dept. of Commerce	64	47	47	61	40	55	74	108	244	275	227
Dept. of Defense	31,884	32,010	33,921	33,739	28,417	32,056	31,066	30,304	30,028	30,336	29,103
Dept. of Education	26	30	37	40	39	42	44	40	39	40	45
Dept. of Energy	2,659	2,801	2,761	3,060	2,710	2,760	2,822	2,766	2,685	2,376	2,320
Dept. of Health & Human Services	584	661	814	939	1,594	1,042	1,157	1,285	1,379	1,390	1,417
Dept. of the Interior	22	24	27	33	40	39	39	44	29	26	27
Dept. of Justice	23	26	21	21	28	28	23	19	32	54	59
Dept. of Transportation	256	213	183	247	265	288	319	347	356	307	311
Dept. of the Treasury	10	10	9	7	7	4	6	10	12	13	11
Dept. of Veterans Affairs	19	19	21	22	23	23	29	25	19	22	22
Environmental Protection Agency	71	80	107	105	80	80	134	151	150	105	170
Agency for International Development	64	69	60	29	20	66	23	38	30	20	14
National Aeronautics & Space Administration	1,518	1,999	2,515	3,473	3,909	4,428	4,471	4,456	4,969	5,332	4,964
National Science Foundation	0	0	0	0	0	0	0	0	0	0	0
Nuclear Regulatory Commission	0	0	0	0	0	0	0	0	0	0	0
Smithsonian Institution	0	0	0	0	0	0	0	0	0	0	0
Tennessee Valley Authority	60	69	48	43	50	73	81	72	67	72	63
All other agencies	26	31	34	72	46	53	61	74	62	51	55

Appendix table 4-27.
Federal obligations for R&D and R&D plant, by agency and character of work: FYs 1987-97

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
R&D PLANT											
Total, all agencies	1,846	2,057	2,165	2,272	2,853	2,985	3,101	2,171	2,257	1,971	2,085
Dept. of Agriculture	112	135	89	102	145	165	142	126	143	150	125
Dept. of Commerce	5	11	9	15	16	21	25	31	78	80	106
Dept. of Defense	477	436	499	487	426	397	372	222	65	85	40
Dept. of Education	21	5	2	9	4	2	2	2	2	0	0
Dept. of Energy	772	915	873	916	1,220	1,321	1,462	912	745	756	826
Dept. of Health & Human Services	37	20	79	108	86	97	149	120	256	304	429
Dept. of the Interior	12	9	11	14	22	18	23	9	7	2	7
Dept. of Justice	11	0	0	0	0	0	0	0	0	0	0
Dept. of Transportation	11	14	16	22	18	25	32	41	29	29	23
Dept. of the Treasury	0	0	0	0	0	0	0	0	0	0	0
Dept. of Veterans Affairs	6	20	11	3	3	6	3	12	7	4	4
Environmental Protection Agency	0	0	0	0	0	0	3	5	5	5	5
Agency for International Development	7	6	0	0	0	0	0	0	0	0	0
National Aeronautics & Space Administration	309	428	520	527	724	818	749	515	625	333	315
National Science Foundation	61	57	54	39	160	102	130	172	290	219	200
Nuclear Regulatory Commission	0	0	0	0	0	0	0	0	0	0	0
Smithsonian Institution	3	1	3	5	2	4	5	5	5	5	5
Tennessee Valley Authority	0	0	0	5	5	3	1	0	1	1	0
All other agencies	1	0	0	19	23	7	1	0	0	0	0
R&D AND R&D PLANT											
Total, all agencies	57,100	58,827	63,572	65,831	64,148	68,577	70,415	69,427	71,012	71,048	70,149
Dept. of Agriculture	1,060	1,152	1,128	1,211	1,381	1,492	1,470	1,525	1,523	1,502	1,494
Dept. of Commerce	408	400	407	454	505	672	682	857	1,214	1,252	1,201
Dept. of Defense	35,709	35,685	38,076	37,756	32,561	36,526	36,221	34,788	34,427	34,369	33,004
Dept. of Education	154	146	161	179	175	171	180	178	179	182	188
Dept. of Energy	5,529	5,951	6,066	6,547	7,203	7,493	7,724	6,960	6,890	6,432	6,721
Dept. of Health & Human Services	6,643	7,178	7,981	8,513	9,842	9,085	10,499	11,142	11,711	12,218	12,614
Dept. of the Interior	416	426	480	523	615	628	642	703	568	568	581
Dept. of Justice	54	43	38	41	49	48	49	45	58	81	94
Dept. of Transportation	336	319	319	388	398	470	578	662	756	671	728
Dept. of the Treasury	27	26	26	26	31	25	17	19	62	64	65
Dept. of Veterans Affairs	215	235	246	241	220	230	240	260	245	280	262
Environmental Protection Agency	348	347	380	420	433	484	498	558	556	462	586
Agency for International Development	224	211	279	335	378	366	382	254	303	247	187
National Aeronautics & Space Administration	4,097	4,759	5,913	7,060	8,004	8,475	8,769	8,812	9,640	9,946	9,519
National Science Foundation	1,532	1,590	1,724	1,729	1,945	1,970	2,012	2,212	2,439	2,361	2,479
Nuclear Regulatory Commission	123	109	115	109	109	119	120	91	88	59	59
Smithsonian Institution	74	76	84	89	100	102	107	129	129	130	142
Tennessee Valley Authority	78	88	63	70	73	101	110	98	94	104	77
All other agencies	74	88	87	144	127	122	117	134	130	122	148

Appendix table 4-27.
Federal obligations for R&D and R&D plant, by agency and character of work: FYs 1987-97

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
						Millions of constant 1992 dollars					
TOTAL R&D											
Total, all agencies	66,651	66,165	68,687	68,197	63,061	65,593	65,608	64,053	63,899	62,740	60,287
Dept. of Agriculture	1,143	1,185	1,161	1,189	1,272	1,327	1,294	1,333	1,282	1,228	1,212
Dept. of Commerce	485	453	445	470	504	651	640	787	1,056	1,065	971
Dept. of Defense	42,499	41,083	42,032	39,987	33,060	36,130	34,941	32,920	31,935	31,139	29,198
Dept. of Education	160	164	178	182	176	169	173	168	165	165	167
Dept. of Energy	5,738	5,870	5,808	6,041	6,155	6,172	6,103	5,760	5,711	5,155	5,222
Dept. of Health & Human Services	7,969	8,343	8,840	9,019	10,037	8,988	10,087	10,497	10,646	10,821	10,793
Dept. of the Interior	487	486	525	546	610	609	603	661	522	513	508
Dept. of Justice	51	50	43	43	50	48	48	43	54	73	83
Dept. of Transportation	392	355	339	393	391	445	531	591	676	583	625
Dept. of the Treasury	32	30	29	27	32	25	16	18	57	58	57
Dept. of Veterans Affairs	253	251	263	255	223	224	230	236	221	251	229
Environmental Protection Agency	420	405	425	450	445	484	483	527	513	415	515
Agency for International Development	262	238	312	359	389	366	373	242	281	224	165
National Aeronautics & Space Administration	4,568	5,047	6,033	7,010	7,490	7,658	7,817	7,901	8,378	8,732	8,153
National Science Foundation	1,774	1,786	1,868	1,813	1,837	1,868	1,834	1,943	1,997	1,945	2,019
Nuclear Regulatory Commission	148	126	128	117	112	119	117	86	82	54	52
Smithsonian Institution	86	88	90	90	101	98	99	118	115	114	121
Tennessee Valley Authority	94	102	70	70	70	97	106	93	87	94	68
All other agencies	88	103	98	134	107	116	113	128	121	111	131
BASIC RESEARCH											
Total, all agencies	10,787	11,041	11,859	12,109	12,521	12,490	13,060	12,908	12,914	13,154	13,049
Dept. of Agriculture	537	560	542	557	574	595	600	577	553	533	538
Dept. of Commerce	31	36	33	34	35	35	36	38	37	34	34
Dept. of Defense	1,095	1,022	1,060	1,017	1,023	1,099	1,236	1,164	1,175	1,030	1,015
Dept. of Education	4	5	5	5	9	8	5	5	5	3	3
Dept. of Energy	1,289	1,381	1,578	1,615	1,735	1,736	1,710	1,527	1,519	1,777	1,802
Dept. of Health & Human Services	4,617	4,757	4,908	4,988	5,196	5,059	5,552	5,604	5,633	5,851	5,809
Dept. of the Interior	163	147	211	220	236	231	224	79	51	51	50
Dept. of Justice	10	9	8	9	7	5	5	6	8	8	11
Dept. of Transportation	0	0	0	0	0	1	2	3	44	42	48
Dept. of the Treasury	6	6	4	4	4	4	6	0	0	0	0
Dept. of Veterans Affairs	21	20	19	17	17	16	13	14	12	13	12
Environmental Protection Agency	38	32	57	79	94	110	87	97	65	60	67
Agency for International Development	3	3	3	5	6	6	8	2	2	2	4
National Aeronautics & Space Administration	1,223	1,297	1,585	1,756	1,755	1,738	1,754	1,870	1,838	1,825	1,670
National Science Foundation	1,654	1,670	1,748	1,702	1,724	1,742	1,700	1,782	1,834	1,787	1,851
Nuclear Regulatory Commission	0	0	0	0	0	0	0	0	0	0	0
Smithsonian Institution	86	88	90	90	101	98	99	118	115	114	121
Tennessee Valley Authority	5	4	3	5	2	2	10	8	8	11	0
All other agencies	6	5	5	5	6	6	11	13	15	14	14

Appendix table 4-27.
Federal obligations for R&D and R&D plant, by agency and character of work: FYs 1987-97

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
APPLIED RESEARCH											
Total, all agencies	10,854	10,695	11,369	11,091	12,137	12,001	13,150	13,226	13,641	12,803	12,791
Dept. of Agriculture	571	588	579	582	636	666	620	682	655	623	601
Dept. of Commerce	377	363	360	371	427	561	531	646	793	782	735
Dept. of Defense	2,943	2,753	3,029	2,770	2,802	2,975	3,426	2,895	2,853	2,556	2,405
Dept. of Education	125	124	131	134	127	120	125	125	123	126	124
Dept. of Energy	1,242	1,224	1,142	1,143	1,633	1,676	1,643	1,599	1,697	1,220	1,365
Dept. of Health & Human Services	2,647	2,815	3,021	3,024	3,202	2,887	3,407	3,669	3,731	3,709	3,729
Dept. of the Interior	298	310	283	289	333	340	341	540	444	439	433
Dept. of Justice	14	11	12	12	15	15	20	19	16	17	20
Dept. of Transportation	83	106	135	128	118	156	219	258	301	262	301
Dept. of the Treasury	15	13	15	16	21	17	4	9	45	46	48
Dept. of Veterans Affairs	209	208	220	214	183	185	189	199	192	217	197
Environmental Protection Agency	297	281	249	259	269	294	265	287	308	260	297
Agency for International Development	182	154	242	322	362	294	342	204	251	204	149
National Aeronautics & Space Administration	1,514	1,421	1,635	1,528	1,714	1,491	1,704	1,787	1,922	2,064	2,086
National Science Foundation	120	116	121	111	112	127	135	162	164	158	168
Nuclear Regulatory Commission	148	126	128	117	112	119	117	86	82	54	52
Smithsonian Institution	0	0	0	0	0	0	0	0	0	0	0
Tennessee Valley Authority	17	18	13	18	17	22	18	16	16	18	13
All other agencies	52	62	55	52	54	56	44	43	48	50	68
DEVELOPMENT											
Total, all agencies	45,010	44,428	45,460	44,997	38,402	41,102	39,399	37,919	37,343	36,784	34,447
Dept. of Agriculture	35	37	40	51	63	66	74	74	75	73	73
Dept. of Commerce	77	54	52	66	41	55	72	103	226	249	201
Dept. of Defense	38,461	37,307	37,943	36,201	29,235	32,056	30,278	28,861	27,907	27,553	25,778
Dept. of Education	31	35	42	43	41	42	43	38	37	36	40
Dept. of Energy	3,208	3,265	3,088	3,283	2,788	2,760	2,750	2,634	2,495	2,158	2,055
Dept. of Health & Human Services	705	771	911	1,007	1,639	1,042	1,127	1,224	1,282	1,262	1,255
Dept. of the Interior	26	28	30	36	41	39	38	42	27	23	24
Dept. of Justice	27	30	23	22	29	28	23	18	30	49	52
Dept. of Transportation	309	249	205	265	273	288	311	331	331	279	276
Dept. of the Treasury	11	12	10	7	7	4	5	9	12	12	9
Dept. of Veterans Affairs	23	22	23	24	23	23	28	23	18	20	19
Environmental Protection Agency	86	93	120	112	82	80	130	144	139	95	151
Agency for International Development	77	81	67	31	21	66	22	36	28	18	12
National Aeronautics & Space Administration	1,831	2,330	2,813	3,726	4,022	4,428	4,358	4,244	4,618	4,843	4,396
National Science Foundation	0	0	0	0	0	0	0	0	0	0	0
Nuclear Regulatory Commission	0	0	0	0	0	0	0	0	0	0	0
Smithsonian Institution	0	0	0	0	0	0	0	0	0	0	0
Tennessee Valley Authority	73	80	54	46	51	73	79	68	62	66	56
All other agencies	31	36	38	77	47	53	59	71	57	46	49

Appendix table 4-27.
Federal obligations for R&D and R&D plant, by agency and character of work: FYs 1987-97

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
R&D PLANT											
Total, all agencies	2,227	2,398	2,422	2,437	2,935	2,985	3,022	2,068	2,097	1,790	1,847
Dept. of Agriculture	135	158	100	110	149	165	139	120	133	136	111
Dept. of Commerce	6	13	10	17	16	21	25	30	72	72	93
Dept. of Defense	576	508	559	523	438	397	362	211	61	77	35
Dept. of Education	25	6	2	10	4	2	2	2	2	0	0
Dept. of Energy	931	1,066	977	983	1,255	1,321	1,424	868	692	686	732
Dept. of Health & Human Services	44	23	88	116	89	97	146	114	238	276	380
Dept. of the Interior	14	11	12	15	23	18	23	9	6	2	6
Dept. of Justice	13	0	0	0	0	0	0	0	0	0	0
Dept. of Transportation	14	16	17	23	19	25	31	39	27	26	20
Dept. of the Treasury	0	0	0	0	0	0	0	0	0	0	0
Dept. of Veterans Affairs	7	23	12	4	3	6	3	11	7	3	4
Environmental Protection Agency	0	0	0	0	0	0	2	5	4	4	4
Agency for International Development	8	7	0	0	0	0	0	0	0	0	0
National Aeronautics & Space Administration	373	499	581	565	744	818	730	491	581	302	279
National Science Foundation	74	66	60	42	164	102	127	164	269	199	177
Nuclear Regulatory Commission	0	0	0	0	0	0	0	0	0	0	0
Smithsonian Institution	3	1	4	5	2	4	5	5	5	5	4
Tennessee Valley Authority	0	0	0	5	5	3	1	0	1	1	0
All other agencies	1	0	0	20	23	7	1	0	0	0	0
R&D AND R&D PLANT											
Total, all agencies	68,878	68,562	71,109	70,634	65,996	68,577	68,630	66,121	65,996	64,530	62,133
Dept. of Agriculture	1,278	1,342	1,261	1,299	1,421	1,492	1,433	1,453	1,416	1,364	1,323
Dept. of Commerce	492	466	455	487	520	672	664	816	1,128	1,138	1,064
Dept. of Defense	43,074	41,590	42,591	40,510	33,498	36,526	35,303	33,131	31,996	31,216	29,233
Dept. of Education	185	170	180	192	180	171	175	170	167	165	167
Dept. of Energy	6,670	6,936	6,785	7,024	7,411	7,493	7,528	6,628	6,403	5,842	5,953
Dept. of Health & Human Services	8,013	8,366	8,928	9,135	10,126	9,085	10,232	10,611	10,884	11,097	11,173
Dept. of the Interior	501	497	537	561	633	628	626	670	528	515	514
Dept. of Justice	65	50	43	43	50	48	48	43	54	73	83
Dept. of Transportation	406	371	357	417	410	470	563	630	702	609	645
Dept. of the Treasury	33	31	29	28	32	25	16	18	57	58	57
Dept. of Veterans Affairs	260	274	275	259	226	230	233	247	228	254	232
Environmental Protection Agency	420	405	425	450	445	484	485	532	517	420	519
Agency for International Development	271	245	312	359	389	366	373	242	281	224	165
National Aeronautics & Space Administration	4,941	5,546	6,614	7,575	8,234	8,475	8,547	8,392	8,959	9,034	8,431

Appendix table 4-27.
Federal obligations for R&D and R&D plant, by agency and character of work: FYs 1987-97

Agency	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
National Science Foundation	1,848	1,853	1,928	1,855	2,001	1,970	1,961	2,107	2,267	2,144	2,196
Nuclear Regulatory Commission	148	126	128	117	112	119	117	86	82	54	52
Smithsonian Institution	90	88	94	95	102	102	104	123	120	118	126
Tennessee Valley Authority	94	102	70	75	75	101	107	93	87	95	68
All other agencies	90	103	97	154	130	122	114	128	121	111	131

NOTE: See appendix table 4-1 for GDP implicit price deflators used to convert current dollars to constant 1992 dollars.

SOURCES: National Science Foundation, Science Resources Studies Division (NSF/SRS), *Federal Funds for Research and Development, Detailed Historical Tables: Fiscal Years 1956-1996*, NSF 96-320 (Arlington, VA : 1996); and NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997*, Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997).

See figures 4-13 and 4-14 and text table 4-7.

Appendix table 4-28.
Department of Defense basic research funding: FYs 1996-2001
(Millions of dollars)

	1996	1997	1998	1999	2000	2001
Total Department of Defense	1,126	1,156	1,218	1,270	1,317	1,361
Total, services	787	825	858	897	934	970
Army	186	204	215	224	236	246
In-house laboratory independent research	14	15	16	17	18	19
Defense research sciences	125	142	147	153	162	167
University and industry research centers	47	47	52	54	57	60
Navy	377	387	403	428	449	470
In-house laboratory independent research	15	15	17	17	17	18
Defense research sciences	362	372	386	411	432	452
Air Force (Defense research sciences)	224	234	240	245	249	254
Total, Defense agencies	339	331	360	373	383	391
Chemical and biological defense programs	27	29	26	27	28	29
Office of the Secretary of Defense	234	227	259	270	277	285
In-house laboratory independent research	3	2	1	1	0	0
University research initiatives	222	209	237	247	255	262
Focused research initiatives	9	16	21	22	22	23
Advanced Research Projects Agency (Defense research sciences)	78	75	75	76	78	77

SOURCE: Department of Defense, *Basic Research Plan* (Washington, DC: 1996).

Appendix table 4-29.
Estimated federal obligations for R&D, by selected agency, performer, and character of work: FY 1997
(Millions of current dollars)

Agency	Total	Federal intramural	Industrial firms	FFRDCs administered by industry	Universities and colleges	FFRDCs administered by U&C	Other nonprofit	FFRDCs administered by nonprofits	State and local govt.	Foreign
Total R&D										
Total, all agencies	68,064	16,404	30,713	1,340	12,362	3,231	2,884	644	282	206
Dept. of Agriculture	1,369	922	12	0	421	0	7	0	2	4
Dept. of Commerce	1,096	712	303	0	71	*	6	0	3	1
Dept. of Defense	32,964	7,919	22,625	155	1,288	203	351	363	0	61
Dept. of Energy	5,895	507	1,516	933	574	2,035	69	233	14	14
Dept. of Health & Human Services	12,185	2,362	557	227	7,088	21	1,734	21	129	46
Dept. of the Interior	574	508	16	*	48	*	*	0	*	1
Dept. of Transportation	706	239	264	2	67	9	27	7	91	*
Environmental Protection Agency	581	237	158	0	132	0	43	0	7	4
National Aeronautics & Space Admin	9,204	2,301	5,063	0	708	804	275	4	3	47
National Science Foundation	2,279	19	125	*	1,824	145	156	1	5	5
All other agencies	1,212	677	75	24	142	13	216	16	27	23
Basic research										
Total, all agencies	14,732	2,668	1,279	368	7,405	1,520	1,270	83	92	47
Dept. of Agriculture	608	395	7	0	199	0	4	0	1	2
Dept. of Commerce	39	34	1	0	4	*	*	0	0	0
Dept. of Defense	1,146	293	153	1	647	4	39	*	0	9
Dept. of Energy	2,035	69	103	241	440	1,096	14	70	2	1
Dept. of Health & Human Services	6,558	1,142	270	126	3,928	17	973	11	64	27
Dept. of the Interior	57	51	0	0	6	0	*	0	0	0
Dept. of Transportation	54	*	20	*	1	*	12	0	21	0
Environmental Protection Agency	75	31	20	0	17	0	6	0	1	*
National Aeronautics & Space Admin	1,885	471	614	0	480	257	56	1	1	3
National Science Foundation	2,090	18	90	*	1,680	145	149	*	3	4
All other agencies	186	164	0	0	4	0	17	1	1	1
Applied research										
Total, all agencies	14,441	5,028	3,521	637	3,418	611	930	109	115	73
Dept. of Agriculture	678	449	6	0	218	0	3	0	1	2
Dept. of Commerce	830	605	152	0	64	*	4	0	3	1
Dept. of Defense	2,716	1,073	1,192	8	321	65	39	14	0	5
Dept. of Energy	1,541	183	173	529	93	439	36	69	6	13
Dept. of Health & Human Services	4,210	1,047	222	76	2,204	3	579	9	56	14
Dept. of the Interior	489	441	6	*	41	*	*	0	*	1
Dept. of Transportation	340	148	110	1	29	2	14	1	36	*
Environmental Protection Agency	335	137	91	0	76	0	25	0	4	2
National Aeronautics & Space Admin	2,356	589	1,485	0	107	90	71	1	1	12
National Science Foundation	189	1	34	0	144	*	6	0	2	2
All other agencies	757	356	50	23	120	13	153	16	6	22

Appendix table 4-29.
Estimated federal obligations for R&D, by selected agency, performer, and character of work: FY 1997
(Millions of current dollars)

Agency	Total	Federal intramural	Industrial firms	FFRDCs administered by industry	Universities and colleges	FFRDCs administered by U&C	Other nonprofit	FFRDCs administered by nonprofits	State and local govt.	Foreign
					Development					
Total, all agencies	38,890	8,708	25,913	334	1,539	1,099	684	453	75	87
Dept. of Agriculture	82	78	0	0	4	0	*	0	*	*
Dept. of Commerce	227	73	150	0	3	0	1	0	0	1
Dept. of Defense	29,103	6,553	21,280	146	320	134	274	349	0	48
Dept. of Energy	2,320	255	1,240	163	41	501	19	94	6	*
Dept. of Health & Human Services	1,417	173	65	25	955	1	182	1	10	4
Dept. of the Interior	27	16	10	0	1	0	0	0	0	0
Dept. of Transportation	311	91	134	1	37	6	1	6	35	*
Environmental Protection Agency	170	69	46	0	39	0	13	0	2	1
National Aeronautics & Space Admin	4,964	1,241	2,963	0	120	457	147	2	1	32
National Science Foundation	0	0	0	0	0	0	0	0	0	0
All other agencies	268	157	25	0	19	0	47	0	21	1

* = less than $500,000; FFRDCs = federally funded research and development centers; U&C = universities and colleges

NOTES: These figures reflect funding levels as reported by federal agencies in March through October 1996.

SOURCE: National Science Foundation, Science Resources Studies Division, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997*, Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997).

See text table 4-6.

Appendix table 4-30.
Federal obligations for R&D, by character of work and performer: FYs 1987-97

Character of work and performer	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996(est.)	1997(est.)
						Millions of current dollars					
Total R&D	55,253	56,769	61,406	63,667	61,295	65,592	67,314	67,256	68,755	69,077	68,064
Federal intramural[a]	13,413	14,115	15,121	16,002	15,238	15,690	16,556	16,139	17,343	16,897	16,404
Industrial firms excluding FFRDCs	26,768	26,719	28,548	29,378	26,421	29,745	30,326	30,454	30,469	31,268	30,713
FFRDCs administered by industry	1,860	1,911	1,960	2,237	2,068	2,010	1,451	1,294	1,204	1,231	1,340
Universities and colleges excluding FFRDCs	7,337	7,828	8,672	9,142	10,169	10,271	11,156	11,829	11,933	12,251	12,362
FFRDCs administered by universities	3,210	3,474	3,497	3,466	3,604	3,856	3,666	3,293	3,574	3,302	3,231
Nonprofit institutions excluding FFRDCs	1,711	1,683	1,999	2,249	2,637	2,804	2,811	2,930	2,807	2,867	2,884
FFRDCs administered by nonprofit institutions	511	506	522	632	679	746	753	736	831	721	644
State and local government	148	142	167	214	215	184	320	325	317	274	282
Foreign	296	392	919	345	264	288	272	257	278	266	206
Basic research	8,942	9,474	10,602	11,286	12,171	12,490	13,399	13,553	13,895	14,482	14,732
Federal intramural[a]	2,046	2,050	2,371	2,366	2,447	2,397	2,605	2,505	2,713	2,414	2,668
Industrial firms excluding FFRDCs	467	597	773	888	950	920	959	1,109	1,221	1,226	1,279
FFRDCs administered by industry	120	133	167	175	209	188	237	238	239	340	368
Universities and colleges excluding FFRDCs	4,666	4,868	5,221	5,548	6,065	6,332	6,799	7,024	6,951	7,754	7,405
FFRDCs administered by universities	907	990	1,098	1,228	1,306	1,394	1,438	1,336	1,438	1,504	1,520
Nonprofit institutions excluding FFRDCs	658	729	839	924	1,016	1,097	1,165	1,126	1,134	1,062	1,270
FFRDCs administered by nonprofit institutions	13	18	42	59	81	65	71	74	75	72	83
State and local government	38	43	44	50	49	42	72	75	79	70	92
Foreign	29	46	47	48	49	54	53	66	45	41	47
Applied research	8,998	9,176	10,163	10,453	11,798	12,001	13,491	13,887	14,678	14,096	14,441
Federal intramural[a]	3,392	3,288	3,611	3,587	4,093	4,219	4,755	4,983	5,075	4,990	5,028
Industrial firms excluding FFRDCs	1,982	2,046	2,102	2,312	2,457	2,531	3,060	2,954	3,507	3,447	3,521
FFRDCs administered by industry	314	322	353	367	416	405	559	500	579	538	637
Universities and colleges excluding FFRDCs	1,975	2,155	2,572	2,593	2,803	2,729	3,046	3,299	3,420	3,166	3,418
FFRDCs administered by universities	564	575	605	581	855	958	910	845	797	582	611
Nonprofit institutions excluding FFRDCs	550	571	681	738	910	952	876	969	922	1,039	930
FFRDCs administered by nonprofit institutions	77	65	67	89	90	74	102	104	135	112	109
State and local government	53	60	78	76	80	67	140	156	143	129	115
Foreign	93	94	95	109	94	66	44	77	100	93	73
Development	37,313	38,119	40,640	41,929	37,327	41,102	40,424	39,815	40,181	40,499	38,890
Federal intramural[a]	7,975	8,776	9,139	10,049	8,699	9,074	9,196	8,651	9,555	9,493	8,708
Industrial firms excluding FFRDCs	24,320	24,077	25,673	26,178	23,014	26,294	26,307	26,391	25,741	26,595	25,913
FFRDCs administered by industry	1,426	1,456	1,440	1,695	1,444	1,417	655	556	386	354	334
Universities and colleges excluding FFRDCs	697	805	879	1,001	1,301	1,211	1,312	1,505	1,561	1,331	1,539
FFRDCs administered by universities	1,739	1,909	1,794	1,658	1,443	1,504	1,319	1,112	1,339	1,216	1,099
Nonprofit institutions excluding FFRDCs	503	383	480	587	712	754	771	835	750	766	684
FFRDCs administered by nonprofit institutions	421	423	412	484	509	606	580	558	621	538	453
State and local government	58	39	46	88	86	75	108	95	95	75	75
Foreign	173	251	777	188	121	168	175	113	133	132	87

Appendix table 4-30.
Federal obligations for R&D, by character of work and performer: FYs 1987-97

Character of work and performer	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996(est.)	1997(est.)
						Millions of constant 1992 dollars					
Total R&D	66,650	66,164	68,687	68,312	63,061	65,592	65,608	64,053	63,899	62,740	60,287
Federal intramural[a]	16,180	16,451	16,914	17,170	15,677	15,690	16,136	15,371	16,118	15,347	14,529
Industrial firms excluding FFRDCs	32,290	31,141	31,933	31,521	27,182	29,745	29,558	29,004	28,317	28,399	27,203
FFRDCs administered by industry	2,244	2,227	2,192	2,400	2,128	2,010	1,414	1,232	1,119	1,118	1,186
Universities and colleges excluding FFRDCs	8,850	9,124	9,700	9,809	10,462	10,271	10,873	11,265	11,090	11,127	10,950
FFRDCs administered by universities	3,872	4,049	3,912	3,719	3,708	3,856	3,573	3,136	3,322	2,999	2,861
Nonprofit institutions excluding FFRDCs	2,064	1,962	2,236	2,413	2,713	2,804	2,740	2,790	2,608	2,604	2,554
FFRDCs administered by nonprofit institutions	616	590	584	678	699	746	734	700	773	655	571
State and local government	179	166	187	230	221	184	312	310	294	249	249
Foreign	357	457	1,028	370	272	288	265	244	258	242	182
Basic research	10,786	11,042	11,859	12,109	12,522	12,490	13,059	12,907	12,914	13,154	13,049
Federal intramural[a]	2,468	2,389	2,652	2,539	2,517	2,397	2,539	2,386	2,521	2,192	2,363
Industrial firms excluding FFRDCs	563	696	865	953	977	920	935	1,056	1,135	1,113	1,133
FFRDCs administered by industry	145	155	187	188	215	188	231	226	222	309	326
Universities and colleges excluding FFRDCs	5,628	5,674	5,840	5,953	6,240	6,332	6,627	6,690	6,460	7,042	6,559
FFRDCs administered by universities	1,094	1,154	1,228	1,318	1,344	1,394	1,402	1,272	1,337	1,366	1,346
Nonprofit institutions excluding FFRDCs	793	850	938	991	1,045	1,097	1,135	1,072	1,054	965	1,125
FFRDCs administered by nonprofit institutions	16	21	47	63	83	65	69	70	70	65	73
State and local government	45	50	49	54	50	42	70	72	73	64	82
Foreign	35	54	53	52	50	54	52	63	41	38	41
Applied research	10,854	10,695	11,368	11,216	12,138	12,001	13,149	13,226	13,641	12,803	12,791
Federal intramural[a]	4,091	3,832	4,039	3,849	4,211	4,219	4,635	4,746	4,716	4,533	4,454
Industrial firms excluding FFRDCs	2,391	2,385	2,351	2,481	2,528	2,531	2,982	2,814	3,259	3,131	3,118
FFRDCs administered by industry	378	375	395	394	428	405	545	476	538	488	564
Universities and colleges excluding FFRDCs	2,382	2,512	2,877	2,782	2,884	2,729	2,969	3,142	3,179	2,876	3,027
FFRDCs administered by universities	681	670	677	623	880	958	887	805	741	529	542
Nonprofit institutions excluding FFRDCs	663	666	762	792	936	952	854	923	857	944	823
FFRDCs administered by nonprofit institutions	92	76	75	95	93	74	99	99	125	102	96
State and local government	64	70	87	82	82	67	136	148	133	117	102
Foreign	112	110	106	117	97	66	43	74	93	84	64
Development	45,009	44,428	45,459	44,988	38,402	41,102	39,400	37,919	37,343	36,784	34,447
Federal intramural[a]	9,620	10,228	10,223	10,782	8,950	9,074	8,963	8,239	8,880	8,622	7,713
Industrial firms excluding FFRDCs	29,337	28,062	28,717	28,088	23,677	26,294	25,640	25,134	23,923	24,155	22,952
FFRDCs administered by industry	1,721	1,697	1,611	1,819	1,486	1,417	638	530	359	321	296
Universities and colleges excluding FFRDCs	841	938	983	1,074	1,338	1,211	1,279	1,434	1,451	1,209	1,363
FFRDCs administered by universities	2,097	2,225	2,007	1,779	1,485	1,504	1,286	1,059	1,244	1,105	974
Nonprofit institutions excluding FFRDCs	607	446	537	630	733	754	751	795	697	695	606
FFRDCs administered by nonprofit institutions	508	493	461	519	524	606	565	531	577	488	401
State and local government	70	45	51	94	88	75	105	90	88	68	66
Foreign	209	293	869	202	124	168	171	108	124	120	77

Appendix table 4-30.
Federal obligations for R&D, by character of work and performer: FYs 1987-97

FFRDCs = federally funded research and development centers

NOTE: See appendix table 4-1 for GDP implicit price deflators used to convert current dollars to constant 1992 dollars.

[a]Federal intramural activities cover costs associated with the planning and administration of intramural and extramural programs by federal personnel and actual intramural performance.

SOURCES: National Science Foundation, Science Resources Studies Division (NSF/SRS), *Federal Funds for Research and Development, Detailed Historical Tables: Fiscal Years 1956-1996,* NSF 96-320 (Arlington, VA: 1996); and NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997).

Appendix table 4-31.
Federal R&D obligations for federal intramural performance, by selected agency: FYs 1980-97
(Millions of current dollars)

	All agencies	Defense	Energy	NASA	HHS	USDA	Commerce	Interior	All other agencies
1980	7,632	3,796	474	965	820	457	226	242	653
1981	8,426	4,281	451	1,044	872	511	237	274	756
1982	9,141	5,139	176	1,166	946	531	242	261	680
1983	10,582	6,401	258	1,134	1,034	559	252	274	670
1984	11,572	7,257	216	1,043	1,066	589	256	334	811
1985	12,945	8,324	224	1,171	1,147	628	280	342	830
1986	13,535	8,881	206	1,217	1,236	630	285	332	749
1987	13,413	8,336	248	1,414	1,293	649	320	355	799
1988	14,115	8,880	245	1,335	1,408	694	316	353	883
1989	15,121	9,295	248	1,733	1,529	689	325	394	907
1990	16,003	9,639	307	1,968	1,662	737	336	424	929
1991	15,238	8,157	381	2,112	1,975	824	400	490	900
1992	15,690	8,601	336	2,210	1,783	862	512	513	872
1993	16,556	8,742	517	2,295	2,033	868	500	522	1,080
1994	16,139	8,017	562	2,271	2,206	931	597	595	959
1995	17,343	8,907	491	2,254	2,485	915	665	492	1,135
1996 (est.)	16,897	8,655	416	2,403	2,240	898	688	493	1,104
1997 (est.)	16,404	7,919	507	2,301	2,362	922	712	508	1,172

HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; USDA = Department of Agriculture

NOTE: Intramural activities cover costs associated with the planning and administration of intramural and extramural R&D programs by federal personnel and actual intramural R&D performance.

SOURCES: National Science Foundation, Science Resources Studies Division (NSF/SRS), *Federal Funds for Research and Development, Detailed Historical Tables: Fiscal Years 1956-1996*, NSF 96-320 (Arlington, VA: 1996); and NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997*, Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997).

See text table 4-7.

Appendix table 4-32.
Federal R&D laboratory campuses, by agency and state: FY 1995

Federal agency	Number of laboratory campuses	1995 (millions)
Total	515	26,578.8
Department of Agriculture	185	733.4
Agricultural Research Service	107	556.1
Forest Service	78	177.3
Department of Commerce	38	430.3
Nat. Inst. of Standards & Tech.	2	199.9
Nat. Oceanic & Atmos. Admin.	36	230.4
Department of Defense	68	9,150.8
Dept. of the Air Force	11	1,824.0
Dept. of the Army	29	2,076.3
Dept. of the Navy	21	4,668.2
Other Defense agencies	7	582.3
Department of Education	10	41.0
Department of Energy	33	8,080.7
Defense Programs	3	3,203.3
Energy research	16	2,670.6
Energy efficiency & renewable	1	237.6
Environmental management	3	904.0
Fossil energy	6	445.7
Naval reactors	2	585.0
Nonproliferation	1	5.0
Office of the Sec. of Energy	1	29.5
Dept. of Health & Human Services	19	1,371.4
Centers for Disease Ctrl. & Prev.	6	108.6
Food and Drug Administration[a]	3	40.2
National Institutes of Health	10	1,222.6
Department of the Interior	20	547.4
Bureau of Reclamation	1	71.3
National Biological Service	16	105.1
U.S. Geological Survey	3	371.0
Department of Justice—DEA	2	1.0
Department of Transportation	6	536.2
Federal Aviation Administration	3	211.7
Federal Highway Administration	1	125.5
Nat. Highway Traf. Safety Admin.	1	0.8
Research & Spec Prog Admin.	1	198.2
Department of the Treasury—IRS	1	1.5
Department of Veterans Affairs	102	270.0
Environ. Protection Agency (R&D)	11	348.2
Nat. Aeronautics & Space Admin.	10	4,832.7
Aeronautics	4	1,369.7
Mission to Planet Earth	1	646.5
Space flight	4	2,032.8
Space science	1	783.7
National Science Foundation	5	173.4
Nuclear Regulatory Commission	1	16.0
Smithsonian Institution	2	17.5
Tennessee Valley Authority	2	27.3

State	Number of laboratory campuses	1995 (millions)
Total	515	26,578.8
Alabama	11	992.3
Alaska	10	33.8
Arizona	8	125.2
Arkansas	7	32.1
California	46	4,119.7
Colorado	13	575.3
Connecticut	5	18.6
Delaware	1	1.0
Florida	21	848.6
Georgia	14	132.8
Hawaii	6	21.2
Idaho	8	816.9
Illinois	15	727.7
Indiana	3	11.3
Iowa	4	64.8
Kansas	3	6.8
Kentucky	2	2.6
Louisiana	8	39.8
Maine	1	0.4
Maryland	25	2,921.2
Massachusetts	15	1,005.3
Michigan	8	101.8
Minnesota	7	33.9
Mississippi	13	285.1
Missouri	8	71.4
Montana	6	21.0
Nebraska	4	19.9
Nevada	3	28.4
New Hampshire	3	31.4
New Jersey	8	592.1
New Mexico	9	2,692.5
New York	19	680.1
North Carolina	13	240.4
North Dakota	5	24.6
Ohio	12	705.2
Oklahoma	10	142.3
Oregon	14	83.3
Pennsylvania	14	578.7
Rhode Island	5	416.3
South Carolina	10	122.2
South Dakota	2	2.2
Tennessee	8	844.9
Texas	22	910.6
Utah	7	75.2
Vermont	2	3.8
Virginia	19	3,964.4
Washington	19	617.9
West Virginia	9	228.0
Wisconsin	9	42.0
Wyoming	3	4.7
Washington, D.C.	9	487.3
Puerto Rico	4	15.8
Foreign countries[b]	5	14.0

DEA = Drug Enforcement Administration; IRS = Internal Revenue Service

NOTES: Data for the Department of Defense and the National Aeronautics and Space Administration are from their FY 1994 operating budgets; data for the Department of Education are from its FY 1996 operating budget.

[a]Data for the Food and Drug Administration exclude product testing activities.

[b]The Agricultural Research Service has R&D laboratories in Argentina, France, and Panama. The Navy has medical labs in Egypt and Indonesia.

SOURCE: U.S. General Accounting Office, *Federal R&D Laboratories*, GAO/RCED/NSIAD-96-78R (Washington, DC: 1996).

Appendix table 4-33.
Federal R&D obligations to FFRDCs, by administering sector and selected agency: FYs 1987-97
(Millions of current dollars)

	All agencies	Defense	Energy	NASA	All other agencies
		Total			
1987	5,580	1,462	3,410	476	233
1988	5,891	1,541	3,572	560	217
1989	6,075	1,386	3,728	633	328
1990	6,425	1,494	3,895	622	415
1991	6,451	1,396	3,948	738	369
1992	6,718	1,537	3,996	793	392
1993	5,871	1,239	3,521	688	424
1994	5,322	856	3,310	778	378
1995	5,610	823	3,296	1,048	443
1996 (est.)	5,255	749	3,131	907	468
1997 (est.)	5,214	721	3,201	808	485
		FFRDCs administered by industry			
1987	1,860	325	1,475	0	61
1988	1,911	316	1,536	0	60
1989	2,056	309	1,588	0	160
1990	2,327	419	1,718	0	190
1991	2,168	316	1,690	0	162
1992	2,117	335	1,607	0	175
1993	1,451	202	1,094	0	156
1994	1,294	116	1,011	0	167
1995	1,204	93	936	0	175
1996 (est.)	1,231	76	905	0	250
1997 (est.)	1,340	155	933	0	252
		FFRDCs administered by universities and colleges			
1987	3,210	737	1,839	475	158
1988	3,474	829	1,945	560	141
1989	3,497	686	2,033	630	148
1990	3,466	658	2,020	619	168
1991	3,604	637	2,072	736	159
1992	3,856	668	2,227	791	169
1993	3,667	545	2,205	685	232
1994	3,293	275	2,077	771	170
1995	3,574	262	2,057	1,044	212
1996 (est.)	3,302	223	2,002	903	174
1997 (est.)	3,231	203	2,035	804	189
		FFRDCs administered by other nonprofit institutions			
1987	511	400	96	1	14
1988	506	397	91	1	16
1989	522	391	107	3	20
1990	632	416	157	2	57
1991	679	442	186	2	49
1992	746	534	163	2	47
1993	753	492	222	2	37
1994	736	466	222	7	41
1995	831	468	303	4	57
1996 (est.)	721	449	224	4	44
1997 (est.)	644	363	233	4	45

FFRDCs = federally funded research and development centers; NASA = National Aeronautics and Space Administration

SOURCES: National Science Foundation, Science Resources Studies Division (NSF/SRS), *Federal Funds for Research and Development, Detailed Historical Tables: Fiscal Years 1956-1996,* NSF 96-320 (Arlington, VA: 1996); NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997); and unpublished tabulations.

See text table 4-7.

Appendix table 4-34.
Federal obligations for R&D to federally funded research and development centers, by individual FFRDC and agency: FY 1995
(Thousands of dollars)

FFRDC	Total	Commerce	Defense	Energy	HHS	NASA	NSF	Other agencies
TOTAL, ALL FFRDCs	5,609,641	129	823,106	3,295,890	186,057	1,047,684	141,476	115,299
FFRDCs administered by industrial firms	1,203,899	0	93,468	935,637	142,164	0	10	32,620
Energy Technology Engineering Center	11,783	0	48	11,526	0	0	0	209
Idaho National Engineering Laboratory	77,745	0	1,578	63,753	0	0	0	12,414
NCI Frederick Cancer R&D Center	141,707	0	72	0	141,635	0	0	0
Oak Ridge National Laboratory	288,332	0	9,086	267,663	529	0	10	11,044
Sandia National Laboratories	654,472	0	82,659	562,860	0	0	0	8,953
Savannah River Technology Center	29,860	0	25	29,835	0	0	0	0
FFRDCs administered by universities & colleges	3,574,349	129	261,520	2,057,324	24,478	1,043,913	140,883	46,102
Ames Laboratory	29,815	0	30	25,930	0	0	0	3,855
Argonne National Laboratory	252,879	4	1,841	246,877	0	240	0	3,917
Brookhaven National Laboratory	216,094	50	2,696	199,269	2,806	353	1,448	9,472
Ernest Orlando Lawrence Berkeley National Laboratory	170,870	75	879	156,754	12,343	703	116	0
Fermi National Accelerator Laboratory	170,917	0	0	170,917	0	0	0	0
Jet Propulsion Laboratory	1,056,916	0	25,778	0	0	1,031,078	60	0
Lawrence Livermore National Laboratory	500,622	0	32,857	461,840	3,192	1,016	2	1,715
Lincoln Laboratory	158,648	0	150,206	0	0	343	0	8,099
Los Alamos National Laboratory	540,637	0	24,781	489,485	5,537	812	1162	18,860
National Astronomy & Ionosphere Center	7,669	0	0	0	0	0	7,669	0
National Center for Atmospheric Research	79,483	0	462	0	0	7,449	71,572	0
National Optical Astronomy Observatories	29,099	0	0	0	0	0	29,099	0
National Radio Astronomy Observatory	29,960	0	0	0	363	0	29,597	0
Oak Ridge Institute for Science & Education	16,747	0	25	14,330	237	1,919	52	184
Princeton Plasma Physics Laboratory	115,284	0	0	115,178	0	0	106	0
Software Engineering Institute	21,965	0	21,965	0	0	0	0	0
Stanford Linear Accelerator Center	117,713	0	0	117,713	0	0	0	0
Thomas Jefferson National Accelerator Facility	59,031	0	0	59,031	0	0	0	0
FFRDCs administered by other nonprofit institutions	831,393	0	468,118	302,929	19,415	3,771	583	36,577
Aerospace FFRDC	137,495	0	136,552	0	0	738	205	0
Arroyo Center	2,621	0	2,621	0	0	0	0	0
C3I Federally Funded Research & Development Center	192,993	0	190,330	0	0	2,549	114	0
Center for Advanced Aviation System Development	15,961	0	7,073	0	0	0	0	8,888
Center for Naval Analyses	44,143	0	44,056	0	0	0	87	0
Center for Nuclear Waste Regulatory Analyses	5,795	0	0	0	0	0	0	5,795
Critical Technologies Institute	600	0	600	0	0	0	0	0
Inhalation Toxicology Research Institution	7,417	0	0	6,648	769	0	0	0
Institute for Defense Analyses Studies & Analyses FFRDC	56,215	0	56,038	0	0	0	177	0
Logistics Management Institute	2,271	0	1,871	0	0	200	0	200

Appendix table 4-34.
Federal obligations for R&D to federally funded research and development centers, by individual FFRDC and agency: FY 1995
(Thousands of dollars)

FFRDC	Total	Commerce	Defense	Energy	HHS	NASA	NSF	Other agencies
National Defense Research Institute	14,326	0	2,633	0	11,558	135	0	0
National Renewable Energy Laboratory	102,278	0	0	102,278	0	0	0	0
Pacific Northwest National Laboratory	208,529	0	2,944	194,003	7,088	0	0	4,494
Project Air Force	24,149	0	24,000	0	0	149	0	0
Tax Systems Modernization Institute	17,200	0	0	0	0	0	0	17,200

FFRDC = federally funded research and development center; HHS = Department of Health and Human Services; NASA = National Aeronautics and Space Administration; NSF = National Science Foundation

SOURCE: National Science Foundation, Science Resources Studies Division, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997*, Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997).

Appendix table 4-35.
Federal obligations for R&D to federally funded research and development centers, by individual FFRDC: FYs 1987-95
(Thousands of dollars)

FFRDC	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL, ALL FFRDCs	5,580,231	5,890,825	6,075,331	6,398,286	6,451,491	6,610,876	5,871,234	5,321,939	5,609,641
FFRDCs administered by industrial firms	1,859,963	1,911,314	2,056,329	2,326,808	2,168,256	2,009,767	1,451,325	1,293,494	1,203,899
Bettis Atomic Power Laboratory[a]	383,460	350,859	358,097	331,506	334,486	318,395	0	0	0
Energy Technology Engineering Center	20,284	14,746	10,470	9,364	16,270	13,231	14,288	1,010	11,783
Hanford Engineering Development Laboratory[a]	98,289	94,020	93,045	98,048	13,722	9,765	0	0	0
Idaho National Engineering Laboratory	117,743	104,112	120,067	173,209	175,143	134,220	68,452	85,853	77,745
Knolls Atomic Power Laboratory[a]	245,258	291,615	311,642	290,513	317,818	361,461	0	0	0
NCI Frederick Cancer R&D Center	6,854	13,600	110,285	143,961	114,380	16,430	107,112	127,181	141,707
Oak Ridge National Laboratory	236,553	249,570	277,707	422,146	292,433	291,305	319,357	288,824	288,332
Sandia National Laboratories	703,904	732,811	670,551	704,925	736,940	801,367	883,304	730,311	654,472
Savannah River Technology Center	47,618	59,981	104,465	153,136	167,064	63,593	58,812	60,315	29,860
FFRDCs administered by universities & colleges	3,209,624	3,473,924	3,497,050	3,449,838	3,603,818	3,855,467	3,666,498	3,292,933	3,574,349
Ames Laboratory	15,812	17,657	17,588	19,527	26,906	24,808	26,992	27,796	29,815
Argonne National Laboratory	187,063	200,871	211,732	249,181	254,080	256,434	273,859	258,533	252,879
Brookhaven National Laboratory	180,802	195,112	214,837	202,992	222,755	217,953	212,759	218,792	216,094
Ernest Orlando Lawrence Berkeley National Laboratory	120,459	122,226	142,641	240,242	146,705	160,124	169,294	174,136	170,870
Fermi National Accelerator Laboratory	136,650	145,475	160,462	157,947	158,883	166,220	168,117	168,684	170,917
Institute for Advanced Technology	0	0	0	1,579	2,548	7,078	13,873	0	0
Jet Propulsion Laboratory	483,964	678,811	771,362	698,709	797,629	963,504	741,535	785,880	1,056,916
Lawrence Livermore National Laboratory	877,401	905,311	779,275	652,888	815,470	802,136	705,261	526,388	500,622
Lincoln Laboratory	261,262	223,643	207,930	210,322	199,104	190,266	291,842	136,058	158,648
Los Alamos National Laboratory	645,046	665,812	655,138	627,304	603,461	623,077	637,417	552,389	540,637
National Astronomy & Ionosphere Center	5,814	6,752	6,187	7,337	6,051	7,347	7,766	10,035	7,669
National Center for Atmospheric Research	42,165	40,824	46,560	46,200	49,315	54,564	55,897	59,527	79,483
National Optical Astronomy Observatories	23,958	23,005	24,028	24,413	25,740	28,510	27,545	28,271	29,099
National Radio Astronomy Observatory	16,375	17,300	18,457	28,516	30,636	35,315	29,215	29,218	29,960
Oak Ridge Institute for Science & Education	11,561	13,539	12,600	26,550	15,942	21,716	16,993	24,082	16,747
Princeton Plasma Physics Laboratory	89,938	89,717	90,066	89,487	87,713	109,719	106,097	102,109	115,284
Software Engineering Institute	13,992	18,937	17,870	33,674	22,396	29,025	21,688	25,247	21,965
Stanford Linear Accelerator Center	90,312	99,707	109,500	115,491	115,118	134,074	131,568	121,429	117,713
Thomas Jefferson National Accelerator Facility	7,050	9,225	10,817	17,479	23,366	23,597	28,780	44,359	59,031
FFRDCs administered by other nonprofit institutions	510,644	505,587	521,952	621,640	679,417	745,642	753,411	735,512	831,393
Aerospace FFRDC	97,792	71,232	67,832	115,547	97,701	223,686	153,102	144,900	137,495
Arroyo Center	0	0	0	356	22,789	18,131	15,140	1,765	2,621
C3I Federal Contract Research Center	192,651	234,259	227,152	163,641	183,220	156,896	188,068	189,967	192,993
Center for Advanced Aviation System Development	0	0	0	21,863	17,813	35,410	36,300	17,498	15,961
Center for Naval Analyses	34,316	34,990	34,694	38,046	48,121	42,493	45,464	46,733	44,143
Center for Nuclear Waste Regulatory Analyses	0	0	1,625	2,635	3,287	3,040	4,983	5,234	5,795
Critical Technologies Institute	0	0	0	0	0	0	600	0	0
Inhalation Toxicology Research Institute	0	0	8,210	7,704	7,524	7,516	8,052	7,341	7,417

Appendix table 4-35.
Federal obligations for R&D to federally funded research and development centers, by individual FFRDC: FYs 1987-95
(Thousands of dollars)

FFRDC	1987	1988	1989	1990	1991	1992	1993	1994	1995
Institute for Defense Analyses Studies & Analyses FFRDC	27,691	33,326	41,124	54,828	44,229	49,378	48,575	46,731	56,215
Logistics Management Institute	1,608	2,013	1,145	36,328	3,341	2,045	3,928	3,122	2,271
National Defense Research Institute	17,152	15,819	21,427	7,375	25,849	23,634	8,396	17,833	14,326
National Renewable Energy Research Laboratory[b]	52,401	47,632	50,889	60,849	72,558	77,847	111,304	81,948	102,278
Pacific Northwest Laboratories	66,734	66,316	67,622	112,373	130,585	105,566	125,659	148,440	208,529
Project Air Force	20,299	0	232	95	22,400	0	1,685	24,000	24,149
Tax Systems Modernization Institute	0	0	0	0	0	0	2,155	2,155	17,200

FFRDC = federally funded research and development center

[a]The Department of Energy decertified Bettis Atomic Power Laboratory, Hanford Engineering Development Laboratory, and Knolls Atomic Power Laboratory as FFRDCs in October/November 1992.

[b]In September 1991, the name was changed from Solar Energy Research Institute.

SOURCES: National Science Foundation, Science Resources Studies Division, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997); and unpublished tabulations.

Appendix table 4-36.
Advanced Technology Program awards: 1990-96

	1990	1991	1992	1993	1994	1995	1996	Total
Number of awards	11	28	21	29	88	103	8	288
Single applicants	6	18	18	24	50	62	6	184
Joint ventures	5	10	3	5	38	41	2	104
Total participants[a]	35	83	32	50	211	318	12	741
Resubmittals	NA	3	7	6	4	17	2	39
Funding ($ millions)	96	202	97	118	640	827	37	2,019
ATP share	46	93	48	60	309	414	19	989
To joint ventures	38	65	19	19	216	304	9	670
To single applicants	8	28	29	41	93	110	10	319
Industry share	52	109	49	58	331	413	18	1,030
From joint ventures	45	83	19	20	233	340	10	750
From single applicants	7	26	30	38	98	73	8	280

ATP = Advanced Technology Program

NOTE: Funding of each award is the total in a period of two to six years.

[a]Total participants include single applicants, joint venture leads, and joint venture participants. This category excludes subcontractors, informal collaborators with joint ventures, and collaborators and strategic partners of single applicants.

SOURCE: U.S. Department of Commerce, Advanced Technology Program, unpublished tabulations.

See figure 4-17.

Appendix table 4-37.
Small Business Innovation Research awards, by award type and agency: FYs 1983-95
(Millions of current dollars)

Award type and agency	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	Cumulative 1983-95
Total[a]	45	108	199	298	351	389	432	461	483	508	698	718	865	5,555
By type														
Phase I awards	45	48	69	99	110	102	108	118	128	128	154	220	232	1,561
Phase II awards	0	60	130	199	241	285	322	342	336	371	491	474	602	3,853
By agency														
Defense	20	45	78	151	194	208	233	241	241	242	385	354	414	2,806
Health and Human Services	7	23	45	57	67	73	79	84	93	102	126	133	181	1,070
National Aeronautics and Space Administration	5	13	29	36	32	47	52	62	69	79	86	116	118	744
Energy	5	16	26	29	28	30	33	39	39	43	50	53	70	461
National Science Foundation	5	7	10	15	17	17	19	20	22	23	29	34	42	260
Agriculture	1	2	3	4	4	4	4	4	5	6	7	7	9	60
Transportation	*	2	3	4	3	3	4	4	6	3	4	7	10	53
Environmental Protection Agency	*	1	2	3	3	3	3	3	4	4	5	5	7	43
Education	*	1	1	2	2	2	2	2	3	2	3	3	3	26
Nuclear Regulatory Commission	*	1	1	1	1	1	1	1	0	1	2	1	2	13
Commerce	0	0	0	1	2	1	1	1	1	2	2	4	8	23
Interior	*	1	*	0	0	0	0	0	0	0	0	0	0	1

* = less than $500,000

[a]Totals are Small Business Innovation Research award obligations that include award modifications. The details by award type and agency do not necessarily contain subsequent year revisions and may not sum to totals.

SOURCE: U.S. Small Business Administration, *Small Business Innovation Development Act* (Washington, DC: annual series).

Appendix table 4-38.
Budgetary impact and company claims of the federal research and experimentation tax credit: FYs 1981-97
(Millions of dollars)

	Credits claimed by U.S. firms (current $)[a]	Outlay equivalent cost of credit (current $)[b]	Total federal R&D outlays	Ratio of credit outlays to R&D (%)	Credits claimed by U.S. firms (constant $)[a]	Outlay equivalent cost of credit (constant $)[b]
1981	639	205	32,459	0.63	981	315
1982	839	640	34,391	1.86	1,203	917
1983	1,278	1,010	36,659	2.76	1,751	1,384
1984	1,589	3,360	39,691	8.47	2,097	4,434
1985	1,628	2,430	44,171	5.50	2,076	3,099
1986	1,292	2,295	50,609	4.53	1,603	2,847
1987	1,053	2,715	51,612	5.26	1,270	3,274
1988	1,277	1,240	54,739	2.27	1,488	1,445
1989	1,341	1,590	59,450	2.67	1,499	1,778
1990	1,547	1,625	62,135	2.62	1,660	1,744
1991	1,585	1,070	61,130	1.75	1,631	1,101
1992	1,578	1,850	62,934	2.94	1,578	1,850
1993	NA	1,900	65,241	2.91	NA	1,851
1994	NA	2,110	66,159	3.19	NA	2,009
1995	NA	1,820	66,375	2.74	NA	1,691
1996	NA	1,245	66,877	1.86	NA	1,131
1997	NA	1,055	67,692	1.56	NA	934

NA = not available

NOTES: Tax expenditure estimates are prepared by the U.S. Treasury Department, based on the income tax law enacted as of December 31 of the year for which the expenditures are reported. Expenditures for the years 1996-97 are estimated based on the income tax law enacted as of December 31, 1996. See appendix table 4-1 for GDP implicit price deflators used to convert current dollars to constant 1992 dollars.

[a]The value of credits actually received by U.S. firms is less than the amounts claimed.

[b]"Outlay equivalent" estimates are comparable to taxable outlay figures reported in the budget. This allows for a comparison of the resource cost of the tax credit with the cost of direct federal R&D expenditure support.

SOURCES: U.S. Office of Management and Budget, *Budget of the United States Government* (Washington, DC: U.S. Government Printing Office, annual series); and U.S. Internal Revenue Service, as reported in Office of Technology Assessment, *The Effectiveness of Research and Experimentation Tax Credits,* OTA-8P-ITC-174 (Washington, DC: U.S. Government Printing Office, 1995).

See figure 4-30.

Appendix table 4-39.
Federal R&D funding, by budget function: FYs 1980, 1985, and 1990-98

Function	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998
Millions of current dollars											
Total	29,739	49,887	63,781	65,898	68,398	69,884	68,331	68,791	69,049	70,988	71,602
National defense	14,946	33,698	39,925	39,328	40,083	41,249	37,764	37,204	37,801	39,030	38,726
Nondefense	14,793	16,189	23,856	26,570	28,315	28,635	30,567	31,587	31,249	31,958	32,876
Health	3,694	5,418	8,308	9,226	10,055	10,280	10,993	11,407	11,867	12,693	12,998
Space research and technology	2,738	2,725	5,765	6,511	6,744	6,988	7,414	7,916	7,844	7,795	8,004
General science	1,233	1,862	2,410	2,635	2,659	2,691	2,712	2,794	2,846	2,962	3,086
Energy	3,603	2,389	2,726	2,953	3,153	2,677	2,873	2,844	2,521	2,259	2,229
Natural resources and environment	999	1,059	1,386	1,582	1,688	1,802	1,865	1,988	1,802	1,842	1,902
Transportation	887	1,030	1,045	1,231	1,523	1,703	1,888	1,833	1,795	1,827	1,939
Agriculture	585	836	950	1,052	1,155	1,152	1,193	1,194	1,176	1,185	1,196
Education, training, employment, and social services	468	220	374	433	365	348	373	369	331	370	411
International affairs	125	210	375	378	371	382	254	287	252	190	246
Veterans' benefits and services	126	193	216	219	245	250	265	257	259	267	239
Commerce and housing credit	101	114	140	178	192	220	380	525	432	435	498
Community and regional development	119	50	67	88	95	57	68	70	50	54	46
Administration of justice	45	47	44	51	51	49	46	59	56	67	70
Income security	47	21	33	30	37	36	45	43	16	10	10
General government	22	17	17	4	4	1	0	1	2	2	2
Millions of constant 1992 dollars											
Total	50,150	63,631	68,435	67,796	68,398	68,113	65,077	63,932	62,716	62,877	61,726
National defense	25,204	42,982	42,838	40,461	40,083	40,204	35,966	34,576	34,333	34,570	33,384
Nondefense	24,946	20,649	25,597	27,335	28,315	27,909	29,111	29,356	28,382	28,306	28,341
Health	6,229	6,911	8,914	9,492	10,055	10,019	10,470	10,601	10,778	11,243	11,205
Space research and technology	4,617	3,476	6,186	6,699	6,744	6,811	7,061	7,357	7,124	6,904	6,900
General science	2,079	2,375	2,586	2,711	2,659	2,623	2,583	2,597	2,585	2,624	2,660
Energy	6,076	3,047	2,925	3,038	3,153	2,609	2,736	2,643	2,290	2,001	1,922
Natural resources and environment	1,685	1,351	1,487	1,628	1,688	1,756	1,776	1,848	1,637	1,632	1,640
Transportation	1,496	1,314	1,121	1,266	1,523	1,660	1,798	1,704	1,630	1,618	1,672
Agriculture	987	1,066	1,019	1,082	1,155	1,123	1,136	1,110	1,068	1,050	1,031
Education, training, employment, and social services	789	281	401	445	365	339	355	343	301	328	354
International affairs	211	268	402	389	371	372	242	267	229	168	212
Veterans' benefits and services	212	246	232	225	245	244	252	239	235	236	206
Commerce and housing credit	170	145	150	183	192	214	362	488	392	385	429
Community and regional development	201	64	72	91	95	56	65	65	45	48	40
Administration of justice	76	60	47	52	51	48	44	55	51	59	60
Income security	79	27	35	31	37	35	43	40	15	9	9
General government	37	22	18	4	4	1	0	1	2	2	2

NOTES: Data for 1980-96 are actual budget authority. Data for 1997 and 1998 are preliminary based on the FY 1998 budget. See appendix table 4-1 for GDP implicit price deflaters used to convert current dollars to constant 1992 dollars.

SOURCE: National Science Foundation, Science Resources Studies Division, *Federal R&D Funding by Budget Function: Fiscal Years 1996-98* (Arlington, VA: forthcoming).

See figure 4-28.

Appendix table 4-40.
Federal basic research funding, by budget function: FYs 1980, 1985, and 1990-98

Function	1980	1985	1990	1991	1992	1993	1994	1995	1996	1997	1998
Millions of current dollars											
Total	4,716	7,810	11,288	12,405	12,973	13,440	13,552	13,772	14,443	14,853	15,296
Health	1,761	3,243	4,661	5,021	5,506	5,700	5,889	6,068	6,395	6,826	7,015
General science	1,152	1,779	2,306	2,526	2,532	2,553	2,542	2,622	2,662	2,773	2,886
Space research and technology	482	498	1,389	1,479	1,499	1,588	1,796	1,614	1,685	1,557	1,517
National defense	552	856	964	1,188	1,147	1,323	1,174	1,181	1,165	1,133	1,191
Energy	200	428	761	878	921	917	921	930	1,182	1,219	1,313
Agriculture	246	406	456	486	528	553	567	565	547	545	563
Natural resources and environment	136	206	336	389	383	376	224	187	147	149	157
Transportation	79	255	242	246	266	238	220	389	456	445	429
Education, training, employment, and social services	61	86	106	115	118	121	145	153	140	139	146
Commerce and housing credit	15	23	31	39	35	34	38	35	37	39	40
Veterans' benefits and services	14	15	16	16	16	16	16	16	13	14	14
Administration of justice	9	4	9	6	5	5	5	9	12	12	24
Community and regional development	8	6	3	10	11	10	9	3	0	0	0
General government	–	4	3	0	0	0	0	0	0	0	0
International affairs	0	4	4	6	6	8	6	0	2	2	1
Income security	1	0	0	0	0	0	0	0	0	0	0
Millions of constant 1992 dollars[a]											
Total	7,953	9,966	12,111	12,762	12,973	13,101	12,907	12,799	13,118	13,156	13,186
Health	2,970	4,136	5,001	5,166	5,506	5,556	5,609	5,639	5,808	6,046	6,047
General science	1,943	2,269	2,474	2,599	2,532	2,488	2,421	2,437	2,418	2,456	2,488
Space research and technology	813	635	1,490	1,522	1,499	1,548	1,710	1,500	1,530	1,379	1,308
National defense	931	1,092	1,034	1,222	1,147	1,289	1,118	1,098	1,058	1,004	1,027
Energy	337	546	817	903	921	894	877	864	1,074	1,080	1,132
Agriculture	415	518	489	500	528	539	540	525	497	483	485
Natural resources and environment	229	263	361	400	383	366	213	174	134	132	135
Transportation	133	325	260	253	266	232	210	362	414	394	370
Education, training, employment, and social services	103	110	114	118	118	118	138	142	127	123	126
Commerce and housing credit	25	29	33	40	35	33	36	33	34	35	34
Veterans' benefits and services	24	19	17	16	16	16	15	15	12	12	12
Administration of justice	15	5	10	6	5	5	5	8	11	11	21
Community and regional development	13	8	3	10	11	10	9	3	0	0	0
General government	–	5	3	0	0	0	0	0	0	0	0
International affairs	0	5	4	6	6	8	6	0	2	2	1
Income security	2	0	0	0	0	0	0	0	0	0	0

NOTE: Data for 1980-96 are actual budget authority. Data for 1997 and 1998 are preliminary based on the FY 1998 budget.

[a]See appendix table 4-1 for GDP implicit price deflaters used to convert current dollars to constant 1992 dollars.

SOURCE: National Science Foundation, Science Resources Studies Division, *Federal R&D Funding by Budget Function: Fiscal Years 1996-98* (Arlington, VA: forthcoming).

Appendix table 4-41.
Distribution of government R&D budget appropriations, by socioeconomic objective: Most recent year
(Percentages)

Objective	United States (1996)	Japan (1996)	Germany (1995)	France (1996)	United Kingdom (1995)	Italy (1995)	Canada (1995)
Total (millions of U.S. $)[a]	69,049	15,068	15,285	13,255	8,184	6,478	3,264
Agriculture, forestry, and fishing	2.4	3.4	2.6	3.6	4.6	2.7	13.8
Industrial development	0.6	3.8	13.2	4.8	9.3	8.8	10.4
Energy	3.7	19.8	3.5	4.7	0.9	3.1	8.2
Infrastructure	2.7	2.0	1.6	0.5	1.8	0.5	5.1
Transport and telecommunications	2.6	1.7	0.5	NA	0.3	NA	3.9
Urban and rural planning	0.1	0.3	1.1	NA	1.5	NA	1.2
Environmental protection	0.7	0.6	3.5	2.0	2.1	2.4	2.5
Health	17.6	2.8	3.1	5.2	7.7	8.8	8.9
Social development and services	1.0	1.1	2.4	0.9	2.5	2.8	3.7
Earth and atmosphere	1.2	1.3	2.4	0.8	2.2	1.4	1.6
Advancement of knowledge	4.1	52.1	52.8	35.2	24.8	52.8	33.4
Advancement of research	4.1	11.1	14.6	19.2	6.1	8.0	14.1
General university funds	–	41.0	38.2	16.0	18.7	44.8	19.4
Civil space	11.4	7.0	5.1	10.9	2.9	8.7	7.5
Defense	54.7	6.2	9.1	29.0	40.8	4.7	4.8
Not elsewhere classified	0.0	0.0	0.7	2.5	0.4	3.3	0.0

NA = not separately available but included in subtotal; – = the United States does not have an equivalent to general university funds

NOTES: Percentages may not add to 100 because of rounding. U.S. data are based on budget authority. Because of general university funds and slight differences in accounting practices, the distribution of government budgets among socioeconomic objectives may not completely reflect the actual distribution of government-funded research in particular objectives. Japanese data are based on science and technology budget data, which include items other than R&D. Such items are a small proportion of the budget; therefore, the data may still be used as an approximate indicator of relative government emphasis on R&D by objective.

[a]Conversions of foreign currencies to U.S. dollars are calculated with purchasing power parity exchange rates. (See appendix table 4-2.)

SOURCES: National Science Foundation, Science Resources Studies Division, *Federal R&D Funding by Budget Function: Fiscal Years 1996-98* (Arlington, VA: forthcoming); and Organisation for Economic Co-operation and Development, Main Science and Technology Indicators database (Paris: August 1997).

See figure 4-26.

Appendix table 4-42.
International R&D expenditures and R&D as a percentage of GDP: 1981-97

	United States	Japan	Germany[a]	France	United Kingdom	Italy	Canada
Total R&D expenditures in billions of constant 1992 U.S. dollars[b]							
1981	109.2	35.0	23.8	16.8	17.6	7.0	5.3
1982	114.9	37.6	24.5	18.0	NA	7.2	5.7
1983	122.6	40.5	25.0	18.5	17.0	7.7	5.8
1984	134.3	43.6	25.7	19.6	NA	8.4	6.3
1985	145.5	48.4	28.3	20.4	18.5	9.6	6.8
1986	148.8	49.1	29.2	20.7	19.4	9.9	7.2
1987	151.4	52.5	31.3	21.5	19.7	10.7	7.3
1988	155.0	56.7	32.4	22.5	20.3	11.4	7.4
1989	157.8	62.1	33.8	24.0	20.9	12.0	7.6
1990	162.0	67.2	34.1	25.4	21.3	12.8	8.0
1991	165.0	68.6	36.5	25.7	19.6	13.2	8.1
1992	164.9	69.6	37.2	26.5	20.7	13.6	8.4
1993	161.0	67.4	35.6	25.8	20.7	12.4	8.9
1994	160.5	66.4	35.5	25.2	20.7	11.8	9.2
1995	170.1	70.6	35.4	25.2	19.9	11.8	9.3
1996	175.6	NA	33.1	NA	NA	11.6	9.3
1997	182.2	NA	NA	NA	NA	NA	NA
R&D expenditures as a percentage of GDP							
1981	2.32	2.13	2.43	1.97	2.37	0.88	1.25
1982	2.49	2.22	2.52	2.06	NA	0.91	1.40
1983	2.55	2.35	2.52	2.11	2.19	0.95	1.37
1984	2.61	2.43	2.51	2.21	NA	1.01	1.41
1985	2.74	2.58	2.72	2.25	2.23	1.13	1.45
1986	2.71	2.55	2.73	2.23	2.25	1.13	1.49
1987	2.68	2.62	2.88	2.27	2.19	1.19	1.44
1988	2.64	2.66	2.86	2.28	2.14	1.22	1.39
1989	2.60	2.77	2.87	2.33	2.15	1.24	1.39
1990	2.64	2.85	2.75	2.41	2.18	1.30	1.47
1991	2.71	2.82	2.61	2.41	2.11	1.32	1.52
1992	2.64	2.76	2.48	2.42	2.13	1.31	1.57
1993	2.52	2.68	2.43	2.45	2.15	1.26	1.63
1994	2.43	2.64	2.33	2.38	2.11	1.16	1.62
1995	2.52	2.78	2.28	2.34	2.05	1.14	1.61
1996	2.55	NA	2.26	NA	NA	1.13	1.59
1997	2.59	NA	NA	NA	NA	NA	NA

Appendix table 4-42.
International R&D expenditures and R&D as a percentage of GDP: 1981-97

	United States	Japan	Germany[a]	France	United Kingdom	Italy	Canada
Total R&D expenditures in billions of constant 1992 units of national currency[c]							
1981	109.2	6,678.0	52.2	110.0	11.0	10,469.1	6.7
1982	114.9	7,171.3	53.7	117.5	NA	10,841.8	7.3
1983	122.6	7,757.3	54.6	121.3	10.8	11,548.6	7.4
1984	134.3	8,335.2	55.9	128.2	NA	12,576.3	8.0
1985	145.5	9,249.3	61.7	133.4	11.6	14,388.2	8.7
1986	148.8	9,406.9	63.4	135.4	12.2	14,887.0	9.2
1987	151.4	10,055.2	67.8	140.9	12.4	16,103.5	9.3
1988	155.0	10,825.8	70.0	147.2	12.8	17,124.5	9.4
1989	157.8	11,832.1	72.8	156.4	13.1	17,954.5	9.6
1990	162.0	12,820.3	73.7	165.9	13.4	19,161.9	10.2
1991	165.0	13,146.5	78.6	166.7	12.7	19,760.0	10.3
1992	164.9	13,001.1	76.4	169.4	12.7	19,660.7	10.7
1993	161.0	12,655.4	73.9	169.6	13.1	18,698.4	11.4
1994	160.5	12,510.7	72.8	168.5	13.4	17,608.1	11.8
1995	170.1	13,303.9	72.6	169.4	13.3	17,787.7	12.0
1996	175.6	NA	72.7	NA	NA	17,776.9	12.0

NA = not available

[a]German data before 1991 are for West Germany only.

[b]Conversions of foreign currencies to U.S. dollars are calculated with purchasing power parity exchange rates. Constant 1992 dollars are based on U.S. GDP implicit price deflators. (See appendix tables 4-1 and 4-2.)

[c]Constant foreign currencies are based on deflation with each countries' GDP implicit price deflators.

SOURCES: National Science Foundation, Science Resources Studies Division, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; and Organisation for Economic Co-operation and Development, Main Science and Technology Indicators database (Paris: August 1997).

See figures 4-18, 4-19, 4-20, and 4-21.

Appendix table 4-43.
R&D as a percentage of GDP in selected former communist countries: 1990-95
(Percentages)

	Russian Federation	Czech Republic	Hungary	Poland
1990	2.03	NA	NA	NA
1991	1.43	2.12	1.07	NA
1992	0.74	1.83	1.05	NA
1993	0.77	1.35	0.98	NA
1994	0.84	1.25	0.89	0.82
1995	0.73	1.15	0.75	0.74

NA = not available

SOURCES: Organisation for Economic Co-operation and Development, Main Science and Technology Indicators database (Paris: August 1997); and Centre for Science Research and Statistics, *Russian Science and Technology at a Glance: 1996* (Moscow: 1997).

See figure 4-22.

Appendix table 4-44.
International nondefense R&D expenditures and R&D as a percentage of GDP: 1981-97

	United States	Japan	Germany[a]	France	United Kingdom	Italy	Canada
Total nondefense R&D expenditures in billions of constant 1992 U.S. dollars[b]							
1981	81.4	34.8	23.0	13.4	13.7	6.8	5.1
1982	82.6	37.4	23.7	14.5	NA	7.1	5.6
1983	86.3	40.3	24.0	15.2	13.1	7.4	5.6
1984	93.9	43.3	24.7	16.1	NA	8.0	6.1
1985	100.4	48.0	27.1	16.9	14.6	9.1	6.6
1986	101.9	48.8	28.0	17.0	15.6	9.4	7.0
1987	103.3	52.1	29.9	17.5	16.2	10.3	7.0
1988	107.8	56.2	31.0	18.3	17.1	10.8	7.1
1989	113.8	61.6	32.4	19.7	17.6	11.4	7.3
1990	120.9	66.6	32.6	20.5	18.0	12.4	7.7
1991	127.8	67.9	35.0	21.1	16.6	12.7	7.9
1992	129.4	68.9	35.8	22.4	17.8	13.1	NA
1993	126.3	66.5	34.5	22.0	17.8	11.9	8.7
1994	128.6	65.6	34.3	21.7	18.0	11.3	NA
1995	138.3	69.7	34.2	NA	17.2	11.5	9.1
1996	144.4	NA	NA	NA	NA	NA	NA
1997	151.7	NA	NA	NA	NA	NA	NA
Nondefense R&D expenditures as a percentage of GDP							
1981	1.73	2.12	2.34	1.57	1.84	0.85	1.21
1982	1.79	2.21	2.44	1.66	NA	0.89	1.36
1983	1.80	2.34	2.43	1.74	1.69	0.93	1.33
1984	1.83	2.41	2.42	1.82	NA	0.97	1.36
1985	1.89	2.56	2.60	1.87	1.76	1.07	1.41
1986	1.86	2.53	2.61	1.84	1.82	1.08	1.44
1987	1.83	2.60	2.75	1.85	1.79	1.15	1.39
1988	1.84	2.63	2.74	1.85	1.80	1.15	1.34
1989	1.88	2.75	2.75	1.92	1.81	1.18	1.34
1990	1.97	2.83	2.62	1.95	1.84	1.26	1.43
1991	2.10	2.79	2.51	1.98	1.79	1.27	1.49
1992	2.07	2.73	2.39	2.04	1.83	1.27	NA
1993	1.98	2.65	2.35	2.10	1.85	1.21	1.59
1994	1.95	2.60	2.25	2.05	1.84	1.11	NA
1995	2.05	2.74	2.20	NA	1.78	1.11	1.58
1996	2.10	NA	NA	NA	NA	NA	NA
1997	2.15	NA	NA	NA	NA	NA	NA

NA = not available

[a]German data before 1991 are for West Germany only.

[b]Conversions of foreign currencies to U.S. dollars are calculated with purchasing power parity exchange rates. Constant 1992 dollars are based on U.S. GDP implicit price deflators. (See appendix tables 4-1 and 4-2.)

SOURCES: National Science Foundation, Science Resources Studies Division, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; and Organisation for Economic Co-operation and Development, Main Science and Technology Indicators database (Paris: August 1997).

See figures 4-19 and 4-21.

Appendix table 4-45.
International R&D expenditures, by performing sector and source of funds: Mid-1990s

R&D performer	Total	Source of R&D funds: Industry	Government	Higher education	Private nonprofit	Abroad	Percent distribution, performers
			Billions of yen				
Japan, 1995 total	13,358	9,644	2,741	874	83	14	100.0
Industry	9,396	9,223	149	–	10	13	70.3
Government	1,391	10	1,379	1	–	–	10.4
Higher education	1,932	45	1,012	872	3	–	14.5
Private nonprofit	640	366	201	1	70	1	4.8
Percent distribution, sources	100.0	72.2	20.5	6.5	0.6	0.1	
			Millions of deutsch marks				
Germany, 1996 total	79,860	48,800	29,430	0	260	1,370	100.0
Industry	53,100	47,250	4,750	–	100	1,000	66.5
Government	11,500	400	10,770	–	160	170	14.4
Higher education	15,260	1150	13,910	–	–	200	19.1
Private nonprofit	–	–	–	–	–	–	0.0
Percent distribution, sources	100.0	61.1	36.9	0.0	0.3	1.7	
			Millions of francs				
France, 1994 total	175,563	85,462	73,049	996	1,503	14,553	100.0
Industry	108,568	82,266	14,062	21	33	12,186	61.8
Government	36,217	1,916	32,675	56	27	1,543	20.6
Higher education	28,407	896	26,046	716	104	646	16.2
Private nonprofit	2,369	384	266	203	1,339	178	1.3
Percent distribution, sources	100.0	48.7	41.6	0.6	0.9	8.3	
			Millions of pounds				
United Kingdom, 1995 total	14,328	6,877	4,777	117	505	2,052	100.0
Industry	9,379	6,478	1,122	–	–	1,780	65.5
Government	2,076	228	1,752	3	34	59	14.5
Higher education	2,695	167	1,823	114	380	211	18.8
Private nonprofit	177	5	79	–	90	3	1.2
Percent distribution, sources	100.0	48.0	33.3	0.8	3.5	14.3	
			Billions of lire				
Italy, 1996 total	20,985	10,380	9,692	0	0	913	100.0
Industry	12,113	10,035	1,427	–	–	651	57.7
Government	4,174	85	3,946	–	–	142	19.9
Higher education	4,698	260	4,318	–	–	120	22.4
Private nonprofit	–	–	–	–	–	–	0.0
Percent distribution, sources	100.0	49.5	46.2	0.0	0.0	4.4	
			Millions of Canadian dollars				
Canada, 1996 total	12,939	6,029	4,538	296	343	1,357	100.0
Industry	8,143	5,670	777	–	–	1,321	62.9
Government	1,841	27	1,809	–	–	5	14.2
Higher education	2,775	296	1,901	296	263	18	21.4
Private nonprofit	180	36	51	–	80	13	1.4
Percent distribution, sources	100.0	46.6	35.1	2.3	2.7	10.5	

– = assumed negligible or no data available

SOURCE: Organisation for Economic Co-operation and Development, unpublished tabulations.

See figure 4-23.

Appendix table 4-46.
R&D expenditures in the United States, by performing sector and domestic and foreign source of funds: 1980, 1987, and 1995
(Millions of U.S. dollars)

R&D performer	Total	Source of R&D funds					Percent distribution, performers
		Industry	Government	Higher education	Private nonprofit	Foreign	
Total 1980 expenditures	63,076	29,409	29,857	1,382	911	1,517	100.0
Industry	44,505	28,959	14,029	–	–	1,517	70.6
Government	7,831	–	7,831	–	–	–	12.4
Higher education	8,565	250	6,522	1,382	411	–	13.6
Other nonprofit	2,175	200	1,475	–	500	–	3.4
Percent distribution, sources	100.0	46.6	47.3	2.2	1.4	2.4	
Total 1987 expenditures	125,840	58,173	58,253	3,259	1,658	4,497	100.0
Industry	92,155	56,906	30,752	–	–	4,497	73.2
Government	13,588	–	13,588	–	–	–	10.8
Higher education	16,768	811	11,843	3,259	855	–	13.3
Other nonprofit	3,329	456	2,070	–	803	–	2.6
Percent distribution, sources	100.0	46.2	46.3	2.6	1.3	3.6	
Total 1995 expenditures	183,013	96,026	63,147	5,739	3,129	14,972	100.0
Industry	132,103	93,680	23,451	–	–	14,972	72.2
Government	17,231	–	17,231	–	–	–	9.4
Higher education	27,708	1,516	18,839	5,739	1,613	–	15.1
Other nonprofit	5,971	830	3,626	–	1,516	–	3.3
Percent distribution, sources	100.0	52.5	34.5	3.1	1.7	8.2	

– = assumed negligible or no data available

NOTE: Foreign sources represent funding from companies in the United States with foreign ownership of 50 percent or more.

SOURCES: National Science Foundation, Science Resources Studies Division, *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; and U.S. Bureau of Economic Analysis, unpublished tabulations.

See figure 4-23.

Appendix table 4-47.
Discrepancy between federal R&D support as reported by performers and by federal agencies: 1980-96
(Billions of dollars)

	All performers			Industrial performers		
	Performer-reported	Agency-reported	Difference	Performer-reported	Agency-reported	Difference
1980	29.9	29.8	0.0	12.8	13.0	–0.2
1981	33.7	33.1	0.6	15.0	14.9	0.1
1982	37.1	36.4	0.7	17.1	17.2	–0.1
1983	41.4	38.7	2.7	19.1	17.0	2.1
1984	46.3	42.2	4.1	21.7	18.6	3.0
1985	52.5	48.4	4.1	25.3	21.7	3.6
1986	54.5	51.4	3.1	26.0	24.2	1.8
1987	58.3	55.3	3.0	28.8	26.8	2.0
1988	59.9	56.8	3.2	28.2	26.7	1.5
1989	60.3	61.4	–1.1	26.4	28.5	–2.2
1990	61.5	63.6	–2.1	25.8	29.4	–3.6
1991	60.6	61.3	–0.7	24.1	26.4	–2.3
1992	60.7	65.6	–4.9	22.4	29.7	–7.4
1993	60.4	67.3	–7.0	20.8	30.2	–9.4
1994	60.7	67.3	–6.6	20.3	30.5	–10.2
1995	63.1	68.8	–5.6	21.2	30.5	–9.3
1996	62.8	69.1	–6.3	20.9	31.3	–10.3

NOTES: Performer-reported data are expenditures, and agency-reported data are obligations. Data for 1996 are preliminary. The differences in the two series are derived from unrounded data, not shown in the table.

SOURCES: National Science Foundation, Science Resources Studies Division (NSF/SRS), *National Patterns of R&D Resources: 1997 Data Update,* <<http://www.nsf.gov/sbe/srs/natpat97/start.htm>>; and NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997).

See figure 4-27.

Appendix table 4-48.
Distribution of strategic technology alliances between and within economic blocs, by technology: 1980-96

	Total[a]			Biotechnology			Information technologies			New materials		
	Total	Inter-region	Intra-region	Total	Inter-region	Intra-region	Total	Inter-region	Intra-region	Total	Inter-region	Intra-region
Number of international alliances												
1980	136	60	76	58	22	36	66	33	33	12	5	7
1981	156	66	90	46	13	33	95	46	49	15	7	8
1982	200	108	92	71	27	44	107	68	39	22	13	9
1983	210	106	104	45	20	25	133	69	64	32	17	15
1984	296	134	162	73	27	46	200	97	103	23	10	13
1985	386	160	226	132	54	78	201	84	117	53	22	31
1986	405	151	254	120	37	83	212	91	121	73	23	50
1987	404	164	240	126	56	70	212	83	129	66	25	41
1988	402	152	250	115	39	76	217	96	121	48	17	31
1989	355	148	207	78	37	41	233	92	141	44	19	25
1990	287	122	165	34	17	17	222	86	136	31	19	12
1991	264	119	145	34	17	17	212	95	117	18	7	11
1992	355	149	206	82	42	40	240	93	147	33	14	19
1993	399	165	234	117	50	67	226	92	134	56	23	33
1994	489	203	286	174	83	91	277	105	172	38	15	23
1995	587	244	343	199	98	101	340	122	218	48	24	24
1996	483	201	282	168	95	73	280	95	185	35	11	24
Percentage share, by interregional and intraregional distribution												
1980	100	44	56	100	38	62	100	50	50	100	42	58
1981	100	42	58	100	28	72	100	48	52	100	47	53
1982	100	54	46	100	38	62	100	64	36	100	59	41
1983	100	50	50	100	44	56	100	52	48	100	53	47
1984	100	45	55	100	37	63	100	49	52	100	43	57
1985	100	41	59	100	41	59	100	42	58	100	42	58
1986	100	37	63	100	31	69	100	43	57	100	32	68
1987	100	41	59	100	44	56	100	39	61	100	38	62
1988	100	38	62	100	34	66	100	44	56	100	35	65
1989	100	42	58	100	47	53	100	39	61	100	43	57
1990	100	43	57	100	50	50	100	39	61	100	61	39
1991	100	45	55	100	50	50	100	45	55	100	39	61
1992	100	42	58	100	51	49	100	39	61	100	42	58
1993	100	41	59	100	43	57	100	41	59	100	41	59
1994	100	42	58	100	48	52	100	38	62	100	39	61
1995	100	42	58	100	49	51	100	36	64	100	50	50
1996	100	42	58	100	57	43	100	34	66	100	31	69

Appendix table 4-48.
Distribution of strategic technology alliances between and within economic blocs, by technology: 1980-96

	Total[a]			Biotechnology			Information technologies			New materials		
	Number of interregional alliances											
	Europe-Japan	Europe-U.S.	Japan-U.S.	Europe-Japan	Europe-U.S.	Japan-U.S.	Europe-Japan	Europe-U.S.	Japan-U.S.	Europe-Japan	Europe-U.S.	Japan-U.S.
1980	5	40	15	0	15	7	5	20	8	0	5	0
1981	10	30	26	1	4	8	7	23	16	2	3	2
1982	15	54	39	2	11	14	9	37	22	4	6	3
1983	18	37	51	2	12	6	12	19	38	4	6	7
1984	19	60	55	0	18	9	14	41	42	5	1	4
1985	26	82	52	7	30	17	13	44	27	6	8	8
1986	26	78	47	1	22	14	19	46	26	6	10	7
1987	16	95	53	5	37	14	6	48	29	5	10	10
1988	15	98	39	1	30	8	11	62	23	3	6	8
1989	18	86	44	7	21	9	8	56	28	3	9	7
1990	22	66	34	3	12	2	15	42	29	4	12	3
1991	15	53	51	1	14	2	12	37	46	2	2	3
1992	17	89	43	3	33	6	12	52	29	2	4	8
1993	16	104	45	2	38	10	10	48	34	4	18	1
1994	18	145	40	5	71	7	12	63	30	1	11	3
1995	23	167	54	7	84	7	12	69	41	4	14	6
1996	16	135	50	6	76	13	9	50	36	1	9	1
	Number of intraregional alliances											
	Europe	Japan	U.S.	Europe	Japan	U.S.	Europe	Japan	U.S.	Europe	Japan	U.S.
1980	29	5	42	10	1	25	13	4	16	6	0	1
1981	30	12	48	8	2	23	18	8	23	4	2	2
1982	27	8	57	6	2	36	17	4	18	4	2	3
1983	33	20	51	9	2	14	17	15	32	7	3	5
1984	59	15	88	14	4	28	40	7	56	5	4	4
1985	105	35	86	38	7	33	60	10	47	7	18	6
1986	78	58	118	15	16	52	52	15	54	11	27	12
1987	69	38	133	18	9	43	46	7	76	5	22	14
1988	86	23	141	31	5	40	48	7	66	7	11	13
1989	74	11	122	16	2	23	45	7	89	13	2	10
1990	34	10	121	5	0	12	25	9	102	4	1	7
1991	29	10	106	2	0	15	24	9	84	3	1	7
1992	41	10	155	10	1	29	25	9	113	6	0	13
1993	35	7	192	10	2	55	14	4	116	11	1	21
1994	39	12	235	25	1	65	9	9	154	5	2	16
1995	54	8	281	27	1	73	22	4	192	5	3	16
1996	43	11	228	20	0	53	18	8	159	5	3	16

[a]Includes all agreements reported for biotechnology, information technologies, and new materials.

SOURCE: J. Hagedoorn, Maastricht Economic Research Institute on Innovation and Technology, Cooperative Agreements and Technology Indicators database, unpublished tabulations.

See figures 4-31 and 4-32.

Appendix table 4-49.
Proportion of industrial R&D expenditures financed from foreign sources, by selected country: 1980-96
(Percentages)

	Canada	France	Germany[a]	Italy	Japan	United Kingdom	United States
1980	NA	NA	NA	NA	NA	NA	3.4
1981	7.4	7.0	1.2	4.3	0.1	8.7	NA
1982	10.7	4.8	1.3	4.7	0.1	NA	NA
1983	16.6	4.6	1.4	4.3	0.1	6.8	NA
1984	17.1	6.5	1.5	6.2	0.1	NA	NA
1985	14.3	6.9	1.4	6.1	0.1	11.1	NA
1986	13.6	8.0	1.4	7.3	0.1	12.2	NA
1987	16.8	8.7	1.5	6.9	0.1	12.0	4.9
1988	18.0	9.2	2.1	6.6	0.1	12.0	5.7
1989	16.7	10.9	2.7	6.5	0.1	13.4	6.6
1990	17.4	11.1	2.7	7.3	0.1	15.5	7.8
1991	18.0	11.4	2.6	8.6	0.1	16.0	7.8
1992	NA	12.0	2.5	5.4	0.1	15.0	9.0
1993	17.2	11.3	1.9	5.9	0.1	15.4	9.6
1994	17.0	11.2	2.0	8.1	0.1	16.0	10.6
1995	NA	NA	1.9	5.4	0.1	19.0	11.3
1996	17.0	NA	1.9	5.4	NA	NA	NA

NA = not available

NOTE: There are no data on foreign sources of U.S. industrial R&D performance. The figures shown here to approximate such foreign involvement are the estimated percentages of U.S. industrial performance undertaken by majority-owned (that is, 50 percent or more) nonbank U.S. affiliates of foreign companies.

[a]German data before 1991 are for West Germany only.

SOURCES: U.S. Bureau of Economic Analysis, unpublished tabulations; and Organisation for Economic Co-operation and Development, Main Science and Technology Indicators database (Paris: August 1997).

See figure 4-24.

Appendix table 4-50.
Company-financed R&D performed abroad by U.S. companies and their foreign subsidiaries, by industry: 1985-95

Industry	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Millions of current U.S. dollars											
Total	3,650	4,624	5,226	6,208	6,706	7,952	9,147	10,063	9,565	9,395	13,052
Food, kindred, and tobacco products	75	69	37	27	42	41	66	88	112	117	142
Chemicals and allied products	843	1,071	1,243	1,548	1,532	2,007	2,401	2,676	2,833	2,456	4,194
Industrial and other chemicals	444	579	625	855	609	720	1,009	1,045	1,318	917	1,632
Drugs and medicines	399	492	618	693	923	1,287	1,392	1,631	1,561	1,539	2,562
Petroleum refining and extraction	47	40	47	59	47	76	107	119	104	111	76
Stone, clay, and glass products	D	D	D	D	D	59	38	41	38	27	31
Primary metals	D	D	18	23	24	26	20	18	12	15	26
Fabricated metal products	21	26	40	D	D	95	86	109	119	125	111
Machinery	689	951	1,233	1,326	1,432	1,451	1,476	1,439	340	308	501
Electrical equipment	591	D	432	591	573	770	651	568	525	495	872
Transportation equipment	1,025	D	D	1,750	1,916	2,055	2,402	D	D	D	D
Professional and scientific instruments	169	212	317	404	474	611	656	685	751	900	988
Nonmanufacturing industries	18	27	64	146	256	415	778	835	1,770	1,500	2,206
Millions of constant 1992 U.S. dollars[a]											
Total	4,646	5,738	6,292	7,210	7,474	8,492	9,399	10,063	9,321	8,951	12,134
Food, kindred, and tobacco products	95	86	45	31	47	44	68	88	109	111	132
Chemicals and allied products	1,073	1,329	1,496	1,798	1,707	2,143	2,467	2,676	2,761	2,340	3,899
Industrial and other chemicals	565	718	752	993	679	769	1,037	1,045	1,284	874	1,517
Drugs and medicines	508	610	744	805	1,029	1,374	1,430	1,631	1,521	1,466	2,382
Petroleum refining and extraction	60	50	57	69	52	81	110	119	101	106	71
Stone, clay, and glass products	D	D	D	D	D	63	39	41	37	26	29
Primary metals	D	D	22	27	27	28	21	18	12	14	24
Fabricated metal products	27	32	48	D	D	101	88	109	116	119	103
Machinery	877	1,180	1,484	1,540	1,596	1,550	1,517	1,439	331	293	466
Electrical equipment	752	D	520	686	639	822	669	568	512	472	811
Transportation equipment	1,305	D	D	2,032	2,135	2,195	2,468	D	D	D	D
Professional and scientific instruments	215	263	382	469	528	653	674	685	732	857	919
Nonmanufacturing industries	23	34	77	170	285	443	799	835	1,725	1,429	2,051

Appendix table 4-50.
Company-financed R&D performed abroad by U.S. companies and their foreign subsidiaries, by industry: 1985-95

Industry	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
						Percentage of domestic funding					
Total	6.4	7.7	8.5	9.3	9.1	9.7	10.1	10.7	10.1	9.7	12.0
Food, kindred, and tobacco products	6.6	5.4	3.1	2.3	3.4	3.3	5.2	6.3	8.3	7.9	9.1
Chemicals and allied products	10.1	12.4	13.2	14.3	12.8	15.2	16.6	17.7	17.0	14.8	24.2
Industrial and other chemicals	9.2	11.6	11.7	14.4	9.5	9.9	13.5	14.6	17.5	13.2	22.9
Drugs and medicines	11.5	13.5	15.1	14.1	16.7	21.8	20.0	20.6	17.1	16.0	25.1
Petroleum refining and extraction	2.1	2.0	2.5	3.0	2.2	3.3	4.3	5.2	4.9	5.7	4.3
Stone, clay, and glass products	D	D	D	D	D	11.0	8.4	8.6	7.2	4.9	7.0
Primary metals	D	D	2.5	3.7	3.6	3.6	2.8	3.5	1.9	2.2	4.5
Fabricated metal products	2.7	3.3	6.3	D	D	12.9	11.5	15.1	12.7	14.4	11.8
Machinery	6.4	8.9	11.7	11.1	10.7	10.7	10.8	10.4	4.1	3.8	5.2
Electrical equipment	6.4	D	4.1	5.9	6.0	8.3	7.3	6.0	4.5	3.7	5.1
Transportation equipment	8.5	D	D	12.6	13.1	14.4	16.2	D	D	D	D
Professional and scientific instruments	3.7	4.5	6.4	7.6	8.3	9.7	9.6	9.4	10.0	11.2	11.6
Nonmanufacturing industries	0.4	0.6	1.2	2.0	2.5	2.5	3.4	3.6	7.2	6.3	8.0

D = withheld to avoid disclosing operations of individual companies

[a]See appendix table 4-1 for GDP implicit price deflators used to convert current dollars to constant 1992 dollars.

SOURCE: National Science Foundation, Science Resources Studies Division, *Research and Development in Industry: 1995* (Arlington, VA: 1998, forthcoming).

See figure 4-35.

Appendix table 4-51.
Expenditures for R&D performance for majority-owned foreign affiliates of U.S. parent companies, by region/country: 1982 and 1989-94
(Millions of U.S. dollars)

Region/country	1982	1989	1990	1991	1992	1993	1994
Total	3,647	7,048	10,187	9,396	11,084	10,951	11,482
Canada	545	914	1,159	1,039	1,006	1,025	852
Europe	2,591	5,178	7,952	7,143	8,024	7,533	8,255
Belgium	181	317	388	383	458	455	523
France	263	545	882	907	1,021	941	1,249
Germany	893	1,496	2,561	2,504	2,726	2,567	3,216
Ireland	31	134	539	573	664	664	464
Italy	136	294	476	327	326	304	389
Netherlands	101	360	459	478	482	393	260
Spain	36	115	103	100	323	320	D
Sweden	29	33	130	83	84	48	67
Switzerland	51	67	76	91	101	109	145
United Kingdom	805	1,673	2,221	1,606	1,737	1,634	1,706
Other European countries	65	144	117	91	102	98	D
Asia and Pacific	294	760	846	916	1,719	1,964	1,817
Japan	104	488	512	596	664	881	1,088
Australia	120	181	197	144	173	175	225
Singapore	D	25	54	87	360	312	243
Other Asian and Pacific countries	D	66	83	89	522	596	261
Latin America and other Western Hemisphere	179	153	201	253	291	383	502
Brazil	96	90	113	149	172	220	253
Mexico	38	37	53	64	76	D	189
Other Latin America	45	26	35	40	43	D	60
Middle East	11	32	16	30	25	28	38
Africa	26	11	13	15	19	18	19
South Africa	23	9	10	12	16	14	14
Other African countries	3	2	3	3	3	4	5

D = withheld to avoid disclosing operations of individual companies

NOTES: The data include foreign direct investments of nonbank U.S. affiliates conducted by and for the foreign affiliates. The data exclude expenditures for R&D conducted for others under a contract. Benchmark survey statistics are reported for 1982, 1989, and 1994. Data are preliminary for 1994. Expenditures reported here differ from the data in appendix table 4-50.

SOURCE: U.S. Bureau of Economic Analysis, *U.S. Direct Investment Abroad: Operations of U.S. Parent Companies and Their Foreign Affiliates* (Washington, DC: U.S. Government Printing Office, annual series).

See figures 4-33, 4-34, and 4-36.

Appendix table 4-52.
Foreign R&D expenditures in the United States, by industry and region/country: 1980-95
(Millions of current U.S. dollars)

Industry and region/country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total	1,946	3,110	3,744	4,164	4,738	5,240	5,804	6,521	7,834	9,465	11,522	11,872	13,864	14,199	15,566	17,666
Expenditures by industry																
Petroleum	D	253	255	310	366	388	380	311	364	387	520	438	586	428	407	387
Manufacturing	D	2,645	3,133	3,553	4,058	4,478	5,011	5,573	6,903	8,398	9,868	10,177	11,383	11,842	12,970	14,743
Food and kindred products	19	32	39	44	43	51	54	58	106	187	192	195	245	266	294	301
Chemicals and allied products	834	1,580	1,870	2,037	2,349	2,627	2,782	3,220	3,719	4,371	5,243	5,755	D	6,580	7,003	8,326
Industrial chemicals	454	1,085	1,329	1,397	1,620	1,836	1,657	1,899	2,126	2,284	2,498	2,391	D	1,906	1,993	2,540
Other chemicals	146	179	170	181	200	228	167	230	276	252	372	427	490	442	504	531
Drugs and medicines	234	316	371	459	529	563	958	1,091	1,318	1,835	2,373	2,937	3,211	4,232	4,506	5,255
Primary metal industries	24	71	79	59	66	102	97	91	102	155	166	189	173	201	170	172
Fabricated metal products	21	20	28	82	54	64	76	67	106	209	152	145	D	172	178	176
Machinery, except electrical	189	284	297	350	355	342	286	476	692	1,070	1,190	1,094	1,098	1,019	954	1,089
Office and computing machines	NA	NA	NA	NA	NA	NA	NA	370	497	622	794	788	774	624	479	552
Other	NA	NA	NA	NA	NA	NA	NA	106	195	448	396	306	324	395	475	537
Electrical equipment	318	385	505	613	799	977	1,366	1,105	1,389	1,371	1,817	1,647	1,953	2,168	2,613	2,770
Transportation equipment	101	136	150	92	95	83	124	76	225	265	193	207	D	266	375	478
Professional and scientific instruments	32	52	47	42	42	58	112	279	242	366	420	472	D	581	671	682
Nonmanufacturing industries	D	212	356	301	314	374	413	637	567	680	1,134	1,257	1,895	1,929	2,189	2,536
Services	37	43	41	51	60	54	77	243	69	108	384	358	744	932	996	922
Other	D	169	315	250	254	320	336	394	498	572	750	899	1,151	997	1,193	1,614
Expenditures by region/country																
Canada	135	777	1,032	1,212	1,405	1,550	1,542	1,666	1,804	1,758	1,944	2,060	2,113	2,159	2,332	1,396
Europe	1,544	1,936	2,229	2,324	2,632	2,918	3,450	3,881	4,754	6,022	7,520	7,785	8,993	9,362	10,313	13,370
United Kingdom	312	405	520	559	664	748	764	833	1,171	1,645	1,889	2,046	2,177	2,211	2,499	2,419
Germany	380	436	529	591	602	671	851	1,139	1,242	1,503	1,764	1,720	2,100	2,209	2,425	3,976
France	146	204	232	215	261	166	352	366	435	572	812	953	1,204	1,235	1,449	1,644
Netherlands	299	373	397	387	432	514	517	542	618	703	784	663	696	697	736	838
Switzerland	338	416	447	463	546	625	744	765	962	1,195	1,669	1,849	2,064	2,423	2,444	3,088
Sweden	36	53	54	62	63	116	141	128	166	214	281	237	308	200	289	807
Other European countries	33	49	50	47	64	78	81	108	160	190	321	317	444	387	471	598
Japan	88	142	141	171	210	267	292	307	571	822	1,307	1,353	1,709	1,801	1,790	1,867
Latin America	D	D	D	401	423	427	427	391	352	400	386	397	580	539	637	280
All other countries	D	D	D	56	68	78	93	276	353	463	365	277	469	338	494	753

D = withheld to avoid disclosing operations of individual companies; NA = not available

NOTES: The data include foreign direct investments of nonbank U.S. affiliates with 10 percent or more foreign ownership and exclude expenditures for R&D conducted for others under a contract.

SOURCE: U.S. Bureau of Economic Analysis, *Foreign Direct Investment in the United States: Operations of U.S. Affiliates of Foreign Companies* (Washington, DC: U.S. Government Printing Office, annual series).

Appendix table 4-53.
R&D expenditures in the United States by majority-owned nonbank U.S. affiliates of foreign companies, by industry of affiliate and country of ultimate beneficial owner: 1980 and 1987-95
(Millions of current U.S. dollars)

Industry and region/country	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total	1,517	4,497	5,485	6,720	8,511	9,127	10,745	11,262	12,671	14,972
Expenditures by industry										
Petroleum	175	283	339	378	D	D	551	420	400	382
Manufacturing	1,245	3,809	4,773	5,915	7,282	7,839	9,056	9,560	10,855	12,913
Food and kindred products	19	58	105	185	189	190	240	260	283	294
Chemicals and allied products	733	D	D	D	3,832	4,266	4,692	5,167	5,654	7,298
Industrial and other chemicals	501	D	D	D	1,465	D	D	D	1,429	2,919
Drugs and medicines	232	1,075	1,293	1,806	2,367	D	D	D	4,225	4,379
Rubber products	8	50	98	117	155	150	305	216	210	211
Stone, clay, and glass products	10	32	61	62	114	102	113	106	151	157
Primary metal industries	D	38	37	75	69	82	79	83	77	71
Fabricated metal products	D	62	100	201	138	132	136	155	165	162
Machinery, except electrical	92	D	446	556	645	602	609	529	551	636
Computer and office equipment	28	D	285	295	380	341	328	247	203	248
Other	65	79	161	260	264	261	281	282	348	388
Electrical and electronic equipment	285	D	1,114	1,078	1,533	1,562	1,880	2,061	2,549	2,704
Household audio & video, and comm. equip.	66	555	777	721	971	959	1,129	1,133	1,345	1,515
Electronic components and other	219	D	337	357	562	603	752	928	1,204	1,189
Transportation equipment	10	D	D	D	106	159	203	231	331	434
Professional and scientific instruments	28	254	210	295	333	411	556	524	578	593
Nonmanufacturing industries	97	405	373	427	D	D	1,138	1,282	1,416	1,677
Services	5	59	42	77	D	D	211	420	455	430
Wholesale trade	69	312	300	297	571	682	803	745	839	1,113
Motor vehicles and equipment	D	86	67	71	283	277	252	220	182	179
Electrical goods	5	71	107	D	145	224	220	157	236	336
Other	23	34	31	53	D	D	124	117	122	134

Appendix table 4-53.
R&D expenditures in the United States by majority-owned nonbank U.S. affiliates of foreign companies, by industry of affiliate and country of ultimate beneficial owner: 1980 and 1987-95
(Millions of current U.S. dollars)

Industry and region/country	1980	1987	1988	1989	1990	1991	1992	1993	1994	1995
Expenditures by region/country										
Canada	113	D	D	D	D	D	D	D	D	1,350
Europe	1,217	3,458	4,241	5,414	6,762	7,275	8,325	8,628	9,487	11,609
France	39	332	402	510	766	913	1,230	1,190	1,383	1,572
Germany	281	824	963	1,216	1,435	1,596	1,855	2,003	2,147	3,663
Italy	D	D	73	93	151	143	91	132	157	180
Netherlands	D	540	615	690	757	642	685	674	719	816
Sweden	D	124	160	205	271	225	322	180	263	D
Switzerland	329	D	D	1,060	1,455	1,637	1,873	2,117	2,127	2,471
United Kingdom	247	790	1,085	1,568	1,809	1,987	2,090	2,139	2,428	2,315
Other European countries	16	47	D	72	118	132	179	193	263	D
Asia and Pacific	D	179	345	412	796	834	1,080	1,232	1,397	1,646
Japan	D	133	282	369	709	741	938	1,112	1,200	1,281
Other	D	46	63	43	87	93	142	120	197	365
Latin America & other Western Hemisphere	155	329	302	352	314	330	534	D	610	274
Middle East	2	14	9	10	9	9	20	38	62	71
Africa	D	D	D	D	D	D	4	5	2	D

D = withheld to avoid disclosing operations of individual companies

NOTES: The data include foreign direct investments of nonbank U.S. affiliates with 50 percent or more foreign ownership. These R&D expenditures are a subset of total foreign R&D expenditures reported in appendix table 4-52. The data exclude expenditures for R&D conducted for others under a contract.

SOURCE: U.S. Bureau of Economic Analysis, unpublished tabulations.

See figures 4-33, 4-34, and 4-37.

Appendix table 4-54.
Support for R&D and R&D plant from state government sources: 1995

	Support for R&D and R&D plant (thousand $)	Ranking	Dollars per capita	Ranking	Share state spending (percent)	Ranking
Total states	2,514,169		9.59		0.35	
Alabama	230	50	0.05	50	0.00	50
Alaska	5,167	42	8.56	27	0.11	39
Arizona	68,627	12	16.27	10	0.68	6
Arkansas	2,142	43	0.86	44	0.03	44
California	248,756	1	7.87	29	0.29	27
Colorado	24,135	24	6.44	33	0.30	24
Connecticut	6,986	40	2.13	41	0.06	41
Delaware	7,240	39	10.10	18	0.22	32
Florida	245,154	2	17.31	7	0.63	8
Georgia	183,526	4	25.49	4	1.02	3
Hawaii	35,406	23	29.83	2	0.57	9
Idaho	14,304	29	12.30	12	0.52	12
Illinois	105,513	7	8.92	24	0.40	17
Indiana	23,838	25	4.11	37	0.20	34
Iowa	49,240	17	17.33	6	0.54	10
Kansas	80,907	10	31.54	1	1.09	2
Kentucky	5,462	41	1.42	42	0.05	42
Louisiana	12,338	32	2.84	40	0.08	40
Maine	12,140	34	9.78	19	0.32	23
Maryland	48,983	18	9.72	21	0.34	21
Massachusetts	21,803	27	3.59	38	0.12	38
Michigan	58,959	15	6.17	34	0.22	31
Minnesota	23,671	26	5.13	36	0.17	35
Mississippi	1,743	44	0.65	47	0.03	47
Missouri	55,448	16	10.41	17	0.48	13
Montana	10,456	37	12.02	13	0.45	15
Nebraska	45,816	19	27.99	3	1.12	1
Nevada	984	45	0.64	48	0.03	46
New Hampshire	10,584	36	9.22	22	0.46	14
New Jersey	69,009	11	8.69	26	0.30	25
New Mexico	12,846.69	31	7.62	30	0.21	33
New York	149,597	6	8.25	28	0.24	30
North Carolina	100,161	8	13.92	11	0.54	11
North Dakota	15,676	28	24.46	5	0.89	4
Ohio	82,989	9	7.44	31	0.28	28
Oklahoma	9,977	38	3.04	39	0.13	37
Oregon	35,677	22	11.36	15	0.33	22
Pennsylvania	204,850	3	16.97	8	0.65	7
Rhode Island	746	47	0.75	46	0.02	48
South Carolina	40,529	21	11.03	16	0.38	20
South Dakota	12,324	33	16.91	9	0.74	5
Tennessee	755	46	0.14	49	0.01	49
Texas	169,570	5	9.06	23	0.43	16
Utah	13,936	30	7.14	32	0.29	26
Vermont	490	49	0.84	45	0.03	45
Virginia	64,707	13	9.78	20	0.38	19
Washington	64,021	14	11.79	14	0.39	18
West Virginia	11,138	35	6.09	35	0.13	36
Wisconsin	45,033	20	8.79	25	0.28	29
Wyoming	557	48	1.16	43	0.03	43

NOTE: These are preliminary tabulations subject to revision and refinement.

SOURCE: Battelle Memorial Institute and the State Science and Technology Institute, *Survey of State Research and Development Expenditures: FY 1995* (Columbus, OH: forthcoming).

Appendix table 4-55.
State R&D expenditures, by performing sector and source of funds: 1995
(Millions of current dollars)

Performing sector:		Total R&D	Federal Govt.	Industry			Universities & colleges						U&C FFRDCs	Other nonprofit institutions[a]	Nonprofit FFRDCs
Funding sector:		Total R&D	Federal Govt.	Total	Federal Govt.[b]	Industry[b]	Total	Federal Govt.	Nonfederal govt.	Industry	U&C	Nonprofits	Federal Govt.[c]	Federal Govt.	Federal Govt.
State	Rank														
United States, total		183,013	17,343	132,103	23,451	108,652	22,101	13,331	1,655	1,492	4,024	1,599	5,405	2,806	831
Alabama	25	1,681	642	686	273	413	335	190	7	29	87	22	0	18	0
Alaska	47	163	61	30	D	D	72	37	6	5	24	0	0	1	0
Arizona	24	1,995	178	1,356	620	736	380	210	8	23	126	12	75	6	0
Arkansas	44	330	58	181	D	D	88	33	24	8	20	3	0	3	0
California	1	36,133	1,844	28,710	6,925	21,785	2,594	1,797	107	120	373	198	2,378	362	245
Colorado	20	2,603	168	1,865	274	1,591	394	260	22	24	52	35	125	46	5
Connecticut	13	4,311	18	3,906	389	3,517	377	228	19	20	78	32	0	10	0
Delaware	28	1,149	15	1,077	12	1,065	53	27	2	4	15	5	0	3	0
District of Columbia	18	3,128	2,106	672	17	656	181	133	1	13	20	15	0	169	0
Florida	12	5,223	554	4,101	1,634	2,467	559	317	41	36	135	29	0	8	0
Georgia	23	2,113	272	1,175	142	1,031	658	302	54	55	222	25	0	8	0
Hawaii	38	509	402	14	D	D	78	44	27	0	4	3	0	15	0
Idaho	32	914	28	827	D	D	59	20	14	7	16	2	0	1	0
Illinois	7	7,487	81	5,776	146	5,630	818	468	47	43	195	65	771	41	0
Indiana	17	3,163	62	2,721	382	2,339	376	197	22	35	101	20	0	4	0
Iowa	27	1,391	37	998	D	D	323	164	47	19	78	15	32	1	0
Kansas	34	764	12	569	D	D	181	70	39	11	53	8	0	1	0
Kentucky	36	594	6	452	4	448	135	60	10	17	44	5	0	1	0
Louisiana	41	423	45	61	D	D	315	136	72	21	66	19	0	2	0
Maine	42	345	4	286	D	D	32	16	2	4	9	1	0	23	0
Maryland	9	6,519	4,159	1,075	287	788	1,160	895	76	55	85	50	0	123	2
Massachusetts	4	9,969	316	7,416	1,458	5,958	1,147	825	13	89	92	128	345	587	159
Michigan	2	13,275	82	12,388	148	12,240	755	418	49	51	181	57	0	50	0
Minnesota	19	3,087	30	2,636	315	2,321	337	195	50	23	46	23	0	85	0
Mississippi	45	315	133	66	D	D	113	63	24	9	11	6	0	3	0
Missouri	21	2,499	55	2,028	584	1,443	397	213	21	37	93	33	0	18	0
Montana	48	119	34	17	D	D	67	27	13	6	20	1	0	2	0
Nebraska	43	336	23	150	D	D	157	55	42	11	46	3	0	6	0
Nevada	40	445	35	322	D	D	87	48	6	7	25	1	0	1	0
New Hampshire	35	598	31	472	36	436	93	60	4	4	13	12	0	2	0
New Jersey	5	9,128	344	8,200	197	8,002	443	209	40	26	136	33	126	11	4
New Mexico	15	3,295	481	1,461	1,380	81	230	157	17	11	39	7	1,109	6	7
New York	3	10,954	117	8,651	1,821	6,831	1,702	1,107	96	98	206	195	281	203	0
North Carolina	16	3,191	220	2,226	15	2,212	687	432	98	74	62	21	0	59	0
North Dakota	49	98	25	12	D	D	60	28	2	3	25	2	0	1	0
Ohio	10	5,314	599	4,001	574	3,428	643	375	48	54	107	59	0	72	0
Oklahoma	37	529	45	288	38	249	186	60	20	11	79	17	0	9	0
Oregon	30	1,089	56	741	35	706	259	158	30	12	37	21	0	33	0
Pennsylvania	8	6,919	228	5,331	376	4,955	1,140	754	35	120	164	66	32	189	0
Rhode Island	33	896	254	520	D	D	106	72	3	2	26	2	0	17	0

Appendix table 4-55.
State R&D expenditures, by performing sector and source of funds: 1995
(Millions of current dollars)

Performing sector:		Total R&D	Federal Govt.	Industry			Universities & colleges						U&C FFRDCs	Other nonprofit institutions[a]	Nonprofit FFRDCs
Funding sector:		Total R&D	Federal Govt.	Total	Federal Govt.[b]	Industry[b]	Total	Federal Govt.	Nonfederal govt.	Industry	U&C	Nonprofits	Federal Govt.[c]	Federal Govt.	Federal Govt.
State	Rank														
South Carolina	31	996	34	739	D	D	220	109	18	19	54	19	0	3	0
South Dakota	51	55	13	19	0	19	21	11	7	0	2	1	0	1	0
Tennessee	26	1,402	62	1,003	D	D	308	192	35	16	45	20	10	20	0
Texas	6	8,385	538	6,211	912	5,298	1,472	748	159	102	297	167	0	163	1
Utah	29	1,144	131	803	178	625	202	141	15	9	28	9	0	8	0
Vermont	46	308	5	248	D	D	54	33	2	5	10	4	0	1	0
Virginia	14	3,897	1,581	1,577	743	834	447	262	47	46	64	28	74	42	177
Washington	11	5,241	160	4,294	D	D	486	340	14	39	77	15	0	96	205
West Virginia	39	475	140	243	D	D	53	30	2	3	13	4	33	6	0
Wisconsin	22	2,226	40	1,706	33	1,673	473	271	43	17	92	51	0	7	0
Wyoming	50	87	9	25	D	D	40	15	3	2	17	3	0	13	0
Other/unknown		5,805	771	1,772	3,502	8,875	548	320	53	30	114	30	16	248	26

FFRDCs = federally funded research and development centers; U&C = universities and colleges; D = data have been withheld to avoid disclosing information about individual companies

NOTES: Data are based on annual reports by performers, except for the nonprofit sector. Details may not sum to totals because of rounding.

[a]State data for nonprofit performance using nonfederal funds are not available. For 1995, total nonprofit performance is estimated at $5,152 million. Industry provided an estimated $830 million to the nonprofit sector, and nonprofit institutions provided an estimated $1,516 million. These amounts are included in the total R&D "other/unknown" category.

[b]Federal support for industry R&D includes performance at industry FFRDCs; industry support of industry R&D includes all nonfederal sources.

[c]Includes total R&D expenditures of FFRDCs administered by academic institutions.

SOURCES: National Science Foundation, Science Resources Studies Division (NSF/SRS), *Research and Development in Industry: 1995* (Arlington, VA: 1998, forthcoming); NSF/SRS, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables (Arlington, VA: 1998, forthcoming); and NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997).

Appendix table 4-56.
Annual aggregate data on independent research and development: FYs 1963-96
(Millions of current dollars)

	Incurred by industry	Accepted by government IR&D program				Not accepted under IR&D program	DOD and NASA IR&D reimbursement	R&D obligations[a]		Percent of R&D performed by industry with funding from:[b]	
		Total accepted	DOD share	NASA share	Not reimbursed			DOD to industry	NASA to industry	DOD & NASA (1)	DOD (2)
1963	439	255	197	24	34	184	221	5,173	2,307	3.0	3.8
1964	419	272	199	50	23	147	249	4,880	3,369	3.0	4.1
1965	439	300	198	60	42	139	258	4,362	3,853	3.1	4.5
1966	502	357	224	69	64	145	293	4,557	3,928	3.5	4.9
1967	591	439	277	58	104	152	335	5,428	3,798	3.6	5.1
1968	776	579	338	61	180	197	399	5,090	3,382	4.7	6.6
1969	808	653	410	43	200	155	453	5,157	2,899	5.6	8.0
1970	753	597	376	44	177	156	420	4,524	2,521	6.0	8.3
1971	703	567	354	41	172	136	395	4,629	2,077	5.9	7.6
1972	936	725	392	40	293	211	432	5,108	1,960	6.1	7.7
1973	1,164	876	441	40	395	288	481	5,138	1,961	6.8	8.6
1974	1,175	921	467	39	415	254	506	5,173	1,785	7.3	9.0
1975	1,224	1,010	493	40	477	214	533	5,640	1,792	7.2	8.7
1976	1,388	1,061	544	41	476	327	585	6,019	2,042	7.3	9.0
1977	1,560	1,199	598	46	555	361	644	6,997	2,002	7.2	8.5
1978	1,788	1,365	643	49	673	423	692	7,317	2,043	7.4	8.8
1979	2,104	1,517	708	54	755	587	762	7,695	2,270	7.6	9.2
1980	2,373	1,728	812	57	859	645	869	9,022	1,924	7.9	9.0
1981	2,796	2,039	1,056	66	917	757	1,122	10,826	2,096	8.7	9.8
1982	3,654	2,821	1,338	67	1,416	833	1,405	13,795	1,433	9.2	9.7
1983	4,017	2,961	1,601	78	1,282	1,056	1,679	14,541	1,030	10.8	11.0
1984	5,173	3,897	1,884	86	1,927	1,276	1,970	15,967	1,263	11.4	11.8
1985	5,036	3,500	2,099	88	1,313	1,536	2,187	18,944	1,576	10.7	11.1
1986	5,042	3,537	2,198	77	1,262	1,505	2,275	21,502	1,584	9.9	10.2
1987	4,885	3,544	2,186	67	1,291	1,341	2,253	23,934	1,463	8.9	9.1
1988	4,825	3,694	2,181	89	1,424	1,131	2,270	23,295	1,962	9.0	9.4
1989	4,866	3,798	2,233	110	1,455	1,068	2,343	24,734	2,426	8.6	9.0
1990	4,910	3,766	2,158	131	1,477	1,144	2,289	24,443	3,285	8.3	8.8
1991	5,099	4,327	2,203	133	1,991	772	2,336	21,034	3,667	9.5	10.5
1992	4,903	4,320	2,117	84	2,119	583	2,201	24,107	3,765	7.9	8.8
1993	3,337	3,085	1,904	151	1,030	252	2,055	23,654	4,112	7.4	8.0
1994	3,068	2,842	1,746	167	929	226	1,913	23,408	4,305	6.9	7.5
1995	2,848	2,720	1,619	167	934	128	1,786	22,553	4,687	6.6	7.2
1996	3,031	2,863	1,768	172	923	168	1,940	24,395	5,258	6.5	7.2

DOD = Department of Defense; IR&D = independent research and development; NASA = National Aeronautics and Space Administration

NOTES: The significant decrease in reported statistics between FYs 1992 and 1993 is primarily due to (1) change in the Federal Acquisition Regulations definition of "major contractor" and (2) change in the Defense Contract Audit Agency criteria used in determining contractors to be reported. Previously, these criteria included contractors with auditable costs of $40 million or more; the current threshold is $70 million or more. The increase in the percentage of IR&D costs accepted is due to an expansion of the activities eligible for reimbursement.

[a]Includes R&D performed by federally funded research and development centers administered by the industrial sector.

[b]Percentages were calculated as follows: numerator in (1) is total DOD and NASA IR&D reimbursements, and denominator is total DOD and NASA R&D performed by industry, excluding IR&D; numerator in (2) is total DOD IR&D reimbursements, and denominator is DOD R&D performed by industry, excluding IR&D.

SOURCES: Defense Contract Audit Agency, *Independent Research and Development and Bid and Proposal Costs Incurred by Major Defense Contractors 1976-96* (Washington, DC: annual series); NASA, unpublished tabulations; J. Reppy, "Defense Department Payments for 'Company-Financed' R&D," Research Policy Vol. 6, No. 4 (October 1977): p. 403; National Science Foundation, Science Resources Studies Division (NSF/SRS), *Federal Funds for Research and Development, Detailed Historical Tables: Fiscal Years 1956-1996*, NSF 96-320 (Arlington, VA: 1996); and NSF/SRS, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997*, Detailed Statistical Tables, NSF 97-327 (Arlington, VA: 1997).

Appendix table 5-1.
Total, federally funded, and nonfederally funded academic R&D, by basic research, applied research, and development: 1960-97
(Percentages)

	Total academic R&D				Federally supported academic R&D				Nonfederally supported academic R&D			
	Total academic	Basic research	Applied research	Develop-ment	Total academic	Basic research	Applied research	Develop-ment	Total academic	Basic research	Applied research	Develop-ment
1960	**100.0**	68.8	26.3	4.9	**64.2**	75.2	20.6	4.2	**35.8**	57.1	36.7	6.2
1961	**100.0**	71.7	23.8	4.5	**66.8**	77.5	18.6	3.9	**33.2**	59.9	34.3	5.8
1962	**100.0**	74.2	21.8	4.0	**69.2**	79.5	17.3	3.3	**30.8**	62.4	31.9	5.7
1963	**100.0**	77.1	19.5	3.4	**71.2**	82.2	15.2	2.6	**28.8**	64.7	30.0	5.3
1964	**100.0**	77.9	18.6	3.5	**72.4**	82.8	14.3	3.0	**27.6**	65.1	29.9	5.0
1965	**100.0**	76.5	19.0	4.4	**73.2**	80.8	15.0	4.1	**26.8**	64.8	29.9	5.3
1966	**100.0**	75.9	19.3	4.8	**73.4**	79.9	15.6	4.6	**26.6**	65.0	29.6	5.4
1967	**100.0**	76.3	19.1	4.6	**73.2**	79.7	15.9	4.4	**26.8**	67.2	27.7	5.1
1968	**100.0**	76.8	18.5	4.6	**72.5**	79.8	15.7	4.5	**27.5**	69.1	25.9	5.0
1969	**100.0**	76.9	18.3	4.8	**71.2**	79.3	15.8	4.9	**28.8**	71.0	24.4	4.6
1970	**100.0**	76.7	18.6	4.6	**69.7**	78.5	16.6	5.0	**30.3**	72.7	23.4	3.9
1971	**100.0**	76.7	19.5	3.8	**68.6**	78.7	17.4	3.9	**31.4**	72.4	24.0	3.6
1972	**100.0**	73.9	22.4	3.7	**68.6**	76.0	20.7	3.3	**31.4**	69.3	26.3	4.4
1973	**100.0**	71.2	24.5	4.2	**68.0**	74.1	22.4	3.5	**32.0**	65.1	29.1	5.8
1974	**100.0**	71.0	24.7	4.4	**67.2**	74.5	22.1	3.4	**32.8**	63.7	30.0	6.3
1975	**100.0**	69.5	26.2	4.4	**67.2**	73.7	22.9	3.4	**32.8**	60.9	32.9	6.3
1976	**100.0**	68.6	26.7	4.7	**67.2**	73.5	22.7	3.8	**32.8**	58.7	34.9	6.5
1977	**100.0**	68.5	26.1	5.4	**66.8**	73.3	21.9	4.7	**33.2**	58.9	34.4	6.8
1978	**100.0**	67.7	25.3	7.1	**66.4**	72.3	20.7	7.0	**33.6**	58.4	34.4	7.2
1979	**100.0**	67.2	24.6	8.2	**67.2**	71.1	20.1	8.7	**32.8**	59.2	33.8	7.1
1980	**100.0**	66.7	25.1	8.1	**67.4**	70.2	21.2	8.6	**32.6**	59.5	33.2	7.3
1981	**100.0**	67.0	25.1	7.9	**66.3**	71.3	20.6	8.1	**33.7**	58.4	34.1	7.5
1982	**100.0**	66.8	25.2	8.0	**64.6**	71.3	20.4	8.3	**35.4**	58.6	34.0	7.5
1983	**100.0**	67.1	25.4	7.5	**63.2**	70.9	21.3	7.7	**36.8**	60.4	32.5	7.1
1984	**100.0**	66.8	25.7	7.4	**62.9**	70.8	21.6	7.6	**37.1**	60.1	32.8	7.2
1985	**100.0**	67.9	24.7	7.3	**62.3**	71.9	20.6	7.6	**37.7**	61.4	31.6	6.9
1986	**100.0**	68.7	24.1	7.2	**61.2**	72.7	19.8	7.5	**38.8**	62.4	30.8	6.8
1987	**100.0**	68.3	24.6	7.1	**60.5**	72.1	20.5	7.4	**39.5**	62.3	30.9	6.8
1988	**100.0**	65.9	26.4	7.8	**60.6**	69.2	22.6	8.2	**39.4**	60.8	32.2	7.1
1989	**100.0**	65.4	26.9	7.7	**59.8**	68.9	23.0	8.1	**40.2**	60.1	32.7	7.2
1990	**100.0**	65.5	26.3	8.2	**58.9**	69.2	21.9	8.9	**41.1**	60.3	32.6	7.1
1991	**100.0**	66.1	25.4	8.5	**58.4**	69.6	20.8	9.6	**41.6**	61.2	31.8	7.0
1992	**100.0**	66.5	25.2	8.3	**59.2**	69.7	21.0	9.2	**40.8**	61.9	31.2	6.9
1993	**100.0**	66.7	25.1	8.2	**60.0**	70.4	20.6	9.0	**40.0**	61.3	31.7	7.0
1994	**100.0**	67.0	24.7	8.3	**60.2**	70.9	20.0	9.1	**39.8**	61.1	31.9	7.0
1995	**100.0**	67.0	24.8	8.2	**60.2**	71.1	20.0	8.9	**39.8**	60.9	32.1	7.0
1996 (est.)	**100.0**	67.0	25.0	8.0	**59.9**	71.0	20.3	8.7	**40.1**	61.0	32.0	7.0
1997 (est.)	**100.0**	67.0	24.9	8.1	**59.4**	71.0	20.1	8.9	**40.6**	61.1	31.9	7.0

NOTE: See appendix tables 4-4, 4-5, 4-6, and 4-7 for the data underlying these percentages.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *National Patterns of R&D Resources: 1996,* NSF 96-333 (Arlington, VA: 1996); and NSF, unpublished tabulations.

See figure 5-2.

Appendix table 5-2.
Support for academic R&D, by sector: FYs 1960-97

	Total	Source of support				
		Federal Government	State/local government	Industry	Academic institutions	All other sources
	Millions of current dollars					
1960	646	405	85	40	64	52
1961	763	500	95	40	70	58
1962	904	613	106	40	79	66
1963	1,081	760	118	41	89	73
1964	1,275	917	132	40	103	83
1965	1,474	1,073	143	41	124	93
1966	1,715	1,261	156	42	148	108
1967	1,921	1,409	164	48	181	119
1968	2,149	1,572	172	55	218	132
1969	2,225	1,600	197	60	223	145
1970	2,335	1,647	219	61	243	165
1971	2,500	1,724	255	70	274	177
1972	2,630	1,795	270	74	305	187
1973	2,884	1,985	295	84	318	202
1974	3,023	2,032	307	96	370	218
1975	3,409	2,288	332	113	417	259
1976	3,729	2,512	364	123	446	285
1977	4,067	2,726	374	139	514	314
1978	4,625	3,059	414	170	623	359
1979	5,366	3,598	472	193	735	368
1980	6,063	4,098	491	236	835	403
1981	6,847	4,571	546	291	1,004	435
1982	7,324	4,768	616	337	1,111	491
1983	7,882	4,989	626	389	1,302	576
1984	8,620	5,431	690	475	1,411	613
1985	9,687	6,064	752	560	1,617	694
1986	10,928	6,712	915	700	1,869	732
1987	12,153	7,343	1,023	790	2,168	828
1988	13,463	8,193	1,106	872	2,356	935
1989	14,976	8,990	1,223	995	2,697	1,071
1990	16,285	9,636	1,324	1,128	3,006	1,191
1991	17,584	10,232	1,473	1,205	3,367	1,307
1992	18,816	11,090	1,491	1,280	3,547	1,409
1993	19,948	11,953	1,559	1,361	3,589	1,486
1994	21,039	12,658	1,566	1,419	3,815	1,580
1995	22,101	13,331	1,655	1,492	4,024	1,599
1996 (est.)	22,908	13,744	1,715	1,589	4,205	1,655
1997 (est.)	23,811	14,186	1,799	1,685	4,404	1,737

Appendix table 5-2.
Support for academic R&D, by sector: FYs 1960-97

	Total	Source of support				
		Federal Government	State/local government	Industry	Academic institutions	All other sources
	Millions of constant 1992 dollars[a]					
1960	2,772	1,738	365	172	275	223
1961	3,223	2,112	401	169	296	245
1962	3,781	2,564	443	167	330	276
1963	4,462	3,137	487	169	367	301
1964	5,200	3,740	538	163	420	339
1965	5,911	4,303	573	164	497	373
1966	6,730	4,948	612	165	581	424
1967	7,295	5,351	623	182	687	452
1968	7,875	5,761	630	202	799	484
1969	7,805	5,612	691	210	782	509
1970	7,781	5,488	730	203	810	550
1971	7,923	5,464	808	222	868	561
1972	7,956	5,429	815	225	922	564
1973	8,359	5,755	854	243	923	585
1974	8,178	5,498	830	260	1,000	590
1975	8,359	5,611	813	277	1,024	634
1976	8,528	5,744	832	282	1,019	651
1977	8,649	5,797	795	295	1,094	667
1978	9,197	6,083	824	337	1,238	714
1979	9,850	6,605	866	355	1,349	675
1980	10,216	6,905	827	397	1,408	679
1981	10,509	7,016	838	447	1,540	667
1982	10,499	6,836	883	483	1,593	704
1983	10,801	6,837	858	533	1,784	790
1984	11,375	7,166	911	627	1,862	809
1985	12,355	7,735	959	714	2,062	885
1986	13,556	8,326	1,135	868	2,318	909
1987	14,653	8,854	1,234	953	2,615	998
1988	15,689	9,547	1,289	1,017	2,746	1,090
1989	16,745	10,051	1,368	1,112	3,016	1,197
1990	17,477	10,342	1,421	1,210	3,226	1,279
1991	18,098	10,532	1,516	1,240	3,465	1,345
1992	18,816	11,090	1,491	1,280	3,547	1,409
1993	19,435	11,646	1,519	1,326	3,496	1,448
1994	20,030	12,051	1,491	1,350	3,633	1,505
1995	20,540	12,389	1,538	1,387	3,739	1,486
1996 (est.)	20,811	12,486	1,558	1,444	3,820	1,503
1997 (est.)	21,091	12,566	1,594	1,493	3,901	1,539

Appendix table 5-2.
Support for academic R&D, by sector: FYs 1960-97

	Total	Source of support				
		Federal Government	State/local government	Industry	Academic institutions	All other sources
		Percentages				
1960	100.0	62.7	13.2	6.2	9.9	8.0
1961	100.0	65.5	12.5	5.2	9.2	7.6
1962	100.0	67.8	11.7	4.4	8.7	7.3
1963	100.0	70.3	10.9	3.8	8.2	6.8
1964	100.0	71.9	10.4	3.1	8.1	6.5
1965	100.0	72.8	9.7	2.8	8.4	6.3
1966	100.0	73.5	9.1	2.4	8.6	6.3
1967	100.0	73.3	8.5	2.5	9.4	6.2
1968	100.0	73.2	8.0	2.6	10.1	6.1
1969	100.0	71.9	8.9	2.7	10.0	6.5
1970	100.0	70.5	9.4	2.6	10.4	7.1
1971	100.0	69.0	10.2	2.8	11.0	7.1
1972	100.0	68.2	10.2	2.8	11.6	7.1
1973	100.0	68.8	10.2	2.9	11.0	7.0
1974	100.0	67.2	10.2	3.2	12.2	7.2
1975	100.0	67.1	9.7	3.3	12.2	7.6
1976	100.0	67.4	9.8	3.3	11.9	7.6
1977	100.0	67.0	9.2	3.4	12.6	7.7
1978	100.0	66.1	9.0	3.7	13.5	7.8
1979	100.0	67.1	8.8	3.6	13.7	6.9
1980	100.0	67.6	8.1	3.9	13.8	6.6
1981	100.0	66.8	8.0	4.3	14.7	6.4
1982	100.0	65.1	8.4	4.6	15.2	6.7
1983	100.0	63.3	7.9	4.9	16.5	7.3
1984	100.0	63.0	8.0	5.5	16.4	7.1
1985	100.0	62.6	7.8	5.8	16.7	7.2
1986	100.0	61.4	8.4	6.4	17.1	6.7
1987	100.0	60.4	8.4	6.5	17.8	6.8
1988	100.0	60.9	8.2	6.5	17.5	6.9
1989	100.0	60.0	8.2	6.6	18.0	7.2
1990	100.0	59.2	8.1	6.9	18.5	7.3
1991	100.0	58.2	8.4	6.9	19.1	7.4
1992	100.0	58.9	7.9	6.8	18.9	7.5
1993	100.0	59.9	7.8	6.8	18.0	7.4
1994	100.0	60.2	7.4	6.7	18.1	7.5
1995	100.0	60.3	7.5	6.8	18.2	7.2
1996 (est.)	100.0	60.0	7.5	6.9	18.4	7.2
1997 (est.)	100.0	59.6	7.6	7.1	18.5	7.3

[a]See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1992 dollars.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables, forthcoming (Arlington, VA: 1998); and NSF, annual series.

See figure 5-3.

Appendix table 5-3.
Sources of R&D funds at private and public institutions: 1975, 1985, and 1995

Year and institution type	Total	Source of funds				
		Federal Government	State/local government	Industry	Academic institutions	Other sources
		Millions of current dollars				
1975						
Private, total	1,244.6	960.5	34.1	43.2	76.5	130.3
Public, total	2,164.1	1,327.5	297.6	69.8	340.9	128.3
1985						
Private, total	3,402.2	2,574.6	68.2	217.4	289.2	252.8
Public, total	6,285.0	3,489.7	683.9	342.5	1,327.8	441.0
1995						
Private, total	7,194.3	5,238.4	173.1	486.4	644.6	651.7
Public, total	14,907.0	8,092.7	1,481.9	1,006.0	3,379.1	947.3
		Percentages				
1975						
Private, total	100.0	77.2	2.7	3.5	6.1	10.5
Public, total	100.0	61.3	13.8	3.2	15.8	5.9
1985						
Private, total	100.0	75.7	2.0	6.4	8.5	7.4
Public, total	100.0	55.5	10.9	5.4	21.1	7.0
1995						
Private, total	100.0	72.8	2.4	6.8	9.0	9.1
Public, total	100.0	54.3	9.9	6.7	22.7	6.4

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables, forthcoming (Arlington, VA: 1998); and NSF, annual series.

Appendix table 5-4.
R&D expenditures at the top 100 academic institutions, by source of funds: 1995
(Millions of current dollars)

Rank and academic institution	Institution type	Total	Source of funds				
			Federal Government	State/ local government	Industry	Academic **institutions**	All other sources
Total, all institutions		22,101	13,331	1,655	1,492	4,024	1,599
1 University of Michigan, all campuses	Public	443	276	9	29	98	31
2 University of Wisconsin-Madison	Public	404	229	38	13	81	43
3 University of Washington	Public	389	291	10	37	44	7
4 Massachusetts Institute of Technology	Private	371	274	*	53	16	28
5 Texas A&M University, all campuses	Public	363	137	81	31	105	8
6 University of California-San Diego	Public	357	284	9	11	27	26
7 Cornell University, all campuses	Private	344	207	49	18	38	32
8 Johns Hopkins University[a]	Private	342	273	3	11	15	41
9 University of Minnesota, all campuses	Public	337	195	50	23	46	23
10 Pennsylvania State University, all campuses	Public	331	187	10	50	83	0
Total, top 10 institutions		3,679	2,354	259	276	553	237
11 University of California-San Francisco	Public	330	224	20	14	33	38
12 Stanford University	Private	319	273	*	16	7	21
13 University of California-Los Angeles	Public	304	202	4	15	41	42
14 University of Arizona	Public	292	169	6	15	93	9
15 University of California-Berkeley	Public	291	158	29	14	71	20
16 Harvard University	Private	276	204	*	8	13	51
17 University of Pennsylvania	Private	272	201	5	12	24	30
18 University of Colorado, all campuses	Public	250	170	4	13	29	33
19 Ohio State University, all campuses	Public	246	123	28	22	39	35
20 University of Illinois at Urbana-Champaign	Public	246	139	29	12	54	12
Total, top 20 institutions		6,506	4,216	384	418	958	528
21 Columbia University in the City of New York	Private	245	206	2	1	8	27
22 University of California-Davis	Public	244	123	18	8	77	19
23 Yale University	Private	232	175	3	14	16	24
24 University of Texas at Austin	Public	229	144	11	3	51	19
25 University of Southern California	Private	222	164	7	18	34	0
26 Duke University	Private	219	149	5	33	16	17
27 Georgia Institute of Technology, all campuses	Public	212	105	6	26	75	0
28 University of Maryland at College Park	Public	210	94	55	25	36	0
29 University of North Carolina at Chapel Hill	Public	209	157	24	2	26	0
30 Washington University	Private	209	147	5	22	15	21
Total, top 30 institutions		8,737	5,678	520	571	1,312	655
31 University of Georgia	Public	206	58	40	11	97	1
32 Purdue University, all campuses	Public	203	93	19	25	65	*
33 Rutgers the State University of NJ, all campuses	Public	192	73	26	8	73	12
34 Baylor College of Medicine	Private	190	94	5	12	24	55
35 Louisiana State University, all campuses	Public	187	61	64	10	37	14
36 University of Pittsburgh, all campuses	Public	186	144	4	8	17	13
37 North Carolina State University at Raleigh	Public	180	69	67	26	17	*
38 Northwestern University	Private	174	90	3	7	55	18
39 University of Iowa	Public	165	103	5	11	35	11
40 Michigan State University	Public	163	74	27	7	42	12
Total, top 40 institutions		10,584	6,538	780	697	1,774	791

Appendix table 5-4.
R&D expenditures at the top 100 academic institutions, by source of funds: 1995
(Millions of current dollars)

Rank and academic institution	Institution type	Total	Source of funds				
			Federal Govern-ment	State/ local government	Industry	Academic **institutions**	All other sources
41 University of Alabama at Birmingham	Public	159	107	4	19	11	17
42 University of Rochester	Private	159	126	9	13	3	8
43 Iowa State University	Public	155	59	42	8	42	4
44 University of Florida	Public	154	79	11	11	47	6
45 University of Tennessee University-Wide Administrative Central Office	Public	151	76	27	11	28	10
46 New York University	Private	149	94	2	6	18	29
47 Virginia Polytechnic Institute and State University	Public	149	79	33	12	21	3
48 Emory University	Private	148	93	4	11	19	21
49 Indiana University, all campuses	Public	146	85	2	6	32	20
50 SUNY at Buffalo, all campuses	Public	144	76	12	13	16	27
Total, top 50 institutions		12,097	7,413	925	807	2,012	936
51 Case Western Reserve University	Private	141	107	4	5	12	12
52 University of Connecticut, all campuses	Public	140	50	15	7	61	7
53 California Institute of Technology	Private	138	121	*	5	9	2
54 University of Virginia, all campuses	Public	137	85	5	15	14	16
55 University of New Mexico, all campuses	Public	129	91	4	3	26	5
56 University of Miami	Private	129	97	2	12	6	12
57 University of Chicago	Private	126	105	1	2	8	11
58 Carnegie Mellon University	Private	126	85	8	18	5	10
59 University of Texas Southwestern Medical Center Dallas	Public	125	79	*	15	6	25
60 Oregon State University	Public	123	69	28	3	14	9
Total, top 60 institutions		13,411	8,301	993	893	2,174	1,047
61 University of Missouri, Columbia	Public	123	32	15	10	58	7
62 SUNY at Stony Brook, all campuses	Public	123	77	3	6	31	7
63 University of Texas MD Anderson Cancer Center	Public	122	45	0	0	50	28
64 Colorado State University	Public	122	75	17	6	22	2
65 University of Illinois at Chicago	Public	119	58	3	6	41	12
66 University of Kentucky, all campuses	Public	112	50	9	12	36	5
67 Vanderbilt University	Private	111	92	*	3	9	7
68 University of California-Irvine	Public	110	70	4	9	15	12
69 University of Maryland at Baltimore	Public	108	60	15	18	6	9
70 University of Nebraska at Lincoln	Public	108	37	34	3	33	*
Total, top 70 institutions		14,569	8,895	1,093	966	2,474	1,135
71 Wayne State University	Public	106	46	9	8	32	11
72 University of Utah	Public	106	84	*	4	11	6
73 Princeton University	Private	104	64	*	6	24	10
74 Boston University	Private	104	83	*	9	0	11
75 Georgetown University	Private	102	74	*	6	15	7
76 University of Oklahoma, all campuses	Public	102	37	11	6	35	14
77 University of Kansas, all campuses	Public	101	42	8	8	37	5
78 Tulane University	Private	100	61	4	10	22	3
79 Washington State University	Public	97	49	4	3	33	9
80 University of Medicine and Dentistry of New Jersey	Public	96	46	6	8	26	11
Total, top 80 institutions		15,588	9,482	1,135	1,034	2,708	1,222

Appendix table 5-4.
R&D expenditures at the top 100 academic institutions, by source of funds: 1995
(Millions of current dollars)

Rank and academic institution	Institution type	Total	Source of funds				
			Federal Government	State/ local government	Industry	Academic **institutions**	All other sources
81 Yeshiva University	Private	95	72	0	2	12	9
82 Auburn University, all campuses	Public	93	28	*	3	57	4
83 University of South Florida	Public	93	30	8	5	45	6
84 Mount Sinai School of Medicine	Private	92	59	3	6	11	13
85 University of Cincinnati, all campuses	Public	91	55	3	9	19	6
86 University of Texas Health Science Center San Antonio	Public	87	54	9	9	11	4
87 Florida State University	Public	86	46	3	2	31	4
88 Clemson University	Public	83	29	15	5	29	4
89 Utah State University	Public	82	48	14	3	15	2
90 New Mexico State University, all campuses	Public	81	57	12	2	8	2
Total, top 90 institutions		16,471	9,960	1,200	1,080	2,946	1,276
91 Woods Hole Oceanographic Institution	Private	80	73	*	0	1	6
92 University of South Carolina, all campuses	Public	80	44	3	8	22	3
93 University of California-Santa Barbara	Public	79	63	1	3	7	5
94 University of Hawaii at Manoa	Public	78	44	27	0	4	3
95 Rockefeller University	Private	77	41	*	4	17	14
96 Tufts University	Private	77	50	2	5	14	6
97 Arizona State University, main	Public	77	35	*	7	31	3
98 Virginia Commonwealth University	Public	77	47	2	6	18	4
99 Oklahoma State University, all campuses	Public	76	19	8	3	43	3
100 Oregon Health Sciences University	Public	75	49	*	5	16	4
Total, top 100 institutions		17,247	10,427	1,243	1,121	3,120	1,326

* = less than $1 million

[a]These figures exclude the Applied Physics Laboratory (APL) at Johns Hopkins University, which is similar to a federally funded research and development center and dominates the R&D performed at the university. In 1995, APL had total R&D expenditures of $447 million, of which $434 million were provided by federal sources.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables, forthcoming (Arlington, VA: 1998); and NSF, unpublished tabulations.

Appendix table 5-5.
Total, federal, and nonfederal R&D expenditures at academic institutions, by field and source of funds: 1995

Field	Total R&D		Millions of dollars		Percentages	
	Millions of dollars	Percent	Federal	Non-federal[a]	Federal	Non-federal[a]
TOTAL SCIENCE & ENGINEERING	22,101.2	100.0	13,331.2	8,770.1	60.3	39.7
Total sciences	18,556.0	84.0	11,196.4	7,359.6	60.3	39.7
Physical sciences	2,241.4	10.1	1,631.5	609.9	72.8	27.2
Astronomy	307.4	1.4	208.6	98.8	67.9	32.1
Chemistry	773.1	3.5	535.0	238.1	69.2	30.8
Physics	969.0	4.4	750.6	218.3	77.5	22.5
Other	192.0	0.9	137.3	54.7	71.5	28.5
Mathematics	283.6	1.3	206.0	77.6	72.6	27.4
Computer sciences	679.7	3.1	477.7	202.0	70.3	29.7
Environmental sciences	1,434.2	6.5	962.1	472.1	67.1	32.9
Atmospheric sciences	208.2	0.9	163.5	44.7	78.5	21.5
Earth sciences	460.4	2.1	269.1	191.3	58.5	41.5
Oceanography	481.1	2.2	338.3	142.7	70.3	29.7
Other	284.5	1.3	191.1	93.4	67.2	32.8
Life sciences	12,133.2	54.9	7,119.7	5,013.5	58.7	41.3
Agricultural sciences	1,734.2	7.8	526.8	1,207.4	30.4	69.6
Biological sciences	3,835.7	17.4	2,492.9	1,342.7	65.0	35.0
Medical sciences	6,057.2	27.4	3,807.3	2,249.9	62.9	37.1
Other	506.1	2.3	292.7	213.4	57.8	42.2
Psychology	370.2	1.7	250.0	120.2	67.5	32.5
Social sciences	1,018.4	4.6	391.9	626.5	38.5	61.5
Economics	244.1	1.1	79.0	165.1	32.4	67.6
Political science	177.0	0.8	63.7	113.3	36.0	64.0
Sociology	216.3	1.0	105.2	111.1	48.6	51.4
Other	380.9	1.7	143.9	237.0	37.8	62.2
Other sciences	395.4	1.8	157.6	237.8	39.9	60.1
Total engineering	3,545.2	16.0	2,134.7	1,410.5	60.2	39.8
Aeronautical/astronautical	227.5	1.0	170.8	56.6	75.1	24.9
Chemical	296.2	1.3	160.9	135.3	54.3	45.7
Civil	427.9	1.9	184.5	243.4	43.1	56.9
Electrical/electronic	790.1	3.6	518.0	272.1	65.6	34.4
Mechanical	508.9	2.3	329.1	179.8	64.7	35.3
Materials	325.7	1.5	171.6	154.1	52.7	47.3
Other	968.9	4.4	599.7	369.2	61.9	38.1

[a]See appendix table 5-2 for detail on nonfederal sources.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables, forthcoming (Arlington, VA: 1998); and NSF, unpublished tabulations.

Appendix table 5-6.
Expenditures for academic R&D, by field: 1985-95

Field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
						Millions of current dollars					
TOTAL SCIENCE & ENGINEERING	9,687	10,928	12,153	13,463	14,976	16,285	17,584	18,816	19,948	21,039	22,101
Total sciences	8,269	9,287	10,261	11,367	12,584	13,629	14,677	15,754	16,793	17,691	18,556
Physical sciences	1,148	1,287	1,398	1,554	1,647	1,807	1,939	2,055	2,130	2,174	2,241
Astronomy	96	102	108	127	137	170	211	238	259	269	307
Chemistry	422	470	514	565	606	648	671	704	740	761	773
Physics	551	631	673	740	786	842	881	921	940	951	969
Other	80	85	103	122	117	147	176	191	191	193	192
Mathematics	128	152	177	199	215	222	230	248	272	282	284
Computer sciences	281	321	372	408	473	515	554	556	608	650	680
Environmental sciences	705	776	839	894	1,003	1,068	1,117	1,240	1,317	1,407	1,434
Atmospheric sciences	108	121	132	138	165	173	175	194	210	207	208
Earth sciences	254	274	284	294	324	354	384	413	416	459	460
Oceanography	258	280	299	333	359	377	390	428	459	455	481
Other	86	101	123	128	156	163	169	205	232	285	284
Life sciences	5,279	5,891	6,529	7,257	8,061	8,726	9,472	10,196	10,851	11,493	12,133
Agricultural sciences	999	1,089	1,121	1,176	1,282	1,349	1,458	1,512	1,559	1,661	1,734
Biological sciences	1,781	1,946	2,144	2,408	2,640	2,859	3,064	3,303	3,535	3,733	3,836
Medical sciences	2,318	2,615	3,000	3,377	3,819	4,154	4,546	4,964	5,323	5,637	6,057
Other	181	240	264	296	321	363	404	417	433	462	506
Psychology	158	170	187	213	234	253	283	328	350	357	370
Social sciences	383	462	502	552	633	703	750	815	896	951	1,018
Economics	118	136	149	163	187	201	209	222	231	241	244
Political science	59	69	81	87	103	115	125	142	151	162	177
Sociology	75	96	95	108	119	132	156	163	183	195	216
Other	131	162	177	194	224	255	260	288	331	352	381
Other sciences	186	228	256	290	318	336	332	315	368	378	395
Total engineering	1,418	1,641	1,892	2,096	2,392	2,656	2,907	3,062	3,155	3,348	3,545
Aeronautical/astronautical	81	94	108	123	148	163	180	196	212	220	227
Chemical	116	132	148	163	194	218	244	261	274	280	296
Civil	153	178	191	224	245	284	315	339	371	401	428
Electrical/electronic	337	395	451	509	595	663	679	704	698	742	790
Mechanical	208	228	275	304	343	391	421	451	483	499	509
Materials	NA	NA	NA	NA	NA	274	304	294	299	310	326
Other	523	613	719	774	867	663	764	817	818	897	969

Appendix table 5-6.
Expenditures for academic R&D, by field: 1985-95

Field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
					Millions of constant 1992 dollars[a]						
TOTAL SCIENCE & ENGINEERING	12,355	13,556	14,653	15,689	16,745	17,477	18,098	18,816	19,435	20,030	20,540
Total sciences	10,547	11,521	12,372	13,246	14,070	14,626	15,107	15,754	16,361	16,842	17,245
Physical sciences	1,465	1,596	1,686	1,811	1,842	1,939	1,995	2,055	2,075	2,070	2,083
Astronomy	123	126	131	148	154	183	217	238	252	256	286
Chemistry	538	583	619	659	678	695	690	704	721	724	718
Physics	703	782	812	862	879	903	907	921	916	905	901
Other	102	105	124	143	131	158	181	191	186	184	178
Mathematics	163	188	214	232	240	238	237	248	265	269	264
Computer sciences	358	399	449	476	528	552	571	556	593	619	632
Environmental sciences	900	963	1,011	1,042	1,122	1,146	1,150	1,240	1,283	1,339	1,333
Atmospheric sciences	138	150	160	161	185	186	180	194	205	197	193
Earth sciences	324	340	342	343	362	380	395	413	406	437	428
Oceanography	329	347	361	388	401	405	401	428	447	433	447
Other	109	126	149	150	174	175	174	205	226	272	264
Life sciences	6,733	7,308	7,872	8,457	9,013	9,364	9,749	10,196	10,571	10,942	11,276
Agricultural sciences	1,274	1,351	1,351	1,371	1,433	1,448	1,501	1,512	1,519	1,581	1,612
Biological sciences	2,272	2,415	2,585	2,806	2,951	3,068	3,153	3,303	3,444	3,554	3,565
Medical sciences	2,957	3,244	3,617	3,936	4,270	4,458	4,680	4,964	5,186	5,367	5,629
Other	231	297	318	345	359	390	415	417	422	440	470
Psychology	202	211	226	248	261	271	291	328	341	340	344
Social sciences	489	574	606	643	708	755	772	815	873	905	946
Economics	151	168	180	190	209	215	215	222	225	230	227
Political science	76	85	98	101	116	124	129	142	147	154	165
Sociology	95	119	115	126	133	141	160	163	179	186	201
Other	167	201	213	226	250	274	268	288	322	335	354
Other sciences	238	283	309	337	356	360	341	315	359	359	367
Total engineering	1,808	2,035	2,281	2,443	2,675	2,851	2,992	3,062	3,074	3,188	3,295
Aeronautical/astronautical	103	117	130	143	166	175	185	196	207	210	211
Chemical	148	164	179	189	217	234	251	261	267	266	275
Civil	195	221	230	261	274	305	324	339	362	382	398
Electrical/electronic	430	490	544	593	665	711	699	704	680	706	734
Mechanical	265	283	331	354	384	419	433	451	470	475	473
Materials	NA	NA	NA	NA	NA	294	313	294	291	295	303
Other	667	761	867	902	970	712	786	817	797	854	900

Appendix table 5-6.
Expenditures for academic R&D, by field: 1985-95

Field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
						Percentages					
TOTAL SCIENCE & ENGINEERING	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total sciences	85.4	85.0	84.4	84.4	84.0	83.7	83.5	83.7	84.2	84.1	84.0
Physical sciences	11.9	11.8	11.5	11.5	11.0	11.1	11.0	10.9	10.7	10.3	10.1
Astronomy	1.0	0.9	0.9	0.9	0.9	1.0	1.2	1.3	1.3	1.3	1.4
Chemistry	4.4	4.3	4.2	4.2	4.0	4.0	3.8	3.7	3.7	3.6	3.5
Physics	5.7	5.8	5.5	5.5	5.2	5.2	5.0	4.9	4.7	4.5	4.4
Other	0.8	0.8	0.8	0.9	0.8	0.9	1.0	1.0	1.0	0.9	0.9
Mathematics	1.3	1.4	1.5	1.5	1.4	1.4	1.3	1.3	1.4	1.3	1.3
Computer sciences	2.9	2.9	3.1	3.0	3.2	3.2	3.2	3.0	3.1	3.1	3.1
Environmental sciences	7.3	7.1	6.9	6.6	6.7	6.6	6.4	6.6	6.6	6.7	6.5
Atmospheric sciences	1.1	1.1	1.1	1.0	1.1	1.1	1.0	1.0	1.1	1.0	0.9
Earth sciences	2.6	2.5	2.3	2.2	2.2	2.2	2.2	2.2	2.1	2.2	2.1
Oceanography	2.7	2.6	2.5	2.5	2.4	2.3	2.2	2.3	2.3	2.2	2.2
Other	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.1	1.2	1.4	1.3
Life sciences	54.5	53.9	53.7	53.9	53.8	53.6	53.9	54.2	54.4	54.6	54.9
Agricultural sciences	10.3	10.0	9.2	8.7	8.6	8.3	8.3	8.0	7.8	7.9	7.8
Biological sciences	18.4	17.8	17.6	17.9	17.6	17.6	17.4	17.6	17.7	17.7	17.4
Medical sciences	23.9	23.9	24.7	25.1	25.5	25.5	25.9	26.4	26.7	26.8	27.4
Other	1.9	2.2	2.2	2.2	2.1	2.2	2.3	2.2	2.2	2.2	2.3
Psychology	1.6	1.6	1.5	1.6	1.6	1.6	1.6	1.7	1.8	1.7	1.7
Social sciences	4.0	4.2	4.1	4.1	4.2	4.3	4.3	4.3	4.5	4.5	4.6
Economics	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.1	1.1
Political science	0.6	0.6	0.7	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.8
Sociology	0.8	0.9	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	1.0
Other	1.4	1.5	1.5	1.4	1.5	1.6	1.5	1.5	1.7	1.7	1.7
Other sciences	1.9	2.1	2.1	2.2	2.1	2.1	1.9	1.7	1.8	1.8	1.8
Total engineering	14.6	15.0	15.6	15.6	16.0	16.3	16.5	16.3	15.8	15.9	16.0
Aeronautical/astronautical	0.8	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.1	1.0	1.0
Chemical	1.2	1.2	1.2	1.2	1.3	1.3	1.4	1.4	1.4	1.3	1.3
Civil	1.6	1.6	1.6	1.7	1.6	1.7	1.8	1.8	1.9	1.9	1.9
Electrical/electronic	3.5	3.6	3.7	3.8	4.0	4.1	3.9	3.7	3.5	3.5	3.6
Mechanical	2.1	2.1	2.3	2.3	2.3	2.4	2.4	2.4	2.4	2.4	2.3
Materials	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Other	5.4	5.6	5.9	5.8	5.8	4.1	4.3	4.3	4.1	4.3	4.4

NA = not available

[a]See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1992 dollars.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables, forthcoming (Arlington, VA: 1998); and NSF, unpublished tabulations.

See figure 5-4.

Appendix table 5-7.
Percentage of academic R&D funds federally financed, by field: 1975-95

Field	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL S&E	67.1	67.4	67.0	66.1	67.1	67.6	66.8	65.1	63.3	63.0	62.6	61.4	60.4	60.9	60.0	59.2	58.2	58.9	59.9	60.2	60.3
Total sciences	67.0	67.4	67.0	65.9	66.8	67.4	66.5	64.8	62.9	62.8	62.8	61.7	60.7	61.3	60.4	59.5	58.6	59.3	60.1	60.3	60.3
Physical sciences	81.4	80.5	80.0	79.0	81.5	81.9	80.8	78.9	77.7	78.1	77.5	76.4	75.2	74.5	72.7	72.8	71.4	71.8	71.0	71.9	72.8
Astronomy	73.4	69.8	71.8	71.6	74.8	75.6	71.0	70.6	68.0	66.1	67.0	68.5	65.7	66.1	64.0	66.1	64.4	66.5	63.8	67.6	67.9
Chemistry	76.8	77.0	76.2	75.4	75.8	77.7	76.0	74.7	73.8	75.1	74.2	72.1	71.7	71.3	69.6	68.7	67.3	68.1	68.2	68.3	69.2
Physics	86.4	85.3	85.2	84.7	86.5	86.8	86.4	83.5	82.1	82.3	82.2	80.9	79.4	78.4	77.1	77.5	77.1	76.9	75.3	76.2	77.5
Other	77.7	77.2	73.7	69.7	82.7	78.7	81.1	81.2	80.5	80.1	75.1	75.8	75.1	74.7	69.5	71.8	66.4	67.7	70.3	70.8	71.5
Mathematics	78.6	77.4	77.7	75.1	77.6	78.4	77.8	74.5	71.9	75.0	75.9	75.5	74.4	75.4	73.3	72.6	74.1	74.0	74.6	72.9	72.6
Computer sci.	74.3	74.0	67.6	61.1	70.9	70.4	72.4	74.2	74.6	72.7	69.7	72.4	69.1	70.8	68.5	66.5	67.0	68.3	69.6	71.3	70.3
Environmental sci.	70.8	73.4	74.7	72.5	72.6	73.1	71.1	70.1	69.1	69.1	67.2	66.6	65.0	65.9	64.8	63.8	62.7	63.7	66.0	67.4	67.1
Atmospheric sci.	NA	NA	NA	NA	NA	84.1	77.0	79.9	78.4	80.7	79.8	81.2	82.0	81.2	77.9	75.7	74.1	72.1	76.3	79.6	78.5
Earth sci.	NA	NA	NA	NA	NA	69.7	67.1	64.9	62.4	61.4	60.7	58.3	56.2	59.3	57.7	57.7	56.7	57.7	58.4	58.6	58.5
Oceanography	NA	NA	NA	NA	NA	77.6	77.9	77.4	76.6	76.4	72.7	74.3	72.6	71.6	72.5	69.4	67.6	71.6	71.8	71.1	70.3
Other	70.8	73.4	74.7	72.5	72.6	59.1	58.0	53.5	54.2	54.0	53.9	50.3	48.9	49.8	48.1	51.0	52.9	51.6	58.6	67.0	67.2
Life sciences	65.1	65.7	65.3	64.1	64.1	64.9	64.0	62.4	60.2	60.1	60.4	59.3	58.8	59.6	59.3	58.3	57.2	58.0	58.9	58.7	58.7
Agricultural sci.	29.4	29.7	28.8	29.8	30.2	30.9	29.7	29.5	28.4	28.2	29.4	26.8	26.6	27.4	27.3	26.1	25.9	27.6	28.9	29.9	30.4
Biological sci.	72.5	73.5	74.5	73.0	72.6	74.0	73.0	71.4	69.5	69.5	67.9	67.4	66.2	66.8	65.8	64.5	63.7	64.7	65.3	65.6	65.0
Medical sci.	75.6	75.5	74.9	73.1	73.7	74.4	74.1	72.0	68.9	67.6	68.0	66.6	65.4	65.5	65.5	64.3	62.7	62.7	63.3	62.7	62.9
Other	71.8	72.6	71.7	70.4	70.1	67.3	67.5	64.0	61.0	62.9	60.0	61.3	59.8	61.7	61.0	59.1	60.0	58.2	59.3	58.7	57.8
Psychology	76.8	76.2	74.8	71.4	72.3	73.3	72.7	68.1	66.0	67.4	66.9	67.0	66.1	65.9	65.5	64.8	65.8	65.4	67.0	67.6	67.5
Social sciences	55.2	52.7	51.6	50.6	53.0	53.8	51.0	45.6	42.6	39.8	40.1	37.4	33.6	34.2	33.5	32.2	33.7	34.5	37.7	37.8	38.5
Economics	48.2	44.5	43.8	46.9	48.4	48.8	45.4	43.7	39.6	39.1	37.0	33.5	29.1	30.2	29.1	27.1	28.6	29.8	33.4	31.5	32.4
Political science	41.8	42.2	46.2	43.4	46.0	43.4	42.0	37.3	36.8	33.9	33.1	29.4	29.7	29.0	25.0	22.0	22.8	24.7	28.3	31.0	36.0
Sociology	65.5	62.1	61.1	60.7	63.4	65.0	60.5	58.5	55.3	54.0	53.5	51.2	46.2	44.1	45.2	45.5	46.3	50.0	49.7	49.5	48.6
Other	55.9	54.8	52.9	49.4	52.2	54.1	52.3	42.8	39.3	35.3	38.5	35.8	32.4	34.4	34.9	33.9	35.5	34.2	38.5	38.7	37.8
Other sciences	57.2	59.5	54.9	58.1	54.9	53.6	56.5	56.5	52.7	48.5	49.3	47.1	44.8	41.9	40.1	41.1	33.8	32.4	35.1	36.2	39.9
Total engineering	68.1	67.3	67.6	67.8	68.7	68.6	68.5	67.2	65.5	64.0	61.2	59.6	58.8	58.7	57.8	57.4	56.3	57.2	58.9	59.4	60.2
Aeronautical/ astronautical	NA	NA	NA	NA	NA	79.5	80.0	79.1	78.7	78.2	76.4	77.0	74.1	76.3	77.5	77.7	76.4	76.7	75.1	75.4	75.1
Chemical	NA	NA	NA	NA	NA	64.4	66.9	62.0	59.5	59.1	55.6	55.4	51.7	52.6	52.1	50.6	48.4	48.4	52.2	53.7	54.3
Civil	NA	NA	NA	NA	NA	64.0	56.8	51.5	50.4	51.8	51.5	49.6	47.0	45.6	41.7	41.2	39.3	42.3	41.6	40.7	43.1
Electrical/ electronic	NA	NA	NA	NA	NA	75.7	75.9	77.1	73.8	71.0	67.7	65.9	64.8	64.9	65.0	65.1	64.2	63.9	65.7	65.9	65.6
Mechanical	NA	NA	NA	NA	NA	67.0	67.5	68.3	67.1	66.5	64.6	64.9	64.9	63.5	62.4	61.0	59.7	59.7	64.2	65.2	64.7
Materials	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	50.9	50.4	48.7	50.3	49.9	52.7
Other	68.1	67.3	67.6	67.8	68.7	65.7	67.3	65.3	63.5	61.1	57.3	54.6	55.0	54.9	53.6	54.6	54.8	57.5	58.9	60.3	61.9

NA = not available

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables, forthcoming (Arlington, VA: 1998); and NSF, unpublished tabulations.

Appendix table 5-8.
Federal obligations for academic R&D, by agency: 1971-97

	All agencies	National Institutes of Health	National Science Foundation	Department of Defense	National Aeronautics & Space Administration	Department of Energy[a]	Department of Agriculture	All other agencies
Millions of current dollars								
1971	1,645	603	267	211	134	94	72	264
1972	1,904	756	362	217	119	85	87	277
1973	1,917	826	374	204	111	83	94	224
1974	2,214	1,108	389	197	99	94	95	232
1975	2,411	1,154	435	203	108	132	108	271
1976	2,552	1,263	437	240	119	145	120	228
1977	2,905	1,399	511	273	118	188	140	276
1978	3,375	1,588	537	383	127	240	186	313
1979	3,889	1,880	617	438	139	260	200	355
1980	4,263	2,012	685	495	158	285	216	412
1981	4,466	2,101	702	573	171	301	243	375
1982	4,605	2,140	715	664	186	277	255	369
1983	4,966	2,392	783	724	189	297	275	306
1984	5,547	2,715	880	830	204	321	261	335
1985	6,340	3,158	1,002	940	237	357	293	352
1986	6,559	3,243	992	1,098	254	345	274	355
1987	7,337	3,903	1,096	1,017	294	386	280	361
1988	7,828	4,199	1,143	1,071	338	406	305	366
1989	8,672	4,565	1,254	1,189	434	454	328	449
1990	9,138	4,779	1,321	1,213	471	500	348	505
1991	10,169	5,521	1,436	1,152	534	621	386	520
1992	10,271	5,064	1,540	1,403	586	640	438	600
1993	11,208	5,848	1,562	1,616	614	583	433	553
1994	11,829	6,191	1,680	1,735	641	565	439	577
1995	11,933	6,271	1,734	1,592	708	594	435	599
1996 (est.)	12,251	6,908	1,726	1,380	708	557	423	549
1997 (est.)	12,362	6,987	1,824	1,288	708	574	421	561
Millions of constant 1992 dollars[b]								
1971	5,214	1,911	846	669	425	298	228	837
1972	5,758	2,287	1,096	656	360	256	265	838
1973	5,555	2,394	1,085	590	323	240	273	650
1974	5,990	2,997	1,053	534	268	254	256	627
1975	5,914	2,829	1,066	499	265	324	265	666
1976	5,836	2,888	998	550	272	332	274	522
1977	6,179	2,975	1,086	581	250	400	298	588
1978	6,711	3,157	1,068	762	253	477	371	623
1979	7,138	3,452	1,132	804	255	477	367	652
1980	7,184	3,390	1,154	835	266	480	365	695
1981	6,854	3,224	1,078	879	263	462	373	576
1982	6,602	3,068	1,025	951	266	397	366	529
1983	6,806	3,277	1,073	992	259	407	377	420
1984	7,320	3,583	1,162	1,095	269	423	344	443
1985	8,086	4,027	1,278	1,199	303	456	374	450
1986	8,136	4,022	1,230	1,362	315	428	339	440
1987	8,847	4,706	1,322	1,226	354	466	337	435
1988	9,122	4,893	1,332	1,248	394	473	355	426
1989	9,696	5,105	1,402	1,329	485	507	367	502
1990	9,806	5,129	1,418	1,302	505	537	374	542
1991	10,466	5,683	1,478	1,186	549	639	397	535
1992	10,271	5,064	1,540	1,403	586	640	438	600
1993	10,920	5,697	1,522	1,574	598	568	422	539
1994	11,262	5,895	1,600	1,652	611	538	418	549
1995	11,090	5,828	1,611	1,480	658	552	404	557
1996 (est.)	11,130	6,276	1,568	1,253	643	506	384	499
1997 (est.)	10,950	6,189	1,615	1,141	627	509	373	497

Appendix table 5-8.
Federal obligations for academic R&D, by agency: 1971-97

	All agencies	National Institutes of Health	National Science Foundation	Department of Defense	National Aeronautics & Space Administration	Department of Energy[a]	Department of Agriculture	All other agencies
				Percentages by agency				
1971	100.0	36.7	16.2	12.8	8.1	5.7	4.4	16.0
1972	100.0	39.7	19.0	11.4	6.3	4.4	4.6	14.6
1973	100.0	43.1	19.5	10.6	5.8	4.3	4.9	11.7
1974	100.0	50.0	17.6	8.9	4.5	4.2	4.3	10.5
1975	100.0	47.8	18.0	8.4	4.5	5.5	4.5	11.3
1976	100.0	49.5	17.1	9.4	4.7	5.7	4.7	8.9
1977	100.0	48.2	17.6	9.4	4.0	6.5	4.8	9.5
1978	100.0	47.0	15.9	11.4	3.8	7.1	5.5	9.3
1979	100.0	48.4	15.9	11.3	3.6	6.7	5.1	9.1
1980	100.0	47.2	16.1	11.6	3.7	6.7	5.1	9.7
1981	100.0	47.0	15.7	12.8	3.8	6.7	5.4	8.4
1982	100.0	46.5	15.5	14.4	4.0	6.0	5.5	8.0
1983	100.0	48.2	15.8	14.6	3.8	6.0	5.5	6.2
1984	100.0	49.0	15.9	15.0	3.7	5.8	4.7	6.0
1985	100.0	49.8	15.8	14.8	3.7	5.6	4.6	5.6
1986	100.0	49.4	15.1	16.7	3.9	5.3	4.2	5.4
1987	100.0	53.2	14.9	13.9	4.0	5.3	3.8	4.9
1988	100.0	53.6	14.6	13.7	4.3	5.2	3.9	4.7
1989	100.0	52.6	14.5	13.7	5.0	5.2	3.8	5.2
1990	100.0	52.3	14.5	13.3	5.2	5.5	3.8	5.5
1991	100.0	54.3	14.1	11.3	5.2	6.1	3.8	5.1
1992	100.0	49.3	15.0	13.7	5.7	6.2	4.3	5.8
1993	100.0	52.2	13.9	14.4	5.5	5.2	3.9	4.9
1994	100.0	52.3	14.2	14.7	5.4	4.8	3.7	4.9
1995	100.0	52.6	14.5	13.3	5.9	5.0	3.6	5.0
1996 (est.)	100.0	56.4	14.1	11.3	5.8	4.5	3.5	4.5
1997 (est.)	100.0	56.5	14.8	10.4	5.7	4.6	3.4	4.5

NOTE: Percentages may not total 100 because of rounding.

[a]Data for 1974 to 1976 are for the Energy Research and Development Administration; data for 1977 and thereafter are for the U.S. Department of Energy.

[b]See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1992 dollars.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, Vol. 45, NSF 97-327 (Arlington, VA: 1997); and NSF, annual series.

Appendix table 5-9.
Federal obligations for academic research, by agency: 1971-97

	All agencies	National Institutes of Health	National Science Foundation	Department of Defense	National Aeronautics & Space Administration	Department of Energy[a]	Department of Agriculture	All other agencies
Millions of current dollars								
1971	1,430	551	254	184	70	90	72	209
1972	1,643	677	346	177	48	81	87	226
1973	1,691	749	370	161	80	79	94	158
1974	1,958	1,004	369	167	85	86	94	153
1975	2,079	1,036	420	165	91	112	108	148
1976	2,250	1,138	429	192	98	116	119	158
1977	2,584	1,269	505	221	105	134	139	211
1978	2,928	1,437	534	243	116	175	181	241
1979	3,333	1,657	612	271	125	204	198	266
1980	3,699	1,835	680	313	146	224	214	287
1981	3,920	1,929	698	363	157	248	240	284
1982	4,045	1,995	713	413	156	236	253	280
1983	4,468	2,246	783	472	170	273	273	250
1984	5,030	2,573	880	539	177	311	260	290
1985	5,726	2,990	1,002	587	213	336	292	305
1986	5,883	3,054	992	707	225	334	273	298
1987	6,640	3,651	1,096	681	263	372	279	298
1988	7,023	3,856	1,143	729	310	384	304	297
1989	7,793	4,167	1,254	840	387	437	326	382
1990	8,137	4,349	1,321	795	422	479	346	426
1991	8,868	4,729	1,436	794	474	596	384	456
1992	9,061	4,517	1,540	912	512	605	436	538
1993	9,844	5,204	1,562	1,090	539	547	429	473
1994	10,323	5,517	1,680	1,111	555	529	435	496
1995	10,372	5,481	1,734	1,063	588	558	431	518
1996 (est.)	10,920	6,163	1,726	1,026	588	526	419	472
1997 (est.)	10,823	6,033	1,824	968	588	533	417	461
Millions of constant 1992 dollars[b]								
1971	4,532	1,746	805	583	222	285	228	662
1972	4,969	2,048	1,047	535	145	245	263	684
1973	4,902	2,171	1,072	467	232	229	272	458
1974	5,297	2,716	998	452	230	233	254	414
1975	5,098	2,541	1,030	405	223	275	265	363
1976	5,146	2,603	981	439	224	265	272	361
1977	5,495	2,699	1,074	470	223	285	296	449
1978	5,823	2,858	1,062	483	231	348	360	479
1979	6,118	3,042	1,123	497	229	374	363	488
1980	6,233	3,092	1,146	527	246	377	361	484
1981	6,016	2,961	1,071	557	241	381	368	436
1982	5,799	2,860	1,022	592	224	338	363	401
1983	6,123	3,078	1,073	647	233	374	374	343
1984	6,638	3,395	1,161	711	234	410	343	383
1985	7,303	3,814	1,278	749	272	429	372	389
1986	7,298	3,789	1,231	877	279	414	339	370
1987	8,006	4,402	1,321	821	317	449	336	359
1988	8,184	4,494	1,332	850	361	447	354	346
1989	8,714	4,659	1,402	939	433	489	365	427
1990	8,732	4,667	1,418	853	453	514	371	457
1991	9,128	4,867	1,478	817	488	613	395	469
1992	9,061	4,517	1,540	912	512	605	436	538
1993	9,591	5,070	1,522	1,062	525	533	418	461
1994	9,828	5,252	1,599	1,058	528	504	414	472
1995	9,639	5,094	1,611	988	546	519	400	481
1996 (est.)	9,920	5,599	1,568	932	534	478	381	428
1997 (est.)	9,587	5,344	1,615	857	520	472	369	408

Appendix table 5-9.
Federal obligations for academic research, by agency: 1971-97

	All agencies	National Institutes of Health	National Science Foundation	Department of Defense	National Aeronautics & Space Administration	Department of Energy[a]	Department of Agriculture	All other agencies
				Percentages by agency				
1971	100.0	38.5	17.8	12.9	4.9	6.3	5.0	14.6
1972	100.0	41.2	21.1	10.8	2.9	4.9	5.3	13.8
1973	100.0	44.3	21.9	9.5	4.7	4.7	5.6	9.3
1974	100.0	51.3	18.8	8.5	4.3	4.4	4.8	7.8
1975	100.0	49.8	20.2	7.9	4.4	5.4	5.2	7.1
1976	100.0	50.6	19.1	8.5	4.4	5.2	5.3	7.0
1977	100.0	49.1	19.5	8.6	4.1	5.2	5.4	8.2
1978	100.0	49.1	18.2	8.3	4.0	6.0	6.2	8.2
1979	100.0	49.7	18.4	8.1	3.8	6.1	5.9	8.0
1980	100.0	49.6	18.4	8.5	3.9	6.1	5.8	7.8
1981	100.0	49.2	17.8	9.3	4.0	6.3	6.1	7.2
1982	100.0	49.3	17.6	10.2	3.9	5.8	6.3	6.9
1983	100.0	50.3	17.5	10.6	3.8	6.1	6.1	5.6
1984	100.0	51.2	17.5	10.7	3.5	6.2	5.2	5.8
1985	100.0	52.2	17.5	10.3	3.7	5.9	5.1	5.3
1986	100.0	51.9	16.9	12.0	3.8	5.7	4.6	5.1
1987	100.0	55.0	16.5	10.3	4.0	5.6	4.2	4.5
1988	100.0	54.9	16.3	10.4	4.4	5.5	4.3	4.2
1989	100.0	53.5	16.1	10.8	5.0	5.6	4.2	4.9
1990	100.0	53.4	16.2	9.8	5.2	5.9	4.3	5.2
1991	100.0	53.3	16.2	9.0	5.3	6.7	4.3	5.1
1992	100.0	49.9	17.0	10.1	5.7	6.7	4.8	5.9
1993	100.0	52.9	15.9	11.1	5.5	5.6	4.4	4.8
1994	100.0	53.4	16.3	10.8	5.4	5.1	4.2	4.8
1995	100.0	52.8	16.7	10.2	5.7	5.4	4.2	5.0
1996 (est.)	100.0	56.4	15.8	9.4	5.4	4.8	3.8	4.3
1997 (est.)	100.0	55.7	16.8	8.9	5.4	4.9	3.9	4.3

NOTES: Percentages may not total 100 because of rounding. Academic research includes basic research and applied research.

[a]Data for 1974 to 1976 are for the Energy Research and Development Administration; data for 1977 and thereafter are for the U.S. Department of Energy.

[b]See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars to constant 1992 dollars.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, Vol. 45, NSF 97-327 (Arlington, VA: 1997); and NSF, annual series.

Appendix table 5-10.
Distribution of federal agency academic research obligations, by field: FY 1995
(Percentages)

Field	National Science Foundation	National Aeronautics & Space Administration	Department of Defense	Department of Energy	Department of Health & Human Services	Department of Agriculture
TOTAL SCIENCE & ENGINEERING	100.0	100.0	100.0	100.0	100.0	100.0
Total sciences	77.5	82.3	61.4	85.4	98.6	94.7
Physical sciences	23.1	37.5	13.2	56.8	1.6	5.8
Astronomy	2.8	19.4	0.5	0.0	0.0	0.0
Chemistry	8.4	1.0	5.9	7.7	1.4	5.8
Physics	9.9	11.3	6.7	48.6	0.2	0.0
Other	2.1	5.9	0.1	0.5	0.0	0.0
Mathematics	4.5	0.2	3.8	1.6	0.4	0.1
Computer sciences	5.5	4.8	20.5	0.8	0.3	0.5
Environmental sciences	16.9	25.2	10.6	10.4	0.2	1.0
Atmospheric sciences	5.8	9.5	2.6	5.0	0.0	0.8
Earth sciences	5.9	3.2	2.8	4.3	0.0	0.2
Oceanography	2.9	2.2	4.3	0.8	0.0	0.0
Other	2.3	10.2	1.0	0.3	0.2	0.0
Life sciences	17.0	9.1	10.7	15.1	85.7	75.2
Agricultural sciences	0.0	0.2	0.0	0.0	0.0	35.9
Biology (excluding environmental)	11.9	4.0	2.5	10.1	39.9	20.4
Environmental biology	4.5	0.3	1.9	0.0	0.7	16.8
Medical sciences	0.0	1.6	3.8	4.5	43.0	2.1
Other	0.5	2.9	2.4	0.4	2.1	0.0
Psychology	0.8	0.7	2.0	0.0	4.3	0.0
Biological aspects	0.2	0.0	0.6	0.0	0.0	0.0
Social aspects	0.4	0.4	1.1	0.0	0.0	0.0
Other	0.2	0.3	0.3	0.0	4.3	0.0
Social sciences	4.0	0.1	0.0	0.0	1.5	12.1
Anthropology	0.7	0.0	0.0	0.0	0.0	0.0
Economics	0.7	0.0	0.0	0.0	0.1	10.4
Political science	0.4	0.0	0.0	0.0	0.0	0.0
Sociology	0.4	0.0	0.0	0.0	0.0	1.8
Other	1.8	0.1	0.0	0.0	1.4	0.0
Other sciences	5.8	4.7	0.8	0.8	4.5	0.0
Total engineering	22.5	17.7	38.6	14.6	1.4	5.3
Aeronautical	0.0	5.4	2.0	0.0	0.0	0.0
Astronautical	0.0	2.0	0.6	0.0	0.0	0.0
Chemical	2.4	0.5	0.5	3.6	0.0	0.0
Civil	2.1	0.2	1.0	0.8	0.0	0.0
Electrical	2.5	1.3	11.5	0.5	0.0	0.0
Mechanical	2.9	1.7	6.8	1.5	0.0	0.0
Materials	8.3	3.3	10.7	3.3	0.0	0.0
Other	4.2	3.4	5.6	4.9	1.4	5.3

NOTES: Academic research includes both basic and applied research. The six agencies shown are the only ones that report their research obligations to academia by science and engineering field; they represent approximately 96 percent of academic research obligations.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, Vol. 45, NSF 97-327 (Arlington, VA: 1997); and NSF, annual series.

See figure 5-5.

Appendix table 5-11.
Percentage of federal academic research obligations provided by major agencies, by field: FY 1995

Field	National Science Foundation	National Aeronautics & Space Administration	Department of Defense	Department of Energy	Department of Health & Human Services	Department of Agriculture
TOTAL SCIENCE & ENGINEERING	17.4	5.9	10.7	5.6	56.2	4.3
Total sciences	15.1	5.4	7.4	5.4	62.1	4.6
Physical sciences	33.5	18.5	11.7	26.5	7.7	2.1
Astronomy	28.8	68.0	3.2	0.0	0.0	0.0
Chemistry	40.0	1.6	17.4	11.9	22.3	6.9
Physics	29.0	11.2	12.0	46.0	1.8	0.0
Other	48.5	46.6	1.3	3.6	0.0	0.0
Mathematics	52.6	0.8	26.8	6.0	13.5	0.4
Computer sciences	26.2	7.7	59.7	1.2	4.6	0.5
Environmental sciences	46.5	23.5	17.9	9.2	2.2	0.7
Atmospheric sciences	46.7	26.0	12.6	13.0	0.0	1.6
Earth sciences	58.0	10.8	16.9	13.7	0.0	0.5
Oceanography	44.9	11.4	39.8	3.9	0.0	0.0
Other	31.3	47.8	8.6	1.3	11.1	0.0
Life sciences	5.2	0.9	2.0	1.5	84.7	5.7
Agricultural sciences	0.0	0.8	0.0	0.0	0.0	99.2
Biology (excluding environmental)	7.8	0.9	1.0	2.1	84.8	3.3
Environmental biology	37.2	0.9	9.7	0.0	17.5	34.6
Medical sciences	0.0	0.4	1.6	1.0	96.6	0.4
Other	5.3	9.8	14.9	1.4	68.6	0.0
Psychology	4.9	1.5	7.5	0.0	86.2	0.0
Biological aspects	32.4	0.9	66.5	0.0	0.2	0.0
Social aspects	34.5	10.9	54.4	0.0	0.1	0.0
Other	1.2	0.7	1.1	0.0	97.0	0.0
Social sciences	33.7	0.2	0.0	0.0	40.5	25.6
Anthropology	100.0	0.0	0.0	0.0	0.0	0.0
Economics	20.1	0.0	0.1	0.0	5.2	74.6
Political science	98.5	0.0	0.0	0.0	1.5	0.0
Sociology	41.3	0.0	0.2	0.0	11.7	46.7
Other	28.7	0.4	0.0	0.0	70.9	0.0
Other sciences	25.4	7.1	2.1	1.1	64.3	0.0
Total engineering	35.9	9.5	37.6	7.5	7.4	2.1
Aeronautical	0.0	60.2	39.8	0.0	0.0	0.0
Astronautical	0.0	63.8	36.2	0.0	0.0	0.0
Chemical	60.2	4.3	6.9	28.6	0.0	0.0
Civil	70.0	2.3	19.3	8.4	0.0	0.0
Electrical	24.8	4.2	69.3	1.7	0.0	0.0
Mechanical	36.0	7.1	50.9	6.0	0.0	0.0
Materials	48.9	6.5	38.3	6.2	0.0	0.0
Other	25.7	7.0	21.1	9.7	28.4	8.1

NOTES: Academic research includes both basic and applied research. The six agencies shown are the only ones that report their research obligations to academia by science and engineering field; they represent approximately 96 percent of academic research obligations.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Federal Funds for Research and Development: Fiscal Years 1995, 1996, and 1997,* Detailed Statistical Tables, Vol. 45, NSF 97-327 (Arlington, VA: 1997); and NSF, annual series.

See figure 5-6.

Appendix table 5-12.
Square footage of total, new construction, and repair/renovation of academic research space, by field: 1986-97
(Thousands of square feet)

Field	1986-87 actual	1988-89 actual	1990-91 actual	1992-93 actual	1994-95 actual	1996-97 actual/ planned
Total space						
Total, all fields	NA	112,062	116,327	122,015	127,369	136,481
Physical sciences	NA	16,024	16,121	16,353	17,001	17,872
Mathematics	NA	722	790	829	937	1,005
Computer sciences	NA	1,437	1,445	1,606	1,779	2,075
Earth, atmospheric, and ocean sciences	NA	6,313	6,056	6,728	7,053	7,246
Agricultural sciences	NA	17,622	20,821	19,910	20,120	22,118
Biological sciences—universities & colleges	NA	16,072	17,569	17,072	16,982	18,662
Biological sciences—medical schools	NA	7,838	8,584	10,649	10,876	10,797
Medical sciences—universities & colleges	NA	5,320	4,959	6,234	6,070	7,402
Medical sciences—medical schools	NA	14,042	14,762	16,139	16,799	17,727
Psychology	NA	3,085	2,978	2,984	3,178	3,404
Social sciences	NA	3,337	3,338	3,253	3,403	3,977
Other sciences, not elsewhere classified	NA	4,350	1,846	2,162	2,442	2,363
Engineering	NA	15,900	17,057	18,095	20,730	21,832
New construction						
Total, all fields	9,922	10,647	11,433	10,992	9,521	10,843
Physical sciences	799	2,000	1,609	1,257	1,551	1,153
Mathematics	9	25	46	44	8	72
Computer sciences	237	286	293	172	143	121
Earth, atmospheric, and ocean sciences	380	324	529	502	282	746
Agricultural sciences	1,513	1,146	955	1,218	808	1,051
Biological sciences—universities & colleges	1,275	1,549	1,374	1,169	1,028	1,804
Biological sciences—medical schools	433	712	1,426	1,020	579	465
Medical sciences—universities & colleges	613	306	673	669	388	926
Medical sciences—medical schools	1,335	1,948	2,288	3,154	1,694	2,049
Psychology	132	115	164	78	145	82
Social sciences	202	329	*	221	380	176
Other sciences, not elsewhere classified	603	418	380	420	340	77
Engineering	2,390	1,490	1,697	1,065	2,174	2,122
Repaired/renovated space						
Total, all fields	13,431	11,449	8,606	9,134	13,122	13,698
Physical sciences	1,746	1,928	1,680	1,725	2,474	1,991
Mathematics	37	136	39	11	67	95
Computer sciences	193	144	164	54	124	142
Earth, atmospheric, and ocean sciences	362	930	450	418	521	570
Agricultural sciences	628	530	391	335	1,245	661
Biological sciences—universities & colleges	2,555	2,203	1,055	1,304	1,610	1,777
Biological sciences—medical schools	1,056	1,259	1,301	864	752	1,380
Medical sciences—universities & colleges	737	705	627	284	757	773
Medical sciences—medical schools	2,499	1,598	1,443	1,678	3,129	3,058
Psychology	256	88	254	141	182	272
Social sciences	181	119	*	236	296	346
Other sciences, not elsewhere classified	465	180	42	152	162	162
Engineering	2,716	1,630	1,159	1,932	1,803	2,410

NA = not available; * = data included with psychology

NOTES: Data for two years are combined—e.g., 1988-89 refers to two fiscal years. In the 1986-87 period, data were not reported for total R&D space. Square footage refers to net assignable square feet. Total space is actual space reported. New construction and repair/renovation for 1996-97 are planned rather than actual space. Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Science Resources Studies Division, *Scientific and Engineering Research Facilities at Universities and Colleges: 1996,* NSF 96-326 (Arlington, VA: 1996).

See figure 5-8.

Appendix table 5-13.
Cost of academic research new construction and repair/renovation projects, by field: 1986-97

Field	Total cost in millions of constant 1995 dollars[a]						Cost per square foot in constant 1995 dollars					
	1986-87 actual	1988-89 actual	1990-91 actual	1992-93 actual	1994-95 actual	1996-97 planned	1986-87 actual	1988-89 actual	1990-91 actual	1992-93 actual	1994-95 actual	1996-97 planned
New construction												
Total, all fields	2,570	2,874	3,353	3,040	2,768	3,072	259	270	293	277	291	283
Physical sciences	228	468	484	364	426	390	285	234	301	290	275	338
Mathematics	2	10	14	11	2	25	222	400	304	250	250	347
Computer sciences	77	76	45	51	46	31	325	266	154	297	322	256
Earth, atmospheric, and ocean sciences	71	95	191	133	33	240	187	293	361	265	117	322
Agricultural sciences	188	177	197	227	150	212	124	154	206	186	186	202
Biological sciences—U&C	406	462	508	316	388	507	318	298	370	270	377	281
Biological sciences—MS	174	211	429	369	226	214	402	296	301	362	390	460
Medical sciences—U&C	254	71	170	173	122	243	414	232	253	259	314	262
Medical sciences—MS	378	684	738	907	525	672	283	351	323	288	310	328
Psychology	29	29	41	17	42	38	220	252	250	218	290	463
Social sciences	48	56	*	48	112	54	238	170	*	217	295	307
Other sciences, n.e.c.	174	82	90	111	122	16	289	196	237	264	359	208
Engineering	538	453	445	309	575	429	225	304	262	290	264	202
Repair/renovation												
Total, all fields	1,050	1,178	931	905	1,058	1,258	78	103	108	99	81	92
Physical sciences	132	192	170	145	192	241	76	100	101	84	78	121
Mathematics	5	13	6	2	6	1	135	96	154	182	90	11
Computer sciences	22	11	24	4	8	13	114	76	146	74	65	92
Earth, atmospheric, and ocean sciences	26	21	18	34	35	41	72	23	40	81	67	72
Agricultural sciences	25	27	39	15	72	48	40	51	100	45	58	73
Biological sciences—U&C	183	147	152	117	127	187	72	67	144	90	79	105
Biological sciences—MS	97	89	138	125	101	175	92	71	106	145	134	127
Medical sciences—U&C	65	28	59	30	59	65	88	40	94	106	78	84
Medical sciences—MS	218	188	187	253	226	132	87	118	130	151	72	43
Psychology	17	13	35	11	28	29	66	148	138	78	154	107
Social sciences	45	10	*	11	40	60	249	84	*	47	135	173
Other sciences, n.e.c.	38	19	6	8	12	42	82	106	143	53	74	259
Engineering	176	422	92	150	150	222	65	259	79	78	83	92

* = data included with psychology; n.e.c. = not elsewhere classified; U&C = universities and colleges; MS = medical schools

NOTES: Data for two years are combined—e.g., 1988-89 refers to two fiscal years. Square foot refers to net assignable square feet. Current dollars have been adjusted to 1995 constant dollars using the Bureau of Census's Composite Fixed-Weighted Price Index for Construction.

[a]Project cost estimates are prorated to reflect R&D component only.

SOURCE: National Science Foundation, Science Resources Studies Division, *Scientific and Engineering Research Facilities at Universities and Colleges: 1996,* NSF 96-326 (Arlington, VA: 1996).

Appendix table 5-14.
Funds for new construction and repair/renovation of S&E research space, by type of institution and funding source: 1986-95

Institution type and funding source	Millions of current dollars					Percent of funds				
	1986-87	1988-89	1990-91	1992-93	1994-95	1986-87	1988-89	1990-91	1992-93	1994-95
New construction and repair/renovation										
Total, all institutions	2,888.5	3,474.0	3,801.3	3,646.9	3,825.6	100.0	100.0	100.0	100.0	100.0
Federal Government	172.7	413.1	525.3	515.4	317.1	6.0	11.9	13.8	14.1	8.3
State and local government	1,012.2	1,124.5	1,199.6	1,220.7	1,446.5	35.0	32.4	31.6	33.5	37.8
Private donations	588.5	511.3	453.2	373.4	470.8	20.4	14.7	11.9	10.2	12.3
Institutional funds	617.8	914.6	749.5	705.1	874.6	21.4	26.3	19.7	19.3	22.9
Tax-exempt bonds	450.7	390.1	793.9	700.5	476.6	15.6	11.2	20.9	19.2	12.5
Other debt	6.9	111.8	43.4	65.7	224.3	0.2	3.2	1.1	1.8	5.9
Other	39.3	6.0	36.3	65.9	15.8	1.4	0.2	1.0	1.8	0.4
Total, public institutions	1,790.7	2,425.5	2,469.3	2,536.8	2,368.1	100.0	100.0	100.0	100.0	100.0
Federal Government	53.5	305.7	412.7	360.1	154.3	3.0	12.6	16.7	14.2	6.5
State and local government	981.1	1,067.7	1,042.9	1,166.9	1,419.0	54.8	44.0	42.2	46.0	59.9
Private donations	274.1	214.9	182.9	177.4	139.9	15.3	8.9	7.4	7.0	5.9
Institutional funds	264.3	659.8	404.8	352.7	303.2	14.8	27.2	16.4	13.9	12.8
Tax-exempt bonds	215.0	161.1	410.7	446.4	324.4	12.0	6.6	16.6	17.6	13.7
Other debt	2.7	13.0	7.8	17.8	14.4	0.2	0.5	0.3	0.7	0.6
Other	0.4	0.6	7.5	15.2	13.0	0.0	0.0	0.3	0.6	0.5
Total, private institutions	1,097.8	1,048.5	1,332.0	1,110.1	1,457.5	100.0	100.0	100.0	100.0	100.0
Federal Government	119.2	107.4	112.6	155.3	162.8	10.9	10.2	8.5	14.0	11.2
State and local government	31.1	56.8	156.7	53.8	27.5	2.8	5.4	11.8	4.8	1.9
Private donations	314.4	296.4	270.3	196.0	330.9	28.6	28.3	20.3	17.7	22.7
Institutional funds	353.5	254.8	344.7	352.4	571.4	32.2	24.3	25.9	31.7	39.2
Tax-exempt bonds	235.7	229.0	383.2	254.1	152.2	21.5	21.8	28.8	22.9	10.4
Other debt	4.2	98.8	35.6	47.9	209.9	0.4	9.4	2.7	4.3	14.4
Other	38.9	5.4	28.8	50.7	2.8	3.5	0.5	2.2	4.6	0.2
New construction										
Total, all institutions	2,050.6	2,464.5	2,975.6	2,811.9	2,767.5	100.0	100.0	100.0	100.0	100.0
Federal Government	145.4	352.0	476.3	459.3	206.4	7.1	14.3	16.0	16.3	7.5
State and local government	779.1	890.7	956.6	968.6	1,180.9	38.0	36.1	32.1	34.4	42.7
Private donations	487.5	459.2	352.6	301.0	360.0	23.8	18.6	11.8	10.7	13.0
Institutional funds	289.8	343.8	394.1	374.4	441.9	14.1	14.0	13.2	13.3	16.0
Tax-exempt bonds	313.1	320.2	727.5	620.1	426.1	15.3	13.0	24.4	22.1	15.4
Other debt	3.1	95.9	35.4	38.9	145.7	0.2	3.9	1.2	1.4	5.3
Other	31.9	0.8	33.1	49.7	6.5	1.6	0.0	1.1	1.8	0.2
Total, public institutions	1,354.8	1,727.0	2,020.0	2,016.4	1,872.3	100.0	100.0	100.0	100.0	100.0
Federal Government	40.3	274.3	388.1	325.8	115.4	3.0	15.9	19.2	16.2	6.2
State and local government	754.5	838.4	809.4	929.8	1,164.6	55.7	48.5	40.1	46.1	62.2
Private donations	259.1	192.9	139.1	152.5	123.9	19.1	11.2	6.9	7.6	6.6
Institutional funds	109.2	256.3	270.2	198.3	142.4	8.1	14.8	13.4	9.8	7.6
Tax-exempt bonds	189.5	154.5	398.6	390.5	306.1	14.0	8.9	19.7	19.4	16.3
Other debt	2.4	8.1	7.8	16.2	13.5	0.2	0.5	0.4	0.8	0.7
Other	0.2	0.6	6.9	3.3	6.5	0.0	0.0	0.3	0.2	0.3

Appendix table 5-14.
Funds for new construction and repair/renovation of S&E research space, by type of institution and funding source: 1986-95

Institution type and funding source	Millions of current dollars					Percent of funds				
	1986-87	1988-89	1990-91	1992-93	1994-95	1986-87	1988-89	1990-91	1992-93	1994-95
Total, private institutions	695.8	737.5	955.6	795.5	895.2	100.0	100.0	100.0	100.0	1 0 0 . 0
Federal Government	105.1	77.7	88.2	133.5	91.0	15.1	10.5	9.2	16.8	10.2
State and local government	24.6	52.3	147.2	38.8	16.3	3.5	7.1	15.4	4.9	1.8
Private donations	228.4	266.3	213.5	148.5	236.1	32.8	36.1	22.3	18.7	26.4
Institutional funds	180.6	87.5	123.9	176.1	299.5	26.0	11.9	13.0	22.1	33.5
Tax-exempt bonds	123.6	165.7	328.9	229.6	120.0	17.8	22.5	34.4	28.9	13.4
Other debt	0.7	87.8	27.6	22.7	132.2	0.1	11.9	2.9	2.9	14.8
Other	31.7	0.2	26.2	46.4	0.0	4.6	0.0	2.7	5.8	0.0
Repair/renovation										
Total, all institutions	1,837.9	009.5	825.7	835.0	1,058.1	100.0	100.0	100.0	100.0	100.0
Federal Government	27.3	61.1	49.0	56.1	110.7	3.3	6.1	5.9	6.7	10.5
State and local government	233.1	233.8	243.0	252.1	265.6	27.8	23.2	29.4	30.2	25.1
Private donations	101.0	52.1	100.6	72.4	110.8	12.1	5.2	12.2	8.7	10.5
Institutional funds	328.0	570.8	355.4	330.7	432.7	39.1	56.5	43.0	39.6	40.9
Tax-exempt bonds	137.6	69.9	66.4	80.4	50.5	16.4	6.9	8.0	9.6	4.8
Other debt	3.8	15.9	8.0	26.8	78.6	0.5	1.6	1.0	3.2	7.4
Other	7.4	5.2	3.2	16.2	9.3	0.9	0.5	0.4	1.9	0.9
Total, public institutions	435.9	698.5	449.3	520.4	495.8	100.0	100.0	100.0	100.0	100.0
Federal Government	13.2	31.4	24.6	34.3	38.9	3.0	4.5	5.5	6.6	7.8
State and local government	226.6	229.3	233.5	237.1	254.4	52.0	32.8	52.0	45.6	51.3
Private donations	15.0	22.0	43.8	24.9	16.0	3.4	3.1	9.7	4.8	3.2
Institutional funds	155.1	403.5	134.6	154.4	160.8	35.6	57.8	30.0	29.7	32.4
Tax-exempt bonds	25.5	6.6	12.1	55.9	18.3	5.8	0.9	2.7	10.7	3.7
Other debt	0.3	4.9	0.0	1.6	0.9	0.1	0.7	0.0	0.3	0.2
Other	0.2	0.0	0.6	11.9	6.5	0.0	0.0	0.1	2.3	1.3
Total, private institutions	402.0	311.0	376.4	314.6	562.3	100.0	100.0	100.0	100.0	100.0
Federal Government	14.1	29.7	24.4	21.8	71.8	3.5	9.5	6.5	6.9	12.8
State and local government	6.5	4.5	9.5	15.0	11.2	1.6	1.4	2.5	4.8	2.0
Private donations	86.0	30.1	56.8	47.5	94.8	21.4	9.7	15.1	15.1	16.9
Institutional funds	172.9	167.3	220.8	176.3	271.9	43.0	53.8	58.7	56.0	48.4
Tax-exempt bonds	112.1	63.3	54.3	24.5	32.2	27.9	20.4	14.4	7.8	5.7
Other debt	3.5	11.0	8.0	25.2	77.7	0.9	3.5	2.1	8.0	13.8
Other	7.2	5.2	2.6	4.3	2.8	1.8	1.7	0.7	1.4	0.5

NOTES: Data for two years are combined—e.g., 1988-89 refers to two fiscal years. Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Science Resources Studies Division, *Scientific and Engineering Research Facilities at Universities and Colleges: 1996,* NSF 96-326 (Arlington, VA: 1996).

See figure 5-7.

Appendix table 5-15.
Total stock of S&E research space, by condition and field: 1988-96
(Percentages)

Field	Suitable for use in most scientifically sophisticated research					Effective for most uses, but not most scientifically sophisticated research					Requires limited repair/renovation to be used effectively					Requires major repair/renovation to be used effectively[a]					Requires replacement[b]		
	1988	1990	1992	1994	1996	1988	1990	1992	1994	1996	1988	1990	1992	1994	1996	1988	1990	1992	1994	1996	1992	1994	1996
Physical sciences	25.7	26.3	29.9	24.8	32.2	34.5	33.5	32.5	33.8	NA	22.3	23.7	23.0	23.8	48.3	17.5	16.5	12.5	15.3	NA	2.1	2.3	18.8
Mathematics	29.5	25.9	30.6	22.6	42.9	45.3	44.6	47.1	47.0	NA	19.4	21.9	17.5	24.9	46.8	5.8	7.6	3.0	4.1	NA	1.8	1.3	9.9
Computer sciences	32.6	38.3	43.9	35.2	55.0	35.0	35.5	35.4	40.9	NA	16.2	18.0	13.7	17.9	37.1	16.2	8.1	6.0	4.7	NA	1.0	1.2	7.5
Environmental sciences	18.7	18.7	22.5	22.1	32.4	40.6	40.4	41.9	35.9	NA	26.0	26.1	23.7	22.9	48.1	14.7	14.8	9.5	13.0	NA	2.4	6.0	19.1
Agricultural sciences	21.2	20.3	16.8	18.2	30.2	32.5	33.6	34.3	32.0	NA	26.2	24.1	22.7	27.4	46.2	20.0	22.0	18.5	13.6	NA	7.7	8.8	23.5
Biological sciences—universities and colleges	23.2	27.5	25.5	22.6	37.9	36.2	34.3	32.6	31.0	NA	25.0	24.2	26.7	27.1	43.8	15.5	14.0	12.5	14.2	NA	2.8	5.0	17.8
Biological sciences—medical schools	36.2	34.3	38.6	36.9	45.1	34.0	33.5	30.2	32.2	NA	16.5	18.9	17.4	15.8	40.1	13.4	13.2	12.5	13.3	NA	1.4	1.8	14.7
Medical sciences—universities and colleges	18.1	24.0	24.4	25.7	35.2	40.1	35.1	34.4	34.4	NA	27.2	23.8	24.0	23.3	43.6	14.6	17.0	13.8	11.8	NA	3.4	4.7	20.6
Medical sciences—medical schools	25.2	28.4	29.7	33.7	44.3	35.1	34.4	33.3	29.1	NA	23.1	23.7	22.3	20.5	36.0	16.6	13.4	12.6	13.5	NA	2.0	3.3	19.7
Psychology	23.2	20.5	22.2	22.8	38.2	43.7	46.6	46.9	37.9	NA	20.8	21.4	20.9	26.1	48.7	12.3	11.6	9.0	11.1	NA	1.0	2.0	12.3
Social sciences	14.8	17.2	17.1	14.4	31.8	47.7	45.0	42.8	46.2	NA	26.7	28.1	26.7	28.2	54.2	10.8	9.8	12.2	9.0	NA	1.2	1.9	13.1
Engineering	26.1	27.9	28.4	31.4	38.2	37.6	35.6	36.1	32.3	NA	22.4	22.0	22.2	21.3	43.3	13.9	14.5	10.8	12.1	NA	2.4	2.8	17.9

NA = not available

NOTES: Percentage of total is calculated within each field according to the condition of the research space. In 1996, the survey response categories were changed to “suitable for the most scientifically competitive research”; “effective for most levels of research, but may need limited repair/renovation”; and “requires major renovation or replacement to be used effectively.”

[a]The data for 1988 and 1990 in this category include space requiring replacement.

[b]This category was first used in the 1992 survey.

SOURCE: National Science Foundation, Science Resources Studies Division, *Scientific and Engineering Research Facilities at Universities and Colleges 1996,* NSF 96-326 (Arlington, VA: 1996).

See text table 5-2.

Appendix table 5-16.
Adequacy of the amount of S&E research space, by field: 1988-96

Field	Total number of institutions					Percentage of institutions reporting that their space is:														
						Adequate					Generally adequate					Inadequate				
	1988	1990	1992	1994	1996	1988	1990	1992	1994	1996	1988	1990	1992	1994	1996	1988	1990	1992	1994	1996
Physical sciences	445	450	433	489	490	4.7	8.7	10.6	6.4	44.9	52.4	50.8	52.3	53.1	NA	42.9	40.5	37.0	40.5	54.5
Mathematical sciences	318	296	300	348	343	21.0	17.6	16.1	16.0	68.4	53.6	47.2	58.6	55.5	NA	25.4	35.2	25.3	28.3	30.3
Computer sciences	331	280	297	347	340	15.1	13.5	12.9	15.5	54.6	38.2	41.5	56.7	48.3	NA	46.9	45.0	30.3	36.0	43.7
Environmental sciences	297	284	314	310	306	11.0	11.1	10.5	7.2	53.7	49.4	48.4	59.4	59.6	NA	39.5	40.5	30.1	33.2	46.0
Agricultural sciences	96	94	96	123	112	11.0	17.0	17.5	10.5	48.1	51.2	39.9	48.2	59.7	NA	37.7	43.1	34.3	29.6	51.9
Biological sciences—universities and colleges	444	451	434	490	504	8.3	8.7	10.8	6.2	45.9	45.8	48.2	51.8	53.7	NA	45.9	43.1	37.4	40.1	53.3
Biological sciences—medical schools	91	105	125	132	116	3.7	10.4	3.6	10.6	55.9	47.3	35.5	60.5	53.5	NA	49.0	54.1	35.9	35.5	45.5
Medical sciences—universities and colleges	191	189	210	243	239	14.3	13.0	14.2	11.7	42.6	46.0	40.3	50.1	50.3	NA	39.7	46.7	35.7	38.2	57.4
Medical sciences—medical schools	134	141	146	126	118	0.8	7.0	4.2	10.8	34.1	52.6	33.8	54.1	44.8	NA	46.6	59.2	41.8	44.0	65.9
Psychology	403	398	388	425	430	16.8	13.2	17.2	14.8	55.4	51.4	54.3	50.0	53.9	NA	31.8	32.4	32.9	31.2	43.8
Social sciences	360	345	328	378	378	12.9	12.7	8.2	7.2	51.2	50.2	51.0	64.4	63.4	NA	36.9	36.2	27.4	29.3	47.6
Other sciences	90	69	71	63	81	10.4	16.9	14.0	15.0	51.8	51.3	39.2	44.9	50.0	NA	38.4	44.0	41.1	36.5	40.7
Engineering	283	296	290	297	288	8.7	10.6	5.8	6.7	42.8	40.1	40.8	49.1	53.3	NA	51.1	48.6	45.1	40.5	57.2

NA = not available

NOTE: The 1996 survey question included only three categories: adequate; inadequate, including insufficient; or not applicable or not needed. In previous years, the survey included five categories: adequate, generally adequate, inadequate, nonexistent but needed, or not applicable or not needed.

SOURCE: National Science Foundation, Science Resources Studies Division, *Scientific and Engineering Research Facilities at Universities and Colleges: 1996,* NSF 96-326 (Arlington, VA: 1996).

Appendix table 5-17.
Expenditures for deferred S&E research facility construction and repair/renovation needs, by field: 1996
(Millions of current dollars)

Field	Total, all needs			In a plan[a]		Not in a plan[a]	
	Construction & repair/renovation	Construction	Repair/ renovation	Construction	Repair/ renovation	Construction	Repair/ renovation
Total science & engineering	9,341	5,675	3,666	4,629	2,790	1,046	876
Physical sciences	1,857	1,175	682	1,065	587	110	95
Mathematics	123	59	64	56	53	3	11
Computer sciences	153	120	33	86	22	33	11
Environmental sciences	667	473	193	377	166	96	28
Agricultural sciences	808	516	292	356	145	160	148
Biological sciences—universities & colleges	1,445	790	656	639	508	151	148
Biological sciences—medical schools	374	200	174	166	102	34	72
Medical sciences—universities & colleges	518	328	190	238	114	90	76
Medical sciences—medical schools	1,261	767	494	660	404	107	90
Psychology	135	84	51	55	41	29	10
Social sciences	306	185	121	142	64	43	57
Other sciences	168	71	97	60	57	11	40
Engineering	1,523	907	616	727	525	180	91

[a]This refers to whether the deferred need is included (or not included) in a formal institutional plan.

SOURCE: National Science Foundation, Science Resources Studies Division, *Scientific and Engineering Research Facilities at Universities and Colleges: 1996,* NSF 96-326 (Arlington, VA: 1996).

Science & Engineering Indicators – 1998

Appendix table 5-18.
Current fund expenditures for research equipment at academic institutions, by field: 1985-95

Field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
					Millions of current dollars						
Total expenditures											
Total science & engineering	671.6	782.9	837.0	912.0	986.1	1,012.2	1,023.9	1,032.2	1,038.5	1,100.7	1,235.3
Physical sciences	141.8	162.9	166.2	181.4	180.8	191.1	189.4	198.1	207.0	206.5	237.8
Mathematics	6.0	6.8	9.8	9.7	10.3	10.2	10.6	10.3	15.1	14.8	15.3
Computer sciences	35.5	42.6	42.8	42.7	43.0	48.0	58.5	45.0	53.4	58.7	77.0
Environmental sciences	47.8	51.3	55.4	55.8	67.5	72.1	70.0	77.5	76.4	82.9	81.2
Life sciences	282.6	330.6	335.3	379.4	431.0	419.9	411.3	429.0	416.7	435.5	464.1
Psychology	8.7	8.7	10.6	9.6	10.6	10.7	11.1	11.1	15.4	12.6	12.1
Social sciences	10.1	14.1	11.8	11.9	14.5	15.0	14.0	17.9	18.9	21.2	26.4
Other sciences	14.7	20.1	26.8	25.9	26.5	25.1	25.2	18.5	18.1	22.0	31.2
Engineering	124.4	145.9	178.3	195.5	201.9	220.0	233.8	224.7	217.4	246.5	290.2
Federal expenditures											
Total science & engineering	432.3	501.3	526.4	576.5	595.4	606.0	610.3	617.2	635.9	664.5	723.5
Physical sciences	113.2	130.5	130.5	142.8	133.2	144.0	139.3	151.5	153.6	151.0	175.8
Mathematics	4.9	5.2	7.6	7.6	6.9	6.7	6.7	7.0	11.3	10.6	9.0
Computer sciences	29.4	35.1	33.9	34.7	30.9	31.6	43.6	29.6	37.4	40.3	47.8
Environmental sciences	32.3	35.0	35.9	36.7	44.6	47.5	42.9	52.0	53.9	59.9	55.5
Life sciences	157.1	188.4	187.8	215.0	237.8	223.3	220.5	230.5	226.2	227.3	225.7
Psychology	6.2	5.9	8.1	6.5	6.9	6.8	7.1	7.1	10.6	7.7	7.7
Social sciences	4.0	4.3	3.5	3.3	4.9	4.9	5.1	7.7	7.6	8.7	10.5
Other sciences	6.8	11.7	13.7	12.1	13.2	11.5	9.6	5.2	7.5	9.6	9.8
Engineering	78.3	85.2	105.3	117.8	117.0	129.6	135.4	126.6	127.8	149.4	181.7
Nonfederal expenditures											
Total science & engineering	239.3	281.6	310.6	335.5	390.7	406.2	413.6	415.0	402.6	436.2	511.8
Physical sciences	28.6	32.4	35.7	38.7	47.6	47.1	50.1	46.6	53.4	55.5	62.0
Mathematics	1.1	1.6	2.2	2.1	3.3	3.5	3.9	3.3	3.8	4.1	6.3
Computer sciences	6.0	7.5	8.9	8.0	12.1	16.4	14.8	15.4	16.1	18.4	29.2
Environmental sciences	15.5	16.3	19.4	19.1	22.9	24.7	27.1	25.6	22.5	23.0	25.7
Life sciences	125.5	142.2	147.5	164.4	193.2	196.6	190.9	198.6	190.5	208.2	238.5
Psychology	2.5	2.8	2.5	3.0	3.7	3.9	4.0	4.1	4.8	5.0	4.4
Social sciences	6.0	9.8	8.3	8.6	9.6	10.1	8.9	10.1	11.3	12.5	15.9
Other sciences	7.9	8.3	13.1	13.9	13.3	13.5	15.6	13.2	10.6	12.5	21.4
Engineering	46.1	60.7	73.0	77.7	84.9	90.3	98.4	98.1	89.6	97.1	108.4

Appendix table 5-18.
Current fund expenditures for research equipment at academic institutions, by field: 1985-95

Field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
					Millions of constant 1992 dollars[a]						
Total expenditures											
Total science & engineering	856.6	971.2	1,009.2	1,062.7	1,102.6	1,086.2	1,053.9	1,032.2	1,011.7	1,047.9	1,148.1
Physical sciences	180.9	202.1	200.4	211.4	202.2	205.1	195.0	198.1	201.7	196.6	221.0
Mathematics	7.7	8.5	11.8	11.3	11.5	11.0	10.9	10.3	14.7	14.1	14.3
Computer sciences	45.2	52.8	51.6	49.8	48.1	51.5	60.2	45.0	52.1	55.9	71.6
Environmental sciences	61.0	63.6	66.7	65.0	75.4	77.4	72.0	77.5	74.4	79.0	75.5
Life sciences	360.4	410.1	404.3	442.2	481.9	450.6	423.3	429.0	406.0	414.6	431.3
Psychology	11.1	10.7	12.7	11.2	11.9	11.5	11.4	11.1	15.0	12.0	11.2
Social sciences	12.9	17.5	14.2	13.8	16.2	16.1	14.4	17.9	18.4	20.2	24.6
Other sciences	18.8	24.9	32.4	30.2	29.6	26.9	25.9	18.5	17.7	21.0	29.0
Engineering	158.7	181.0	215.0	227.8	225.8	236.1	240.6	224.7	211.8	234.7	269.7
Federal expenditures											
Total science & engineering	551.4	621.9	634.7	671.8	665.7	650.4	628.2	617.2	619.5	632.7	672.4
Physical sciences	144.4	161.9	157.4	166.4	148.9	154.5	143.4	151.5	149.6	143.8	163.4
Mathematics	6.3	6.4	9.2	8.8	7.8	7.2	6.9	7.0	11.1	10.1	8.4
Computer sciences	37.5	43.6	40.9	40.5	34.6	33.9	44.9	29.6	36.4	38.4	44.4
Environmental sciences	41.2	43.4	43.3	42.7	49.9	51.0	44.2	52.0	52.5	57.0	51.6
Life sciences	200.4	233.8	226.5	250.6	265.9	239.7	226.9	230.5	220.4	216.4	209.7
Psychology	7.9	7.3	9.8	7.6	7.8	7.3	7.3	7.1	10.3	7.3	7.2
Social sciences	5.1	5.3	4.2	3.9	5.4	5.2	5.3	7.7	7.4	8.3	9.8
Other sciences	8.7	14.5	16.5	14.1	14.7	12.4	9.9	5.2	7.3	9.1	9.1
Engineering	99.9	105.7	127.0	137.3	130.8	139.1	139.4	126.6	124.5	142.2	168.9
Nonfederal expenditures											
Total science & engineering	305.2	349.3	374.5	391.0	436.9	435.9	425.7	415.0	392.2	415.3	475.6
Physical sciences	36.5	40.2	43.0	45.1	53.2	50.6	51.6	46.6	52.1	52.8	57.6
Mathematics	1.4	2.0	2.6	2.5	3.7	3.7	4.1	3.3	3.7	3.9	5.9
Computer sciences	7.7	9.3	10.7	9.3	13.5	17.6	15.3	15.4	15.7	17.5	27.2
Environmental sciences	19.7	20.2	23.4	22.3	25.6	26.5	27.9	25.6	21.9	21.9	23.9
Life sciences	160.1	176.3	177.9	191.6	216.0	211.0	196.4	198.6	185.6	198.2	221.6
Psychology	3.2	3.5	3.0	3.5	4.1	4.2	4.1	4.1	4.7	4.7	4.1
Social sciences	7.7	12.2	10.1	10.0	10.8	10.9	9.1	10.1	11.0	11.9	14.8
Other sciences	10.1	10.4	15.8	16.2	14.9	14.5	16.0	13.2	10.4	11.9	19.9
Engineering	58.8	75.3	88.0	90.5	95.0	96.9	101.2	98.1	87.3	92.5	100.8

[a]See appendix table 4-1 for gross domestic product implicit price deflators used to convert current dollars into constant 1992 dollars.

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables, forthcoming (Arlington, VA: 1998); and NSF, annual series.

See figure 5-9.

Appendix table 5-19.
Current fund expenditures for research equipment at academic institutions as a percentage of total academic R&D expenditures, by field: 1985-95
(Percentages)

	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total science & engineering	6.9	7.2	6.9	6.8	6.6	6.2	5.8	5.5	5.2	5.2	5.6
Physical sciences	12.4	12.7	11.9	11.7	11.0	10.6	9.8	9.6	9.7	9.5	10.6
Mathematics	4.7	4.5	5.5	4.9	4.8	4.6	4.6	4.1	5.6	5.2	5.4
Computer sciences	12.6	13.3	11.5	10.5	9.1	9.3	10.5	8.1	8.8	9.0	11.3
Environmental sciences	6.8	6.6	6.6	6.2	6.7	6.8	6.3	6.3	5.8	5.9	5.7
Life sciences	5.4	5.6	5.1	5.2	5.3	4.8	4.3	4.2	3.8	3.8	3.8
Psychology	5.5	5.1	5.6	4.5	4.6	4.2	3.9	3.4	4.4	3.5	3.3
Social sciences	2.6	3.0	2.4	2.1	2.3	2.1	1.9	2.2	2.1	2.2	2.6
Other sciences	7.9	8.8	10.5	9.0	8.3	7.5	7.6	5.9	4.9	5.8	7.9
Engineering	8.8	8.9	9.4	9.3	8.4	8.3	8.0	7.3	6.9	7.4	8.2

SOURCES: National Science Foundation (NSF), Science Resources Studies Division, *Academic Science and Engineering R&D Expenditures: Fiscal Year 1995,* Detailed Statistical Tables, forthcoming (Arlington, VA: 1998); and NSF, annual series.

Appendix table 5-20.
Number and percentage of academic research instruments, by field, price range, and type: 1993

Field	All instruments		Computers and data handling instruments		Chromatographs and spectrometers		Microscopy instruments		Bioanalytical instruments		Other instruments	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All systems												
Total	61,684	100	12,023	100	13,789	100	5,597	100	10,205	100	20,071	100
Engineering	18,051	29	4,137	34	2,723	20	801	14	273	3	10,117	50
Chemistry	6,787	11	817	7	4,003	29	180	3	32	*	1,755	9
Physics/astronomy	6,415	10	1,443	12	1,159	8	212	4	303	3	3,299	16
Environmental sciences	5,126	8	1,455	12	1,740	13	554	10	142	1	1,234	6
Computer sciences	2,110	3	1,812	15	0	0	0	0	0	0	298	1
Academic departments	1,426	2	1,174	10	0	0	0	0	0	0	252	1
Computer facilities	684	1	638	5	0	0	0	0	0	0	46	*
Agricultural sciences	615	1	67	1	227	2	27	*	172	2	122	1
Biological sciences	20,978	34	2,126	18	3,797	28	3,611	65	9,217	90	2,227	11
Other, multidisciplinary	1,603	3	167	1	140	1	211	4	66	1	1,019	5
Systems costing $20,000 - $999,999												
Total	61,348	100	11,892	100	13,730	100	5,579	100	10,205	100	19,943	100
Engineering	17,996	29	4,135	35	2,696	20	800	14	273	3	10,091	51
Chemistry	6,771	11	815	7	3,999	29	180	3	32	*	1,744	9
Physics/astronomy	6,316	10	1,443	12	1,152	8	195	3	303	3	3,224	16
Environmental sciences	5,101	8	1,449	12	1,737	13	554	10	142	1	1,218	6
Computer sciences	1,992	3	1,694	14	0	0	0	0	0	0	298	1
Academic departments	1,425	2	1,173	10	0	0	0	0	0	0	252	1
Computer facilities	567	1	521	4	0	0	0	0	0	0	46	*
Agricultural sciences	615	1	67	1	227	2	27	*	172	2	122	1
Biological sciences	20,955	34	2,122	18	3,778	28	3,611	65	9,217	90	2,227	11
Other, multidisciplinary	1,603	3	167	1	140	1	211	4	66	1	1,019	5
Systems costing $1 million or more												
Total	337	100	131	100	59	100	19	100	0	0	128	100
Engineering	55	16	2	2	26	44	1	7	0	0	26	20
Chemistry	16	5	1	1	4	6	0	0	0	0	11	8
Physics/astronomy	99	29	0	0	7	11	17	93	0	0	75	59
Environmental sciences	25	7	5	4	3	6	0	0	0	0	16	13
Computer sciences	118	35	118	90	0	0	0	0	0	0	0	0
Academic departments	1	*	1	1	0	0	0	0	0	0	0	0
Computer facilities	117	35	117	89	0	0	0	0	0	0	0	0
Agricultural sciences	0	0	0	0	0	0	0	0	0	0	0	0
Biological sciences	23	7	3	3	19	33	0	0	0	0	0	0
Other, multidisciplinary	0	0	0	0	0	0	0	0	0	0	0	0

* = less than 0.5 percent

NOTES: Table includes data for supersystems—large, integrated instrumentation systems/facilities generally costing $1 million or more. Percentages may not total 100 because of rounding.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Academic Research Instruments and Instrumentation Needs: 1993, available from <<http://www.nsf.gov/sbe/srs/instmnt/start.htm>>.

Appendix table 5-21.
Aggregate purchase price and percentage distribution of academic research instruments, by field, price range, and type: 1993

Field	All instruments		Computers and data handling instruments		Chromatographs and spectrometers		Microscopy instruments		Bioanalytical instruments		Other instruments	
	$ million	Percent	$ million	Percent	$ million	Percent	$ million	Percent	$ million	Percent	$ million	Percent
All systems												
Total	6,255	100	1,851	30	1,286	21	547	9	468	7	2,103	34
Engineering	1,399	100	222	16	197	14	101	7	20	1	860	61
Chemistry	678	100	68	10	472	70	9	1	2	*	127	19
Physics/astronomy	1,062	100	136	13	175	16	38	4	20	2	694	65
Environmental sciences	696	100	180	26	171	25	115	17	5	1	224	32
Computer sciences	1,135	100	1,108	98	0	0	0	0	0	0	28	2
Academic departments	103	100	88	85	0	0	0	0	0	0	15	15
Computer facilities	1,032	100	1,020	99	0	0	0	0	0	0	12	1
Agricultural sciences	25	100	3	12	11	42	2	7	5	20	5	18
Biological sciences	1,150	100	119	10	250	22	259	23	414	36	109	9
Other, multidisciplinary	108	100	16	14	11	10	23	21	2	2	57	52
Systems costing $20,000 - $999,999												
Total	4,366	100	784	18	1,124	26	527	12	468	11	1,463	34
Engineering	1,303	100	219	17	166	13	100	8	20	2	799	61
Chemistry	651	100	57	9	467	72	9	1	2	*	116	18
Physics/astronomy	501	100	136	27	84	17	19	4	20	4	243	48
Environmental sciences	502	100	111	22	164	33	115	23	5	1	107	21
Computer sciences	157	100	129	82	0	0	0	0	0	0	28	18
Academic departments	100	100	85	85	0	0	0	0	0	0	15	15
Computer facilities	56	100	44	78	0	0	0	0	0	0	12	22
Agricultural sciences	25	100	3	12	11	42	2	7	5	20	5	18
Biological sciences	1,118	100	113	10	223	20	259	23	414	37	109	10
Other, multidisciplinary	108	100	16	14	11	10	23	21	2	2	57	52
Systems costing $1 million or more												
Total	1,889	100	1,067	57	162	9	20	1	0	0	640	34
Engineering	97	100	3	3	31	32	1	1	0	0	61	63
Chemistry	27	S	11	S	5	S	0	0	0	0	11	S
Physics/astronomy	561	100	0	0	91	16	19	3	0	0	451	80
Environmental sciences	193	100	69	36	7	4	0	0	0	0	117	60
Computer sciences	978	100	978	100	0	0	0	0	0	0	0	0
Academic departments	2	S	2	S	0	0	0	0	0	0	0	0
Computer facilities	976	100	976	100	0	0	0	0	0	0	0	0
Agricultural sciences	0	0	0	0	0	0	0	0	0	0	0	0
Biological sciences	33	S	6	S	27	S	0	0	0	0	0	0
Other, multidisciplinary	0	0	0	0	0	0	0	0	0	0	0	0

* = less than 0.5 percent; S = fewer than 10 cases for analysis

NOTES: Table includes data for supersystems—large, integrated instrumentation systems/facilities generally costing $1 million or more. Percentages may not total 100 because of rounding.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Academic Research Instruments and instrumentation Needs: 1993, available from <<http://www.nsf.gov/sbe/srs/instmnt/start.htm>>.

Appendix table 5-22.
Current age of academic research instruments, by detailed type of instrument: 1993

Type of instrument	Total	Current age (percent of total systems) 0-2 years	2-4 years	4-6 years	6-8 years	8+ years	Mean age (in years)
Total, all instruments	100	17	23	21	16	23	5.8
Computers and data handling instruments	100	18	31	23	20	9	4.0
Computers/components costing $1 million and over	100	17	7	70	7	0	3.5
Computers/components costing $500,000 – $999,999	100	10	44	36	6	4	3.7
Computers/components costing $50,000 – $499,999	100	12	26	23	27	12	4.6
Computers/components costing $20,000 – $49,999	100	21	34	22	16	7	3.7
Chromatographs and spectrometers	100	14	21	19	15	32	6.0
Chromatographs and elemental analyzers	100	16	27	20	14	22	4.8
Electron/auger/ion scattering	100	21	10	18	17	34	6.1
UV/visible/infrared spectrophotometer	100	12	18	23	13	34	5.8
NMR/EPR spectrometer	100	9	10	21	15	45	8.4
X-ray diffraction systems	100	23	10	16	21	29	5.9
Other spectroscopy instruments	100	12	23	15	14	36	6.9
Microscopy instruments	100	18	23	18	15	27	6.8
Electron microscopes	100	6	21	21	12	41	9.4
Other microscopy instruments	100	24	23	16	16	21	5.5
Bioanalytical instruments	100	12	16	25	16	31	8.2
Cell sorters/counters, cytometers	100	23	22	18	21	16	4.6
Centrifuges and accessories	100	11	16	27	16	29	7.5
DNA/protein synthesizers/sequencers/analyzers	100	26	15	22	18	19	6.5
Growth/environmental chambers	100	11	22	29	14	24	5.9
Scintillation/gamma radiation/counters/detectors	100	7	15	22	13	43	10.9
Other instruments	100	20	23	19	16	21	5.3
Electronics instruments (cameras, etc.)	100	7	17	27	31	18	5.5
Temperature/pressure control/measurement instruments	100	22	19	21	18	20	5.0
Lasers and optical instruments	100	30	21	23	8	19	4.2
Robots, manufacturing machines	100	47	22	9	10	12	3.4
Telescopes/astronomical	100	*	58	4	1	36	6.9
Nuclear reactors/nuclear science instrument systems	100	0	7	25	36	32	10.7
Research vessels/planes/helicopters	100	0	38	24	13	25	5.8
Wind/wave/water/shock tunnels	S	0	0	S	0	S	S
Molecular/electron/ion beam systems	100	43	8	11	4	34	5.5
Major prototype systems	100	7	45	9	19	21	7.1
Other, not elsewhere classified	100	18	24	18	17	23	5.7

* = less than 0.5 percent; S = fewer than 10 cases for analysis

NOTE: Table does not include data for supersystems—large, integrated instrumentation systems/facilities generally costing $1 million or more.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Academic Research Instruments and Instrumentation Needs: 1993, available from <<http://www.nsf.gov/sbe/srs/instmnt/start.htm>>.

Appendix table 5-23.
Academic employment of doctoral scientists and engineers, by type of position and field: 1973-95
(Thousands)

Field	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
Total												
Total science & engineering	118.0	134.1	145.5	155.4	167.1	176.2	190.3	196.0	206.7	210.6	213.8	217.5
Total sciences	105.6	120.7	130.7	139.5	151.0	158.1	170.4	174.8	183.9	187.8	190.6	193.7
Physical sciences	22.1	23.6	25.0	24.6	25.4	25.1	27.0	27.2	27.7	27.7	28.6	29.3
Mathematics	9.7	11.0	11.7	12.2	12.4	12.9	13.6	13.8	14.5	15.2	15.5	14.6
Computer sciences	NA	NA	NA	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.1
Environmental sciences	3.4	3.9	4.2	4.2	4.6	4.8	5.2	5.6	5.9	6.0	6.4	6.4
Life sciences	34.9	39.4	42.6	47.0	51.3	54.9	58.7	61.3	64.8	66.9	68.2	71.6
Psychology	12.2	14.8	16.2	17.7	20.1	21.0	23.1	23.7	25.0	25.2	25.0	26.1
Social sciences	23.4	28.0	31.1	33.6	36.9	38.9	42.0	42.2	44.5	44.8	44.4	42.5
Engineering	12.4	13.4	14.8	15.8	16.1	18.1	19.9	21.2	22.9	22.8	23.1	23.8
Total full-time faculty												
Total science & engineering	103.3	116.4	125.6	131.2	142.0	148.4	156.9	164.5	169.8	173.1	172.4	171.4
Total sciences	92.0	104.2	112.2	116.9	127.3	132.0	139.0	145.2	149.6	153.1	152.3	151.3
Physical sciences	17.8	18.9	20.0	20.0	20.5	20.2	21.2	22.0	21.5	21.7	21.3	20.9
Mathematics	9.3	10.4	10.9	11.4	11.7	12.3	12.7	12.9	13.5	14.2	14.7	13.0
Computer sciences	NA	NA	NA	0.1	0.3	0.4	0.7	0.9	1.3	1.8	2.3	2.8
Environmental sciences	3.0	3.4	3.6	3.5	3.8	4.0	4.2	4.4	4.7	4.5	4.5	4.7
Life sciences	29.5	33.1	34.9	37.3	40.9	43.5	45.6	48.1	49.3	51.1	50.8	52.8
Psychology	10.8	12.8	13.9	14.3	16.4	17.3	18.5	19.2	20.2	20.7	19.5	20.1
Social sciences	21.6	25.5	28.8	30.4	33.7	34.4	36.1	37.7	39.0	39.0	39.2	37.1
Engineering	11.3	12.2	13.5	14.3	14.7	16.4	17.9	19.3	20.2	20.1	20.1	20.0
Full-time senior faculty												
Total science & engineering	74.0	84.3	90.7	97.2	107.4	115.6	119.8	127.3	131.1	133.0	128.6	127.3
Total sciences	65.3	74.5	80.0	85.6	95.0	101.9	105.9	112.0	115.2	117.2	113.0	112.1
Physical sciences	13.0	14.6	15.3	16.0	16.9	17.1	17.7	18.3	17.8	17.6	16.9	16.4
Mathematics	5.9	6.9	7.6	8.3	9.1	9.7	10.0	10.5	10.9	11.8	11.5	10.6
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.3	0.4	0.9	0.9	1.7
Environmental sciences	2.2	2.5	2.7	2.8	2.9	3.1	3.1	3.2	3.6	3.6	3.7	3.6
Life sciences	21.0	23.4	24.6	27.0	29.6	32.6	33.7	35.8	36.4	37.4	35.8	37.2
Psychology	7.3	8.7	9.1	9.9	11.7	12.8	13.5	14.3	15.0	15.3	14.3	14.5
Social sciences	15.9	18.5	20.7	21.7	24.9	26.4	27.7	29.5	31.1	30.6	29.9	28.1
Engineering	8.7	9.7	10.7	11.6	12.4	13.7	13.9	15.3	15.9	15.8	15.7	15.3

Appendix table 5-23.
Academic employment of doctoral scientists and engineers, by type of position and field: 1973-95
(Thousands)

Field	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
Full-time junior faculty												
Total science & engineering	29.3	32.1	34.9	34.0	34.6	32.8	37.2	37.2	38.7	40.1	43.8	44.0
Total sciences	26.7	29.6	32.2	31.3	32.3	30.2	33.1	33.2	34.4	35.8	39.3	39.3
Physical sciences	4.8	4.3	4.8	4.0	3.7	3.1	3.5	3.6	3.7	4.1	4.3	4.5
Mathematics	3.3	3.5	3.3	3.1	2.6	2.5	2.7	2.4	2.6	2.4	3.2	2.4
Computer sciences	NA	NA	NA	0.1	0.2	0.3	0.6	0.6	0.9	1.0	1.4	1.2
Environmental sciences	0.8	0.9	0.9	0.7	0.9	0.9	1.1	1.1	1.1	0.9	0.9	1.1
Life sciences	8.5	9.7	10.3	10.3	11.3	10.8	11.9	12.3	12.8	13.7	15.0	15.6
Psychology	3.6	4.2	4.8	4.4	4.8	4.5	5.0	4.9	5.2	5.4	5.2	5.5
Social sciences	5.7	7.1	8.2	8.6	8.8	8.1	8.4	8.2	7.9	8.4	9.3	9.0
Engineering	2.6	2.5	2.7	2.8	2.3	2.7	4.0	4.0	4.3	4.3	4.5	4.8
All other full-time positions												
Total science & engineering	7.6	8.3	8.8	11.4	12.6	13.4	18.1	16.4	19.2	20.2	22.2	23.9
Total sciences	6.8	7.4	8.0	10.5	11.5	12.3	16.6	15.3	17.7	18.4	20.7	21.7
Physical sciences	1.9	1.9	2.1	2.0	2.4	2.5	3.0	2.6	3.3	3.2	3.7	3.8
Mathematics	0.2	0.3	0.4	0.4	0.4	0.3	0.5	0.4	0.5	0.6	0.5	0.6
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Environmental sciences	0.3	0.3	0.3	0.5	0.5	0.5	0.7	0.8	0.7	0.9	1.1	1.1
Life sciences	2.5	2.4	2.8	3.9	4.0	4.6	6.2	6.0	6.7	7.2	7.7	8.4
Psychology	0.8	1.0	1.2	1.8	2.2	2.2	2.9	2.8	2.9	2.8	3.9	3.9
Social sciences	1.0	1.5	1.2	1.9	2.0	2.2	3.2	2.6	3.5	3.5	3.7	3.6
Engineering	0.8	0.9	0.8	0.9	1.1	1.1	1.5	1.1	1.5	1.8	1.5	2.1
Postdoctoral and part-time positions												
Total science & engineering	7.1	9.5	11.0	12.7	12.6	14.4	15.3	15.1	17.8	17.2	19.2	22.3
Total sciences	6.8	9.1	10.5	12.1	12.2	13.7	14.8	14.3	16.6	16.3	17.7	20.7
Physical sciences	2.3	2.7	2.8	2.7	2.5	2.4	2.8	2.6	2.9	2.8	3.7	4.7
Mathematics	0.2	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.5	0.4	0.3	1.0
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Environmental sciences	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.6	0.8	0.7
Life sciences	2.8	4.0	5.0	5.8	6.4	6.8	6.9	7.2	8.8	8.6	9.7	10.4
Psychology	0.6	0.9	1.1	1.6	1.4	1.6	1.8	1.7	1.9	1.6	1.6	2.2
Social sciences	0.8	1.0	1.1	1.3	1.3	2.2	2.6	1.9	2.1	2.3	1.5	1.8
Engineering	0.3	0.4	0.5	0.6	0.3	0.7	0.5	0.8	1.1	0.9	1.5	1.6

NA = not available

NOTES: Details may not add to totals because of rounding. Data exclude university-managed federally funded research and development centers. Due to survey coverage, the data also exclude scientists and engineers with doctorates from foreign institutions. Field of employment data were discontinued after the 1991 survey and are not shown. Faculty is defined by position. Senior faculty includes full and associate professors; junior faculty members are either assistant professors or instructors.

SOURCE: National Science Foundation, Science Resources Studies Division, *Characteristics of Doctoral Scientists and Engineers in the United States: 1995*, Detailed Statistical Tables, NSF 97-333 (Arlington, VA: 1997).

See figure 5-10.

Appendix table 5-24.
Academic employment of doctoral scientists and engineers, by degree field, sex, and type of position: 1973-95
(Thousands)

Field and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
						Total academic employment						
All, total S&E	118.0	134.1	145.5	155.4	167.1	176.2	190.3	196.0	206.7	210.6	213.8	217.5
Total sciences	105.6	120.7	130.7	139.5	151.0	158.1	170.4	174.8	183.9	187.8	190.6	193.7
Physical sciences	22.1	23.6	25.0	24.6	25.4	25.1	27.0	27.2	27.7	27.7	28.6	29.3
Mathematics	9.7	11.0	11.7	12.2	12.4	12.9	13.6	13.8	14.5	15.2	15.5	14.6
Computer sciences	NA	NA	NA	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.1
Environmental sciences	3.4	3.9	4.2	4.2	4.6	4.8	5.2	5.6	5.9	6.0	6.4	6.4
Life sciences	34.9	39.4	42.6	47.0	51.3	54.9	58.7	61.3	64.8	66.9	68.2	71.6
Psychology	12.2	14.8	16.2	17.7	20.1	21.0	23.1	23.7	25.0	25.2	25.0	26.1
Social sciences	23.4	28.0	31.1	33.6	36.9	38.9	42.0	42.2	44.5	44.8	44.4	42.5
Engineering	12.4	13.4	14.8	15.8	16.1	18.1	19.9	21.2	22.9	22.8	23.1	23.8
Male, total S&E	107.3	120.3	129.0	136.0	144.0	149.8	159.2	162.0	168.0	168.7	166.9	165.1
Total sciences	94.9	106.9	114.3	120.3	128.1	132.0	139.7	141.4	145.8	146.9	144.8	142.9
Physical sciences	20.7	22.1	23.3	22.9	23.5	23.2	24.9	24.9	25.2	25.4	25.7	25.9
Mathematics	9.0	10.3	10.8	11.3	11.3	11.8	12.3	12.5	13.0	13.9	13.7	12.8
Computer sciences	0.0	0.0	0.0	0.1	0.3	0.4	0.7	0.9	1.3	1.6	2.1	2.5
Environmental sciences	3.3	3.8	4.1	4.0	4.3	4.5	4.9	5.1	5.3	5.4	5.7	5.5
Life sciences	30.8	34.3	36.6	40.1	42.9	44.5	46.7	47.9	49.5	50.1	49.4	50.1
Psychology	10.0	11.8	12.6	13.5	14.9	15.1	16.0	16.2	16.5	16.0	14.7	14.7
Social sciences	21.0	24.7	26.9	28.5	30.9	32.3	34.3	33.9	35.1	34.6	33.4	31.3
Engineering	12.3	13.3	14.7	15.7	15.9	17.8	19.5	20.6	22.2	21.8	22.1	22.3
Female, total S&E	10.7	13.8	16.5	19.4	23.1	26.5	31.1	34.0	38.7	41.9	46.9	52.4
Total sciences	10.7	13.8	16.4	19.2	22.9	26.1	30.7	33.5	38.0	40.9	45.8	50.9
Physical sciences	1.4	1.5	1.6	1.7	1.9	1.9	2.1	2.3	2.5	2.3	2.9	3.5
Mathematics	0.6	0.8	0.9	0.9	1.1	1.1	1.3	1.4	1.5	1.4	1.7	1.8
Computer sciences	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.4	0.5	0.6
Environmental sciences	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.9
Life sciences	4.0	5.1	6.0	6.9	8.4	10.3	12.1	13.3	15.3	16.8	18.8	21.5
Psychology	2.2	3.0	3.6	4.3	5.2	5.9	7.1	7.6	8.5	9.2	10.3	11.5
Social sciences	2.4	3.3	4.2	5.2	6.0	6.5	7.7	8.3	9.4	10.2	10.9	11.2
Engineering	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.6	0.7	1.0	1.1	1.5

Appendix table 5-24.
Academic employment of doctoral scientists and engineers, by degree field, sex, and type of position: 1973-95
(Thousands)

Field and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
						Full-time senior faculty						
All, total S&E	74.0	84.3	90.7	97.2	107.4	115.6	119.8	127.3	131.1	133.0	128.6	127.3
Total sciences	65.3	74.5	80.0	85.6	95.0	101.9	105.9	112.0	115.2	117.2	113.0	112.1
Physical sciences	13.0	14.6	15.3	16.0	16.9	17.1	17.7	18.3	17.8	17.6	16.9	16.4
Mathematics	5.9	6.9	7.6	8.3	9.1	9.7	10.0	10.5	10.9	11.8	11.5	10.6
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.3	0.4	0.9	0.9	1.7
Environmental sciences	2.2	2.5	2.7	2.8	2.9	3.1	3.1	3.2	3.6	3.6	3.7	3.6
Life sciences	21.0	23.4	24.6	27.0	29.6	32.6	33.7	35.8	36.4	37.4	35.8	37.2
Psychology	7.3	8.7	9.1	9.9	11.7	12.8	13.5	14.3	15.0	15.3	14.3	14.5
Social sciences	15.9	18.5	20.7	21.7	24.9	26.4	27.7	29.5	31.1	30.6	29.9	28.1
Engineering	8.7	9.7	10.7	11.6	12.4	13.7	13.9	15.3	15.9	15.8	15.7	15.3
Male, total S&E	69.7	78.9	84.7	90.3	98.7	104.9	107.4	113.3	115.3	115.5	110.3	107.0
Total sciences	61.0	69.2	74.0	78.7	86.5	91.4	93.7	98.2	99.6	100.1	95.0	92.2
Physical sciences	12.5	14.1	14.7	15.4	16.2	16.4	17.0	17.5	16.9	16.9	16.0	15.4
Mathematics	5.6	6.5	7.2	7.9	8.6	9.1	9.3	9.8	10.0	10.8	10.5	9.8
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.3	0.4	0.8	0.8	1.4
Environmental sciences	2.2	2.5	2.7	2.7	2.8	3.0	3.0	3.1	3.4	3.4	3.5	3.4
Life sciences	19.5	21.6	22.7	24.9	26.9	29.1	29.4	31.0	31.1	31.4	29.3	29.3
Psychology	6.4	7.6	7.8	8.4	9.7	10.5	10.8	11.2	11.5	11.3	10.2	10.1
Social sciences	14.7	16.9	18.8	19.5	22.3	23.2	24.2	25.4	26.4	25.5	24.7	22.8
Engineering	8.7	9.7	10.7	11.5	12.2	13.6	13.7	15.1	15.7	15.4	15.3	14.8
Female, total S&E	4.3	5.4	6.0	7.0	8.6	10.7	12.4	14.0	15.8	17.6	18.3	20.3
Total sciences	4.3	5.4	6.0	6.9	8.5	10.5	12.2	13.8	15.6	17.1	18.0	19.8
Physical sciences	0.5	0.5	0.6	0.6	0.6	0.7	0.8	0.9	0.9	0.7	0.9	1.0
Mathematics	0.3	0.4	0.4	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	0.8
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.3
Environmental sciences	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
Life sciences	1.5	1.8	1.9	2.2	2.7	3.5	4.3	4.8	5.4	6.1	6.5	7.8
Psychology	0.8	1.1	1.2	1.4	2.0	2.4	2.7	3.1	3.5	4.0	4.1	4.4
Social sciences	1.1	1.5	1.8	2.2	2.6	3.1	3.6	4.1	4.7	5.1	5.2	5.3
Engineering	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2	0.2	0.4	0.3	0.5

Appendix table 5-24.
Academic employment of doctoral scientists and engineers, by degree field, sex, and type of position: 1973-95
(Thousands)

Field and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
						Full-time junior faculty						
All, total S&E	29.3	32.1	34.9	34.0	34.6	32.8	37.2	37.2	38.7	40.1	43.8	44.0
Total sciences	26.7	29.6	32.2	31.3	32.3	30.2	33.1	33.2	34.4	35.8	39.3	39.3
Physical sciences	4.8	4.3	4.8	4.0	3.7	3.1	3.5	3.6	3.7	4.1	4.3	4.5
Mathematics	3.3	3.5	3.3	3.1	2.6	2.5	2.7	2.4	2.6	2.4	3.2	2.4
Computer sciences	NA	NA	NA	0.1	0.2	0.3	0.6	0.6	0.9	1.0	1.4	1.2
Environmental sciences	0.8	0.9	0.9	0.7	0.9	0.9	1.1	1.1	1.1	0.9	0.9	1.1
Life sciences	8.5	9.7	10.3	10.3	11.3	10.8	11.9	12.3	12.8	13.7	15.0	15.6
Psychology	3.6	4.2	4.8	4.4	4.8	4.5	5.0	4.9	5.2	5.4	5.2	5.5
Social sciences	5.7	7.1	8.2	8.6	8.8	8.1	8.4	8.2	7.9	8.4	9.3	9.0
Engineering	2.6	2.5	2.7	2.8	2.3	2.7	4.0	4.0	4.3	4.3	4.5	4.8
Male, total S&E	26.0	27.5	28.9	27.3	27.1	25.2	27.8	27.2	27.6	28.1	29.7	28.5
Total sciences	23.5	25.1	26.3	24.6	24.9	22.6	23.9	23.4	23.5	24.2	25.7	24.4
Physical sciences	4.5	4.0	4.4	3.6	3.2	2.7	3.0	3.2	3.2	3.4	3.5	3.4
Mathematics	3.1	3.2	2.9	2.7	2.2	2.2	2.3	2.0	2.2	2.2	2.7	2.0
Computer sciences	NA	NA	NA	0.1	0.2	0.3	0.5	0.5	0.8	0.8	1.1	1.0
Environmental sciences	0.7	0.9	0.8	0.7	0.9	0.8	0.9	0.9	0.9	0.7	0.7	0.7
Life sciences	7.5	8.1	8.4	8.1	8.9	8.1	8.5	8.5	8.4	8.8	9.5	9.5
Psychology	2.7	3.0	3.3	2.8	3.0	2.6	2.7	2.7	2.9	3.0	2.3	2.4
Social sciences	5.0	5.9	6.5	6.6	6.5	5.9	6.0	5.6	5.2	5.3	5.9	5.5
Engineering	2.6	2.4	2.7	2.7	2.2	2.6	3.8	3.8	4.0	3.9	4.0	4.1
Female, total S&E	3.3	4.6	6.0	6.8	7.5	7.7	9.4	10.0	11.2	12.0	14.1	15.6
Total sciences	3.3	4.6	5.9	6.7	7.4	7.6	9.2	9.7	10.8	11.6	13.6	14.9
Physical sciences	0.3	0.3	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.7	0.9	1.1
Mathematics	0.2	0.3	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.3	0.5	0.5
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.3	0.2
Environmental sciences	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.4
Life sciences	1.1	1.6	1.9	2.2	2.4	2.7	3.4	3.8	4.5	4.9	5.5	6.1
Psychology	0.9	1.2	1.5	1.6	1.8	1.9	2.3	2.2	2.3	2.4	2.9	3.1
Social sciences	0.8	1.2	1.7	2.1	2.3	2.1	2.4	2.6	2.7	3.0	3.4	3.5
Engineering	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.5	0.7

Appendix table 5-24.
Academic employment of doctoral scientists and engineers, by degree field, sex, and type of position: 1973-95
(Thousands)

Field and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
						All other full-time positions						
All, total S&E	7.6	8.3	8.8	11.4	12.6	13.4	18.1	16.4	19.2	20.2	22.2	23.9
Total sciences	6.8	7.4	8.0	10.5	11.5	12.3	16.6	15.3	17.7	18.4	20.7	21.7
Physical sciences	1.9	1.9	2.1	2.0	2.4	2.5	3.0	2.6	3.3	3.2	3.7	3.8
Mathematics	0.2	0.3	0.4	0.4	0.4	0.3	0.5	0.4	0.5	0.6	0.5	0.6
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Environmental sciences	0.3	0.3	0.3	0.5	0.5	0.5	0.7	0.8	0.7	0.9	1.1	1.1
Life sciences	2.5	2.4	2.8	3.9	4.0	4.6	6.2	6.0	6.7	7.2	7.7	8.4
Psychology	0.8	1.0	1.2	1.8	2.2	2.2	2.9	2.8	2.9	2.8	3.9	3.9
Social sciences	1.0	1.5	1.2	1.9	2.0	2.2	3.2	2.6	3.5	3.5	3.7	3.6
Engineering	0.8	0.9	0.8	0.9	1.1	1.1	1.5	1.1	1.5	1.8	1.5	2.1
Male, total S&E	6.5	7.2	7.4	9.5	10.0	10.3	14.3	12.0	13.9	14.4	15.4	16.1
Total sciences	5.7	6.4	6.7	8.6	8.9	9.3	12.8	10.9	12.5	12.8	14.0	14.1
Physical sciences	1.8	1.8	1.9	1.8	2.1	2.2	2.7	2.2	2.9	2.9	3.3	3.2
Mathematics	0.2	0.3	0.4	0.3	0.3	0.2	0.4	0.4	0.4	0.6	0.4	0.5
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Environmental sciences	0.3	0.3	0.3	0.5	0.5	0.5	0.7	0.7	0.6	0.7	0.9	0.9
Life sciences	2.0	1.9	2.2	3.0	3.0	3.2	4.6	4.1	4.6	4.9	5.1	5.6
Psychology	0.7	0.8	0.9	1.4	1.4	1.4	1.8	1.6	1.5	1.2	1.9	1.7
Social sciences	0.8	1.3	0.9	1.6	1.6	1.7	2.5	1.8	2.4	2.4	2.2	2.1
Engineering	0.8	0.9	0.8	0.9	1.1	1.0	1.5	1.0	1.4	1.7	1.5	2.0
Female, total S&E	1.1	1.1	1.4	2.0	2.6	3.1	3.8	4.5	5.3	5.8	6.7	7.7
Total sciences	1.1	1.1	1.4	2.0	2.6	3.1	3.8	4.4	5.2	5.7	6.7	7.6
Physical sciences	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.3	0.4	0.6
Mathematics	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2	0.2
Life sciences	0.6	0.5	0.6	0.9	1.0	1.3	1.6	1.8	2.1	2.4	2.6	2.8
Psychology	0.2	0.2	0.3	0.5	0.8	0.8	1.1	1.3	1.4	1.6	2.0	2.2
Social sciences	0.2	0.2	0.2	0.3	0.4	0.5	0.7	0.8	1.1	1.1	1.5	1.5
Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1

Appendix table 5-24.
Academic employment of doctoral scientists and engineers, by degree field, sex, and type of position: 1973-95
(Thousands)

Field and sex	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
						Postdoctoral and part-time positions						
All, total S&E	7.1	9.5	11.0	12.7	12.6	14.4	15.3	15.1	17.8	17.2	19.2	22.3
Total sciences	6.8	9.1	10.5	12.1	12.2	13.7	14.8	14.3	16.6	16.3	17.7	20.7
Physical sciences	2.3	2.7	2.8	2.7	2.5	2.4	2.8	2.6	2.9	2.8	3.7	4.7
Mathematics	0.2	0.3	0.3	0.4	0.3	0.4	0.3	0.4	0.5	0.4	0.3	1.0
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Environmental sciences	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.5	0.6	0.8	0.7
Life sciences	2.8	4.0	5.0	5.8	6.4	6.8	6.9	7.2	8.8	8.6	9.7	10.4
Psychology	0.6	0.9	1.1	1.6	1.4	1.6	1.8	1.7	1.9	1.6	1.6	2.2
Social sciences	0.8	1.0	1.1	1.3	1.3	2.2	2.6	1.9	2.1	2.3	1.5	1.8
Engineering	0.3	0.4	0.5	0.6	0.3	0.7	0.5	0.8	1.1	0.9	1.5	1.6
Male, total S&E	5.0	6.7	7.8	9.0	8.2	9.4	9.8	9.5	11.3	10.7	11.5	13.5
Total sciences	4.7	6.3	7.3	8.4	7.8	8.7	9.3	8.8	10.2	9.8	10.1	12.1
Physical sciences	1.9	2.2	2.3	2.2	1.9	1.9	2.2	2.0	2.3	2.2	3.0	3.8
Mathematics	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.4	0.3	0.1	0.6
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Environmental sciences	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.6	0.5
Life sciences	2.0	2.7	3.3	4.1	4.1	4.1	4.2	4.3	5.5	5.1	5.6	5.7
Psychology	0.2	0.4	0.6	0.9	0.8	0.7	0.8	0.7	0.6	0.4	0.2	0.5
Social sciences	0.5	0.6	0.7	0.8	0.6	1.5	1.6	1.1	1.1	1.4	0.6	0.9
Engineering	0.3	0.3	0.5	0.6	0.3	0.6	0.5	0.7	1.1	0.9	1.3	1.4
Female, total S&E	2.1	2.8	3.2	3.7	4.4	5.0	5.6	5.6	6.4	6.6	7.7	8.8
Total sciences	2.1	2.8	3.2	3.7	4.4	5.0	5.5	5.5	6.4	6.5	7.6	8.5
Physical sciences	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.8	0.8
Mathematics	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.4
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.1
Life sciences	0.9	1.3	1.6	1.8	2.3	2.7	2.8	2.9	3.3	3.5	4.1	4.7
Psychology	0.4	0.5	0.5	0.7	0.7	0.8	1.0	1.0	1.3	1.2	1.4	1.7
Social sciences	0.3	0.4	0.4	0.5	0.7	0.7	1.0	0.8	1.0	0.9	0.9	0.9
Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.3

NA = not available

NOTES: Data exclude university-managed federally funded research and development centers. Due to survey coverage, the data also exclude scientists and engineers with doctorates from foreign institutions. Field of employment data were discontinued after the 1991 survey and are not shown. Faculty is defined by position. Senior faculty includes full and associate professors; junior faculty members are either assistant professors or instructors.

SOURCE: National Science Foundation, Science Resources Studies Division, *Characteristics of Doctoral Scientists and Engineers in the United States: 1995*, Detailed Statistical Tables, NSF 97-333 (Arlington, VA: 1997).

Appendix table 5-25.
Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973-95
(Thousands)

Field and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
						Total academic employment						
All, total S&E	118.0	134.1	145.5	155.4	167.1	176.2	190.3	196.0	206.7	210.6	213.8	217.5
Total sciences	105.6	120.7	130.7	139.5	151.0	158.1	170.4	174.8	183.9	187.8	190.6	193.7
Physical sciences	22.1	23.6	25.0	24.6	25.4	25.1	27.0	27.2	27.7	27.7	28.6	29.3
Mathematics	9.7	11.0	11.7	12.2	12.4	12.9	13.6	13.8	14.5	15.2	15.5	14.6
Computer sciences	NA	NA	NA	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.1
Environmental sciences	3.4	3.9	4.2	4.2	4.6	4.8	5.2	5.6	5.9	6.0	6.4	6.4
Life sciences	34.9	39.4	42.6	47.0	51.3	54.9	58.7	61.3	64.8	66.9	68.2	71.6
Psychology	12.2	14.8	16.2	17.7	20.1	21.0	23.1	23.7	25.0	25.2	25.0	26.1
Social sciences	23.4	28.0	31.1	33.6	36.9	38.9	42.0	42.2	44.5	44.8	44.4	42.5
Engineering	12.4	13.4	14.8	15.8	16.1	18.1	19.9	21.2	22.9	22.8	23.1	23.8
White non-Hispanic, total S&E	107.8	121.6	131.5	140.0	150.0	157.3	168.5	172.9	181.1	183.5	181.8	182.6
Total sciences	97.0	110.0	118.8	126.5	135.9	142.1	152.1	155.8	163.0	165.3	164.3	165.0
Physical sciences	19.7	21.1	22.1	21.9	22.3	21.9	23.4	23.3	23.7	23.8	23.4	23.8
Mathematics	8.8	10.0	10.6	10.8	11.0	11.5	11.9	12.2	12.6	13.0	12.9	12.0
Computer sciences	NA	NA	NA	0.1	0.2	0.4	0.6	0.9	1.1	1.4	1.6	2.1
Environmental sciences	3.3	3.7	4.0	4.0	4.3	4.5	4.9	5.2	5.5	5.7	5.9	5.7
Life sciences	32.2	35.8	38.8	42.4	46.1	49.4	52.7	54.7	57.6	59.2	59.1	61.3
Psychology	11.6	13.9	15.2	16.8	18.8	19.6	21.3	22.0	23.2	23.2	22.9	23.6
Social sciences	21.4	25.3	28.2	30.5	33.1	34.7	37.3	37.6	39.4	39.1	38.6	36.5
Engineering	10.8	11.6	12.6	13.5	14.0	15.2	16.4	17.2	18.1	18.2	17.5	17.6
Asian, total S&E	5.1	6.1	6.8	9.8	10.9	11.8	14.1	15.1	16.4	16.9	21.0	22.5
Total sciences	4.0	5.0	5.4	7.9	9.2	9.5	11.1	11.6	12.3	13.2	16.3	17.6
Physical sciences	1.1	1.3	1.4	1.9	2.0	2.2	2.6	2.9	2.8	2.6	3.8	4.1
Mathematics	0.4	0.5	0.5	0.9	0.9	1.0	1.1	1.1	1.3	1.6	1.9	1.8
Computer sciences	NA	NA	NA	0.0	0.1	0.1	0.1	0.1	0.3	0.5	0.8	0.9
Environmental sciences	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5
Life sciences	1.3	1.8	2.0	3.1	3.6	3.6	4.0	4.5	4.8	5.1	6.4	6.8
Psychology	0.1	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.6
Social sciences	1.0	1.1	1.2	1.6	2.0	2.0	2.5	2.2	2.4	2.6	2.7	2.8
Engineering	1.1	1.1	1.3	1.9	1.8	2.4	3.0	3.5	4.1	3.7	4.7	4.9
Underrep. minorities, total S&E[a]	2.4	3.2	3.8	5.0	6.0	6.8	7.3	8.0	9.2	10.2	11.5	12.8
Total sciences	2.3	3.0	3.5	4.6	5.7	6.2	6.8	7.4	8.5	9.3	10.5	11.5
Physical sciences	0.5	0.5	0.5	0.7	0.9	1.0	0.9	1.0	1.1	1.3	1.6	1.5
Mathematics	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	0.8	0.9
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2
Environmental sciences	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
Life sciences	0.9	1.1	1.2	1.4	1.6	1.8	1.9	2.1	2.5	2.6	2.9	3.6
Psychology	0.3	0.4	0.6	0.6	0.9	1.0	1.3	1.2	1.3	1.5	1.7	2.0
Social sciences	0.5	0.8	0.8	1.5	1.8	2.0	2.2	2.4	2.8	3.1	3.2	3.2
Engineering	0.2	0.2	0.3	0.4	0.3	0.5	0.5	0.5	0.7	0.9	1.0	1.3

Appendix table 5-25.
Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973-95
(Thousands)

Field and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
Black, total S&E	1.3	1.7	1.8	2.0	2.6	3.3	3.4	3.6	3.8	4.7	4.9	6.1
Total sciences	1.3	1.6	1.7	1.9	2.5	3.0	3.2	3.3	3.6	4.3	4.6	5.6
Physical sciences	0.3	0.2	0.2	0.2	0.3	0.4	0.3	0.3	0.3	0.4	0.5	0.6
Mathematics	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.4	0.6	0.6	0.6	0.6	0.8	0.9	0.9	1.0	1.2	1.3	1.8
Psychology	0.2	0.3	0.3	0.3	0.4	0.6	0.6	0.7	0.7	0.9	0.9	1.1
Social sciences	0.3	0.5	0.5	0.7	1.0	1.1	1.3	1.2	1.3	1.6	1.6	1.8
Engineering	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.4	0.3	0.5
Hispanic, total S&E	0.9	1.2	1.6	2.4	2.5	2.6	3.1	3.4	4.3	4.5	5.0	5.7
Total sciences	0.8	1.1	1.4	2.1	2.4	2.4	2.8	3.1	3.9	4.1	4.4	5.0
Physical sciences	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.5	0.6	0.8	0.8	0.8
Mathematics	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1
Environmental sciences	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Life sciences	0.4	0.4	0.5	0.7	0.8	0.8	0.8	1.0	1.2	1.2	1.3	1.6
Psychology	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.8
Social sciences	0.1	0.2	0.2	0.6	0.5	0.6	0.7	0.8	1.1	1.1	1.2	1.1
Engineering	0.1	0.1	0.2	0.3	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.7
Native American, total S&E	0.2	0.3	0.4	0.6	0.8	0.8	0.8	0.9	1.1	0.9	1.0	1.0
Total sciences	0.2	0.3	0.4	0.6	0.7	0.7	0.7	0.9	1.0	0.8	1.0	0.9
Physical sciences	0.0	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.1
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Psychology	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.2
Social sciences	0.1	0.1	0.1	0.2	0.3	0.3	0.2	0.3	0.5	0.4	0.4	0.3
Engineering	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.1	0.1	0.1

Appendix table 5-25.
Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973-95
(Thousands)

Field and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
						Full-time faculty						
All, total S&E	103.3	116.4	125.6	131.2	142.0	148.4	156.9	164.5	169.8	173.1	172.4	171.4
Total sciences	92.0	104.2	112.2	116.9	127.3	132.0	139.0	145.2	149.6	153.1	152.3	151.3
Physical sciences	17.8	18.9	20.0	20.0	20.5	20.2	21.2	22.0	21.5	21.7	21.3	20.9
Mathematics	9.3	10.4	10.9	11.4	11.7	12.3	12.7	12.9	13.5	14.2	14.7	13.0
Computer sciences	NA	NA	NA	0.1	0.3	0.4	0.7	0.9	1.3	1.8	2.3	2.8
Environmental sciences	3.0	3.4	3.6	3.5	3.8	4.0	4.2	4.4	4.7	4.5	4.5	4.7
Life sciences	29.5	33.1	34.9	37.3	40.9	43.5	45.6	48.1	49.3	51.1	50.8	52.8
Psychology	10.8	12.8	13.9	14.3	16.4	17.3	18.5	19.2	20.2	20.7	19.5	20.1
Social sciences	21.6	25.5	28.8	30.4	33.7	34.4	36.1	37.7	39.0	39.0	39.2	37.1
Engineering	11.3	12.2	13.5	14.3	14.7	16.4	17.9	19.3	20.2	20.1	20.2	20.0
White non-Hispanic, total S&E	94.9	106.2	114.3	118.7	128.1	133.4	139.7	146.2	149.8	151.8	148.7	147.1
Total sciences	85.0	95.6	102.6	106.5	115.4	119.4	124.9	130.4	133.6	135.7	133.1	131.7
Physical sciences	16.1	17.2	18.0	18.0	18.5	17.8	18.8	19.3	18.9	18.9	18.0	17.8
Mathematics	8.5	9.5	9.9	10.1	10.3	10.9	11.1	11.4	11.7	12.2	12.3	10.7
Computer sciences	NA	NA	NA	0.0	0.2	0.3	0.5	0.7	1.0	1.3	1.5	1.9
Environmental sciences	2.9	3.3	3.5	3.3	3.6	3.8	4.0	4.1	4.4	4.3	4.2	4.3
Life sciences	27.5	30.4	32.1	33.9	37.2	39.7	41.3	43.4	44.4	46.0	45.1	46.7
Psychology	10.3	12.1	13.0	13.6	15.4	16.2	17.1	17.9	18.8	19.2	18.0	18.4
Social sciences	19.7	23.2	26.1	27.5	30.2	30.7	32.2	33.6	34.4	33.8	34.1	31.9
Engineering	10.0	10.6	11.6	12.2	12.7	14.0	14.8	15.9	16.2	16.2	15.6	15.3
Asian, total S&E	4.0	4.7	5.0	7.8	8.4	9.2	10.9	11.7	12.4	12.7	14.9	14.5
Total sciences	3.0	3.7	3.9	6.0	6.8	7.2	8.2	8.8	9.0	9.6	11.2	11.0
Physical sciences	0.7	0.8	0.9	1.3	1.2	1.5	1.6	1.8	1.7	1.7	2.2	2.0
Mathematics	0.4	0.5	0.5	0.8	0.9	1.0	1.1	1.1	1.3	1.5	1.7	1.6
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.1	0.3	0.5	0.7	0.8
Environmental sciences	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3
Life sciences	0.9	1.2	1.3	2.1	2.3	2.4	2.8	3.1	3.1	3.0	3.7	3.5
Psychology	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4
Social sciences	0.9	1.1	1.1	1.5	1.9	1.9	2.1	2.1	2.2	2.4	2.3	2.5
Engineering	0.9	1.0	1.1	1.8	1.7	1.9	2.7	3.0	3.4	3.1	3.7	3.6
Underrep. minorities, total S&E[a]	2.1	2.7	3.3	4.3	5.2	5.6	5.9	6.5	7.6	8.7	9.2	10.0
Total sciences	1.9	2.5	3.0	4.0	4.9	5.2	5.5	6.0	7.0	7.9	8.3	8.9
Physical sciences	0.4	0.4	0.4	0.6	0.8	0.9	0.7	0.8	0.9	1.1	1.2	1.1
Mathematics	0.2	0.2	0.2	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.7	0.7
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2
Environmental sciences	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Life sciences	0.7	0.9	1.0	1.1	1.4	1.4	1.5	1.7	1.9	2.1	2.1	2.6
Psychology	0.2	0.3	0.5	0.4	0.6	0.8	0.9	0.9	1.0	1.2	1.1	1.4
Social sciences	0.4	0.6	0.8	1.4	1.6	1.7	1.8	2.0	2.5	2.9	2.9	2.8
Engineering	0.1	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.6	0.8	0.9	1.1

Appendix table 5-25.
Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973-95
(Thousands)

Field and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
Black, total S&E	1.2	1.4	1.5	1.7	2.3	2.6	2.7	2.9	3.2	4.1	3.9	4.8
Total sciences	1.1	1.3	1.5	1.6	2.2	2.4	2.6	2.7	3.0	3.7	3.6	4.3
Physical sciences	0.2	0.2	0.2	0.2	0.2	0.3	0.1	0.2	0.3	0.4	0.4	0.5
Mathematics	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2	0.2	0.2	0.2
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.3	0.5	0.5	0.5	0.5	0.6	0.7	0.7	0.8	1.0	1.0	1.3
Psychology	0.1	0.2	0.3	0.2	0.4	0.4	0.5	0.5	0.6	0.7	0.6	0.6
Social sciences	0.3	0.4	0.4	0.6	0.9	0.9	1.1	1.0	1.1	1.5	1.4	1.5
Engineering	0.1	0.1	0.0	0.1	0.1	0.2	0.1	0.2	0.2	0.4	0.3	0.5
Hispanic, total S&E	0.7	1.0	1.3	2.0	2.1	2.2	2.4	2.7	3.3	3.7	3.9	4.4
Total sciences	0.6	0.9	1.2	1.7	2.0	2.0	2.2	2.5	3.0	3.3	3.5	3.8
Physical sciences	0.1	0.2	0.2	0.3	0.4	0.4	0.4	0.5	0.4	0.6	0.6	0.5
Mathematics	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.4
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.1
Environmental sciences	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Life sciences	0.3	0.4	0.4	0.5	0.7	0.6	0.6	0.8	0.9	0.9	0.9	1.2
Psychology	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.4	0.5
Social sciences	0.1	0.2	0.2	0.5	0.5	0.5	0.5	0.7	0.9	1.0	1.0	1.0
Engineering	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.6
Native American, total S&E	0.2	0.3	0.4	0.6	0.7	0.8	0.8	0.9	1.0	0.8	0.9	0.8
Total sciences	0.2	0.3	0.3	0.6	0.7	0.7	0.7	0.8	0.9	0.8	0.8	0.7
Physical sciences	0.0	0.1	0.0	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.2
Psychology	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Social sciences	0.1	0.1	0.1	0.2	0.3	0.3	0.2	0.3	0.4	0.4	0.4	0.3
Engineering	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.1
Full-time nonfaculty, part-time, and postdoctorate positions												
All, total S&E	14.7	17.8	19.9	24.1	25.2	27.8	33.4	31.5	36.9	37.4	41.4	46.2
Total sciences	13.6	16.5	18.5	22.6	23.7	26.1	31.4	29.6	34.3	34.7	38.4	42.4
Physical sciences	4.2	4.6	4.9	4.7	4.8	5.0	5.8	5.2	6.2	6.0	7.4	8.5
Mathematics	0.4	0.6	0.8	0.8	0.7	0.7	0.8	0.9	1.0	1.0	0.8	1.6
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.2	0.2	0.1	0.2	0.3
Environmental sciences	0.4	0.5	0.6	0.7	0.8	0.8	1.0	1.2	1.2	1.5	1.9	1.7
Life sciences	5.4	6.3	7.7	9.7	10.4	11.4	13.1	13.1	15.5	15.8	17.4	18.8
Psychology	1.4	1.9	2.3	3.4	3.7	3.7	4.6	4.5	4.8	4.4	5.5	6.1
Social sciences	1.8	2.5	2.3	3.3	3.2	4.4	5.8	4.5	5.5	5.8	5.2	5.4
Engineering	1.1	1.2	1.3	1.5	1.4	1.7	2.0	1.9	2.6	2.7	3.0	3.8

Appendix table 5-25.
Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973-95
(Thousands)

Field and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
White non-Hispanic, total S&E	12.9	15.4	17.2	21.3	21.9	23.9	28.8	26.7	31.3	31.7	33.1	35.5
Total sciences	12.0	14.4	16.2	20.1	20.5	22.7	27.2	25.4	29.4	29.7	31.2	33.2
Physical sciences	3.6	4.0	4.1	3.9	3.9	4.1	4.7	4.0	4.8	4.9	5.4	6.0
Mathematics	0.4	0.6	0.7	0.7	0.6	0.6	0.8	0.8	0.9	0.8	0.6	1.3
Computer sciences	NA	NA	NA	0.0	0.0	0.1	0.1	0.2	0.1	0.1	0.2	0.2
Environmental sciences	0.4	0.4	0.5	0.7	0.7	0.8	0.9	1.1	1.0	1.4	1.7	1.4
Life sciences	4.7	5.4	6.7	8.5	8.9	9.7	11.4	11.3	13.2	13.2	14.0	14.6
Psychology	1.3	1.8	2.2	3.2	3.4	3.4	4.2	4.1	4.4	4.0	4.9	5.2
Social sciences	1.6	2.2	2.0	3.0	3.0	4.0	5.1	4.0	5.0	5.3	4.5	4.7
Engineering	0.8	1.0	1.0	1.3	1.4	1.2	1.7	1.3	1.9	2.0	1.9	2.3
Asian, total S&E	1.1	1.5	1.7	2.1	2.5	2.7	3.2	3.3	4.0	4.2	6.1	8.0
Total sciences	1.0	1.3	1.5	1.9	2.4	2.2	2.9	2.8	3.3	3.6	5.1	6.6
Physical sciences	0.5	0.5	0.6	0.6	0.8	0.7	1.0	1.0	1.1	0.9	1.6	2.1
Mathematics	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.2
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.3
Life sciences	0.4	0.6	0.8	1.0	1.4	1.2	1.3	1.4	1.7	2.1	2.7	3.4
Psychology	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
Social sciences	0.0	0.1	0.1	0.2	0.1	0.1	0.4	0.2	0.2	0.2	0.3	0.3
Engineering	0.1	0.1	0.2	0.2	0.1	0.4	0.3	0.5	0.7	0.6	1.0	1.3
Underrep. minorities, total S&E[a]	0.4	0.5	0.5	0.7	0.8	1.1	1.4	1.5	1.7	1.5	2.3	2.8
Total sciences	0.3	0.5	0.5	0.6	0.8	1.0	1.3	1.4	1.6	1.4	2.2	2.7
Physical sciences	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.4	0.4
Mathematics	0.0	0.0	0.0	0.0	0.1	0.0	0.1	0.0	0.1	0.1	0.1	0.2
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Life sciences	0.2	0.2	0.2	0.2	0.2	0.4	0.4	0.5	0.6	0.5	0.8	0.9
Psychology	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.5	0.7
Social sciences	0.0	0.1	0.1	0.1	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.4
Engineering	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Black, total S&E	0.2	0.3	0.3	0.3	0.4	0.6	0.6	0.7	0.6	0.6	1.0	1.3
Total sciences	0.2	0.3	0.2	0.3	0.4	0.6	0.6	0.7	0.5	0.5	1.0	1.3
Physical sciences	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.1
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.4
Psychology	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.1	0.3	0.4
Social sciences	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.2
Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Appendix table 5-25.
Academic employment of doctoral scientists and engineers, by degree field, race/ethnicity, and type of position: 1973-95
(Thousands)

Field and race/ethnicity	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
Hispanic, total S&E	0.2	0.2	0.3	0.4	0.4	0.5	0.7	0.7	1.0	0.8	1.0	1.3
Total sciences	0.2	0.2	0.2	0.3	0.4	0.4	0.6	0.6	0.9	0.8	0.9	1.2
Physical sciences	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.1	0.2	0.2	0.2	0.2
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.1
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Life sciences	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.4	0.3	0.4	0.4
Psychology	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.2	0.2	0.2
Social sciences	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.1	0.1	0.2	0.1
Engineering	0.0	0.0	0.0	0.1	0.0	0.1	0.1	0.0	0.1	0.0	0.1	0.1
Native American, total S&E	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2
Total sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.0	0.1	0.2
Physical sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Mathematics	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Computer sciences	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Environmental sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Life sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0
Psychology	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Social sciences	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Engineering	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

NA = not available

NOTES: Data exclude university-managed federally funded research and development centers. Due to survey coverage, the data also exclude scientists and engineers with doctorates from foreign institutions. Field of employment data were discontinued after the 1991 survey and are not shown. Faculty positions include full, associate, and assistant professors and instructors. Details may not add to totals because of rounding and the inclusion of Hispanic respondents in different racial categories.

[a]Underrepresented minorities in science and engineering are blacks, Hispanics, and Native Americans.

SOURCE: National Science Foundation, Science Resources Studies Division, *Characteristics of Doctoral Scientists and Engineers in the United States: 1995*, Detailed Statistical Tables, NSF 97-333 (Arlington, VA: 1997).

Appendix table 5-26.
Age distribution of academic doctoral scientists and engineers, by type of appointment: 1973-95
(Percentages)

	Total	35 and younger	36-45 years old	46-55 years old	56-65 years old	65 and older
All doctoral scientists and engineers						
1973	100.0	33.0	33.4	22.1	9.9	1.6
1975	100.0	30.7	34.8	22.7	10.3	1.5
1977	100.0	28.6	36.1	22.7	11.2	1.4
1979	100.0	24.0	39.0	23.1	12.2	1.6
1981	100.0	22.4	39.3	22.5	13.8	2.1
1983	100.0	18.6	40.5	23.9	14.4	2.6
1985	100.0	17.4	39.8	25.2	14.7	2.8
1987	100.0	15.9	37.6	28.5	15.2	2.8
1989	100.0	15.2	34.9	31.0	15.8	3.1
1991	100.0	14.8	34.3	32.4	15.7	2.8
1993	100.0	16.3	33.9	32.8	14.8	2.3
1995	100.0	15.7	33.2	32.8	15.7	2.6
Full-time faculty						
1973	100.0	30.4	34.6	23.2	10.2	1.5
1975	100.0	27.8	36.2	23.9	10.6	1.5
1977	100.0	25.2	37.3	24.2	11.9	1.4
1979	100.0	20.2	40.2	24.8	13.1	1.7
1981	100.0	18.5	40.3	24.3	14.8	2.2
1983	100.0	14.8	41.1	25.8	15.7	2.6
1985	100.0	14.1	40.3	27.0	15.9	2.8
1987	100.0	12.1	37.6	30.7	16.8	2.9
1989	100.0	10.9	34.7	33.7	17.6	3.0
1991	100.0	11.6	33.6	34.9	17.1	2.8
1993	100.0	11.9	33.8	35.4	16.4	2.5
1995	100.0	10.9	32.8	35.7	17.8	2.8
All other types of appointment						
1973	100.0	54.6	23.3	12.9	6.8	2.4
1975	100.0	52.0	24.3	14.1	7.6	1.9
1977	100.0	53.9	27.0	11.3	6.1	1.7
1979	100.0	49.7	31.2	11.6	6.2	1.3
1981	100.0	47.5	32.8	11.5	7.1	1.2
1983	100.0	43.0	36.8	11.6	5.9	2.7
1985	100.0	35.4	37.5	15.6	8.3	3.1
1987	100.0	38.7	37.5	15.6	6.0	2.3
1989	100.0	37.6	35.9	17.0	6.4	3.1
1991	100.0	30.9	37.4	19.9	8.7	3.0
1993	100.0	35.8	34.1	21.5	7.3	1.4
1995	100.0	35.4	35.1	20.6	7.0	1.8

NOTES: Faculty positions include full, associate, and assistant professors and instructors. Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Doctorate Recipients, unpublished tabulations (1997).

See figure 5-12.

Appendix table 5-27.
Age distribution of full-time doctoral S&E faculty at research universities and other academic institutions: 1973-95

Age bracket	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
All universities and colleges												
Total number (thousands)	*103.3*	*116.4*	*125.6*	*131.2*	*142.0*	*148.4*	*156.9*	*164.5*	*169.8*	*173.1*	*172.4*	*171.4*
Under 30 (%)	7.1	5.0	4.5	3.4	3.1	2.2	1.9	1.3	1.5	1.5	2.1	1.6
31-35 (%)	23.2	22.8	20.5	16.7	15.2	12.5	12.0	10.5	9.4	10.2	9.8	9.0
36-40 (%)	18.8	20.2	21.8	23.4	21.5	19.8	19.0	17.1	16.1	15.4	16.0	15.7
41-45 (%)	16.1	16.3	15.6	16.8	19.0	21.7	21.7	20.6	18.7	18.4	17.5	17.0
46-50 (%)	13.1	13.0	13.6	13.6	13.1	14.1	15.4	18.7	20.7	19.6	19.1	17.5
51-55 (%)	10.2	10.9	10.9	11.6	11.5	12.1	11.9	12.3	13.4	15.6	16.4	18.4
56-60 (%)	6.3	6.6	7.7	8.2	9.2	9.6	9.1	10.2	10.5	10.5	9.9	11.3
61-65 (%)	3.9	4.0	4.3	4.9	5.6	6.1	6.6	6.5	7.1	6.4	6.7	6.6
66+ (%)	1.3	1.2	1.1	1.4	1.8	2.0	2.4	2.7	2.7	2.4	2.5	2.8
Research universities[a]												
Total number (thousands)	*55.7*	*61.4*	*64.7*	*67.1*	*73.8*	*72.2*	*80.6*	*84.2*	*86.6*	*85.8*	*84.3*	*81.6*
Under 30 (%)	6.7	4.9	4.6	3.9	4.2	2.8	2.5	1.6	1.9	1.5	2.3	1.6
31-35 (%)	21.7	21.6	19.3	17.3	15.4	12.8	13.4	12.4	11.0	11.4	11.1	9.4
36-40 (%)	18.2	19.1	20.2	20.7	20.5	19.4	18.3	17.0	17.5	17.3	17.4	17.5
41-45 (%)	16.4	15.8	14.8	16.8	17.6	19.2	19.7	19.1	17.2	17.4	17.2	17.9
46-50 (%)	13.7	13.7	14.4	13.6	12.5	13.8	14.6	17.1	17.6	18.1	17.8	16.2
51-55 (%)	10.7	11.9	11.9	12.2	11.3	11.9	11.9	11.5	13.1	14.2	14.5	16.0
56-60 (%)	6.9	7.2	8.5	8.8	10.1	10.5	9.2	10.4	10.6	10.5	9.8	11.3
61-65 (%)	4.4	4.5	5.1	5.2	6.2	7.2	7.7	7.6	7.6	6.6	7.0	6.7
66+ (%)	1.4	1.4	1.3	1.6	2.2	2.3	2.7	3.3	3.5	3.1	2.9	3.5
Other types of universities and colleges												
Total number (thousands)	*47.6*	*54.9*	*60.9*	*64.2*	*68.2*	*76.2*	*76.3*	*80.2*	*83.2*	*87.2*	*88.1*	*89.7*
Under 30 (%)	7.6	5.1	4.3	2.8	2.0	1.7	1.3	1.0	1.0	1.5	1.8	1.6
31-35 (%)	24.9	24.0	21.9	16.1	14.9	12.1	10.5	8.6	7.7	9.0	8.6	8.6
36-40 (%)	19.6	21.4	23.6	26.3	22.7	20.1	19.7	17.3	14.6	13.6	14.8	14.2
41-45 (%)	15.7	16.8	16.5	16.8	20.5	24.1	23.8	22.1	20.2	19.3	17.9	16.2
46-50 (%)	12.5	12.3	12.8	13.7	13.6	14.4	16.1	20.5	23.8	21.1	20.4	18.8
51-55 (%)	9.5	9.8	9.8	11.0	11.7	12.3	11.9	13.0	13.8	17.0	18.2	20.5
56-60 (%)	5.7	5.9	6.8	7.6	8.3	8.6	8.9	9.9	10.5	10.6	9.9	11.4
61-65 (%)	3.2	3.5	3.5	4.6	4.9	5.0	5.6	5.4	6.5	6.2	6.3	6.5
66+ (%)	1.3	1.1	0.8	1.1	1.3	1.6	2.1	2.1	1.8	1.7	2.1	2.2

NOTES: Faculty positions include full, associate, and assistant professors and instructors. Italics = rounded numbers; all other numbers are percentages.

[a]Research universities are designated by Carnegie classification code (see Carnegie Foundation for the Advancement of Teaching, *A Classification of Institutions of Higher Education,* 1994 ed., Princeton: Princeton University Press, 1994).

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Doctorate Recipients, unpublished tabulations (1997).

See figure 5-13.

Appendix table 5-28.
Employment sector of recent S&E Ph.D.s, by sex and race/ethnicity: 1973-95
(Thousands)

Sector	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
All recent S&E Ph.D.s												
Total	45.4	45.0	43.2	40.7	42.0	42.7	43.8	44.8	47.8	53.6	49.7	52.1
Academia	25.0	23.4	22.5	20.9	20.7	20.5	21.8	21.1	23.3	25.5	25.1	26.9
Business	8.6	9.9	9.0	8.8	11.6	12.0	11.5	9.5	10.6	12.7	12.4	13.6
Government	4.5	4.3	4.1	3.9	3.3	3.7	3.2	3.4	3.3	3.5	4.0	4.1
FFRDCs	2.1	2.0	1.9	1.6	1.3	0.8	1.6	1.5	1.6	2.2	2.1	1.6
All other	5.1	5.4	5.6	5.5	5.1	5.5	5.7	9.2	9.0	9.5	6.1	5.9
Men												
Total	40.8	39.1	36.4	33.2	32.6	32.3	32.2	32.2	34.0	37.0	33.9	34.0
Academia	21.9	19.5	18.2	16.4	15.5	14.7	15.5	14.9	16.1	16.7	16.8	16.7
Business	8.4	9.5	8.3	7.9	10.0	10.0	9.4	8.0	8.7	10.3	9.6	10.5
Government	4.2	3.9	3.6	3.3	2.6	2.9	2.4	2.4	2.4	2.6	2.6	2.6
FFRDCs	2.0	1.9	1.8	1.5	1.2	0.7	1.4	1.3	1.4	1.9	1.6	1.2
All other	4.2	4.4	4.4	4.0	3.4	3.8	3.4	5.6	5.4	5.4	3.2	3.0
Women												
Total	4.6	5.8	6.8	7.5	9.4	10.4	11.6	12.6	13.8	16.6	15.8	18.1
Academia	3.1	3.9	4.3	4.5	5.2	5.8	6.3	6.2	7.3	8.8	8.3	10.2
Business	0.3	0.4	0.7	0.9	1.6	2.0	2.1	1.6	1.9	2.4	2.8	3.0
Government	0.3	0.4	0.5	0.6	0.7	0.9	0.8	1.0	0.9	0.9	1.4	1.5
FFRDCs	0.0	0.1	0.1	0.1	0.2	0.1	0.2	0.3	0.2	0.3	0.5	0.4
All other	0.8	1.0	1.3	1.4	1.7	1.7	2.3	3.6	3.6	4.1	2.9	3.0
Whites												
Total	40.6	38.5	36.4	34.4	35.3	35.4	36.1	36.2	37.3	40.2	36.1	35.9
Academia	22.8	20.4	19.5	18.1	18.0	17.3	18.1	17.2	18.3	19.5	18.0	18.8
Business	7.4	7.9	6.9	6.7	8.9	9.4	9.2	7.4	7.9	8.5	7.8	8.2
Government	4.2	3.8	3.6	3.5	2.9	3.3	2.6	2.9	2.8	2.9	3.4	3.2
FFRDCs	1.9	1.8	1.6	1.3	1.1	0.7	1.5	1.4	1.3	1.9	1.7	1.2
All other	4.4	4.5	4.8	4.7	4.3	4.5	4.7	7.2	7.0	7.3	5.2	4.6
Asians												
Total	2.8	4.1	4.5	4.2	4.8	4.9	5.2	6.0	7.5	9.9	10.6	12.6
Academia	1.2	1.6	1.7	1.6	1.7	2.1	2.4	2.5	3.3	4.1	5.4	6.2
Business	1.0	1.6	1.8	1.8	2.4	2.1	1.8	1.7	2.3	3.5	3.9	4.7
Government	0.2	0.2	0.2	0.2	0.2	0.1	0.4	0.2	0.3	0.4	0.4	0.6
FFRDCs	0.1	0.1	0.2	0.2	0.2	0.0	0.1	0.1	0.2	0.3	0.3	0.4
All other	0.4	0.5	0.6	0.5	0.5	0.6	0.5	1.4	1.3	1.6	0.6	0.8
Underrepresented minorities[a]												
Total	1.0	1.6	1.7	2.0	1.8	2.3	2.3	2.5	3.0	3.4	3.0	3.5
Academia	0.6	0.9	1.0	1.1	0.9	1.1	1.2	1.3	1.7	1.8	1.7	1.9
Business	0.1	0.2	0.2	0.3	0.2	0.5	0.4	0.4	0.4	0.7	0.6	0.7
Government	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3
FFRDCs	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.1	0.1	0.1	0.0
All other	0.2	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.7	0.6	0.3	0.5

FFRDC = federally funded research and development center

NOTES: Recent Ph.D.s are those who have earned their doctorate within the three preceding years. Details may not add to totals because of rounding.

[a]Underrepresented minorities in science and engineering are blacks, Hispanics, and Native Americans. Data on race/ethnicity exclude unknown cases and do not add to total.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Doctorate Recipients, unpublished tabulations (1997).

Appendix table 5-29.
Recent S&E Ph.D.s employed in higher education, by field and type of appointment: 1973-95
(Thousands)

Appointment	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
Science & engineering												
Total	25.0	23.4	22.5	20.9	20.7	20.5	21.8	21.1	23.3	25.5	25.1	26.9
Faculty	18.8	16.8	15.0	12.8	12.0	11.8	12.5	11.0	11.4	14.4	12.4	11.6
Postdoctorate	3.2	4.3	5.2	5.2	5.9	5.7	6.0	6.3	7.8	7.0	8.4	10.7
Other	2.1	1.5	1.4	2.6	2.6	2.3	3.0	3.5	3.7	3.4	4.3	4.6
Physical sciences												
Total	4.1	3.1	3.0	2.2	2.2	2.0	2.5	2.4	2.9	2.9	3.4	3.8
Faculty	1.9	1.2	1.2	0.8	0.7	0.6	0.8	0.7	0.8	1.0	0.9	0.7
Postdoctorate	1.3	1.4	1.5	1.1	1.3	1.1	1.5	1.4	1.7	1.4	2.1	2.4
Other	0.6	0.3	0.2	0.2	0.2	0.3	0.2	0.3	0.3	0.4	0.3	0.6
Mathematics												
Total	2.3	1.9	1.8	1.3	1.1	1.1	1.1	1.1	1.1	1.6	1.6	1.2
Faculty	2.2	1.7	1.5	1.2	1.0	1.0	1.0	0.8	0.9	1.3	1.4	0.8
Postdoctorate	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.3
Other	0.0	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.2	0.1	0.2
Computer sciences												
Total	NA	NA	NA	0.1	0.3	0.2	0.4	0.5	0.6	0.7	0.7	0.8
Faculty	NA	NA	NA	0.1	0.2	0.2	0.3	0.4	0.6	0.7	0.6	0.6
Postdoctorate	NA	NA	NA	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Other	NA	NA	NA	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.1
Environmental sciences												
Total	0.7	0.8	0.7	0.6	0.6	0.6	0.6	0.8	0.6	0.7	0.7	0.9
Faculty	0.5	0.6	0.4	0.3	0.3	0.3	0.4	0.4	0.3	0.3	0.2	0.3
Postdoctorate	0.1	0.1	0.1	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.4
Other	0.1	0.1	0.0	0.2	0.1	0.2	0.1	0.1	0.1	0.1	0.2	0.2
Life sciences												
Total	7.1	6.9	6.6	6.7	7.3	7.4	7.4	7.4	8.2	9.0	8.8	10.2
Faculty	4.6	4.0	3.2	2.8	2.9	3.1	2.8	2.6	2.5	3.4	2.5	3.0
Postdoctorate	1.5	2.2	2.8	3.2	3.6	3.5	3.4	3.6	4.4	4.4	4.8	5.6
Other	0.6	0.4	0.4	0.7	0.8	0.7	1.0	1.0	1.2	0.9	1.5	1.5
Psychology												
Total	2.6	2.8	3.0	3.1	2.9	2.7	3.0	2.7	2.9	2.8	2.6	2.9
Faculty	2.2	2.3	2.3	2.0	1.7	1.8	1.7	1.4	1.5	1.8	1.4	1.5
Postdoctorate	0.1	0.3	0.3	0.4	0.5	0.3	0.5	0.4	0.6	0.3	0.2	0.7
Other	0.2	0.2	0.2	0.6	0.6	0.4	0.7	0.8	0.8	0.6	1.0	0.8
Social sciences												
Total	5.8	5.9	5.5	5.3	4.9	4.5	4.6	4.0	4.0	4.5	4.3	4.0
Faculty	5.5	5.4	5.0	4.5	4.0	3.5	3.6	3.1	2.8	3.7	3.4	3.1
Postdoctorate	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.0	0.2	0.1	0.1	0.2
Other	0.2	0.3	0.3	0.5	0.7	0.5	0.8	0.8	0.9	0.6	0.8	0.7
Engineering												
Total	2.4	1.9	1.9	1.6	1.4	2.0	2.3	2.3	3.0	3.3	3.0	3.2
Faculty	2.0	1.5	1.4	1.2	1.2	1.4	1.9	1.6	2.0	2.3	1.9	1.6
Postdoctorate	0.1	0.2	0.3	0.2	0.2	0.3	0.2	0.4	0.5	0.4	0.7	1.0
Other	0.3	0.2	0.1	0.3	0.1	0.2	0.1	0.3	0.4	0.5	0.4	0.6

NA = not available

NOTES: Recent Ph.D.s are those who have earned their doctorate within the three preceding years. Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Doctorate Recipients, unpublished tabulations (1997).

See figure 5-15.

Appendix table 5-30.
Recent S&E Ph.D.s employed in higher education, by sex, race/ethnicity, and type of appointment: 1973-95
(Thousands)

Appointment	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
All recent S&E Ph.D.s												
Total	25.0	23.4	22.5	20.9	20.7	20.5	21.8	21.1	23.3	25.5	25.1	26.9
Faculty	18.8	16.8	15.0	12.8	12.0	11.8	12.5	11.0	11.4	14.4	12.4	11.6
Postdoctorate	3.2	4.3	5.2	5.2	5.9	5.7	6.0	6.3	7.8	7.0	8.4	10.7
Other	2.1	1.5	1.4	2.6	2.6	2.3	3.0	3.5	3.7	3.4	4.3	4.6
Men												
Total	21.9	19.5	18.2	16.4	15.5	14.7	15.5	14.9	16.1	16.7	16.8	16.7
Faculty	16.7	14.2	12.3	10.0	9.2	8.8	9.0	7.9	7.9	9.6	8.3	7.0
Postdoctorate	2.8	3.4	4.2	4.1	4.4	4.1	4.2	4.7	5.7	4.7	6.0	6.9
Other	1.6	1.2	1.1	2.1	1.8	1.5	2.0	2.2	2.2	1.9	2.5	2.8
Women												
Total	3.1	3.9	4.3	4.5	5.2	5.8	6.3	6.2	7.3	8.8	8.3	10.2
Faculty	2.1	2.6	2.8	2.8	2.8	3.0	3.5	3.2	3.5	4.8	4.1	4.6
Postdoctorate	0.4	0.8	1.0	1.1	1.5	1.6	1.7	1.6	2.2	2.3	2.4	3.7
Other	0.4	0.3	0.3	0.5	0.8	0.8	1.1	1.3	1.5	1.5	1.9	1.9
Whites												
Total	22.8	20.4	19.5	18.1	18.0	17.3	18.1	17.2	18.3	19.5	18.0	18.8
Faculty	17.3	14.9	13.3	11.1	10.7	10.1	10.4	9.2	9.2	11.3	9.2	9.0
Postdoctorate	2.8	3.4	4.2	4.4	4.8	4.8	4.9	4.9	5.9	4.8	5.4	6.6
Other	1.9	1.3	1.2	2.3	2.3	1.8	2.6	3.0	2.9	2.7	3.5	3.2
Asians												
Total	1.2	1.6	1.7	1.6	1.7	2.1	2.4	2.5	3.3	4.1	5.4	6.2
Faculty	0.6	0.7	0.7	0.8	0.5	1.0	1.3	1.0	1.3	1.8	2.1	1.7
Postdoctorate	0.3	0.7	0.8	0.6	0.9	0.7	0.8	1.1	1.4	1.8	2.6	3.5
Other	0.1	0.1	0.1	0.2	0.2	0.4	0.3	0.3	0.4	0.5	0.6	1.0
Underrepresented minorities[a]												
Total	0.6	0.9	1.0	1.1	0.9	1.1	1.2	1.3	1.7	1.8	1.7	1.9
Faculty	0.4	0.8	0.8	0.9	0.7	0.7	0.7	0.7	0.9	1.3	1.0	0.9
Postdoctorate	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.4	0.3	0.4	0.6
Other	0.1	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.3	0.2	0.3	0.4

NOTES: Recent Ph.D.s are those who have earned their doctorate within the three preceding years. Details may not add to totals because of rounding.

[a]Underrepresented minorities in science and engineering are blacks, Hispanics, and Native Americans.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Doctorate Recipients, unpublished tabulations (1997).

See figure 5-15.

Appendix table 5-31.
Academic doctoral scientists and engineers, by self-reported primary work responsibility and type of employing institution: 1973-95
(Thousands)

	All academic institutions			Research universities[a]			Other universities and colleges		
	Teaching	Research	Other	Teaching	Research	Other	Teaching	Research	Other
				Number (thousands)					
1973	73.3	27.8	16.9	32.3	17.5	7.8	41.0	10.3	9.2
1975	83.9	30.8	19.4	36.5	19.0	7.8	47.3	11.8	11.6
1977	82.2	37.0	26.3	33.3	21.9	12.4	48.9	15.1	13.8
1979	83.9	41.3	30.2	33.6	23.3	14.4	50.3	17.9	15.9
1981	95.9	46.5	24.6	39.6	28.1	10.8	56.3	18.4	13.8
1983	97.7	48.9	29.6	36.2	28.2	12.7	61.5	20.6	16.9
1985	101.1	56.0	33.3	37.4	34.9	13.2	63.7	21.1	20.1
1987	99.4	66.5	30.1	35.1	42.5	13.6	64.2	24.0	16.5
1989	101.0	72.2	33.6	34.4	45.0	14.4	66.5	27.2	19.1
1991	103.4	73.9	33.2	33.5	45.9	14.1	69.9	28.1	19.2
1993	98.3	80.2	35.2	31.6	46.5	14.7	66.8	33.7	20.5
1995	100.2	83.0	34.3	30.5	45.9	13.7	69.7	37.1	20.7
				Percent					
1973	62	24	14	56	30	13	68	17	15
1975	63	23	14	58	30	12	67	17	16
1977	57	25	18	49	32	18	63	19	18
1979	54	27	19	47	33	20	60	21	19
1981	57	28	15	50	36	14	64	21	16
1983	55	28	17	47	37	16	62	21	17
1985	53	29	17	44	41	15	61	20	19
1987	51	34	15	38	47	15	61	23	16
1989	49	35	16	37	48	15	59	24	17
1991	49	35	16	36	49	15	60	24	16
1993	46	38	16	34	50	16	55	28	17
1995	46	38	16	34	51	15	55	29	16

NOTE: Details may not add to totals because of rounding.

[a]Research universities are designated by Carnegie classification code (see Carnegie Foundation for the Advancement of Teaching, *A Classification of Institutions of Higher Education*, 1994 ed., Princeton: Princeton University Press, 1994).

SOURCE: National Science Foundation, Survey of Doctorate Recipients, unpublished tabulations (1997).

Appendix table 5-32.
Academic doctoral scientists and engineers with work responsibility for R&D, by degree field: 1973-95

Field	1973	1975	1977	1979	1981	1983	1985	1987	1989	1991	1993	1995
Total employment (thousands)												
Total science & engineering	118.0	134.1	145.5	155.4	167.1	176.2	190.3	196.0	206.7	210.6	213.8	217.5
Total sciences	105.6	120.7	130.7	139.5	151.0	158.1	170.4	174.8	183.9	187.8	190.6	193.7
Physical sciences	22.1	23.6	25.0	24.6	25.4	25.1	27.0	27.2	27.7	27.7	28.6	29.3
Mathematics	9.7	11.0	11.7	12.2	12.4	12.9	13.6	13.8	14.5	15.2	15.5	14.6
Computer sciences	NA	NA	NA	0.1	0.3	0.5	0.8	1.1	1.5	2.0	2.5	3.1
Environmental sciences	3.4	3.9	4.2	4.2	4.6	4.8	5.2	5.6	5.9	6.0	6.4	6.4
Life sciences	34.9	39.4	42.6	47.0	51.3	54.9	58.7	61.3	64.8	66.9	68.2	71.6
Psychology	12.2	14.8	16.2	17.7	20.1	21.0	23.1	23.7	25.0	25.2	25.0	26.1
Social sciences	23.4	28.0	31.1	33.6	36.9	38.9	42.0	42.2	44.5	44.8	44.4	42.5
Engineering	12.4	13.4	14.8	15.8	16.1	18.1	19.9	21.2	22.9	22.8	23.1	23.8
Active in R&D (thousands)												
Total science & engineering	82.3	90.6	85.0	90.0	104.5	106.7	114.7	143.9	151.6	156.6	150.1	153.5
Total sciences	73.3	81.6	76.1	80.2	94.3	95.1	101.9	127.2	133.9	138.4	132.6	135.0
Physical sciences	16.3	16.9	16.3	15.4	16.8	16.3	17.5	20.2	20.8	20.8	20.0	20.6
Mathematics	6.8	7.5	6.8	6.9	7.3	7.7	7.7	9.7	10.2	10.7	9.5	9.4
Computer sciences	NA	NA	NA	0.1	0.3	0.4	0.5	1.0	1.3	1.7	2.0	2.4
Environmental sciences	2.5	2.8	2.9	2.7	3.3	3.3	3.8	4.6	4.9	5.1	5.0	5.1
Life sciences	26.0	29.0	28.7	32.1	36.7	38.2	39.6	48.8	51.8	53.3	51.8	53.8
Psychology	7.3	8.5	7.7	8.3	10.5	10.7	10.9	14.3	14.3	15.7	14.9	15.6
Social sciences	14.3	16.9	13.8	14.7	19.6	18.6	22.0	28.6	30.5	31.1	29.3	28.1
Engineering	9.0	9.0	8.9	9.8	10.2	11.6	12.8	16.7	17.7	18.2	17.5	18.5
Percentage active in R&D												
Total science & engineering	70	68	58	58	63	61	60	73	73	74	70	71
Total sciences	69	68	58	57	62	60	60	73	73	74	70	70
Physical sciences	74	72	65	63	66	65	65	74	75	75	70	70
Mathematics	70	68	58	57	59	59	57	70	71	71	61	64
Computer sciences	NA	NA	NA	86	95	72	69	90	89	86	79	76
Environmental sciences	72	73	69	65	72	69	73	83	84	84	78	80
Life sciences	75	74	67	68	71	70	67	80	80	80	76	75
Psychology	60	57	48	47	52	51	47	60	57	62	60	60
Social sciences	61	60	44	44	53	48	52	68	68	69	66	66
Engineering	73	67	60	62	63	64	64	79	77	80	76	78

NA = not available

NOTES: Data exclude university-managed federally funded research and development centers. Due to survey coverage, the data also exclude scientists and engineers with doctorates from foreign institutions. All data are based on degree field. Those who are "active in R&D" reported a primary or secondary work responsibility for R&D. For 1981-87, counts are lower bound estimates because a fraction of academic respondents was not asked about secondary work responsibility (15 percent in 1981, 6 percent in 1983, 13 percent in 1985, and fewer than 1 percent in 1987). Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Science Resources Studies Division, *Characteristics of Doctoral Scientists and Engineers in the United States: 1995*, Detailed Statistical Tables, NSF 97-333 (Arlington, VA: 1997).

See figure 5-16.

Appendix table 5-33.
Academic doctoral scientists and engineers reporting federal support from one or more agencies, by field: 1973-95
(Percentages)

	1973	1975	1977	1979	1981	1983	*1985*[a]	1987	1989	1991	*1993*[a]	*1995*[a]
Total science & engineering												
Total number employed	118,000	134,100	145,500	155,400	167,100	176,200	*190,300*	196,000	206,700	210,600	*213,800*	*217,500*
Percentage supported	46	42	41	39	42	44	*37*	48	49	50	*37*	*39*
Funding from 1 agency	80	80	81	82	81	80	*82*	74	74	70	*75*	*73*
Funding from 2 agencies	17	16	15	15	16	17	*16*	20	20	23	*20*	*21*
Funding from 3+ agencies	4	4	3	3	3	3	*3*	6	6	7	*5*	*5*
Total sciences												
Total number employed	105,600	120,700	130,700	139,600	151,000	158,100	*170,400*	174,800	183,800	187,800	*190,700*	*193,700*
Percentage supported	45	41	40	38	41	43	*36*	47	48	49	*36*	*38*
Funding from 1 agency	81	81	82	83	82	81	*82*	75	75	72	*76*	*75*
Funding from 2 agencies	16	16	15	14	15	17	*15*	20	19	22	*19*	*20*
Funding from 3+ agencies	3	3	3	2	3	3	*3*	5	5	6	*5*	*5*
Physical sciences												
Total number employed	22,100	23,600	25,000	24,600	25,400	25,100	*27,000*	27,200	27,700	27,700	*28,600*	*29,300*
Percentage supported	49	45	46	44	50	51	*43*	54	58	56	*46*	*48*
Funding from 1 agency	77	75	77	77	76	74	*78*	68	69	63	*68*	*66*
Funding from 2 agencies	20	21	19	20	17	23	*18*	24	24	30	*26*	*28*
Funding from 3+ agencies	3	4	4	3	7	3	*3*	8	7	7	*6*	*7*
Mathematics												
Total number employed	9,700	11,000	11,700	12,200	12,400	12,900	*13,600*	13,800	14,500	15,200	*15,500*	*14,600*
Percentage supported	29	19	19	21	21	30	*21*	31	33	34	*19*	*22*
Funding from 1 agency	90	89	88	86	83	89	*84*	78	74	75	*80*	*75*
Funding from 2 agencies	8	10	11	14	15	9	*15*	19	22	19	*16*	*21*
Funding from 3+ agencies	2	1	1	0	2	2	*1*	3	4	6	*4*	*3*
Computer sciences												
Total number employed	NA	NA	NA	100	300	500	*800*	1,100	1,500	2,000	*2,500*	*3,100*
Percentage supported	NA	NA	NA	35	30	45	*45*	62	52	49	*40*	*43*
Funding from 1 agency	NA	NA	NA	100	86	72	*78*	65	63	58	*58*	*63*
Funding from 2 agencies	NA	NA	NA	0	14	28	*22*	30	34	38	*37*	*33*
Funding from 3+ agencies	NA	NA	NA	0	0	0	*0*	5	3	3	*5*	*5*
Environmental sciences												
Total number employed	3,400	3,900	4,200	4,200	4,600	4,800	*5,200*	5,600	5,900	6,000	*6,400*	*6,400*
Percentage supported	47	46	43	45	49	54	*51*	60	63	65	*51*	*54*
Funding from 1 agency	63	65	65	73	63	58	*62*	55	54	48	*55*	*54*
Funding from 2 agencies	29	27	24	19	26	30	*27*	29	32	33	*29*	*35*
Funding from 3+ agencies	7	8	10	9	11	12	*11*	16	14	19	*16*	*11*

Appendix table 5-33.
Academic doctoral scientists and engineers reporting federal support from one or more agencies, by field: 1973-95
(Percentages)

	1973	1975	1977	1979	1981	1983	*1985*[a]	1987	1989	1991	*1993*[a]	*1995*[a]
Life sciences												
Total number employed	34,900	39,400	42,600	47,000	51,300	54,900	*58,700*	61,300	64,800	66,900	*68,200*	*71,600*
Percentage supported	60	59	57	55	59	59	*53*	65	65	65	*52*	*52*
Funding from 1 agency	82	83	84	85	84	82	*84*	76	76	74	*81*	*79*
Funding from 2 agencies	15	15	14	13	14	16	*14*	19	18	20	*16*	*17*
Funding from 3+ agencies	3	3	3	2	2	2	*2*	5	5	6	*4*	*5*
Psychology												
Total number employed	12,200	14,800	16,200	17,700	20,100	21,000	*23,100*	23,700	25,000	25,200	*25,000*	*26,100*
Percentage supported	39	36	33	32	32	30	*25*	31	35	35	*26*	*27*
Funding from 1 agency	85	84	86	86	81	84	*84*	84	81	80	*81*	*85*
Funding from 2 agencies	13	13	12	12	17	15	*15*	14	15	15	*16*	*13*
Funding from 3+ agencies	2	3	2	2	2	2	*1*	3	4	5	*3*	*2*
Social sciences												
Total number employed	23,400	28,000	31,100	33,600	36,900	38,900	*42,000*	42,200	44,500	44,800	*44,400*	*42,500*
Percentage supported	26	24	23	20	21	24	*17*	27	28	28	*14*	*16*
Funding from 1 agency	84	86	87	88	86	89	*89*	79	84	73	*76*	*81*
Funding from 2 agencies	11	12	12	11	14	9	*8*	16	13	22	*21*	*17*
Funding from 3+ agencies	4	3	1	1	0	2	*2*	4	3	5	*3*	*2*
Engineering												
Total number employed	12,400	13,400	14,800	15,800	16,100	18,100	*19,900*	21,200	22,900	22,800	*23,100*	*23,800*
Percentage supported	55	50	51	49	50	55	*42*	57	56	63	*43*	*50*
Funding from 1 agency	70	71	74	72	75	72	*76*	66	63	60	*64*	*61*
Funding from 2 agencies	24	22	20	23	19	20	*19*	24	24	28	*28*	*30*
Funding from 3+ agencies	6	7	6	5	6	8	*5*	9	13	13	*8*	*9*

NA = not available

[a]Data are not comparable to other years that had reference periods of a total academic year: 1985 data reference support in a single month; 1993 and 1995 data reference support in a single week. Details may not add to totals because of rounding.

SOURCE: National Science Foundation, Science Resources Studies Division, unpublished tabulations (1997).

Appendix table 5-34.
Full-time S&E graduate students, by source and mechanism of primary support: 1980-95

Support source	All mechanisms	Fellowships	Traineeships	Research assistantships	Teaching assistantships	Other	Self-support
			Number				
Total							
1980	238,492	20,532	17,550	51,567	53,890	19,446	75,507
1981	242,118	20,106	16,777	52,722	55,746	20,210	76,557
1982	244,830	20,873	14,640	52,580	58,334	20,455	77,948
1983	252,092	21,365	13,514	54,904	60,072	20,960	81,277
1984	253,959	21,638	13,465	57,735	61,257	20,697	79,167
1985	257,351	22,576	13,665	60,995	61,822	20,635	77,658
1986	266,197	22,966	13,526	66,011	62,563	22,246	78,885
1987	271,080	21,965	14,096	70,214	62,859	22,166	79,780
1988	275,204	22,361	14,397	74,588	63,071	21,584	79,203
1989	282,741	23,476	14,527	79,059	64,316	21,082	80,281
1990	292,854	25,269	15,212	80,747	64,973	22,265	84,388
1991	307,049	26,697	15,417	85,175	65,229	22,956	91,575
1992	322,753	28,666	15,376	88,032	65,739	23,565	101,375
1993	329,876	29,170	15,452	90,158	67,344	21,378	106,374
1994	332,453	28,976	15,716	92,033	66,900	21,672	107,156
1995	330,235	28,954	16,108	89,983	66,147	22,294	106,749
			Federal				
1980	52,969	4,635	13,306	29,316	662	5,050	NA
1981	50,903	4,093	12,176	29,147	619	4,868	NA
1982	47,411	4,097	10,077	28,313	428	4,496	NA
1983	47,764	4,118	9,114	29,152	498	4,882	NA
1984	47,793	4,125	8,970	29,463	400	4,835	NA
1985	49,058	4,423	8,954	30,433	549	4,699	NA
1986	51,365	4,600	8,688	32,739	495	4,843	NA
1987	53,542	4,449	8,922	34,996	444	4,731	NA
1988	55,492	4,569	8,664	36,752	504	5,003	NA
1989	57,444	5,177	8,682	38,555	490	4,540	NA
1990	59,274	6,316	9,242	38,504	609	4,603	NA
1991	63,017	7,447	9,630	40,790	476	4,674	NA
1992	65,634	7,761	10,055	42,588	643	4,587	NA
1993	67,697	7,515	10,188	44,504	846	4,644	NA
1994	68,583	6,945	10,418	45,633	780	4,807	NA
1995	67,469	6,904	10,314	44,503	732	5,016	NA
			Nonfederal				
1980	110,016	15,897	4,244	22,251	53,228	14,396	NA
1981	114,658	16,013	4,601	23,575	55,127	15,342	NA
1982	119,471	16,776	4,563	24,267	57,906	15,959	NA
1983	123,051	17,247	4,400	25,752	59,574	16,078	NA
1984	126,999	17,513	4,495	28,272	60,857	15,862	NA
1985	130,635	18,153	4,711	30,562	61,273	15,936	NA
1986	135,947	18,366	4,838	33,272	62,068	17,403	NA
1987	137,758	17,516	5,174	35,218	62,415	17,435	NA
1988	140,509	17,792	5,733	37,836	62,567	16,581	NA
1989	145,016	18,299	5,845	40,504	63,826	16,542	NA
1990	149,192	18,953	5,970	42,243	64,364	17,662	NA
1991	152,457	19,250	5,787	44,385	64,753	18,282	NA
1992	155,744	20,905	5,321	45,444	65,096	18,978	NA
1993	155,805	21,655	5,264	45,654	66,498	16,734	NA
1994	156,714	22,031	5,298	46,400	66,120	16,865	NA
1995	156,017	22,050	5,794	45,480	65,415	17,278	NA

Appendix table 5-34.
Full-time S&E graduate students, by source and mechanism of primary support: 1980-95

Support source	All mechanisms	Fellowships	Traineeships	Research assistantships	Teaching assistantships	Other	Self-support
				Percent			
Total							
1980	100.0	8.6	7.4	21.6	22.6	8.2	31.7
1981	100.0	8.3	6.9	21.8	23.0	8.3	31.6
1982	100.0	8.5	6.0	21.5	23.8	8.4	31.8
1983	100.0	8.5	5.4	21.8	23.8	8.3	32.2
1984	100.0	8.5	5.3	22.7	24.1	8.1	31.2
1985	100.0	8.8	5.3	23.7	24.0	8.0	30.2
1986	100.0	8.6	5.1	24.8	23.5	8.4	29.6
1987	100.0	8.1	5.2	25.9	23.2	8.2	29.4
1988	100.0	8.1	5.2	27.1	22.9	7.8	28.8
1989	100.0	8.3	5.1	28.0	22.7	7.5	28.4
1990	100.0	8.6	5.2	27.6	22.2	7.6	28.8
1991	100.0	8.7	5.0	27.7	21.2	7.5	29.8
1992	100.0	8.9	4.8	27.3	20.4	7.3	31.4
1993	100.0	8.8	4.7	27.3	20.4	6.5	32.2
1994	100.0	8.7	4.7	27.7	20.1	6.5	32.2
1995	100.0	8.8	4.9	27.2	20.0	6.8	32.3
				Federal			
1980	100.0	8.8	25.1	55.3	1.2	9.5	NA
1981	100.0	8.0	23.9	57.3	1.2	9.6	NA
1982	100.0	8.6	21.3	59.7	0.9	9.5	NA
1983	100.0	8.6	19.1	61.0	1.0	10.2	NA
1984	100.0	8.6	18.8	61.6	0.8	10.1	NA
1985	100.0	9.0	18.3	62.0	1.1	9.6	NA
1986	100.0	9.0	16.9	63.7	1.0	9.4	NA
1987	100.0	8.3	16.7	65.4	0.8	8.8	NA
1988	100.0	8.2	15.6	66.2	0.9	9.0	NA
1989	100.0	9.0	15.1	67.1	0.9	7.9	NA
1990	100.0	10.7	15.6	65.0	1.0	7.8	NA
1991	100.0	11.8	15.3	64.7	0.8	7.4	NA
1992	100.0	11.8	15.3	64.9	1.0	7.0	NA
1993	100.0	11.1	15.0	65.7	1.2	6.9	NA
1994	100.0	10.1	15.2	66.5	1.1	7.0	NA
1995	100.0	10.2	15.3	66.0	1.1	7.4	NA
				Nonfederal			
1980	100.0	14.4	3.9	20.2	48.4	13.1	NA
1981	100.0	14.0	4.0	20.6	48.1	13.4	NA
1982	100.0	14.0	3.8	20.3	48.5	13.4	NA
1983	100.0	14.0	3.6	20.9	48.4	13.1	NA
1984	100.0	13.8	3.5	22.3	47.9	12.5	NA
1985	100.0	13.9	3.6	23.4	46.9	12.2	NA
1986	100.0	13.5	3.6	24.5	45.7	12.8	NA
1987	100.0	12.7	3.8	25.6	45.3	12.7	NA
1988	100.0	12.7	4.1	26.9	44.5	11.8	NA
1989	100.0	12.6	4.0	27.9	44.0	11.4	NA
1990	100.0	12.7	4.0	28.3	43.1	11.8	NA
1991	100.0	12.6	3.8	29.1	42.5	12.0	NA
1992	100.0	13.4	3.4	29.2	41.8	12.2	NA
1993	100.0	13.9	3.4	29.3	42.7	10.7	NA
1994	100.0	14.1	3.4	29.6	42.2	10.8	NA
1995	100.0	14.1	3.7	29.2	41.9	11.1	NA

NA = not available.

NOTE: Science and engineering includes the health fields (medical sciences and other life sciences).

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

See figures 5-17 and 5-18.

Appendix table 5-35.
Full-time S&E graduate students, by institution type, and source and mechanism of primary support: 1995

Institution type & support mechanism	Source of support			
	Total	Federal	Nonfederal	Self
Number of full-time S&E graduate students				
Private, all mechanisms	96,997	19,978	39,557	37,462
Fellowship	13,247	2,849	10,398	NA
Traineeship	7,276	3,870	3,406	NA
Research assistantship	20,070	11,939	8,131	NA
Teaching assistantship	12,293	209	12,084	NA
Other	44,111	1,111	5,538	37,462
Public, all mechanisms	233,238	47,491	116,460	69,287
Fellowship	15,707	4,055	11,652	NA
Traineeship	8,832	6,444	2,388	NA
Research assistantship	69,913	32,564	37,349	NA
Teaching assistantship	53,854	523	53,331	NA
Other	84,932	3,905	11,740	69,287
Percent of full-time S&E graduate students				
Private, all mechanisms	100.0	100.0	100.0	100.0
Fellowship	13.7	14.3	26.3	NA
Traineeship	7.5	19.4	8.6	NA
Research assistantship	20.7	59.8	20.6	NA
Teaching assistantship	12.7	1.0	30.5	NA
Other	45.5	5.6	14.0	100.0
Public, all mechanisms	100.0	100.0	100.0	100.0
Fellowship	6.7	8.5	10.0	NA
Traineeship	3.8	13.6	2.1	NA
Research assistantship	30.0	68.6	32.1	NA
Teaching assistantship	23.1	1.1	45.8	NA
Other	36.4	8.2	10.1	100.0
Percent of full-time S&E graduate students				
Private, all mechanisms	100.0	20.6	40.8	38.6
Fellowship	100.0	21.5	78.5	NA
Traineeship	100.0	53.2	46.8	NA
Research assistantship	100.0	59.5	40.5	NA
Teaching assistantship	100.0	1.7	98.3	NA
Other	100.0	2.5	12.6	84.9
Public, all mechanisms	100.0	20.4	49.9	29.7
Fellowship	100.0	25.8	74.2	NA
Traineeship	100.0	73.0	27.0	NA
Research assistantship	100.0	46.6	53.4	NA
Teaching assistantship	100.0	1.0	99.0	NA
Other	100.0	4.6	13.8	81.6

NA = not available

NOTE: Science and engineering includes the health sciences (medical sciences and other life sciences).

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

Appendix table 5-36.
Primary mechanisms of support for 1995 S&E Ph.D. recipients, by degree field

Field	All mechanisms	Research assistantships	Fellowships	Traineeships	Teaching assistantships	Other	Self-support
			Number				
TOTAL S&E	27,846	8,058	666	3,744	1,795	8,592	4,991
Total sciences	21,839	5,497	525	3,296	1,654	6,603	4,264
Physical sciences	3,840	1,679	91	661	112	1,052	245
Astronomy	173	91	6	20	5	45	6
Chemistry	2,161	826	46	428	72	638	151
Physics	1,479	749	38	212	34	358	88
Other	27	13	1	1	1	11	0
Mathematics	1,190	132	27	566	39	323	103
Computer sciences	998	317	26	152	28	279	196
Environmental sciences	778	314	15	77	24	239	109
Atmospheric sciences	130	72	0	3	2	43	10
Earth sciences	454	170	11	65	13	134	61
Oceanography	114	56	1	4	4	39	10
Other	80	16	3	5	5	23	28
Life sciences	7,737	2,247	213	691	950	2,391	1,245
Agricultural sciences	1,036	407	28	33	23	406	139
Biological sciences	5,370	1,673	171	566	830	1,519	611
Medical sciences	556	104	12	40	52	190	158
Other	775	63	2	52	45	276	337
Psychology	3,419	395	42	368	175	1,072	1,367
Social sciences	3,877	413	111	781	326	1,247	999
Anthropology	410	22	16	68	40	133	131
Economics	1,153	170	34	274	97	394	184
History of science	41	3	3	11	3	11	10
Linguistics	201	11	4	61	17	55	53
Political science	893	71	20	152	75	289	286
Sociology	554	76	17	103	48	167	143
Other	625	60	17	112	46	198	192
Total engineering	6,007	2,561	141	448	141	1,989	727
Aeronautical/ astronautical	251	105	5	25	7	90	19
Chemical	708	336	23	44	27	227	51
Civil	656	238	8	34	11	264	101
Electrical/electronics	1,731	703	50	143	36	562	237
Industrial	283	64	6	40	11	93	69
Mechanical	1,024	452	11	103	15	325	118
Materials	588	341	11	19	9	167	41
Other	766	322	27	40	25	261	91

Appendix table 5-36.
Primary mechanisms of support for 1995 S&E Ph.D. recipients, by degree field

Field	All mechanisms	Research assistantships	Fellowships	Traineeships	Teaching assistantships	Other	Self-support
			Percent				
TOTAL S&E	100.0	28.9	2.4	13.4	6.4	30.9	17.9
Total sciences	100.0	25.2	2.4	15.1	7.6	30.2	19.5
Physical sciences	100.0	43.7	2.4	17.2	2.9	27.4	6.4
Astronomy	100.0	52.6	3.5	11.6	2.9	26.0	3.5
Chemistry	100.0	38.2	2.1	19.8	3.3	29.5	7.0
Physics	100.0	50.6	2.6	14.3	2.3	24.2	5.9
Other	100.0	48.1	3.7	3.7	3.7	40.7	0.0
Mathematics	100.0	11.1	2.3	47.6	3.3	27.1	8.7
Computer sciences	100.0	31.8	2.6	15.2	2.8	28.0	19.6
Environmental sciences	100.0	40.4	1.9	9.9	3.1	30.7	14.0
Atmospheric sciences	100.0	55.4	0.0	2.3	1.5	33.1	7.7
Earth sciences	100.0	37.4	2.4	14.3	2.9	29.5	13.4
Oceanography	100.0	49.1	0.9	3.5	3.5	34.2	8.8
Other	100.0	20.0	3.8	6.3	6.3	28.8	35.0
Life sciences	100.0	29.0	2.8	8.9	12.3	30.9	16.1
Agricultural sciences	100.0	39.3	2.7	3.2	2.2	39.2	13.4
Biological sciences	100.0	31.2	3.2	10.5	15.5	28.3	11.4
Medical sciences	100.0	18.7	2.2	7.2	9.4	34.2	28.4
Other	100.0	8.1	0.3	6.7	5.8	35.6	43.5
Psychology	100.0	11.6	1.2	10.8	5.1	31.4	40.0
Social sciences	100.0	10.7	2.9	20.1	8.4	32.2	25.8
Anthropology	100.0	5.4	3.9	16.6	9.8	32.4	32.0
Economics	100.0	14.7	2.9	23.8	8.4	34.2	16.0
History of science	100.0	7.3	7.3	26.8	7.3	26.8	24.4
Linguistics	100.0	5.5	2.0	30.3	8.5	27.4	26.4
Political science	100.0	8.0	2.2	17.0	8.4	32.4	32.0
Sociology	100.0	13.7	3.1	18.6	8.7	30.1	25.8
Other	100.0	9.6	2.7	17.9	7.4	31.7	30.7
Total engineering	100.0	42.6	2.3	7.5	2.3	33.1	12.1
Aeronautical/ astronautical	100.0	41.8	2.0	10.0	2.8	35.9	7.6
Chemical	100.0	47.5	3.2	6.2	3.8	32.1	7.2
Civil	100.0	36.3	1.2	5.2	1.7	40.2	15.4
Electrical/electronics	100.0	40.6	2.9	8.3	2.1	32.5	13.7
Industrial	100.0	22.6	2.1	14.1	3.9	32.9	24.4
Mechanical	100.0	44.1	1.1	10.1	1.5	31.7	11.5
Materials	100.0	58.0	1.9	3.2	1.5	28.4	7.0
Other	100.0	42.0	3.5	5.2	3.3	34.1	11.9

NA = not available

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Earned Doctorates, various years, unpublished tabulations.

See figure 5-20.

Appendix table 5-37.
Full-time S&E graduate students, by field and mechanism of primary support: 1995

Field	All mechanisms	Research assistantships	Fellowships	Traineeships	Teaching assistantships	Other	Self-support
			Number				
TOTAL S&E	330,235	89,983	28,954	16,108	66,147	22,294	106,749
Total sciences	262,373	62,958	22,921	15,099	55,931	17,289	88,175
Physical sciences	28,892	11,808	2,354	688	11,710	730	1,602
Astronomy	871	439	148	28	225	5	26
Chemistry	16,750	6,466	1,270	445	7,386	372	811
Physics	11,054	4,842	929	215	4,073	349	646
Other	217	61	7	0	26	4	119
Mathematics	13,422	1,451	1,274	222	7,316	675	2,484
Computer sciences	16,564	3,921	924	216	3,364	1,551	6,588
Environmental sciences	11,290	4,661	891	136	2,507	730	2,365
Atmospheric sciences	959	619	67	8	107	69	89
Earth sciences	5,810	2,151	512	59	1,855	334	899
Oceanography	2,228	1,257	195	24	215	166	371
Other	2,293	634	117	45	330	161	1,006
Life sciences	100,132	29,158	8,104	10,942	13,089	6,587	32,252
Agricultural sciences	9,630	5,401	454	146	941	477	2,211
Biological sciences	48,283	19,182	5,395	5,308	9,293	2,143	6,962
Medical sciences	13,863	2,928	1,272	1,661	1,246	1,292	5,464
Other	28,356	1,647	983	3,827	1,609	2,675	17,615
Psychology	35,762	4,626	1,824	1,115	6,152	3,094	18,951
Social sciences	56,311	7,333	7,550	1,780	11,793	3,922	23,933
Anthropology	5,792	452	1,168	132	1,278	344	2,418
Economics	11,746	2,094	1,546	271	3,028	809	3,998
History of science	340	17	127	10	99	18	69
Linguistics	2,486	177	369	50	701	282	907
Political science	17,660	1,624	2,468	777	2,666	1,136	8,989
Sociology	7,353	1,131	915	241	2,145	431	2,490
Other	10,934	1,838	957	299	1,876	902	5,062
Total engineering	67,862	27,025	6,033	1,009	10,216	5,005	18,574
Aeronautical/ astronautical	2,693	1,175	262	31	315	377	533
Chemical	5,962	3,100	791	105	907	218	841
Civil	12,248	4,225	924	196	1,850	816	4,237
Electrical/electronics	18,303	6,684	1,455	156	3,137	1,439	5,432
Industrial	5,328	1,339	300	37	824	504	2,324
Mechanical	11,119	4,419	942	187	1,950	777	2,844
Materials	3,880	2,535	371	48	352	123	451
Other	8,329	3,548	988	249	881	751	1,912

Appendix table 5-37.
Full-time S&E graduate students, by field and mechanism of primary support: 1995

Field	All mechanisms	Research assistantships	Fellowships	Traineeships	Teaching assistantships	Other	Self-support
			Percent				
TOTAL S&E	100.0	27.2	8.8	4.9	20.0	6.8	32.3
Total sciences	100.0	24.0	8.7	5.8	21.3	6.6	33.6
Physical sciences	100.0	40.9	8.1	2.4	40.5	2.5	5.5
Astronomy	100.0	50.4	17.0	3.2	25.8	0.6	3.0
Chemistry	100.0	38.6	7.6	2.7	44.1	2.2	4.8
Physics	100.0	43.8	8.4	1.9	36.8	3.2	5.8
Other	100.0	28.1	3.2	0.0	12.0	1.8	54.8
Mathematics	100.0	10.8	9.5	1.7	54.5	5.0	18.5
Computer sciences	100.0	23.7	5.6	1.3	20.3	9.4	39.8
Environmental sciences	100.0	41.3	7.9	1.2	22.2	6.5	20.9
Atmospheric sciences	100.0	64.5	7.0	0.8	11.2	7.2	9.3
Earth sciences	100.0	37.0	8.8	1.0	31.9	5.7	15.5
Oceanography	100.0	56.4	8.8	1.1	9.6	7.5	16.7
Other	100.0	27.6	5.1	2.0	14.4	7.0	43.9
Life sciences	100.0	29.1	8.1	10.9	13.1	6.6	32.2
Agricultural sciences	100.0	56.1	4.7	1.5	9.8	5.0	23.0
Biological sciences	100.0	39.7	11.2	11.0	19.2	4.4	14.4
Medical sciences	100.0	21.1	9.2	12.0	9.0	9.3	39.4
Other	100.0	5.8	3.5	13.5	5.7	9.4	62.1
Psychology	100.0	12.9	5.1	3.1	17.2	8.7	53.0
Social sciences	100.0	13.0	13.4	3.2	20.9	7.0	42.5
Anthropology	100.0	7.8	20.2	2.3	22.1	5.9	41.7
Economics	100.0	17.8	13.2	2.3	25.8	6.9	34.0
History of science	100.0	5.0	37.4	2.9	29.1	5.3	20.3
Linguistics	100.0	7.1	14.8	2.0	28.2	11.3	36.5
Political science	100.0	9.2	14.0	4.4	15.1	6.4	50.9
Sociology	100.0	15.4	12.4	3.3	29.2	5.9	33.9
Other	100.0	16.8	8.8	2.7	17.2	8.2	46.3
Total engineering	100.0	39.8	8.9	1.5	15.1	7.4	27.4
Aeronautical/ astronautical	100.0	43.6	9.7	1.2	11.7	14.0	19.8
Chemical	100.0	52.0	13.3	1.8	15.2	3.7	14.1
Civil	100.0	34.5	7.5	1.6	15.1	6.7	34.6
Electrical/electronics	100.0	36.5	7.9	0.9	17.1	7.9	29.7
Industrial	100.0	25.1	5.6	0.7	15.5	9.5	43.6
Mechanical	100.0	39.7	8.5	1.7	17.5	7.0	25.6
Materials	100.0	65.3	9.6	1.2	9.1	3.2	11.6
Other	100.0	42.6	11.9	3.0	10.6	9.0	23.0

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

See figure 5-20.

Appendix table 5-38.
Full-time S&E graduate students with a research assistantship as mechanism of primary support, by field: 1995

Field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
						Number of full-time S&E graduate students					
TOTAL S&E	60,995	66,011	70,214	74,588	79,059	80,747	85,175	88,032	90,158	92,033	89,983
Total sciences	43,085	45,593	48,044	51,139	54,466	55,448	58,399	60,492	62,227	63,951	62,958
Physical sciences	10,284	10,992	11,556	12,056	12,442	12,138	12,229	12,445	12,293	12,378	11,808
Astronomy	305	323	336	338	372	383	397	425	395	467	439
Chemistry	5,797	6,173	6,444	6,644	6,803	6,572	6,569	6,606	6,586	6,690	6,466
Physics	4,133	4,447	4,719	5,026	5,235	5,153	5,232	5,359	5,251	5,131	4,842
Other	49	49	57	48	32	30	31	55	61	90	61
Mathematics	998	1,038	1,111	1,226	1,304	1,335	1,356	1,410	1,436	1,534	1,451
Computer sciences	2,058	2,322	2,817	3,032	3,324	3,334	3,565	3,682	3,802	3,903	3,921
Environmental sciences	3,707	3,827	3,647	3,879	4,150	4,189	4,387	4,615	4,729	4,857	4,661
Atmospheric sciences	447	418	441	479	499	493	529	606	626	659	619
Earth sciences	2,126	2,105	1,890	1,973	2,071	2,054	2,061	2,091	2,172	2,215	2,151
Oceanography	848	962	963	1,051	1,166	1,170	1,273	1,339	1,331	1,401	1,257
Other	286	342	353	376	414	472	524	579	600	582	634
Life sciences	17,888	19,220	20,191	21,570	23,162	23,923	25,809	26,755	28,046	29,202	29,158
Agricultural sciences	4,445	4,703	4,603	4,552	4,730	4,755	5,002	5,174	5,239	5,385	5,401
Biological sciences	11,222	12,086	12,944	14,125	15,189	15,764	16,846	17,627	18,853	19,438	19,182
Medical sciences	1,326	1,465	1,675	1,843	2,020	2,188	2,584	2,630	2,582	2,881	2,928
Other	895	966	969	1,050	1,223	1,216	1,377	1,324	1,372	1,498	1,647
Psychology	3,070	3,101	3,227	3,715	3,846	4,052	4,235	4,306	4,559	4,676	4,626
Social sciences	5,080	5,093	5,495	5,661	6,238	6,477	6,818	7,279	7,362	7,401	7,333
Anthropology	277	287	346	353	407	449	462	454	452	454	452
Economics	1,955	2,003	1,994	2,064	2,004	2,055	2,150	2,165	2,214	2,173	2,094
History of science	11	19	18	23	14	14	34	24	7	22	17
Linguistics	163	126	190	179	202	218	178	169	196	197	177
Political science	1,028	1,015	1,116	1,197	1,378	1,375	1,527	1,757	1,637	1,671	1,624
Sociology	765	767	866	860	955	1,117	1,073	1,109	1,202	1,160	1,131
Other	881	876	965	985	1,278	1,249	1,394	1,601	1,654	1,724	1,838
Total engineering	17,910	20,418	22,170	23,449	24,593	25,299	26,776	27,540	27,931	28,082	27,025
Aeronautical/astronautical	725	823	815	934	1,040	1,137	1,232	1,222	1,266	1,245	1,175
Chemical	2,454	2,582	2,745	2,814	2,813	2,839	2,987	3,012	3,120	3,270	3,100
Civil	2,417	2,786	2,900	3,072	3,042	3,115	3,565	3,936	4,048	4,254	4,225
Electrical/electronic	3,695	4,474	5,132	5,735	6,141	6,224	6,556	6,867	6,925	6,855	6,684
Industrial	572	705	923	1,030	1,141	1,130	1,249	1,235	1,271	1,342	1,339
Mechanical	3,280	3,666	3,947	4,069	4,248	4,306	4,630	4,731	4,787	4,688	4,419
Materials	1,963	2,247	2,264	2,333	2,512	2,547	2,507	2,661	2,651	2,608	2,535
Other	2,804	3,135	3,444	3,462	3,656	4,001	4,050	3,876	3,863	3,820	3,548

Appendix table 5-38.
Full-time S&E graduate students with a research assistantship as mechanism of primary support, by field: 1995

Field	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
	Percent of full-time S&E graduate students										
TOTAL S&E	23.7	24.8	25.9	27.1	28.0	27.6	27.7	27.3	27.3	27.7	27.2
Total sciences	21.4	22.1	23.0	24.1	24.9	24.4	24.7	24.4	24.3	24.5	24.0
Physical sciences	38.6	39.6	40.7	42.2	42.6	41.2	40.6	40.6	40.2	41.2	40.9
Astronomy	48.0	49.4	49.5	47.9	48.8	48.5	49.0	50.6	46.6	49.0	50.4
Chemistry	37.2	38.6	39.7	41.3	41.8	40.1	39.3	38.9	38.3	39.1	38.6
Physics	40.2	40.6	41.7	43.2	43.5	42.3	42.1	42.2	42.4	43.6	43.8
Other	30.2	32.0	29.4	33.6	25.2	24.6	23.1	37.9	37.7	40.9	28.1
Mathematics	8.4	8.4	8.5	9.1	9.5	9.6	9.5	9.6	9.9	10.8	10.8
Computer sciences	14.8	15.5	18.4	20.0	21.3	20.0	21.6	21.0	21.9	23.4	23.7
Environmental sciences	32.7	34.0	34.9	38.1	41.4	40.9	42.3	42.0	41.6	42.3	41.3
Atmospheric sciences	51.3	48.9	53.5	57.8	61.6	59.5	61.6	63.2	63.9	66.4	64.5
Earth sciences	27.6	28.5	28.4	31.3	34.6	35.4	36.2	35.5	36.4	37.3	37.0
Oceanography	54.3	56.8	58.3	64.5	64.8	60.5	63.9	62.8	61.1	60.1	56.4
Other	23.9	26.0	27.3	26.4	29.0	28.0	28.6	28.8	26.8	26.5	27.6
Life sciences	25.7	27.3	28.4	29.6	30.8	30.9	31.5	31.1	30.6	30.2	29.1
Agricultural sciences	48.1	50.3	50.6	49.9	52.1	52.3	53.8	54.7	55.3	56.7	56.1
Biological sciences	30.3	32.0	33.9	36.0	37.6	38.5	39.5	39.7	40.6	40.5	39.7
Medical sciences	15.5	16.8	18.4	19.2	20.2	20.7	23.5	22.4	20.4	21.9	21.1
Other	6.1	6.6	6.6	7.0	7.7	7.2	7.3	6.5	6.0	5.8	5.8
Psychology	12.1	11.8	11.8	13.2	13.1	13.2	13.1	12.6	13.1	13.2	12.9
Social sciences	11.8	11.9	12.6	12.9	13.8	13.4	13.5	13.4	13.2	13.1	13.0
Anthropology	7.1	7.1	8.4	8.3	9.2	9.3	9.1	8.5	8.3	7.8	7.8
Economics	17.9	18.3	18.4	18.9	18.2	18.3	18.1	17.6	18.3	18.2	17.8
History of science	4.8	8.0	6.7	8.6	5.1	4.5	11.2	7.3	2.1	6.5	5.0
Linguistics	7.0	5.3	7.8	7.1	8.2	8.4	7.0	6.8	7.7	7.8	7.1
Political science	7.9	7.6	8.6	9.1	9.8	9.0	9.5	9.9	8.9	9.3	9.2
Sociology	14.7	14.8	15.5	15.2	16.2	17.3	16.3	15.6	16.5	15.6	15.4
Other	12.2	13.0	13.2	14.2	17.7	16.1	17.0	17.7	17.2	16.6	16.8
Total engineering	32.0	33.9	35.8	37.2	38.2	38.3	37.7	37.0	37.8	39.2	39.8
Aeronautical/astronautical	36.4	38.2	34.4	36.9	37.5	37.8	37.1	37.0	38.8	41.5	43.6
Chemical	44.2	46.2	48.4	52.5	53.3	52.2	51.6	50.7	51.6	53.6	52.0
Civil	24.8	27.9	30.1	30.9	30.5	30.8	31.5	31.6	32.5	33.7	34.5
Electrical/electronic	25.0	27.5	30.0	32.4	33.3	33.3	32.9	32.7	33.9	35.3	36.5
Industrial	16.6	18.5	22.2	24.0	24.5	23.7	22.3	20.3	21.5	22.7	25.1
Mechanical	37.0	37.5	38.6	39.1	40.5	39.6	39.6	38.2	38.6	39.5	39.7
Materials	63.5	66.7	65.9	67.3	67.5	64.8	61.8	62.3	62.4	63.5	65.3
Other	33.4	34.1	36.9	37.3	40.5	43.7	43.3	43.1	42.4	44.9	42.6

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

See figure 5-19.

Appendix table 5-39.
S&E research assistants, by field and primary source of support: 1995

Field	Total number	Total percent	Number of research assistants		Percent of research assistants	
			Federal	Nonfederal	Federal	Nonfederal
TOTAL SCIENCE & ENGINEERING	89,983	100.0	44,503	45,480	49.5	50.5
Total sciences	62,958	70.0	31,868	31,090	50.6	49.4
Physical sciences	11,808	13.1	8,852	2,956	75.0	25.0
Astronomy	439	0.5	335	104	76.3	23.7
Chemistry	6,466	7.2	4,721	1,745	73.0	27.0
Physics	4,842	5.4	3,764	1,078	77.7	22.3
Other	61	0.1	32	29	52.5	47.5
Mathematics	1,451	1.6	659	792	45.4	54.6
Computer sciences	3,921	4.4	2,429	1,492	61.9	38.1
Environmental sciences	4,661	5.2	2,935	1,726	63.0	37.0
Atmospheric sciences	619	0.7	507	112	81.9	18.1
Earth sciences	2,151	2.4	1,339	812	62.3	37.7
Oceanography	1,257	1.4	848	409	67.5	32.5
Other	634	0.7	241	393	38.0	62.0
Life sciences	29,158	32.4	14,036	15,122	48.1	51.9
Agricultural sciences	5,401	6.0	1,863	3,538	34.5	65.5
Biological sciences	19,182	21.3	10,513	8,669	54.8	45.2
Medical sciences	2,928	3.3	1,165	1,763	39.8	60.2
Other	1,647	1.8	495	1,152	30.1	69.9
Psychology	4,626	5.1	1,481	3,145	32.0	68.0
Social sciences	7,333	8.1	1,476	5,857	20.1	79.9
Anthropology	452	0.5	102	350	22.6	77.4
Economics	2,094	2.3	533	1,561	25.5	74.5
History of science	17	0.0	1	16	5.9	94.1
Linguistics	177	0.2	58	119	32.8	67.2
Political science	1,624	1.8	115	1,509	7.1	92.9
Sociology	1,131	1.3	237	894	21.0	79.0
Other	1,838	2.0	430	1,408	23.4	76.6
Total engineering	27,025	30.0	12,635	14,390	46.8	53.2
Aeronautical/astronautical	1,175	1.3	668	507	56.9	43.1
Chemical	3,100	3.4	1,400	1,700	45.2	54.8
Civil	4,225	4.7	1,581	2,644	37.4	62.6
Electrical/electronics	6,684	7.4	3,316	3,368	49.6	50.4
Industrial	1,339	1.5	408	931	30.5	69.5
Mechanical	4,419	4.9	2,201	2,218	49.8	50.2
Materials	2,535	2.8	1,374	1,161	54.2	45.8
Other	3,548	3.9	1,687	1,861	47.5	52.5

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

Appendix table 5-40.
S&E research assistants whose primary source of support is the Federal Government, by field: 1975-95
(Percentages)

Field	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL S&E	57.6	57.2	57.4	NA	57.2	56.9	55.3	53.8	53.1	51.0	49.9	49.6	49.8	49.3	48.8	47.7	47.9	48.4	49.4	49.6	49.5
Total sciences	55.5	54.8	55.2	NA	55.3	55.2	53.8	52.0	51.2	50.2	51.1	50.8	51.2	50.5	50.2	49.3	49.5	50.1	51.1	51.0	50.6
Physical sciences	85.2	83.8	84.7	NA	83.4	83.7	84.5	80.9	81.7	81.1	78.4	78.8	76.8	74.4	73.6	72.9	72.8	73.0	74.7	76.1	75.0
Astronomy	84.5	87.7	84.0	NA	82.0	87.4	87.1	80.8	86.7	82.1	86.2	88.9	75.3	79.0	77.4	70.2	72.5	79.1	83.5	80.5	76.3
Chemistry	82.4	80.3	80.2	NA	79.9	81.7	80.9	80.2	77.4	77.3	75.3	76.2	73.4	71.8	69.8	70.6	69.1	69.8	71.6	73.8	73.0
Physics	89.0	87.9	90.5	NA	88.1	86.0	89.5	82.5	87.9	86.5	82.7	82.2	81.7	77.8	78.5	76.1	77.5	76.4	78.1	78.8	77.7
Other	25.8	30.0	73.7	NA	56.3	100.0	13.3	12.9	39.5	52.8	36.7	42.9	52.6	41.7	50.0	50.0	48.4	72.7	70.5	74.4	52.5
Mathematics	47.7	51.3	51.4	NA	51.4	53.7	44.7	44.6	43.6	47.1	47.9	51.8	57.2	54.3	50.8	45.7	47.5	48.5	51.3	48.4	45.4
Computer sci.	60.6	52.8	65.5	NA	71.1	65.4	65.1	64.1	60.2	60.1	52.0	49.3	53.2	54.2	53.5	53.5	54.8	54.2	58.5	61.0	61.9
Environmental sci.	73.7	71.5	71.6	NA	75.6	71.8	69.3	69.6	66.4	65.2	64.8	61.9	61.5	59.6	59.7	59.0	58.4	62.5	63.4	63.3	63.0
Atmospheric sci.	79.7	90.7	93.7	NA	95.3	91.0	89.0	89.2	83.4	81.4	87.7	86.6	86.8	78.9	89.0	93.5	86.0	89.6	87.4	86.8	81.9
Earth sciences	74.3	69.1	71.2	NA	74.0	71.8	65.8	66.3	63.7	62.4	60.3	58.4	58.5	57.5	59.4	57.8	57.4	60.6	61.6	60.9	62.3
Oceanography	73.3	69.7	68.3	NA	74.8	72.0	69.9	69.6	70.4	70.5	71.7	66.6	65.9	60.5	55.1	57.4	56.9	62.7	65.0	65.0	67.5
Other	60.9	61.6	52.4	NA	60.7	49.2	61.2	59.4	49.5	46.0	42.0	39.8	33.7	43.9	39.4	32.2	38.0	40.6	41.0	41.9	38.0
Life sciences	47.5	48.0	47.2	NA	46.9	48.0	46.5	45.0	44.1	42.1	44.7	44.6	46.4	46.7	47.3	46.8	47.2	47.9	48.5	48.3	48.1
Agricultural sci.	35.7	34.1	34.8	NA	32.9	34.8	32.0	31.5	28.9	25.1	29.6	29.5	31.3	32.3	32.8	32.2	33.3	34.2	33.4	32.3	34.5
Biological sci.	52.8	54.6	53.0	NA	54.2	55.6	54.1	52.5	52.2	50.9	52.3	52.2	53.1	53.1	54.1	53.5	53.8	54.1	55.0	54.7	54.8
Medical sci.	60.0	57.4	53.9	NA	47.8	46.3	44.9	42.8	42.5	37.2	40.1	38.6	43.5	42.1	41.6	38.8	38.8	41.4	42.4	43.2	39.8
Other	53.4	45.3	49.0	NA	35.6	31.0	34.9	29.3	27.8	28.7	30.9	31.5	33.8	31.6	28.0	32.2	31.6	31.9	27.6	32.2	30.1
Psychology	45.5	43.2	44.9	NA	46.3	36.7	35.9	34.0	31.9	31.8	33.1	32.9	33.4	32.5	33.1	32.7	33.9	33.4	34.0	31.7	32.0
Social sciences	29.1	27.6	28.5	NA	26.9	27.3	24.4	19.9	18.5	17.7	19.1	17.4	16.7	16.6	16.6	17.0	18.1	19.1	20.2	19.4	20.1
Anthropology	41.3	34.8	29.1	NA	34.8	30.1	40.6	28.6	24.8	15.8	22.4	16.7	19.7	19.5	15.7	12.2	13.4	20.7	23.0	19.6	22.6
Economics	29.5	25.7	30.5	NA	28.7	30.8	25.9	23.2	22.7	21.5	23.7	22.6	22.5	21.7	23.1	21.6	21.0	22.1	24.4	24.9	25.5
History of sci.	0.0	30.0	41.7	NA	18.2	7.1	0.0	0.0	0.0	0.0	9.1	0.0	5.6	13.0	7.1	21.4	20.6	12.5	42.9	18.2	5.9
Linguistics	38.8	56.3	43.3	NA	31.7	31.7	27.6	23.6	27.7	24.4	22.7	31.7	16.8	10.1	19.3	14.7	23.6	28.4	28.6	32.5	32.8
Political science	10.3	11.8	12.5	NA	11.2	10.1	4.6	6.0	4.9	6.6	6.1	4.4	3.1	5.4	6.0	6.8	9.8	5.6	8.7	6.8	7.1
Sociology	35.1	34.3	35.0	NA	35.7	39.4	36.9	25.8	23.5	21.7	28.4	23.5	19.2	19.7	18.3	19.4	21.3	22.5	21.5	19.1	21.0
Other	33.1	32.3	27.6	NA	26.9	23.7	23.1	19.2	18.4	20.7	14.3	13.6	17.2	17.4	16.4	20.4	20.9	26.3	23.2	23.4	23.4
Total engineering	63.1	63.7	63.4	NA	62.4	61.3	59.3	58.6	57.9	53.2	47.1	46.8	46.8	46.6	45.6	44.2	44.4	44.7	45.6	46.2	46.8
Aero./astronautical	75.2	68.2	73.6	NA	70.6	64.7	68.4	76.0	78.3	77.9	65.9	67.8	69.6	67.9	59.9	57.3	60.1	58.0	57.4	57.8	56.9
Chemical	61.9	61.2	61.6	NA	55.9	57.2	54.1	51.6	52.0	49.2	44.9	47.3	48.2	46.0	44.5	44.9	43.1	43.3	44.6	43.0	45.2
Civil	52.5	54.8	52.4	NA	56.8	58.3	50.9	52.2	47.1	45.5	41.7	40.1	42.1	39.7	39.4	37.9	39.5	40.0	39.0	39.0	37.4
Electrical/electronic	77.7	77.3	75.1	NA	72.3	69.5	68.2	69.9	66.4	57.6	46.0	45.4	45.6	47.3	44.0	42.9	43.7	43.8	44.3	46.7	49.6
Industrial	42.6	36.1	46.1	NA	40.9	44.2	44.6	34.5	39.5	30.3	26.9	24.8	26.8	28.1	25.2	23.8	29.9	27.4	28.2	31.1	30.5
Mechanical	63.9	66.6	67.5	NA	64.7	60.4	60.0	57.7	60.0	55.2	48.3	46.6	48.8	50.7	50.3	47.7	45.8	46.6	50.3	51.3	49.8
Materials	71.0	74.5	72.7	NA	76.7	73.2	72.7	70.1	67.8	63.5	58.4	58.9	54.8	55.2	56.2	52.1	50.6	52.8	52.5	52.6	54.2
Other	54.7	56.1	54.6	NA	53.8	54.9	52.5	51.6	51.5	48.5	44.9	45.4	44.0	41.4	43.8	43.5	45.0	45.2	46.6	47.4	47.5

NA = not available

NOTE: Science and engineering includes the health sciences (medical sciences and other life sciences).

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

See figure 5-21.

Appendix table 5-41.
Federal research assistantships, by agency of primary support: 1972-95

	All federal agencies	National Institutes of Health	Other Department of Health & Human Services	National Science Foundation	Department of Defense	Department of Agriculture[a]	All other agencies
			Number				
1972	20,666	3,395	513	6,832	2,676	NA	7,250
1973	20,584	2,953	793	6,901	2,371	NA	7,566
1974	22,255	3,468	906	6,899	2,657	NA	8,325
1975	23,037	3,884	866	6,819	2,494	NA	8,974
1976	24,338	4,450	882	7,031	2,537	NA	9,438
1977	25,066	4,304	931	7,037	2,637	NA	10,157
1978	NA	NA	NA	NA	NA	NA	NA
1979	28,008	5,060	1,100	7,501	2,801	NA	11,546
1980	29,316	5,436	587	7,627	2,934	NA	12,732
1981	29,147	5,505	543	7,596	3,297	NA	12,206
1982	28,313	5,295	509	7,747	3,467	NA	11,295
1983	29,152	5,456	549	8,066	3,934	NA	11,147
1984	29,463	5,762	583	8,283	4,081	NA	10,754
1985	30,433	6,147	751	8,558	4,195	1,818	8,964
1986	32,739	7,001	710	9,084	4,646	1,954	9,344
1987	34,996	7,662	814	9,487	5,617	2,325	9,091
1988	36,752	8,598	761	9,822	6,028	2,300	9,243
1989	38,555	9,342	906	9,875	5,916	2,448	10,068
1990	38,504	9,463	965	9,705	5,412	2,431	10,528
1991	40,790	9,990	1,055	10,161	5,484	2,816	11,284
1992	42,588	10,623	986	10,652	5,727	2,959	11,641
1993	44,504	11,368	725	10,814	6,232	3,019	12,346
1994	45,633	11,624	902	11,194	6,217	3,143	12,553
1995	44,503	11,382	990	10,672	6,337	2,997	12,125
			Percent				
1972	100.0	16.4	2.5	33.1	12.9	NA	35.1
1973	100.0	14.3	3.9	33.5	11.5	NA	36.8
1974	100.0	15.6	4.1	31.0	11.9	NA	37.4
1975	100.0	16.9	3.8	29.6	10.8	NA	39.0
1976	100.0	18.3	3.6	28.9	10.4	NA	38.8
1977	100.0	17.2	3.7	28.1	10.5	NA	40.5
1978	NA	NA	NA	NA	NA	NA	NA
1979	100.0	18.1	3.9	26.8	10.0	NA	41.2
1980	100.0	18.5	2.0	26.0	10.0	NA	43.4
1981	100.0	18.9	1.9	26.1	11.3	NA	41.9
1982	100.0	18.7	1.8	27.4	12.2	NA	39.9
1983	100.0	18.7	1.9	27.7	13.5	NA	38.2
1984	100.0	19.6	2.0	28.1	13.9	NA	36.5
1985	100.0	20.2	2.5	28.1	13.8	6.0	29.5
1986	100.0	21.4	2.2	27.7	14.2	6.0	28.5
1988	100.0	23.4	2.1	26.7	16.4	6.3	25.1
1989	100.0	24.2	2.3	25.6	15.3	6.3	26.1
1990	100.0	24.6	2.5	25.2	14.1	6.3	27.3
1991	100.0	24.5	2.6	24.9	13.4	6.9	27.7
1992	100.0	24.9	2.3	25.0	13.4	6.9	27.3
1993	100.0	25.5	1.6	24.3	14.0	6.8	27.7
1994	100.0	25.5	2.0	24.5	13.6	6.9	27.5
1995	100.0	25.6	2.2	24.0	14.2	6.7	27.2

NA = not available

NOTE: Percentages may not total 100 because of rounding.

[a]Data were reported for the Department of Agriculture for the first time in 1985.

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

Appendix table 5-42.
S&E research assistants with primary support from federal agencies, by field: 1995
(Percentages)

Field	All federal agencies	National Science Foundation	Department of Defense	National Institutes of Health	Other Department of Health & Human Services	Department of Agriculture	All other agencies
TOTAL S&E	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Total sciences	71.6	65.6	44.8	95.3	88.9	89.8	62.7
Physical sciences	19.9	30.2	15.6	14.3	13.7	1.2	23.4
Astronomy	0.8	1.2	0.1	0.0	0.0	0.0	1.7
Chemistry	10.6	15.8	6.9	13.6	12.5	1.0	7.4
Physics	8.5	13.3	8.6	0.6	1.2	0.2	14.1
Other	0.1	0.0	0.0	0.1	0.0	0.0	0.1
Mathematics	1.5	2.7	2.0	0.4	1.8	0.4	1.4
Computer sciences	5.5	8.4	16.3	0.7	1.1	0.4	3.3
Environmental sciences	6.6	11.6	4.3	0.2	0.3	1.9	11.1
Atmospheric sciences	1.1	1.8	0.7	0.0	0.2	0.3	2.1
Earth sciences	3.0	6.7	0.4	0.0	0.0	0.5	4.7
Oceanography	1.9	2.7	2.7	0.1	0.0	0.1	3.1
Other	0.5	0.3	0.4	0.1	0.1	1.0	1.1
Life sciences	31.5	9.2	3.9	71.6	52.8	72.2	16.3
Agricultural sciences	4.2	0.7	0.4	0.1	0.5	37.6	5.1
Biological sciences	23.6	7.9	2.8	62.2	32.9	32.9	9.1
Medical sciences	2.6	0.4	0.6	7.1	8.8	1.6	1.2
Other	1.1	0.2	0.1	2.2	10.6	0.0	0.9
Psychology	3.3	1.2	1.8	7.0	14.4	0.5	2.4
Social sciences	3.3	2.2	0.9	1.2	4.6	13.1	4.9
Anthropology	0.2	0.2	0.1	0.1	0.0	0.0	0.5
Economics	1.2	0.4	0.1	0.1	1.4	10.3	1.3
History of science	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Linguistics	0.1	0.2	0.1	0.1	0.2	0.0	0.1
Political science	0.3	0.2	0.1	0.0	0.7	0.3	0.6
Sociology	0.5	0.4	0.0	0.7	1.8	1.5	0.5
Other	1.0	0.9	0.6	0.2	0.5	1.0	1.9
Total engineering	28.4	34.4	55.2	4.7	11.1	10.2	37.3
Aeronautical/astronautical	1.5	0.7	4.0	0.0	0.2	0.1	2.7
Chemical	3.1	5.5	2.3	0.6	1.5	1.9	4.2
Civil	3.6	4.2	3.5	0.3	1.0	1.6	6.8
Electrical/electronics	7.5	10.4	21.7	0.7	1.7	1.1	5.8
Industrial	0.9	1.2	1.2	0.1	2.2	0.0	1.4
Mechanical	4.9	5.1	10.1	0.6	0.7	0.1	7.8
Materials	3.1	4.0	6.8	0.1	1.1	0.1	4.1
Other	3.8	3.2	5.7	2.4	2.6	5.2	4.4

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

See figure 5-22.

Appendix table 5-43.
S&E research assistants with primary support from the Federal Government, by field and agency of primary support: 1995
(Percentages)

Field	All federal agencies	National Science Foundation	Department of Defense	National Institutes of Health	Other Department of Health & Human Services	Department of Agriculture	All other agencies
TOTAL S&E	100.0	24.0	14.2	25.6	2.2	6.7	27.2
Total sciences	100.0	22.0	8.9	34.0	2.8	8.4	23.9
Physical sciences	100.0	36.5	11.2	18.4	1.5	0.4	32.0
Astronomy	100.0	37.3	2.4	0.0	0.0	0.0	60.3
Chemistry	100.0	35.6	9.3	32.7	2.6	0.6	19.1
Physics	100.0	37.7	14.5	1.9	0.3	0.2	45.5
Other	100.0	0.0	0.0	43.8	0.0	0.0	56.3
Mathematics	100.0	43.6	19.0	7.0	2.7	2.0	25.8
Computer sciences	100.0	37.1	42.5	3.1	0.5	0.5	16.4
Environmental sciences	100.0	42.1	9.2	0.7	0.1	2.0	45.9
Atmospheric sciences	100.0	38.3	8.5	0.4	0.4	2.0	50.5
Earth sciences	100.0	53.8	2.1	0.2	0.0	1.0	42.9
Oceanography	100.0	33.6	20.4	1.1	0.0	0.5	44.5
Other	100.0	15.4	11.2	2.9	0.4	12.4	57.7
Life sciences	100.0	7.0	1.8	58.0	3.7	15.4	14.1
Agricultural sciences	100.0	4.0	1.4	0.8	0.3	60.5	33.1
Biological sciences	100.0	8.1	1.7	67.3	3.1	9.4	10.5
Medical sciences	100.0	3.3	3.2	69.3	7.5	4.1	12.6
Other	100.0	4.6	1.4	50.1	21.2	0.0	22.6
Psychology	100.0	8.4	7.7	53.5	9.7	1.1	19.6
Social sciences	100.0	16.2	3.9	9.6	3.1	26.7	40.5
Anthropology	100.0	16.7	6.9	16.7	0.0	1.0	58.8
Economics	100.0	7.3	0.8	1.3	2.6	57.8	30.2
History of science	100.0	100.0	0.0	0.0	0.0	0.0	0.0
Linguistics	100.0	44.8	6.9	19.0	3.4	0.0	25.9
Political science	100.0	14.8	3.5	4.3	6.1	8.7	62.6
Sociology	100.0	18.1	0.0	31.2	7.6	19.4	23.6
Other	100.0	22.3	9.1	6.3	1.2	6.7	54.4
Total engineering	100.0	29.1	27.7	4.2	0.9	2.4	35.7
Aeronautical/ astronautical	100.0	12.0	37.9	0.1	0.3	0.3	49.4
Chemical	100.0	42.3	10.5	5.2	1.1	4.1	36.8
Civil	100.0	28.3	14.0	1.8	0.6	3.0	52.2
Electrical/electronics	100.0	33.5	41.4	2.3	0.5	1.0	21.3
Industrial	100.0	31.9	17.9	2.7	5.4	0.0	42.2
Mechanical	100.0	24.8	29.2	2.9	0.3	0.2	42.7
Materials	100.0	31.2	31.1	0.8	0.8	0.2	35.8
Other	100.0	20.0	21.5	15.9	1.5	9.2	31.8

SOURCE: National Science Foundation, Science Resources Studies Division, Survey of Graduate Students and Postdoctorates in Science and Engineering, various years, unpublished tabulations.

See figure 5-23.

Appendix table 5-44.
U.S. scientific and technical journal articles, by sector and field: 1981-95

	Number of articles by:							Percent of articles by:						
	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other
All natural science and engineering fields														
1981	132,280	90,412	11,141	13,099	4,791	9,959	2,883	100	68	8	10	4	8	2
1982	133,623	92,335	11,039	13,084	4,512	9,766	2,889	100	69	8	10	3	7	2
1983	132,416	90,556	11,760	12,880	4,627	9,932	2,665	100	68	9	10	3	8	2
1984	131,112	90,455	11,266	12,828	4,053	9,865	2,652	100	69	9	10	3	8	2
1985	137,771	95,340	11,767	12,899	4,917	10,188	2,662	100	69	9	9	4	7	2
1986	137,771	95,813	11,874	12,893	4,762	9,895	2,541	100	70	9	9	3	7	2
1987	134,498	94,424	11,273	12,255	4,619	9,546	2,383	100	70	8	9	3	7	2
1988	138,143	97,176	11,853	12,298	4,593	9,983	2,240	100	70	9	9	3	7	2
1989	140,833	99,214	11,964	12,373	4,533	10,360	2,390	100	70	8	9	3	7	2
1990	140,994	99,498	12,296	12,379	4,403	10,065	2,356	100	71	9	9	3	7	2
1991	142,334	100,276	12,660	12,266	4,392	10,244	2,499	100	70	9	9	3	7	2
1992	143,175	101,781	12,423	11,986	4,319	10,149	2,523	100	71	9	8	3	7	2
1993	140,588	100,049	11,757	11,796	3,987	10,500	2,501	100	71	8	8	3	7	2
1994	141,975	100,904	12,065	11,979	4,539	10,381	2,109	100	71	8	8	3	7	1
1995	142,792	101,458	11,791	11,858	4,792	10,755	2,141	100	71	8	8	3	8	1
Clinical medicine														
1981	48,073	32,841	1,563	4,995	256	6,746	1,673	100	68	3	10	1	14	3
1982	48,531	33,388	1,626	5,006	235	6,554	1,722	100	69	3	10	0	14	4
1983	48,056	32,872	1,732	4,916	207	6,746	1,584	100	68	4	10	0	14	3
1984	48,736	33,319	1,860	4,992	216	6,762	1,587	100	68	4	10	0	14	3
1985	50,596	35,008	1,834	4,972	288	6,943	1,551	100	69	4	10	1	14	3
1986	50,638	34,920	2,111	5,025	254	6,788	1,542	100	69	4	10	1	13	3
1987	49,905	34,787	2,075	4,867	203	6,498	1,475	100	70	4	10	0	13	3
1988	49,932	34,722	2,146	4,846	224	6,633	1,362	100	70	4	10	0	13	3
1989	50,510	34,938	2,380	4,685	193	6,841	1,472	100	69	5	9	0	14	3
1990	50,322	35,058	2,477	4,623	192	6,588	1,384	100	70	5	9	0	13	3
1991	50,142	34,794	2,545	4,510	195	6,678	1,420	100	69	5	9	0	13	3
1992	50,326	35,111	2,638	4,288	179	6,618	1,493	100	70	5	9	0	13	3
1993	50,258	34,659	2,685	4,306	185	6,968	1,454	100	69	5	9	0	14	3
1994	49,702	34,432	2,818	4,204	236	6,798	1,215	100	69	6	8	0	14	2
1995	50,343	34,818	2,955	4,067	230	7,021	1,253	100	69	6	8	0	14	2

Appendix table 5-44.
U.S. scientific and technical journal articles, by sector and field: 1981-95

	Number of articles by:							Percent of articles by:						
	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other
Biomedical research														
1981	21,847	16,904	563	2,101	377	1,578	326	100	77	3	10	2	7	1
1982	22,732	17,704	568	2,085	336	1,702	337	100	78	2	9	1	7	1
1983	22,497	17,359	687	2,128	343	1,638	342	100	77	3	9	2	7	2
1984	22,196	17,112	771	2,044	280	1,652	338	100	77	3	9	1	7	2
1985	24,460	18,825	921	2,253	332	1,771	359	100	77	4	9	1	7	1
1986	24,765	18,797	1,164	2,291	343	1,818	352	100	76	5	9	1	7	1
1987	24,542	18,571	1,208	2,303	357	1,778	324	100	76	5	9	1	7	1
1988	25,072	19,073	1,263	2,220	361	1,882	272	100	76	5	9	1	8	1
1989	26,541	20,157	1,367	2,385	357	2,015	261	100	76	5	9	1	8	1
1990	26,660	20,279	1,382	2,336	379	1,977	308	100	76	5	9	1	7	1
1991	26,918	20,444	1,524	2,258	413	1,982	297	100	76	6	8	2	7	1
1992	27,782	21,255	1,535	2,273	360	2,050	309	100	77	6	8	1	7	1
1993	27,119	20,686	1,508	2,276	329	2,009	310	100	76	6	8	1	7	1
1994	27,465	20,880	1,597	2,244	358	2,121	265	100	76	6	8	1	8	1
1995	28,081	21,225	1,671	2,245	398	2,252	291	100	76	6	8	1	8	1
Biology														
1981	14,740	11,053	332	2,221	130	553	451	100	75	2	15	1	4	3
1982	14,974	11,458	364	2,169	136	460	388	100	77	2	14	1	3	3
1983	14,216	10,804	342	2,136	113	471	351	100	76	2	15	1	3	2
1984	14,166	10,690	412	2,123	118	455	368	100	75	3	15	1	3	3
1985	13,083	10,077	383	1,792	96	398	337	100	77	3	14	1	3	3
1986	13,000	10,068	337	1,862	69	380	285	100	77	3	14	1	3	2
1987	12,231	9,547	359	1,670	72	328	255	100	78	3	14	1	3	2
1988	12,370	9,562	363	1,702	95	395	253	100	77	3	14	1	3	2
1989	12,726	9,705	385	1,812	85	431	308	100	76	3	14	1	3	2
1990	13,182	10,015	444	1,928	90	410	296	100	76	3	15	1	3	2
1991	12,862	9,743	439	1,875	59	422	325	100	76	3	15	0	3	3
1992	12,062	9,154	398	1,708	60	424	319	100	76	3	14	0	4	3
1993	11,304	8,583	395	1,595	65	375	292	100	76	3	14	1	3	3
1994	11,433	8,514	491	1,710	73	381	263	100	74	4	15	1	3	2
1995	11,167	8,334	487	1,659	71	372	244	100	75	4	15	1	3	2

Appendix table 5-44.
U.S. scientific and technical journal articles, by sector and field: 1981-95

	Number of articles by:							Percent of articles by:						
	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other
Chemistry														
1981	10,880	7,647	1,798	687	437	243	68	100	70	17	6	4	2	1
1982	11,758	8,242	1,860	848	478	245	86	100	70	16	7	4	2	1
1983	11,010	7,710	1,880	716	420	214	71	100	70	17	7	4	2	1
1984	11,137	7,941	1,761	764	427	180	64	100	71	16	7	4	2	1
1985	11,585	8,137	1,951	794	418	217	68	100	70	17	7	4	2	1
1986	12,313	8,734	2,101	734	490	189	66	100	71	17	6	4	2	1
1987	11,827	8,455	2,010	694	439	182	48	100	71	17	6	4	2	0
1988	12,384	8,867	2,051	726	477	202	62	100	72	17	6	4	2	1
1989	12,405	9,025	1,960	685	490	190	55	100	73	16	6	4	2	0
1990	12,719	9,272	2,054	666	470	182	75	100	73	16	5	4	1	1
1991	13,086	9,447	2,122	699	485	239	95	100	72	16	5	4	2	1
1992	12,926	9,561	1,981	686	436	195	69	100	74	15	5	3	2	1
1993	13,252	9,789	2,045	633	443	272	70	100	74	15	5	3	2	1
1994	12,598	9,178	1,950	720	423	263	65	100	73	15	6	3	2	1
1995	12,900	9,495	1,874	699	536	248	48	100	74	15	5	4	2	0
Physics														
1981	13,053	8,123	2,135	835	1,753	180	28	100	62	16	6	13	1	0
1982	13,255	8,195	2,224	848	1,748	202	38	100	62	17	6	13	2	0
1983	13,021	8,197	2,086	760	1,727	200	51	100	63	16	6	13	2	0
1984	12,691	8,118	2,007	754	1,567	199	47	100	64	16	6	12	2	0
1985	15,903	9,802	2,823	933	2,054	234	56	100	62	18	6	13	1	0
1986	16,361	10,129	2,881	917	2,195	206	33	100	62	18	6	13	1	0
1987	16,078	10,209	2,739	854	2,006	229	42	100	63	17	5	12	1	0
1988	17,499	11,111	3,024	936	2,159	231	37	100	63	17	5	12	1	0
1989	17,649	11,392	2,915	949	2,107	245	41	100	65	17	5	12	1	0
1990	17,242	11,113	2,939	905	2,008	236	41	100	64	17	5	12	1	0
1991	18,078	11,866	2,889	1,000	2,017	249	57	100	66	16	6	11	1	0
1992	17,848	11,814	2,812	1,026	1,919	214	62	100	66	16	6	11	1	0
1993	16,912	11,641	2,241	990	1,757	216	68	100	69	13	6	10	1	0
1994	18,836	13,116	2,228	1,121	2,093	242	36	100	70	12	6	11	1	0
1995	17,883	12,489	1,897	1,053	2,196	202	46	100	70	11	6	12	1	0

Appendix table 5-44.
U.S. scientific and technical journal articles, by sector and field: 1981-95

	Number of articles by:							Percent of articles by:						
	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other
Earth and space sciences														
1981	7,257	4,710	408	1,164	562	315	97	100	65	6	16	8	4	1
1982	7,057	4,529	461	1,092	554	312	109	100	64	7	15	8	4	2
1983	6,862	4,371	448	1,091	518	330	104	100	64	7	16	8	5	2
1984	6,748	4,329	447	1,062	523	296	92	100	64	7	16	8	4	1
1985	7,663	4,795	598	1,197	533	364	177	100	63	8	16	7	5	2
1986	7,811	4,985	580	1,206	579	285	178	100	64	7	15	7	4	2
1987	7,797	4,984	587	1,169	568	323	166	100	64	8	15	7	4	2
1988	7,653	4,916	516	1,120	526	418	157	100	64	7	15	7	5	2
1989	7,770	4,954	565	1,112	534	429	176	100	64	7	14	7	6	2
1990	7,716	4,941	481	1,147	548	457	142	100	64	6	15	7	6	2
1991	8,138	5,155	605	1,149	569	471	189	100	63	7	14	7	6	2
1992	8,233	5,363	596	1,149	552	416	159	100	65	7	14	7	5	2
1993	8,522	5,631	522	1,186	561	453	170	100	66	6	14	7	5	2
1994	8,904	5,826	625	1,258	621	417	158	100	65	7	14	7	5	2
1995	9,378	6,132	579	1,311	710	481	166	100	65	6	14	8	5	2
Engineering and technology														
1981	12,486	5,555	4,191	1,009	1,220	283	229	100	44	34	8	10	2	2
1982	11,619	5,518	3,778	926	974	220	202	100	47	33	8	8	2	2
1983	13,105	5,936	4,419	1,071	1,252	270	157	100	45	34	8	10	2	1
1984	11,976	5,830	3,870	999	874	256	149	100	49	32	8	7	2	1
1985	10,822	5,442	3,081	847	1,152	198	103	100	50	28	8	11	2	1
1986	9,774	5,369	2,579	790	776	180	81	100	55	26	8	8	2	1
1987	9,225	5,291	2,165	630	921	151	67	100	57	23	7	10	2	1
1988	9,488	5,537	2,336	660	698	171	86	100	58	25	7	7	2	1
1989	9,568	5,676	2,266	678	715	169	65	100	59	24	7	7	2	1
1990	10,113	6,084	2,402	694	677	159	98	100	60	24	7	7	2	1
1991	9,999	5,978	2,441	715	608	153	104	100	60	24	7	6	2	1
1992	10,833	6,634	2,333	809	776	176	105	100	61	22	7	7	2	1
1993	10,051	6,185	2,242	736	601	158	130	100	62	22	7	6	2	1
1994	10,058	6,210	2,262	677	693	121	94	100	62	22	7	7	1	1
1995	10,229	6,370	2,240	774	623	136	87	100	62	22	8	6	1	1

Appendix table 5-44.
U.S. scientific and technical journal articles, by sector and field: 1981-95

	Number of articles by:							Percent of articles by:						
	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other	Total	Academia	Industry	Federal	FFRDC	Non-profit	Other
Mathematics														
1981	3,944	3,579	151	87	56	61	11	100	91	4	2	1	2	0
1982	3,697	3,301	158	110	51	71	7	100	89	4	3	1	2	0
1983	3,649	3,307	166	62	47	63	5	100	91	5	2	1	2	0
1984	3,462	3,116	138	90	48	65	7	100	90	4	3	1	2	0
1985	3,659	3,254	176	111	44	63	11	100	89	5	3	1	2	0
1986	3,109	2,811	121	68	56	49	4	100	90	4	2	2	2	0
1987	2,893	2,580	130	68	53	57	6	100	89	4	2	2	2	0
1988	3,745	3,388	154	88	53	51	11	100	90	4	2	1	1	0
1989	3,664	3,367	126	67	52	40	12	100	92	3	2	1	1	0
1990	3,040	2,736	117	80	39	56	12	100	90	4	3	1	2	0
1991	3,111	2,849	95	60	46	50	12	100	92	3	2	1	2	0
1992	3,165	2,889	130	47	37	56	7	100	91	4	1	1	2	0
1993	3,170	2,875	119	74	46	49	7	100	91	4	2	1	2	0
1994	2,979	2,748	94	45	42	38	13	100	92	3	2	1	1	0
1995	2,811	2,595	88	50	28	43	6	100	92	3	2	1	2	0

NOTE: Percentages may not total 100 because of rounding.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

Appendix table 5-45.
Broad and fine fields for publications output data

Broad field	Fine fields		
Clinical medicine	Addictive diseases Allergy Anesthesiology Arthritis & rheumatism Cancer Cardiovascular system Dentistry Dermatology & venereal disease Endocrinology Fertility Gastroenterology General & internal medicine	Geriatrics Hematology Hygiene & public health Immunology Miscellaneous clinical Nephrology Neurology & neurosurgery Obstetrics & gynecology Ophthalmology Orthopedics Otorhinolaryngology	Pathology Pediatrics Pharmacology Pharmacy Psychiatry Radiology & nuclear medicine Respiratory system Surgery Tropical medicine Urology Veterinary medicine
Biomedical research	Anatomy & morphology Biochemistry & molecular biology Biomedical engineering Biophysics Cell biology, cytology & histology	Embryology Genetics & heredity General biomedical research Microbiology Microscopy	Miscellaneous biomedical research Nutrition & dietetics Parasitology Physiology Virology
Biology	Agriculture & food science Botany Dairy & animal science Ecology	Entomology General biology General zoology	Marine and hydro-biology Miscellaneous biology Miscellaneous zoology
Chemistry	Analytical chemistry Applied chemistry General chemistry	Inorganic & nuclear chemistry Organic chemistry	Physical chemistry Polymers
Physics	Acoustics Applied physics Chemical physics	Fluids & plasmas General physics Miscellaneous physics	Nuclear & particle physics Optics Solid state physics
Earth and space sciences	Astronomy & astrophysics Earth & planetary science Environmental science	Geography Geology General engineering	Meteorology & atmospheric science Oceanography & limnology Metals & metallurgy
Engineering and technology	Aerospace technology Chemical engineering Civil engineering Computers Electrical engineering & electronics	Industrial engineering Library & information science Materials science Mechanical engineering	Miscellaneous engineering & technology Nuclear technology Operations research & management
Mathematics	Applied mathematics General mathematics	Miscellaneous mathematics	Probability & statistics

SOURCE: CHI Research, Inc., Science Indicators database.

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
All natural science and engineering fields													
Academia													
1981	NA	2,905	8,138	2,072	7,352	2,384	20.4	NA	2.8	7.8	2.0	7.1	2.3
1983	NA	3,386	8,234	2,160	7,798	2,429	20.9	NA	3.2	7.8	2.1	7.4	2.3
1985	NA	4,063	8,694	2,406	8,326	2,461	21.3	NA	3.6	7.8	2.2	7.5	2.2
1987	NA	4,598	9,104	2,684	8,286	2,477	22.1	NA	4.1	8.2	2.4	7.4	2.2
1989	NA	5,301	9,163	2,783	9,005	2,633	22.1	NA	4.5	7.8	2.4	7.6	2.2
1991	NA	6,199	9,334	3,054	9,237	2,806	22.6	NA	5.1	7.7	2.5	7.7	2.3
1993	NA	6,611	9,626	3,282	9,537	2,932	23.1	NA	5.4	7.9	2.7	7.8	2.4
1995	NA	7,479	10,442	3,863	10,326	2,708	24.2	NA	5.9	8.3	3.1	8.2	2.2
Industry													
1981	2,905	NA	639	248	296	172	27.3	21.6	NA	4.7	1.8	2.2	1.3
1983	3,386	NA	837	352	404	235	30.4	23.2	NA	5.7	2.4	2.8	1.6
1985	4,063	NA	901	380	514	241	34.0	26.9	NA	6.0	2.5	3.4	1.6
1987	4,598	NA	1,029	417	639	266	38.0	30.5	NA	6.8	2.8	4.2	1.8
1989	5,301	NA	1,215	455	814	311	40.4	32.3	NA	7.4	2.8	5.0	1.9
1991	6,199	NA	1,358	518	878	379	42.5	34.6	NA	7.6	2.9	4.9	2.1
1993	6,611	NA	1,565	550	1,094	464	47.0	37.8	NA	9.0	3.1	6.3	2.7
1995	7,479	NA	1,719	735	1,239	501	50.2	40.8	NA	9.4	4.0	6.8	2.7
Federal Government													
1981	8,138	639	NA	265	818	423	49.4	43.8	3.4	NA	1.4	4.4	2.3
1983	8,234	837	NA	272	838	441	50.5	44.4	4.5	NA	1.5	4.5	2.4
1985	8,694	901	NA	303	961	508	52.0	45.7	4.7	NA	1.6	5.0	2.7
1987	9,104	1,029	NA	331	985	529	55.1	48.6	5.5	NA	1.8	5.3	2.8
1989	9,163	1,215	NA	427	1,067	481	55.2	47.9	6.4	NA	2.2	5.6	2.5
1991	9,334	1,358	NA	419	1,173	552	55.9	48.2	7.0	NA	2.2	6.1	2.9
1993	9,626	1,565	NA	438	1,224	691	58.0	49.9	8.1	NA	2.3	6.3	3.6
1995	10,442	1,719	NA	620	1,435	618	60.2	52.2	8.6	NA	3.1	7.2	3.1
FFRDCs													
1981	2,072	248	265	NA	85	21	38.7	32.4	3.9	4.1	NA	1.3	0.3
1983	2,160	352	272	NA	107	41	41.8	33.7	5.5	4.2	NA	1.7	0.6
1985	2,406	380	303	NA	132	29	43.1	34.6	5.5	4.4	NA	1.9	0.4
1987	2,684	417	331	NA	129	35	47.2	39.0	6.1	4.8	NA	1.9	0.5
1989	2,783	455	427	NA	164	38	49.4	40.1	6.6	6.2	NA	2.4	0.5
1991	3,054	518	419	NA	207	37	52.7	43.4	7.4	6.0	NA	2.9	0.5
1993	3,282	550	438	NA	198	48	57.4	47.7	8.0	6.4	NA	2.9	0.7
1995	3,863	735	620	NA	279	71	55.8	45.9	8.7	7.4	NA	3.3	0.8

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by: Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	Percent of all articles coauthored by: All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Nonprofits													
1981	7,352	296	818	85	NA	486	54.9	50.3	2.0	5.6	0.6	NA	3.3
1983	7,798	404	838	107	NA	519	56.8	52.3	2.7	5.6	0.7	NA	3.5
1985	8,326	514	961	132	NA	547	58.1	53.2	3.3	6.1	0.8	NA	3.5
1987	8,286	639	985	129	NA	515	59.7	55.0	4.2	6.5	0.9	NA	3.4
1989	9,005	814	1,067	164	NA	589	59.9	54.6	4.9	6.5	1.0	NA	3.6
1991	9,237	878	1,173	207	NA	767	61.1	55.3	5.3	7.0	1.2	NA	4.6
1993	9,537	1,094	1,224	198	NA	861	60.9	55.1	6.3	7.1	1.1	NA	5.0
1995	10,326	1,239	1,435	279	NA	770	62.4	56.8	6.8	7.9	1.5	NA	4.2
Other													
1981	2,384	172	423	21	486	NA	62.2	51.8	3.7	9.2	0.5	10.6	NA
1983	2,429	235	441	41	519	NA	65.5	54.4	5.3	9.9	0.9	11.6	NA
1985	2,461	241	508	29	547	NA	66.3	54.3	5.3	11.2	0.6	12.1	NA
1987	2,477	266	529	35	515	NA	69.7	58.4	6.3	12.5	0.8	12.1	NA
1989	2,633	311	481	38	589	NA	71.8	59.8	7.1	10.9	0.9	13.4	NA
1991	2,806	379	552	37	767	NA	71.9	59.9	8.1	11.8	0.8	16.4	NA
1993	2,932	464	691	48	861	NA	73.4	59.9	9.5	14.1	1.0	17.6	NA
1995	2,708	501	618	71	770	NA	75.8	62.2	11.5	14.2	1.6	17.7	NA
Clinical medicine													
Academia													
1981	NA	636	4,698	119	5,479	1,718	29.6	NA	1.6	12.0	0.3	14.0	4.4
1983	NA	779	4,469	130	5,738	1,752	29.6	NA	2.0	11.3	0.3	14.5	4.4
1985	NA	1,080	4,718	166	6,072	1,763	29.6	NA	2.6	11.2	0.4	14.4	4.2
1987	NA	1,322	4,993	157	5,948	1,802	30.1	NA	3.1	11.8	0.4	14.1	4.3
1989	NA	1,584	4,789	161	6,177	1,881	30.5	NA	3.7	11.3	0.4	14.5	4.4
1991	NA	1,880	4,611	157	6,219	1,911	30.3	NA	4.4	10.8	0.4	14.6	4.5
1993	NA	2,102	4,636	158	6,507	2,004	30.8	NA	4.9	10.8	0.4	15.2	4.7
1995	NA	2,457	4,791	229	6,700	1,822	31.3	NA	5.6	11.0	0.5	15.4	4.2
Industry													
1981	636	NA	151	14	173	72	39.0	30.5	NA	7.2	0.7	8.3	3.5
1983	779	NA	193	10	240	103	42.2	32.5	NA	8.1	0.4	10.0	4.3
1985	1,080	NA	247	28	278	103	49.0	39.6	NA	9.1	1.0	10.2	3.8
1987	1,322	NA	301	38	385	152	51.2	41.5	NA	9.5	1.2	12.1	4.8
1989	1,584	NA	353	37	516	165	52.9	42.1	NA	9.4	1.0	13.7	4.4
1991	1,880	NA	415	29	533	222	54.4	45.3	NA	10.0	0.7	12.8	5.3
1993	2,102	NA	468	42	701	266	55.7	46.2	NA	10.3	0.9	15.4	5.8
1995	2,457	NA	509	51	786	317	56.9	47.7	NA	9.9	1.0	15.3	6.2

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Federal Government													
1981	4,698	151	NA	28	556	273	63.5	59.1	1.9	NA	0.4	7.0	3.4
1983	4,469	193	NA	28	584	279	62.1	57.4	2.5	NA	0.4	7.5	3.6
1985	4,718	247	NA	48	658	347	63.5	58.1	3.0	NA	0.6	8.1	4.3
1987	4,993	301	NA	53	661	359	65.7	60.9	3.7	NA	0.6	8.1	4.4
1989	4,789	353	NA	64	690	334	65.8	60.2	4.4	NA	0.8	8.7	4.2
1991	4,611	415	NA	53	718	351	65.3	59.3	5.3	NA	0.7	9.2	4.5
1993	4,636	468	NA	57	773	438	66.7	60.3	6.1	NA	0.7	10.1	5.7
1995	4,791	509	NA	94	929	408	69.5	62.9	6.7	NA	1.2	12.2	5.4
FFRDCs													
1981	119	14	28	NA	21	5	45.6	33.5	3.9	7.9	NA	5.9	1.4
1983	130	10	28	NA	28	5	53.5	41.7	3.2	9.0	NA	9.0	1.6
1985	166	28	48	NA	43	6	53.6	38.3	6.5	11.1	NA	9.9	1.4
1987	143	16	34	NA	34	10	55.2	42.4	4.7	10.1	NA	10.1	3.0
1989	157	38	53	NA	26	4	58.8	45.5	11.0	15.4	NA	7.5	1.2
1991	161	37	64	NA	32	12	64.5	46.5	10.7	18.5	NA	9.2	3.5
1993	157	29	53	NA	36	7	62.0	45.9	8.5	15.5	NA	10.5	2.0
1995	158	42	57	NA	30	4	66.9	45.1	12.0	16.3	NA	8.6	1.1
Nonprofits													
1981	5,479	173	556	25	NA	403	58.3	54.4	1.7	5.5	0.2	NA	4.0
1983	5,738	240	584	28	NA	438	59.9	56.1	2.3	5.7	0.3	NA	4.3
1985	6,072	278	658	43	NA	461	60.7	56.6	2.6	6.1	0.4	NA	4.3
1987	5,948	385	661	26	NA	452	62.0	58.0	3.8	6.4	0.3	NA	4.4
1989	6,177	516	690	32	NA	482	61.7	57.0	4.8	6.4	0.3	NA	4.5
1991	6,219	533	718	36	NA	627	62.7	57.8	5.0	6.7	0.3	NA	5.8
1993	6,507	701	773	30	NA	727	62.1	57.5	6.2	6.8	0.3	NA	6.4
1995	6,700	786	929	40	NA	643	62.9	57.9	6.8	8.0	0.3	NA	5.6
Other													
1981	1,718	72	273	6	403	NA	69.5	59.6	2.5	9.5	0.2	14.0	NA
1983	1,752	103	279	5	438	NA	71.8	62.0	3.6	9.9	0.2	15.5	NA
1985	1,763	103	347	6	461	NA	73.5	62.0	3.6	12.2	0.2	16.2	NA
1987	1,802	152	359	4	452	NA	74.9	64.6	5.5	12.9	0.1	16.2	NA
1989	1,881	165	334	12	482	NA	76.6	65.5	5.7	11.6	0.4	16.8	NA
1991	1,911	222	351	7	627	NA	78.1	66.4	7.7	12.2	0.2	21.8	NA
1993	2,004	266	438	4	727	NA	77.8	66.2	8.8	14.5	0.1	24.0	NA
1995	1,822	317	408	14	643	NA	80.1	66.8	11.6	15.0	0.5	23.6	NA

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Biomedical research													
Academia													
1981	NA	276	1,270	202	1,175	236	15.7	NA	1.5	6.7	1.1	6.2	1.2
1983	NA	334	1,316	181	1,296	269	16.1	NA	1.7	6.7	0.9	6.6	1.4
1985	NA	534	1,578	200	1,564	301	17.8	NA	2.5	7.3	0.9	7.3	1.4
1987	NA	718	1,652	223	1,610	301	19.1	NA	3.3	7.7	1.0	7.5	1.4
1989	NA	790	1,815	243	1,920	318	19.6	NA	3.4	7.7	1.0	8.2	1.4
1991	NA	935	1,772	323	1,959	376	20.0	NA	3.9	7.3	1.3	8.1	1.6
1993	NA	1,045	1,825	303	2,000	361	20.1	NA	4.2	7.4	1.2	8.1	1.5
1995	NA	1,216	2,013	395	2,393	378	22.1	NA	4.7	7.8	1.5	9.3	1.5
Industry													
1981	276	NA	57	20	40	14	43.4	35.3	NA	7.3	2.6	5.1	1.8
1983	334	NA	95	18	62	20	44.5	34.6	NA	9.8	1.9	6.4	2.1
1985	534	NA	146	22	90	31	48.3	38.8	NA	10.6	1.6	6.5	2.3
1987	718	NA	191	33	135	28	49.0	39.6	NA	10.5	1.8	7.5	1.5
1989	790	NA	208	41	163	35	47.0	38.8	NA	10.2	2.0	8.0	1.7
1991	935	NA	205	51	186	31	48.7	40.1	NA	8.8	2.2	8.0	1.3
1993	1,045	NA	227	48	222	42	52.1	43.2	NA	9.4	2.0	9.2	1.7
1995	1,216	NA	229	56	284	50	52.9	44.1	NA	8.3	2.0	10.3	1.8
Federal Government													
1981	1,270	57	NA	48	145	35	47.7	42.6	1.9	NA	1.6	4.9	1.2
1983	1,316	95	NA	38	135	46	48.1	43.2	3.1	NA	1.2	4.4	1.5
1985	1,578	146	NA	63	165	54	51.7	46.7	4.3	NA	1.9	4.9	1.6
1987	1,652	191	NA	71	198	46	53.0	46.9	5.4	NA	2.0	5.6	1.3
1989	1,815	208	NA	92	216	39	54.0	48.1	5.5	NA	2.4	5.7	1.0
1991	1,772	205	NA	95	253	55	55.8	48.5	5.6	NA	2.6	6.9	1.5
1993	1,825	227	NA	72	225	80	54.8	48.9	6.1	NA	1.9	6.0	2.1
1995	2,013	229	NA	102	248	73	58.1	52.4	6.0	NA	2.7	6.5	1.9
FFRDCs													
1981	202	20	48	NA	21	3	47.1	38.0	3.8	9.0	NA	4.0	0.6
1983	181	18	38	NA	27	11	44.9	37.3	3.7	7.8	NA	5.6	2.3
1985	200	22	63	NA	26	8	52.7	39.9	4.4	12.6	NA	5.2	1.6
1987	223	33	71	NA	27	12	55.3	39.9	5.9	12.7	NA	4.8	2.1
1989	243	41	92	NA	25	8	55.6	41.7	7.0	15.8	NA	4.3	1.4
1991	323	51	95	NA	55	8	59.4	46.1	7.3	13.6	NA	7.9	1.1
1993	303	48	72	NA	42	8	64.2	50.7	8.0	12.0	NA	7.0	1.3
1995	395	56	102	NA	80	8	64.3	52.2	7.4	13.5	NA	10.6	1.1

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Nonprofits													
1981	1,175	40	145	20	NA	53	55.3	49.7	1.7	6.1	0.8	NA	2.2
1983	1,296	62	135	27	NA	51	55.7	51.3	2.5	5.3	1.1	NA	2.0
1985	1,564	90	165	26	NA	56	59.5	55.0	3.2	5.8	0.9	NA	2.0
1987	1,610	135	198	27	NA	46	60.1	55.1	4.6	6.8	0.9	NA	1.6
1989	1,920	163	216	25	NA	73	61.7	57.1	4.8	6.4	0.7	NA	2.2
1991	1,959	186	253	55	NA	91	63.4	57.5	5.5	7.4	1.6	NA	2.7
1993	2,000	222	225	42	NA	78	62.4	57.1	6.3	6.4	1.2	NA	2.2
1995	2,393	284	248	80	NA	89	64.6	59.5	7.1	6.2	2.0	NA	2.2
Other													
1981	236	14	35	5	53	NA	56.0	47.2	2.8	7.0	1.0	10.6	NA
1983	269	20	46	11	51	NA	59.0	49.6	3.7	8.5	2.0	9.4	NA
1985	301	31	54	8	56	NA	58.9	51.3	5.3	9.2	1.4	9.5	NA
1987	301	28	46	12	46	NA	64.0	54.2	5.0	8.3	2.2	8.3	NA
1989	318	35	39	8	73	NA	71.4	62.7	6.9	7.7	1.6	14.4	NA
1991	376	31	55	8	91	NA	72.9	63.6	5.2	9.3	1.4	15.4	NA
1993	361	42	80	8	78	NA	70.9	59.1	6.9	13.1	1.3	12.8	NA
1995	378	50	73	8	89	NA	72.7	62.6	8.3	12.1	1.3	14.7	NA
Biology													
Academia													
1981	NA	176	829	49	221	262	12.2	NA	1.5	6.9	0.4	1.8	2.2
1983	NA	210	1,024	48	247	213	13.8	NA	1.8	8.6	0.4	2.1	1.8
1985	NA	242	852	50	194	202	13.1	NA	2.2	7.6	0.4	1.7	1.8
1987	NA	204	871	58	182	163	13.2	NA	1.9	8.2	0.5	1.7	1.5
1989	NA	285	902	50	232	242	14.7	NA	2.6	8.2	0.5	2.1	2.2
1991	NA	296	989	45	225	234	15.0	NA	2.7	8.9	0.4	2.0	2.1
1993	NA	316	894	59	213	252	16.2	NA	3.2	8.9	0.6	2.1	2.5
1995	NA	386	1,020	69	254	210	18.0	NA	3.9	10.4	0.7	2.6	2.1
Industry													
1981	176	NA	41	5	6	13	46.9	38.9	NA	9.1	1.1	1.3	2.9
1983	210	NA	70	13	13	18	54.2	42.0	NA	14.0	2.6	2.6	3.6
1985	242	NA	50	5	7	21	50.5	43.8	NA	9.0	0.9	1.3	3.8
1987	204	NA	36	2	9	13	47.0	40.6	NA	7.2	0.4	1.8	2.6
1989	285	NA	58	9	11	21	57.1	47.9	NA	9.7	1.5	1.8	3.5
1991	296	NA	72	3	13	21	52.8	45.1	NA	11.0	0.5	2.0	3.2
1993	316	NA	89	6	18	19	60.0	49.4	NA	13.9	0.9	2.8	3.0
1995	386	NA	98	8	23	28	57.3	49.3	NA	12.5	1.0	2.9	3.6

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Federal Government													
1981	829	41	NA	11	38	66	33.5	29.9	1.5	NA	0.4	1.4	2.4
1983	1,024	70	NA	12	45	69	40.6	36.5	2.5	NA	0.4	1.6	2.5
1985	852	50	NA	7	26	64	39.9	36.1	2.1	NA	0.3	1.1	2.7
1987	871	36	NA	7	24	61	41.8	39.0	1.6	NA	0.3	1.1	2.7
1989	902	58	NA	7	41	58	41.2	37.1	2.4	NA	0.3	1.7	2.4
1991	989	72	NA	13	41	72	42.7	38.7	2.8	NA	0.5	1.6	2.8
1993	894	89	NA	13	32	77	45.5	40.1	4.0	NA	0.6	1.4	3.5
1995	1,020	98	NA	21	57	68	47.2	42.9	4.1	NA	0.9	2.4	2.9
FFRDCs													
1981	49	5	11	NA	1	3	37.1	29.3	3.0	6.6	NA	0.6	1.8
1983	48	13	12	NA	5	2	42.3	30.8	8.3	7.7	NA	3.2	1.3
1985	50	5	7	NA	2	5	45.5	37.3	3.7	5.2	NA	1.5	3.7
1987	58	2	7	NA	2	1	57.1	51.8	1.8	6.3	NA	1.8	0.9
1989	50	9	7	NA	1	1	45.2	40.3	7.3	5.6	NA	0.8	0.8
1991	45	3	13	NA	2	3	58.1	48.4	3.2	14.0	NA	2.2	3.2
1993	59	6	13	NA	5	4	65.5	52.2	5.3	11.5	NA	4.4	3.5
1995	69	8	21	NA	2	2	61.8	52.7	6.1	16.0	NA	1.5	1.5
Nonprofits													
1981	221	6	38	2	NA	20	36.2	30.4	0.8	5.2	0.3	NA	2.8
1983	247	13	45	5	NA	18	44.5	37.8	2.0	6.9	0.8	NA	2.8
1985	194	7	26	2	NA	17	41.1	35.3	1.3	4.7	0.4	NA	3.1
1987	182	9	24	2	NA	10	44.8	39.0	1.9	5.1	0.4	NA	2.1
1989	232	11	41	1	NA	12	43.2	37.4	1.8	6.6	0.2	NA	1.9
1991	225	13	41	2	NA	23	42.5	36.6	2.1	6.7	0.3	NA	3.7
1993	213	18	32	5	NA	24	46.4	37.8	3.2	5.7	0.9	NA	4.3
1995	254	23	57	2	NA	18	50.1	43.1	3.9	9.7	0.3	NA	3.1
Other													
1981	262	13	66	0	20	NA	51.9	41.3	2.1	10.4	0.0	3.2	NA
1983	213	18	69	2	18	NA	54.6	41.1	3.5	13.3	0.4	3.5	NA
1985	202	21	64	5	17	NA	55.1	40.6	4.2	12.9	1.0	3.4	NA
1987	163	13	61	1	10	NA	54.9	43.0	3.4	16.1	0.3	2.6	NA
1989	242	21	58	1	12	NA	61.5	49.8	4.3	11.9	0.2	2.5	NA
1991	234	21	72	3	23	NA	58.4	46.2	4.1	14.2	0.6	4.5	NA
1993	252	19	77	4	24	NA	65.7	50.9	3.8	15.6	0.8	4.8	NA
1995	210	28	68	2	18	NA	63.3	52.1	6.9	16.9	0.5	4.5	NA

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Chemistry													
Academia													
1981	NA	269	188	194	101	23	8.9	NA	3.2	2.2	2.3	1.2	0.3
1983	NA	328	202	182	90	19	9.2	NA	3.9	2.4	2.1	1.1	0.2
1985	NA	365	227	183	74	29	9.3	NA	4.1	2.5	2.0	0.8	0.3
1987	NA	468	225	255	71	25	10.6	NA	5.0	2.4	2.7	0.8	0.3
1989	NA	518	226	293	76	17	10.7	NA	5.1	2.2	2.9	0.8	0.2
1991	NA	622	260	298	123	59	11.9	NA	5.8	2.4	2.8	1.1	0.5
1993	NA	656	263	332	111	38	11.7	NA	5.9	2.3	3.0	1.0	0.3
1995	NA	717	311	409	150	40	13.8	NA	6.5	2.8	3.7	1.4	0.4
Industry													
1981	269	NA	24	9	12	7	14.9	13.5	NA	1.2	0.5	0.6	0.4
1983	328	NA	52	27	11	9	18.3	15.3	NA	2.4	1.3	0.5	0.4
1985	365	NA	37	20	23	9	18.9	16.4	NA	1.7	0.9	1.0	0.4
1987	468	NA	59	32	19	7	23.1	19.8	NA	2.5	1.4	0.8	0.3
1989	518	NA	78	41	13	11	26.1	21.9	NA	3.3	1.7	0.5	0.5
1991	622	NA	91	42	26	24	27.8	23.8	NA	3.5	1.6	1.0	0.9
1993	656	NA	91	57	29	17	30.0	25.5	NA	3.5	2.2	1.1	0.7
1995	717	NA	99	48	13	11	33.0	29.0	NA	4.0	1.9	0.5	0.4
Federal Government													
1981	188	24	NA	2	10	3	25.8	22.9	2.9	NA	0.2	1.2	0.4
1983	202	52	NA	10	13	5	29.1	22.8	5.9	NA	1.1	1.5	0.6
1985	227	37	NA	9	17	3	27.9	23.4	3.8	NA	0.9	1.8	0.3
1987	225	59	NA	5	12	5	32.5	25.6	6.7	NA	0.6	1.4	0.6
1989	226	78	NA	14	13	3	35.1	25.6	8.8	NA	1.6	1.5	0.3
1991	260	91	NA	25	20	20	38.1	27.8	9.7	NA	2.7	2.1	2.1
1993	263	91	NA	15	28	13	40.4	29.8	10.3	NA	1.7	3.2	1.5
1995	311	99	NA	33	10	6	40.6	32.1	10.2	NA	3.4	1.0	0.6
FFRDCs													
1981	194	9	2	NA	0	1	37.1	34.5	1.6	0.4	NA	0.0	0.2
1983	182	27	10	NA	3	0	39.3	32.5	4.8	1.8	NA	0.5	0.0
1985	183	20	9	NA	2	0	39.6	33.2	3.6	1.6	NA	0.4	0.0
1987	255	32	5	NA	3	1	46.0	41.3	5.2	0.8	NA	0.5	0.2
1989	293	41	14	NA	1	0	47.6	42.2	5.9	2.0	NA	0.1	0.0
1991	298	42	25	NA	9	2	49.6	42.2	5.9	3.5	NA	1.3	0.3
1993	332	57	15	NA	3	3	54.2	48.6	8.3	2.2	NA	0.4	0.4
1995	409	48	33	NA	6	6	55.5	48.6	5.7	3.9	NA	0.7	0.7

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Nonprofits													
1981	101	12	10	4	NA	1	37.0	32.0	3.8	3.2	1.3	NA	0.3
1983	90	11	13	3	NA	1	38.7	31.9	3.9	4.6	1.1	NA	0.4
1985	74	23	17	2	NA	1	36.1	26.0	8.1	6.0	0.7	NA	0.4
1987	71	19	12	3	NA	2	37.1	28.3	7.6	4.8	1.2	NA	0.8
1989	76	13	13	1	NA	0	37.7	29.2	5.0	5.0	0.4	NA	0.0
1991	123	26	20	9	NA	5	45.0	35.2	7.4	5.7	2.6	NA	1.4
1993	111	29	28	3	NA	4	40.8	29.8	7.8	7.5	0.8	NA	1.1
1995	150	13	10	6	NA	1	45.2	40.9	3.5	2.7	1.6	NA	0.3
Other													
1981	23	7	3	1	1	NA	34.9	26.7	8.1	3.5	1.2	1.2	NA
1983	19	9	5	0	1	NA	28.3	20.7	9.8	5.4	0.0	1.1	NA
1985	29	9	3	0	1	NA	39.6	31.9	9.9	3.3	0.0	1.1	NA
1987	25	7	5	1	2	NA	51.4	34.7	9.7	6.9	1.4	2.8	NA
1989	17	11	3	0	0	NA	41.1	23.3	15.1	4.1	0.0	0.0	NA
1991	59	24	20	2	5	NA	56.3	41.0	16.7	13.9	1.4	3.5	NA
1993	38	17	13	3	4	NA	55.0	34.2	15.3	11.7	2.7	3.6	NA
1995	40	11	6	6	1	NA	67.5	50.0	13.8	7.5	7.5	1.3	NA
Physics													
Academia													
1981	NA	508	298	856	89	8	17.5	NA	5.3	3.1	9.0	0.9	0.1
1983	NA	603	340	998	126	28	19.8	NA	6.2	3.5	10.2	1.3	0.3
1985	NA	806	385	1,153	116	27	19.8	NA	6.8	3.3	9.8	1.0	0.2
1987	NA	878	400	1,301	124	22	20.4	NA	7.1	3.2	10.5	1.0	0.2
1989	NA	1,047	490	1,327	157	25	20.2	NA	7.5	3.5	9.6	1.1	0.2
1991	NA	1,229	562	1,442	203	42	21.2	NA	8.3	3.8	9.7	1.4	0.3
1993	NA	1,180	681	1,576	178	59	22.1	NA	7.9	4.5	10.5	1.2	0.4
1995	NA	1,189	719	1,762	204	44	21.5	NA	7.3	4.4	10.8	1.2	0.3
Industry													
1981	508	NA	77	75	6	3	24.2	19.9	NA	3.0	2.9	0.2	0.1
1983	603	NA	99	131	19	14	29.2	23.0	NA	3.8	5.0	0.7	0.5
1985	806	NA	120	155	22	12	28.7	23.0	NA	3.4	4.4	0.6	0.3
1987	878	NA	114	177	23	12	30.8	25.1	NA	3.3	5.1	0.7	0.3
1989	1,047	NA	187	197	27	7	33.9	27.6	NA	4.9	5.2	0.7	0.2
1991	1,229	NA	234	259	38	17	38.7	31.0	NA	5.9	6.5	1.0	0.4
1993	1,180	NA	247	245	35	26	44.9	35.8	NA	7.5	7.4	1.1	0.8
1995	1,189	NA	254	338	24	18	51.4	39.9	NA	8.5	11.3	0.8	0.6

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Federal Government													
1981	298	77	NA	54	7	5	35.9	27.5	7.1	NA	5.0	0.6	0.5
1983	340	99	NA	63	4	10	42.1	32.6	9.5	NA	6.0	0.4	1.0
1985	385	120	NA	48	4	5	39.5	30.6	9.5	NA	3.8	0.3	0.4
1987	400	114	NA	63	6	11	43.6	33.6	9.6	NA	5.3	0.5	0.9
1989	490	187	NA	82	12	1	46.4	35.3	13.5	NA	5.9	0.9	0.1
1991	562	234	NA	89	27	9	51.3	37.3	15.5	NA	5.9	1.8	0.6
1993	681	247	NA	92	24	14	55.6	43.3	15.7	NA	5.8	1.5	0.9
1995	719	254	NA	118	22	6	54.7	42.4	15.0	NA	7.0	1.3	0.4
FFRDCs													
1981	856	75	54	NA	15	0	40.2	35.4	3.1	2.2	NA	0.6	0.0
1983	998	131	63	NA	10	3	45.3	39.6	5.2	2.5	NA	0.4	0.1
1985	1,153	155	48	NA	17	3	44.0	38.2	5.1	1.6	NA	0.6	0.1
1987	1,301	177	63	NA	24	3	48.4	42.2	5.7	2.0	NA	0.8	0.1
1989	1,327	197	82	NA	19	5	47.9	40.9	6.1	2.5	NA	0.6	0.2
1991	1,442	259	89	NA	28	8	51.2	44.3	8.0	2.7	NA	0.9	0.2
1993	1,576	245	92	NA	31	8	57.7	50.2	7.8	2.9	NA	1.0	0.3
1995	1,762	338	118	NA	31	13	53.5	45.6	8.8	3.1	NA	0.8	0.3
Nonprofits													
1981	89	6	7	11	NA	0	44.0	35.6	2.4	2.8	4.4	NA	0.0
1983	126	19	4	10	NA	0	47.9	43.2	6.5	1.4	3.4	NA	0.0
1985	116	22	4	17	NA	3	41.9	34.9	6.6	1.2	5.1	NA	0.9
1987	124	23	6	24	NA	0	44.7	37.2	6.9	1.8	7.2	NA	0.0
1989	157	27	12	19	NA	0	49.7	42.2	7.3	3.2	5.1	NA	0.0
1991	203	38	27	28	NA	2	60.2	48.7	9.1	6.5	6.7	NA	0.5
1993	178	35	24	31	NA	1	57.8	47.2	9.3	6.4	8.2	NA	0.3
1995	204	24	22	31	NA	2	62.3	55.3	6.5	6.0	8.4	NA	0.5
Other													
1981	8	3	5	4	0	NA	38.5	20.5	7.7	12.8	10.3	0.0	NA
1983	28	14	10	3	0	NA	47.7	32.6	16.3	11.6	3.5	0.0	NA
1985	27	12	5	3	3	NA	42.9	29.7	13.2	5.5	3.3	3.3	NA
1987	22	12	11	3	0	NA	56.3	31.0	16.9	15.5	4.2	0.0	NA
1989	25	7	1	5	0	NA	49.3	37.3	10.4	1.5	7.5	0.0	NA
1991	42	17	9	8	2	NA	58.4	41.6	16.8	8.9	7.9	2.0	NA
1993	59	26	14	8	1	NA	63.6	44.7	19.7	10.6	6.1	0.8	NA
1995	44	18	6	13	2	NA	68.5	49.4	20.2	6.7	14.6	2.2	NA

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Earth and space sciences													
Academia													
1981	NA	207	560	357	174	57	21.5	NA	3.7	10.0	6.4	3.1	1.0
1983	NA	222	530	320	187	81	22.2	NA	4.2	10.0	6.0	3.5	1.5
1985	NA	286	604	363	217	98	23.4	NA	4.9	10.3	6.2	3.7	1.7
1987	NA	311	645	411	250	115	24.6	NA	5.0	10.5	6.7	4.1	1.9
1989	NA	336	628	401	346	113	24.9	NA	5.4	10.1	6.5	5.6	1.8
1991	NA	351	764	474	405	126	27.3	NA	5.3	11.5	7.1	6.1	1.9
1993	NA	380	892	523	416	129	27.0	NA	5.2	12.2	7.2	5.7	1.8
1995	NA	467	1,108	652	512	158	29.4	NA	5.7	13.5	7.9	6.2	1.9
Industry													
1981	207	NA	127	34	17	11	51.0	34.2	NA	21.0	5.6	2.8	1.8
1983	222	NA	139	31	18	20	53.2	33.4	NA	20.9	4.7	2.7	3.0
1985	286	NA	173	36	35	33	52.2	32.7	NA	19.8	4.1	4.0	3.8
1987	311	NA	198	68	32	38	55.7	34.3	NA	21.8	7.5	3.5	4.2
1989	336	NA	203	55	46	52	57.7	37.5	NA	22.7	6.1	5.1	5.8
1991	351	NA	198	53	45	37	55.4	37.1	NA	20.9	5.6	4.8	3.9
1993	380	NA	255	61	47	44	65.2	42.4	NA	28.4	6.8	5.2	4.9
1995	467	NA	296	110	64	41	68.4	44.7	NA	28.4	10.5	6.1	3.9
Federal Government													
1981	560	127	NA	88	46	19	44.1	34.7	7.9	NA	5.5	2.9	1.2
1983	530	139	NA	78	42	21	44.9	34.5	9.0	NA	5.1	2.7	1.4
1985	604	173	NA	89	67	24	47.6	35.2	10.1	NA	5.2	3.9	1.4
1987	645	198	NA	105	71	40	50.9	37.0	11.4	NA	6.0	4.1	2.3
1989	628	203	NA	132	82	41	51.9	37.4	12.1	NA	7.9	4.9	2.4
1991	764	198	NA	129	100	38	53.8	41.6	10.8	NA	7.0	5.4	2.1
1993	892	255	NA	157	110	50	57.8	44.9	12.8	NA	7.9	5.5	2.5
1995	1,108	296	NA	207	148	48	62.3	48.5	13.0	NA	9.1	6.5	2.1
FFRDCs													
1981	357	34	88	NA	19	6	50.4	42.5	4.0	10.5	NA	2.3	0.7
1983	320	31	78	NA	28	15	49.6	40.2	3.9	9.8	NA	3.5	1.9
1985	363	36	89	NA	33	3	52.3	43.2	4.3	10.6	NA	3.9	0.4
1987	411	68	105	NA	39	8	55.3	43.2	7.2	11.0	NA	4.1	0.8
1989	401	55	132	NA	76	9	57.6	44.2	6.1	14.5	NA	8.4	1.0
1991	474	53	129	NA	65	7	59.3	47.9	5.4	13.0	NA	6.6	0.7
1993	523	61	157	NA	74	16	60.8	50.4	5.9	15.1	NA	7.1	1.5
1995	652	110	207	NA	98	21	60.1	48.0	8.1	15.3	NA	7.2	1.5

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Nonprofits													
1981	174	17	46	19	NA	3	46.3	38.6	3.8	10.2	4.2	NA	0.7
1983	187	18	42	28	NA	6	46.0	37.6	3.6	8.4	5.6	NA	1.2
1985	217	35	67	33	NA	6	48.3	37.9	6.1	11.7	5.8	NA	1.0
1987	250	32	71	39	NA	5	57.6	45.5	5.8	12.9	7.1	NA	0.9
1989	346	46	82	76	NA	19	57.3	45.3	6.0	10.7	9.9	NA	2.5
1991	405	45	100	65	NA	17	56.9	47.1	5.2	11.6	7.6	NA	2.0
1993	416	47	110	74	NA	21	60.0	48.8	5.5	12.9	8.7	NA	2.5
1995	512	64	148	98	NA	12	63.7	52.5	6.6	15.2	10.0	NA	1.2
Other													
1981	57	11	19	6	3	NA	51.0	39.3	7.6	13.1	4.1	2.1	NA
1983	81	20	21	15	6	NA	62.2	47.1	11.6	12.2	8.7	3.5	NA
1985	98	33	24	3	6	NA	53.2	37.3	12.5	9.1	1.1	2.3	NA
1987	115	38	40	8	5	NA	62.3	43.4	14.3	15.1	3.0	1.9	NA
1989	113	52	41	9	19	NA	64.1	39.4	18.1	14.3	3.1	6.6	NA
1991	126	37	38	7	17	NA	58.2	42.1	12.4	12.7	2.3	5.7	NA
1993	129	44	50	16	21	NA	65.8	44.2	15.1	17.1	5.5	7.2	NA
1995	158	41	48	21	12	NA	70.0	52.7	13.7	16.0	7.0	4.0	NA
Engineering and technology													
Academia													
1981	NA	746	260	259	67	69	20.1	NA	11.5	4.0	4.0	1.0	1.1
1983	NA	811	311	275	59	62	20.3	NA	11.6	4.5	3.9	0.8	0.9
1985	NA	645	273	256	51	36	18.4	NA	10.2	4.3	4.0	0.8	0.6
1987	NA	617	283	241	59	48	18.5	NA	10.0	4.6	3.9	1.0	0.8
1989	NA	644	277	278	61	30	18.1	NA	9.7	4.2	4.2	0.9	0.5
1991	NA	810	333	282	65	46	20.1	NA	11.4	4.7	4.0	0.9	0.6
1993	NA	818	382	297	68	80	20.4	NA	11.0	5.2	4.0	0.9	1.1
1995	NA	968	443	321	66	46	21.3	NA	12.4	5.7	4.1	0.8	0.6
Industry													
1981	746	NA	159	89	41	53	20.7	15.6	NA	3.3	1.9	0.9	1.1
1983	811	NA	188	118	39	50	21.8	16.0	NA	3.7	2.3	0.8	1.0
1985	645	NA	123	112	59	32	24.3	17.9	NA	3.4	3.1	1.6	0.9
1987	617	NA	121	64	31	16	29.0	23.4	NA	4.6	2.4	1.2	0.6
1989	644	NA	122	73	35	18	29.7	23.3	NA	4.4	2.6	1.3	0.7
1991	810	NA	137	80	36	26	32.3	26.3	NA	4.4	2.6	1.2	0.8
1993	818	NA	179	89	37	48	36.7	28.2	NA	6.2	3.1	1.3	1.7
1995	968	NA	231	123	41	35	40.7	32.2	NA	7.7	4.1	1.4	1.2

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Federal Government													
1981	260	159	NA	33	14	21	34.1	20.7	12.7	NA	2.6	1.1	1.7
1983	311	188	NA	42	14	12	36.6	22.9	13.8	NA	3.1	1.0	0.9
1985	273	123	NA	39	24	10	37.9	25.1	11.3	NA	3.6	2.2	0.9
1987	283	121	NA	27	10	7	45.2	32.6	14.0	NA	3.1	1.2	0.8
1989	277	122	NA	35	10	5	43.9	30.3	13.4	NA	3.8	1.1	0.5
1991	333	137	NA	14	12	6	44.4	33.4	13.8	NA	1.4	1.2	0.6
1993	382	179	NA	32	29	17	52.0	35.6	16.7	NA	3.0	2.7	1.6
1995	443	231	NA	44	19	9	53.8	38.5	20.1	NA	3.8	1.6	0.8
FFRDCs													
1981	259	89	33	NA	6	3	24.6	18.0	6.2	2.3	NA	0.4	0.2
1983	275	118	42	NA	6	5	29.2	18.1	7.8	2.8	NA	0.4	0.3
1985	256	112	39	NA	8	4	29.4	18.2	8.0	2.8	NA	0.6	0.3
1987	241	64	27	NA	7	6	28.8	21.1	5.6	2.4	NA	0.6	0.5
1989	278	73	35	NA	10	3	39.8	28.7	7.5	3.6	NA	1.0	0.3
1991	282	80	14	NA	11	2	44.1	31.9	9.0	1.6	NA	1.2	0.2
1993	297	89	32	NA	13	5	46.1	33.4	10.0	3.6	NA	1.5	0.6
1995	321	123	44	NA	22	7	47.5	33.0	12.6	4.5	NA	2.3	0.7
Nonprofits													
1981	67	41	14	6	NA	6	32.2	19.3	11.8	4.0	1.7	NA	1.7
1983	59	39	14	6	NA	5	32.2	17.8	11.7	4.2	1.8	NA	1.5
1985	51	59	24	8	NA	3	42.0	19.0	21.9	8.9	3.0	NA	1.1
1987	59	31	10	7	NA	0	40.9	28.4	14.9	4.8	3.4	NA	0.0
1989	61	35	10	10	NA	1	42.5	26.2	15.0	4.3	4.3	NA	0.4
1991	65	36	12	11	NA	2	46.8	29.5	16.4	5.5	5.0	NA	0.9
1993	68	37	29	13	NA	6	53.8	28.6	15.5	12.2	5.5	NA	2.5
1995	66	41	19	22	NA	4	53.3	30.8	19.2	8.9	10.3	NA	1.9
Other													
1981	69	53	21	3	6	NA	41.2	22.9	17.6	7.0	1.0	2.0	NA
1983	62	50	12	5	5	NA	52.0	27.6	22.2	5.3	2.2	2.2	NA
1985	36	32	10	4	3	NA	51.4	25.0	22.2	6.9	2.8	2.1	NA
1987	48	16	7	6	0	NA	60.2	46.6	15.5	6.8	5.8	0.0	NA
1989	30	18	5	3	1	NA	50.5	31.6	18.9	5.3	3.2	1.1	NA
1991	46	26	6	2	2	NA	46.6	31.1	17.6	4.1	1.4	1.4	NA
1993	80	48	17	5	6	NA	62.0	37.6	22.5	8.0	2.3	2.8	NA
1995	46	35	9	7	4	NA	61.9	33.1	25.2	6.5	5.0	2.9	NA

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Mathematics													
Academia													
1981	NA	89	36	36	45	9	5.4	NA	2.3	0.9	0.9	1.1	0.2
1983	NA	100	42	25	55	6	6.0	NA	2.7	1.1	0.7	1.5	0.2
1985	NA	105	57	35	38	5	6.4	NA	2.8	1.5	0.9	1.0	0.1
1987	NA	80	35	38	42	1	6.3	NA	2.7	1.2	1.3	1.4	0.0
1989	NA	97	36	30	36	7	5.1	NA	2.5	0.9	0.8	0.9	0.2
1991	NA	76	43	33	38	12	6.0	NA	2.3	1.3	1.0	1.2	0.4
1993	NA	114	53	34	44	9	7.2	NA	3.4	1.6	1.0	1.3	0.3
1995	NA	79	37	26	47	10	6.2	NA	2.6	1.2	0.9	1.5	0.3
Industry													
1981	89	NA	3	0	1	0	44.2	42.8	NA	1.4	0.0	0.5	0.0
1983	100	NA	2	6	2	1	45.1	42.6	NA	0.9	2.6	0.9	0.4
1985	105	NA	5	2	0	0	44.5	42.9	NA	2.0	0.8	0.0	0.0
1987	80	NA	9	3	5	0	47.4	42.1	NA	4.7	1.6	2.6	0.0
1989	97	NA	6	2	3	2	54.2	51.1	NA	3.2	1.1	1.6	1.1
1991	76	NA	6	1	1	1	52.3	49.0	NA	3.9	0.6	0.6	0.6
1993	114	NA	9	2	5	2	61.2	56.7	NA	4.5	1.0	2.5	1.0
1995	79	NA	3	1	4	1	58.3	56.8	NA	2.2	0.7	2.9	0.7
Federal Government													
1981	36	3	NA	1	1	0	35.1	32.4	2.7	NA	0.9	0.9	0.0
1983	42	2	NA	0	1	0	50.0	47.7	2.3	NA	0.0	1.1	0.0
1985	57	5	NA	0	0	1	41.8	39.0	3.4	NA	0.0	0.0	0.7
1987	35	9	NA	0	3	0	42.1	36.8	9.5	NA	0.0	3.2	0.0
1989	36	6	NA	1	3	0	45.7	39.1	6.5	NA	1.1	3.3	0.0
1991	43	6	NA	1	2	1	53.8	46.2	6.5	NA	1.1	2.2	1.1
1993	53	9	NA	0	3	2	54.9	46.9	8.0	NA	0.0	2.7	1.8
1995	37	3	NA	1	2	0	51.4	50.0	4.1	NA	1.4	2.7	0.0
FFRDCs													
1981	36	0	1	NA	0	1	49.4	46.8	0.0	1.3	NA	0.0	1.3
1983	25	6	0	NA	0	0	44.8	37.3	9.0	0.0	NA	0.0	0.0
1985	35	2	0	NA	1	0	56.3	54.7	3.1	0.0	NA	1.6	0.0
1987	38	3	0	NA	1	0	54.4	48.1	3.8	0.0	NA	1.3	0.0
1989	30	2	1	NA	0	0	48.1	39.0	2.6	1.3	NA	0.0	0.0
1991	33	1	1	NA	1	0	52.2	47.8	1.4	1.4	NA	1.4	0.0
1993	34	2	0	NA	0	0	51.5	50.0	2.9	0.0	NA	0.0	0.0
1995	26	1	1	NA	0	0	57.4	55.3	2.1	2.1	NA	0.0	0.0

Appendix table 5-46.
Coauthorship of U.S. scientific and technical articles across sectors, by article field: 1981-95

Sector	Number of multisector articles coauthored by:						Percent of all articles coauthored by:						
	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others	All sectors	Academia	Industry	Federal Govt.	FFRDCs	Nonprofits	All others
Nonprofits													
1981	45	1	1	1	NA	1	50.5	49.5	1.1	1.1	1.1	NA	1.1
1983	55	2	1	0	NA	0	56.1	56.1	2.0	1.0	0.0	NA	0.0
1985	38	0	0	1	NA	0	43.3	42.2	0.0	0.0	1.1	NA	0.0
1987	42	5	3	1	NA	0	47.8	45.7	5.4	3.3	1.1	NA	0.0
1989	36	3	3	0	NA	2	59.1	54.5	4.5	4.5	0.0	NA	3.0
1991	38	1	2	1	NA	0	51.3	47.5	1.3	2.5	1.3	NA	0.0
1993	44	5	3	0	NA	0	58.2	55.7	6.3	3.8	0.0	NA	0.0
1995	47	4	2	0	NA	1	65.3	62.7	5.3	2.7	0.0	NA	1.3
Other													
1981	9	0	0	0	1	NA	58.8	52.9	0.0	0.0	0.0	5.9	NA
1983	6	1	0	0	0	NA	77.8	66.7	11.1	0.0	0.0	0.0	NA
1985	5	0	1	0	0	NA	35.7	35.7	0.0	7.1	0.0	0.0	NA
1987	1	0	0	0	0	NA	16.7	16.7	0.0	0.0	0.0	0.0	NA
1989	7	2	0	0	2	NA	47.4	36.8	10.5	0.0	0.0	10.5	NA
1991	12	1	1	0	0	NA	60.0	60.0	5.0	5.0	0.0	0.0	NA
1993	9	2	2	0	0	NA	73.3	60.0	13.3	13.3	0.0	0.0	NA
1995	10	1	0	0	1	NA	80.0	66.7	6.7	0.0	0.0	6.7	NA

FFRDC = federally funded research and development center; NA = not available

NOTES: Cross-sector percentages add to more than percentage coauthored with all sectors because of papers with authors in more than two sectors. Coauthored articles are counted in each collaborating sector. Details may not add to totals because of rounding.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

Appendix table 5-47.
Distribution of citations in U.S. scientific and technical articles to other U.S. scientific and technical articles, by sector and field: 1990 and 1995

Citing sector	Citing year	Number of citations to: All sectors	Academia	Industry	Federal Govt.	FFRDCs	Non-profits	Others	Percent of citations to: Academia	Industry	Federal Govt.	FFRDCs	Non-profits	Others
All natural science and engineering fields														
Academic	1990	440,334	335,353	25,252	34,940	6,440	33,321	5,028	76	6	8	1	8	1
	1995	443,191	341,017	26,165	30,500	6,126	34,908	4,474	77	6	7	1	8	1
Industry	1990	41,586	19,270	15,353	3,369	750	2,352	491	46	37	8	2	6	1
	1995	39,085	19,628	12,744	2,929	551	2,827	407	50	33	7	1	7	1
Federal Government	1990	54,570	28,157	3,439	17,462	683	4,030	800	52	6	32	1	7	1
	1995	49,271	26,717	3,139	14,409	673	3,638	693	54	6	29	1	7	1
FFRDCs	1990	10,114	4,955	1,116	547	3,203	269	24	49	11	5	32	3	0
	1995	10,658	5,766	822	771	2,947	313	38	54	8	7	28	3	0
Nonprofits	1990	50,298	29,677	2,523	4,533	338	12,285	941	59	5	9	1	24	2
	1995	52,378	31,645	2,738	3,792	280	13,110	813	60	5	7	1	25	2
All other	1990	7,800	4,605	406	934	65	825	965	59	5	12	1	11	12
	1995	6,814	4,111	410	757	35	787	714	60	6	11	1	12	10
Clinical medicine														
Academic	1990	159,444	116,645	5,212	15,584	234	18,350	3,419	73	3	10	0	12	2
	1995	151,621	110,581	7,347	12,834	202	17,720	2,937	73	5	8	0	12	2
Industry	1990	11,098	5,588	2,866	1,223	15	1,107	297	50	26	11	0	10	3
	1995	12,630	6,285	3,729	1,051	15	1,339	211	50	30	8	0	11	2
Federal Government	1990	22,246	11,749	917	6,767	34	2,243	537	53	4	30	0	10	2
	1995	18,819	10,241	977	5,195	33	1,938	437	54	5	28	0	10	2
FFRDCs	1990	495	288	22	52	73	52	7	58	4	11	15	11	1
	1995	457	281	22	40	75	36	4	61	5	9	16	8	1
Nonprofits	1990	28,340	16,566	927	2,667	36	7,411	733	58	3	9	0	26	3
	1995	28,254	16,465	1,274	2,233	28	7,609	645	58	5	8	0	27	2
All other	1990	4,945	2,956	179	597	5	636	574	60	4	12	0	13	12
	1995	4,222	2,549	182	457	2	591	442	60	4	11	0	14	10
Biomedical research														
Academic	1990	155,167	119,366	8,665	12,384	993	12,661	1,097	77	6	8	1	8	1
	1995	164,284	129,210	8,782	10,201	968	14,225	898	79	5	6	1	9	1
Industry	1990	11,400	5,970	3,066	1,151	94	1,002	118	52	27	10	1	9	1
	1995	13,357	7,435	3,504	957	85	1,264	112	56	26	7	1	9	1
Federal Government	1990	18,755	10,049	1,328	5,581	136	1,525	136	54	7	30	1	8	1
	1995	16,847	9,863	1,052	4,333	111	1,372	116	59	6	26	1	8	1
FFRDCs	1990	1,336	784	105	87	284	73	2	59	8	7	21	5	0
	1995	1,552	997	106	109	248	87	6	64	7	7	16	6	0
Nonprofits	1990	17,787	10,619	1,295	1,566	106	4,026	175	60	7	9	1	23	1
	1995	19,663	12,448	1,244	1,234	95	4,513	129	63	6	6	0	23	1
All other	1990	1,800	1,055	126	202	20	149	249	59	7	11	1	8	14
	1995	1,743	1,086	132	188	11	159	166	62	8	11	1	9	10

Appendix table 5-47.
Distribution of citations in U.S. scientific and technical articles to other U.S. scientific and technical articles, by sector and field: 1990 and 1995

Citing sector	Citing year	Number of citations to: All sectors	Academia	Industry	Federal Govt.	FFRDCs	Non-profits	Others	Percent of citations to: Academia	Industry	Federal Govt.	FFRDCs	Non-profits	Others
Biology														
Academic	1990	24,010	20,558	526	2,046	44	593	244	86	2	9	0	2	1
	1995	19,740	16,481	532	1,849	47	578	253	83	3	9	0	3	1
Industry	1990	856	543	178	99	1	27	8	63	21	12	0	3	1
	1995	866	519	192	115	3	27	10	60	22	13	0	3	1
Federal Government	1990	4,034	2,014	95	1,789	5	73	59	50	2	44	0	2	1
	1995	3,620	1,843	90	1,526	9	92	61	51	2	42	0	3	2
FFRDCs	1990	65	47	2	5	9	2	0	72	3	8	14	3	0
	1995	120	79	3	18	14	5	2	66	3	15	12	4	2
Nonprofits	1990	926	605	19	63	2	223	15	65	2	7	0	24	2
	1995	847	542	21	85	3	180	17	64	2	10	0	21	2
All other	1990	406	252	11	65	1	14	63	62	3	16	0	3	16
	1995	334	209	10	50	0	15	50	63	3	15	0	4	15
Chemistry														
Academic	1990	32,470	27,910	2,597	896	745	262	59	86	8	3	2	1	0
	1995	33,822	28,892	2,907	856	632	459	75	85	9	3	2	1	0
Industry	1990	4,845	2,350	2,127	205	77	77	9	49	44	4	2	2	0
	1995	3,986	1,891	1,766	179	56	76	18	47	44	4	1	2	0
Federal Government	1990	1,553	679	200	609	35	24	7	44	13	39	2	2	0
	1995	1,516	688	180	580	24	31	13	45	12	38	2	2	1
FFRDCs	1990	923	486	81	27	323	5	0	53	9	3	35	1	0
	1995	953	571	74	32	269	7	1	60	8	3	28	1	0
Nonprofits	1990	439	233	71	28	8	96	2	53	16	6	2	22	0
	1995	851	467	89	29	10	252	4	55	10	3	1	30	0
All other	1990	132	80	17	13	3	4	17	61	13	10	2	3	13
	1995	116	50	28	21	3	5	9	43	24	18	3	4	8
Physics														
Academic	1990	38,039	27,217	6,001	1,368	2,912	489	53	72	16	4	8	1	0
	1995	38,027	28,951	4,444	1,511	2,616	446	58	76	12	4	7	1	0
Industry	1990	9,524	3,209	5,473	329	429	60	24	34	57	3	5	1	0
	1995	4,941	2,012	2,377	242	241	51	18	41	48	5	5	1	0
Federal Government	1990	3,066	1,261	578	976	198	34	17	41	19	32	6	1	1
	1995	2,801	1,328	405	887	134	38	9	47	14	32	5	1	0
FFRDCs	1990	4,959	2,206	761	152	1,773	60	7	44	15	3	36	1	0
	1995	4,339	2,159	444	160	1,527	42	7	50	10	4	35	1	0
Nonprofits	1990	764	383	125	46	53	150	7	50	16	6	7	20	1
	1995	551	333	40	29	46	103	1	60	7	5	8	19	0
All other	1990	110	46	25	9	22	4	3	42	23	8	20	4	3
	1995	81	42	20	7	5	2	5	52	25	9	6	2	6

Appendix table 5-47.
Distribution of citations in U.S. scientific and technical articles to other U.S. scientific and technical articles, by sector and field: 1990 and 1995

Citing sector	Citing year	Number of citations to: All sectors	Academia	Industry	Federal Govt.	FFRDCs	Non-profits	Others	Percent of citations to: Academia	Industry	Federal Govt.	FFRDCs	Non-profits	Others
Earth and space sciences														
Academic	1990	18,852	13,756	784	2,179	1,178	821	134	73	4	12	6	4	1
	1995	23,977	17,420	885	2,703	1,421	1,332	216	73	4	11	6	6	1
Industry	1990	1,247	610	286	214	70	43	25	49	23	17	6	3	2
	1995	1,367	638	278	279	103	44	26	47	20	20	8	3	2
Federal Government	1990	3,918	1,972	186	1,348	249	120	43	50	5	34	6	3	1
	1995	4,595	2,301	274	1,484	333	150	53	50	6	32	7	3	1
FFRDCs	1990	1,795	934	74	200	508	72	6	52	4	11	28	4	0
	1995	2,765	1,481	105	379	654	127	18	54	4	14	24	5	1
Nonprofits	1990	1,795	1,133	55	150	122	327	8	63	3	8	7	18	0
	1995	2,014	1,283	45	169	94	408	14	64	2	8	5	20	1
All other	1990	300	157	23	44	11	14	52	52	8	15	4	5	17
	1995	262	146	24	31	12	12	36	56	9	12	5	5	14
Engineering & technology														
Academic	1990	9,295	7,104	1,348	433	291	98	22	76	15	5	3	1	0
	1995	9,115	7,071	1,194	506	214	102	28	78	13	6	2	1	0
Industry	1990	2,490	925	1,319	143	59	35	10	37	53	6	2	1	0
	1995	1,831	774	871	103	46	23	12	42	48	6	3	1	1
Federal Government	1990	869	343	127	366	24	7	1	39	15	42	3	1	0
	1995	997	407	159	384	28	16	4	41	16	39	3	2	0
FFRDCs	1990	486	169	67	25	219	5	1	35	14	5	45	1	0
	1995	433	175	67	31	151	9	1	40	15	7	35	2	0
Nonprofits	1990	184	87	30	11	11	44	2	47	16	6	6	24	1
	1995	131	57	24	11	4	33	2	44	18	8	3	25	2
All other	1990	80	42	24	6	1	3	5	53	30	8	1	4	6
	1995	43	22	13	4	1	0	3	51	30	9	2	0	7

Appendix table 5-47.
Distribution of citations in U.S. scientific and technical articles to other U.S. scientific and technical articles, by sector and field: 1990 and 1995

Citing sector	Citing year	Number of citations to: All sectors	Academia	Industry	Federal Govt.	FFRDCs	Non-profits	Others	Percent of citations to: Academia	Industry	Federal Govt.	FFRDCs	Non-profits	Others
Mathematics														
Academic	1990	3,056	2,797	119	49	43	47	1	92	4	2	1	2	0
	1995	2,606	2,411	76	41	25	46	7	93	3	2	1	2	0
Industry	1990	126	76	37	6	5	1	1	60	29	5	4	1	1
	1995	107	74	27	2	1	3	0	69	25	2	1	3	0
Federal Government	1990	130	89	8	26	2	4	0	68	6	20	2	3	0
	1995	75	46	4	22	1	1	1	61	5	29	1	1	1
FFRDCs	1990	56	40	3	0	12	1	0	71	5	0	21	2	0
	1995	39	24	2	3	9	1	0	62	5	8	23	3	0
Nonprofits	1990	62	50	2	2	0	8	0	81	3	3	0	13	0
	1995	68	50	3	3	0	11	1	74	4	4	0	16	1
All other	1990	27	20	1	1	0	1	3	74	4	4	0	4	11
	1995	12	9	1	0	0	1	1	75	8	0	0	8	8

FFRDC = federally funded research and development center

NOTE: Details may not add to totals because of rounding.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

Appendix table 5-48.
Distribution of citations in U.S. scientific and technical articles across broad and fine fields: 1994-95

Broad/fine field of citing article	Number of cited articles	Percentage of cited articles in: Same fine field	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth & space sciences	Engineering & technology	Mathe-matics
Broad field										
Clinical medicine	920,375	NA	73	26	1	0	0	0	0	0
Biomedical research	651,297	NA	17	77	2	2	1	1	0	0
Biology	106,508	NA	6	27	62	1	0	4	0	0
Chemistry	196,606	NA	3	11	1	69	12	2	2	0
Physics	246,357	NA	1	4	0	7	83	2	4	0
Earth & space science	114,848	NA	1	8	3	1	3	83	1	0
Engineering & technology	53,137	NA	1	2	1	8	20	3	64	2
Mathematics	9,960	NA	2	2	0	0	8	1	9	79
Clinical medicine										
Addictive diseases	4,750	30	85	14	1	0	0	0	0	0
Allergy	4,251	21	80	19	1	0	0	0	0	0
Anesthesiology	8,799	47	90	9	1	0	0	0	0	0
Arthritis & rheumatism	9,337	33	84	16	1	0	0	0	0	0
Cancer	72,060	39	69	30	1	0	0	0	0	0
Cardiovascular system	57,970	50	78	21	1	0	0	0	0	0
Dentistry	7,461	60	86	13	1	0	0	0	0	0
Dermatology & venereal disease	13,238	34	74	25	1	0	0	0	0	0
Endocrinology	44,651	33	61	38	1	0	0	0	0	0
Fertility	8,012	30	69	26	5	0	0	0	0	0
Gastroenterology	21,768	32	75	24	1	0	0	0	0	0
General & internal medicine	75,753	25	77	22	1	0	0	0	0	0
Geriatrics	5,381	24	79	21	1	0	0	0	0	0
Hematology	30,550	30	64	35	0	0	0	0	0	0
Hygiene & public health	11,701	30	78	13	3	1	0	4	0	1
Immunology	121,214	44	63	36	1	0	0	0	0	0
Miscellaneous clinical medicine	2,940	27	73	26	0	0	0	0	0	0
Nephrology	11,308	24	64	35	1	0	0	0	0	0
Neurology, neurosurgery	125,305	51	69	30	1	0	0	0	0	0
Obstetrics, gynecology	12,713	44	88	11	0	0	0	0	0	0
Ophthalmology	13,023	59	79	20	0	0	0	0	0	0
Orthopedics	4,361	63	87	13	0	0	0	0	0	0
Otorhinolaryngology	7,687	51	87	9	0	0	4	0	0	0
Pathology	20,835	21	70	30	1	0	0	0	0	0
Pediatrics	15,042	28	82	17	0	0	0	0	0	0
Pharmacology	92,961	31	67	30	1	2	0	0	0	0
Pharmacy	4,346	14	71	15	1	12	0	0	0	0
Psychiatry	13,391	67	95	5	0	0	0	0	0	0
Radiology & nuclear medicine	29,328	57	90	7	0	1	1	0	1	0

Appendix table 5-48.
Distribution of citations in U.S. scientific and technical articles across broad and fine fields: 1994-95

Broad/fine field of citing article	Number of cited articles	Percentage of cited articles in: Same fine field	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth & space sciences	Engineering & technology	Mathe-matics
Respiratory system	14,250	28	82	18	0	0	0	0	0	0
Surgery	30,428	49	90	9	0	0	0	0	0	0
Tropical medicine	1,747	17	60	32	6	0	0	0	0	0
Urology	12,299	49	91	9	0	0	0	0	0	0
Veterinary medicine	11,581	42	71	22	7	0	0	0	0	0
Biomedical research										
Anatomy & morphology	3,833	9	30	65	5	0	0	0	0	0
Biochemistry & molecular biology	300,619	50	13	83	2	2	0	0	0	0
Biomedical engineering	8,153	23	24	60	3	7	1	2	3	0
Biophysics	8,934	14	10	78	1	6	4	0	0	0
Cell biology, cytology & histology	54,087	21	21	77	2	0	0	0	0	0
Embryology	8,718	19	15	84	1	0	0	0	0	0
General biomedical research	73,897	27	22	66	4	2	2	3	0	0
Genetics & heredity	40,393	29	13	81	6	0	0	0	0	0
Microbiology	41,026	43	15	78	4	1	0	1	0	0
Microscopy	2,813	15	26	49	2	3	16	0	3	0
Miscellaneous biomedical research	5,179	17	43	50	2	2	1	1	1	1
Nutrition & dietetics	11,477	30	39	55	6	1	0	0	0	0
Parasitology	5,283	28	23	70	7	0	0	0	0	0
Physiology	48,332	33	35	62	2	0	0	0	0	0
Virology	38,594	47	14	85	1	0	0	0	0	0
Biology										
Agriculture & food science	17,844	51	5	17	68	4	0	5	1	0
Botany	35,776	50	1	35	61	2	0	1	0	0
Dairy & animal science	8,423	61	18	14	67	0	0	0	0	0
Ecology	9,726	48	1	17	77	0	0	4	0	0
Entomology	8,719	57	4	23	71	1	0	0	0	0
General biology	5,606	7	21	62	16	1	0	1	0	0
General zoology	4,665	14	14	38	46	0	0	2	0	0
Marine biology & hydro-biology	10,885	47	3	14	65	0	0	18	0	0
Miscellaneous biology	2,140	32	12	31	47	0	0	7	0	1
Miscellaneous zoology	2,730	37	5	20	73	0	0	1	0	0
Chemistry										
Analytical chemistry	26,073	55	8	12	3	67	5	4	1	0
Applied chemistry	1,656	21	5	19	9	52	3	4	7	0
General chemistry	56,053	36	3	17	2	65	10	2	1	0
Inorganic & nuclear chemistry	15,935	35	1	7	0	88	3	0	1	0
Organic chemistry	34,697	41	5	8	2	84	1	0	0	0
Physical chemistry	45,934	36	1	9	0	55	30	2	4	0
Polymers	16,263	64	0	4	0	79	13	0	4	0

Appendix table 5-48.
Distribution of citations in U.S. scientific and technical articles across broad and fine fields: 1994-95

Broad/fine field of citing article	Number of cited articles	Percentage of cited articles in: Same fine field	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth & space sciences	Engineering & technology	Mathe-matics
Physics										
Acoustics	3,562	62	9	2	0	0	68	2	16	2
Applied physics	51,328	53	0	3	0	6	82	1	8	0
Chemical physics	41,267	46	1	7	0	22	68	1	1	0
Fluids & plasmas	7,309	55	0	1	0	3	81	6	8	1
General physics	58,507	48	0	4	0	3	86	3	2	1
Miscellaneous physics	721	28	0	0	0	1	70	4	6	18
Nuclear & particle physics	32,739	68	0	1	0	1	94	3	0	0
Optics	15,811	50	2	3	1	2	80	3	9	0
Solid state physics	35,151	40	0	5	0	4	88	0	2	0
Earth and space sciences										
Astronomy & astrophysics	37,421	89	0	4	0	0	4	92	0	0
Earth & planetary science	34,862	64	0	10	1	1	3	84	1	0
Environmental science	14,975	51	8	12	12	6	1	60	2	0
Geology	10,617	53	0	8	2	2	2	85	1	0
Meteorology & atmospheric science	10,049	61	0	8	2	2	4	83	2	0
Oceanography & limnology	6,923	59	0	9	13	1	3	73	1	0
Engineering and technology										
Aerospace technology	1,951	60	0	0	0	1	17	2	77	3
Chemical engineering	5,233	42	1	6	1	29	11	3	49	0
Civil engineering	1,238	48	0	2	5	2	3	25	61	2
Computers	4,350	66	3	4	0	2	8	0	77	6
Electrical engineering & electronics	12,153	56	1	2	0	3	27	2	63	3
General engineering	360	13	0	0	0	2	38	4	48	7
Industrial engineering	65	29	0	2	0	0	0	0	92	6
Library & information science	11	27	55	9	0	9	0	0	27	0
Materials science	11,617	40	0	3	1	10	28	1	58	0
Mechanical engineering	5,607	54	0	1	0	4	16	2	73	3
Metals & metallurgy	6,215	52	0	1	0	8	18	0	73	0
Misc. engineering & technology	1,273	29	1	4	7	4	12	21	49	2
Nuclear technology	2,656	56	7	2	0	2	23	1	65	0
Operations research & mgmt science	417	59	1	1	0	0	0	2	76	18
Mathematics										
Applied mathematics	3,458	56	1	2	0	1	13	2	18	64
General mathematics	4,143	78	0	1	0	0	6	0	3	90
Miscellaneous mathematics	260	37	0	0	0	0	5	0	7	87
Probability & statistics	2,098	77	7	4	1	0	2	1	5	80

NA = not available

NOTE: Citation counts are from U.S. articles published in 1994 and 1995 to U.S. output published in 1990 through 1993, based on the 1985 Science Citation Index journals set. Details may not add to totals because of rounding.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
All natural science and engineering fields										
World	368,934	389,846	403,845	425,346	438,767	100.0	100.0	100.0	100.0	100.0
United States	132,278	137,771	140,833	143,174	142,792	35.9	35.3	34.9	33.7	32.5
Canada	14,440	16,656	17,232	17,958	17,359	3.9	4.3	4.3	4.2	4.0
United Kingdom	30,794	32,256	30,571	31,806	32,980	8.3	8.3	7.6	7.5	7.5
France	18,567	18,422	19,754	21,548	23,811	5.0	4.7	4.9	5.1	5.4
Germany	26,837	27,310	27,353	29,169	30,654	7.3	7.0	6.8	6.9	7.0
Austria	2,160	2,179	2,315	2,522	2,807	0.6	0.6	0.6	0.6	0.6
Belgium	3,309	3,424	3,233	3,488	3,996	0.9	0.9	0.8	0.8	0.9
Ireland	700	653	665	708	900	0.2	0.2	0.2	0.2	0.2
Luxembourg	13	12	6	15	20	0.0	0.0	0.0	0.0	0.0
Netherlands	5,993	7,079	8,017	8,492	9,239	1.6	1.8	2.0	2.0	2.1
Switzerland	4,801	4,895	4,783	5,423	5,896	1.3	1.3	1.2	1.3	1.3
Other W. Europe	10	5	5	5	9	0.0	0.0	0.0	0.0	0.0
Italy	7,803	9,377	10,720	12,351	14,117	2.1	2.4	2.7	2.9	3.2
Spain	2,362	4,016	5,402	7,578	8,811	0.6	1.0	1.3	1.8	2.0
Portugal	184	232	446	607	764	0.0	0.1	0.1	0.1	0.2
Greece	793	935	1,262	1,431	1,639	0.2	0.2	0.3	0.3	0.4
Turkey	251	326	563	880	1,359	0.1	0.1	0.1	0.2	0.3
Yugoslavia (former)	861	885	1,055	1,399	1,220	0.2	0.2	0.3	0.3	0.3
Slovenia	0	0	0	0	339	0.0	0.0	0.0	0.0	0.1
Croatia	0	0	0	0	434	0.0	0.0	0.0	0.0	0.1
Bosnia	0	0	0	0	5	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	442	0.0	0.0	0.0	0.0	0.1
Other S. Europe	29	30	38	50	73	0.0	0.0	0.0	0.0	0.0
Denmark	3,198	3,194	3,252	3,408	3,513	0.9	0.8	0.8	0.8	0.8
Sweden	5,846	6,698	6,935	6,700	7,190	1.6	1.7	1.7	1.6	1.6
Norway	1,920	2,072	1,851	2,128	2,180	0.5	0.5	0.5	0.5	0.5
Finland	2,173	2,485	2,499	2,785	3,246	0.6	0.6	0.6	0.7	0.7
Iceland	34	57	62	85	117	0.0	0.0	0.0	0.0	0.0
Bulgaria	983	1,079	1,114	1,029	779	0.3	0.3	0.3	0.2	0.2
Hungary	2,107	1,907	1,617	1,472	1,469	0.6	0.5	0.4	0.3	0.3
Poland	4,130	3,964	3,759	3,507	3,895	1.1	1.0	0.9	0.8	0.9
Czechoslovakia (former)	3,152	2,886	2,593	2,612	2,431	0.9	0.7	0.6	0.6	0.6
Czech Republic	0	0	0	0	1,577	0.0	0.0	0.0	0.0	0.4
Slovakia	0	0	0	0	854	0.0	0.0	0.0	0.0	0.2
Other E. Europe	649	583	480	504	554	0.2	0.1	0.1	0.1	0.1
USSR (former)	29,610	30,293	29,992	28,282	21,749	8.0	7.8	7.4	6.6	5.0
Russia	0	0	0	0	17,180	0.0	0.0	0.0	0.0	3.9
Ukraine	0	0	0	0	2,489	0.0	0.0	0.0	0.0	0.6
Baltic states	0	0	0	0	457	0.0	0.0	0.0	0.0	0.1

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Other former USSR	0	0	0	0	1,623	0.0	0.0	0.0	0.0	0.4
Japan	25,088	29,618	32,832	37,402	39,498	6.8	7.6	8.1	8.8	9.0
China	1,100	1,943	3,761	4,914	6,200	0.3	0.5	0.9	1.2	1.4
Taiwan	366	687	1,470	2,738	3,884	0.1	0.2	0.4	0.6	0.9
South Korea	168	424	911	1,441	2,964	0.0	0.1	0.2	0.3	0.7
Singapore	124	289	409	577	891	0.0	0.1	0.1	0.1	0.2
Hong Kong	0	0	628	696	1,091	0.0	0.0	0.2	0.2	0.2
India	11,725	9,586	8,440	8,448	7,851	3.2	2.5	2.1	2.0	1.8
Other Asia	929	957	1,089	1,169	1,397	0.3	0.2	0.3	0.3	0.3
Australia	8,138	8,247	8,487	8,712	9,747	2.2	2.1	2.1	2.0	2.2
New Zealand	1,722	1,703	1,611	1,766	1,830	0.5	0.4	0.4	0.4	0.4
Argentina	892	1,190	1,327	1,261	1,581	0.2	0.3	0.3	0.3	0.4
Brazil	1,438	1,465	1,761	2,540	2,760	0.4	0.4	0.4	0.6	0.6
Chile	561	569	631	694	700	0.2	0.1	0.2	0.2	0.2
Other S. America	517	424	489	585	652	0.1	0.1	0.1	0.1	0.1
Mexico	648	740	878	979	1,408	0.2	0.2	0.2	0.2	0.3
Other C. America	310	259	271	319	343	0.1	0.1	0.1	0.1	0.1
Israel	3,698	4,233	3,982	3,975	4,322	1.0	1.1	1.0	0.9	1.0
Other Near East	773	1,060	1,388	1,153	1,409	0.2	0.3	0.3	0.3	0.3
Egypt	1,060	926	1,118	1,102	1,136	0.3	0.2	0.3	0.3	0.3
Other N. Africa	237	234	298	387	497	0.1	0.1	0.1	0.1	0.1
South Africa	1,782	2,025	2,130	1,936	1,744	0.5	0.5	0.5	0.5	0.4
Nigeria	780	757	651	479	342	0.2	0.2	0.2	0.1	0.1
Kenya	267	251	262	256	253	0.1	0.1	0.1	0.1	0.1
Other S. & C. Africa	685	635	680	777	772	0.2	0.2	0.2	0.2	0.2
Clinical medicine										
World	116,371	125,532	130,106	133,913	134,576	100.0	100.0	100.0	100.0	100.0
United States	48,072	50,595	50,510	50,326	50,343	41.3	40.3	38.8	37.6	37.4
Canada	4,006	4,817	5,195	5,440	5,065	3.4	3.8	4.0	4.1	3.8
United Kingdom	11,378	13,228	12,956	13,036	12,624	9.8	10.5	10.0	9.7	9.4
France	6,070	5,356	5,865	6,302	6,761	5.2	4.3	4.5	4.7	5.0
Germany	8,180	8,169	8,239	8,873	8,706	7.0	6.5	6.3	6.6	6.5
Austria	1,054	1,027	1,160	1,216	1,260	0.9	0.8	0.9	0.9	0.9
Belgium	1,275	1,274	1,304	1,373	1,444	1.1	1.0	1.0	1.0	1.1
Ireland	327	299	266	282	344	0.3	0.2	0.2	0.2	0.3
Luxembourg	12	5	3	8	7	0.0	0.0	0.0	0.0	0.0
Netherlands	1,910	2,719	3,255	3,241	3,691	1.6	2.2	2.5	2.4	2.7
Switzerland	1,926	1,835	1,880	2,031	2,067	1.7	1.5	1.4	1.5	1.5
Other W. Europe	0	0	0	1	2	0.0	0.0	0.0	0.0	0.0

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Italy	2,715	3,608	4,045	4,616	4,957	2.3	2.9	3.1	3.4	3.7
Spain	512	723	1,222	1,911	2,240	0.4	0.6	0.9	1.4	1.7
Portugal	57	56	77	107	129	0.0	0.0	0.1	0.1	0.1
Greece	214	177	286	354	488	0.2	0.1	0.2	0.3	0.4
Turkey	73	84	197	372	542	0.1	0.1	0.2	0.3	0.4
Yugoslavia (former)	202	194	225	325	259	0.2	0.2	0.2	0.2	0.2
Slovenia	0	0	0	0	49	0.0	0.0	0.0	0.0	0.0
Croatia	0	0	0	0	108	0.0	0.0	0.0	0.0	0.1
Bosnia	0	0	0	0	3	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	99	0.0	0.0	0.0	0.0	0.1
Other S. Europe	6	1	11	13	15	0.0	0.0	0.0	0.0	0.0
Denmark	1,692	1,862	1,815	1,590	1,495	1.5	1.5	1.4	1.2	1.1
Sweden	3,078	3,616	3,461	3,213	3,167	2.6	2.9	2.7	2.4	2.4
Norway	911	963	857	907	932	0.8	0.8	0.7	0.7	0.7
Finland	1,155	1,325	1,328	1,456	1,555	1.0	1.1	1.0	1.1	1.2
Iceland	13	21	27	32	48	0.0	0.0	0.0	0.0	0.0
Bulgaria	84	63	83	89	84	0.1	0.1	0.1	0.1	0.1
Hungary	574	492	302	358	274	0.5	0.4	0.2	0.3	0.2
Poland	781	579	434	376	405	0.7	0.5	0.3	0.3	0.3
Czechoslovakia (former)	608	514	541	445	359	0.5	0.4	0.4	0.3	0.3
Czech Republic	0	0	0	0	201	0.0	0.0	0.0	0.0	0.1
Slovakia	0	0	0	0	157	0.0	0.0	0.0	0.0	0.1
Other E. Europe	64	39	31	24	20	0.1	0.0	0.0	0.0	0.0
USSR (former)	3,797	3,646	3,675	2,201	1,057	3.3	2.9	2.8	1.6	0.8
Russia	0	0	0	0	914	0.0	0.0	0.0	0.0	0.7
Ukraine	0	0	0	0	59	0.0	0.0	0.0	0.0	0.0
Baltic states	0	0	0	0	46	0.0	0.0	0.0	0.0	0.0
Other former USSR	0	0	0	0	38	0.0	0.0	0.0	0.0	0.0
Japan	5,908	7,861	9,559	11,229	11,446	5.1	6.3	7.3	8.4	8.5
China	158	288	443	506	495	0.1	0.2	0.3	0.4	0.4
Taiwan	57	150	299	586	871	0.0	0.1	0.2	0.4	0.6
South Korea	19	24	89	167	337	0.0	0.0	0.1	0.1	0.3
Singapore	49	106	123	166	204	0.0	0.1	0.1	0.1	0.2
Hong Kong	0	0	347	341	394	0.0	0.0	0.3	0.3	0.3
India	1,510	1,184	1,059	1,180	955	1.3	0.9	0.8	0.9	0.7
Other Asia	255	267	317	340	393	0.2	0.2	0.2	0.3	0.3
Australia	2,563	2,728	2,954	2,992	3,294	2.2	2.2	2.3	2.2	2.4
New Zealand	508	611	591	629	630	0.4	0.5	0.5	0.5	0.5
Argentina	270	308	332	317	381	0.2	0.2	0.3	0.2	0.3
Brazil	305	297	326	640	632	0.3	0.2	0.3	0.5	0.5
Chile	251	241	276	307	289	0.2	0.2	0.2	0.2	0.2

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Other S. America	144	119	140	171	178	0.1	0.1	0.1	0.1	0.1
Mexico	293	247	281	232	270	0.3	0.2	0.2	0.2	0.2
Other C. America	106	102	85	90	86	0.1	0.1	0.1	0.1	0.1
Israel	1,283	1,641	1,511	1,510	1,474	1.1	1.3	1.2	1.1	1.1
Other Near East	238	328	443	450	507	0.2	0.3	0.3	0.3	0.4
Egypt	189	140	149	167	170	0.2	0.1	0.1	0.1	0.1
Other N. Africa	69	56	67	79	103	0.1	0.0	0.1	0.1	0.1
South Africa	750	810	733	595	487	0.6	0.6	0.6	0.4	0.4
Nigeria	295	287	251	202	131	0.3	0.2	0.2	0.2	0.1
Kenya	153	155	154	141	138	0.1	0.1	0.1	0.1	0.1
Other S. & C. Africa	259	305	337	367	383	0.2	0.2	0.3	0.3	0.3
Biomedical research										
World	55,303	64,717	68,616	71,502	72,002	100.0	100.0	100.0	100.0	100.0
United States	21,847	24,461	26,541	27,782	28,081	39.5	37.8	38.7	38.9	39.0
Canada	2,254	2,647	2,879	3,072	2,977	4.1	4.1	4.2	4.3	4.1
United Kingdom	4,709	5,301	5,043	5,385	5,758	8.5	8.2	7.3	7.5	8.0
France	2,883	3,251	3,423	3,789	4,013	5.2	5.0	5.0	5.3	5.6
Germany	3,915	3,963	4,358	4,346	4,559	7.1	6.1	6.4	6.1	6.3
Austria	179	212	263	328	343	0.3	0.3	0.4	0.5	0.5
Belgium	547	613	621	654	696	1.0	0.9	0.9	0.9	1.0
Ireland	66	85	97	87	170	0.1	0.1	0.1	0.1	0.2
Luxembourg	0	4	0	2	5	0.0	0.0	0.0	0.0	0.0
Netherlands	1,107	1,313	1,390	1,564	1,620	2.0	2.0	2.0	2.2	2.2
Switzerland	677	817	825	975	1,037	1.2	1.3	1.2	1.4	1.4
Other W. Europe	0	0	0	1	0	0.0	0.0	0.0	0.0	0.0
Italy	1,109	1,378	1,535	1,766	2,039	2.0	2.1	2.2	2.5	2.8
Spain	490	745	1,010	1,190	1,356	0.9	1.2	1.5	1.7	1.9
Portugal	33	40	68	97	135	0.1	0.1	0.1	0.1	0.2
Greece	65	107	109	114	132	0.1	0.2	0.2	0.2	0.2
Turkey	23	25	28	62	93	0.0	0.0	0.0	0.1	0.1
Yugoslavia (former)	152	97	136	140	108	0.3	0.1	0.2	0.2	0.1
Slovenia	0	0	0	0	43	0.0	0.0	0.0	0.0	0.1
Croatia	0	0	0	0	26	0.0	0.0	0.0	0.0	0.0
Bosnia	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	39	0.0	0.0	0.0	0.0	0.1
Other S. Europe	2	1	1	7	8	0.0	0.0	0.0	0.0	0.0
Denmark	468	476	533	663	602	0.8	0.7	0.8	0.9	0.8
Other former USSR	0	0	0	0	1,623	0.0	0.0	0.0	0.0	0.4
Sweden	1,030	1,172	1,299	1,204	1,223	1.9	1.8	1.9	1.7	1.7
Norway	297	319	294	317	298	0.5	0.5	0.4	0.4	0.4
Finland	310	383	365	380	450	0.6	0.6	0.5	0.5	0.6

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Iceland	3	9	13	13	16	0.0	0.0	0.0	0.0	0.0
Bulgaria	211	540	502	261	78	0.4	0.8	0.7	0.4	0.1
Hungary	397	335	342	239	215	0.7	0.5	0.5	0.3	0.3
Poland	572	470	367	427	297	1.0	0.7	0.5	0.6	0.4
Czechoslovakia (former)	452	367	371	440	352	0.8	0.6	0.5	0.6	0.5
Czech Republic	0	0	0	0	236	0.0	0.0	0.0	0.0	0.3
Slovakia	0	0	0	0	117	0.0	0.0	0.0	0.0	0.2
Other E. Europe	84	53	26	13	20	0.2	0.1	0.0	0.0	0.0
USSR (former)	3,148	5,618	5,177	4,473	2,716	5.7	8.7	7.5	6.3	3.8
Russia	0	0	0	0	2,401	0.0	0.0	0.0	0.0	3.3
Ukraine	0	0	0	0	131	0.0	0.0	0.0	0.0	0.2
Baltic states	0	0	0	0	48	0.0	0.0	0.0	0.0	0.1
Other former USSR	0	0	0	0	136	0.0	0.0	0.0	0.0	0.2
Japan	3,429	4,339	5,175	5,843	6,125	6.2	6.7	7.5	8.2	8.5
China	49	179	294	381	464	0.1	0.3	0.4	0.5	0.6
Taiwan	27	56	135	255	341	0.0	0.1	0.2	0.4	0.5
South Korea	12	27	65	112	238	0.0	0.0	0.1	0.2	0.3
Singapore	13	25	47	78	93	0.0	0.0	0.1	0.1	0.1
Hong Kong	0	0	68	62	85	0.0	0.0	0.1	0.1	0.1
India	1,605	1,622	1,324	1,022	1,043	2.9	2.5	1.9	1.4	1.4
Other Asia	99	121	131	132	148	0.2	0.2	0.2	0.2	0.2
Australia	1,037	1,221	1,289	1,327	1,405	1.9	1.9	1.9	1.9	2.0
New Zealand	176	208	175	230	203	0.3	0.3	0.3	0.3	0.3
Argentina	182	258	224	190	264	0.3	0.4	0.3	0.3	0.4
Brazil	266	332	436	454	497	0.5	0.5	0.6	0.6	0.7
Chile	112	68	104	92	99	0.2	0.1	0.2	0.1	0.1
Other S. America	106	78	74	86	84	0.2	0.1	0.1	0.1	0.1
Mexico	75	113	130	163	225	0.1	0.2	0.2	0.2	0.3
Other C. America	37	30	36	60	64	0.1	0.0	0.1	0.1	0.1
Israel	554	643	596	639	646	0.0	1.0	0.9	0.9	0.9
Other Near East	68	103	94	73	92	0.1	0.2	0.1	0.1	0.1
Egypt	104	44	67	65	74	0.2	0.1	0.1	0.1	0.1
Other N. Africa	19	20	17	26	37	0.0	0.0	0.0	0.0	0.1
South Africa	154	258	346	278	247	0.3	0.4	0.5	0.4	0.3
Nigeria	78	93	70	37	29	0.1	0.1	0.1	0.1	0.0
Kenya	30	31	48	33	37	0.1	0.0	0.1	0.0	0.1
Other S. & C. Africa	47	54	61	77	74	0.1	0.1	0.1	0.1	0.1
Biology										
World	39,232	34,896	34,199	34,559	34,988	100.0	100.0	100.0	100.0	100.0
United States	14,740	13,083	12,726	12,062	11,167	37.6	37.5	37.2	34.9	31.9
Canada	2,456	2,884	2,813	2,729	2,401	6.3	8.3	8.2	7.9	6.9

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
United Kingdom	3,525	3,087	2,654	2,511	2,672	9.0	8.8	7.8	7.3	7.6
France	1,369	1,151	1,164	1,329	1,380	3.5	3.3	3.4	3.8	3.9
Germany	2,373	1,890	1,817	1,625	1,841	6.0	5.4	5.3	4.7	5.3
Austria	136	133	140	157	146	0.3	0.4	0.4	0.5	0.4
Belgium	293	355	229	184	275	0.7	1.0	0.7	0.5	0.8
Ireland	95	85	85	51	86	0.2	0.2	0.2	0.1	0.2
Luxembourg	1	1	0	1	1	0.0	0.0	0.0	0.0	0.0
Netherlands	612	608	690	730	885	1.6	1.7	2.0	2.1	2.5
Switzerland	236	214	227	252	308	0.6	0.6	0.7	0.7	0.9
Other W. Europe	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Italy	452	345	424	552	666	1.2	1.0	1.2	1.6	1.9
Spain	256	267	501	885	992	0.7	0.8	1.5	2.6	2.8
Portugal	8	11	42	64	92	0.0	0.0	0.1	0.2	0.3
Greece	59	84	107	138	154	0.2	0.2	0.3	0.4	0.4
Turkey	19	28	37	49	65	0.0	0.1	0.1	0.1	0.2
Yugoslavia (former)	26	35	43	55	60	0.1	0.1	0.1	0.2	0.2
Slovenia	0	0	0	0	11	0.0	0.0	0.0	0.0	0.0
Croatia	0	0	0	0	25	0.0	0.0	0.0	0.0	0.1
Bosnia	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	24	0.0	0.0	0.0	0.0	0.1
Other S. Europe	13	15	9	10	8	0.0	0.0	0.0	0.0	0.0
Denmark	258	190	205	280	357	0.7	0.5	0.6	0.8	1.0
Sweden	372	366	496	529	574	0.9	1.0	1.5	1.5	1.6
Norway	250	275	232	276	277	0.6	0.8	0.7	0.8	0.8
Finland	142	151	185	252	288	0.4	0.4	0.5	0.7	0.8
Iceland	3	6	7	19	15	0.0	0.0	0.0	0.1	0.0
Bulgaria	70	28	53	44	42	0.2	0.1	0.2	0.1	0.1
Hungary	192	118	94	62	74	0.5	0.3	0.3	0.2	0.2
Poland	226	195	187	196	170	0.6	0.6	0.5	0.6	0.5
Czechoslovakia (former)	547	421	129	176	164	1.4	1.2	0.4	0.5	0.5
Czech Republic	0	0	0	0	117	0.0	0.0	0.0	0.0	0.3
Slovakia	0	0	0	0	46	0.0	0.0	0.0	0.0	0.1
Other E. Europe	13	6	3	4	4	0.0	0.0	0.0	0.0	0.0
USSR (former)	1,113	936	796	858	927	2.8	2.7	2.3	2.5	2.6
Russia	0	0	0	0	792	0.0	0.0	0.0	0.0	2.3
Ukraine	0	0	0	0	51	0.0	0.0	0.0	0.0	0.1
Baltic states	0	0	0	0	32	0.0	0.0	0.0	0.0	0.1
Other former USSR	0	0	0	0	52	0.0	0.0	0.0	0.0	0.1
Japan	2,404	2,456	2,363	2,537	2,609	6.1	7.0	6.9	7.3	7.5
China	178	156	136	189	223	0.5	0.4	0.4	0.5	0.6
Taiwan	63	71	153	204	253	0.2	0.2	0.4	0.6	0.7

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
South Korea	9	14	25	39	87	0.0	0.0	0.1	0.1	0.2
Singapore	8	17	32	40	39	0.0	0.0	0.1	0.1	0.1
Hong Kong	0	0	23	14	59	0.0	0.0	0.1	0.0	0.2
India	1,927	857	775	730	574	4.9	2.5	2.3	2.1	1.6
Other Asia	266	235	274	306	331	0.7	0.7	0.8	0.9	0.9
Australia	1,803	1,666	1,720	1,726	1,811	4.6	4.8	5.0	5.0	5.2
New Zealand	540	465	432	466	515	1.4	1.3	1.3	1.3	1.5
Argentina	108	123	152	174	226	0.3	0.4	0.4	0.5	0.6
Brazil	205	149	149	226	264	0.5	0.4	0.4	0.7	0.8
Chile	61	70	68	67	82	0.2	0.2	0.2	0.2	0.2
Other S. America	102	84	105	119	126	0.3	0.2	0.3	0.3	0.4
Mexico	49	87	116	165	227	0.1	0.2	0.3	0.5	0.6
Other C. America	106	69	82	84	94	0.3	0.2	0.2	0.2	0.3
Israel	440	407	417	378	390	1.1	1.2	1.2	1.1	1.1
Other Near East	106	100	142	121	122	0.3	0.3	0.4	0.4	0.3
Egypt	146	111	126	113	101	0.4	0.3	0.4	0.3	0.3
Other N. Africa	23	28	34	34	38	0.1	0.1	0.1	0.1	0.1
South Africa	296	329	383	355	360	0.8	0.9	1.1	1.0	1.0
Nigeria	226	217	190	127	110	0.6	0.6	0.6	0.4	0.3
Kenya	62	51	43	67	65	0.2	0.1	0.1	0.2	0.2
Other S. & C. Africa	262	176	173	209	196	0.7	0.5	0.5	0.6	0.6
Chemistry										
World	54,432	55,268	56,126	59,500	61,221	100.0	100.0	100.0	100.0	100.0
United States	10,880	11,585	12,405	12,926	12,900	20.0	21.0	22.1	21.7	21.1
Canada	1,670	1,726	1,653	1,774	1,808	3.1	3.1	2.9	3.0	3.0
United Kingdom	3,610	3,287	3,142	3,356	3,573	6.6	5.9	5.6	5.6	5.8
France	3,199	3,261	3,231	3,462	3,665	5.9	5.9	5.8	5.8	6.0
Germany	4,587	5,139	4,864	5,014	5,499	8.4	9.3	8.7	8.4	9.0
Austria	289	302	271	301	348	0.5	0.5	0.5	0.5	0.6
Belgium	452	442	386	458	528	0.8	0.8	0.7	0.8	0.9
Ireland	84	55	60	96	74	0.2	0.1	0.1	0.2	0.1
Luxembourg	0	1	1	2	1	0.0	0.0	0.0	0.0	0.0
Netherlands	833	755	858	901	876	1.5	1.4	1.5	1.5	1.4
Switzerland	653	672	584	713	756	1.2	1.2	1.0	1.2	1.2
Other W. Europe	0	0	1	0	3	0.0	0.0	0.0	0.0	0.0
Italy	1,462	1,518	1,631	1,815	1,931	2.7	2.7	2.9	3.1	3.2
Spain	678	1,411	1,326	1,756	1,901	1.2	2.6	2.4	3.0	3.1
Portugal	26	22	77	111	140	0.0	0.0	0.1	0.2	0.2
Greece	94	159	232	219	264	0.2	0.3	0.4	0.4	0.4
Turkey	26	57	105	146	265	0.0	0.1	0.2	0.2	0.4

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Yugoslavia (former)	199	246	263	396	332	0.4	0.4	0.5	0.7	0.5
Slovenia	0	0	0	0	95	0.0	0.0	0.0	0.0	0.2
Croatia	0	0	0	0	141	0.0	0.0	0.0	0.0	0.2
Bosnia	0	0	0	0	1	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	95	0.0	0.0	0.0	0.0	0.2
Other S. Europe	0	1	10	4	7	0.0	0.0	0.0	0.0	0.0
Denmark	223	179	184	221	283	0.4	0.3	0.3	0.4	0.5
Sweden	500	511	542	592	642	0.9	0.9	1.0	1.0	1.0
Norway	174	176	156	174	198	0.3	0.3	0.3	0.3	0.3
Finland	167	192	172	175	267	0.3	0.3	0.3	0.3	0.4
Iceland	0	2	3	2	4	0.0	0.0	0.0	0.0	0.0
Bulgaria	309	197	217	298	257	0.6	0.4	0.4	0.5	0.4
Hungary	555	504	482	460	490	1.0	0.9	0.9	0.8	0.8
Poland	1,233	1,318	1,138	1,024	1,263	2.3	2.4	2.0	1.7	2.1
Czechoslovakia (former)	961	978	925	803	782	1.8	1.8	1.6	1.3	1.3
Czech Republic	0	0	0	0	492	0.0	0.0	0.0	0.0	0.8
Slovakia	0	0	0	0	290	0.0	0.0	0.0	0.0	0.5
Other E. Europe	233	212	245	277	223	0.4	0.4	0.4	0.5	0.4
USSR (former)	9,077	8,462	8,164	7,806	6,000	16.7	15.3	14.5	13.1	9.8
Russia	0	0	0	0	4,799	0.0	0.0	0.0	0.0	7.8
Ukraine	0	0	0	0	563	0.0	0.0	0.0	0.0	0.9
Baltic states	0	0	0	0	103	0.0	0.0	0.0	0.0	0.2
Other former USSR	0	0	0	0	535	0.0	0.0	0.0	0.0	0.9
Japan	5,926	5,887	5,907	6,620	6,694	10.9	10.7	10.5	11.1	10.9
China	89	185	568	961	1,463	0.2	0.3	1.0	1.6	2.4
Taiwan	78	123	226	491	694	0.1	0.2	0.4	0.8	1.1
South Korea	49	139	317	465	829	0.1	0.3	0.6	0.8	1.4
Singapore	8	31	66	81	118	0.0	0.1	0.1	0.1	0.2
Hong Kong	0	0	58	96	152	0.0	0.0	0.1	0.2	0.2
India	3,191	2,674	2,535	2,400	2,376	5.9	4.8	4.5	4.0	3.9
Other Asia	91	114	136	163	234	0.2	0.2	0.2	0.3	0.4
Australia	926	774	763	764	890	1.7	1.4	1.4	1.3	1.5
New Zealand	154	113	126	132	152	0.3	0.2	0.2	0.2	0.2
Argentina	135	214	225	218	232	0.2	0.4	0.4	0.4	0.4
Brazil	180	155	168	250	333	0.3	0.3	0.3	0.4	0.5
Chile	60	78	80	93	75	0.1	0.1	0.1	0.2	0.1
Other S. America	65	52	51	63	84	0.1	0.1	0.1	0.1	0.1
Mexico	59	67	87	108	192	0.1	0.1	0.2	0.2	0.3
Other C. America	31	16	27	32	42	0.1	0.0	0.0	0.1	0.1
Israel	345	374	338	281	323	0.6	0.7	0.6	0.5	0.5
Other Near East	121	177	251	165	233	0.2	0.3	0.4	0.3	0.4
Egypt	383	395	475	426	440	0.7	0.7	0.8	0.7	0.7

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Other N. Africa	54	54	94	115	147	0.1	0.1	0.2	0.2	0.2
South Africa	202	192	222	216	190	0.4	0.3	0.4	0.4	0.3
Nigeria	74	52	54	46	28	0.1	0.1	0.1	0.1	0.0
Kenya	4	2	3	2	2	0.0	0.0	0.0	0.0	0.0
Other S. & C. Africa	43	37	36	39	30	0.1	0.1	0.1	0.1	0.0
Physics										
World	45,561	54,044	61,449	66,960	74,221	100.0	100.0	100.0	100.0	100.0
United States	13,053	15,903	17,649	17,847	17,882	28.6	29.4	28.7	26.7	24.1
Canada	1,335	1,732	1,668	1,800	1,834	2.9	3.2	2.7	2.7	2.5
United Kingdom	2,904	3,026	3,048	3,446	3,955	6.4	5.6	5.0	5.1	5.3
France	2,671	3,218	3,590	3,825	4,581	5.9	6.0	5.8	5.7	6.2
Germany	3,493	4,316	4,832	5,583	6,499	7.7	8.0	7.9	8.3	8.8
Austria	239	258	271	302	435	0.5	0.5	0.4	0.5	0.6
Belgium	377	407	425	515	642	0.8	0.8	0.7	0.8	0.9
Ireland	52	58	70	87	127	0.1	0.1	0.1	0.1	0.2
Luxembourg	0	1	1	0	2	0.0	0.0	0.0	0.0	0.0
Netherlands	803	870	1,008	1,104	1,152	1.8	1.6	1.6	1.6	1.6
Switzerland	736	877	876	1,011	1,187	1.6	1.6	1.4	1.5	1.6
Other W. Europe	9	5	4	2	2	0.0	0.0	0.0	0.0	0.0
Italy	1,150	1,513	1,819	2,131	2,746	2.5	2.8	3.0	3.2	3.7
Spain	259	535	735	1,037	1,335	0.6	1.0	1.2	1.5	1.8
Portugal	32	48	85	105	127	0.1	0.1	0.1	0.2	0.2
Greece	131	159	215	258	270	0.3	0.3	0.3	0.4	0.4
Turkey	35	49	55	79	146	0.1	0.1	0.1	0.1	0.2
Yugoslavia (former)	149	193	217	285	270	0.3	0.4	0.4	0.4	0.4
Slovenia	0	0	0	0	88	0.0	0.0	0.0	0.0	0.1
Croatia	0	0	0	0	80	0.0	0.0	0.0	0.0	0.1
Bosnia	0	0	0	0	1	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	101	0.0	0.0	0.0	0.0	0.1
Other S. Europe	0	2	1	4	17	0.0	0.0	0.0	0.0	0.0
Denmark	301	267	289	356	411	0.7	0.5	0.5	0.5	0.6
Sweden	360	501	598	629	889	0.8	0.9	1.0	0.9	1.2
Norway	100	88	95	147	153	0.2	0.2	0.2	0.2	0.2
Finland	167	200	194	238	335	0.4	0.4	0.3	0.4	0.5
Iceland	2	2	3	7	10	0.0	0.0	0.0	0.0	0.0
Bulgaria	189	157	157	232	203	0.4	0.3	0.3	0.3	0.3
Hungary	181	225	203	198	259	0.4	0.4	0.3	0.3	0.3
Poland	799	872	1,131	1,020	1,260	1.8	1.6	1.8	1.5	1.7
Czechoslovakia (former)	285	328	394	415	467	0.6	0.6	0.6	0.6	0.6
Czech Republic	0	0	0	0	318	0.0	0.0	0.0	0.0	0.4

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Slovakia	0	0	0	0	149	0.0	0.0	0.0	0.0	0.2
Other E. Europe	147	162	94	103	185	0.3	0.3	0.2	0.2	0.2
USSR (former)	7,647	8,422	9,347	9,341	8,300	16.8	15.6	15.2	14.0	11.2
Russia	0	0	0	0	6,106	0.0	0.0	0.0	0.0	8.2
Ukraine	0	0	0	0	1,276	0.0	0.0	0.0	0.0	1.7
Baltic states	0	0	0	0	181	0.0	0.0	0.0	0.0	0.2
Other former USSR	0	0	0	0	737	0.0	0.0	0.0	0.0	1.0
Japan	3,750	4,775	6,116	7,272	8,370	8.2	8.8	10.0	10.9	11.3
China	241	573	1,487	1,868	2,350	0.5	1.1	2.4	2.8	3.2
Taiwan	48	116	258	497	750	0.1	0.2	0.4	0.7	1.0
South Korea	34	89	193	329	859	0.1	0.2	0.3	0.5	1.2
Singapore	10	36	35	67	160	0.0	0.1	0.1	0.1	0.2
Hong Kong	0	0	37	63	189	0.0	0.0	0.1	0.1	0.3
India	1,713	1,578	1,493	1,638	1,665	3.8	2.9	2.4	2.4	2.2
Other Asia	87	89	101	107	123	0.2	0.2	0.2	0.2	0.2
Australia	619	668	613	681	980	1.4	1.2	1.0	1.0	1.3
New Zealand	68	81	68	87	89	0.1	0.1	0.1	0.1	0.1
Argentina	113	188	262	222	309	0.2	0.3	0.4	0.3	0.4
Brazil	279	342	431	612	700	0.6	0.6	0.7	0.9	0.9
Chile	14	42	34	42	57	0.0	0.1	0.1	0.1	0.1
Other S. America	52	48	66	86	106	0.1	0.1	0.1	0.1	0.1
Mexico	102	149	152	179	323	0.2	0.3	0.2	0.3	0.4
Other C. America	7	15	18	28	34	0.0	0.0	0.0	0.0	0.0
Israel	504	526	586	614	887	1.1	1.0	1.0	0.9	1.2
Other Near East	67	90	103	87	154	0.1	0.2	0.2	0.1	0.2
Egypt	85	82	119	144	177	0.2	0.2	0.2	0.2	0.2
Other N. Africa	31	30	43	56	95	0.1	0.1	0.1	0.1	0.1
South Africa	93	104	136	150	121	0.2	0.2	0.2	0.2	0.2
Nigeria	24	17	13	12	13	0.1	0.0	0.0	0.0	0.0
Kenya	2	1	4	0	4	0.0	0.0	0.0	0.0	0.0
Other S. & C. Africa	16	14	17	24	33	0.0	0.0	0.0	0.0	0.0
Earth and space sciences										
World	16,991	17,834	18,714	20,926	23,187	100.0	100.0	100.0	100.0	100.0
United States	7,257	7,663	7,770	8,233	9,379	42.7	43.0	41.5	39.3	40.4
Canada	888	1,061	1,310	1,352	1,485	5.2	5.9	7.0	6.5	6.4
United Kingdom	1,441	1,475	1,420	1,544	1,850	8.5	8.3	7.6	7.4	8.0
France	774	681	834	929	1,217	4.6	3.8	4.5	4.4	5.2
Germany	833	914	851	1,051	1,181	4.9	5.1	4.5	5.0	5.1
Austria	49	60	51	67	101	0.3	0.3	0.3	0.3	0.4
Belgium	101	123	86	107	140	0.6	0.7	0.5	0.5	0.6

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Ireland	30	30	39	48	41	0.2	0.2	0.2	0.2	0.2
Luxembourg	0	0	0	0	1	0.0	0.0	0.0	0.0	0.0
Netherlands	216	356	359	400	461	1.3	2.0	1.9	1.9	2.0
Switzerland	141	131	129	179	227	0.8	0.7	0.7	0.9	1.0
Other W. Europe	0	0	0	1	0	0.0	0.0	0.0	0.0	0.0
Italy	349	319	440	568	661	2.1	1.8	2.4	2.7	2.9
Spain	55	74	228	325	403	0.3	0.4	1.2	1.6	1.7
Portugal	6	12	23	26	37	0.0	0.1	0.1	0.1	0.2
Greece	62	72	99	122	116	0.4	0.4	0.5	0.6	0.5
Turkey	17	23	45	59	90	0.1	0.1	0.2	0.3	0.4
Yugoslavia (former)	22	33	37	61	57	0.1	0.2	0.2	0.3	0.2
Slovenia	0	0	0	0	14	0.0	0.0	0.0	0.0	0.1
Croatia	0	0	0	0	27	0.0	0.0	0.0	0.0	0.1
Bosnia	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	16	0.0	0.0	0.0	0.0	0.1
Other S. Europe	7	7	6	8	11	0.0	0.0	0.0	0.0	0.0
Denmark	88	101	89	149	202	0.5	0.6	0.5	0.7	0.9
Sweden	120	205	236	249	288	0.7	1.1	1.3	1.2	1.2
Norway	85	134	111	177	189	0.5	0.8	0.6	0.8	0.8
Finland	58	84	96	97	153	0.3	0.5	0.5	0.5	0.7
Iceland	7	15	9	6	19	0.0	0.1	0.0	0.0	0.1
Bulgaria	35	20	29	30	27	0.2	0.1	0.2	0.1	0.1
Hungary	21	26	21	45	51	0.1	0.1	0.1	0.2	0.2
Poland	86	67	82	88	114	0.5	0.4	0.4	0.4	0.5
Czechoslovakia (former)	103	120	75	100	92	0.6	0.7	0.4	0.5	0.4
Czech Republic	0	0	0	0	70	0.0	0.0	0.0	0.0	0.3
Slovakia	0	0	0	0	23	0.0	0.0	0.0	0.0	0.1
Other E. Europe	4	4	6	6	5	0.0	0.0	0.0	0.0	0.0
USSR (former)	1,704	1,271	1,298	1,614	963	10.0	7.1	6.9	7.7	4.2
Russia	0	0	0	0	845	0.0	0.0	0.0	0.0	3.6
Ukraine	0	0	0	0	66	0.0	0.0	0.0	0.0	0.3
Baltic states	0	0	0	0	25	0.0	0.0	0.0	0.0	0.1
Other former USSR	0	0	0	0	27	0.0	0.0	0.0	0.0	0.1
Japan	395	592	737	766	969	2.3	3.3	3.9	3.7	4.2
China	240	268	143	157	196	1.4	1.5	0.8	0.8	0.8
Taiwan	12	8	18	57	122	0.1	0.0	0.1	0.3	0.5
South Korea	3	7	17	23	60	0.0	0.0	0.1	0.1	0.3
Singapore	5	11	12	15	15	0.0	0.1	0.1	0.1	0.1
Hong Kong	0	0	11	20	33	0.0	0.0	0.1	0.1	0.1
India	479	508	391	499	380	2.8	2.8	2.1	2.4	1.6
Other Asia	33	38	57	40	69	0.2	0.2	0.3	0.2	0.3
Australia	530	527	612	617	646	3.1	3.0	3.3	2.9	2.8

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
New Zealand	160	135	128	134	145	0.9	0.8	0.7	0.6	0.6
Argentina	30	36	58	51	70	0.2	0.2	0.3	0.2	0.3
Brazil	85	70	110	163	141	0.5	0.4	0.6	0.8	0.6
Chile	47	40	34	66	63	0.3	0.2	0.2	0.3	0.3
Other S. America	17	13	14	21	27	0.1	0.1	0.1	0.1	0.1
Mexico	33	39	59	60	105	0.2	0.2	0.3	0.3	0.5
Other C. America	8	9	12	15	8	0.0	0.1	0.1	0.1	0.0
Israel	128	139	145	160	176	0.8	0.8	0.8	0.8	0.8
Other Near East	33	50	82	69	67	0.2	0.3	0.4	0.3	0.3
Egypt	19	29	48	51	42	0.1	0.2	0.3	0.2	0.2
Other N. Africa	8	9	7	15	19	0.0	0.1	0.0	0.1	0.1
South Africa	106	159	184	207	229	0.6	0.9	1.0	1.0	1.0
Nigeria	31	42	30	34	14	0.2	0.2	0.2	0.2	0.1
Kenya	7	7	6	12	4	0.0	0.0	0.0	0.1	0.0
Other S. & C. Africa	29	20	25	41	34	0.2	0.1	0.1	0.2	0.1
Engineering and technology										
World	30,710	28,004	25,442	29,684	30,585	100.0	100.0	100.0	100.0	100.0
United States	12,486	10,822	9,568	10,833	10,229	40.7	38.6	37.6	36.5	33.4
Canada	1,304	1,348	1,213	1,393	1,432	4.2	4.8	4.8	4.7	4.7
United Kingdom	2,596	2,197	1,782	1,991	2,087	8.5	7.8	7.0	6.7	6.8
France	1,020	843	961	1,213	1,354	3.3	3.0	3.8	4.1	4.4
Germany	2,322	2,167	1,786	2,119	1,823	7.6	7.7	7.0	7.1	6.0
Austria	134	108	91	102	123	0.4	0.4	0.4	0.3	0.4
Belgium	175	122	112	143	196	0.6	0.4	0.4	0.5	0.6
Ireland	20	26	25	42	40	0.1	0.1	0.1	0.1	0.1
Luxembourg	0	0	1	2	3	0.0	0.0	0.0	0.0	0.0
Netherlands	370	311	308	406	426	1.2	1.1	1.2	1.4	1.4
Switzerland	360	283	190	206	235	1.2	1.0	0.7	0.7	0.8
Other W. Europe	1	0	0	0	2	0.0	0.0	0.0	0.0	0.0
Italy	428	472	533	669	831	1.4	1.7	2.1	2.3	2.7
Spain	72	139	205	312	376	0.2	0.5	0.8	1.1	1.2
Portugal	12	26	54	81	81	0.0	0.1	0.2	0.3	0.3
Greece	118	122	162	183	174	0.4	0.4	0.6	0.6	0.6
Turkey	47	49	86	102	145	0.2	0.2	0.3	0.3	0.5
Yugoslavia (former)	85	60	97	103	109	0.3	0.2	0.4	0.3	0.4
Slovenia	0	0	0	0	27	0.0	0.0	0.0	0.0	0.1
Croatia	0	0	0	0	19	0.0	0.0	0.0	0.0	0.1
Bosnia	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	63	0.0	0.0	0.0	0.0	0.2
Other S. Europe	1	3	0	3	6	0.0	0.0	0.0	0.0	0.0

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Denmark	94	65	81	99	106	0.3	0.2	0.3	0.3	0.3
Sweden	305	255	240	230	322	1.0	0.9	0.9	0.8	1.1
Norway	70	73	67	101	99	0.2	0.3	0.3	0.3	0.3
Finland	117	106	115	149	168	0.4	0.4	0.5	0.5	0.5
Iceland	2	0	0	3	2	0.0	0.0	0.0	0.0	0.0
Bulgaria	52	43	39	50	63	0.2	0.2	0.2	0.2	0.2
Hungary	88	61	79	46	64	0.3	0.2	0.3	0.2	0.2
Poland	338	295	269	270	292	1.1	1.1	1.1	0.9	1.0
Czechoslovakia (former)	153	117	109	163	164	0.5	0.4	0.4	0.5	0.5
Czech Republic	0	0	0	0	115	0.0	0.0	0.0	0.0	0.4
Slovakia	0	0	0	0	49	0.0	0.0	0.0	0.0	0.2
Other E. Europe	53	57	34	44	65	0.2	0.2	0.1	0.1	0.2
USSR (former)	2,340	1,663	1,239	1,577	1,550	7.6	5.9	4.9	5.3	5.1
Russia	0	0	0	0	1,150	0.0	0.0	0.0	0.0	3.8
Ukraine	0	0	0	0	314	0.0	0.0	0.0	0.0	1.0
Baltic states	0	0	0	0	20	0.0	0.0	0.0	0.0	0.1
Other former USSR	0	0	0	0	66	0.0	0.0	0.0	0.0	0.2
Japan	2,827	3,213	2,580	2,843	3,018	9.2	11.5	10.1	9.6	9.9
China	113	227	567	657	757	0.4	0.8	2.2	2.2	2.5
Taiwan	52	125	342	603	796	0.2	0.4	1.3	2.0	2.6
South Korea	36	109	167	279	515	0.1	0.4	0.7	0.9	1.7
Singapore	23	44	80	109	222	0.1	0.2	0.3	0.4	0.7
Hong Kong	0	0	62	78	150	0.0	0.0	0.2	0.3	0.5
India	954	863	737	887	779	3.1	3.1	2.9	3.0	2.5
Other Asia	73	59	45	55	72	0.2	0.2	0.2	0.2	0.2
Australia	460	470	363	467	582	1.5	1.7	1.4	1.6	1.9
New Zealand	89	62	66	61	68	0.3	0.2	0.3	0.2	0.2
Argentina	43	48	58	61	83	0.1	0.2	0.2	0.2	0.3
Brazil	72	68	77	125	125	0.2	0.2	0.3	0.4	0.4
Chile	10	15	18	13	17	0.0	0.1	0.1	0.0	0.1
Other S. America	21	18	25	22	24	0.1	0.1	0.1	0.1	0.1
Mexico	27	24	35	50	48	0.1	0.1	0.1	0.2	0.2
Other C. America	9	12	9	6	9	0.0	0.0	0.0	0.0	0.0
Israel	293	349	250	270	284	1.0	1.2	1.0	0.9	0.9
Other Near East	104	171	233	165	210	0.3	0.6	0.9	0.6	0.7
Egypt	119	110	126	121	121	0.4	0.4	0.5	0.4	0.4
Other N. Africa	15	18	19	47	37	0.0	0.1	0.1	0.2	0.1
South Africa	143	131	92	109	82	0.5	0.5	0.4	0.4	0.3
Nigeria	42	30	36	15	12	0.1	0.1	0.1	0.1	0.0
Kenya	5	1	0	1	2	0.0	0.0	0.0	0.0	0.0
Other S. & C. Africa	22	14	15	16	14	0.1	0.0	0.1	0.1	0.0

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Mathematics										
World	10,334	9,551	9,193	8,302	7,987	100.0	100.0	100.0	100.0	100.0
United States	3,943	3,659	3,664	3,165	2,811	38.2	38.3	39.9	38.1	35.2
Canada	527	441	501	398	357	5.1	4.6	5.4	4.8	4.5
United Kingdom	631	655	526	537	461	6.1	6.9	5.7	6.5	5.8
France	581	661	686	699	840	5.6	6.9	7.5	8.4	10.5
Germany	1,134	752	606	558	546	11.0	7.9	6.6	6.7	6.8
Austria	80	79	68	49	51	0.8	0.8	0.7	0.6	0.6
Belgium	89	88	70	54	75	0.9	0.9	0.8	0.7	0.9
Ireland	26	15	23	15	18	0.3	0.2	0.3	0.2	0.2
Luxembourg	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Netherlands	142	147	149	146	128	1.4	1.5	1.6	1.8	1.6
Switzerland	72	66	72	56	79	0.7	0.7	0.8	0.7	1.0
Other W. Europe	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Italy	138	224	293	234	286	1.3	2.3	3.2	2.8	3.6
Spain	40	122	175	162	208	0.4	1.3	1.9	2.0	2.6
Portugal	10	17	20	16	23	0.1	0.2	0.2	0.2	0.3
Greece	50	55	52	43	41	0.5	0.6	0.6	0.5	0.5
Turkey	11	11	10	11	13	0.1	0.1	0.1	0.1	0.2
Yugoslavia (former)	26	27	37	34	25	0.3	0.3	0.4	0.4	0.3
Slovenia	0	0	0	0	12	0.0	0.0	0.0	0.0	0.2
Croatia	0	0	0	0	8	0.0	0.0	0.0	0.0	0.1
Bosnia	0	0	0	0	0	0.0	0.0	0.0	0.0	0.0
Yugoslavia (current)	0	0	0	0	5	0.0	0.0	0.0	0.0	0.1
Other S. Europe	0	0	0	1	1	0.0	0.0	0.0	0.0	0.0
Denmark	74	54	56	50	57	0.7	0.6	0.6	0.6	0.7
Sweden	81	72	63	54	85	0.8	0.8	0.7	0.7	1.1
Norway	33	44	39	29	34	0.3	0.5	0.4	0.3	0.4
Finland	57	44	44	38	30	0.6	0.5	0.5	0.5	0.4
Iceland	4	2	0	3	3	0.0	0.0	0.0	0.0	0.0
Bulgaria	33	31	34	25	25	0.3	0.3	0.4	0.3	0.3
Hungary	99	146	94	64	42	1.0	1.5	1.0	0.8	0.5
Poland	95	168	151	106	94	0.9	1.8	1.6	1.3	1.2
Czechoslovakia (former)	43	41	49	70	51	0.4	0.4	0.5	0.8	0.6
Czech Republic	0	0	0	0	28	0.0	0.0	0.0	0.0	0.4
Slovakia	0	0	0	0	23	0.0	0.0	0.0	0.0	0.3
Other E. Europe	51	50	41	33	32	0.5	0.5	0.4	0.4	0.4
USSR (former)	784	275	296	412	236	7.6	2.9	3.2	5.0	3.0
Russia	0	0	0	0	173	0.0	0.0	0.0	0.0	2.2

Appendix table 5-49.
Scientific and technical articles, by country and field: 1981-95, selected years

Region/country	Number of scientific & technical articles published in:					Percent of total scientific & technical articles published in:				
	1981	1985	1989	1992	1995	1981	1985	1989	1992	1995
Ukraine	0	0	0	0	29	0.0	0.0	0.0	0.0	0.4
Baltic states	0	0	0	0	2	0.0	0.0	0.0	0.0	0.0
Other former USSR	0	0	0	0	32	0.0	0.0	0.0	0.0	0.4
Japan	449	495	395	292	267	4.3	5.2	4.3	3.5	3.3
China	32	67	123	195	252	0.3	0.7	1.3	2.3	3.2
Taiwan	29	38	39	45	57	0.3	0.4	0.4	0.5	0.7
South Korea	6	15	38	27	39	0.1	0.2	0.4	0.3	0.5
Singapore	8	19	14	21	40	0.1	0.2	0.2	0.3	0.5
Hong Kong	0	0	22	22	29	0.0	0.0	0.2	0.3	0.4
India	346	300	126	92	79	3.3	3.1	1.4	1.1	1.0
Other Asia	25	34	28	26	27	0.2	0.4	0.3	0.3	0.3
Australia	200	193	173	138	139	1.9	2.0	1.9	1.7	1.7
New Zealand	27	28	25	27	28	0.3	0.3	0.3	0.3	0.4
Argentina	11	15	16	28	16	0.1	0.2	0.2	0.3	0.2
Brazil	46	52	64	70	68	0.4	0.5	0.7	0.8	0.9
Chile	6	15	17	14	18	0.1	0.2	0.2	0.2	0.2
Other S. America	10	12	14	17	23	0.1	0.1	0.2	0.2	0.3
Mexico	10	14	18	22	18	0.1	0.1	0.2	0.3	0.2
Other C. America	6	6	2	4	6	0.1	0.1	0.0	0.0	0.1
Israel	151	154	139	123	142	1.5	1.6	1.5	1.5	1.8
Other Near East	36	41	40	23	24	0.3	0.4	0.4	0.3	0.3
Egypt	15	15	8	15	11	0.1	0.2	0.1	0.2	0.1
Other N. Africa	18	19	17	15	21	0.2	0.2	0.2	0.2	0.3
South Africa	38	42	34	26	28	0.4	0.4	0.4	0.3	0.4
Nigeria	10	19	7	6	5	0.1	0.2	0.1	0.1	0.1
Kenya	4	3	4	0	1	0.0	0.0	0.0	0.0	0.0
Other S. & C. Africa	7	15	16	4	8	0.1	0.2	0.2	0.0	0.1

NOTE: Data for Hong Kong are included with the United Kingdom through 1986. Details may not add to totals because of rounding.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

See figures 5-24 and 5-25.

Appendix table 5-50.
Scientific and technical article output of selected countries compared to gross domestic product: 1995

Country	Number of articles	GDP (billions of U.S. $)	Articles/ GDP (billions of U.S. $)
Israel	4,322	80	54
Sweden	7,190	177	41
Switzerland	5,896	159	37
Finland	3,246	92	35
Denmark	3,513	113	31
Netherlands	9,239	302	31
New Zealand	1,830	62	29
United Kingdom	32,980	1,138	29
Canada	17,359	694	25
Australia	9,747	405	24
Iceland	117	5	23
Slovakia	854	39	22
Croatia	434	20	22
Russia	17,180	796	22
Yugoslavia (current)	442	21	21
Germany	30,654	1,452	21
Norway	2,180	106	21
France	23,811	1,173	20
Belgium	3,996	197	20
Hungary	1,469	73	20
United States	142,792	7,248	20
Austria	2,807	152	18
Bulgaria	779	43	18
Poland	3,895	227	17
Ireland	900	55	16
Greece	1,639	102	16
Spain	8,811	565	16
Slovenia	339	23	15
Czech Republic	1,577	106	15
Japan	39,498	2,679	15
Ukraine	2,489	175	14
Singapore	891	66	13
Taiwan	3,884	291	13
Italy	14,117	1,089	13
South Africa	1,744	215	8
Hong Kong	1,091	152	7
Kenya	253	37	7
Egypt	1,136	171	7
Portugal	764	116	7
Chile	700	113	6
Argentina	1,581	279	6
India	7,851	1,409	6
South Korea	2,964	591	5
Bosnia	5	1	5
Turkey	1,359	346	4
Brazil	2,760	977	3
Nigeria	342	136	3
Luxembourg	20	10	2
Mexico	1,408	721	2
China	6,200	3,500	2

SOURCES: **World GDP data**—U.S. Central Intelligence Agency, World Fact Book <<http://www.odci.gov/cia/publications/nsolo/wbf-eco.htm>> (September 1997); **publications data**—Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

See figure 5-26.

Appendix table 5-51.
Distribution of scientific and technical articles for selected countries, by field: 1981-95, selected years
(Percentages)

Field	Articles published in: 1981	1985	1989	1992	1995	Articles published in: 1981	1985	1989	1992	1995
	World					**United States**				
Clinical medicine	31.5	32.2	32.2	31.5	30.7	36.3	36.7	35.9	35.2	35.3
Biomedical research	15.0	16.6	17.0	16.8	16.4	16.5	17.8	18.8	19.4	19.7
Biology	10.6	9.0	8.5	8.1	8.0	11.1	9.5	9.0	8.4	7.8
Chemistry	14.8	14.2	13.9	14.0	14.0	8.2	8.4	8.8	9.0	9.0
Physics	12.3	13.9	15.2	15.7	16.9	9.9	11.5	12.5	12.5	12.5
Earth & space sciences	4.6	4.6	4.6	4.9	5.3	5.5	5.6	5.5	5.8	6.6
Engineering & technology	8.3	7.2	6.3	7.0	7.0	9.4	7.9	6.8	7.6	7.2
Mathematics	2.8	2.4	2.3	2.0	1.8	3.0	2.7	2.6	2.2	2.0
	Canada					**United Kingdom**				
Clinical medicine	27.7	28.9	30.1	30.3	29.2	36.9	41.0	42.4	41.0	38.3
Biomedical research	15.6	15.9	16.7	17.1	17.1	15.3	16.4	16.5	16.9	17.5
Biology	17.0	17.3	16.3	15.2	13.8	11.4	9.6	8.7	7.9	8.1
Chemistry	11.6	10.4	9.6	9.9	10.4	11.7	10.2	10.3	10.6	10.8
Physics	9.2	10.4	9.7	10.0	10.6	9.4	9.4	10.0	10.8	12.0
Earth & space sciences	6.1	6.4	7.6	7.5	8.6	4.7	4.6	4.6	4.9	5.6
Engineering & technology	9.0	8.1	7.0	7.8	8.2	8.4	6.8	5.8	6.3	6.3
Mathematics	3.6	2.6	2.9	2.2	2.1	2.0	2.0	1.7	1.7	1.4
	France					**Germany**				
Clinical medicine	32.7	29.1	29.7	29.2	28.4	30.5	29.9	30.1	30.4	28.4
Biomedical research	15.5	17.6	17.3	17.6	16.9	14.6	14.5	15.9	14.9	14.9
Biology	7.4	6.2	5.9	6.2	5.8	8.8	6.9	6.6	5.6	6.0
Chemistry	17.2	17.7	16.4	16.1	15.4	17.1	18.8	17.8	17.2	17.9
Physics	14.4	17.5	18.2	17.8	19.2	13.0	15.8	17.7	19.1	21.2
Earth & space sciences	4.2	3.7	4.2	4.3	5.1	3.1	3.3	3.1	3.6	3.9
Engineering & technology	5.5	4.6	4.9	5.6	5.7	8.7	7.9	6.5	7.3	5.9
Mathematics	3.1	3.6	3.5	3.2	3.5	4.2	2.8	2.2	1.9	1.8
	Netherlands					**Switzerland**				
Clinical medicine	31.9	38.4	40.6	38.2	40.0	40.1	37.5	39.3	37.5	35.1
Biomedical research	18.5	18.5	17.3	18.4	17.5	14.1	16.7	17.2	18.0	17.6
Biology	10.2	8.6	8.6	8.6	9.6	4.9	4.4	4.7	4.6	5.2
Chemistry	13.9	10.7	10.7	10.6	9.5	13.6	13.7	12.2	13.1	12.8
Physics	13.4	12.3	12.6	13.0	12.5	15.3	17.9	18.3	18.6	20.1
Earth & space sciences	3.6	5.0	4.5	4.7	5.0	2.9	2.7	2.7	3.3	3.9
Engineering & technology	6.2	4.4	3.8	4.8	4.6	7.5	5.8	4.0	3.8	4.0
Mathematics	2.4	2.1	1.9	1.7	1.4	1.5	1.3	1.5	1.0	1.3
	Other Western Europe					**Sweden**				
Clinical medicine	43.1	41.5	43.9	42.7	39.5	52.7	54.0	49.9	48.0	44.0
Biomedical research	12.8	14.6	15.8	15.9	15.7	17.6	17.5	18.7	18.0	17.0
Biology	8.5	9.2	7.3	5.8	6.6	6.4	5.5	7.2	7.9	8.0
Chemistry	13.3	12.8	11.6	12.7	12.3	8.6	7.6	7.8	8.8	8.9
Physics	10.9	11.6	12.4	13.4	15.6	6.2	7.5	8.6	9.4	12.4
Earth & space sciences	2.9	3.4	2.8	3.3	3.7	2.1	3.1	3.4	3.7	4.0
Engineering & technology	5.3	4.1	3.7	4.3	4.7	5.2	3.8	3.5	3.4	4.5
Mathematics	3.1	2.9	2.6	1.8	1.9	1.4	1.1	0.9	0.8	1.2

Appendix table 5-51.
Distribution of scientific and technical articles for selected countries, by field: 1981-95, selected years
(Percentages)

Field	Articles published in: 1981	1985	1989	1992	1995	Articles published in: 1981	1985	1989	1992	1995
	Other Northern Europe					**Italy**				
Clinical medicine	51.5	53.4	52.5	47.4	44.5	34.8	38.5	37.7	37.4	35.1
Biomedical research	14.7	15.2	15.7	16.3	15.1	14.2	14.7	14.3	14.3	14.4
Biology	8.9	8.0	8.2	9.8	10.3	5.8	3.7	4.0	4.5	4.7
Chemistry	7.7	7.0	6.7	6.8	8.3	18.7	16.2	15.2	14.7	13.7
Physics	7.8	7.1	7.6	8.9	10.0	14.7	16.1	17.0	17.3	19.5
Earth & space sciences	3.2	4.3	4.0	5.1	6.2	4.5	3.4	4.1	4.6	4.7
Engineering & technology	3.9	3.1	3.4	4.2	4.1	5.5	5.0	5.0	5.4	5.9
Mathematics	2.3	1.8	1.8	1.4	1.4	1.8	2.4	2.7	1.9	2.0
	Spain					**Other Southern Europe**				
Clinical medicine	21.7	18.0	22.6	25.2	25.4	26.1	21.3	23.7	26.8	28.3
Biomedical research	20.7	18.6	18.7	15.7	15.4	13.0	11.2	10.2	9.6	9.4
Biology	10.8	6.6	9.3	11.7	11.3	5.9	7.2	7.1	7.2	7.5
Chemistry	28.7	35.1	24.5	23.2	21.6	16.3	20.1	20.4	20.1	19.9
Physics	11.0	13.3	13.6	13.7	15.2	16.4	18.7	17.0	16.7	16.4
Earth & space sciences	2.3	1.8	4.2	4.3	4.6	5.4	6.1	6.2	6.3	6.2
Engineering & technology	3.0	3.5	3.8	4.1	4.3	12.4	10.8	11.9	10.8	10.2
Mathematics	1.7	3.0	3.2	2.1	2.4	4.6	4.6	3.5	2.4	2.0
	Eastern Europe					**Russia[a]**				
Clinical medicine	19.2	16.2	14.5	14.2	12.5	12.0	12.3	7.8	5.3	28.3
Biomedical research	15.6	16.9	16.8	15.1	10.5	18.5	17.3	15.8	14.0	9.4
Biology	9.5	7.4	4.9	5.3	5.0	3.1	2.7	3.0	4.6	7.5
Chemistry	29.9	30.8	31.4	31.4	33.0	27.9	27.2	27.6	27.9	19.9
Physics	14.5	16.7	20.7	21.6	26.0	27.8	31.2	33.0	35.5	16.4
Earth & space sciences	2.3	2.3	2.2	2.9	3.2	4.2	4.3	5.7	4.9	6.2
Engineering & technology	6.2	5.5	5.5	6.3	7.1	5.5	4.1	5.6	6.7	10.2
Mathematics	2.9	4.2	3.9	3.3	2.7	0.9	1.0	1.5	1.0	2.0
	Japan					**China**				
Clinical medicine	23.5	26.5	29.1	30.0	29.0	14.4	14.8	11.8	10.3	8.0
Biomedical research	13.7	14.6	15.8	15.6	15.5	4.5	9.2	7.8	7.8	7.5
Biology	9.6	8.3	7.2	6.8	6.6	16.2	8.0	3.6	3.8	3.6
Chemistry	23.6	19.9	18.0	17.7	16.9	8.1	9.5	15.1	19.6	23.6
Physics	14.9	16.1	18.6	19.4	21.2	21.9	29.5	39.5	38.0	37.9
Earth & space sciences	1.6	2.0	2.2	2.0	2.5	21.8	13.8	3.8	3.2	3.2
Engineering & technology	11.3	10.8	7.9	7.6	7.6	10.3	11.7	15.1	13.4	12.2
Mathematics	1.8	1.7	1.2	0.8	0.7	2.9	3.4	3.3	4.0	4.1
	Asian newly industrializing economies[b]					**India**				
Clinical medicine	19.7	20.0	25.1	23.1	20.5	12.9	12.4	12.5	14.0	12.2
Biomedical research	7.6	7.9	9.4	9.4	8.6	13.7	16.9	15.7	12.1	13.3
Biology	12.1	7.1	6.7	5.5	5.0	16.4	8.9	9.2	8.6	7.3
Chemistry	21.2	20.7	19.6	20.7	20.3	27.2	27.9	30.0	28.4	30.3
Physics	13.6	17.1	15.2	17.6	22.2	14.6	16.5	17.7	19.4	21.2
Earth & space sciences	3.0	2.1	1.8	2.2	2.6	4.1	5.3	4.6	5.9	4.8
Engineering & technology	16.7	20.0	19.0	19.6	19.0	8.1	9.0	8.7	10.5	9.9
Mathematics	6.1	5.0	3.2	2.2	1.9	3.0	3.1	1.5	1.1	1.0

Appendix table 5-51.
Distribution of scientific and technical articles for selected countries, by field: 1981-95, selected years
(Percentages)

Field	Articles published in: 1981	1985	1989	1992	1995	Articles published in: 1981	1985	1989	1992	1995
	Other Asian nations					**Australia & New Zealand**				
Clinical medicine	27.4	27.9	29.1	29.1	28.1	31.1	33.6	35.1	34.6	33.9
Biomedical research	10.7	12.6	12.0	11.3	10.6	12.3	14.4	14.5	14.9	13.9
Biology	28.6	24.6	25.2	26.2	23.7	23.8	21.4	21.3	20.9	20.1
Chemistry	9.8	11.9	12.5	13.9	16.8	11.0	8.9	8.8	8.6	9.0
Physics	9.4	9.3	9.3	9.2	8.8	7.0	7.5	6.7	7.3	9.2
Earth & space sciences	3.6	4.0	5.2	3.4	4.9	7.0	6.7	7.3	7.2	6.8
Engineering & technology	7.9	6.2	4.1	4.7	5.2	5.6	5.3	4.2	5.0	5.6
Mathematics	2.7	3.6	2.6	2.2	1.9	2.3	2.2	2.0	1.6	1.4
	Mexico					**Argentina**				
Clinical medicine	45.2	33.4	32.0	23.7	19.2	30.3	25.9	25.0	25.1	24.1
Biomedical research	11.6	15.3	14.8	16.6	16.0	20.4	21.7	16.9	15.1	16.7
Biology	7.6	11.8	13.2	16.9	16.1	12.1	10.3	11.5	13.8	14.3
Chemistry	9.1	9.1	9.9	11.0	13.6	15.1	18.0	17.0	17.3	14.7
Physics	15.7	20.1	17.3	18.3	22.9	12.7	15.8	19.7	17.6	19.5
Earth & space sciences	5.1	5.3	6.7	6.1	7.5	3.4	3.0	4.4	4.0	4.4
Engineering & technology	4.2	3.2	4.0	5.1	3.4	4.8	4.0	4.4	4.8	5.2
Mathematics	1.5	1.9	2.1	2.2	1.3	1.2	1.3	1.2	2.2	1.0
	Brazil					**Chile**				
Clinical medicine	21.2	20.3	18.5	25.2	22.9	44.7	42.4	43.7	44.2	41.3
Biomedical research	18.5	22.7	24.8	17.9	18.0	20.0	12.0	16.5	13.3	14.1
Biology	14.3	10.2	8.5	8.9	9.6	10.9	12.3	10.8	9.7	11.7
Chemistry	12.5	10.6	9.5	9.8	12.1	10.7	13.7	12.7	13.4	10.7
Physics	19.4	23.3	24.5	24.1	25.4	2.5	7.4	5.4	6.1	8.1
Earth & space sciences	5.9	4.8	6.2	6.4	5.1	8.4	7.0	5.4	9.5	9.0
Engineering & technology	5.0	4.6	4.4	4.9	4.5	1.8	2.6	2.9	1.9	2.4
Mathematics	3.2	3.5	3.6	2.8	2.5	1.1	2.6	2.7	2.0	2.6
	Other Central & South America					**Israel**				
Clinical medicine	30.2	32.4	29.6	28.9	26.5	34.7	38.8	37.9	38.0	34.1
Biomedical research	17.3	15.8	14.5	16.2	14.9	15.0	15.2	15.0	16.1	14.9
Biology	25.2	22.4	24.6	22.5	22.1	11.9	9.6	10.5	9.5	9.0
Chemistry	11.6	10.0	10.3	10.5	12.7	9.3	8.8	8.5	7.1	7.5
Physics	7.1	9.2	11.1	12.6	14.1	13.6	12.4	14.7	15.4	20.5
Earth & space sciences	3.0	3.2	3.4	4.0	3.5	3.5	3.3	3.6	4.0	4.1
Engineering & technology	3.6	4.4	4.5	3.1	3.3	7.9	8.2	6.3	6.8	6.6
Mathematics	1.9	2.6	2.1	2.3	2.9	4.1	3.6	3.5	3.1	3.3
	Other Near East					**Egypt**				
Clinical medicine	30.8	30.9	31.9	39.0	36.0	17.8	15.1	13.3	15.2	15.0
Biomedical research	8.8	9.7	6.8	6.3	6.5	9.8	4.8	6.0	5.9	6.5
Biology	13.7	9.4	10.2	10.5	8.7	13.8	12.0	11.3	10.3	8.9
Chemistry	15.7	16.7	18.1	14.3	16.5	36.1	42.7	42.5	38.7	38.7
Physics	8.7	8.5	7.4	7.5	10.9	8.0	8.9	10.6	13.1	15.6
Earth & space sciences	4.3	4.7	5.9	6.0	4.8	1.8	3.1	4.3	4.6	3.7
Engineering & technology	13.5	16.1	16.8	14.3	14.9	11.2	11.9	11.3	11.0	10.7
Mathematics	4.7	3.9	2.9	2.0	1.7	1.4	1.6	0.7	1.4	1.0

Appendix table 5-51.
Distribution of scientific and technical articles for selected countries, by field: 1981-95, selected years
(Percentages)

Field	Articles published in: 1981	1985	1989	1992	1995	Articles published in: 1981	1985	1989	1992	1995
	Other North Africa					**South Africa**				
Clinical medicine	29.1	23.9	22.5	20.4	20.7	42.1	40.0	34.4	30.7	27.9
Biomedical research	8.0	8.5	5.7	6.7	7.4	8.6	12.7	16.2	14.4	14.2
Biology	9.7	12.0	11.4	8.8	7.6	16.6	16.2	18.0	18.3	20.6
Chemistry	22.8	23.1	31.5	29.7	29.6	11.3	9.5	10.4	11.2	10.9
Physics	13.1	12.8	14.4	14.5	19.1	5.2	5.1	6.4	7.7	6.9
Earth & space sciences	3.4	3.8	2.3	3.9	3.8	5.9	7.9	8.6	10.7	13.1
Engineering & technology	6.3	7.7	6.4	12.1	7.4	8.0	6.5	4.3	5.6	4.7
Mathematics	7.6	8.1	5.7	3.9	4.2	2.1	2.1	1.6	1.3	1.6
	Other Central & South Africa									
Clinical medicine	40.8	45.5	46.6	47.0	47.7					
Biomedical research	8.9	10.8	11.2	9.7	10.2					
Biology	31.8	27.0	25.5	26.7	27.1					
Chemistry	7.0	5.5	5.8	5.8	4.4					
Physics	2.4	1.9	2.1	2.4	3.7					
Earth & space sciences	3.9	4.2	3.8	5.8	3.8					
Engineering & technology	4.0	2.7	3.2	2.1	2.0					
Mathematics	1.2	2.3	1.7	0.7	1.0					

NOTE: Details may not add to totals because of rounding.

[a]Data are for the former USSR except for 1995.

[b]Data for Hong Kong are included with United Kingdom through 1986.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation; unpublished tabulations.

See figure 5-27 and text table 5-12.

Appendix table 5-52.
Coauthored and internationally coauthored scientific and technical articles for selected countries: 1981 and 1995

Country	All articles[a]		Multi-author articles (percent of total)		Internationally coauthored (percent of coauthored)	
	1981	1995	1981	1995	1981	1995
World[b]	368,934	438,767	33	50	17	29
United States	132,278	142,792	43	58	18	32
Canada	14,440	17,359	40	59	43	52
United Kingdom	30,794	32,980	32	55	42	53
France	18,567	23,811	44	64	35	53
Germany	26,837	30,654	31	54	45	61
Austria	2,160	2,807	39	65	45	64
Belgium	3,309	3,996	42	67	52	68
Ireland	700	900	39	61	50	66
Netherlands	5,993	9,239	35	65	48	54
Switzerland	4,801	5,896	40	63	67	76
Italy	7,803	14,117	51	71	32	49
Portugal	184	764	50	70	64	72
Spain	2,362	8,811	34	57	35	55
Greece	793	1,639	35	62	58	62
Turkey	251	1,359	44	56	69	46
Denmark	3,198	3,513	50	69	42	63
Sweden	5,846	7,190	50	66	36	59
Norway	1,920	2,180	44	68	40	58
Finland	2,173	3,246	48	70	33	50
Bulgaria	983	779	27	56	57	74
Hungary	2,107	1,469	38	70	44	73
Poland	4,130	3,895	28	59	55	78
Former USSR states	29,610	21,749	15	37	18	70
Japan	25,088	39,498	30	53	17	27
China	1,100	6,200	27	54	47	53
Taiwan	366	3,884	39	54	67	34
South Korea	168	2,964	50	62	78	46
Singapore	124	891	39	45	48	59
Hong Kong[c]	NA	1,091	NA	57	NA	69
India	11,725	7,851	18	35	30	43
Australia	8,138	9,747	32	54	38	49
New Zealand	1,722	1,830	30	54	44	58
Argentina	892	1,581	35	58	34	53
Brazil	1,438	2,760	46	67	53	64
Chile	561	700	41	67	50	67
Mexico	648	1,408	52	66	53	67
Israel	3,698	4,322	51	66	44	56
Egypt	1,060	1,136	36	51	42	57
South Africa	1,782	1,744	44	55	29	48
Nigeria	780	342	28	55	50	64
Kenya	267	253	32	70	68	84

NA = not available

NOTE: Details may not add to totals because of rounding.

[a]Data include all scientific and technical articles in natural science and engineering fields.

[b]International collaboration rates for the entire world cannot be compared to country rates because, regardless of the number of countries involved, an internationally coauthored article is counted only once.

[c]Data for Hong Kong are included with United Kingdom through 1986.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

Appendix table 5-53.
Coauthored and internationally coauthored scientific and technical articles for selected countries, by field: 1981-85 and 1991-95

	Number of articles (in thousands)						Percent of total articles			
	Total		Multi-author		Internationally coauthored		Multi-author		Internationally coauthored	
Country	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95
All natural science and engineering fields										
World[a]	1,875.4	2,117.3	657.3	1,002.9	121.0	271.9	35	47	6	13
United States	697.9	773.7	311.8	431.3	60.0	126.2	45	56	9	16
United Kingdom	168.5	186.2	58.9	96.2	24.7	48.1	35	52	15	26
Germany	145.0	174.6	49.3	88.1	23.5	52.7	34	50	16	30
France	100.4	132.2	46.7	81.3	17.9	42.2	46	61	18	32
Italy	48.0	76.9	26.9	53.5	9.0	25.2	56	70	19	33
Other S. Europe	29.9	74.0	12.1	41.7	5.7	23.9	41	56	19	32
Nordic countries	78.2	96.3	41.1	62.8	16.1	34.5	52	65	21	36
Other W. Europe	99.3	136.2	42.1	82.8	22.9	51.9	42	61	23	38
Japan	138.4	200.6	46.0	100.0	8.6	25.5	33	50	6	13
Canada	84.5	103.9	36.1	59.3	15.1	29.5	43	57	18	28
Eastern Europe	57.2	58.1	20.1	32.8	10.0	23.8	35	56	17	41
Former USSR	152.9	134.6	24.3	39.0	4.5	22.9	16	29	3	17
Baltic states	NA	1.9	NA	1.1	NA	1.0	NA	57	NA	51
Russia	NA	59.3	NA	19.5	NA	12.5	NA	33	NA	21
Other former USSR	152.9	73.3	24.3	18.5	4.5	9.4	16	25	3	13
Israel	22.6	25.6	12.2	16.9	5.3	9.4	54	66	24	37
Near East/N. Africa	12.2	17.6	5.3	9.6	3.4	6.5	43	54	28	37
Other Africa	19.5	21.3	8.6	12.8	4.2	8.3	44	60	21	39
India	55.7	43.8	10.8	14.5	3.5	5.9	19	33	6	13
Central America	5.9	9.6	3.2	6.2	2.2	4.4	55	64	37	46
South America	20.2	32.7	9.0	20.4	4.8	13.1	44	62	24	40
Aust. & N. Zealand	52.6	62.6	18.1	31.8	7.3	15.6	34	51	14	25
China	9.1	30.8	3.4	16.1	2.1	8.8	37	52	23	29
Asian NIEs[b]	5.6	37.5	2.4	20.0	1.5	9.1	42	53	27	24
Other Asian/Pacific	5.9	9.2	2.9	6.4	2.3	5.2	50	70	39	57
Clinical medicine										
World[a]	598.7	664.8	288.4	384.1	28.7	64.1	48	58	5	10
United States	251.4	267.1	141.8	170.0	15.0	32.9	56	64	6	12
United Kingdom	62.8	71.5	26.5	38.9	6.1	12.9	42	54	10	18
Germany	42.6	48.4	16.5	26.0	4.2	10.0	39	54	10	21
France	30.4	36.2	15.8	23.8	3.4	8.0	52	66	11	22
Italy	16.5	26.7	9.3	18.6	2.0	6.2	56	70	12	23
Other S. Europe	6.2	17.7	2.9	10.8	0.9	3.8	47	61	15	21
Nordic countries	40.7	42.3	24.8	30.3	6.3	11.7	61	72	15	28
Other W. Europe	37.6	50.4	18.4	33.9	6.5	15.7	49	67	17	31
Japan	34.8	59.2	14.7	33.2	2.1	6.5	42	56	6	11
Canada	23.5	30.2	13.5	20.7	3.5	7.7	58	68	15	26
Eastern Europe	9.9	7.6	4.2	4.7	1.4	2.9	42	63	15	39
Former USSR	19.3	11.4	4.9	3.7	0.4	1.3	25	33	2	12
Baltic states	NA	0.2	NA	0.1	NA	0.1	NA	69	NA	60
Russia	NA	4.4	NA	1.6	NA	0.6	NA	36	NA	14
Other former USSR	19.3	6.7	4.9	2.0	0.4	0.6	25	30	2	9
Israel	7.8	8.4	5.5	6.4	1.1	1.9	70	77	14	23
Near East/N. Africa	2.8	4.3	1.4	2.6	0.7	1.4	50	61	26	32
Other Africa	8.3	8.1	4.7	5.8	1.6	3.4	57	71	19	41
India	7.1	5.8	2.1	2.6	0.3	0.7	29	45	5	11
Central America	2.1	2.1	1.2	1.5	0.6	0.9	59	69	29	44
South America	5.6	8.4	2.8	5.4	1.1	2.8	50	65	19	34
Aust. & N. Zealand	16.6	20.6	6.8	11.4	1.6	3.9	41	55	10	19
China	1.4	3.1	0.7	1.9	0.3	1.4	48	61	21	43
Asian NIEs[b]	1.1	8.0	0.6	5.2	0.4	1.8	58	65	32	22
Other Asian/Pacific	1.7	2.7	1.0	2.1	0.7	1.6	59	77	40	59

Appendix table 5-53.
Coauthored and internationally coauthored scientific and technical articles for selected countries, by field: 1981-85 and 1991-95

	Number of articles (in thousands)						Percent of total articles			
	Total		Multi-author		Internationally coauthored		Multi-author		Internationally coauthored	
Country	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95
Biomedical research										
World[a]	290.8	351.8	107.4	179.4	20.7	48.4	37	51	7	14
United States	119.0	149.8	54.6	88.7	10.8	25.6	46	59	9	17
United Kingdom	27.1	32.5	9.2	17.2	4.5	9.5	34	53	17	29
Germany	22.3	27.0	8.0	14.7	4.3	9.5	36	54	19	35
France	16.1	22.9	8.0	14.2	3.0	7.3	49	62	19	32
Italy	7.0	11.2	4.0	8.1	1.4	3.7	58	72	21	33
Other S. Europe	4.8	10.3	1.8	5.6	0.7	3.3	38	55	14	32
Nordic countries	12.5	16.4	6.4	11.0	3.1	6.7	51	67	25	41
Other W. Europe	15.8	23.9	7.0	15.0	4.0	9.9	44	62	25	41
Japan	19.8	31.7	7.5	18.3	1.6	5.0	38	58	8	16
Canada	13.4	17.8	5.9	10.8	2.4	5.3	44	61	18	30
Eastern Europe	8.8	8.0	3.4	4.6	1.6	3.2	39	58	19	40
Former USSR	19.6	19.3	4.2	6.4	0.8	3.0	21	33	4	15
Baltic states	NA	0.2	NA	0.2	NA	0.1	NA	68	NA	59
Russia	NA	8.3	NA	3.0	NA	1.6	NA	36	NA	19
Other former USSR	19.6	10.8	4.2	3.3	0.8	1.3	21	30	4	12
Israel	3.6	4.1	1.9	2.7	0.9	1.7	53	66	25	42
Near East/N. Africa	1.0	1.2	0.5	0.7	0.3	0.5	51	62	32	47
Other Africa	2.0	2.8	0.8	1.7	0.5	1.1	42	61	25	41
India	7.3	5.5	1.2	1.8	0.4	0.7	16	32	5	13
Central America	0.8	1.5	0.4	1.0	0.3	0.7	52	66	33	47
South America	3.7	5.4	1.7	3.4	0.8	2.0	45	62	20	37
Aust. & N. Zealand	6.9	9.4	2.4	4.9	1.1	2.7	34	52	16	29
China	0.6	2.4	0.3	1.2	0.2	0.8	47	52	32	35
Asian NIEs[b]	0.4	3.4	0.2	2.1	0.1	1.0	47	62	30	30
Other Asian/Pacific	0.7	1.1	0.4	0.9	0.3	0.7	57	76	44	63
Biology										
World[a]	189.1	171.7	51.6	69.1	10.5	19.6	27	40	6	11
United States	73.7	62.9	25.7	29.0	5.0	8.3	35	46	7	13
United Kingdom	18.0	14.4	4.2	6.3	2.0	3.5	23	44	11	25
Germany	11.4	9.8	3.0	4.0	1.6	2.5	26	41	14	26
France	6.9	7.6	2.8	4.2	1.1	2.1	40	55	16	28
Italy	2.4	3.3	1.0	1.9	0.4	0.9	43	58	16	28
Other S. Europe	2.2	6.7	0.8	3.1	0.5	1.7	35	46	21	25
Nordic countries	5.6	7.9	1.8	3.6	1.0	2.1	33	46	17	27
Other W. Europe	7.6	8.9	2.2	4.4	1.2	2.8	29	49	16	31
Japan	12.6	13.7	3.7	6.4	0.7	1.6	29	47	6	12
Canada	14.3	14.5	4.4	6.7	1.6	2.8	31	46	11	19
Eastern Europe	5.0	2.9	1.5	1.5	0.7	1.1	30	52	13	37
Former USSR	5.4	4.4	0.9	1.1	0.2	0.5	17	24	3	12
Baltic states	NA	0.1	NA	0.0	NA	0.0	NA	53	NA	47
Russia	NA	2.3	NA	0.5	NA	0.3	NA	23	NA	13
Other former USSR	5.4	2.1	0.9	0.5	0.2	0.2	17	24	3	10
Israel	2.3	2.3	1.0	1.4	0.4	0.8	41	59	19	33
Near East/N. Africa	1.6	1.8	0.7	1.0	0.5	0.8	43	58	29	46
Other Africa	4.4	4.8	1.4	2.5	0.9	1.8	31	52	21	37
India	8.1	3.6	1.1	1.1	0.4	0.5	14	30	5	15
Central America	1.0	1.9	0.5	1.1	0.4	0.8	49	58	42	45
South America	2.8	3.9	1.3	2.3	0.8	1.6	46	59	30	40
Aust. & N. Zealand	11.6	12.4	3.5	5.6	1.2	2.4	30	45	11	19
China	1.2	1.3	0.3	0.9	0.2	0.7	28	65	16	53
Asian NIEs[b]	0.6	2.0	0.2	1.0	0.2	0.6	42	53	32	29
Other Asian/Pacific	1.6	2.3	0.7	1.5	0.6	1.3	45	68	38	59

Appendix table 5-53.
Coauthored and internationally coauthored scientific and technical articles for selected countries, by field: 1981-85 and 1991-95

	Number of articles (in thousands)						Percent of total articles			
	Total		Multi-author		Internationally coauthored		Multi-author		Internationally coauthored	
Country	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95
Chemistry										
World[a]	273.4	296.1	62.4	101.1	15.0	31.5	23	34	5	11
United States	59.1	69.9	16.7	27.1	5.4	10.1	28	39	9	14
United Kingdom	19.0	19.9	5.8	9.3	3.2	5.0	31	47	17	25
Germany	24.7	29.6	6.7	11.8	3.4	6.7	27	40	14	23
France	16.6	20.4	6.4	10.7	2.6	5.7	39	52	16	28
Italy	8.6	10.5	4.2	6.6	1.3	2.7	49	63	15	26
Other S. Europe	7.8	15.5	2.7	7.8	1.1	4.5	35	50	14	29
Nordic countries	5.7	7.8	2.1	4.1	1.2	2.8	36	53	21	36
Other W. Europe	12.1	15.4	3.6	7.2	2.3	4.9	30	47	19	32
Japan	29.6	33.6	7.1	12.4	1.1	2.6	24	37	4	8
Canada	9.1	10.0	2.7	4.0	1.7	2.5	30	39	18	25
Eastern Europe	17.2	16.8	5.5	8.2	2.5	5.0	32	49	14	30
Former USSR	46.7	35.2	7.0	7.8	1.0	3.6	15	22	2	10
Baltic states	NA	0.4	NA	0.2	NA	0.2	NA	43	NA	38
Russia	NA	15.6	NA	3.8	NA	1.8	NA	24	NA	12
Other former USSR	46.7	19.2	7.0	3.9	1.0	1.6	15	20	2	8
Israel	2.0	1.9	0.7	1.1	0.5	0.7	37	56	23	39
Near East/N. Africa	3.2	4.7	1.1	2.2	0.6	1.5	34	47	20	31
Other Africa	1.7	1.8	0.6	0.8	0.4	0.6	34	45	23	32
India	15.3	12.4	2.0	2.8	0.7	1.0	13	22	4	8
Central America	0.6	1.0	0.3	0.7	0.2	0.4	54	64	44	41
South America	2.5	3.9	0.7	2.1	0.4	1.3	30	54	17	34
Aust. & N. Zealand	5.4	5.5	1.6	2.6	0.8	1.4	30	47	15	25
China	0.8	6.1	0.3	2.4	0.2	1.1	33	39	22	18
Asian NIEs[b]	1.1	7.4	0.3	3.2	0.2	1.2	27	44	15	17
Other Asian/Pacific	0.6	1.2	0.2	0.7	0.2	0.5	41	61	35	45
Physics										
World[a]	240.2	339.4	68.1	148.8	23.3	63.7	28	44	10	19
United States	73.2	102.7	29.2	56.1	10.6	25.7	40	55	14	25
United Kingdom	16.6	22.8	5.6	12.5	4.0	9.1	34	55	24	40
Germany	22.6	37.7	8.8	21.1	6.2	16.3	39	56	27	43
France	17.3	26.8	8.4	17.6	4.9	12.2	49	66	28	45
Italy	8.0	15.5	5.6	12.0	2.5	7.8	70	78	32	50
Other S. Europe	4.6	13.1	2.3	8.7	1.4	6.7	49	66	31	51
Nordic countries	6.7	11.9	3.4	8.2	2.8	7.0	51	69	42	59
Other W. Europe	14.9	23.3	6.8	14.6	5.8	12.6	46	63	39	54
Japan	20.8	40.1	6.2	19.2	1.5	6.0	30	48	7	15
Canada	8.4	12.1	3.4	7.0	2.2	5.0	40	58	26	41
Eastern Europe	9.2	15.4	3.5	9.8	2.3	8.4	38	64	25	55
Former USSR	40.2	47.8	3.9	14.8	1.5	11.1	10	31	4	23
Baltic states	NA	0.7	NA	0.4	NA	0.4	NA	56	NA	51
Russia	NA	21.4	NA	8.0	NA	6.3	NA	37	NA	30
Other former USSR	40.2	25.6	3.9	6.4	1.5	4.4	10	25	4	17
Israel	3.3	5.1	1.6	3.2	1.3	2.6	49	63	38	51
Near East/N. Africa	1.1	2.3	0.5	1.3	0.4	1.0	46	57	35	44
Other Africa	0.8	1.3	0.3	0.7	0.2	0.5	40	56	31	42
India	8.9	9.1	2.1	3.7	0.8	1.8	24	40	9	20
Central America	0.8	1.8	0.5	1.1	0.3	0.8	55	63	39	45
South America	3.0	6.8	1.2	4.4	0.8	3.2	41	64	25	47
Aust. & N. Zealand	3.8	5.5	1.1	2.6	0.7	1.9	28	47	18	35
China	2.1	11.2	0.7	6.7	0.4	2.7	33	60	19	24
Asian NIEs[b]	0.9	7.6	0.4	4.3	0.2	2.1	40	57	25	28
Other Asian/Pacific	0.5	0.8	0.2	0.5	0.1	0.4	38	62	31	52

Appendix table 5-53.
Coauthored and internationally coauthored scientific and technical articles for selected countries, by field: 1981-85 and 1991-95

	Number of articles (in thousands)						Percent of total articles			
	Total		Multi-author		Internationally coauthored		Multi-author		Internationally coauthored	
Country	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95
Earth and space sciences										
World[a]	84.3	107.2	29.5	53.4	9.5	21.8	35	50	11	20
United States	38.3	49.1	17.0	28.6	5.5	11.9	45	58	14	24
United Kingdom	8.5	11.0	3.5	6.5	2.4	4.8	41	60	28	43
Germany	5.1	7.7	2.4	4.9	1.8	4.0	46	63	35	52
France	4.4	7.2	2.5	5.2	1.5	3.7	56	73	33	51
Italy	2.0	4.1	1.3	3.2	0.8	2.0	64	78	37	50
Other S. Europe	1.2	4.2	0.6	2.6	0.5	1.8	53	63	40	44
Nordic countries	2.5	5.1	1.2	3.3	0.9	2.5	48	64	35	48
Other W. Europe	3.6	6.2	1.8	3.9	1.4	3.2	49	64	40	52
Japan	2.4	5.0	1.1	3.1	0.4	1.6	46	62	18	32
Canada	5.6	8.8	2.5	5.2	1.4	3.2	45	59	26	36
Eastern Europe	1.4	2.0	0.5	1.2	0.4	1.0	38	61	25	51
Former USSR	8.3	7.1	1.5	2.7	0.4	1.9	19	38	5	27
Baltic states	NA	0.1	NA	0.1	NA	0.1	NA	68	NA	63
Russia	NA	3.4	NA	1.4	NA	1.1	NA	42	NA	32
Other former USSR	8.3	3.5	1.5	1.2	0.4	0.7	19	34	5	21
Israel	0.8	1.2	0.4	0.7	0.3	0.5	53	63	37	46
Near East/N. Africa	0.5	0.9	0.2	0.5	0.2	0.4	51	56	42	42
Other Africa	1.0	1.7	0.4	0.9	0.3	0.7	38	55	30	39
India	2.6	2.5	0.6	0.9	0.3	0.5	23	37	11	21
Central America	0.3	0.7	0.2	0.5	0.2	0.4	59	71	53	61
South America	1.1	2.2	0.6	1.6	0.5	1.4	54	73	47	60
Aust. & N. Zealand	3.9	4.9	1.5	2.9	1.0	2.0	38	58	25	40
China	1.4	1.4	0.4	0.9	0.2	0.7	31	66	18	52
Asian NIEs[b]	0.1	1.0	0.1	0.6	0.1	0.4	52	61	45	44
Other Asian/Pacific	0.2	0.5	0.1	0.3	0.1	0.3	60	71	55	64
Engineering and technology										
World[a]	149.7	146.4	38.2	52.7	8.0	15.4	25	36	5	11
United States	62.2	54.9	19.2	23.5	4.4	7.5	31	43	7	14
United Kingdom	12.9	11.2	3.0	4.2	1.6	2.3	23	37	12	20
Germany	11.8	11.1	2.9	4.3	1.3	2.5	25	39	11	22
France	5.2	7.2	1.8	3.7	0.8	1.9	35	51	15	27
Italy	2.5	4.0	1.0	2.2	0.3	1.1	40	54	14	27
Other S. Europe	2.1	4.9	0.7	2.3	0.4	1.4	33	47	21	29
Nordic countries	3.2	3.8	0.9	1.7	0.5	1.2	28	46	17	31
Other W. Europe	5.4	5.9	1.6	2.7	1.1	1.9	30	46	20	33
Japan	15.8	15.6	5.2	6.8	0.8	1.9	33	44	5	12
Canada	7.2	8.0	2.4	3.6	1.3	2.0	34	45	18	25
Eastern Europe	3.6	3.6	1.0	1.7	0.6	1.3	28	48	17	37
Former USSR	10.6	7.9	1.7	2.1	0.2	1.0	16	26	2	13
Baltic states	NA	0.1	NA	0.0	NA	0.0	NA	50	NA	45
Russia	NA	3.3	NA	1.0	NA	0.6	NA	29	NA	17
Other former USSR	10.6	4.4	1.7	1.1	0.2	0.4	16	24	2	10
Israel	1.8	1.6	0.7	0.8	0.4	0.6	37	50	25	36
Near East/N. Africa	1.6	2.2	0.7	1.0	0.5	0.8	43	46	34	35
Other Africa	1.0	0.7	0.3	0.3	0.2	0.2	29	40	16	28
India	4.8	4.5	1.3	1.5	0.4	0.5	27	34	9	12
Central America	0.2	0.3	0.1	0.2	0.1	0.1	52	57	45	43
South America	0.9	1.3	0.4	0.8	0.3	0.5	47	58	29	38
Aust. & N. Zealand	3.1	3.1	0.8	1.3	0.5	0.9	26	42	15	27
China	1.0	4.0	0.4	1.7	0.4	1.0	41	42	34	26
Asian NIEs[b]	1.1	7.3	0.4	3.2	0.3	1.6	39	43	28	22
Other Asian/Pacific	0.4	0.4	0.2	0.3	0.1	0.2	44	62	40	51

Appendix table 5-53.
Coauthored and internationally coauthored scientific and technical articles for selected countries, by field: 1981-85 and 1991-95

	Number of articles (in thousands)						Percent of total articles			
	Total		Multi-author		Internationally coauthored		Multi-author		Internationally coauthored	
Country	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95	1981-85	1991-95
Mathematics										
World[a]	48.1	39.8	11.5	14.4	5.2	7.4	24	36	11	19
United States	20.0	17.3	7.2	8.1	3.2	4.1	36	47	16	24
United Kingdom	3.6	2.9	1.1	1.3	0.9	1.0	31	45	25	36
Germany	4.5	3.3	1.0	1.4	0.8	1.2	22	42	18	36
France	3.4	4.0	1.0	1.8	0.7	1.2	30	46	21	29
Italy	1.0	1.6	0.4	0.9	0.3	0.6	41	56	27	39
Other S. Europe	1.0	1.7	0.2	0.8	0.2	0.7	25	49	19	39
Nordic countries	1.3	1.2	0.4	0.6	0.4	0.5	33	49	28	41
Other W. Europe	2.3	2.2	0.7	1.1	0.6	0.9	31	49	26	42
Japan	2.6	1.7	0.5	0.6	0.3	0.3	20	35	12	19
Canada	2.9	2.5	1.2	1.4	1.0	1.2	43	56	37	47
Eastern Europe	2.0	1.7	0.6	0.9	0.5	0.8	29	52	23	47
Former USSR	2.9	1.6	0.3	0.4	0.1	0.4	9	27	3	22
Baltic states	NA	0.0	NA	0.0	NA	0.0	NA	75	NA	63
Russia	NA	0.6	NA	0.2	NA	0.2	NA	37	NA	33
Other former USSR	2.9	1.0	0.3	0.2	0.1	0.1	9	19	3	15
Israel	1.0	1.0	0.5	0.6	0.4	0.5	47	60	41	55
Near East/N. Africa	0.4	0.3	0.2	0.2	0.2	0.2	35	48	34	45
Other Africa	0.3	0.2	0.1	0.1	0.1	0.1	29	48	25	37
India	1.7	0.5	0.4	0.2	0.2	0.2	26	42	14	31
Central America	0.1	0.2	0.1	0.1	0.0	0.1	44	57	38	43
South America	0.5	0.8	0.2	0.4	0.2	0.3	46	58	38	46
Aust. & N. Zealand	1.2	1.1	0.4	0.6	0.4	0.5	36	55	30	49
China	0.5	1.3	0.3	0.5	0.2	0.4	48	43	43	34
Asian NIEs[b]	0.3	0.8	0.1	0.4	0.1	0.3	43	47	35	38
Other Asian/Pacific	0.1	0.2	0.1	0.1	0.1	0.1	39	58	39	55

NA = not available; NIEs = newly industrialized economies

NOTE: Details may not add to totals because of rounding.

[a]International collaboration rates for the entire world cannot be compared to country rates because, regardless of the number of countries involved, an internationally coauthored article is counted only once.

[b]Data for Hong Kong are included with United Kingdom through 1986.

SOURCE: Institute for Scientific Information, Science Citation Index; CHI Research Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

Code	Country/region	Collaborating country (by country code) 1981-85																
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**13**	**14**	**15**	**16**	**17**	**19**
	Articles (thousands)	697.9	84.5	168.5	100.4	145.0	11.8	19.2	3.8	0.1	35.4	29.1	48.0	4.9	1.4	16.7	1.6	18.1
	Multi-author (%)	45	43	35	46	34	42	45	42	58	41	43	56	37	52	37	46	53
	International (%)	9	18	15	18	16	20	24	23	46	19	29	19	23	39	13	31	23
1	United States		12	13	7	11	1	2	0	0	3	4	4	1	0	1	0	2
2	Canada	47		10	8	4	0	1	0	0	2	2	1	0	0	0	0	1
3	United Kingdom	28	6		7	8	1	2	1	0	4	3	5	1	1	1	0	2
4	France	23	6	9		10	1	5	0	0	3	6	7	1	1	2	0	1
5	Germany	25	2	9	8		3	2	0	0	4	7	4	1	0	1	0	2
6	Austria	16	2	8	5	28		2	0	0	3	8	5	0	0	1	0	1
7	Belgium	19	3	9	18	9	1		0	0	9	5	5	0	0	2	0	1
8	Ireland	17	6	38	7	5	0	3		0	3	1	4	0	0	1	0	1
9	Luxembourg	0	1	7	29	14	1	10	6		9	3	10	0	0	0	0	4
10	Netherlands	24	3	13	8	12	1	6	0	0		4	5	0	0	1	0	2
11	Switzerland	22	2	9	11	18	2	3	0	0	3		9	1	0	1	0	2
13	Italy	25	2	13	13	9	1	2	0	0	4	8		0	0	2	0	1
14	Greece	31	4	18	9	11	1	2	0	0	2	5	2		0	1	0	1
15	Portugal	22	2	25	17	7	0	1	1	0	2	2	2	0		2	0	1
16	Spain	20	2	13	20	8	1	4	0	0	3	4	8	0	0		0	1
17	Turkey	36	3	18	4	17	1	2	0	0	1	1	3	1	0	1		1
19	Denmark	22	4	12	5	9	1	1	0	0	3	4	2	0	0	1	0	
20	Finland	23	4	9	5	8	1	2	0	0	3	3	2	0	0	0	0	4
21	Norway	22	3	12	4	9	1	2	0	0	2	2	2	0	1	0	0	9
22	Sweden	26	2	9	5	9	1	2	0	0	3	4	4	0	0	1	0	9
23	Iceland	26	6	21	3	6	0	0	0	0	1	1	0	0	0	0	0	11
24	Bulgaria	4	1	3	6	22	3	1	0	0	1	0	3	1	0	0	0	1
25	Hungary	18	3	6	5	19	3	2	0	0	3	2	4	0	0	0	0	1
26	Poland	17	4	8	10	19	1	2	0	0	3	4	5	0	0	1	0	1
27	Czechoslovakia	6	2	4	5	20	1	2	0	0	2	1	3	0	0	0	0	1
28	Czech Republic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
29	Slovakia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
31	USSR	8	1	2	6	25	1	1	0	0	2	2	3	0	0	0	0	2
32	Russia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
33	Ukraine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
34	Baltic states	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
36	Japan	49	5	6	4	9	1	1	0	0	2	2	1	0	0	0	0	1
37	China	48	5	7	7	8	0	1	0	0	1	2	2	0	0	1	0	0
38	Taiwan	51	6	4	0	4	0	0	0	0	0	0	0	0	0	0	0	0
39	South Korea	57	5	3	2	5	0	1	0	0	0	1	1	0	0	0	0	0
40	Singapore	21	7	16	2	1	0	0	0	0	0	2	0	0	0	0	0	0

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

Code	Country/region	Collaborating country (by country code) 1981-85																
		1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**13**	**14**	**15**	**16**	**17**	**19**
41	Hong Kong	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
42	India	34	9	12	4	10	0	1	0	0	2	2	3	0	0	0	0	1
44	Australia	33	7	21	4	5	1	1	0	0	2	2	1	0	0	0	0	2
45	New Zealand	29	8	18	2	5	1	1	0	0	1	1	1	0	0	0	0	1
46	Israel	55	3	7	5	11	0	1	0	0	2	3	2	0	0	0	0	1
48	Argentina	32	3	8	9	10	0	1	0	0	2	1	4	0	0	2	0	1
49	Brazil	37	6	9	10	8	0	1	0	0	1	2	4	0	0	1	0	1
50	Chile	37	5	7	7	8	0	1	0	0	2	1	2	0	0	7	0	1
52	Mexico	51	6	5	8	5	0	1	0	0	0	2	2	0	0	4	0	0
54	Egypt	31	4	13	7	12	1	1	0	0	1	1	1	0	0	0	0	2
56	South Africa	30	5	20	3	10	0	1	0	0	2	2	1	0	0	0	0	1

Code	Country/region	1981-85 **20**	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**31**	**32**	**33**	**34**	**36**	**37**	**38**
	Articles (thousands)	13.4	11.2	35.3	0.3	5.5	11.4	20.6	16.5	NA	NA	152.9	NA	NA	NA	138.4	9.1	2.8
	Multi-author (%)	50	49	54	58	33	44	31	36	NA	NA	16	NA	NA	NA	33	37	43
	International (%)	17	21	20	44	19	21	18	15	NA	NA	3	NA	NA	NA	6	23	26
1	United States	1	1	3	0	0	1	1	0	0	0	1	0	0	0	7	2	1
2	Canada	1	1	1	0	0	1	1	0	0	0	0	0	0	0	3	1	0
3	United Kingdom	1	1	3	0	0	1	1	0	0	0	0	0	0	0	2	1	0
4	France	1	1	2	0	0	1	2	1	0	0	1	0	0	0	2	1	0
5	Germany	1	1	3	0	1	2	3	2	0	0	5	0	0	0	3	1	0
6	Austria	1	1	2	0	1	2	2	1	0	0	2	0	0	0	2	0	0
7	Belgium	1	1	3	0	0	1	1	1	0	0	1	0	0	0	2	0	0
8	Ireland	1	1	2	0	0	0	1	0	0	0	0	0	0	0	1	0	0
9	Luxembourg	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Netherlands	1	1	3	0	0	1	2	1	0	0	1	0	0	0	2	0	0
11	Switzerland	1	1	3	0	0	1	1	0	0	0	1	0	0	0	2	0	0
13	Italy	1	1	3	0	0	1	2	1	0	0	2	0	0	0	1	0	0
14	Greece	1	0	2	0	1	0	0	1	0	0	1	0	0	0	1	0	0
15	Portugal	1	5	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16	Spain	0	0	2	0	0	0	1	0	0	0	1	0	0	0	1	1	0
17	Turkey	0	0	2	0	0	0	0	1	0	0	0	0	0	0	2	0	0
19	Denmark	2	5	15	0	0	1	1	0	0	0	1	0	0	0	1	0	0
20	Finland		3	16	0	0	1	1	2	0	0	4	0	0	0	1	0	0
21	Norway	3		16	0	0	0	2	1	0	0	1	0	0	0	1	0	0
22	Sweden	5	6		0	0	1	2	1	0	0	1	0	0	0	2	1	0
23	Iceland	4	4	15		0	0	0	0	0	0	0	0	0	0	0	0	0
24	Bulgaria	0	0	1	0		3	5	7	0	0	31	0	0	0	1	0	0

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

Code	Country/region	Collaborating country (by country code) 1981-85																
		20	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**	**31**	**32**	**33**	**34**	**36**	**37**	**38**
25	Hungary	1	0	2	0	1		3	5	0	0	12	0	0	0	2	0	0
26	Poland	1	1	4	0	1	2		4	0	0	5	0	0	0	1	0	0
27	Czechoslovakia	2	1	2	0	3	5	6		0	0	25	0	0	0	1	0	0
28	Czech Republic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
29	Slovakia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
31	USSR	2	1	2	0	7	6	5	13	0	0		0	0	0	1	0	0
32	Russia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
33	Ukraine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
34	Baltic states	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
36	Japan	0	0	2	0	0	1	1	0	0	0	1	0	0	0		2	2
37	China	0	0	2	0	0	0	0	0	0	0	0	0	0	0	8		0
38	Taiwan	0	0	0	0	0	0	0	0	0	0	0	0	0	0	24	1	
39	South Korea	0	0	1	0	0	0	0	0	0	0	0	0	0	0	18	0	0
40	Singapore	0	0	2	0	0	1	0	0	0	0	0	0	0	0	3	0	0
41	Hong Kong	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
42	India	0	0	2	0	0	0	0	1	0	0	1	0	0	0	5	0	0
44	Australia	1	0	2	0	0	0	0	0	0	0	0	0	0	0	2	1	0
45	New Zealand	0	1	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0
46	Israel	0	0	2	0	0	0	0	0	0	0	0	0	0	0	1	0	0
48	Argentina	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
49	Brazil	0	0	1	0	0	0	1	0	0	0	0	0	0	0	2	0	0
50	Chile	0	1	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
52	Mexico	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0	0
54	Egypt	0	1	1	0	0	1	1	1	0	0	1	0	0	0	2	0	0
56	South Africa	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0

Code	Country/region	1981-85												
		39	**40**	**41**	**42**	**44**	**45**	**46**	**48**	**49**	**50**	**52**	**54**	**56**
	Articles (thousands)	1.7	1.1	NA	55.7	43.2	9.4	22.6	5.6	8.3	3.3	4.0	5.6	9.9
	Multi-author (%)	44	35	NA	19	35	32	54	35	47	44	55	40	47
	International (%)	31	22	NA	6	14	15	24	13	25	22	31	20	14
1	United States	1	0	0	2	3	1	5	0	1	1	1	1	1
2	Canada	0	0	0	2	3	1	1	0	1	0	1	0	0
3	United Kingdom	0	0	0	2	5	1	2	0	1	0	0	1	1
4	France	0	0	0	1	1	0	1	0	1	0	1	0	0
5	Germany	0	0	0	1	1	0	2	0	1	0	0	1	1
6	Austria	0	0	0	1	2	0	1	0	0	0	0	0	0

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

Code	Country/region	Collaborating country (by country code) 1981-85												
		39	**40**	**41**	**42**	**44**	**45**	**46**	**48**	**49**	**50**	**52**	**54**	**56**
7	Belgium	0	0	0	1	1	0	1	0	0	0	0	0	0
8	Ireland	0	0	0	1	2	0	1	0	0	0	0	0	0
9	Luxembourg	0	0	0	0	0	0	0	0	0	0	0	0	0
10	Netherlands	0	0	0	1	1	0	2	0	0	0	0	0	0
11	Switzerland	0	0	0	1	1	0	2	0	0	0	0	0	0
13	Italy	0	0	0	1	1	0	1	0	1	0	0	0	0
14	Greece	0	0	0	0	1	0	1	0	0	0	0	0	0
15	Portugal	0	0	0	0	1	0	1	0	1	0	0	0	0
16	Spain	0	0	0	0	1	0	0	1	1	2	2	0	0
17	Turkey	0	0	0	1	0	0	1	0	0	0	0	0	0
19	Denmark	0	0	0	1	2	0	1	0	0	0	0	0	0
20	Finland	0	0	0	0	2	0	1	0	0	0	0	0	0
21	Norway	0	0	0	1	1	0	1	0	0	0	0	0	0
22	Sweden	0	0	0	1	1	0	1	0	0	0	0	0	0
23	Iceland	0	0	0	0	1	0	0	0	0	0	0	0	0
24	Bulgaria	0	0	0	1	0	0	0	0	0	0	0	0	0
25	Hungary	0	0	0	0	1	0	0	0	0	0	0	0	0
26	Poland	0	0	0	0	1	0	0	0	0	0	0	0	0
27	Czechoslovakia	0	0	0	1	0	0	0	0	0	0	0	0	0
28	Czech Republic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
29	Slovakia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
31	USSR	0	0	0	1	0	0	0	0	0	0	0	0	0
32	Russia	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
33	Ukraine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
34	Baltic states	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
36	Japan	1	0	0	2	2	0	1	0	1	0	0	0	0
37	China	0	0	0	0	3	0	0	0	0	0	0	0	0
38	Taiwan	0	0	0	1	0	0	1	0	0	0	0	0	1
39	South Korea		0	0	0	0	0	0	0	0	0	0	0	0
40	Singapore	0		0	6	12	1	0	0	1	1	1	1	1
41	Hong Kong	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
42	India	0	0	0		3	0	1	0	1	0	0	0	0
44	Australia	0	1	0	1		5	1	0	0	0	0	0	1
45	New Zealand	0	0	0	1	21		0	0	0	0	0	0	1
46	Israel	0	0	0	0	1	0		0	0	0	0	0	1
48	Argentina	0	0	0	0	1	0	1		10	3	2	0	0
49	Brazil	0	0	0	1	1	0	1	3		1	1	0	0

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

Code	Country/region	Collaborating country (by country code) 1981-85: 39	40	41	42	44	45	46	48	49	50	52	54	56
50	Chile	0	0	0	1	3	0	1	3	4		1	0	0
52	Mexico	0	0	0	1	0	0	0	1	2	1		0	0
54	Egypt	0	0	0	1	0	0	0	0	0	0	0		0
56	South Africa	0	0	0	0	5	1	6	0	0	0	0	0	

Code	Country/region	1991-95: 1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	17	19
	Articles (thousands)	773.7	103.9	186.2	132.2	174.6	16.1	24.1	5.0	0.1	52.7	38.1	76.9	9.3	4.5	46.1	5.8	21.9
	Multi-author (%)	56	57	52	61	50	61	64	59	71	61	59	70	57	67	54	53	65
	International (%)	16	28	26	32	30	37	42	38	67	31	45	33	37	48	29	25	39
1	United States		10	10	8	10	1	2	0	0	3	3	5	1	0	2	0	2
2	Canada	41		8	8	5	1	1	0	0	2	2	3	0	0	1	0	1
3	United Kingdom	23	4		7	8	1	2	1	0	4	3	6	1	1	4	0	2
4	France	20	5	8		10	1	4	0	0	3	5	6	1	1	5	0	1
5	Germany	22	3	7	8		3	2	0	0	4	6	5	1	0	2	0	2
6	Austria	16	2	6	6	24		1	0	0	3	6	4	1	0	2	0	2
7	Belgium	15	2	9	16	9	1		1	0	9	4	5	1	1	3	0	1
8	Ireland	16	4	27	6	8	1	3		0	4	3	4	1	1	3	0	2
9	Luxembourg	6	1	7	17	10	1	15	2		4	5	9	4	1	3	0	4
10	Netherlands	19	3	11	8	12	1	6	0	0		4	5	1	1	3	0	2
11	Switzerland	19	3	8	11	16	2	2	0	0	4		8	1	1	2	0	1
13	Italy	22	3	10	10	9	1	2	0	0	3	6		1	1	4	0	2
14	Greece	17	3	12	11	11	2	3	0	0	2	5	5		2	3	0	2
15	Portugal	12	2	14	12	8	1	4	0	0	4	4	6	3		6	0	1
16	Spain	18	2	12	15	9	1	2	0	0	3	3	8	1	1		0	2
17	Turkey	25	2	14	4	13	1	2	0	0	3	4	5	1	0	2		1
19	Denmark	18	3	11	6	10	1	2	0	0	4	3	4	1	0	2	0	
20	Finland	19	3	7	5	8	1	2	0	0	3	3	3	1	1	2	0	4
21	Norway	18	3	8	6	7	1	2	0	0	3	3	3	2	1	2	0	7
22	Sweden	20	3	8	5	8	1	2	0	0	3	3	4	1	1	2	0	7
23	Iceland	22	2	10	4	5	1	2	0	0	2	1	1	1	1	0	0	13
24	Bulgaria	10	2	4	7	19	2	1	0	0	2	3	7	2	0	4	0	1
25	Hungary	22	3	7	7	16	3	2	0	0	3	4	5	0	0	1	0	1
26	Poland	17	3	6	9	16	1	2	0	0	3	3	6	1	1	2	0	2
27	Czechoslovakia	11	3	6	7	18	3	2	0	0	3	3	4	1	0	2	0	2
28	Czech Republic	11	2	7	9	15	3	3	0	0	3	3	6	2	1	2	0	1
29	Slovakia	9	2	5	8	12	4	4	0	0	2	3	4	2	1	1	0	1

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

Code	Country/region	Collaborating country (by country code) 1991-95																
		1	2	3	4	5	6	7	8	9	10	11	13	14	15	16	17	19
31	USSR	17	2	5	7	19	1	1	0	0	2	3	6	1	0	2	0	1
32	Russia	16	3	5	8	15	1	2	0	0	2	3	5	1	0	1	0	1
33	Ukraine	8	2	3	5	10	1	1	0	0	3	1	4	1	0	2	1	1
34	Baltic states	9	3	4	4	13	0	1	0	0	2	1	4	0	0	1	0	1
36	Japan	40	5	7	4	7	1	1	0	0	2	2	3	0	0	1	0	1
37	China	28	6	7	5	9	1	1	0	0	2	2	5	1	0	1	0	1
38	Taiwan	62	3	3	2	3	0	0	0	0	0	1	1	0	0	0	0	0
39	South Korea	50	3	3	3	4	0	0	0	0	1	1	2	0	0	1	0	0
40	Singapore	22	5	17	2	3	0	1	0	0	1	2	1	0	0	0	0	1
41	Hong Kong	23	6	16	1	3	1	0	0	0	0	1	1	0	0	0	0	0
42	India	28	6	10	5	10	1	1	0	0	2	2	5	0	0	1	0	1
44	Australia	29	6	16	4	7	1	1	0	0	2	2	2	0	0	1	0	1
45	New Zealand	28	7	14	3	6	1	1	0	0	2	1	1	0	0	0	0	1
46	Israel	45	4	6	7	11	1	1	0	0	2	3	4	0	0	1	0	1
48	Argentina	25	3	4	10	9	1	1	0	0	1	1	5	0	0	11	0	1
49	Brazil	27	4	9	10	7	0	2	0	0	1	3	6	1	2	3	0	1
50	Chile	31	4	5	7	8	0	2	0	0	2	1	4	0	0	8	0	0
52	Mexico	35	4	5	8	5	0	1	0	0	1	2	3	0	0	7	0	0
54	Egypt	28	4	8	4	10	2	1	0	0	2	1	4	0	0	1	1	1
56	South Africa	24	5	15	3	11	1	2	0	0	2	2	3	1	0	2	0	1

Code	Country/region	1991-95 20	21	22	23	24	25	26	27	28	29	31	32	33	34	36	37	38
	Articles (thousands)	17.9	13.1	42.7	0.7	5.9	10.1	22.9	9.3	4.4	2.3	58.4	59.3	8.8	1.9	200.6	30.8	17.0
	Multi-author (%)	66	64	65	70	50	67	54	52	61	59	23	33	32	57	50	52	51
	International (%)	32	36	36	54	33	49	42	33	46	41	9	21	25	51	13	29	18
1	United States	1	1	3	0	0	1	2	0	0	0	1	2	0	0	8	2	1
2	Canada	1	1	2	0	0	1	1	0	0	0	0	1	0	0	4	2	0
3	United Kingdom	1	1	3	0	0	1	1	0	0	0	1	1	0	0	3	1	0
4	France	1	1	2	0	0	1	2	0	1	0	1	2	0	0	2	1	0
5	Germany	1	1	3	0	1	2	3	1	1	0	2	4	0	0	3	1	0
6	Austria	1	1	2	0	0	2	2	1	1	1	1	1	0	0	2	2	0
7	Belgium	1	1	3	0	0	1	2	0	1	0	1	2	0	0	2	1	0
8	Ireland	1	1	2	0	0	1	1	0	0	0	0	2	0	0	2	1	0
9	Luxembourg	2	1	0	0	0	1	1	0	1	0	0	0	0	0	1	0	0
10	Netherlands	1	1	3	0	0	1	2	0	0	0	1	2	0	0	3	1	0
11	Switzerland	1	1	2	0	0	1	2	0	0	0	1	2	0	0	2	1	0
13	Italy	1	1	2	0	0	1	2	0	0	0	1	3	0	0	2	1	0

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

Code	Country/region	Collaborating country (by country code) 1991-95																
		20	21	22	23	24	25	26	27	28	29	31	32	33	34	36	37	38
14	Greece	2	2	2	0	1	0	2	0	1	0	1	2	0	0	1	2	0
15	Portugal	2	2	3	0	0	1	2	0	1	0	1	2	0	0	1	0	0
16	Spain	1	1	2	0	0	0	1	0	0	0	1	1	0	0	1	1	0
17	Turkey	1	0	1	0	1	0	1	0	0	0	0	2	1	0	2	0	0
19	Denmark	3	4	11	1	0	1	2	1	0	0	1	2	0	0	2	1	0
20	Finland		3	10	0	0	2	2	0	1	0	2	4	0	1	3	1	0
21	Norway	3		12	1	0	1	2	1	1	0	1	2	0	0	2	1	0
22	Sweden	4	4		0	0	1	2	1	0	0	1	2	0	1	3	1	0
23	Iceland	5	9	12		0	0	0	0	0	0	0	0	0	0	2	1	0
24	Bulgaria	1	0	2	0		2	3	2	1	0	8	6	1	0	3	0	0
25	Hungary	3	1	3	0	1		1	1	0	0	2	2	0	0	3	1	0
26	Poland	2	1	4	0	1	1		1	1	1	2	4	1	0	2	0	0
27	Czechoslovakia	1	1	3	0	1	2	4		1	0	10	3	0	0	2	0	0
28	Czech Republic	2	2	2	0	1	1	3	1		4	0	6	1	0	2	0	0
29	Slovakia	2	2	4	0	0	1	5	1	8		0	7	2	0	2	1	0
31	USSR	2	1	3	0	3	2	4	5	0	0		0	0	0	2	1	0
32	Russia	2	1	3	0	1	1	3	1	1	1	0		5	1	3	1	0
33	Ukraine	1	0	2	0	1	1	7	1	1	2	0	29		1	2	0	1
34	Baltic states	8	2	14	0	1	0	3	0	1	0	0	16	2		1	0	0
36	Japan	1	0	2	0	0	1	1	0	0	0	0	2	0	0		4	1
37	China	1	0	2	0	0	1	1	0	0	0	0	1	0	0	11		1
38	Taiwan	0	0	1	0	0	0	0	0	0	0	0	1	0	0	8	3	
39	South Korea	0	0	1	0	0	0	1	0	0	0	0	2	0	0	19	2	1
40	Singapore	1	0	2	0	0	0	0	0	0	0	0	0	0	0	7	6	3
41	Hong Kong	0	0	2	0	0	0	0	0	0	0	0	0	0	0	3	20	4
42	India	1	0	1	0	0	1	1	0	0	0	1	1	0	0	5	1	0
44	Australia	0	0	3	0	0	0	1	0	0	0	0	1	0	0	4	2	0
45	New Zealand	1	1	2	0	0	0	1	0	0	0	0	0	0	0	4	1	0
46	Israel	0	0	1	0	0	0	1	0	0	0	1	2	0	0	2	0	0
48	Argentina	1	0	3	0	0	0	1	0	0	0	0	0	0	0	1	0	0
49	Brazil	1	1	1	0	0	0	1	0	1	0	0	2	0	0	3	1	0
50	Chile	0	0	2	0	0	0	1	0	0	0	0	0	0	0	1	1	0
52	Mexico	0	0	1	0	0	0	1	0	0	0	0	3	1	0	1	1	0
54	Egypt	1	0	1	0	0	1	1	0	0	0	1	1	0	0	4	1	0
56	South Africa	1	0	1	0	0	0	2	0	0	0	0	1	0	0	2	0	1

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

Code	Country/region	Collaborating country (by country code) 1991-95												
		39	**40**	**41**	**42**	**44**	**45**	**46**	**48**	**49**	**50**	**52**	**54**	**56**
	Articles (thousands)	11.5	3.9	5.1	43.8	52.2	10.4	25.6	8.3	15.7	4.5	7.2	6.7	10.9
	Multi-author (%)	60	43	56	33	51	50	66	55	63	65	62	49	53
	International (%)	28	26	35	13	24	28	37	31	40	40	41	27	22
1	United States	1	0	0	1	3	1	4	1	2	1	1	0	1
2	Canada	0	0	0	1	3	1	1	0	1	0	0	0	0
3	United Kingdom	0	0	1	1	4	1	1	0	1	0	0	0	1
4	France	0	0	0	1	1	0	1	1	2	0	1	0	0
5	Germany	0	0	0	1	2	0	2	0	1	0	0	0	1
6	Austria	0	0	0	1	1	0	1	0	0	0	0	1	1
7	Belgium	0	0	0	1	1	0	1	0	1	0	0	0	0
8	Ireland	0	0	0	0	1	0	1	0	0	0	0	0	0
9	Luxembourg	0	0	0	1	0	0	0	0	1	0	0	0	0
10	Netherlands	0	0	0	1	1	0	1	0	0	0	0	0	0
11	Switzerland	0	0	0	1	1	0	1	0	1	0	0	0	0
13	Italy	0	0	0	1	1	0	1	0	1	0	0	0	0
14	Greece	0	0	0	0	0	0	1	0	1	0	0	0	0
15	Portugal	0	0	0	0	0	0	1	0	4	0	0	0	0
16	Spain	0	0	0	1	1	0	1	2	1	1	1	0	0
17	Turkey	0	0	0	0	0	0	2	0	0	0	0	1	0
19	Denmark	0	0	0	0	1	0	1	0	0	0	0	0	0
20	Finland	0	0	0	0	1	0	1	0	1	0	0	0	0
21	Norway	0	0	0	0	1	0	1	0	1	0	0	0	0
22	Sweden	0	0	0	0	2	0	1	0	1	0	0	0	0
23	Iceland	0	0	0	0	1	0	1	0	0	0	0	0	0
24	Bulgaria	0	0	0	1	1	0	1	0	0	0	0	0	0
25	Hungary	0	0	0	1	1	0	1	0	0	0	0	0	0
26	Poland	0	0	0	0	1	0	1	0	1	0	0	0	0
27	Czechoslovakia	0	0	0	1	0	0	0	0	1	0	0	0	0
28	Czech Republic	0	0	0	0	1	0	1	0	2	0	1	0	0
29	Slovakia	0	0	0	1	1	0	0	0	1	0	0	0	0
31	USSR	0	0	0	1	1	0	1	0	0	0	0	0	0
32	Russia	1	0	0	1	1	0	2	0	1	0	1	0	0
33	Ukraine	0	0	0	0	0	0	0	0	1	0	1	0	0
34	Baltic states	0	0	0	0	0	0	1	0	0	0	0	0	0
36	Japan	2	0	0	1	2	0	1	0	1	0	0	0	0

Appendix table 5-54.
Patterns of international coauthorship in scientific and technical research: 1981-85 and 1991-95
(Percentages)

		Collaborating country (by country code)												
		1991-95												
Code	Country/region	39	40	41	42	44	45	46	48	49	50	52	54	56
37	China	1	1	4	1	3	0	0	0	1	0	0	0	0
38	Taiwan	1	1	3	1	1	0	1	0	0	0	0	0	1
39	South Korea		0	0	1	1	0	0	0	1	0	0	0	0
40	Singapore	0		2	2	10	1	0	0	1	0	0	0	0
41	Hong Kong	0	1		1	5	1	0	0	1	0	0	0	0
42	India	0	0	0		2	0	0	0	1	0	1	0	0
44	Australia	0	1	1	1		4	1	0	1	0	0	0	1
45	New Zealand	0	0	1	1	17		1	0	0	0	0	0	1
46	Israel	0	0	0	0	1	0		0	1	0	0	0	1
48	Argentina	0	0	0	0	1	0	1		8	3	2	0	1
49	Brazil	0	0	0	1	1	0	1	3		1	1	0	1
50	Chile	0	0	0	1	1	0	1	4	4		2	0	1
52	Mexico	0	0	0	1	1	0	1	1	3	2		0	0
54	Egypt	0	0	0	1	0	0	0	0	0	0	0		0
56	South Africa	0	0	0	1	0	5	1	4	1	1	1	0	

NOTES: Listed countries received at least 0.3 percent of all citations for all natural science and engineering fields combined. Hong Kong data were included with United Kingdom through 1986. Details may not add to totals because of rounding.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research, Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

See figure 5-28.

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
All natural science and engineering fields																																		
1	United States	67	3	6	3	4	0	1	2	1	1	1	0	1	0	0	1	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
2	Canada	42	25	7	3	4	0	1	2	1	2	1	0	1	1	0	1	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	0
3	United Kingdom	37	3	30	4	5	0	1	2	2	2	1	1	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	1
4	France	38	3	7	24	6	0	1	2	2	2	1	1	1	0	0	1	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	1
5	Germany	37	3	6	4	27	1	1	2	2	2	1	0	1	1	0	1	0	1	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
6	Austria	38	3	7	4	9	15	1	2	2	2	1	1	1	1	0	2	0	1	1	0	0	4	0	0	0	0	0	0	1	0	0	0	1
7	Belgium	37	3	8	6	6	0	17	3	2	2	1	1	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	1
8	Netherlands	38	3	8	4	6	0	1	21	2	2	1	0	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
9	Switzerland	42	3	7	4	8	1	1	2	16	3	1	0	1	1	0	1	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	1
10	Italy	37	3	8	4	6	1	1	2	2	21	1	1	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
11	Spain	33	3	7	5	5	0	1	2	2	3	22	1	1	1	0	1	0	1	1	0	0	5	0	0	0	0	0	1	1	0	0	1	1
12	Other W./S. Europe	34	3	9	4	6	1	1	2	1	3	2	16	1	1	1	2	0	1	1	0	0	5	1	0	0	0	0	1	1	0	0	0	1
13	Denmark	35	4	9	4	6	0	1	3	2	2	1	1	20	1	1	4	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
14	Finland	37	4	8	3	5	1	1	2	2	2	1	0	1	20	1	4	0	1	1	0	0	4	0	0	0	0	0	0	2	0	0	0	0
15	Norway	35	4	9	3	5	0	1	3	1	2	1	1	2	1	19	4	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	1
16	Sweden	36	3	7	3	5	0	1	2	1	2	1	0	2	1	1	23	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
17	Poland	29	3	6	5	8	1	1	2	2	3	1	1	1	1	0	2	21	1	1	1	0	6	1	0	0	0	0	1	1	0	0	1	0
18	Other E. Europe	32	3	6	5	8	1	1	2	2	3	2	1	1	1	0	2	1	18	1	1	0	6	1	0	0	0	0	1	1	0	0	1	1
19	Israel	45	3	6	4	6	0	1	2	2	2	1	0	1	0	0	1	0	0	18	0	0	4	0	0	0	0	0	0	1	0	0	0	1
20	Russia	35	3	6	5	9	0	1	2	2	3	1	1	1	1	0	1	1	1	1	17	1	7	1	0	0	0	0	1	1	0	0	0	0
21	Other former USSR	33	3	6	5	9	1	1	2	2	3	1	1	1	1	0	2	1	1	1	3	12	8	1	0	0	0	0	1	1	0	0	0	0
22	Japan	35	3	5	3	4	0	1	1	1	2	1	0	0	0	0	1	0	0	1	0	0	37	0	0	0	0	0	0	1	0	0	0	0
23	China	35	3	5	4	7	0	1	2	1	2	1	1	1	0	0	1	1	1	1	0	0	9	19	1	1	0	0	1	1	0	0	0	1
24	Taiwan	41	3	6	3	4	0	1	2	1	2	1	1	0	0	0	1	0	0	1	0	0	8	1	19	0	0	0	1	1	0	0	0	1
25	South Korea	44	3	5	3	4	0	1	2	1	2	1	1	0	0	0	1	0	1	1	0	0	12	1	1	12	0	0	1	1	0	0	1	0
26	Singapore	36	3	9	3	3	0	1	2	2	2	1	1	0	1	0	1	0	1	1	0	0	7	1	2	0	16	0	1	3	0	0	0	1
27	Hong Kong	38	4	10	4	5	0	1	2	1	2	1	1	1	1	0	1	0	0	1	0	0	6	2	1	0	0	11	2	3	0	0	1	1
28	India	31	3	6	4	5	0	1	1	1	2	1	1	0	0	0	1	1	1	1	0	0	6	1	1	0	0	0	29	1	0	0	1	1
29	Australia	37	4	9	3	4	0	1	2	1	2	1	0	1	0	0	2	0	0	1	0	0	4	0	0	0	0	0	0	23	1	0	0	1
30	New Zealand	36	4	11	3	4	0	1	2	2	3	1	1	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	5	16	0	0	1
31	Brazil	36	4	7	5	5	0	1	2	1	3	1	1	1	0	0	1	0	0	1	0	0	5	1	0	0	0	0	1	1	0	18	2	1
32	Other C. & S. America	38	4	7	4	5	0	1	2	1	3	3	1	1	0	0	1	0	1	1	0	0	4	0	0	0	0	0	1	2	0	1	17	1
33	All other countries	30	3	9	5	4	0	1	2	1	2	1	1	1	1	0	1	0	1	1	0	0	4	1	0	0	0	0	2	3	0	1	1	24

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Clinical medicine																																		
1	United States	67	3	6	3	3	0	1	2	1	2	1	0	1	1	0	1	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
2	Canada	46	20	8	3	3	0	1	2	1	2	1	0	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	0
3	United Kingdom	37	3	31	3	4	1	1	2	1	2	1	1	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	1
4	France	42	3	9	18	4	1	1	2	2	3	1	0	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	2	0	0	0	1
5	Germany	42	3	8	4	20	1	1	2	2	3	1	0	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
6	Austria	41	3	9	4	8	11	1	3	3	3	1	1	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	1
7	Belgium	40	4	9	5	5	1	15	3	2	3	1	1	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	2	0	0	0	1
8	Netherlands	40	3	10	3	5	1	1	19	2	2	1	0	1	1	1	2	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	0
9	Switzerland	44	3	9	4	6	1	1	2	13	3	1	0	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	2	0	0	0	1
10	Italy	40	3	9	4	4	1	1	2	2	18	1	1	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
11	Spain	41	3	9	5	4	1	1	2	2	4	15	1	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	1	1
12	Other W./S. Europe	39	4	11	4	4	1	1	3	1	4	1	11	1	1	1	2	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	1
13	Denmark	36	3	10	3	4	0	1	3	2	2	1	0	19	1	1	4	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	1
14	Finland	39	3	9	3	4	1	1	2	1	2	0	1	1	19	1	3	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	0
15	Norway	37	4	9	3	4	1	1	3	2	2	1	1	2	1	18	5	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	1
16	Sweden	37	3	9	3	4	1	1	2	1	2	1	0	2	2	1	23	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
17	Poland	38	3	9	4	7	1	1	2	2	4	2	1	1	1	0	3	10	1	1	0	0	5	0	0	0	0	0	1	1	1	0	0	0
18	Other E. Europe	37	3	9	4	6	1	1	2	2	3	1	1	1	1	1	3	0	15	1	0	0	5	0	0	0	0	0	0	2	0	0	0	0
19	Israel	47	4	7	3	3	1	1	2	2	2	1	0	1	1	0	2	0	0	16	0	0	4	0	0	0	0	0	0	2	0	0	0	1
20	Russia	42	5	9	5	5	1	1	3	2	3	1	1	1	1	0	3	0	1	1	9	0	4	0	0	0	0	0	0	2	0	0	0	0
21	Other former USSR	39	3	11	5	8	0	0	2	2	3	0	1	1	2	1	4	0	0	1	1	7	4	0	0	0	0	0	0	1	0	0	0	1
22	Japan	39	3	7	3	4	0	1	1	1	2	1	0	1	1	0	1	0	0	1	0	0	31	0	0	0	0	0	0	1	0	0	0	0
23	China	40	3	8	3	4	0	1	2	1	3	1	1	1	1	1	2	0	0	1	0	0	10	11	1	0	0	1	1	1	0	0	0	1
24	Taiwan	41	3	8	3	4	0	1	2	1	3	1	1	1	1	1	2	0	0	1	0	0	9	1	13	0	0	1	1	2	0	0	0	1
25	South Korea	49	2	6	3	3	1	1	2	2	3	1	1	1	1	0	1	0	0	1	0	0	10	0	1	7	0	0	1	1	0	0	0	1
26	Singapore	40	3	11	4	3	0	1	1	1	3	2	1	0	1	0	1	0	0	1	0	0	8	1	2	0	9	1	1	3	1	0	0	2
27	Hong Kong	38	3	13	4	3	0	1	2	1	3	1	1	1	1	0	2	0	0	1	0	0	6	1	0	0	0	11	1	2	1	0	0	1
28	India	34	3	9	3	3	0	1	2	1	2	1	1	1	1	0	1	0	0	1	0	0	4	0	0	0	0	0	22	1	0	1	1	4
29	Australia	41	4	11	3	4	0	1	2	2	2	1	0	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	18	1	0	0	1
30	New Zealand	38	4	12	4	4	1	1	2	2	4	1	1	1	1	1	2	0	0	1	0	0	4	0	0	0	0	0	0	4	11	0	0	1
31	Brazil	42	4	10	4	3	0	1	2	1	3	1	1	1	1	0	1	0	0	1	0	0	5	0	0	0	0	0	1	2	0	15	2	2
32	Other C. & S. America	43	3	7	5	4	0	1	2	1	3	1	1	1	1	0	1	0	0	1	0	0	4	0	0	0	0	0	1	2	0	1	14	1
33	All other countries	35	3	12	4	3	1	1	2	2	2	1	1	1	1	1	2	0	0	1	0	0	3	0	1	0	0	0	1	2	0	1	1	19

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	Biomedical research																																	
1	United States	68	3	6	3	4	0	0	1	2	1	0	0	0	0	0	1	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
2	Canada	47	21	6	4	5	0	1	2	2	1	1	0	1	0	0	1	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
3	United Kingdom	42	3	27	4	6	0	1	2	2	1	1	0	1	0	0	1	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
4	France	42	3	7	22	5	0	1	2	2	2	1	0	1	0	0	1	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
5	Germany	43	3	7	4	24	1	1	2	2	1	1	0	1	0	0	1	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
6	Austria	43	4	6	4	9	14	1	2	2	2	1	1	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	0
7	Belgium	38	3	7	6	6	0	17	4	2	1	1	1	1	0	0	1	0	1	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
8	Netherlands	40	3	7	5	6	0	1	21	2	1	1	0	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
9	Switzerland	47	2	7	4	7	0	1	2	16	2	0	0	1	0	0	1	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
10	Italy	42	3	7	4	5	1	1	2	2	19	1	0	1	1	0	2	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
11	Spain	38	4	8	5	5	1	1	2	2	2	20	0	1	1	0	1	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	1	0
12	Other W./S. Europe	39	3	9	4	7	1	1	3	1	3	1	13	1	1	1	2	0	1	1	0	0	5	0	0	0	0	0	1	1	0	0	0	1
13	Denmark	39	4	7	4	6	0	1	3	2	1	1	0	20	1	1	3	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
14	Finland	41	3	7	4	5	1	1	3	2	1	1	0	1	19	0	3	0	0	1	0	0	5	0	0	0	0	0	0	1	0	0	0	0
15	Norway	40	3	8	4	6	1	1	2	1	2	1	0	1	1	18	3	0	0	1	0	0	4	0	0	0	0	0	0	1	0	0	0	0
16	Sweden	42	3	6	4	5	0	1	2	2	1	1	0	1	1	1	21	0	0	1	0	0	4	0	0	0	0	0	0	2	0	0	0	0
17	Poland	40	3	6	5	7	1	1	1	2	2	1	1	1	1	0	2	14	1	1	1	0	6	0	0	0	0	0	0	1	0	0	0	0
18	Other E. Europe	41	4	8	5	6	1	1	2	2	2	1	1	1	1	0	2	0	12	1	0	0	6	0	0	0	0	0	0	1	0	0	0	0
19	Israel	49	3	7	4	6	0	0	2	2	1	1	0	0	0	0	1	0	0	16	0	0	5	0	0	0	0	0	0	1	0	0	0	0
20	Russia	43	3	7	5	7	0	1	2	2	1	1	0	1	1	0	2	0	1	1	13	0	5	0	0	0	0	0	1	1	0	0	0	0
21	Other former USSR	42	3	9	4	7	1	2	3	1	2	1	0	1	0	0	2	1	0	1	1	8	6	0	0	0	0	0	0	2	0	0	1	0
22	Japan	41	3	6	3	4	0	1	1	1	1	1	0	0	0	0	1	0	0	1	0	0	31	0	0	0	0	0	0	1	0	0	0	0
23	China	39	3	7	4	5	0	1	2	1	3	1	1	0	1	0	1	0	0	1	0	0	8	15	0	0	0	0	1	2	0	0	0	1
24	Taiwan	45	3	6	4	4	0	1	1	1	1	1	1	0	0	0	1	0	0	1	0	0	8	1	18	0	0	0	1	1	0	0	0	0
25	South Korea	51	4	7	3	4	0	1	2	1	1	0	0	0	0	0	2	0	0	1	0	0	11	0	0	8	0	0	1	1	0	0	0	0
26	Singapore	42	4	12	3	4	1	2	1	2	1	1	0	1	0	0	1	0	1	1	0	0	6	0	1	0	13	0	1	2	0	0	0	1
27	Hong Kong	44	4	8	4	5	0	1	2	0	1	1	0	0	2	1	1	0	1	0	0	0	6	1	1	0	1	12	0	2	0	0	1	0
28	India	41	3	7	3	5	0	1	1	1	2	1	1	0	1	0	2	0	0	1	0	0	5	0	0	0	0	0	19	1	0	0	1	1
29	Australia	42	4	9	4	5	0	1	2	2	1	1	0	1	0	0	2	0	0	1	0	0	5	0	0	0	0	0	0	19	0	0	0	1
30	New Zealand	39	4	10	4	4	0	0	2	2	1	0	0	1	1	0	1	0	0	1	0	0	5	0	0	0	0	0	0	4	17	0	1	0
31	Brazil	39	4	9	5	4	0	1	2	1	2	1	1	1	0	0	2	0	0	1	0	0	5	0	0	0	0	0	0	2	0	17	2	1
32	Other C. & S. America	40	4	8	5	5	0	1	2	1	2	2	0	1	0	0	1	0	0	1	0	0	5	0	0	0	0	0	0	2	0	1	16	1
33	All other countries	35	3	10	4	3	1	1	2	1	2	1	0	0	1	0	2	0	0	1	0	0	5	0	0	0	0	0	1	3	0	0	1	21

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Biology																																		
1	United States	68	5	5	2	3	0	0	2	1	1	1	0	0	0	0	1	0	0	1	0	0	3	0	0	0	0	0	0	2	1	0	1	1
2	Canada	34	38	6	2	3	0	0	2	0	1	1	0	1	0	1	2	0	0	0	0	0	2	0	0	0	0	0	0	3	1	0	0	1
3	United Kingdom	28	5	36	3	4	0	1	3	1	1	1	1	1	1	1	2	0	0	1	0	0	3	0	0	0	0	0	0	4	1	0	1	2
4	France	28	5	8	29	5	0	1	3	1	1	2	1	1	1	1	1	0	0	1	0	0	4	0	0	0	0	0	0	3	1	0	1	2
5	Germany	28	4	8	3	32	1	1	3	2	1	1	0	1	1	0	2	0	1	1	0	0	4	0	0	0	0	0	0	3	1	0	1	1
6	Austria	29	6	7	3	10	17	1	3	1	2	2	1	2	1	0	4	0	0	0	0	0	4	0	0	0	0	0	0	2	0	0	1	1
7	Belgium	30	4	8	6	6	1	19	4	2	1	2	1	1	1	1	3	0	0	1	0	0	3	0	0	0	0	0	1	2	1	0	0	1
8	Netherlands	26	6	8	4	5	0	1	31	1	1	1	0	1	0	1	3	0	0	1	0	0	3	0	0	0	0	0	0	3	1	0	1	1
9	Switzerland	37	4	8	4	7	0	0	4	19	1	1	0	1	1	0	2	0	0	1	0	0	4	0	0	0	0	0	1	1	0	0	1	1
10	Italy	29	4	7	5	6	0	1	2	2	24	3	1	1	0	0	1	0	1	2	0	0	4	0	0	0	0	0	1	4	0	0	1	1
11	Spain	27	5	7	4	4	0	1	2	1	2	28	2	1	1	1	2	0	0	1	0	0	3	0	0	0	0	0	1	3	1	0	1	1
12	Other W./S. Europe	28	5	10	4	5	1	1	4	1	2	2	19	1	1	1	2	0	1	1	0	0	3	0	0	0	0	0	1	4	1	0	1	2
13	Denmark	24	7	11	4	5	0	1	4	1	2	1	0	25	1	1	4	0	0	1	0	0	3	0	0	0	0	0	0	3	1	0	0	0
14	Finland	26	6	10	3	4	0	1	3	1	1	1	0	1	26	2	6	0	1	1	0	0	2	0	0	0	0	0	0	2	0	0	0	1
15	Norway	23	8	12	3	3	0	1	2	0	1	1	1	2	2	27	6	0	0	0	0	0	3	0	0	0	0	0	0	1	1	0	1	1
16	Sweden	28	6	8	2	4	0	1	4	1	1	1	0	1	1	2	30	0	1	1	0	0	2	0	0	0	0	0	1	3	1	0	0	1
17	Poland	26	5	8	4	7	1	1	2	1	2	1	2	2	2	0	4	19	1	1	0	0	6	0	0	0	0	0	1	3	1	0	1	1
18	Other E. Europe	24	3	9	5	7	0	1	4	1	2	2	1	0	0	1	2	1	19	1	1	0	7	0	0	0	0	0	1	2	1	0	1	1
19	Israel	35	4	6	3	4	0	1	2	0	1	2	1	1	0	0	1	0	0	26	0	0	5	0	0	0	0	0	0	3	1	0	0	1
20	Russia	33	5	10	4	6	0	0	1	1	1	2	1	0	1	1	3	1	1	0	13	1	7	1	1	0	0	0	0	3	0	0	1	1
21	Other former USSR	41	6	8	5	10	1	1	2	0	2	1	1	0	2	2	4	0	1	0	1	7	2	1	0	0	0	0	1	1	0	1	1	1
22	Japan	29	3	5	3	5	0	1	2	1	1	1	0	0	0	0	1	0	0	1	0	0	43	0	0	0	0	0	0	2	0	0	0	1
23	China	30	8	6	3	5	0	1	2	1	3	1	2	1	0	0	1	0	1	0	0	0	11	13	1	1	0	1	1	2	2	0	1	2
24	Taiwan	34	5	3	2	3	0	0	1	1	2	0	0	0	1	0	0	0	1	1	0	0	8	1	29	0	0	0	1	1	0	0	2	1
25	South Korea	44	4	7	2	6	0	1	1	1	2	0	2	0	0	1	0	0	0	0	0	0	13	1	1	6	0	0	1	1	0	0	0	0
26	Singapore	29	7	7	2	2	0	1	2	1	0	2	0	0	0	1	2	1	1	0	0	0	8	1	1	0	25	1	3	2	2	0	1	3
27	Hong Kong	35	3	7	4	1	2	1	3	0	2	2	1	1	0	0	0	1	0	1	0	0	2	3	4	1	2	8	1	13	1	0	1	3
28	India	27	4	6	3	4	0	1	1	1	3	2	1	0	0	0	1	0	1	1	0	0	3	1	0	0	0	0	29	5	1	0	1	3
29	Australia	27	5	8	2	3	0	0	2	1	0	1	0	0	0	0	1	0	0	1	0	0	2	0	0	0	0	0	0	40	2	0	1	2
30	New Zealand	28	5	9	2	3	0	1	3	1	1	0	1	1	1	0	1	0	0	1	0	0	2	0	0	0	0	0	1	9	30	0	1	1
31	Brazil	33	5	6	4	4	0	1	2	2	1	1	0	0	0	0	1	0	2	1	0	0	4	0	0	0	0	0	2	3	1	23	2	2
32	Other C. & S. America	37	5	6	2	3	0	0	2	1	2	2	1	1	0	0	1	0	0	1	0	0	3	0	0	0	0	0	1	4	1	1	21	3
33	All other countries	25	4	8	4	4	1	1	2	1	1	2	1	1	0	0	1	0	0	1	0	0	2	0	0	0	0	0	2	6	1	0	2	31

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Chemistry																																		
1	United States	62	3	5	3	6	0	0	1	1	2	1	1	0	0	0	1	0	1	1	0	0	6	0	0	0	0	0	1	1	0	0	0	0
2	Canada	32	28	5	4	6	0	1	2	1	3	2	1	0	0	0	1	1	1	1	0	0	6	0	0	0	0	0	1	1	0	0	0	1
3	United Kingdom	29	3	30	4	7	0	1	2	1	2	2	1	0	0	0	1	0	1	0	0	0	7	1	0	0	0	0	1	1	0	0	1	1
4	France	28	3	6	31	6	0	1	2	1	2	2	1	0	0	0	1	1	1	1	0	0	7	1	0	0	0	0	1	1	0	0	0	1
5	Germany	27	3	5	4	38	1	1	2	2	2	1	1	0	0	0	1	1	1	1	0	0	6	1	0	0	0	0	1	1	0	0	0	0
6	Austria	26	3	5	4	11	24	1	1	2	2	2	1	1	0	0	1	1	2	0	0	1	7	0	0	0	0	0	1	1	0	0	0	1
7	Belgium	28	4	6	6	7	0	21	3	2	3	2	1	1	0	1	2	2	1	0	1	0	6	0	1	0	0	0	1	1	0	0	1	1
8	Netherlands	31	3	6	5	6	1	1	25	2	3	2	0	1	0	0	2	1	1	1	0	0	7	1	0	0	0	0	1	1	0	0	0	0
9	Switzerland	33	3	7	4	9	1	1	2	22	4	1	1	0	0	0	1	1	1	0	0	0	6	1	0	0	0	0	1	1	0	0	0	1
10	Italy	27	3	6	5	6	0	1	2	2	29	2	1	0	0	0	1	0	1	1	0	0	7	1	0	0	0	0	1	1	0	0	0	0
11	Spain	24	3	5	5	6	0	1	2	1	3	29	1	0	0	0	1	1	1	0	0	0	6	1	1	0	0	0	1	1	0	0	1	1
12	Other W./S. Europe	25	3	7	4	6	0	1	2	1	3	3	25	1	0	0	1	1	2	0	0	0	7	1	1	0	0	0	1	1	0	0	1	1
13	Denmark	30	4	6	5	7	0	1	1	2	2	1	1	23	0	0	4	0	2	1	1	0	7	0	0	0	0	0	1	1	0	0	0	0
14	Finland	32	3	5	4	7	0	0	2	1	2	2	1	1	22	0	3	1	2	0	0	0	5	0	1	0	0	0	0	1	0	0	0	1
15	Norway	30	4	4	4	6	0	2	2	2	2	1	1	1	0	19	5	1	1	0	0	0	7	0	0	0	0	0	1	1	0	0	0	0
16	Sweden	28	3	6	4	6	0	1	3	2	2	1	1	1	0	1	26	1	1	1	0	0	7	1	0	0	0	0	1	2	0	0	0	0
17	Poland	23	3	5	5	6	1	1	2	2	3	2	1	0	1	0	1	30	1	1	1	0	5	1	1	0	0	0	2	1	0	0	0	1
18	Other E. Europe	25	3	5	5	7	1	1	2	2	3	2	2	0	1	0	2	1	22	0	1	0	8	1	0	0	0	0	2	1	0	0	1	1
19	Israel	38	4	5	5	9	0	1	2	1	2	1	1	1	0	0	1	0	0	19	0	0	6	0	0	0	0	0	1	1	0	0	0	0
20	Russia	27	3	5	5	7	0	1	2	1	3	1	1	1	0	0	1	1	1	1	25	1	8	1	0	0	0	0	1	1	0	0	0	1
21	Other former USSR	20	2	5	4	8	0	1	2	2	3	2	2	1	1	0	2	2	2	0	5	21	10	1	1	1	0	0	1	1	0	0	0	1
22	Japan	27	2	4	3	5	0	0	1	1	1	1	0	0	0	0	1	0	1	0	0	0	47	1	0	0	0	0	1	1	0	0	0	0
23	China	28	2	5	4	7	0	0	1	1	2	2	1	0	0	0	1	1	1	1	0	0	10	24	1	1	0	0	2	1	0	0	0	1
24	Taiwan	34	3	4	3	5	0	1	2	1	2	1	1	0	0	0	1	1	0	0	0	0	8	1	27	1	0	0	2	1	0	0	1	1
25	South Korea	37	4	5	3	4	1	1	1	1	3	1	0	0	0	0	0	0	1	0	0	0	12	1	1	19	0	0	1	1	0	0	1	0
26	Singapore	32	3	8	4	4	0	1	3	3	3	3	0	0	1	0	1	0	1	0	0	0	7	2	2	1	16	0	1	2	0	1	1	1
27	Hong Kong	33	4	9	3	8	0	0	1	2	3	1	1	0	0	0	1	0	1	1	0	0	8	1	1	0	0	10	6	2	0	1	1	1
28	India	22	2	5	3	4	0	1	1	1	3	2	1	0	0	0	1	1	1	1	0	0	7	1	1	1	0	0	40	1	0	0	1	1
29	Australia	29	4	7	4	6	0	0	2	2	2	2	1	1	0	0	1	0	1	0	0	0	5	1	0	0	0	0	2	26	0	0	0	1
30	New Zealand	35	3	9	2	8	0	1	1	1	2	2	1	0	0	0	3	0	1	1	0	0	5	1	0	0	0	0	1	5	16	0	0	0
31	Brazil	28	5	6	5	6	0	1	2	1	3	2	2	0	0	0	1	0	1	0	0	0	6	1	0	0	0	0	1	1	0	23	1	1
32	Other C. & S. America	26	3	5	5	7	0	1	1	2	3	4	2	0	0	0	1	1	1	1	0	0	6	1	1	0	0	0	2	1	0	0	24	1
33	All other countries	19	3	5	7	6	0	1	1	1	2	2	2	0	0	0	1	1	1	0	0	0	6	1	1	0	0	0	3	1	0	0	1	33

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																															
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	Physics																																	
1	United States	63	2	4	4	7	0	0	1	2	2	1	1	1	0	0	1	0	0	1	1	0	5	0	0	0	0	0	1	1	0	0	0	0
2	Canada	38	25	5	5	7	0	0	1	2	2	1	1	1	0	0	1	1	1	1	1	0	5	1	0	0	0	0	1	1	0	0	0	0
3	United Kingdom	34	3	28	5	7	1	1	2	2	3	1	1	1	0	0	1	1	0	1	1	0	5	1	0	0	0	0	1	1	0	0	0	0
4	France	31	2	5	29	9	0	1	2	2	3	1	1	1	0	0	1	1	1	1	1	0	6	1	0	0	0	0	1	1	0	0	0	0
5	Germany	32	2	4	5	33	1	0	2	2	2	1	1	1	0	0	1	1	1	1	1	0	5	1	0	0	0	0	1	1	0	0	0	0
6	Austria	32	2	5	6	12	19	1	1	2	2	1	1	1	0	0	1	1	2	1	1	0	5	1	0	0	0	0	1	1	0	0	0	1
7	Belgium	32	2	5	7	8	0	20	3	2	2	1	1	0	0	0	2	1	1	2	1	0	5	0	0	0	0	0	1	0	0	0	0	0
8	Netherlands	35	2	6	5	9	1	1	23	2	2	1	1	1	0	0	1	1	0	1	1	0	5	0	0	0	0	0	1	1	0	0	0	0
9	Switzerland	37	2	5	5	11	0	1	2	18	5	1	1	1	0	0	1	1	1	1	1	0	4	0	0	0	0	0	0	0	0	0	0	0
10	Italy	31	2	6	6	9	1	1	2	3	24	1	1	1	0	0	1	1	1	1	1	0	5	1	0	0	0	0	1	1	0	0	0	0
11	Spain	30	3	5	7	9	0	1	2	2	4	21	1	1	0	0	1	1	1	1	1	0	4	1	0	0	0	0	1	1	0	1	1	0
12	Other W./S. Europe	33	3	6	5	10	1	0	2	2	3	1	17	1	0	0	1	1	1	1	1	0	6	1	0	0	0	0	1	1	0	1	1	0
13	Denmark	36	3	7	5	10	0	0	2	2	3	2	1	15	0	1	3	1	1	1	1	0	4	0	0	0	0	0	1	1	0	0	0	0
14	Finland	30	2	6	6	11	0	1	1	3	2	1	0	2	19	0	2	1	1	1	1	0	5	1	0	0	0	0	1	2	0	0	1	0
15	Norway	31	2	7	6	10	0	1	1	2	3	1	1	3	1	17	3	1	1	1	1	0	4	1	0	0	0	0	1	1	0	1	0	0
16	Sweden	32	2	6	5	9	1	1	2	2	2	1	1	2	1	0	19	1	1	1	1	0	6	0	0	0	0	0	0	1	0	0	1	0
17	Poland	26	2	5	7	11	1	1	3	2	3	1	1	1	0	0	1	21	1	1	1	0	6	1	0	0	0	0	1	1	0	1	1	0
18	Other E. Europe	31	3	5	6	12	1	1	1	2	3	1	1	0	1	0	1	1	17	1	1	0	5	1	0	0	0	0	1	1	0	0	1	0
19	Israel	41	2	5	5	9	0	0	2	2	2	1	1	1	0	0	1	1	1	18	1	0	3	0	0	0	0	0	1	1	0	0	0	0
20	Russia	33	2	5	6	11	0	1	2	2	3	1	1	1	1	0	1	1	1	1	16	1	7	1	0	0	0	0	1	0	0	0	0	0
21	Other former USSR	32	2	5	5	11	1	1	2	2	3	1	1	1	1	0	1	1	1	1	3	12	9	1	0	0	0	0	1	1	0	0	0	0
22	Japan	30	2	3	4	6	0	0	1	1	1	0	0	0	0	0	1	0	0	0	0	0	43	1	0	0	0	0	1	1	0	0	0	0
23	China	36	2	4	4	7	0	0	2	2	2	1	1	1	0	0	1	1	1	1	1	0	9	18	1	0	0	0	1	1	0	1	1	0
24	Taiwan	46	2	4	3	6	0	0	1	1	2	1	0	0	0	0	1	1	1	1	0	0	10	1	14	0	0	0	1	1	0	0	0	0
25	South Korea	46	2	4	3	6	0	0	2	2	2	1	1	1	0	0	1	1	1	1	1	0	12	1	1	11	0	0	1	1	0	0	0	0
26	Singapore	28	1	6	4	4	0	2	1	1	2	0	1	0	0	0	1	1	1	1	0	0	8	1	2	0	26	0	2	3	1	0	0	1
27	Hong Kong	44	3	6	3	5	1	1	2	1	1	1	1	0	0	1	0	0	1	3	1	0	7	4	2	0	1	10	1	1	0	0	0	0
28	India	33	2	4	5	7	0	1	1	2	2	1	1	1	0	0	1	1	1	1	0	0	6	2	1	1	0	0	25	1	0	1	1	0
29	Australia	33	3	7	4	8	0	1	2	2	2	1	1	1	0	0	1	1	1	1	1	0	6	1	0	0	0	0	1	23	0	0	0	0
30	New Zealand	27	3	9	8	9	1	0	1	2	2	1	0	0	1	0	1	0	1	0	0	0	8	1	0	0	0	0	1	5	16	0	0	1
31	Brazil	31	3	5	7	8	0	1	1	2	3	1	2	1	0	0	1	1	1	1	1	0	4	1	0	1	0	0	1	1	0	20	2	1
32	Other C. & S. America	33	2	5	5	8	1	1	2	2	3	4	1	1	0	0	0	1	1	1	1	0	3	1	0	0	0	0	1	1	0	2	17	0
33	All other countries	25	2	7	6	8	0	1	2	1	3	1	1	0	1	0	0	1	1	1	0	0	6	1	0	0	0	0	3	2	0	1	1	22

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Earth and space sciences																																		
1	United States	70	4	6	3	4	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	1	0
2	Canada	38	34	6	3	4	0	0	1	1	1	1	0	0	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	3	0	0	1	1
3	United Kingdom	41	4	28	4	5	0	0	2	1	2	1	1	1	0	1	1	0	0	0	0	0	2	0	0	0	0	0	1	3	0	0	1	1
4	France	39	5	6	25	5	0	1	2	1	3	1	1	1	0	0	1	0	0	1	1	0	2	0	0	0	0	0	0	2	0	0	1	1
5	Germany	43	4	7	5	22	0	0	2	1	2	1	1	1	0	1	1	0	0	0	0	0	2	0	0	0	0	0	1	2	0	0	1	1
6	Austria	39	7	4	5	11	15	1	1	4	2	1	1	0	1	1	1	0	2	0	0	0	1	0	0	0	1	0	1	2	0	0	0	1
7	Belgium	34	3	7	6	9	0	14	6	1	3	1	1	2	0	1	2	1	0	0	1	0	3	0	0	0	0	0	0	2	1	0	0	1
8	Netherlands	38	4	8	4	7	0	1	19	2	2	1	1	1	0	1	2	0	0	0	0	0	2	0	0	0	0	0	0	3	0	0	0	0
9	Switzerland	40	5	7	5	7	1	0	2	17	2	1	1	1	0	1	2	0	0	0	0	0	2	1	0	0	0	0	0	2	0	0	1	1
10	Italy	40	4	8	4	6	0	0	2	1	22	1	1	1	0	0	1	0	0	0	0	0	2	0	0	0	0	0	0	2	0	0	1	0
11	Spain	34	3	9	6	5	0	1	2	2	4	22	1	0	0	0	1	0	1	1	0	0	2	0	0	0	0	0	1	2	0	0	2	1
12	Other W./S. Europe	29	5	11	6	4	0	0	2	1	3	2	23	1	0	1	1	0	1	0	1	0	3	0	0	0	0	0	1	2	0	0	0	1
13	Denmark	35	7	8	4	5	0	1	3	1	3	1	1	20	0	2	4	0	0	0	1	0	1	0	0	0	0	0	0	2	0	0	1	1
14	Finland	32	9	7	1	6	0	1	2	1	2	0	1	1	22	1	6	0	0	0	1	0	2	0	0	0	0	0	0	2	0	0	0	0
15	Norway	37	7	8	3	5	0	0	3	1	2	1	1	2	0	22	3	0	0	0	0	0	2	0	0	0	0	0	0	1	0	0	0	0
16	Sweden	35	5	6	4	7	0	0	3	1	1	1	1	2	1	2	24	0	0	1	0	0	3	1	0	0	0	0	0	1	0	0	1	0
17	Poland	41	7	7	6	7	1	1	1	2	3	1	1	0	1	0	2	10	1	1	0	0	2	0	0	0	0	0	0	2	0	0	1	0
18	Other E. Europe	29	4	8	6	10	1	1	1	4	3	1	1	2	1	1	1	1	18	1	0	0	1	0	0	0	0	0	0	2	0	0	0	1
19	Israel	50	2	8	3	4	0	0	2	1	2	1	0	1	0	0	1	0	0	17	1	0	2	0	0	0	0	0	0	2	0	0	1	1
20	Russia	45	4	7	5	7	0	0	1	1	3	1	1	1	1	1	1	0	0	1	13	0	2	0	0	0	0	0	0	3	0	0	1	0
21	Other former USSR	43	3	6	5	6	0	1	1	1	4	2	1	1	1	1	2	1	1	0	2	7	2	0	1	0	0	0	1	3	1	0	1	1
22	Japan	41	4	7	4	4	0	0	2	1	2	1	0	0	0	0	1	0	0	0	0	0	26	1	0	0	0	0	1	2	0	0	1	1
23	China	37	4	6	8	7	0	1	1	1	2	1	1	2	1	0	0	0	1	1	0	0	5	16	0	0	0	0	1	2	0	0	0	0
24	Taiwan	51	4	5	3	3	0	0	3	1	1	1	1	1	1	0	1	0	1	1	0	0	4	1	12	0	0	0	1	2	0	1	0	1
25	South Korea	54	4	7	4	6	0	0	1	0	5	1	1	0	0	0	1	0	0	0	0	0	4	0	0	4	0	0	0	1	0	0	3	0
26	Singapore	43	10	0	5	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0	5	0	0	0	10	0	0	10	0	0	5	5
27	Hong Kong	28	5	11	2	5	0	0	6	2	2	3	2	0	0	0	0	0	0	0	0	0	5	2	0	2	0	12	0	12	2	0	2	2
28	India	34	3	8	3	5	0	1	1	1	3	1	1	0	0	0	1	1	0	0	0	0	3	0	0	0	0	0	28	3	0	1	0	1
29	Australia	38	6	8	3	4	0	0	2	1	1	0	0	0	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0	28	1	0	1	1
30	New Zealand	39	6	8	3	2	1	0	2	1	1	1	1	0	0	1	1	0	0	0	1	0	3	0	0	0	0	0	1	6	23	1	0	0
31	Brazil	42	6	8	6	3	0	0	2	2	4	1	0	1	0	0	1	0	0	0	0	0	2	1	0	0	0	0	1	3	0	14	1	1
32	Other C. & S. America	44	5	7	4	5	0	0	1	1	4	2	1	0	1	0	1	0	0	0	0	0	1	0	0	0	0	0	1	3	0	1	15	1
33	All other countries	33	5	8	6	5	0	0	1	1	1	1	1	0	0	0	0	0	0	1	0	0	2	0	0	0	0	0	1	4	0	1	1	24

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																														
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
	Engineering and technology																																	
1	United States	71	3	4	3	3	0	0	1	1	1	1	0	0	0	0	1	0	0	1	0	0	5	1	1	0	0	0	1	1	0	0	0	0
2	Canada	32	37	4	3	3	0	0	2	1	2	1	1	0	1	0	1	1	0	1	0	0	5	1	1	0	0	0	1	1	0	0	0	1
3	United Kingdom	29	4	39	3	4	0	0	2	1	2	1	1	0	0	0	1	1	0	0	0	0	5	1	0	0	0	0	1	1	0	0	0	1
4	France	27	2	5	34	6	0	0	3	1	2	1	1	0	0	0	1	1	1	0	0	0	7	1	0	0	0	0	1	1	0	1	1	1
5	Germany	26	2	5	4	41	1	1	2	1	2	1	1	0	0	0	1	1	1	0	0	0	7	1	0	0	0	0	1	1	0	0	0	0
6	Austria	28	2	5	8	10	23	0	1	3	2	0	1	0	0	0	1	1	2	0	0	0	8	1	0	1	0	0	0	0	0	0	0	0
7	Belgium	32	2	6	7	5	0	25	2	1	3	2	1	0	1	0	1	1	1	3	0	0	4	1	1	0	0	0	0	1	0	1	0	1
8	Netherlands	26	4	4	5	7	0	1	31	2	3	1	1	0	1	0	1	1	1	0	0	0	6	1	1	1	0	0	1	1	0	0	0	0
9	Switzerland	25	6	7	4	7	1	0	3	28	2	1	1	0	0	0	1	1	1	1	0	0	9	0	0	0	0	0	1	1	0	0	0	0
10	Italy	28	4	6	4	5	1	1	2	1	31	1	1	0	0	0	1	1	1	1	0	0	6	1	1	1	0	0	1	1	0	0	0	0
11	Spain	25	4	6	6	7	0	1	2	1	2	27	1	0	0	0	2	0	1	0	0	0	6	2	1	0	0	0	1	1	0	0	1	1
12	Other W./S. Europe	30	4	6	3	4	1	1	3	1	3	1	24	1	0	0	1	1	1	0	0	0	6	2	1	1	0	0	2	2	0	1	0	1
13	Denmark	29	3	6	4	6	1	1	2	1	1	1	1	29	1	2	1	0	0	1	1	0	3	2	1	0	0	1	1	1	1	0	0	2
14	Finland	25	5	5	4	4	1	0	2	1	2	1	1	1	32	0	3	1	1	1	1	0	4	1	1	1	0	0	0	2	1	0	0	0
15	Norway	39	7	5	5	5	0	1	2	2	2	1	1	1	0	19	3	1	1	1	0	1	2	1	0	1	0	0	1	1	0	1	0	1
16	Sweden	32	5	7	3	4	0	1	2	1	1	1	1	1	1	0	28	1	1	1	0	0	5	1	1	0	0	0	1	1	0	0	0	0
17	Poland	20	4	5	4	8	0	1	4	4	3	1	1	0	0	0	1	29	0	0	0	0	6	1	0	1	0	0	2	1	0	1	0	0
18	Other E. Europe	26	2	5	4	8	1	0	3	1	2	2	2	0	1	0	1	1	23	1	0	0	9	2	1	1	0	0	2	1	0	0	1	0
19	Israel	45	3	3	4	5	1	0	1	1	1	1	1	0	0	0	1	0	1	24	1	0	3	1	1	1	0	0	1	1	0	0	0	1
20	Russia	29	3	4	5	8	1	0	2	1	2	1	1	1	0	1	1	1	2	0	21	1	10	1	1	0	0	0	1	1	0	0	0	0
21	Other former USSR	29	4	4	6	8	0	0	1	2	2	1	2	0	2	0	1	3	1	0	2	12	10	2	0	0	0	0	2	1	0	0	0	0
22	Japan	24	2	3	2	4	0	0	1	1	1	1	1	0	0	0	1	0	0	0	0	0	53	1	1	0	0	0	1	1	0	0	0	0
23	China	31	4	5	3	6	1	0	1	0	1	1	2	0	0	0	1	1	0	0	0	0	9	25	2	1	0	1	2	1	0	0	0	1
24	Taiwan	41	3	4	2	3	0	0	1	0	1	1	1	0	0	0	1	0	1	1	0	0	7	1	25	1	0	0	2	1	0	0	0	0
25	South Korea	40	3	3	3	3	0	1	1	1	1	1	1	0	1	0	1	0	1	1	0	0	16	1	3	18	0	0	1	1	0	0	0	0
26	Singapore	38	3	8	4	2	0	1	2	1	2	1	1	0	1	0	1	0	0	1	0	0	4	2	2	0	16	0	3	6	0	1	1	1
27	Hong Kong	34	7	7	4	2	0	0	2	0	1	0	1	0	0	0	1	0	1	0	0	0	6	5	2	1	0	19	1	2	0	0	0	0
28	India	29	4	6	3	3	0	0	1	1	1	1	1	1	0	0	0	1	0	0	0	0	9	2	1	1	0	0	32	1	0	0	0	1
29	Australia	31	5	6	3	4	0	1	2	1	2	0	1	1	0	0	1	1	0	1	0	0	5	1	1	0	0	0	2	28	0	0	0	0
30	New Zealand	30	9	11	3	2	0	0	2	1	3	1	1	2	1	0	1	1	1	2	0	0	3	0	0	0	1	2	0	3	23	0	0	1
31	Brazil	31	3	6	7	4	0	0	2	2	3	1	2	0	0	1	0	1	0	1	0	0	6	0	1	0	0	0	2	2	0	24	1	0
32	Other C. & S. America	24	3	5	3	2	0	1	2	2	2	5	1	1	1	0	4	1	1	0	0	0	5	1	1	0	0	0	2	3	0	1	29	1
33	All other countries	23	5	6	6	4	0	1	1	0	2	1	2	0	0	0	1	0	1	1	0	0	6	1	1	0	0	0	3	1	0	1	0	30

Appendix table 5-55.
Selected countries' citations to the international scientific and technical literature: 1995 articles citing 1991-93 publications
(Percentages)

Code	Country/region	Citations received (by country code)																																
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33
Mathematics																																		
1	United States	69	3	4	4	3	0	0	1	1	1	1	1	1	0	0	1	0	1	1	0	0	3	1	0	0	0	0	0	1	0	1	0	0
2	Canada	36	33	6	3	4	1	0	1	1	2	1	1	1	0	1	0	0	0	1	0	0	2	2	0	0	0	0	0	2	1	0	0	0
3	United Kingdom	35	3	40	3	4	0	0	1	2	1	0	1	1	0	0	0	0	0	1	0	0	1	1	0	0	0	0	0	2	0	1	0	1
4	France	31	2	3	40	4	0	0	2	1	2	1	1	1	0	0	1	1	1	1	0	0	3	1	0	0	0	0	0	1	0	1	1	1
5	Germany	34	3	4	3	34	1	2	1	2	1	1	1	0	0	1	1	0	1	1	0	0	3	1	0	0	0	0	0	1	0	0	0	1
6	Austria	29	3	6	4	7	36	0	1	3	1	0	0	0	0	0	0	3	0	3	0	0	0	0	0	1	0	1	0	0	1	0	0	0
7	Belgium	38	1	4	7	8	0	24	5	1	2	2	0	0	0	0	0	0	2	0	0	0	3	1	0	0	0	0	0	2	0	2	0	1
8	Netherlands	23	5	3	4	6	1	2	34	1	3	1	2	0	0	1	1	0	1	1	0	0	6	0	0	0	1	0	1	3	0	2	1	0
9	Switzerland	32	3	9	3	7	0	0	0	23	3	3	0	2	0	0	2	0	2	1	1	0	2	3	0	0	1	0	0	2	0	1	1	0
10	Italy	35	12	24	3	5	2	0	1	4	1	1	1	1	0	0	0	0	0	1	0	0	2	1	0	0	0	0	0	2	0	1	0	0
11	Spain	31	8	0	15	0	0	12	0	0	8	4	4	0	0	0	4	0	8	0	0	0	0	0	0	0	0	4	0	0	0	4	0	0
12	Other W./S. Europe	41	3	5	3	5	0	0	0	3	0	3	28	0	0	0	0	0	0	3	3	0	0	0	3	0	0	0	0	3	0	0	0	0
13	Denmark	44	7	3	1	3	0	1	3	0	1	0	0	22	1	0	0	1	0	0	3	0	1	3	1	0	1	0	0	0	0	0	0	0
14	Finland	25	8	6	10	6	2	2	2	0	0	0	0	2	20	0	0	0	2	2	0	0	2	2	0	0	0	0	0	4	0	6	0	0
15	Norway	40	6	7	1	3	0	0	1	0	1	0	1	1	0	28	0	0	0	0	0	0	1	1	0	0	0	0	1	3	0	0	0	0
16	Sweden	31	3	3	4	6	0	0	0	0	2	1	1	0	1	2	38	1	2	2	0	0	0	1	0	0	0	0	0	2	1	0	0	0
17	Poland	29	2	5	6	7	3	0	1	2	1	0	1	0	0	1	1	29	1	1	0	0	2	0	0	1	0	0	0	2	1	1	4	1
18	Other E. Europe	23	6	2	8	8	1	2	2	2	4	4	1	0	1	0	2	0	25	2	0	0	1	2	0	0	0	1	0	1	0	1	0	1
19	Israel	50	3	6	3	3	0	1	1	1	0	0	1	0	1	0	1	0	1	21	2	1	2	0	0	0	0	0	3	0	0	0	0	0
20	Russia	37	3	6	9	8	0	1	3	1	3	5	0	1	0	0	0	2	0	2	16	1	3	0	1	0	0	0	1	0	0	0	0	0
21	Other former USSR	40	8	4	4	8	4	0	0	0	0	0	0	0	0	0	0	4	0	0	4	20	4	0	0	0	0	0	0	0	0	0	0	0
22	Japan	33	2	5	8	6	0	0	1	1	1	1	0	1	0	0	1	0	2	0	0	0	33	2	0	0	0	0	0	0	0	0	0	0
23	China	31	5	5	4	5	0	0	1	1	3	1	2	0	0	0	1	1	2	2	0	0	6	26	0	0	0	0	1	0	0	1	0	1
24	Taiwan	39	5	5	6	2	0	0	0	2	2	3	0	0	0	2	2	0	2	0	0	0	3	2	23	0	0	2	2	3	0	0	0	0
25	South Korea	57	0	3	3	6	0	0	6	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	17	0	0	0	6	0	0	0	0
26	Singapore	34	2	6	0	10	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2	8	2	0	26	2	0	2	0	2	0	0
27	Hong Kong	53	3	10	0	0	0	0	0	0	3	0	3	0	0	0	0	0	0	3	0	0	3	0	0	0	0	13	0	7	0	0	0	0
28	India	39	5	3	0	5	0	0	0	0	2	0	0	2	2	0	0	0	0	2	0	0	3	3	2	0	0	0	31	0	3	0	0	0
29	Australia	40	6	8	3	3	1	0	3	2	1	1	1	1	0	0	0	0	1	1	1	1	3	3	1	0	1	0	1	22	0	0	0	1
30	New Zealand	48	4	4	0	4	0	4	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	4	17	0	4	0
31	Brazil	36	5	3	3	4	0	3	0	1	4	1	1	0	1	0	0	1	0	3	0	0	1	1	0	0	0	0	0	1	0	29	0	1
32	Other C. & S. America	38	5	4	4	1	0	1	1	1	3	1	1	0	3	0	0	0	0	1	1	0	1	0	0	0	0	0	0	1	0	0	30	0
33	All other countries	28	5	3	8	7	0	0	1	0	5	1	0	1	1	0	0	0	1	3	0	0	2	2	1	0	1	0	2	2	1	0	0	23

NOTE: Listed countries received at least 0.3 percent of all citations for all natural science and engineering fields combined.

SOURCES: Institute for Scientific Information, Science Citation Index; CHI Research, Inc., Science Indicators database; and National Science Foundation, unpublished tabulations.

See figure 5-29.

Appendix table 5-56.
Citations on U.S. patents to the U.S. scientific and technical literature, by field and cited sector: 1988-96

Citing year and cited sector	Total	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth & space sciences	Engineering & technology	Mathe-matics
Number of citations									
1988—Total U.S.	9,495	2,423	2,749	220	1,212	1,595	81	1,211	2
Academia	4,695	1,309	1,654	148	703	465	40	372	1
Industry	2,465	254	323	22	353	804	16	690	1
Federal Government	961	326	303	42	70	128	12	77	0
FFRDCs	340	18	44	0	46	179	5	46	0
Nonprofits	908	457	375	5	34	13	1	21	0
Other	123	57	48	2	3	4	5	3	0
1990—Total U.S.	12,906	3,417	3,818	306	1,673	2,169	76	1,443	3
Academia	6,436	1,853	2,218	201	939	727	30	463	2
Industry	3,448	408	558	30	571	1,068	27	783	0
Federal Government	1,188	422	405	64	56	154	9	76	0
FFRDCs	418	27	55	1	50	189	4	88	1
Nonprofits	1,240	618	517	5	50	25	4	19	0
Other	174	86	62	3	4	3	0	12	0
1992—Total U.S.	19,404	5,294	6,949	436	2,451	2,667	92	1,494	18
Academia	9,982	2,855	3,829	294	1,513	905	47	528	8
Industry	4,552	664	1,053	53	683	1,294	25	769	7
Federal Government	1,898	642	862	63	105	151	8	62	2
FFRDCs	592	41	110	1	88	257	6	85	1
Nonprofits	2,068	948	967	11	57	46	1	36	0
Other	312	144	128	14	5	14	5	14	0
1994—Total U.S.	27,422	7,223	10,334	675	3,114	3,589	121	2,349	14
Academia	14,535	3,989	5,852	453	1,968	1,258	53	947	11
Industry	6,443	936	1,713	94	839	1,710	35	1,111	1
Federal Government	2,519	907	1,087	96	98	200	16	113	0
FFRDCs	808	74	150	4	114	338	4	121	1
Nonprofits	2,727	1,131	1,372	19	84	73	4	42	0
Other	390	186	160	9	11	10	9	15	1
1996—Total U.S.	47,059	13,630	20,617	1,344	4,533	3,498	193	3,215	25
Academia	25,814	7,451	11,565	922	2,951	1,384	101	1,421	14
Industry	9,713	1,856	3,392	180	1,099	1,634	57	1,481	9
Federal Government	4,466	1,674	2,139	181	165	162	17	124	1
FFRDCs	958	114	305	9	139	264	10	114	0
Nonprofits	5,353	2,173	2,897	35	153	45	6	42	1
Other	755	362	319	17	26	9	2	33	0
Distribution of citations across fields, by sector (percentages)									
1988—Total U.S.	100	26	29	2	13	17	1	13	0
Academia	100	28	35	3	15	10	1	8	0
Industry	100	10	13	1	14	33	1	28	0
Federal Government	100	34	32	4	7	13	1	8	0
FFRDCs	100	5	13	0	14	53	1	14	0
Nonprofits	100	50	41	1	4	1	0	2	0
Other	100	46	39	2	2	3	4	2	0
1990—Total U.S.	100	26	30	2	13	17	1	11	0
Academia	100	29	34	3	15	11	0	7	0
Industry	100	12	16	1	17	31	1	23	0
Federal Government	100	36	34	5	5	13	1	6	0
FFRDCs	100	6	13	0	12	45	1	21	0
Nonprofits	100	50	42	0	4	2	0	2	0
Other	100	49	36	2	2	2	0	7	0

Appendix table 5-56.
Citations on U.S. patents to the U.S. scientific and technical literature, by field and cited sector: 1988-96

Citing year and cited sector	Total	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth & space sciences	Engineering & technology	Mathe-matics
1992—Total U.S.	100	27	36	2	13	14	0	8	0
Academia	100	29	38	3	15	9	0	5	0
Industry	100	15	23	1	15	28	1	17	0
Federal Government	100	34	45	3	6	8	0	3	0
FFRDCs	100	7	19	0	15	43	1	14	0
Nonprofits	100	46	47	1	3	2	0	2	0
Other	100	46	41	4	2	4	2	4	0
1994—Total U.S.	100	26	38	2	11	13	0	9	0
Academia	100	27	40	3	14	9	0	7	0
Industry	100	15	27	1	13	27	1	17	0
Federal Government	100	36	43	4	4	8	1	4	0
FFRDCs	100	9	19	0	14	42	0	15	0
Nonprofits	100	41	50	1	3	3	0	2	0
Other	100	48	41	2	3	3	2	4	0
1996—Total U.S.	100	29	44	3	10	7	0	7	0
Academia	100	29	45	4	11	5	0	6	0
Industry	100	19	35	2	11	17	1	15	0
Federal Government	100	37	48	4	4	4	0	3	0
FFRDCs	100	12	32	1	15	28	1	12	0
Nonprofits	100	41	54	1	3	1	0	1	0
Other	100	48	42	2	3	1	0	4	0
1988—Total U.S.	100	100	100	100	100	100	100	100	100
Academia	49	54	60	67	58	29	49	31	50
Industry	26	10	12	10	29	50	20	57	50
Federal Government	10	13	11	19	6	8	15	6	0
FFRDCs	4	1	2	0	4	11	6	4	0
Nonprofits	10	19	14	2	3	1	1	2	0
Other	1	2	2	1	0	0	6	0	0
1990—Total U.S.	100	100	100	100	100	100	100	100	100
Academia	50	54	58	66	56	34	39	32	67
Industry	27	12	15	10	34	49	36	54	0
Federal Government	9	12	11	21	3	7	12	5	0
FFRDCs	3	1	1	0	3	9	5	6	33
Nonprofits	10	18	14	2	3	1	5	1	0
Other	1	3	2	1	0	0	0	1	0
1992—Total U.S.	100	100	100	100	100	100	100	100	100
Academia	51	54	55	67	62	34	51	35	44
Industry	23	13	15	12	28	49	27	51	39
Federal Government	10	12	12	14	4	6	9	4	11
FFRDCs	3	1	2	0	4	10	7	6	6
Nonprofits	11	18	14	3	2	2	1	2	0
Other	2	3	2	3	0	1	5	1	0

Appendix table 5-56.
Citations on U.S. patents to the U.S. scientific and technical literature, by field and cited sector: 1988-96

Citing year and cited sector	Total	Clinical medicine	Biomedical research	Biology	Chemistry	Physics	Earth & space sciences	Engineering & technology	Mathe-matics
1994—Total U.S.	100	100	100	100	100	100	100	100	100
Academia	53	55	57	67	63	35	44	40	79
Industry	23	13	17	14	27	48	29	47	7
Federal Government	9	13	11	14	3	6	13	5	0
FFRDCs	3	1	1	1	4	9	3	5	7
Nonprofits	10	16	13	3	3	2	3	2	0
Other	1	3	2	1	0	0	7	1	7
1996—Total U.S.	100	100	100	100	100	100	100	100	100
Academia	55	55	56	69	65	40	52	44	56
Industry	21	14	16	13	24	47	30	46	36
Federal Government	9	12	10	13	4	5	9	4	4
FFRDCs	2	1	1	1	3	8	5	4	0
Nonprofits	11	16	14	3	3	1	3	1	4
Other	2	3	2	1	1	0	1	1	0

FFRDC = federally funded research and development center

NOTE: Percentages may not total 100 because of rounding.

SOURCES: CHI Research, Inc., U.S. Patent and Citation Indicators database; and National Science Foundation, unpublished tabulations.

See figure 5-30 and text table 5-13.

Appendix table 5-57.
U.S. patents awarded to U.S. universities and colleges with largest 1995 R&D volume and to other academic institutions: 1982-95

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Number of patents														
All academic institutions[a]	458	434	551	588	670	819	813	1225	1176	1331	1533	1607	1762	1860
Public	241	224	259	307	357	396	407	655	670	794	908	940	1067	1190
Private	217	210	292	281	313	423	406	570	506	537	625	667	695	670
Top 100 in 1995 R&D[b]	354	334	407	449	510	662	665	1003	975	1108	1291	1351	1483	1561
Public	203	191	217	262	300	344	353	559	571	671	776	805	912	1022
Private	151	143	190	187	210	318	312	444	404	437	515	546	571	539
Percent of all patents awarded	77	77	74	76	76	81	82	82	83	83	84	84	84	84
Number of academic institutions awarded patents														
All academic institutions[a]	73	83	102	113	121	124	122	153	147	154	152	163	167	168
Public	43	52	56	64	75	70	70	90	87	94	93	101	101	103
Private	30	31	46	49	46	54	52	63	60	60	59	62	66	65
Top 100 in 1995 R&D[b]	51	56	64	71	74	77	76	83	84	85	83	85	87	86
Public	30	35	38	45	48	48	47	52	54	56	54	55	56	55
Private	21	21	26	26	26	29	29	31	30	29	29	30	31	31
Top 100—public														
Arizona State University	0	0	1	1	1	2	0	9	9	12	6	2	3	6
Auburn University	0	0	0	1	1	0	0	0	2	1	5	0	2	2
Clemson University	0	0	2	2	1	3	3	6	6	2	10	4	10	8
Colorado State University	0	0	0	1	3	4	2	0	2	4	1	4	1	1
Florida State University	0	0	1	0	2	2	1	1	1	1	2	9	5	10
Georgia Institute of Technology	8	3	6	11	9	9	7	8	18	11	16	16	20	21
Indiana University	0	3	2	4	0	3	1	6	1	3	6	1	7	6
Iowa State University	15	10	14	21	9	15	15	28	30	39	23	29	37	37
Louisiana State University	0	1	1	1	1	3	4	9	4	5	20	16	11	14
Michigan State University	1	3	3	3	10	6	8	2	7	11	19	13	21	15
New Mexico State University	0	2	0	0	1	2	0	0	0	1	0	2	4	0
North Carolina State University	1	0	2	3	4	6	5	10	14	11	24	27	32	31
Ohio State University	6	9	3	12	5	13	14	13	10	15	21	10	10	17
Oklahoma State University	0	0	0	0	2	0	2	1	1	1	2	0	0	3
Oregon State University	0	1	0	2	3	0	2	1	1	6	9	5	11	6
Pennsylvania State University	0	0	0	0	0	0	0	1	1	1	0	4	11	16
Purdue University	11	11	14	18	9	4	2	11	15	11	5	6	11	10
Rutgers University	0	0	1	1	0	2	2	7	2	15	12	15	18	20
SUNY	8	2	11	5	11	18	10	25	20	27	34	30	37	31
Texas A&M University	3	2	3	8	3	6	9	8	9	12	14	22	20	16
University of Alabama	3	1	1	5	3	5	3	3	6	3	7	6	7	9
University of Arizona	1	2	1	2	2	0	0	1	2	1	1	4	9	10
University of California	42	48	46	42	54	67	60	81	65	84	81	115	163	213
University of Cincinnati	0	0	2	2	1	8	3	8	9	9	7	8	7	8
University of Colorado	0	0	0	0	0	1	0	3	9	6	19	7	14	18

Appendix table 5-57.
U.S. patents awarded to U.S. universities and colleges with largest 1995 R&D volume and to other academic institutions: 1982-95

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Top 100—public														
University of Connecticut	0	0	0	1	1	2	1	2	8	3	9	9	2	8
University of Florida	0	6	10	7	10	13	21	33	33	38	41	34	26	31
University of Georgia	0	7	7	5	6	3	0	3	5	8	10	18	7	10
University of Hawaii	1	1	0	2	0	1	3	2	6	2	5	8	6	7
University of Health Sciences/Chicago	0	0	0	0	2	1	1	1	0	0	0	1	0	0
University of Illinois	7	8	8	10	12	4	9	15	7	8	10	13	14	12
University of Iowa	0	0	0	0	0	0	0	0	0	0	0	0	0	0
University of Kansas	0	2	2	1	0	2	0	1	3	4	7	3	2	2
University of Kentucky	6	6	7	5	7	4	7	6	4	7	7	4	3	11
University of Maryland	0	1	0	0	3	2	2	1	4	4	14	21	15	20
University of Massachusetts	0	0	1	1	0	2	1	3	3	6	5	4	5	12
Univ. of Medicine & Dentistry of NJ	1	1	0	1	4	7	2	4	7	2	6	1	4	5
University of Michigan	2	2	1	1	10	6	14	23	27	21	21	19	28	30
University of Minnesota	10	5	6	11	16	28	26	40	38	32	31	27	28	25
University of Missouri	9	5	4	0	3	8	9	5	6	7	9	8	7	10
University of Nebraska	4	0	5	1	1	1	4	0	3	4	4	10	16	21
University of New Mexico	0	0	0	2	3	1	3	9	9	10	11	5	9	15
University of North Carolina	0	1	0	0	3	2	2	6	8	3	11	14	13	21
University of Oklahoma	2	1	2	5	2	2	6	4	7	3	7	14	8	11
University of Pittsburgh	2	5	8	3	8	10	6	11	11	16	10	10	10	13
University of South Carolina	1	0	2	1	1	0	4	2	0	4	6	2	3	0
University of South Florida	0	0	0	0	1	0	0	2	2	7	5	7	4	6
University of Tennessee	1	0	1	5	8	8	8	12	14	10	12	4	5	14
University of Texas	7	5	8	19	25	21	21	50	54	83	73	86	97	89
Univ. of Texas Anderson Cancer Ctr.	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Univ. of TX SW Medical Ctr. Dallas	0	0	0	0	0	0	0	0	0	0	0	0	0	1
University of Utah	14	15	9	11	7	12	9	13	14	5	13	20	22	17
University of Virginia	8	4	2	1	4	3	4	8	12	11	9	7	5	10
University of Washington	7	2	3	1	2	1	6	5	7	11	12	11	13	17
University of Wisconsin	17	13	16	17	17	11	20	27	16	44	42	56	48	47
Utah State University	0	0	1	3	2	2	1	1	2	3	2	2	2	8
Virginia Commonwealth University	0	0	0	0	0	0	0	0	1	1	3	6	4	2
Virginia Polytechnic Institute	0	0	0	0	0	0	2	7	4	11	18	12	16	6
Washington State University	3	2	0	2	2	2	1	5	3	3	3	2	4	4
Wayne State University	2	1	0	1	5	6	7	16	9	8	16	12	14	9

Appendix table 5-57
U.S. patents awarded to U.S. universities and colleges with largest 1995 R&D volume and to other academic institutions: 1982-95

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Top 100—private														
Baylor College of Medicine	3	1	2	2	2	7	3	7	8	4	6	9	9	4
Boston University	1	2	2	3	6	9	9	9	11	6	22	15	14	14
California Institute of Technology	19	16	15	16	23	27	18	56	30	36	32	29	46	38
Carnegie-Mellon University	0	0	3	3	3	1	2	5	3	5	10	4	8	10
Case Western Reserve University	0	0	1	1	6	3	1	1	2	1	9	6	8	8
Columbia University	0	2	3	4	7	6	15	19	16	8	17	17	18	18
Cornell University	6	10	14	20	13	30	16	22	34	40	41	35	39	36
Duke University	3	3	6	4	6	4	9	11	7	6	9	12	29	20
Emory University	0	0	0	1	1	0	0	7	3	10	6	14	5	11
Georgetown University	1	4	5	1	0	4	3	1	5	3	5	5	7	6
Harvard University	11	10	7	1	2	9	17	15	23	9	16	17	16	14
Johns Hopkins University	8	6	10	15	18	18	21	27	15	25	20	33	23	28
Massachusetts Inst. of Technology	51	47	47	35	45	63	64	101	109	101	125	112	99	104
Mount Sinai School of Medicine	4	3	2	1	2	1	2	1	2	5	3	3	4	4
New York University	7	3	4	5	3	5	4	10	14	8	11	19	16	15
Northwestern University	7	3	2	2	8	10	10	7	5	4	8	8	12	18
Princeton University	0	0	0	0	0	2	1	12	4	13	4	11	7	12
Rockefeller University	3	1	3	5	4	9	11	6	8	14	23	23	13	9
Stanford University	4	16	36	38	33	48	54	43	36	57	42	50	62	54
Tufts University	0	0	0	0	0	1	2	7	1	5	7	9	6	3
Tulane University	0	0	1	2	1	1	3	4	4	7	5	6	6	5
University of Chicago	2	0	2	0	0	1	6	7	2	0	0	6	14	16
University of Miami	2	0	4	4	3	15	5	5	1	1	5	2	5	5
University of Pennsylvania	1	2	4	5	1	2	1	9	19	18	26	34	37	25
University of Rochester	8	9	6	2	8	9	11	11	13	12	10	11	10	6
University of Southern California	5	1	7	5	5	4	7	8	6	5	18	13	15	6
Vanderbilt University	2	1	0	0	5	4	4	4	5	7	4	7	6	9
Washington University	0	1	1	3	1	7	6	12	7	22	18	18	19	21
Woods Hole Oceanographic Inst.	0	0	0	0	0	0	0	1	0	1	0	0	2	1
Yale University	0	2	2	5	3	12	6	11	10	4	12	14	13	16
Other public institutions														
Ball State University	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Bowling Green State University	0	0	0	1	0	0	1	1	1	0	0	0	0	0
California Polytechnic State Univ.	0	0	0	0	0	0	0	0	0	0	0	0	0	1
California State University Fresno	0	0	0	0	0	0	0	0	0	0	0	1	0	3
California State University Fullerton	0	0	0	0	0	0	0	1	0	0	0	0	0	0
City College of New York	0	0	0	0	0	0	0	0	0	0	1	0	1	1
City University of New York	0	0	0	0	0	0	1	1	0	0	0	0	0	1
Cleveland State University	0	0	0	0	0	0	0	0	0	0	3	4	3	0
College of Forestry, Wildlife & Range Sciences, Univ. of Idaho	0	1	0	0	0	0	0	0	0	0	0	0	0	0

Appendix table 5-57.
U.S. patents awarded to U.S. universities and colleges with largest 1995 R&D volume and to other academic institutions: 1982-95

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Colorado School of Mines	0	0	0	2	1	0	0	2	2	2	2	1	1	2
East Carolina University	0	0	0	0	0	0	0	0	1	1	1	1	1	1
East Tennessee State University	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Eastern Washington University	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Florida Agricultural & Mechanical Univ.	0	0	0	0	1	0	1	0	0	0	0	0	0	0
Florida Atlantic University	0	0	0	0	0	0	0	0	0	1	0	3	3	1
Florida International University	0	0	0	0	0	0	0	0	2	0	1	1	0	0
Fort Valley State College	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Georgia State University	0	0	0	0	0	0	0	0	2	0	1	1	2	1
Grand Valley State University	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Hahnemann University	0	0	2	0	0	0	0	0	0	0	2	1	0	0
Illinois State University	0	0	0	0	0	0	0	2	1	0	1	0	0	0
James Madison University	0	0	0	0	0	0	0	0	0	0	0	0	1	0
Kansas State University	2	4	3	2	4	4	3	4	1	7	7	9	20	11
Kent State University	0	0	0	0	0	1	0	0	1	3	2	3	3	4
Medical College of Georgia	0	1	1	1	0	0	0	0	0	0	0	0	0	0
Medical College of Ohio	0	1	0	2	0	4	1	0	1	2	0	0	0	2
Medical University of South Carolina	0	0	0	0	1	0	1	0	1	0	0	0	1	2
Memphis State University	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Miami University	0	1	0	0	0	0	2	0	0	0	0	0	0	0
Michigan Technological University	2	4	7	6	2	1	2	1	5	6	6	3	3	2
Mississippi State University	0	0	0	0	0	0	0	0	0	0	0	1	1	2
Montana State University	3	2	2	1	1	0	0	1	3	2	1	0	4	2
Montclair State College	0	0	0	0	0	0	0	0	1	0	0	0	0	0
New Jersey Institute of Technology	0	0	0	1	0	0	0	2	0	1	2	0	1	2
New Mexico Inst. of Mining & Tech.	0	0	0	0	2	1	0	0	0	0	1	0	3	2
North Carolina Central University	0	0	0	1	0	0	0	0	0	2	0	1	0	0
North Dakota State University	0	0	2	0	0	0	0	2	0	2	2	3	1	5
Northeast University of Technology	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Northeastern Ohio Universities College of Medicine	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Northern Illinois University	0	0	0	0	0	0	1	0	0	1	0	2	2	1
Nova University	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Oak Ridge Associated Universities	0	0	0	0	0	0	1	2	0	0	1	0	0	0
Ohio University	0	0	0	0	1	1	0	1	0	4	3	3	3	5
Old Dominion University	0	0	0	0	0	0	0	0	0	0	0	1	2	0
Oregon Health Sciences University	0	0	0	0	0	3	0	3	4	6	5	5	6	10
Pennsylvania Research Corporation	0	0	0	0	0	1	1	0	2	5	7	6	5	2
Portland State University	0	0	1	0	1	1	0	0	0	0	0	0	0	0
Saginaw Valley State University	0	0	0	0	0	0	1	1	0	1	0	0	1	0
South Dakota School of Mines	0	0	0	1	0	0	0	0	0	0	1	0	2	0

Appendix table 5-57.
U.S. patents awarded to U.S. universities and colleges with largest 1995 R&D volume and to other academic institutions: 1982-95

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Southeastern Illinois College	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Temple University	2	0	2	0	1	5	7	10	9	3	14	9	9	11
Texas Tech University	0	0	0	0	2	1	2	0	0	1	1	0	0	1
University of Iowa	5	3	4	1	8	8	6	8	12	6	7	11	9	17
University of Akron	4	1	3	3	2	0	6	6	9	14	11	9	17	11
University of Alaska	0	0	0	0	0	0	0	0	0	1	1	1	3	2
University of Arkansas	0	0	0	0	1	1	1	2	3	10	16	8	10	5
University of Central Florida	0	0	0	0	0	0	0	1	0	0	0	4	4	6
University of Delaware	12	6	5	9	7	5	8	8	11	10	10	5	4	5
University of Houston	0	0	0	0	1	0	0	3	3	4	1	3	5	8
University of Louisville	0	0	0	0	0	0	0	0	1	0	0	1	1	2
University of Lowell	0	0	0	0	0	0	0	2	1	2	3	1	1	0
University of Maine	2	2	2	3	1	0	0	1	1	0	0	0	0	0
Univ. of Maryland Eastern Shore	0	0	0	0	0	0	0	0	0	0	0	0	0	1
University of Minneapolis	0	0	0	0	0	0	0	0	0	0	0	1	0	0
University of Mississippi	1	0	1	0	0	1	0	2	0	0	1	2	0	2
University of Montana	0	0	0	0	1	0	0	0	0	0	0	1	1	2
University of Nevada	0	0	0	0	0	0	0	0	0	0	1	0	1	0
University of New Hampshire	0	0	0	0	1	0	0	1	0	1	0	0	1	0
University of New Orleans	0	0	0	0	0	0	0	0	0	0	0	0	1	0
University of North Dakota	0	0	0	0	0	0	0	0	3	4	1	2	1	1
University of Northern Iowa	0	0	1	0	1	0	0	0	0	0	0	1	0	0
University of Oregon	0	1	0	0	0	0	0	2	0	0	3	2	3	2
University of Puerto Rico	0	0	0	0	0	0	0	0	0	1	0	1	0	4
University of Rhode Island	0	1	2	2	2	2	3	4	3	3	0	0	0	0
University of South Alabama	0	0	0	1	3	0	0	2	0	1	0	4	2	1
University of Southern Illinois	0	0	1	0	0	0	1	1	2	1	1	1	0	0
University of Southern Mississippi	0	2	0	0	3	3	1	1	3	4	1	2	0	1
University of Southwestern Louisiana	0	0	0	0	1	0	0	2	1	0	0	0	0	0
University of Toledo	2	1	2	0	1	0	0	3	0	2	4	7	6	14
University of Vermont	0	0	0	0	0	1	1	4	4	2	4	1	1	1
University of Wisconsin-Milwaukee	0	0	0	0	0	0	0	0	0	1	1	1	0	1
University of Wyoming	0	0	0	0	0	1	0	0	0	0	0	0	0	2
West Virginia University	0	0	0	1	0	2	0	2	1	1	0	0	1	2
Western Kentucky University	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Western Michigan University	1	0	0	0	0	0	0	0	0	2	0	1	1	0
Western Washington University	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Wichita State University	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Wright State University	1	1	1	6	6	4	2	3	3	3	1	4	3	0

Appendix table 5-57.
U.S. patents awarded to U.S. universities and colleges with largest 1995 R&D volume and to other academic institutions: 1982-95

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Other private institutions														
Adelphi University	1	0	0	0	0	0	0	0	0	0	0	0	0	0
Albany Medical College	0	0	0	0	0	0	0	1	1	0	0	1	0	0
Alfred University	0	1	5	3	1	1	0	1	6	5	5	6	4	3
Ambassador College	0	0	0	0	0	0	0	1	1	1	0	1	0	0
American University	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Baylor University	0	1	0	1	0	0	0	1	0	2	3	2	2	3
Boston College	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Brandeis University	0	0	1	0	0	1	1	9	4	5	4	2	2	3
Brigham Young University	0	1	3	3	6	2	1	8	9	5	9	13	3	3
Brooklyn College Foundation	0	0	0	0	0	0	0	0	0	0	0	1	1	0
Brown University	0	0	1	2	2	1	3	3	3	4	5	1	4	6
Catholic University of America	0	0	0	0	0	0	0	0	0	0	0	1	3	4
Chapman College	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Clark University	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Clarkson University	0	0	0	0	0	0	0	0	0	1	0	0	1	0
College of Aeronautics, Brooklyn	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Concordia University	0	0	0	0	0	0	0	2	1	0	1	0	1	0
Cooperative Institute for Research in Environmental Sciences	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Creighton University	0	0	0	0	0	0	0	0	0	0	0	0	3	1
Dartmouth College	0	2	0	2	1	0	3	2	4	1	1	4	4	3
Davidson College	0	1	0	0	0	0	0	0	0	0	0	0	0	0
Drexel University	0	0	0	0	0	0	0	3	2	2	2	5	6	4
Duquesne University	0	0	0	0	0	0	0	0	0	0	1	0	1	3
Eastern Virginia Medical School	0	0	0	0	0	0	0	0	0	0	0	1	0	0
General Motors Institute	0	0	0	0	1	1	0	4	0	1	1	0	1	0
George Washington University	0	1	0	2	0	0	0	1	0	0	1	2	0	0
Goshen College	0	1	1	0	0	0	0	0	0	0	0	0	0	0
Howard University	0	0	0	0	0	0	0	0	0	0	0	2	0	3
Illinois Institute of Technology	0	0	0	0	0	1	0	0	0	2	1	4	0	7
Lehigh University	1	0	2	0	2	5	1	5	4	6	7	4	3	1
Loma Linda University	0	0	0	1	0	0	0	1	2	2	1	2	2	8
Loyola University of Chicago	0	0	0	0	1	0	0	0	1	1	1	3	1	3
Marquette University	0	0	0	1	0	0	0	0	0	0	0	0	0	2
Mayo Foundation	0	0	0	3	1	1	0	3	4	4	8	9	4	6
Medical College of Hampton Roads	0	0	0	1	0	1	1	0	0	0	2	1	1	1
Medical College of Pennsylvania	0	0	0	0	0	0	0	0	0	0	0	0	1	1
Medical College of Wisconsin	0	0	4	3	3	1	10	2	1	1	0	0	3	4
Mercer University	0	0	0	0	0	0	0	0	0	0	0	0	0	1

Appendix table 5-57.
U.S. patents awarded to U.S. universities and colleges with largest 1995 R&D volume and to other academic institutions: 1982-95

Institution	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Milwaukee School of Engineering	0	0	0	0	0	0	0	0	0	1	0	0	0	0
New York Chiropractic College	0	0	0	0	0	0	0	0	1	0	0	0	0	0
New York Institute of Technology	4	0	2	3	7	7	4	3	1	1	2	0	1	0
New York Medical College	0	0	0	0	0	0	1	2	1	1	0	0	2	0
Northeastern University	1	0	0	3	2	2	1	3	4	6	11	10	15	16
Oregon Graduate Center	1	2	3	3	1	2	1	5	1	1	2	0	0	0
Polytechnic University	0	0	0	0	0	2	2	3	3	2	1	1	0	1
Regis College	0	0	0	0	0	0	0	1	0	0	0	0	0	0
Rensselear Polytechnic Institute	4	0	4	5	6	2	2	5	4	2	2	7	7	7
Rice University	0	0	1	0	0	0	0	0	1	0	0	2	2	0
Roanoke College	0	0	1	2	1	1	1	0	1	0	0	0	0	0
Rochester Institute of Technology	0	0	0	0	0	1	0	0	0	0	0	0	1	0
Siena College	0	0	1	0	0	0	0	0	0	0	0	0	0	0
Smith College	0	0	0	0	0	0	1	0	0	0	0	0	0	0
Southern Methodist University	0	0	0	0	1	1	0	0	0	0	0	0	0	0
St. Johns University	0	0	0	1	0	0	0	1	0	0	0	0	0	0
Stevens Institute of Technology	0	0	0	0	0	0	4	0	1	2	0	0	1	1
St. Louis University	0	0	1	0	1	1	1	0	0	2	1	0	0	1
Syracuse University	0	0	1	2	3	2	5	4	9	2	5	5	3	1
Texas College of Osteopathic Medi.	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Texas Wesleyan University	0	0	0	0	0	0	0	0	0	0	1	0	0	0
Thomas Jefferson University	2	4	10	5	3	3	2	7	5	7	8	9	13	14
Touro College	0	0	0	0	0	0	0	0	1	0	0	0	0	0
Trinity University	0	0	1	0	0	0	0	0	0	0	0	0	2	0
Tuskegee University	0	0	0	0	0	0	0	1	0	0	0	1	0	0
University of Dayton	2	1	2	2	7	5	6	3	5	5	1	3	2	4
University of Denver	0	0	1	0	0	0	0	0	0	0	0	0	0	1
University of Hartford	0	0	0	0	0	0	0	0	0	0	0	1	0	0
University of New England	0	0	0	0	0	0	0	0	0	0	0	0	0	1
University of Notre Dame	0	0	0	1	2	1	2	2	0	3	1	2	3	0
University of Scranton	0	0	0	1	0	0	0	0	0	0	0	0	0	0
University of The Pacific	0	0	0	0	0	0	0	0	1	1	0	0	0	0
Wabash College	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Wake Forest University	0	0	0	0	0	2	3	3	0	1	0	3	4	1
Worcester Polytechnic Institute	1	0	0	0	0	0	0	0	1	0	4	1	2	3
Affiliated organizations[b]	49	52	56	43	51	57	37	34	19	20	17	11	15	9

NOTE: Recording of patents to universities and colleges is not uniform. In some cases, patents may be issued to a systemwide board, rather than to individual institutions within the system. Thus, the institution counts are lower bound numbers.

[a]Data exclude a small number of unaffiliated organizations holding university patents.

[b]Data include organizations holding academic patents but not affiliated with a single institution, such as the Research Triangle Institute, Research Corporation, etc.

SOURCES: U.S. Patent and Trademark Office, *Technology Assessment and Forecast Report, U.S. Universities and Colleges, 1969-95* (Washington, DC: 1996); and National Science Foundation, unpublished tabulations.

See figures 5-31 and 5-32.

Appendix table 5-58.
Utility classes emphasized in patents assigned to U.S. universities and colleges: 1969-95 total

Utility class	Number of U.S. patents awarded		University Activity Index[a]	Cumulative percent of patents	
	Total	Academic		Total	Academic
Total, all utility classes	2,052,216	18,701	1.0	100	100
505 Superconductor technology: apparatus, material, process	1,371	148	11.8	0	1
435 Chemistry: molecular biology and microbiology	16,483	1,686	11.2	1	10
530 Chemistry: natural resins or derivatives; peptides, proteins; lignins	4,545	446	10.8	1	12
800 Multicellular living organisms and unmodified parts thereof	255	21	9.0	1	12
536 Organic compounds—part of the class 532-570 series	4,320	307	7.8	1	14
424 Drug, bio-affecting and body treating compositions	15,777	987	6.9	2	19
436 Chemistry: analytical and immunological testing	5,180	306	6.5	2	21
552 Organic compounds—part of the class 532-570 series	2,347	110	5.1	2	21
623 Prosthesis (i.e., artificial body members), aids, accessories	3,988	175	4.8	3	22
527 Synthetic resins or natural rubbers—part of the class 520 series	259	11	4.7	3	22
128 Surgery	14,999	618	4.5	3	26
260 Chemistry of carbon compounds	125	5	4.4	3	26
171 Unearthing plants or buried objects	310	12	4.2	3	26
514 Drug, bio-affecting and body treating compositions	41,293	1,593	4.2	5	34
372 Coherent light generators	6,729	255	4.2	6	36
607 Surgery: light, thermal, and electrical application	3,565	128	3.9	6	36
378 X-ray or gamma ray systems or devices	4,874	168	3.8	6	37
117 Single- and oriented-crystal, epitaxy growth processes; non-coating	2,042	70	3.8	6	38
136 Batteries: thermoelectric and photoelectric	1,933	61	3.5	6	38
127 Sugar, starch, and carbohydrates	875	24	3.0	6	38
204 Chemistry: electrical and wave energy	11,248	286	2.8	7	40
600 Surgery	2,707	68	2.8	7	40
556 Organic compounds—part of the class 532-570 series	4,364	109	2.7	7	41
606 Surgery	7,678	183	2.6	8	42
549 Organic compounds—part of the class 532-570 series	7,981	185	2.5	8	43
111 Planting	952	22	2.5	8	43
324 Electricity: measuring and testing	16,573	370	2.5	9	45
250 Radiant energy	21,565	470	2.4	10	47
356 Optics: measuring and testing	12,359	252	2.2	11	49
546 Organic compounds—part of the class 532-570 series	7,325	138	2.1	11	49
604 Surgery	13,703	253	2.0	12	51
419 Powder metallurgy processes	1,635	29	1.9	12	51
87 Textiles: braiding, netting, and lace making	227	4	1.9	12	51
47 Plant husbandry	2,869	49	1.9	12	51
216 Etching a substrate: processes	2,229	38	1.9	12	51
385 Optical waveguides	7,214	120	1.8	12	52
540 Organic compounds—part of the class 532-570 series	6,407	106	1.8	13	52
460 Crop threshing or separating	667	11	1.8	13	53
382 Image analysis	4,139	68	1.8	13	53
257 Active solid-state devices (e.g., transistors, solid-state diodes)	13,852	222	1.8	13	54
359 Optics: systems (including communication) and elements	19,939	316	1.7	14	56
501 Compositions: ceramic	4,732	74	1.7	15	56
73 Measuring and testing	28,848	448	1.7	16	59
554 Organic compounds—part of the class 532-570 series	2,140	33	1.7	16	59
209 Classifying, separating, and assorting solids	5,445	83	1.7	16	59
205 Electrolysis: processes, compositions used, preparation methods	9,543	142	1.6	17	60
426 Food or edible material: processes, compositions, and products	14,440	211	1.6	18	61
95 Gas separation: processes	3,380	49	1.6	18	61
374 Thermal measuring and testing	2,994	43	1.6	18	62
44 Fuel and related compositions	2,736	39	1.6	18	62
427 Coating processes	15,384	219	1.6	19	63
71 Chemistry: fertilizers	1,228	17	1.5	19	63
351 Optics: eye examining, vision testing and correcting	2,789	38	1.5	19	63
437 Semiconductor device manufacturing: process	12,277	165	1.5	20	64
364 Electrical computers and data processing systems	21,708	290	1.5	21	66

Appendix table 5-58.
Utility classes emphasized in patents assigned to U.S. universities and colleges: 1969-95 total

Utility class	Number of U.S. patents awarded		University Activity Index[a]	Cumulative percent of patents	
	Total	Academic		Total	Academic
588 Hazardous or toxic waste destruction or containment	988	13	1.4	21	66
210 Liquid purification or separation	21,094	277	1.4	22	67
423 Chemistry of inorganic compounds	15,547	204	1.4	23	68
422 Chemical apparatus, process disinfecting, deodorizing, preserving	9,738	126	1.4	23	69
522 Synthetic resins or natural rubbers—part of the class 520 series	1,555	19	1.3	23	69
449 Bee culture	166	2	1.3	23	69
528 Synthetic resins or natural rubbers—part of the class 520 series	13,579	163	1.3	24	70
534 Organic compounds—part of the class 532-570 series	2,701	32	1.3	24	70
343 Communications: radio wave antennas	4,393	52	1.3	24	70
602 Surgery: splint, brace, or bandage	2,408	28	1.3	24	71
333 Wave transmission lines and networks	6,147	70	1.3	25	71
429 Chemistry: electrical current producing apparatus, product, process	7,650	85	1.2	25	71
504 Plant protecting and regulating compositions	6,061	66	1.2	25	72
395 Information processing system organization	20,753	224	1.2	26	73
525 Synthetic resins or natural rubbers—part of the class 520 series	16,325	176	1.2	27	74
363 Electric power conversion systems	4,778	50	1.1	27	74
56 Harvesters	5,414	56	1.1	27	74
119 Animal husbandry	5,337	55	1.1	28	75
568 Organic compounds—part of the class 532-570 series	9,980	102	1.1	28	75
75 Specialized metallurgical processes, compositions for use	6,263	64	1.1	29	76
560 Organic compounds—part of the class 532-570 series	7,774	79	1.1	29	76
96 Gas separation: apparatus	2,169	22	1.1	29	76
148 Metal treatment	7,353	73	1.1	29	77
365 Static information storage and retrieval	9,770	96	1.1	30	77
548 Organic compounds—part of the class 532-570 series	8,572	84	1.1	30	78
601 Surgery: kinesitherapy	2,052	20	1.1	30	78
270 Sheet-material associating	1,233	12	1.1	30	78
502 Catalyst, solid sorbent, or support therefor: product or process	9,454	92	1.1	31	78
562 Organic compounds—part of the class 532-570 series	6,457	62	1.1	31	79
434 Education and demonstration	4,393	42	1.0	31	79
367 Communications, electrical: acoustic wave systems and devices	5,025	48	1.0	32	79
518 Chemistry: Fischer-Tropsch processes; purification or recovery	526	5	1.0	32	79
544 Organic compounds—part of the class 532-570 series	7,883	72	1.0	32	79
558 Organic compounds—part of the class 532-570 series	5,851	53	1.0	32	80
48 Gas: heating and illuminating	1,441	13	1.0	32	80
310 Electrical generator or motor structure	10,661	94	1.0	33	80
380 Cryptography	2,389	21	1.0	33	80
264 Plastic and nonmetallic article shaping or treating: processes	17,694	155	1.0	34	81
521 Synthetic resins or natural rubbers—part of the class 520 series	5,873	51	1.0	34	81
All others	1,350,222	3,462	0.4	66	19

NOTES: This table presents the number and title of selected classes of technology represented in the U.S. Patent Classification system as of December 31, 1995. Patent counts are the total number awarded to all assignees and to U.S. higher education institutions.

[a]The University Activity Index is calculated by dividing the proportion of university patents in a given class by the proportion of all patents in that class. Index values greater than 1.0 indicate technology classes that receive relatively greater emphasis in university patenting than elsewhere. Data are presented in declining order of importance.

SOURCES: U.S. Patent and Trademark Office, *Technology Assessment and Forecast Report, U.S. Universities and Colleges, 1969-95* (Washington, DC: 1996); and National Science Foundation, unpublished tabulations.

Appendix table 5-59.
Patents awarded to U.S. universities and colleges, by utility class: 1969-74 through 1991-95

Utility class	Number of patents					Percentage of patents				
	1969-74	1975-80	1981-85	1986-90	1991-95	1969-74	1975-80	1981-85	1986-90	1991-95
Total, all utility classes	1,374	2,064	2,467	4,703	8,093	100	100	100	100	100
435 Chemistry: molecular biology and microbiology	46	99	201	454	886	3	5	8	10	11
514 Drug, bio-affecting and body treating compositions	34	129	232	481	717	2	6	9	10	9
424 Drug, bio-affecting and body treating compositions	40	86	124	256	481	3	4	5	5	6
128 Surgery	34	61	79	158	286	2	3	3	3	4
250 Radiant energy	30	59	46	120	215	2	3	2	3	3
530 Chemistry: natural resins or derivatives; peptides or proteins; lignins or reaction products thereof	9	16	83	135	203	1	1	3	3	3
536 Organic compounds—part of the class 532-570 series	13	31	35	63	165	1	2	1	1	2
324 Electricity: measuring and testing	29	18	37	137	149	2	1	1	3	2
364 Electrical computers and data processing systems	11	19	26	88	146	1	1	1	2	2
73 Measuring and testing	59	69	71	104	145	4	3	3	2	2
204 Chemistry: electrical and wave energy	28	24	34	58	142	2	1	1	1	2
359 Optics: systems (including communication) and elements	26	35	31	83	141	2	2	1	2	2
427 Coating processes	7	11	15	55	131	1	1	1	1	2
395 Information processing system organization	18	13	13	51	129	1	1	1	1	2
257 Active solid-state devices (e.g., transistors, solid-state diodes)	7	19	17	53	126	1	1	1	1	2
210 Liquid purification or separation	24	36	32	59	126	2	2	1	1	2
604 Surgery	5	13	36	80	119	0	1	1	2	1
505 Superconductor technology: apparatus, material, process	0	0	0	29	119	0	0	0	1	1
372 Coherent light generators	13	19	29	77	117	1	1	1	2	1
436 Chemistry: analytical and immunological testing	13	61	67	61	104	1	3	3	1	1
428 Stock material or miscellaneous articles	12	16	32	50	96	1	1	1	1	1
356 Optics: measuring and testing	17	25	31	86	93	1	1	1	2	1
525 Synthetic resins or natural rubbers—part of the class 520 series	4	20	24	37	91	0	1	1	1	1
528 Synthetic resins or natural rubbers—part of the class 520 series	13	22	6	32	90	1	1	0	1	1
437 Semiconductor device manufacturing: process	3	13	26	43	80	0	1	1	1	1
423 Chemistry of inorganic compounds	26	41	27	30	80	2	2	1	1	1
606 Surgery	13	11	22	58	79	1	1	1	1	1
264 Plastic and nonmetallic article shaping or treating: processes	7	20	20	33	75	1	1	1	1	1
426 Food or edible material: processes, compositions, and products	24	39	39	35	74	2	2	2	1	1
549 Organic compounds—part of the class 532-570 series	4	32	37	40	72	0	2	1	1	1
546 Organic compounds—part of the class 532-570 series	9	28	9	29	63	1	1	0	1	1
378 X-ray or gamma ray systems or devices	16	30	23	36	63	1	1	1	1	1
623 Prosthesis (i.e., artificial body members), parts thereof, or aids and accessories therefor	20	15	21	59	60	1	1	1	1	1
252 Compositions	9	15	18	24	59	1	1	1	1	1
422 Chemical apparatus and process disinfecting, deodorizing, preserving, or sterilizing	7	14	13	34	58	1	1	1	1	1
205 Electrolysis: processes, compositions used therein, and methods of preparing the compositions	6	17	29	35	55	0	1	1	1	1
348 Television	11	10	4	32	53	1	0	0	1	1
556 Organic compounds—part of the class 532-570 series	9	8	13	26	53	1	0	1	1	1
502 Catalyst, solid sorbent, or support therefor: product or process of making	1	9	11	22	49	0	0	0	0	1
385 Optical waveguides	1	9	19	48	43	0	0	1	1	1
607 Surgery: light, thermal, and electrical application	5	17	20	44	42	0	1	1	1	1

Appendix table 5-59.
Patents awarded to U.S. universities and colleges, by utility class: 1969-74 through 1991-95

Utility class	Number of patents					Percentage of patents				
	1969-74	1975-80	1981-85	1986-90	1991-95	1969-74	1975-80	1981-85	1986-90	1991-95
501 Compositions: ceramic	0	5	6	22	41	0	0	0	0	1
526 Synthetic resins or natural rubbers—part of the class 520 series	1	8	3	19	39	0	0	0	0	0
382 Image analysis	1	2	5	22	38	0	0	0	0	0
540 Organic compounds—part of the class 532-570 series	5	16	12	36	37	0	1	0	1	0
148 Metal treatment	2	10	12	14	35	0	0	0	0	0
318 Electricity: motive power systems	7	7	5	7	33	1	0	0	0	0
544 Organic compounds—part of the class 532-570 series	2	7	10	20	33	0	0	0	0	0
219 Electric heating	4	10	9	15	32	0	0	0	0	0
365 Static information storage and retrieval	23	9	7	25	32	2	0	0	1	0
548 Organic compounds—part of the class 532-570 series	3	15	9	25	32	0	1	0	1	0
568 Organic compounds—part of the class 532-570 series	13	29	14	15	31	1	1	1	0	0
504 Plant protecting and regulating compositions	3	8	4	20	31	0	0	0	0	0
All other utility classes	647	709	719	1,028	1,604	47	34	29	22	20

SOURCES: U.S. Patent and Trademark Office, *Technology Assessment and Forecast Report, U.S. Universities and Colleges, 1969-95* (Washington, DC: 1996); and National Science Foundation, unpublished tabulations.

See figure 5-33.

Appendix table 6-1.
Real gross domestic product, for selected countries: 1960-95
(Billions of 1995 U.S. dollars)

	United States	Canada	Japan	South Korea	Austria	Belgium	Denmark	France	Germany[a]	Italy	Nether-lands	Norway	Sweden	United Kingdom
1960	2,433.07	170.88	415.98	36.12	55.01	76.32	43.97	378.74	544.64	345.35	100.42	29.26	70.36	507.23
1961	2,484.81	176.24	476.54	38.23	57.93	80.11	46.56	399.60	569.86	373.69	103.33	31.04	74.36	520.29
1962	2,634.66	188.73	510.18	39.05	59.32	84.29	49.12	426.26	596.43	396.87	107.77	31.88	77.53	527.20
1963	2,747.51	198.52	563.76	42.62	61.74	87.96	49.35	449.05	613.21	419.14	111.33	33.08	81.66	548.05
1964	2,907.69	211.76	638.25	46.74	65.47	94.08	53.76	478.32	654.06	430.86	120.90	34.74	87.23	577.85
1965	3,092.62	225.73	671.01	49.42	67.34	97.43	56.34	501.18	689.08	444.94	127.31	36.58	90.56	592.48
1966	3,292.07	241.05	742.11	55.44	71.14	100.51	57.67	527.31	708.30	471.57	130.87	37.96	92.46	603.68
1967	3,378.13	248.12	822.07	58.71	73.28	104.40	59.64	552.03	706.12	505.42	137.81	40.34	95.57	617.52
1968	3,537.77	261.40	927.04	65.36	76.56	108.79	62.01	575.54	744.63	538.50	147.04	41.25	99.05	642.68
1969	3,644.70	275.40	1,040.77	74.42	81.36	116.01	65.93	615.77	800.18	571.34	157.04	43.11	104.01	655.93
1970	3,644.92	282.55	1,142.86	80.94	87.16	123.39	67.26	651.06	840.49	601.68	166.07	43.97	110.74	670.90
1971	3,765.30	298.82	1,193.03	87.81	91.61	127.92	69.06	682.20	866.19	613.08	173.46	45.98	111.79	684.23
1972	3,969.91	315.94	1,293.40	92.04	97.30	134.68	72.70	712.43	903.01	631.02	178.85	48.36	114.34	708.19
1973	4,197.97	340.31	1,397.29	103.82	102.06	142.64	75.34	751.19	946.04	672.30	187.88	50.34	118.88	760.31
1974	4,182.80	355.29	1,380.17	112.20	106.08	148.47	74.64	774.55	947.89	703.83	195.49	52.96	122.68	747.39
1975	4,157.95	364.53	1,422.84	119.64	105.70	146.26	74.15	772.39	936.02	688.72	195.78	55.17	125.82	742.01
1976	4,390.32	386.99	1,479.40	133.72	110.53	154.41	78.95	805.17	985.85	733.47	205.11	58.92	127.15	762.61
1977	4,603.54	400.98	1,544.35	147.51	115.55	155.15	80.23	831.07	1,013.90	754.67	209.90	61.03	125.12	780.63
1978	4,834.18	419.32	1,625.77	161.36	115.62	159.39	81.41	858.92	1,044.29	782.80	214.85	63.80	127.31	807.61
1979	4,974.35	435.55	1,714.93	172.87	121.10	162.79	84.30	886.76	1,088.41	827.21	219.63	67.04	132.20	830.20
1980	4,961.34	442.02	1,763.25	168.23	124.64	169.82	83.92	901.16	1,099.08	856.42	222.28	69.86	134.40	812.25
1981	5,082.90	458.25	1,819.15	178.67	124.28	167.06	83.18	911.76	1,100.17	860.48	221.16	70.47	134.39	801.77
1982	4,973.92	443.51	1,874.76	192.23	125.61	169.83	85.69	934.97	1,089.82	864.42	218.58	70.70	135.73	815.63
1983	5,174.45	457.54	1,918.30	214.33	128.11	170.08	87.85	941.47	1,108.99	874.95	222.32	73.98	138.11	845.62
1984	5,527.51	486.40	1,993.44	232.93	129.85	173.81	91.70	953.84	1,140.20	897.42	229.63	78.23	143.70	865.27
1985	5,733.31	509.59	2,081.24	248.18	133.05	175.10	95.64	971.79	1,163.35	922.64	236.70	82.36	146.47	897.76
1986	5,905.86	526.49	2,141.50	276.86	134.62	177.96	99.12	996.26	1,190.63	948.84	243.22	85.80	149.83	936.21
1987	6,076.37	548.42	2,230.56	308.75	136.85	181.74	99.41	1,018.68	1,208.23	978.22	246.66	87.51	154.55	981.27
1988	6,307.12	575.73	2,368.74	343.55	142.41	190.69	100.57	1,064.50	1,253.21	1,016.06	253.11	87.07	158.03	1,030.37
1989	6,519.59	589.81	2,483.18	365.48	147.86	197.26	101.14	1,109.77	1,298.64	1,045.35	264.96	87.86	161.78	1,052.86
1990	6,603.82	588.43	2,609.42	400.23	154.14	204.52	102.58	1,137.60	1,372.71	1,067.96	275.84	89.50	163.99	1,057.04
1991	6,539.60	577.91	2,713.01	436.78	158.52	207.74	103.96	1,146.48	1,441.98	1,080.12	282.11	92.29	162.16	1,036.31
1992	6,717.53	582.33	2,741.60	458.91	161.75	211.25	104.20	1,159.81	1,467.42	1,086.22	287.82	95.31	159.85	1,030.82
1993	6,870.29	595.26	2,745.11	485.30	162.34	208.39	105.74	1,144.38	1,438.83	1,073.67	290.02	97.95	156.30	1,052.18
1994	7,109.43	619.49	2,758.25	526.93	167.29	213.27	110.38	1,176.72	1,470.80	1,096.49	299.85	102.88	161.52	1,092.55
1995	7,253.80	633.90	2,781.74	574.11	170.34	217.39	113.45	1,202.09	1,494.22	1,129.04	306.27	106.24	167.29	1,119.85

NOTE: Country gross domestic products were determined with 1993 purchasing power parities using the Elteto-Köves-Szulc (EKS) aggregation method, which is the method used by the Organisation for Economic Co-operation and Development (OECD) and EUROSTAT in their official statistics. For a discussion of the properties of this aggregation method, see OECD, *Purchasing Power Parities and Real Expenditures, 1993: Volume 1, EKS Results* (Paris: 1995), p. 4.

[a]German data are for the former West Germany only.

SOURCE: U.S. Bureau of Labor Statistics, Office of Productivity and Technology, "Comparative Real Gross Domestic Product Per Capita and Per Employed Person, Fourteen Countries, 1960-1995" (Washington, DC: April 1997).

See figure 6-1.

Appendix table 6-2.
Real gross domestic product per capita, for selected countries: 1960-95
(1995 U.S. dollars)

	United States	Canada	Japan	South Korea	Austria	Belgium	Denmark	France	Germany[a]	Italy	Nether-lands	Norway	Sweden	United Kingdom
1960	13,460	9,542	4,460	1,444	7,806	8,338	9,598	8,290	9,825	7,053	8,745	8,170	9,406	9,685
1961	13,523	9,646	5,065	1,484	8,175	8,723	10,094	8,656	10,144	7,602	8,879	8,599	9,889	9,853
1962	14,120	10,139	5,371	1,473	8,320	9,141	10,571	9,070	10,494	8,007	9,132	8,760	10,253	9,893
1963	14,514	10,468	5,879	1,563	8,604	9,468	10,536	9,387	10,685	8,394	9,305	9,023	10,739	10,220
1964	15,150	10,958	6,587	1,670	9,063	10,032	11,389	9,897	11,282	8,542	9,971	9,404	11,386	10,703
1965	15,913	11,471	6,851	1,722	9,262	10,294	11,843	10,275	11,755	8,752	10,356	9,824	11,710	10,901
1966	16,745	12,024	7,507	1,883	9,716	10,549	12,021	10,721	11,975	9,206	10,508	10,113	11,842	11,048
1967	16,997	12,156	8,227	1,948	9,934	10,897	12,325	11,137	11,910	9,783	10,940	10,654	12,147	11,236
1968	17,623	12,610	9,172	2,120	10,324	11,310	12,741	11,530	12,515	10,347	11,555	10,801	12,515	11,640
1969	17,978	13,097	10,172	2,359	10,934	12,027	13,474	12,238	13,322	10,908	12,199	11,194	13,050	11,827
1970	17,772	13,250	11,019	2,510	11,672	12,786	13,647	12,823	13,858	11,402	12,743	11,339	13,769	12,060
1971	18,129	13,566	11,389	2,670	12,214	13,225	13,915	13,311	14,134	11,541	13,147	11,781	13,804	12,234
1972	18,911	14,178	12,181	2,747	12,897	13,871	14,564	13,780	14,642	11,795	13,417	12,295	14,078	12,624
1973	19,807	15,085	12,859	3,044	13,453	14,646	15,002	14,413	15,265	12,477	13,981	12,711	14,610	13,523
1974	19,555	15,532	12,529	3,234	13,960	15,200	14,795	14,764	15,275	12,940	14,434	13,289	15,034	13,290
1975	19,251	15,706	12,759	3,391	13,946	14,932	14,653	14,657	15,139	12,576	14,333	13,766	15,357	13,197
1976	20,131	16,456	13,119	3,730	14,610	15,739	15,562	15,218	16,022	13,319	14,892	14,635	15,464	13,566
1977	20,898	16,850	13,561	4,051	15,268	15,796	15,768	15,638	16,513	13,655	15,149	15,095	15,163	13,893
1978	21,714	17,445	14,147	4,365	15,289	16,215	15,951	16,092	17,028	14,118	15,414	15,721	15,383	14,376
1979	22,098	17,941	14,799	4,606	16,041	16,549	16,474	16,542	17,738	14,877	15,650	16,461	15,939	14,762
1980	21,786	17,973	15,096	4,413	16,509	17,245	16,382	16,725	17,852	15,387	15,711	17,098	16,173	14,419
1981	22,099	18,404	15,462	4,614	16,420	16,956	16,239	16,828	17,836	15,428	15,523	17,189	16,151	14,228
1982	21,419	17,598	15,827	4,888	16,580	17,231	16,740	17,158	17,681	15,437	15,273	17,183	16,304	14,483
1983	22,082	17,974	16,085	5,370	16,930	17,258	17,178	17,189	18,055	15,561	15,473	17,920	16,582	14,999
1984	23,383	18,925	16,609	5,765	17,152	17,636	17,939	17,334	18,638	15,928	15,921	18,896	17,238	15,313
1985	24,038	19,644	17,236	6,082	17,557	17,762	18,701	17,578	19,064	16,330	16,338	19,833	17,541	15,838
1986	24,538	20,092	17,627	6,718	17,742	18,045	19,356	17,936	19,497	16,771	16,697	20,588	17,902	16,468
1987	25,022	20,656	18,270	7,418	18,012	18,413	19,390	18,248	19,782	17,264	16,821	20,900	18,403	17,213
1988	25,737	21,407	19,319	8,174	18,700	19,221	19,604	18,969	20,394	17,900	17,148	20,683	18,731	18,027
1989	26,354	21,542	20,169	8,610	19,306	19,849	19,705	19,669	20,924	18,392	17,847	20,785	19,049	18,356
1990	26,420	21,174	21,122	9,336	19,943	20,520	19,954	20,051	21,702	18,757	18,455	21,101	19,160	18,364
1991	25,881	20,551	21,893	10,088	20,289	20,764	20,169	20,094	22,505	18,912	18,722	21,655	18,817	17,927
1992	26,299	20,403	22,053	10,490	20,440	21,030	20,148	20,215	22,623	18,994	18,958	22,235	18,441	17,771
1993	26,613	20,564	22,019	10,981	20,315	20,666	20,380	19,849	21,956	19,035	18,968	22,716	17,927	18,082
1994	27,273	21,175	22,073	11,804	20,834	21,083	21,201	20,323	22,333	19,393	19,495	23,724	18,394	18,710
1995	27,572	21,405	22,210	12,732	21,170	21,445	21,678	20,675	22,586	19,934	19,814	24,371	18,952	19,108

NOTE: Country gross domestic products were determined with 1993 purchasing power parities using the Elteto-Köves-Szulc (EKS) aggregation method, which is the method used by the Organisation for Economic Co-operation and Development (OECD) and EUROSTAT in their official statistics. For a discussion of the properties of this aggregation method, see OECD, *Purchasing Power Parities and Real Expenditures, 1993: Volume 1, EKS Results* (Paris: 1995), p. 4.

[a]German data are for the former West Germany only.

SOURCE: U.S. Bureau of Labor Statistics, Office of Productivity and Technology, "Comparative Real Gross Domestic Product Per Capita and Per Employed Person, Fourteen Countries, 1960-1995" (Washington, DC: April 1997).

See figure 6-1.

Appendix table 6-3.
Real gross domestic product per employed person, for selected countries: 1960-95
(1995 U.S. dollars)

	United States	Canada	Japan	South Korea	Austria	Belgium	Denmark	France	Germany[a]	Italy	Nether-lands	Norway	Sweden	United Kingdom
1960	35,627	NA	9,545	NA	17,219	21,993	21,664	19,190	20,897	NA	21,801	19,090	19,461	21,030
1961	36,371	NA	10,791	NA	17,990	22,916	22,607	20,249	21,564	NA	22,111	19,940	20,401	21,350
1962	37,893	NA	11,421	NA	18,571	23,744	23,493	21,605	22,492	NA	22,609	20,362	21,155	21,527
1963	38,972	NA	12,514	5,562	19,458	24,604	23,315	22,579	23,069	NA	23,041	21,039	22,171	22,324
1964	40,361	NA	13,960	5,993	20,663	25,945	24,887	23,789	24,585	NA	24,590	22,023	23,348	23,235
1965	41,900	NA	14,452	6,022	21,393	26,766	25,613	24,849	25,755	NA	25,675	22,996	24,074	23,586
1966	43,307	NA	15,646	6,582	22,826	27,514	25,776	25,951	26,555	NA	26,190	23,761	24,543	23,975
1967	43,411	NA	16,981	6,735	23,931	28,706	26,826	27,098	27,365	NA	27,664	25,074	25,643	24,810
1968	44,526	NA	18,793	7,140	25,329	29,945	27,582	28,337	28,833	NA	29,246	25,608	26,297	25,946
1969	44,771	NA	20,895	7,905	26,936	31,398	29,065	29,862	30,509	NA	30,723	26,530	27,104	26,481
1970	44,523	NA	22,685	8,305	28,743	33,368	29,445	31,151	31,645	NA	32,109	26,631	28,305	27,162
1971	45,816	NA	23,526	8,723	29,864	34,351	30,057	32,494	32,481	NA	33,339	27,597	28,628	28,111
1972	46,925	NA	25,451	8,717	31,495	36,243	30,993	33,735	33,727	NA	34,675	28,712	29,187	28,917
1973	48,037	NA	26,799	9,320	32,477	38,057	31,718	35,084	34,953	NA	36,410	29,696	30,232	30,449
1974	46,986	NA	26,567	9,684	33,474	39,020	31,527	35,863	35,451	NA	37,521	30,836	30,592	29,860
1975	47,236	NA	27,484	10,114	33,551	39,003	31,720	36,077	35,973	NA	37,869	31,512	30,766	29,799
1976	48,300	39,289	28,308	10,650	34,881	41,409	33,178	37,315	38,090	NA	39,445	32,572	30,985	30,875
1977	48,896	39,891	29,161	11,409	36,136	41,774	33,443	38,198	39,118	NA	39,529	32,896	30,429	31,566
1978	49,245	40,339	30,326	11,962	36,074	42,871	33,584	39,284	39,965	NA	40,084	33,784	30,846	32,395
1979	49,294	40,199	31,594	12,652	37,562	43,389	34,360	40,481	40,967	NA	40,226	34,956	31,571	32,879
1980	48,926	39,625	32,153	12,295	38,535	45,308	34,369	41,070	40,737	NA	39,482	35,621	31,746	32,503
1981	49,570	39,945	32,896	12,741	38,406	45,422	34,517	41,755	40,821	41,076	39,073	35,587	31,690	33,227
1982	48,905	39,920	33,562	13,369	39,318	46,785	35,400	42,701	40,925	41,401	38,824	35,651	32,069	34,155
1983	50,221	40,918	33,779	14,776	40,479	47,337	36,184	43,058	42,246	41,826	40,275	37,437	32,556	35,575
1984	51,551	42,381	34,905	16,143	41,049	48,468	37,131	44,011	43,365	42,732	41,079	39,346	33,594	35,814
1985	52,415	43,116	36,195	16,578	41,956	48,557	37,778	44,973	43,918	43,810	41,165	40,339	33,893	36,688
1986	52,806	43,254	36,935	17,856	42,272	49,011	38,154	45,924	44,334	44,835	41,647	40,779	34,457	38,027
1987	52,978	43,870	38,090	18,879	42,991	49,805	37,938	46,807	44,666	46,373	41,525	40,752	35,260	38,970
1988	53,819	44,640	39,777	20,366	44,473	51,509	38,609	48,481	45,971	48,048	42,540	40,853	35,565	39,554
1989	54,534	44,801	40,882	20,813	45,499	52,463	39,044	49,885	46,953	49,472	43,578	42,420	35,887	39,492
1990	54,595	44,433	42,121	22,131	46,530	53,624	40,002	50,611	48,201	49,955	43,509	43,569	36,043	39,368
1991	54,571	44,475	42,955	23,468	47,103	54,396	41,154	50,951	49,402	50,176	43,738	45,272	36,183	39,508
1992	55,767	45,079	42,931	24,203	47,849	55,563	41,510	51,921	49,819	50,897	43,281	46,888	37,330	39,939
1993	56,279	45,475	42,859	25,206	48,289	55,409	42,541	51,832	49,603	51,592	43,157	48,093	38,516	41,085
1994	56,978	46,345	43,030	26,563	49,693	57,106	44,664	53,335	51,310	53,587	44,554	49,930	40,209	42,298
1995	57,333	46,693	43,377	28,174	50,746	57,977	45,166	53,843	52,462	55,841	44,776	50,511	41,013	43,137

NA = not available

NOTE: Country gross domestic products were determined with 1993 purchasing power parities using the Elteto-Köves-Szulc (EKS) aggregation method, which is the method used by the Organisation for Economic Co-operation and Development (OECD) and EUROSTAT in their official statistics. For a discussion of the properties of this aggregation method, see OECD, *Purchasing Power Parities and Real Expenditures, 1993: Volume 1, EKS Results* (Paris: 1995), p. 4.

[a]German data are for the former West Germany only.

SOURCE: U.S. Bureau of Labor Statistics, Office of Productivity and Technology, "Comparative Real Gross Domestic Product Per Capita and Per Employed Person, Fourteen Countries, 1960-1995" (Washington, DC: April 1997).

See figure 6-1.

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
United States														
1970	249,584.0	39.9	NA	NA	6,664.1	46.3	3,233.6	44.0	3,425.6	51.6	NA	NA	NA	NA
1971	263,018.0	40.0	10,495.9	NA	6,992.5	47.8	3,072.0	48.3	3,795.8	53.3	24,356.2	86.7	NA	NA
1972	290,424.0	38.9	11,234.4	47.9	7,528.8	45.6	3,620.5	45.5	4,465.2	56.9	26,848.9	48.1	263,575.1	38.2
1973	323,403.0	37.4	12,165.5	42.1	8,796.2	44.3	4,022.8	44.5	4,736.4	54.2	29,721.0	44.7	293,682.0	36.8
1974	337,278.0	33.3	12,819.4	42.6	7,062.3	35.2	4,451.3	45.6	4,668.2	46.8	29,001.3	41.5	308,276.8	32.7
1975	354,689.0	34.8	13,172.8	41.3	8,791.1	43.7	4,827.9	55.9	5,408.9	49.5	32,200.7	45.0	322,488.3	34.1
1976	405,313.0	34.7	14,018.4	44.0	9,900.5	42.9	5,536.7	43.3	6,408.5	50.4	35,864.0	44.6	369,449.0	34.0
1977	462,365.0	34.5	15,814.7	47.0	12,683.5	43.4	6,661.2	40.4	6,728.6	47.7	41,888.0	44.8	420,477.0	33.8
1978	516,936.0	34.4	18,499.0	45.1	14,580.6	42.6	8,246.0	40.9	7,427.8	46.2	48,753.4	43.7	468,182.6	33.6
1979	571,281.0	33.5	20,217.6	37.7	15,332.4	38.4	9,853.0	38.3	8,099.3	48.1	53,502.2	39.3	517,778.8	33.0
1980	584,406.0	32.1	20,083.8	32.8	19,821.6	41.8	11,959.5	38.4	9,352.2	48.1	61,217.1	38.4	523,188.9	31.5
1981	652,014.0	32.7	30,723.8	46.1	23,437.1	44.2	13,745.7	39.1	10,958.3	50.3	78,864.9	44.6	573,149.1	31.6
1982	649,768.0	33.7	33,401.5	46.8	24,414.1	43.2	15,330.3	37.4	12,911.4	53.2	86,057.3	44.6	563,710.7	32.5
1983	690,088.0	33.8	37,898.5	49.4	29,013.1	45.0	17,314.5	37.7	14,703.9	54.2	98,930.0	46.1	591,158.0	32.3
1984	780,524.0	34.3	39,989.5	46.1	36,191.5	43.3	19,856.0	35.1	15,304.0	53.2	111,341.0	43.6	669,183.0	33.2
1985	802,938.0	35.0	43,277.1	45.2	40,016.8	44.5	20,101.8	35.4	17,315.7	55.7	120,711.4	44.1	682,226.6	33.8
1986	833,149.0	36.4	48,064.1	46.4	41,814.8	44.2	18,079.4	34.8	18,691.8	54.1	126,650.1	44.5	706,498.9	35.3
1987	889,047.0	36.4	47,786.5	43.4	48,234.5	51.9	17,187.1	32.5	20,683.6	54.3	133,891.7	45.6	755,155.3	35.1
1988	971,297.0	36.5	49,504.9	43.5	51,642.7	51.6	18,864.1	31.4	23,209.5	54.1	143,221.2	45.2	828,075.8	35.3
1989	1,013,420.0	36.0	51,646.4	43.6	56,792.5	54.1	19,512.1	32.5	25,769.1	53.1	153,720.1	46.3	859,699.9	34.6
1990	1,031,350.0	35.8	53,608.2	41.0	57,367.3	52.6	19,299.1	33.2	29,075.2	55.0	159,349.8	45.4	872,000.2	34.5
1991	1,028,060.0	36.2	47,616.7	36.3	60,357.8	53.1	16,819.8	31.3	33,416.9	55.5	158,211.2	44.1	869,848.8	35.1
1992	1,063,570.0	35.9	45,246.7	35.4	62,524.0	49.2	17,618.3	29.6	36,165.7	55.2	161,554.7	42.5	902,015.3	34.9
1993	1,116,530.0	36.1	39,487.0	32.6	70,890.2	51.1	17,458.4	27.9	38,624.2	56.4	166,459.8	42.6	950,070.2	35.1
1994	1,197,090.0	36.2	NA	NA	84,507.9	53.9	19,521.9	27.3	40,586.0	55.0	NA	NA	NA	NA
1995	1,287,710.0	36.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
Japan														
1970	26,402,200.0	32.8	44,334.4	44.3	1,470,640.0	37.5	312,745.0	36.2	549,674.0	55.8	2,377,393.4	40.5	24,024,806.6	32.2
1971	28,430,200.0	33.8	51,899.5	45.3	1,458,200.0	37.7	327,933.0	38.1	658,130.0	60.0	2,496,162.5	42.0	25,934,037.5	33.1
1972	31,917,900.0	34.3	62,418.6	45.3	1,738,620.0	39.1	365,772.0	39.5	672,480.0	61.4	2,839,290.6	43.0	29,078,609.4	33.7
1973	39,568,100.0	33.5	90,705.1	47.1	1,972,330.0	37.5	449,269.0	35.6	704,728.0	58.7	3,217,032.1	40.6	36,351,067.9	32.9
1974	45,137,200.0	30.8	108,524.0	48.5	2,078,780.0	37.0	581,084.0	36.1	619,336.0	42.4	3,387,724.0	38.0	41,749,476.0	30.3
1975	44,800,800.0	31.0	121,152.0	49.0	1,972,680.0	38.4	556,282.0	36.9	856,016.0	51.6	3,506,130.0	41.0	41,294,670.0	30.4
1976	51,100,500.0	30.9	133,580.0	49.5	2,618,840.0	36.0	600,145.0	39.2	995,602.0	55.0	4,348,167.0	39.9	46,752,333.0	30.2
1977	55,412,200.0	31.2	132,919.0	49.0	2,822,760.0	36.4	726,608.0	33.5	1,178,250.0	57.9	4,860,537.0	39.7	50,551,663.0	30.6
1978	60,545,300.0	32.6	148,533.0	49.0	2,928,110.0	36.2	836,794.0	33.5	1,502,180.0	67.5	5,415,617.0	41.3	55,129,683.0	32.0
1979	64,815,400.0	31.2	134,096.0	42.8	3,240,990.0	35.4	989,708.0	33.7	1,312,850.0	55.6	5,677,644.0	38.4	59,137,756.0	30.7
1980	70,232,300.0	29.0	153,506.0	44.4	3,932,900.0	33.2	1,179,570.0	33.5	1,476,360.0	52.4	6,742,336.0	36.4	63,489,964.0	28.3
1981	74,938,500.0	29.9	147,224.0	44.6	4,865,830.0	33.3	1,335,990.0	32.4	1,760,620.0	55.5	8,109,664.0	36.5	66,828,836.0	29.2
1982	78,467,500.0	30.9	176,235.0	42.7	5,393,120.0	35.3	1,542,630.0	34.0	1,928,100.0	55.9	9,040,085.0	38.2	69,427,415.0	30.1
1983	81,747,700.0	31.5	203,000.0	43.8	6,278,730.0	34.8	1,986,090.0	34.3	2,093,640.0	58.0	10,561,460.0	37.9	71,186,240.0	30.7
1984	89,244,900.0	31.9	231,453.0	45.0	8,146,470.0	34.7	2,342,440.0	32.7	2,046,000.0	57.0	12,766,363.0	36.7	76,478,537.0	31.2
1985	94,672,600.0	32.9	283,397.0	45.1	8,276,160.0	35.3	2,853,440.0	35.6	2,107,600.0	57.8	13,520,597.0	37.8	81,152,003.0	32.2
1986	95,817,400.0	35.0	265,439.0	44.0	8,308,320.0	35.3	2,912,310.0	36.6	2,326,180.0	61.7	13,812,249.0	38.5	82,005,151.0	34.4
1987	98,406,700.0	36.2	331,277.0	47.6	8,285,500.0	35.6	2,895,760.0	34.6	2,478,640.0	61.7	13,991,177.0	38.5	84,415,523.0	35.8
1988	105,000,000.0	35.9	297,266.0	41.4	9,291,270.0	35.2	3,117,800.0	34.6	2,526,560.0	60.1	15,232,896.0	37.8	89,767,104.0	35.6
1989	113,000,000.0	35.7	265,123.0	36.2	10,281,900.0	36.0	3,535,620.0	34.9	2,756,460.0	61.2	16,839,103.0	38.4	96,160,897.0	35.3
1990	121,000,000.0	35.6	262,173.0	35.1	10,973,200.0	36.3	3,946,330.0	35.0	2,778,640.0	60.3	17,960,343.0	38.3	103,039,657.0	35.2
1991	129,000,000.0	36.1	276,712.0	37.0	11,580,100.0	35.7	4,218,600.0	34.4	2,864,740.0	60.7	18,940,152.0	37.8	110,059,848.0	35.8
1992	128,000,000.0	37.1	316,265.0	38.9	10,349,400.0	35.5	4,007,420.0	33.7	2,992,610.0	61.4	17,665,695.0	37.8	110,334,305.0	37.0
1993	121,000,000.0	37.1	350,262.0	41.7	9,763,680.0	34.8	3,430,760.0	31.7	3,098,270.0	61.8	16,642,972.0	37.2	104,357,028.0	37.1
1994	117,000,000.0	37.2	NA	NA	9,629,530.0	35.5	3,189,820.0	34.2	3,115,700.0	NA	NA	NA	NA	NA
1995	120,000,000.0	37.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
Germany														
1970	259,450.0	40.0	934.6	33.7	NA	NA	4,018.1	79.7	NA	NA	NA	NA	NA	NA
1971	277,210.0	40.2	1,011.1	33.5	NA	NA	4,383.3	80.0	NA	NA	NA	NA	NA	NA
1972	295,650.0	40.4	1,159.2	37.5	NA	NA	5,033.5	80.6	NA	NA	NA	NA	NA	NA
1973	332,580.0	40.2	1,651.3	42.9	NA	NA	5,238.3	81.0	NA	NA	NA	NA	NA	NA
1974	354,320.0	38.0	1,647.1	38.9	NA	NA	5,311.6	79.6	NA	NA	NA	NA	NA	NA
1975	352,540.0	38.0	1,528.7	39.8	NA	NA	4,551.5	82.5	5,501.4	48.7	NA	NA	NA	NA
1976	387,270.0	37.4	1,744.7	45.8	21,028.0	50.0	4,934.4	83.1	6,050.4	47.9	33,757.5	52.4	353,512.5	36.4
1977	411,480.0	38.2	1,764.5	46.4	22,689.3	56.3	5,930.0	81.8	6,444.5	46.7	36,828.3	56.5	374,651.7	37.0
1978	435,350.0	38.9	2,491.1	55.0	22,894.1	56.4	5,951.5	81.6	6,993.3	50.4	38,330.1	57.8	397,019.9	37.7
1979	467,080.0	37.7	2,928.2	48.9	23,919.8	54.5	6,130.5	81.4	7,466.1	50.6	40,444.6	56.0	426,635.4	36.5
1980	476,250.0	35.8	3,272.1	38.1	25,281.6	54.0	6,236.4	77.8	7,356.0	47.1	42,146.1	53.3	434,103.9	34.7
1981	485,710.0	35.0	3,894.3	39.7	26,710.0	54.2	7,582.4	75.6	8,257.4	49.3	46,444.0	54.1	439,266.0	33.8
1982	496,010.0	35.2	3,938.0	34.2	29,017.4	54.6	8,595.1	81.5	8,579.9	50.5	50,130.4	54.4	445,879.6	33.9
1983	519,420.0	35.9	3,932.2	39.0	30,586.4	53.3	9,645.1	76.4	9,676.3	51.5	53,840.0	54.5	465,580.0	34.5
1984	542,600.0	35.2	4,261.0	42.4	31,774.7	52.2	10,732.0	63.7	9,902.6	49.2	56,670.3	52.5	485,929.7	33.9
1985	578,850.0	35.3	4,390.4	40.9	35,119.6	50.4	11,645.3	59.0	10,367.3	49.9	61,522.6	50.9	517,327.4	34.1
1986	620,440.0	38.0	4,716.0	44.5	37,748.9	49.7	12,199.6	62.4	11,770.7	53.3	66,435.2	51.8	554,004.8	36.8
1987	624,690.0	38.1	5,005.4	41.4	40,639.2	55.8	11,786.0	63.9	11,267.4	49.8	68,698.0	54.5	555,992.0	36.8
1988	652,670.0	37.7	5,534.7	45.9	43,421.3	57.2	12,208.3	63.3	12,339.5	50.3	73,503.8	55.8	579,166.2	36.2
1989	686,010.0	36.6	6,254.1	37.7	46,078.2	56.5	11,959.0	63.6	12,793.0	48.0	77,084.3	53.7	608,925.7	35.2
1990	741,550.0	37.0	6,751.8	36.3	48,472.8	54.1	12,635.2	61.0	13,462.0	47.1	81,321.8	51.6	660,228.2	35.7
1991	790,660.0	36.8	7,648.6	38.7	48,115.2	48.6	16,935.1	58.9	14,714.5	49.9	87,413.4	49.4	703,246.6	35.6
1992	799,090.0	37.1	7,585.2	42.7	48,153.7	48.0	14,677.4	55.4	15,746.1	49.7	86,162.4	48.9	712,927.6	36.0
1993	746,310.0	37.2	NA	NA	45,918.9	46.4	11,288.3	52.4	16,032.3	51.3	NA	NA	NA	NA
1994	765,980.0	36.9	NA	NA	46,476.6	45.8	12,332.2	49.4	16,747.5	51.0	NA	NA	NA	NA
1995	789,452.0	36.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
France														
1970	215,840.0	38.5	3,042.1	35.8	6,646.6	52.6	4,787.8	61.4	2,449.5	30.8	16,925.9	45.9	198,914.1	38.0
1971	238,979.0	38.7	3,373.1	36.0	7,610.5	52.3	4,958.0	59.9	2,828.0	30.9	18,769.6	45.4	220,209.4	38.3
1972	265,734.0	38.8	3,861.5	36.8	8,710.6	50.7	5,288.2	59.3	2,995.6	30.6	20,855.9	45.0	244,878.1	38.4
1973	302,922.0	38.2	4,261.5	35.6	10,425.4	50.0	4,959.0	55.4	3,491.6	31.1	23,137.5	43.7	279,784.5	37.8
1974	342,318.0	34.5	4,491.6	31.2	12,618.0	49.6	5,255.1	55.6	4,085.3	31.3	26,450.0	42.4	315,868.0	33.9
1975	381,286.0	37.4	6,030.2	36.3	14,605.9	49.4	5,772.4	53.6	4,753.1	31.0	31,161.6	43.1	350,124.4	36.9
1976	440,749.0	37.0	9,302.5	38.6	16,866.2	48.3	7,429.9	54.1	5,197.5	31.1	38,796.2	43.4	401,952.9	36.4
1977	496,403.0	37.5	10,401.0	39.1	19,146.8	47.4	8,815.8	54.1	5,831.0	31.2	44,194.6	43.3	452,208.4	37.0
1978	564,275.0	39.1	12,980.0	45.8	21,402.6	46.7	8,825.8	53.3	7,558.0	33.3	50,766.4	44.8	513,508.6	38.6
1979	635,601.0	38.1	13,802.0	42.0	25,020.7	43.2	9,718.4	51.3	8,308.0	34.4	56,849.1	42.5	578,751.9	37.7
1980	679,520.0	35.6	16,032.0	39.5	27,054.3	43.9	11,041.2	51.1	9,857.0	34.4	63,984.5	42.0	615,535.5	35.0
1981	733,461.0	34.8	20,108.0	37.9	30,620.0	45.3	13,287.8	50.6	11,377.0	33.3	75,392.8	41.6	658,068.2	34.1
1982	821,520.0	35.0	22,480.0	37.0	34,829.1	45.0	15,791.5	48.4	12,526.0	32.3	85,626.6	40.8	735,893.4	34.4
1983	900,970.0	35.6	27,250.0	40.8	39,133.7	43.2	18,105.4	45.2	15,256.0	34.2	99,745.1	41.2	801,224.9	35.0
1984	956,273.0	34.6	29,913.0	36.9	46,728.4	42.9	25,249.8	48.3	15,271.0	31.2	117,162.2	40.2	839,110.8	33.9
1985	1,033,130.0	35.3	31,005.0	38.1	49,149.9	41.0	28,660.3	47.6	16,247.9	30.0	125,063.1	39.6	908,066.9	34.8
1986	1,120,100.0	38.4	31,444.0	38.6	50,915.5	40.3	29,114.3	47.9	18,851.0	32.1	130,324.8	39.8	989,775.2	38.2
1987	1,143,220.0	38.1	30,661.0	36.8	54,579.1	40.5	27,852.4	47.3	20,368.0	33.3	133,460.5	39.5	1,009,759.5	37.9
1988	1,242,130.0	38.3	35,566.0	37.3	59,239.2	40.9	31,247.6	45.8	21,645.9	31.5	147,698.7	39.2	1,094,431.3	38.2
1989	1,324,620.0	37.3	38,809.0	35.0	62,245.9	39.4	33,131.6	43.6	21,884.0	29.1	156,070.5	37.2	1,168,549.5	37.3
1990	1,394,500.0	37.7	39,840.0	32.5	64,615.6	38.9	34,470.6	44.1	24,548.9	30.5	163,475.1	36.5	1,231,024.9	37.9
1991	1,409,770.0	37.7	39,877.0	32.0	66,026.1	37.4	34,360.4	42.7	25,742.9	30.4	166,006.4	35.6	1,243,763.6	38.0
1992	1,402,730.0	37.6	39,883.0	31.4	66,815.0	37.7	32,387.0	41.8	29,427.9	31.9	168,512.9	35.5	1,234,217.1	37.9
1993	1,380,290.0	38.7	40,646.0	33.6	66,032.0	38.2	28,850.0	40.6	32,935.8	33.9	168,463.8	36.5	1,211,826.2	39.0
1994	1,423,060.0	37.9	38,330.0	31.4	67,573.0	37.4	28,584.0	39.1	31,715.8	32.2	166,202.8	35.0	1,256,857.2	38.3
1995	1,478,010.0	37.6	42,874.0	34.7	71,080.0	37.2	29,687.0	38.0	32,670.0	31.2	176,311.0	35.4	1,301,699.0	37.9

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
United Kingdom														
1970	14,839.0	31.3	474.6	78.5	546.5	36.9	117.6	32.3	226.3	42.5	1,365.1	45.7	13,473.9	30.4
1971	16,093.0	32.0	534.0	81.1	638.1	38.1	115.7	34.2	259.8	44.8	1,547.5	47.6	14,545.5	30.9
1972	18,088.0	33.6	577.7	82.6	717.2	39.1	161.9	38.9	259.8	44.0	1,716.6	48.5	16,371.4	32.6
1973	20,969.0	33.1	606.0	79.8	840.9	37.8	181.8	35.8	292.1	41.0	1,920.8	45.7	19,048.2	32.2
1974	22,720.0	27.3	563.5	64.0	919.4	35.4	216.3	33.3	316.3	35.6	2,015.6	40.2	20,704.4	26.5
1975	27,657.0	29.7	764.3	69.2	1,136.4	39.7	301.0	39.6	412.2	39.3	2,614.0	45.3	25,043.0	28.7
1976	31,883.0	28.2	842.4	38.5	1,223.2	35.4	271.1	30.9	474.0	37.6	2,810.7	36.1	29,072.3	27.6
1977	38,512.0	29.2	896.4	38.6	1,483.2	38.2	352.1	35.9	669.5	41.6	3,401.1	38.7	35,110.9	28.5
1978	44,586.0	31.2	1,046.4	39.8	1,805.7	40.4	433.7	38.4	808.6	43.2	4,094.3	40.6	40,491.7	30.5
1979	49,395.0	29.9	1,159.5	35.5	1,906.6	38.0	570.5	38.4	921.2	41.0	4,557.8	37.9	44,837.2	29.2
1980	54,144.0	30.7	1,727.3	37.1	2,407.2	40.4	642.0	40.5	1,107.7	45.4	5,884.2	40.2	48,259.8	29.8
1981	55,834.0	31.3	1,861.6	35.1	2,578.7	39.9	621.1	42.5	1,192.1	45.2	6,253.5	39.4	49,580.5	30.5
1982	61,158.0	32.3	2,004.2	37.7	3,051.5	42.5	771.6	44.4	1,493.2	49.0	7,320.4	42.4	53,837.6	31.3
1983	64,738.0	31.8	2,305.5	41.0	3,296.0	40.2	921.1	40.0	1,553.8	47.5	8,076.4	41.6	56,661.6	30.7
1984	68,634.0	30.3	2,139.2	36.8	3,890.0	38.6	1,111.6	33.9	1,725.8	47.0	8,866.6	38.8	59,767.4	29.4
1985	76,801.0	31.7	2,228.8	33.1	4,222.1	40.0	1,509.1	35.1	1,988.4	49.3	9,948.3	38.8	66,852.7	30.8
1986	82,422.0	34.1	2,942.0	36.2	4,285.4	39.7	1,499.9	36.5	2,182.4	49.3	10,909.7	39.7	71,512.3	33.4
1987	89,902.0	33.1	3,028.1	34.1	4,459.8	38.5	1,791.9	34.7	2,526.0	50.3	11,805.7	38.5	78,096.3	32.5
1988	100,232.0	33.5	3,394.6	37.2	4,972.2	39.1	2,302.6	34.0	2,939.6	51.4	13,609.0	39.6	86,623.1	32.8
1989	107,166.0	32.9	4,200.7	38.6	4,867.5	35.8	2,398.2	30.6	3,175.9	50.0	14,642.2	37.9	92,523.8	32.2
1990	111,315.0	32.9	5,078.3	42.7	4,914.4	35.2	2,465.8	29.7	3,493.2	51.1	15,951.6	38.9	95,363.4	32.0
1991	106,896.0	32.6	4,770.9	39.6	4,744.9	36.2	2,331.7	28.1	3,801.1	50.5	15,648.6	38.2	91,247.5	31.8
1992	109,071.0	32.2	3,818.5	28.9	4,790.2	36.2	2,093.1	24.0	4,216.0	48.7	14,917.8	34.0	94,153.2	31.9
1993	113,940.0	32.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1994	121,272.0	32.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1995	128,631.0	32.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
Italy														
1970	18,105,000.0	36.4	92,206.4	30.8	455,451.0	47.3	415,480.0	56.5	358,597.0	32.5	1,321,734.4	42.6	16,783,265.6	36.0
1971	19,452,000.0	36.4	110,424.0	30.4	518,762.0	48.5	369,564.0	59.7	386,415.0	32.8	1,385,165.0	42.9	18,066,835.0	36.0
1972	21,016,000.0	36.5	116,961.0	30.1	572,976.0	48.4	282,613.0	61.4	402,055.0	32.4	1,374,605.0	42.0	19,641,395.0	36.1
1973	26,064,000.0	36.6	115,832.0	28.2	660,403.0	50.7	227,590.0	66.2	420,390.0	34.9	1,424,215.0	43.7	24,639,785.0	36.2
1974	34,901,000.0	36.5	148,263.0	30.0	846,521.0	49.9	275,660.0	67.1	502,252.0	43.9	1,772,696.0	47.3	33,128,304.0	36.1
1975	38,436,000.0	36.6	205,515.0	27.1	920,971.0	46.5	312,219.0	64.4	606,728.0	41.4	2,045,433.0	43.6	36,390,567.0	36.2
1976	51,506,000.0	36.6	325,492.0	27.9	1,269,360.0	42.5	411,565.0	60.7	769,069.0	42.3	2,775,486.0	41.7	48,730,514.0	36.3
1977	61,862,000.0	36.6	407,608.0	29.5	1,583,880.0	39.6	488,671.0	58.2	839,007.0	41.3	3,319,166.0	40.2	58,542,834.0	36.4
1978	71,459,000.0	36.6	495,955.0	26.1	1,626,920.0	37.5	541,710.0	56.8	986,175.0	41.9	3,650,760.0	38.2	67,808,240.0	36.5
1979	87,935,000.0	36.6	626,340.0	27.5	1,916,120.0	37.8	772,625.0	58.3	1,191,210.0	42.2	4,506,295.0	39.2	83,428,705.0	36.5
1980	107,923,000.0	36.6	797,661.0	25.6	2,152,840.0	35.7	960,427.0	57.3	1,655,330.0	46.0	5,566,258.0	38.6	102,356,742.0	36.5
1981	124,119,000.0	36.0	1,191,630.0	25.7	2,617,300.0	37.7	1,174,270.0	55.1	1,825,950.0	44.8	6,809,150.0	38.3	117,309,850.0	35.9
1982	140,932,000.0	35.6	1,448,060.0	24.0	3,175,750.0	34.8	1,451,200.0	53.7	2,292,240.0	43.2	8,367,250.0	36.1	132,564,750.0	35.6
1983	156,417,000.0	35.6	1,574,680.0	31.2	4,114,330.0	51.9	1,685,190.0	62.5	3,600,430.0	61.4	10,974,630.0	51.0	145,442,370.0	34.8
1984	176,942,000.0	34.2	1,707,630.0	36.4	4,602,440.0	54.2	2,047,180.0	59.3	3,977,200.0	54.9	12,334,450.0	51.7	164,607,550.0	33.4
1985	196,484,000.0	34.2	1,864,080.0	26.8	4,901,630.0	41.9	2,732,170.0	76.4	4,745,400.0	50.2	14,243,280.0	45.0	182,240,720.0	33.5
1986	213,686,000.0	35.9	2,247,060.0	36.5	5,306,900.0	45.0	2,751,730.0	30.9	4,986,940.0	48.5	15,292,630.0	41.2	198,393,370.0	35.6
1987	230,093,000.0	35.8	2,321,930.0	40.3	5,816,800.0	46.4	2,914,680.0	31.5	5,598,060.0	43.0	16,651,470.0	41.1	213,441,530.0	35.4
1988	256,378,000.0	34.8	2,567,880.0	35.9	6,619,280.0	40.0	3,106,570.0	24.7	NA	NA	NA	NA	NA	NA
1989	279,654,000.0	33.8	3,273,600.0	45.2	7,884,310.0	49.3	3,308,120.0	31.2	NA	NA	NA	NA	NA	NA
1990	293,622,000.0	34.3	3,544,500.0	46.5	8,608,650.0	51.1	2,886,320.0	24.9	NA	NA	NA	NA	NA	NA
1991	300,246,000.0	34.9	3,285,340.0	45.9	8,860,790.0	52.5	2,904,940.0	30.3	NA	NA	NA	NA	NA	NA
1992	307,906,000.0	35.5	NA	NA	8,883,320.0	54.2	3,167,660.0	32.5	NA	NA	NA	NA	NA	NA
1993	310,429,000.0	35.3	NA	NA	8,520,540.0	53.5	3,085,930.0	33.1	NA	NA	NA	NA	NA	NA
1994	331,620,000.0	34.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1995	369,033,000.0	33.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
South Korea														
1970	581,700.0	25.8	NA	NA	16,885.7	40.7	312,745.0	36.2	11,706.0	39.2	341,336.7	36.5	240,363.3	18.2
1971	721,900.0	24.7	NA	NA	25,898.1	39.5	327,933.0	38.1	16,206.0	40.6	370,037.1	38.3	351,862.9	18.0
1972	937,000.0	25.0	NA	NA	39,020.8	33.7	365,772.0	39.5	17,120.5	36.4	421,913.3	38.8	515,086.7	19.4
1973	1,350,200.0	25.0	NA	NA	76,210.2	30.5	449,269.0	35.6	20,159.1	35.0	545,638.3	34.8	804,561.7	21.0
1974	1,970,300.0	23.2	NA	NA	154,792.0	34.0	581,084.0	36.1	34,424.8	40.4	770,300.8	35.9	1,199,999.2	19.0
1975	2,665,300.0	24.1	NA	NA	202,702.0	36.8	556,282.0	36.9	58,688.5	36.7	817,672.5	36.9	1,847,627.5	20.9
1976	3,862,400.0	25.3	NA	NA	307,050.0	32.8	600,145.0	39.2	84,443.9	43.2	991,638.9	37.2	2,870,761.1	22.7
1977	4,837,300.0	25.3	NA	NA	327,563.0	32.2	726,608.0	33.5	112,835.0	44.7	1,167,006.0	34.0	3,670,294.0	23.4
1978	6,513,900.0	25.3	NA	NA	436,609.0	28.4	836,794.0	33.5	148,212.0	45.2	1,421,615.0	32.6	5,092,285.0	23.9
1979	8,644,800.0	24.6	NA	NA	608,218.0	29.0	989,708.0	33.7	176,438.0	40.3	1,774,364.0	32.4	6,870,436.0	23.2
1980	10,743,100.0	22.8	NA	NA	700,517.0	29.7	1,179,570.0	33.5	266,539.0	43.4	2,146,626.0	33.0	8,596,474.0	21.2
1981	13,566,700.0	22.8	NA	NA	921,156.0	29.8	1,335,990.0	32.4	290,042.0	41.8	2,547,188.0	32.2	11,019,512.0	21.4
1982	15,376,400.0	23.2	NA	NA	974,522.0	29.8	1,542,630.0	34.0	380,122.0	44.7	2,897,274.0	33.5	12,479,126.0	21.7
1983	18,637,000.0	24.3	NA	NA	1,358,180.0	30.2	1,986,090.0	34.3	456,738.0	46.9	3,801,008.0	33.7	14,835,992.0	22.6
1984	21,989,100.0	24.6	NA	NA	1,890,080.0	30.9	2,342,440.0	32.7	517,734.0	45.7	4,750,254.0	32.9	17,238,846.0	23.0
1985	24,080,000.0	24.8	NA	NA	1,958,250.0	30.9	2,853,440.0	35.6	558,327.0	45.0	5,370,017.0	34.4	18,709,983.0	23.0
1986	29,449,400.0	25.5	NA	NA	2,722,600.0	28.1	2,912,310.0	36.6	681,001.0	50.1	6,315,911.0	33.2	23,133,489.0	24.0
1987	35,173,500.0	25.1	NA	NA	3,471,710.0	25.2	2,895,760.0	34.6	734,021.0	50.6	7,101,491.0	30.1	28,072,009.0	24.0
1988	42,679,200.0	26.3	NA	NA	4,395,730.0	26.1	3,117,800.0	34.6	989,079.0	46.5	8,502,609.0	30.4	34,176,591.0	25.4
1989	46,252,900.0	26.6	NA	NA	4,896,630.0	28.8	3,535,620.0	34.9	931,269.0	49.9	9,363,519.0	32.3	36,889,381.0	25.5
1990	52,351,000.0	26.5	NA	NA	5,855,520.0	30.8	3,946,330.0	35.0	923,660.0	38.7	10,725,510.0	32.8	41,625,490.0	25.3
1991	61,527,300.0	27.5	NA	NA	6,687,980.0	32.1	4,218,600.0	34.4	1,182,850.0	43.3	12,089,430.0	33.7	49,437,870.0	26.3
1992	66,711,400.0	27.7	NA	NA	6,947,920.0	32.4	4,007,420.0	33.7	1,357,870.0	43.7	12,313,210.0	33.8	54,398,190.0	26.6
1993	72,162,400.0	28.4	NA	NA	8,655,490.0	35.6	3,430,760.0	31.7	1,491,550.0	44.5	13,577,800.0	35.3	58,584,600.0	27.2
1994	82,131,900.0	29.1	NA	NA	10,401,400.0	36.0	3,189,820.0	34.2	1,669,010.0	47.2	15,260,230.0	36.5	NA	NA
1995	94,484,800.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
Spain														
1970	579,816.0	25.4	NA	NA	NA	NA	NA	NA	11,914.3	28.4	NA	NA	NA	NA
1971	656,537.0	25.9	NA	NA	NA	NA	NA	NA	11,983.0	21.0	NA	NA	NA	NA
1972	810,781.0	26.8	NA	NA	NA	NA	NA	NA	16,409.0	24.8	NA	NA	NA	NA
1973	1,005,790.0	27.4	NA	NA	NA	NA	NA	NA	21,130.4	26.7	NA	NA	NA	NA
1974	1,281,930.0	26.1	NA	NA	NA	NA	NA	NA	25,830.8	29.4	NA	NA	NA	NA
1975	1,430,960.0	27.1	NA	NA	NA	NA	NA	NA	29,614.5	31.3	NA	NA	NA	NA
1976	1,713,390.0	27.5	NA	NA	NA	NA	NA	NA	33,523.4	32.6	NA	NA	NA	NA
1977	2,148,850.0	28.6	NA	NA	NA	NA	NA	NA	43,109.3	36.8	NA	NA	NA	NA
1978	3,719,230.0	36.3	7,873.2	67.6	92,189.6	47.0	6,791.4	55.9	73,576.0	49.1	180,430.2	48.8	3,538,799.8	35.8
1979	4,229,370.0	36.8	10,448.9	76.9	94,687.3	48.4	8,194.6	53.0	87,042.0	51.9	200,372.8	51.1	4,028,997.2	36.3
1980	4,977,920.0	36.0	13,242.0	68.6	109,189.0	56.1	8,804.9	42.0	99,517.8	49.2	230,753.7	52.8	4,747,166.3	35.5
1981	5,321,120.0	35.8	18,693.7	65.8	113,029.0	56.9	14,861.5	43.8	121,279.0	52.6	267,863.2	54.5	5,053,256.8	35.1
1982	5,779,520.0	36.5	22,084.0	57.4	133,100.0	53.7	18,439.4	41.0	135,298.0	52.3	308,921.4	52.4	5,470,598.6	35.9
1983	6,541,970.0	36.4	25,394.5	64.2	155,770.0	55.0	20,476.0	48.9	147,872.0	53.1	349,512.5	54.3	6,192,457.5	35.7
1984	6,963,460.0	35.9	21,629.7	67.7	156,185.0	51.5	34,914.9	33.3	154,368.0	54.8	367,097.6	50.8	6,596,362.4	35.3
1985	7,531,800.0	36.2	26,964.2	70.2	154,470.0	50.2	42,962.5	30.1	187,252.0	55.6	411,648.7	49.8	7,120,151.3	35.7
1986	8,322,400.0	40.3	30,872.1	66.5	134,133.0	45.3	34,880.2	29.6	192,557.0	50.5	392,442.3	46.6	7,929,957.7	40.0
1987	9,029,700.0	40.7	35,729.1	60.2	144,252.0	44.3	31,444.4	29.4	217,789.0	50.9	429,214.5	46.7	8,600,485.5	40.5
1988	9,679,100.0	40.5	56,535.0	70.0	182,952.0	46.2	45,087.5	36.0	251,587.0	52.0	536,161.5	49.4	9,142,938.5	40.1
1989	10,675,100.0	40.3	58,861.1	61.6	221,873.0	44.3	55,574.4	42.4	320,233.0	54.5	656,541.5	50.0	10,018,558.5	39.8
1990	11,346,300.0	40.6	76,298.3	66.6	264,633.0	45.7	45,462.4	42.9	377,487.0	57.1	763,880.7	52.3	10,582,419.3	39.9
1991	12,011,700.0	40.9	61,303.8	63.9	240,803.0	46.0	64,162.5	41.0	453,695.0	57.5	819,964.3	52.4	11,191,735.7	40.3
1992	12,380,800.0	42.4	73,806.6	67.9	190,498.0	43.3	35,097.2	26.8	556,604.0	62.9	856,005.8	54.7	11,524,794.2	41.7
1993	12,653,100.0	43.1	NA	NA	229,692.0	44.2	56,937.3	38.1	526,134.0	65.0	NA	NA	NA	NA
1994	13,993,500.0	44.0	NA	NA	269,982.0	44.4	67,821.5	39.5	638,410.0	66.6	NA	NA	NA	NA
1995	16,293,000.0	45.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = not available

NOTE: For U.S. value added, the Organisation for Economic Co-operation and Development reports data supplied by the U.S. Bureau of Economic Analysis on "Gross Product Originating."

[a]The production data used in this calculation are valued in national currency and are maintained by the Organisation for Economic Co-operation and Development in its Structural Analysis Database. These data do not match the production data provided in appendix table 6-5, which are valued in 1987 U.S. dollars.

SOURCE: Organisation for Economic Co-operation and Development, Structural Analysis Database (1996 edition).

See text table 6-2.

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
All manufacturing industries																
Production																
All countries[a]	7,754,045	8,144,508	8,063,357	8,289,382	8,891,805	9,044,120	9,136,926	9,536,219	10,117,377	10,496,222	10,617,686	10,698,977	10,757,128	10,722,920	11,239,430	11,647,170
United States	2,070,477	2,201,960	2,077,227	2,143,027	2,326,374	2,282,612	2,300,127	2,465,600	2,568,882	2,553,131	2,544,395	2,485,743	2,622,845	2,685,838	2,859,185	2,949,769
Canada	173,666	188,763	173,291	183,293	208,511	222,268	230,649	237,541	247,747	243,392	229,974	217,454	223,449	242,460	256,594	267,526
Japan	1,387,623	1,486,046	1,550,489	1,594,840	1,713,927	1,791,557	1,734,699	1,747,725	1,898,321	2,034,442	2,188,385	2,316,907	2,226,411	2,082,610	2,108,386	2,149,120
Germany[b]	637,296	683,703	695,146	708,441	752,312	799,415	794,950	792,963	826,756	882,596	920,154	977,212	947,558	983,256	1,053,734	1,091,743
France	435,143	461,449	478,474	479,285	495,137	501,172	497,227	499,816	524,458	555,932	567,715	571,754	569,432	533,252	554,404	570,845
United Kingdom	348,576	339,809	345,213	358,294	389,559	402,759	400,410	422,852	438,471	448,461	445,029	410,934	435,123	432,630	454,420	472,542
Italy	303,334	312,897	304,996	319,591	347,187	342,220	338,427	345,702	366,457	376,611	366,952	361,669	355,602	347,457	355,722	367,267
China	262,631	243,072	237,225	249,783	244,522	249,616	249,996	274,338	339,767	384,841	313,891	330,941	402,398	541,573	590,053	650,192
South Korea	56,177	66,004	69,885	79,768	92,905	96,487	116,248	138,475	153,162	160,954	177,614	191,979	203,919	220,871	240,551	264,786
Taiwan	71,000	74,776	75,383	83,700	97,038	104,372	128,187	139,648	152,272	152,585	149,580	159,417	158,268	167,748	173,906	186,186
Singapore	13,158	15,048	14,732	15,201	17,375	16,696	19,175	24,209	30,229	28,545	30,165	32,001	33,044	36,695	40,449	44,775
Hong Kong	19,404	23,400	21,411	27,058	27,864	24,962	31,356	36,428	37,173	34,477	32,188	30,364	28,728	28,230	28,229	29,812
Exports																
All countries[a]	1,442,807	1,583,926	1,571,788	1,591,194	1,741,579	1,828,029	1,901,237	2,005,552	2,310,416	2,482,678	2,566,262	2,738,487	2,927,673	3,118,098	3,409,123	3,714,972
United States	205,076	215,057	196,520	180,829	190,702	190,464	200,625	223,520	264,049	305,129	325,537	348,973	375,126	377,147	416,582	467,518
Canada	44,565	50,655	51,778	55,429	66,920	70,194	77,883	76,625	86,283	83,531	87,029	88,615	97,605	105,809	122,345	138,911
Japan	167,319	193,214	193,229	200,055	228,986	240,658	239,059	236,189	256,177	271,250	282,871	286,565	289,159	278,073	278,147	294,184
Germany[b]	201,714	236,978	247,717	242,019	263,450	285,055	279,874	283,854	322,975	344,675	338,540	354,008	357,603	351,484	386,804	412,372
France	102,074	115,528	113,789	114,475	123,326	127,871	125,219	129,568	149,018	159,338	163,496	176,072	184,356	191,650	203,617	217,441
United Kingdom	97,352	92,825	93,078	91,172	98,780	105,171	116,086	121,666	144,213	146,143	153,904	167,575	168,925	174,021	179,349	195,422
Italy	82,515	94,925	95,392	96,995	103,152	112,328	111,828	112,926	127,040	136,181	133,165	136,445	141,531	164,161	176,868	191,834
China	14,390	16,860	16,614	16,623	18,414	15,966	20,939	25,122	38,878	38,979	54,583	63,869	77,492	87,194	107,234	119,935
South Korea	17,633	23,296	25,485	27,608	33,474	34,534	39,268	48,513	59,811	62,943	60,612	66,898	69,541	75,207	83,946	93,778
Taiwan	20,286	22,452	22,073	23,829	28,506	29,328	41,132	56,755	67,491	75,355	76,088	84,905	96,163	100,720	107,293	117,964
Singapore	11,180	12,492	13,177	14,857	17,006	16,498	21,250	25,985	36,375	42,896	45,966	52,626	58,917	69,654	84,947	96,015
Hong Kong	19,453	23,207	23,216	25,108	30,337	31,591	36,790	47,886	62,022	68,659	74,901	86,608	103,239	115,988	124,885	135,950
Imports																
All countries[a]	1,355,470	1,465,746	1,457,058	1,499,989	1,656,996	1,736,679	1,822,093	1,931,793	2,235,044	2,404,720	2,495,021	2,648,558	2,828,165	2,992,882	3,291,253	3,585,730
United States	173,649	204,481	210,587	250,310	324,929	353,212	366,596	365,466	384,887	406,655	396,489	387,994	435,854	489,119	537,703	576,158
Canada	51,245	58,682	50,260	57,261	68,601	71,350	72,911	78,075	90,093	98,754	99,412	100,695	101,563	108,776	123,213	133,322
Japan	47,230	50,930	50,371	52,093	58,471	59,425	70,600	87,645	113,298	127,516	134,680	139,263	140,617	152,266	174,714	197,470
Germany[b]	135,526	133,822	130,627	139,156	144,468	153,151	173,739	185,893	206,584	219,452	250,145	289,071	297,136	290,477	313,343	342,921
France	98,668	104,291	109,703	104,221	107,032	113,643	124,751	135,868	160,660	173,266	180,163	186,363	188,200	186,337	201,498	216,062
United Kingdom	96,239	99,963	101,659	108,492	116,296	121,566	123,549	133,840	168,970	172,383	169,094	163,460	170,521	180,254	191,518	202,162
Italy	66,758	65,862	65,581	64,155	71,448	77,953	83,583	95,307	109,066	118,417	123,532	128,218	132,604	118,890	128,266	139,186
China	14,289	14,604	13,657	16,984	27,482	44,783	40,395	38,940	52,564	53,141	51,077	62,607	80,836	115,361	124,715	137,863
South Korea	13,022	14,866	15,222	17,648	21,232	21,472	24,892	30,324	36,218	41,572	45,731	52,718	49,631	52,659	64,567	76,666
Taiwan	13,436	14,463	13,377	14,835	17,295	16,200	19,659	26,525	34,951	39,898	40,662	46,822	54,346	56,858	60,356	66,577
Singapore	17,715	19,565	21,087	21,974	22,851	21,341	22,172	26,592	33,912	39,341	45,575	51,359	56,768	66,698	77,497	86,354
Hong Kong	22,741	25,879	25,275	26,029	30,677	29,929	32,900	40,676	56,456	56,355	69,827	83,032	99,873	96,913	111,483	122,135

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Apparent consumption																
All countries[a]	8,147,070	8,555,504	8,477,702	8,736,480	9,393,800	9,572,261	9,702,883	10,146,039	10,833,030	11,273,876	11,427,213	11,549,155	11,671,095	11,684,724	12,288,728	12,804,129
United States	2,105,792	2,261,665	2,155,857	2,272,144	2,523,681	2,508,602	2,532,981	2,682,354	2,778,412	2,757,552	2,725,599	2,643,581	2,811,863	2,927,328	3,123,907	3,220,240
Canada	191,269	209,252	184,596	198,864	226,800	240,892	245,133	258,238	273,305	279,780	264,567	252,267	252,572	272,835	289,283	300,078
Japan	1,316,536	1,400,492	1,464,516	1,505,936	1,611,164	1,681,672	1,637,217	1,669,374	1,831,589	1,971,387	2,124,376	2,254,859	2,163,972	2,039,724	2,087,976	2,182,756
Germany[b]	662,759	688,175	690,524	715,405	752,801	796,702	815,768	823,871	857,135	914,116	985,762	1,073,180	1,049,783	1,081,847	1,155,929	1,205,635
France	460,046	482,285	506,017	500,939	513,261	522,694	531,883	542,524	578,030	614,728	630,507	631,857	625,556	582,411	609,991	629,634
United Kingdom	377,831	374,487	381,367	402,928	436,728	450,408	442,718	471,733	506,780	519,154	506,901	456,866	487,201	491,016	520,766	538,791
Italy	318,982	320,178	311,857	323,864	355,092	350,927	352,902	371,126	396,969	410,847	408,079	405,491	400,675	364,914	373,110	385,967
China	265,251	244,231	237,968	254,165	257,759	281,979	274,544	294,317	364,063	409,692	325,969	348,929	430,243	597,814	637,164	691,281
South Korea	56,204	63,763	66,428	77,074	89,479	92,618	112,718	133,738	146,083	156,805	179,355	193,297	199,274	214,988	239,496	264,353
Taiwan	70,785	74,193	74,079	82,941	95,695	101,771	121,311	129,701	144,767	145,201	142,585	153,140	153,145	162,367	167,531	178,265
Singapore	21,531	24,180	24,819	24,778	26,042	24,286	23,645	29,161	33,854	32,175	37,478	39,562	40,786	45,422	47,273	51,594
Hong Kong	27,721	32,092	29,514	34,537	36,153	31,610	37,154	41,834	48,264	42,738	47,983	51,656	54,002	48,229	53,933	56,504
								High-tech industries[c]								
Production																
All countries[a]	591,039	641,913	678,200	729,533	842,787	874,602	907,164	933,213	1,041,079	1,107,432	1,146,496	1,193,049	1,200,246	1,196,162	1,305,495	1,401,256
United States	216,290	231,553	248,692	264,003	304,695	311,135	320,961	301,400	325,241	327,793	338,027	341,448	363,270	350,016	397,297	444,713
Canada	7,759	8,545	8,077	8,048	9,798	11,080	11,922	13,489	15,031	15,804	16,260	17,178	18,352	17,746	20,317	21,776
Japan	140,544	162,815	175,356	191,578	226,617	235,344	234,575	247,089	283,274	311,087	335,719	361,526	332,368	307,732	320,924	320,202
Germany[b]	47,362	52,883	56,008	62,082	68,079	66,461	65,832	64,024	67,679	75,599	80,798	89,459	85,107	92,529	101,167	106,078
France	26,839	31,102	33,899	32,944	37,722	37,474	37,132	39,629	44,027	48,399	50,140	54,040	52,605	51,125	53,478	56,041
United Kingdom	31,393	31,244	32,572	35,228	40,488	43,895	45,816	49,984	54,628	58,255	59,284	56,133	57,843	56,106	62,200	66,811
Italy	15,910	15,264	14,633	15,822	16,217	14,600	15,406	16,510	19,050	20,593	20,766	19,289	18,346	16,925	17,673	18,806
China	11,609	10,146	10,072	12,781	15,344	24,632	23,939	28,567	38,912	43,833	32,710	35,939	47,162	65,115	71,375	81,341
South Korea	4,107	4,958	5,155	6,813	9,253	9,399	13,326	17,568	21,245	21,526	24,172	24,895	25,946	29,781	34,913	39,632
Taiwan	5,423	5,889	6,020	7,626	9,921	10,437	15,697	19,238	21,880	22,797	23,497	25,258	25,655	31,117	29,779	33,325
Singapore	2,616	2,839	2,748	3,762	5,354	5,432	7,437	10,959	14,686	11,843	12,946	13,501	14,705	17,567	20,459	23,410
Hong Kong	2,333	3,138	2,949	3,670	3,927	2,833	3,856	5,127	5,724	5,019	4,761	4,192	4,288	4,076	4,236	4,688
Exports																
All countries[a]	136,339	158,619	164,430	181,571	215,190	229,221	245,438	272,562	332,394	375,482	403,546	451,551	487,091	523,124	598,881	670,822
United States	35,439	39,139	36,074	40,678	43,934	47,384	51,599	59,628	71,978	80,340	90,147	97,933	105,134	102,639	114,473	128,709
Canada	2,701	3,460	3,816	3,928	4,943	5,370	5,899	6,274	6,788	7,276	8,566	10,005	10,687	10,409	12,591	14,890
Japan	22,258	27,805	28,588	35,077	46,277	47,963	50,338	52,243	62,270	67,584	71,102	74,094	74,862	72,528	74,568	79,652
Germany[b]	14,373	20,405	23,033	22,191	25,195	26,494	23,678	24,426	29,445	33,649	32,459	37,419	36,414	37,051	42,519	46,100
France	7,099	9,063	11,695	10,728	12,907	13,207	12,829	14,719	17,657	20,586	20,296	25,356	26,414	28,196	30,200	32,907
United Kingdom	14,143	13,651	15,069	16,072	18,450	20,862	23,747	21,202	26,665	28,646	30,464	38,745	36,443	39,926	42,834	48,257
Italy	4,355	5,171	5,727	5,799	6,795	8,141	7,639	7,614	9,453	10,489	10,689	10,741	11,375	12,792	13,397	14,887
China	307	336	346	417	713	483	785	1,066	2,269	2,138	4,139	4,780	6,790	7,629	10,458	12,173
South Korea	1,878	2,280	2,229	3,073	4,311	4,486	6,780	9,445	12,967	14,710	14,607	16,798	17,814	18,922	22,893	27,707
Taiwan	2,707	3,009	2,744	3,307	4,214	3,882	6,063	10,035	13,452	15,824	17,016	19,670	23,664	26,072	29,820	34,606
Singapore	2,502	2,356	2,428	3,149	4,104	4,417	6,169	9,146	14,088	17,001	19,649	22,309	26,799	33,388	45,047	51,963
Hong Kong	2,554	2,988	2,754	3,627	5,061	4,745	5,132	7,173	10,660	11,706	13,366	15,036	17,696	20,667	24,888	28,111

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Imports																
All countries[a]	121,045	143,141	147,261	165,042	199,632	212,984	230,269	256,721	319,690	361,256	389,724	431,156	466,251	499,417	575,783	645,356
United States	16,953	22,576	24,361	33,224	47,650	50,088	52,738	55,719	64,431	73,906	73,855	78,537	93,060	102,881	116,797	134,379
Canada	5,080	6,207	5,632	6,577	8,493	8,319	9,038	10,222	13,424	13,412	14,828	16,889	17,784	17,539	20,050	23,422
Japan	4,726	5,561	5,332	6,293	6,666	7,491	8,854	10,333	13,279	15,595	18,425	19,171	20,650	23,595	29,425	34,607
Germany[b]	11,513	13,716	13,939	15,326	16,573	18,385	21,101	23,721	27,498	31,511	38,628	42,703	43,018	42,171	47,692	53,577
France	8,254	11,672	13,924	12,206	13,925	14,222	14,319	16,184	22,725	25,967	26,873	32,247	29,542	29,074	31,681	34,978
United Kingdom	10,758	11,441	11,922	14,014	15,892	17,097	17,117	19,775	25,832	29,351	30,230	29,489	30,848	34,268	36,872	38,520
Italy	5,378	6,070	6,150	6,167	7,665	8,752	9,594	11,323	14,115	14,814	16,652	17,785	17,489	15,596	17,024	18,575
China	851	948	784	1,288	3,129	6,104	3,943	4,832	6,321	6,246	6,176	7,866	11,375	16,050	19,394	21,000
South Korea	1,737	1,933	2,041	2,924	3,718	3,558	4,337	5,303	7,577	8,102	8,652	10,142	10,357	10,858	12,987	15,611
Taiwan	1,791	2,080	2,310	2,507	3,135	2,947	3,925	5,403	7,048	8,411	9,078	10,845	12,892	13,932	15,170	16,916
Singapore	2,977	2,974	3,274	4,494	5,121	5,127	5,461	7,120	9,638	11,980	14,448	16,711	18,864	23,358	30,015	34,259
Hong Kong	2,658	2,850	2,785	3,457	4,924	4,457	4,809	6,487	9,891	9,998	12,743	15,512	19,500	19,444	23,111	26,298
Apparent consumption																
All countries[a]	619,157	677,833	714,695	772,608	897,756	933,984	971,482	1,005,470	1,134,762	1,214,277	1,262,325	1,318,735	1,340,470	1,346,029	1,481,316	1,605,229
United States	209,338	227,781	248,830	269,964	322,943	329,573	339,302	317,448	341,871	348,450	352,266	355,396	387,151	385,506	439,082	494,936
Canada	10,807	12,137	10,826	11,664	14,557	15,360	16,517	19,013	23,404	23,786	24,687	26,601	28,179	27,542	31,145	33,801
Japan	129,530	148,735	160,516	173,148	200,698	209,092	208,036	220,705	252,792	279,200	304,202	328,645	300,448	280,427	298,039	315,218
Germany[b]	50,890	55,443	57,412	65,193	70,756	70,210	73,702	74,125	78,818	88,512	101,405	111,403	107,906	114,507	125,682	133,236
France	29,931	36,187	39,333	37,370	42,295	42,134	42,170	45,175	54,000	59,513	62,380	68,015	63,125	59,915	63,439	66,944
United Kingdom	31,537	32,453	33,186	37,234	42,571	45,428	45,225	53,658	60,166	65,691	66,050	56,351	60,851	59,867	66,685	69,149
Italy	18,452	17,983	17,088	18,247	19,510	18,132	20,084	22,923	27,076	28,656	30,528	30,149	28,487	24,265	26,145	27,616
China	12,179	10,786	10,542	13,696	17,840	30,311	27,205	32,494	43,342	48,300	35,469	39,911	53,173	75,306	82,854	88,637
South Korea	4,409	5,146	5,423	7,353	9,646	9,670	12,821	15,931	19,389	19,016	22,251	22,822	23,375	26,961	31,022	35,016
Taiwan	4,789	5,291	5,803	7,249	9,608	10,298	15,192	18,115	20,587	21,915	23,192	25,644	26,323	31,403	29,315	32,163
Singapore	3,373	3,691	3,839	5,443	6,778	6,617	7,403	10,044	12,189	9,222	10,607	11,063	10,720	12,563	12,429	13,526
Hong Kong	2,933	3,585	3,514	4,290	4,920	3,586	4,659	6,081	7,299	5,800	7,028	7,854	9,979	7,178	7,882	8,629
Aircraft																
Production																
All countries[a]	111,561	118,741	121,166	122,112	132,880	143,729	153,164	159,360	170,150	178,634	179,623	181,645	181,957	166,030	181,099	179,616
United States	70,590	74,755	76,806	78,648	85,599	92,782	101,477	103,600	108,325	108,401	113,407	114,356	110,582	92,320	104,937	99,486
Canada	2,226	2,394	1,835	1,613	2,037	2,377	2,813	3,021	3,534	3,915	4,219	3,820	3,509	3,121	4,181	4,245
Japan	2,999	3,463	3,588	3,687	3,977	4,426	4,232	5,026	5,560	5,518	5,464	5,356	5,655	5,461	5,152	5,048
Germany[b]	4,276	4,817	4,734	4,647	4,704	5,473	5,253	6,104	6,318	8,484	8,951	8,946	7,566	7,638	7,430	7,805
France	7,267	9,162	10,410	9,098	10,665	9,243	7,953	8,318	9,814	11,101	10,378	12,122	10,371	9,062	8,614	8,648
United Kingdom	10,519	10,511	10,119	10,309	10,387	11,730	13,478	14,341	14,737	16,242	16,543	15,614	16,318	15,082	15,417	15,955
Italy	3,236	3,138	3,123	2,877	2,934	2,991	3,207	3,205	3,977	4,112	3,423	3,112	2,864	2,552	2,615	2,653
China	3,875	2,982	2,989	3,792	3,808	5,609	5,169	6,086	6,403	7,951	4,783	5,549	11,238	17,489	19,019	21,125
South Korea	1	2	2	2	3	3	3	4	5	5	7	400	290	256	277	317
Taiwan	188	197	194	171	182	208	270	267	259	300	291	335	309	351	329	369
Singapore	92	100	131	173	201	282	306	324	372	297	334	337	454	463	485	539
Hong Kong	0	0	0	1	1	1	1	1	2	2	2	137	157	144	137	149

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Exports																
All countries[a]	32,240	40,196	40,149	38,138	39,462	42,051	42,187	40,918	50,264	61,317	65,301	81,445	80,037	69,519	65,930	63,765
United States	15,787	17,684	13,959	14,001	12,239	15,799	17,043	19,717	22,055	26,727	30,577	33,695	34,420	27,664	25,755	20,682
Canada	881	1,099	1,327	1,062	1,080	1,361	1,908	1,700	1,756	1,951	2,592	3,052	2,296	1,924	2,047	2,086
Japan	113	170	243	210	190	167	165	238	337	458	439	511	548	440	426	443
Germany[b]	2,562	6,612	8,637	6,945	7,725	6,487	3,281	3,546	5,569	7,933	6,932	9,239	8,930	7,769	7,399	8,123
France	1,675	2,719	3,457	3,083	4,228	3,444	2,629	3,165	4,963	6,888	5,978	9,097	9,359	9,289	9,481	9,864
United Kingdom	8,162	7,221	7,904	8,203	8,488	9,164	11,331	7,070	8,731	7,882	8,665	15,378	12,527	10,631	9,186	9,946
Italy	483	1,397	1,510	1,322	1,546	1,509	1,194	1,163	1,636	1,917	2,484	2,289	2,387	1,801	1,754	1,894
China	1	2	2	5	47	24	35	6	14	14	23	37	330	163	160	174
South Korea	135	174	65	95	165	279	342	79	121	198	184	231	247	256	246	242
Taiwan	1	1	0	0	1	2	1	2	4	12	16	45	25	35	32	36
Singapore	136	122	86	199	166	384	138	157	181	489	328	250	245	173	181	199
Hong Kong	38	17	23	41	29	37	58	43	59	47	60	50	68	60	52	48
Imports																
All countries[a]	24,744	32,735	31,189	29,274	30,961	33,611	34,717	32,796	45,356	55,752	61,041	70,481	69,421	60,131	58,036	55,130
United States	2,896	4,156	3,882	3,688	4,935	6,532	6,847	5,637	7,120	7,557	8,604	8,761	9,186	8,449	8,032	7,290
Canada	1,393	1,673	1,051	1,179	1,265	1,605	1,713	1,747	3,479	2,524	2,145	2,285	2,253	1,483	1,290	1,552
Japan	1,365	1,732	1,284	1,803	1,366	1,955	2,179	2,197	2,370	2,349	3,578	3,473	3,972	3,035	3,155	2,755
Germany[b]	1,343	3,174	2,939	3,110	2,728	2,859	3,231	3,089	3,910	4,932	6,571	6,556	6,751	5,384	4,872	5,251
France	1,962	4,664	6,410	4,474	5,138	4,590	3,035	3,395	6,525	8,975	8,399	13,183	10,128	8,375	7,608	7,917
United Kingdom	4,119	3,138	2,298	2,927	3,266	3,678	2,992	2,628	4,167	4,614	5,547	4,665	4,371	4,207	4,427	3,706
Italy	730	1,210	979	1,085	1,279	1,250	1,100	998	1,256	1,323	1,766	2,004	1,691	1,241	1,451	1,501
China	197	18	48	302	155	854	676	706	493	798	878	1,185	2,672	2,923	3,387	2,689
South Korea	395	480	306	344	694	600	545	563	1,294	1,335	1,106	1,698	1,761	1,755	1,737	2,126
Taiwan	291	350	640	394	340	429	225	173	179	537	560	1,265	1,359	1,777	1,523	1,683
Singapore	728	472	432	786	859	975	618	571	520	1,276	962	1,337	1,345	1,554	1,375	1,193
Hong Kong	252	140	256	217	239	247	554	393	236	394	580	641	640	775	483	530
Apparent consumption																
All countries[a]	114,369	125,019	126,205	126,323	138,069	149,600	159,553	164,616	181,867	193,813	197,091	197,882	198,231	179,800	195,298	188,953
United States	62,838	67,006	71,316	72,952	82,343	88,761	96,963	96,119	100,798	98,243	101,790	100,894	97,119	82,605	96,092	93,253
Canada	2,951	3,235	1,884	1,991	2,488	2,957	3,092	3,493	5,698	4,980	4,431	3,834	4,056	3,176	3,954	4,344
Japan	4,284	5,076	4,701	5,342	5,209	6,264	6,295	7,056	7,694	7,546	8,733	8,469	9,243	8,188	8,008	7,012
Germany[b]	4,303	4,634	3,319	4,251	3,542	5,050	6,802	7,377	7,395	9,383	11,987	10,825	9,802	8,815	8,296	8,631
France	8,006	11,839	14,300	11,328	12,732	11,332	9,079	9,418	12,749	15,104	14,464	18,744	13,753	10,750	9,394	9,404
United Kingdom	8,511	8,296	6,549	7,175	7,335	8,655	8,159	11,539	12,206	14,690	15,152	8,615	10,957	10,834	12,523	11,485
Italy	3,656	3,460	3,144	3,123	3,233	3,284	3,551	3,466	4,197	4,220	3,617	3,666	3,044	2,652	2,955	2,951
China	4,071	2,999	3,034	4,089	3,921	6,443	5,814	6,787	6,884	8,737	5,642	6,703	13,631	20,275	22,272	20,020
South Korea	354	414	245	281	542	471	492	532	1,189	1,221	1,035	1,937	1,902	1,899	1,901	2,208
Taiwan	478	547	834	565	521	635	494	439	436	827	838	1,563	1,648	2,099	1,826	1,976
Singapore	707	469	491	793	922	937	809	764	737	1,155	1,008	1,439	1,557	1,820	1,661	1,550
Hong Kong	224	129	240	188	218	220	512	363	195	362	538	741	746	849	559	583

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Office and computing machinery																
Production																
All countries[a]	89,805	99,954	110,386	124,913	155,235	161,471	160,899	174,946	200,527	217,434	229,330	234,965	238,019	243,951	260,766	285,557
United States	34,411	38,280	43,467	48,789	61,917	61,467	57,879	61,300	68,376	65,876	64,124	58,553	66,038	68,483	78,909	92,324
Canada	935	1,200	1,257	1,286	1,721	1,958	1,869	1,998	2,550	2,563	2,629	2,651	2,945	3,100	3,721	4,325
Japan	30,007	33,944	37,221	39,512	45,612	51,284	52,582	59,340	67,734	78,999	89,183	96,140	91,153	85,975	80,573	81,311
Germany[b]	6,015	7,074	8,099	10,116	13,028	11,721	10,286	9,318	9,951	10,280	10,748	14,799	13,036	15,368	17,346	18,295
France	4,668	5,068	5,043	5,923	6,862	7,211	7,519	8,190	8,353	8,821	8,608	9,365	9,776	10,119	10,670	11,408
United Kingdom	2,729	2,579	3,011	3,949	5,644	7,282	6,833	8,476	10,870	12,204	12,626	12,107	12,514	12,807	14,767	16,382
Italy	2,570	2,692	2,556	3,578	4,161	2,782	2,753	2,858	5,263	5,795	6,041	5,004	4,700	4,814	4,873	5,369
China	401	344	365	438	539	508	554	616	758	742	563	625	803	1,071	1,274	1,514
South Korea	49	62	53	176	367	489	823	839	1,189	1,261	1,368	1,444	1,449	2,826	4,024	4,712
Taiwan	222	267	296	502	883	1,011	2,063	3,046	3,374	3,558	3,870	4,167	4,304	4,885	4,956	5,695
Singapore	73	83	151	398	699	844	1,464	2,284	3,759	4,746	5,603	5,741	6,497	9,259	11,304	13,075
Hong Kong	127	179	187	463	663	396	453	581	990	1,279	2,084	2,139	1,906	1,740	1,773	1,993
Exports																
All countries[a]	25,953	29,754	33,229	42,445	56,513	64,657	71,643	85,254	106,119	119,139	127,802	138,337	152,726	168,741	192,292	219,557
United States	9,381	10,596	11,178	12,817	16,140	17,007	18,022	21,328	26,146	27,113	29,089	30,605	32,704	32,511	36,919	43,865
Canada	736	903	983	1,142	1,453	1,504	1,582	2,060	2,623	2,448	2,748	3,206	3,695	3,841	5,116	6,381
Japan	2,773	3,282	4,354	7,059	10,414	11,245	13,820	16,106	20,042	21,789	23,594	24,039	25,968	26,048	25,839	26,940
Germany[b]	2,943	3,689	4,026	4,779	5,669	7,280	7,338	7,219	7,726	8,614	8,490	9,076	8,435	8,846	10,007	10,714
France	1,607	2,022	2,021	2,567	3,154	3,543	3,954	4,610	4,862	5,293	5,040	5,693	6,039	6,180	6,778	7,503
United Kingdom	2,140	2,120	2,518	3,127	4,603	5,600	5,625	6,868	8,756	10,040	10,057	10,453	10,360	12,250	13,748	15,929
Italy	1,696	1,372	1,582	1,705	2,016	3,017	2,852	2,792	3,552	4,244	3,838	3,856	3,658	4,631	4,707	5,245
China	7	4	5	12	19	11	47	81	224	194	399	543	1,149	1,659	2,436	3,160
South Korea	77	91	127	249	481	655	1,094	1,636	2,590	2,918	2,690	2,889	3,029	3,471	3,448	4,458
Taiwan	191	246	283	478	927	1,181	2,164	4,083	5,897	7,550	9,156	11,176	14,008	15,033	16,969	19,638
Singapore	111	125	229	602	1,059	1,278	2,216	3,457	5,690	7,185	9,097	10,183	13,102	16,979	21,717	25,783
Hong Kong	463	580	526	952	1,571	1,347	1,300	1,738	2,539	2,790	3,234	3,950	4,975	5,379	6,152	6,693
Imports																
All countries[a]	25,288	29,142	32,600	41,793	55,771	63,637	70,479	84,095	104,784	117,522	126,056	136,517	150,459	165,556	189,097	215,887
United States	2,787	3,645	4,703	7,844	11,778	13,023	15,279	18,664	23,229	26,998	28,141	30,472	36,274	42,103	47,755	55,622
Canada	1,437	1,912	2,029	2,315	3,342	3,285	3,333	4,162	4,754	5,080	5,814	6,633	7,236	7,548	8,426	9,620
Japan	1,023	1,142	1,227	1,333	1,604	1,938	2,227	2,679	3,661	4,510	5,102	5,598	5,950	7,073	9,028	10,763
Germany[b]	3,128	3,385	3,502	4,415	5,391	6,565	7,553	8,906	10,332	12,182	14,034	15,878	16,570	16,469	18,200	20,821
France	2,526	2,801	3,246	3,798	4,364	5,017	5,820	6,479	7,946	8,253	8,299	8,229	8,789	9,208	10,851	12,422
United Kingdom	2,906	3,283	3,807	4,877	6,158	6,548	6,864	8,588	10,928	12,486	12,637	12,666	13,547	15,363	15,866	16,884
Italy	1,478	1,650	1,605	1,769	2,495	3,054	3,328	4,131	4,963	4,829	5,085	5,428	5,552	5,152	5,215	5,533
China	126	130	166	211	875	1,055	752	1,031	971	891	889	1,218	1,709	2,359	2,855	3,311
South Korea	157	172	268	410	422	583	900	904	1,340	1,498	1,723	1,830	1,600	1,813	2,382	2,989
Taiwan	143	187	230	299	411	456	689	945	1,384	1,598	1,774	1,974	2,270	2,266	2,608	3,014
Singapore	207	262	393	644	814	923	1,063	1,663	2,542	2,990	4,118	4,564	5,413	6,873	8,447	10,275
Hong Kong	463	439	437	634	1,021	927	780	1,081	1,657	1,654	2,030	2,507	3,655	3,480	4,342	4,988

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Apparent consumption																
All countries[a]	97,812	109,320	120,984	138,826	173,861	183,042	184,920	204,326	237,267	259,147	274,307	284,787	293,639	305,913	332,492	368,438
United States	30,869	34,793	40,665	48,043	62,893	63,131	61,144	65,774	74,241	74,905	73,028	68,840	80,792	89,240	102,472	119,265
Canada	1,830	2,433	2,544	2,741	3,959	4,116	4,002	4,624	5,375	5,822	6,382	6,878	7,419	7,777	8,463	9,303
Japan	29,069	32,767	35,375	35,870	39,883	45,310	45,092	50,700	57,311	68,201	77,712	84,851	78,868	74,767	71,474	77,020
Germany[b]	7,324	8,187	9,096	11,554	14,879	13,909	13,445	13,898	15,594	17,251	19,613	25,046	24,316	27,008	30,083	32,124
France	6,027	6,402	6,825	7,862	8,944	9,667	10,482	11,340	12,790	13,256	13,274	13,493	14,218	14,882	16,649	18,129
United Kingdom	3,923	4,097	4,734	6,305	8,184	9,425	9,206	11,640	14,831	16,685	17,212	16,480	17,724	18,400	19,901	21,057
Italy	2,971	3,466	3,153	4,259	5,371	3,921	4,266	5,209	7,970	7,930	8,688	7,982	7,923	7,019	7,116	7,569
China	523	472	529	642	1,404	1,558	1,281	1,605	1,615	1,535	1,250	1,571	1,942	2,613	2,936	3,403
South Korea	172	194	264	475	578	777	1,232	1,040	1,416	1,518	1,931	2,082	1,795	3,102	4,813	5,578
Taiwan	314	387	449	672	1,045	1,149	2,171	2,898	3,181	3,140	3,203	3,164	2,847	3,156	3,059	3,456
Singapore	188	241	353	539	631	702	681	1,068	1,563	1,755	2,149	1,831	1,008	2,001	1,684	1,927
Hong Kong	246	188	234	394	525	331	276	382	777	881	1,735	1,742	1,903	1,265	1,599	1,805
Communications equipment																
Production																
All countries[a]	290,897	316,247	334,407	365,048	431,324	442,150	458,007	454,985	518,277	556,090	578,249	611,493	610,338	614,213	680,801	744,334
United States	87,355	92,424	100,495	106,308	126,020	124,240	125,609	97,200	107,135	110,403	115,578	120,187	134,943	137,208	157,579	196,082
Canada	3,335	3,429	3,425	3,493	4,209	4,517	4,839	5,694	6,133	6,671	6,597	7,920	8,985	8,449	9,163	9,725
Japan	87,834	103,847	111,155	123,447	151,674	153,469	150,053	152,510	178,777	194,236	208,703	227,701	203,181	183,903	201,403	198,080
Germany[b]	27,867	29,829	31,258	34,603	36,251	35,366	37,412	36,809	39,401	43,781	48,374	52,638	51,935	55,766	61,628	64,086
France	11,223	12,322	12,930	12,766	14,900	15,381	15,847	17,356	19,590	21,162	23,340	24,218	23,252	21,942	23,970	25,160
United Kingdom	12,801	12,706	13,465	14,804	17,735	17,814	17,831	18,935	20,404	21,101	21,320	19,482	19,313	18,468	21,614	23,346
Italy	5,773	5,654	5,880	6,432	6,090	6,003	6,612	7,467	7,769	8,791	8,923	8,977	8,560	7,877	8,472	8,991
China	6,667	5,900	5,569	6,866	9,319	17,104	16,274	19,161	27,477	31,198	23,943	25,996	31,431	42,977	47,068	54,174
South Korea	3,116	3,907	3,950	5,362	7,407	7,348	10,752	14,904	17,635	18,273	20,409	20,845	21,883	24,296	28,107	31,880
Taiwan	4,806	5,193	5,235	6,655	8,518	8,839	12,896	15,549	17,825	18,581	18,969	20,380	20,637	25,459	24,074	26,819
Singapore	2,327	2,518	2,321	3,013	4,214	4,075	5,334	7,968	10,178	6,403	6,617	6,892	7,271	7,367	8,179	9,255
Hong Kong	2,154	2,893	2,702	3,163	3,200	2,382	3,335	4,476	4,659	3,668	2,616	1,849	2,156	2,131	2,271	2,487
Exports																
All countries[a]	60,780	68,814	69,104	79,904	97,205	98,693	105,677	120,119	145,809	165,038	179,309	197,561	216,166	241,355	293,514	336,549
United States	7,588	7,965	7,942	10,711	12,290	11,327	12,703	14,882	19,470	22,741	26,583	29,547	33,425	37,829	46,960	59,055
Canada	957	1,272	1,324	1,518	2,225	2,319	2,195	2,277	2,206	2,699	3,008	3,522	4,381	4,313	5,008	5,945
Japan	18,962	23,901	23,540	27,309	35,172	35,996	35,737	35,272	41,207	44,623	46,281	48,687	47,377	45,116	47,414	51,308
Germany[b]	6,152	6,893	7,126	7,146	8,199	8,810	9,027	9,612	11,417	12,408	12,332	13,838	13,627	14,404	18,288	19,840
France	2,195	2,445	2,600	3,008	3,401	3,911	3,853	4,560	5,234	5,591	6,418	7,461	7,517	8,632	9,785	11,095
United Kingdom	2,141	2,368	2,594	2,715	3,228	3,741	4,072	4,603	6,227	7,593	8,555	9,478	9,778	12,716	15,532	17,613
Italy	1,355	1,438	1,645	1,740	2,097	2,310	2,337	2,470	2,954	3,141	3,221	3,399	3,618	4,300	4,758	5,375
China	68	90	103	150	371	107	292	545	1,501	1,345	3,068	3,469	4,494	5,000	6,889	7,765
South Korea	1,645	1,984	2,006	2,696	3,627	3,504	5,270	7,655	10,181	11,507	11,641	13,567	14,408	15,061	19,046	22,837
Taiwan	2,488	2,721	2,424	2,793	3,253	2,669	3,859	5,902	7,495	8,193	7,781	8,375	9,551	10,941	12,749	14,861
Singapore	2,127	1,981	1,969	2,207	2,764	2,625	3,664	5,385	8,040	9,157	10,049	11,702	13,255	15,957	22,812	25,615
Hong Kong	1,901	2,208	2,023	2,444	3,281	3,157	3,518	5,061	7,655	8,486	9,664	10,523	12,070	14,703	18,117	20,735

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Imports																
All countries[a]	55,727	63,728	63,704	75,089	92,948	94,269	101,323	115,359	141,360	159,787	172,979	191,586	210,245	232,492	283,892	325,907
United States	10,562	13,842	14,661	20,440	29,458	28,897	28,899	29,672	32,147	37,334	35,043	36,932	44,765	48,983	57,347	67,408
Canada	1,862	2,190	2,068	2,558	3,343	2,935	3,426	3,738	4,515	5,157	6,129	7,150	7,292	7,362	9,116	10,970
Japan	1,134	1,257	1,242	1,651	2,110	1,943	2,453	3,303	4,660	6,308	7,493	7,780	8,187	10,631	14,213	17,864
Germany[b]	5,520	5,597	5,500	6,101	6,627	6,892	7,937	9,297	10,558	11,836	15,238	16,863	16,154	16,726	20,387	22,955
France	2,899	3,178	3,243	2,866	3,336	3,443	4,178	4,954	6,542	6,782	7,979	8,427	7,852	8,344	9,762	10,913
United Kingdom	3,075	4,176	4,719	5,143	5,305	5,611	5,905	7,149	9,005	10,513	10,303	10,180	10,638	11,937	13,629	14,711
Italy	2,415	2,306	2,437	2,244	2,714	3,090	3,562	4,537	5,800	6,545	7,470	7,934	7,451	6,316	7,703	8,590
China	510	766	518	720	2,013	4,074	2,340	2,810	4,437	4,249	4,012	4,935	6,463	10,214	12,557	14,319
South Korea	1,109	1,193	1,353	2,037	2,447	2,227	2,739	3,672	4,729	5,056	5,587	6,326	6,691	6,932	8,473	10,039
Taiwan	1,238	1,398	1,274	1,646	2,191	1,861	2,788	4,047	5,239	6,040	6,499	7,339	8,935	9,524	10,631	11,783
Singapore	1,928	2,117	2,318	2,940	3,317	3,090	3,631	4,728	6,405	7,532	9,198	10,640	11,913	14,655	19,883	22,459
Hong Kong	1,717	2,010	1,834	2,351	3,397	2,979	3,127	4,587	7,524	7,499	9,629	11,733	14,527	14,543	17,555	20,005
Apparent consumption																
All countries[a]	304,878	332,593	350,590	385,539	457,555	468,897	485,963	486,205	556,021	598,496	623,419	662,058	668,692	676,892	758,009	842,802
United States	92,798	100,904	109,824	119,569	147,252	145,571	146,040	116,970	126,352	132,664	133,042	137,632	157,714	161,353	184,154	224,877
Canada	4,471	4,657	4,493	4,906	5,874	5,705	6,615	7,723	8,995	9,810	10,483	12,448	13,022	12,612	14,570	15,776
Japan	75,559	88,220	95,788	105,850	129,019	130,088	127,380	131,023	154,478	169,194	183,689	201,279	178,098	162,871	182,354	193,040
Germany[b]	30,023	31,654	32,858	36,791	38,386	37,429	40,403	40,844	43,711	48,830	56,869	61,931	60,640	64,628	72,032	76,126
France	12,529	13,727	14,288	13,453	15,775	15,996	17,240	19,018	22,355	23,910	26,693	27,270	25,693	24,078	26,699	28,125
United Kingdom	14,329	15,172	16,310	17,985	20,708	20,722	20,794	22,759	24,912	26,131	25,449	22,826	22,903	21,243	24,055	25,699
Italy	7,332	7,052	7,279	7,579	7,481	7,635	8,699	10,445	11,704	13,353	14,359	14,765	13,726	11,478	13,172	14,039
China	7,113	6,582	5,991	7,449	10,999	21,082	18,355	21,493	30,608	34,282	25,315	27,964	34,070	48,964	53,848	60,930
South Korea	2,885	3,487	3,676	5,218	6,926	6,755	9,255	12,435	14,213	14,146	16,734	16,396	17,152	19,304	21,528	24,179
Taiwan	3,998	4,357	4,520	6,012	8,042	8,513	12,527	14,777	16,970	17,948	19,150	20,916	21,828	26,148	24,430	26,730
Singapore	2,478	2,981	2,995	4,111	5,225	4,978	5,913	8,211	9,889	6,312	7,450	7,792	8,155	8,742	9,084	10,048
Hong Kong	2,462	3,268	3,040	3,709	4,176	3,035	3,871	5,336	6,327	4,558	4,755	5,371	7,329	5,063	5,724	6,241
Drugs and medicines																
Production																
All countries[a]	98,776	106,970	112,241	117,460	123,348	127,252	135,094	143,922	152,126	155,274	159,293	164,947	169,931	171,968	182,830	191,749
United States	23,935	26,094	27,924	30,258	31,160	32,646	35,995	39,300	41,405	43,114	44,918	48,352	51,707	52,005	55,872	56,821
Canada	1,262	1,522	1,560	1,656	1,832	2,228	2,401	2,775	2,814	2,655	2,815	2,787	2,913	3,076	3,251	3,481
Japan	19,704	21,561	23,392	24,932	25,354	26,166	27,708	30,213	31,202	32,334	32,369	32,329	32,379	32,393	33,796	35,762
Germany[b]	9,203	11,164	11,917	12,716	14,096	13,901	12,882	11,794	12,009	13,054	12,725	13,075	12,569	13,757	14,764	15,891
France	3,681	4,550	5,516	5,157	5,296	5,639	5,813	5,764	6,270	7,315	7,815	8,336	9,206	10,002	10,224	10,825
United Kingdom	5,343	5,447	5,978	6,166	6,721	7,068	7,674	8,232	8,616	8,708	8,795	8,931	9,697	9,749	10,402	11,128
Italy	4,331	3,780	3,074	2,935	3,032	2,825	2,833	2,980	2,041	1,895	2,379	2,195	2,222	1,682	1,713	1,792
China	666	921	1,150	1,685	1,678	1,411	1,943	2,704	4,273	3,942	3,421	3,770	3,690	3,577	4,014	4,528
South Korea	940	987	1,150	1,273	1,476	1,558	1,748	1,820	2,416	1,986	2,388	2,206	2,324	2,403	2,505	2,722
Taiwan	208	232	295	298	338	379	469	376	421	358	367	376	404	422	421	442
Singapore	123	139	144	178	240	230	333	384	378	398	392	531	483	478	490	541
Hong Kong	52	66	60	43	63	54	67	69	73	69	60	67	69	61	56	59

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95

(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Exports																
All countries[a]	17,365	19,856	21,948	21,085	22,010	23,820	25,931	26,271	30,203	29,988	31,134	34,209	38,162	43,509	47,145	50,951
United States	2,683	2,894	2,996	3,149	3,264	3,251	3,829	3,700	4,307	3,759	3,899	4,086	4,584	4,634	4,838	5,107
Canada	127	187	182	206	184	186	213	237	203	177	218	225	315	331	420	478
Japan	411	452	451	500	501	555	616	627	684	714	787	858	970	924	889	960
Germany[b]	2,717	3,211	3,244	3,321	3,602	3,917	4,031	4,049	4,733	4,694	4,706	5,267	5,422	6,033	6,826	7,423
France	1,623	1,877	3,617	2,071	2,124	2,309	2,393	2,384	2,598	2,815	2,860	3,104	3,499	4,094	4,156	4,445
United Kingdom	1,699	1,942	2,053	2,027	2,132	2,356	2,719	2,662	2,951	3,131	3,188	3,436	3,778	4,330	4,368	4,769
Italy	822	965	990	1,032	1,136	1,306	1,256	1,190	1,311	1,187	1,146	1,197	1,712	2,059	2,178	2,373
China	230	240	235	250	276	342	410	433	530	585	648	732	818	807	974	1,075
South Korea	21	30	32	33	38	48	73	75	75	87	92	110	130	134	154	170
Taiwan	28	41	37	36	33	31	39	48	57	68	64	74	80	64	70	71
Singapore	129	127	144	141	115	130	150	147	177	171	174	175	197	280	337	366
Hong Kong	152	184	183	190	180	204	256	331	406	384	407	513	583	525	567	636
Imports																
All countries[a]	15,287	17,536	19,768	18,886	19,952	21,467	23,750	24,470	28,190	28,195	29,647	32,572	36,126	41,238	44,758	48,432
United States	707	933	1,114	1,252	1,480	1,636	1,713	1,746	1,935	2,016	2,067	2,373	2,836	3,347	3,664	4,058
Canada	389	432	484	525	543	494	566	576	675	651	740	821	1,002	1,146	1,218	1,281
Japan	1,204	1,430	1,578	1,506	1,586	1,655	1,995	2,154	2,588	2,427	2,252	2,320	2,541	2,856	3,029	3,225
Germany[b]	1,522	1,561	1,997	1,700	1,827	2,068	2,380	2,429	2,699	2,561	2,785	3,407	3,543	3,592	4,233	4,550
France	867	1,029	1,026	1,068	1,087	1,170	1,286	1,356	1,711	1,958	2,196	2,408	2,774	3,146	3,459	3,726
United Kingdom	657	844	1,099	1,067	1,163	1,260	1,356	1,411	1,732	1,738	1,743	1,978	2,293	2,762	2,950	3,219
Italy	755	904	1,129	1,068	1,177	1,357	1,604	1,657	2,096	2,116	2,330	2,418	2,795	2,886	2,654	2,951
China	19	33	52	56	86	121	175	284	421	307	398	528	531	554	596	681
South Korea	76	88	114	132	155	149	152	163	213	213	236	289	304	359	396	457
Taiwan	118	144	165	167	194	202	223	237	245	236	244	267	328	366	407	437
Singapore	114	122	132	125	130	139	150	159	171	182	170	169	193	277	309	332
Hong Kong	225	261	258	254	267	304	348	426	475	451	504	631	678	646	730	776
Apparent consumption																
All countries[a]	102,098	110,902	116,917	121,920	128,271	132,446	141,045	150,322	159,607	162,822	167,508	174,009	179,908	183,424	195,517	205,037
United States	22,833	25,079	27,026	29,400	30,455	32,110	35,156	38,584	40,480	42,638	44,406	48,030	51,526	52,309	56,365	57,540
Canada	1,555	1,813	1,907	2,025	2,236	2,582	2,807	3,173	3,337	3,173	3,392	3,441	3,682	3,976	4,158	4,377
Japan	20,618	22,673	24,652	26,086	26,587	27,430	29,269	31,926	33,309	34,259	34,068	34,047	34,239	34,601	36,202	38,145
Germany[b]	9,240	10,968	12,139	12,597	13,949	13,822	13,053	12,006	12,118	13,048	12,936	13,600	13,148	14,056	15,271	16,354
France	3,370	4,218	3,920	4,726	4,845	5,139	5,369	5,399	6,106	7,243	7,949	8,508	9,461	10,204	10,696	11,286
United Kingdom	4,772	4,888	5,593	5,769	6,343	6,626	7,065	7,720	8,217	8,185	8,237	8,431	9,267	9,391	10,206	10,908
Italy	4,492	4,005	3,511	3,287	3,425	3,292	3,568	3,802	3,205	3,154	3,864	3,736	3,794	3,117	2,901	3,058
China	472	735	988	1,516	1,517	1,228	1,756	2,610	4,234	3,745	3,262	3,674	3,529	3,454	3,798	4,284
South Korea	999	1,050	1,239	1,379	1,600	1,668	1,842	1,924	2,570	2,130	2,552	2,407	2,526	2,656	2,780	3,051
Taiwan	303	343	430	436	505	557	660	575	621	539	560	584	668	736	773	818
Singapore	130	154	157	185	274	261	357	420	401	437	417	555	511	521	519	573
Hong Kong	165	191	183	157	197	208	226	251	248	237	264	321	319	321	369	387

[a]A total of 68 countries are included.

[b]German data are for the former West Germany only.

[c]High-tech industries include aircraft, office and computing machinery, communication equipment, and drugs and medicines.

SOURCE: WEFA/ICF Global Industry Service (Eddystone, PA: Spring 1997).

See figures 6-2, 6-3, 6-4, 6-5, 6-6, 6-7, 6-8, 6-9, and 6-10.

Appendix table 6-6.
U.S. trade in advanced technology products: 1990-96
(Millions of U.S. dollars)

Product category	1990	1991	1992	1993	1994	1995	1996
U.S. exports							
Total	94,727.6	101,641.5	107,091.3	108,356.6	120,743.3	138,416.5	154,909.2
Biotechnology	661.2	706.0	745.8	892.7	1,029.2	1,055.5	1,197.4
Life science	4,860.3	5,492.5	5,826.0	6,133.7	6,821.3	8,571.5	9,255.6
Opto-electronics	524.0	627.9	604.0	701.7	926.3	1,164.6	1,418.6
Computers and telecommunications	31,375.0	30,726.3	32,569.2	34,198.8	39,859.3	47,890.5	52,780.1
Electronics	7,535.5	8,925.6	9,968.4	11,987.4	16,235.6	31,391.7	36,548.0
Flexible manufacturing	3,095.7	3,251.4	3,412.6	4,039.0	5,191.0	7,469.6	8,583.6
Advanced materials	6,403.0	6,226.1	7,153.6	8,404.2	10,406.2	4,519.5	1,693.6
Aerospace	36,972.7	41,904.5	42,445.5	37,348.1	34,955.4	30,983.1	38,088.7
Weapons	687.9	851.7	784.1	745.1	730.6	1,040.5	1,466.9
Nuclear technology	1,260.5	1,304.2	1,502.4	1,375.6	1,560.6	1,272.0	1,258.9
Software technology	1,351.8	1,625.2	2,079.7	2,530.2	3,027.9	3,057.9	2,617.7
U.S. imports							
Total	59,381.2	63,252.1	71,871.5	81,233.1	98,116.5	124,787.0	130,361.6
Biotechnology	32.1	48.7	48.8	59.2	73.3	444.8	548.8
Life science	3,417.6	4,305.8	4,821.4	4,607.5	4,821.5	6,607.2	7,291.6
Opto-electronics	1,138.0	2,038.4	2,570.3	2,531.0	2,544.1	2,816.6	3,172.8
Computers and telecommunications	30,110.5	29,153.4	33,848.5	39,790.2	49,440.0	58,865.6	61,346.1
Electronics	10,955.3	12,391.7	14,205.3	17,824.2	25,507.3	38,232.6	36,756.8
Flexible manufacturing	1,676.6	1,789.7	1,684.5	2,222.2	2,899.7	4,947.5	5,740.7
Advanced materials	1,045.6	1,051.5	1,548.4	2,052.9	1,091.8	1,527.6	1,219.8
Aerospace	10,713.8	12,106.0	12,687.2	11,613.3	11,135.6	10,540.5	12,805.4
Weapons	129.9	167.8	156.9	164.7	143.9	205.0	265.5
Nuclear technology	4.5	3.0	5.2	7.9	22.7	39.8	626.1
Software technology	157.4	196.0	295.0	360.0	436.5	559.8	588.0
U.S. trade balance							
Total	35,346.4	38,389.4	35,219.8	27,123.6	22,626.8	13,629.5	24,547.6
Biotechnology	629.1	657.3	697.0	833.5	956.0	610.7	648.6
Life science	1,442.8	1,186.7	1,004.6	1,526.2	1,999.7	1,964.3	1,964.1
Opto-electronics	–613.9	–1,410.5	–1,966.3	–1,829.3	–1,617.8	–1,652.0	–1,754.2
Computers and telecommunications	1,264.5	1,572.9	–1,279.3	–5,591.4	–9,580.7	–10,975.1	–8,566.0
Electronics	–3,419.9	–3,466.1	–4,236.9	–5,836.8	–9,271.7	–6,840.9	–208.8
Flexible manufacturing	1,419.1	1,461.7	1,728.1	1,816.8	2,291.3	2,522.1	2,842.9
Advanced materials	5,357.5	5,174.6	5,605.3	6,351.3	9,314.4	2,991.9	473.8
Aerospace	26,258.9	29,798.5	29,758.3	25,734.8	23,819.7	20,442.7	25,283.3
Weapons	558.0	683.9	627.2	580.4	586.7	835.6	1,201.4
Nuclear technology	1,256.0	1,301.1	1,497.2	1,367.7	1,537.9	1,232.2	632.9
Software technology	1,194.5	1,429.2	1,784.7	2,170.3	2,591.4	2,498.1	2,029.7

SOURCE: U.S. Bureau of the Census, Foreign Trade Division <<http://www.fedstats.gov>>, 1997.

See figure 6-11.

Appendix table 6-7.
U.S. receipts and payments of royalties and fees associated with affiliated and unaffiliated foreign residents: 1987-95
(Millions of U.S. dollars)

	Total	Foreign residents	
		Affiliated	Unaffiliated
Receipts			
1987	9,914	7,629	2,285
1988	11,802	9,156	2,646
1989	13,064	10,207	2,857
1990	16,634	13,251	3,384
1991	18,107	14,395	3,712
1992	19,715	15,718	3,997
1993	20,323	15,707	4,616
1994	22,274	17,422	4,849
1995	26,953	21,619	5,333
Payments			
1987	1,844	1,296	547
1988	2,585	1,410	1,175
1989	2,602	1,778	824
1990	3,135	2,206	929
1991	4,076	2,996	1,080
1992	5,074	3,381	1,694
1993	4,765	3,364	1,401
1994	5,518	3,810	1,708
1995	6,312	5,148	1,163
Balance			
1987	8,070	6,333	1,738
1988	9,217	7,746	1,471
1989	10,462	8,429	2,033
1990	13,499	11,045	2,455
1991	14,031	11,399	2,632
1992	14,641	12,337	2,303
1993	15,558	12,343	3,215
1994	16,756	13,612	3,141
1995	20,641	16,471	4,170

NOTE: Details may not add to totals because of rounding.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business,* Vol. 76, No. 11 (November 1996).

See figure 6-12.

Appendix table 6-8.
U.S. receipts and payments of royalties and license fees generated from the exchange and use of industrial processes with unaffiliated foreign residents, by region/country: 1987-95
(Millions of U.S. dollars)

Region/country	Receipts									Payments									Balance								
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1987	1988	1989	1990	1991	1992	1993	1994	1995	1987	1988	1989	1990	1991	1992	1993	1994	1995
All countries	1,678	1,962	2,051	2,333	2,434	2,525	2,820	3,043	3,316	459	525	612	665	796	818	1,054	1,056	819	1,219	1,437	1,439	1,668	1,638	1,707	1,776	1,987	2,497
Canada	87	60	62	79	62	47	41	53	49	9	11	8	16	11	10	8	11	8	78	49	54	63	51	37	33	42	41
Europe	446	517	530	630	575	637	642	771	737	320	355	433	482	637	635	820	734	482	126	162	97	148	–62	2	–178	37	255
European Union	353	410	378	500	475	498	496	601	652	248	279	342	360	426	417	472	420	401	105	131	36	140	49	81	24	181	251
France	73	82	52	78	91	64	89	129	68	33	37	51	54	73	D	92	104	109	40	45	1	24	18	64	–3	25	–41
Germany[a]	79	73	77	107	97	108	109	142	162	100	112	137	133	182	D	187	128	109	–21	–39	–60	–26	–85	108	–78	14	53
Italy	57	73	68	105	70	99	69	71	58	25	20	22	29	34	24	9	6	7	32	53	46	76	36	75	60	65	51
United Kingdom	60	67	81	91	106	103	103	114	109	72	90	102	111	106	125	123	104	95	–12	–23	–21	–20	0	–22	–20	10	14
All other	93	107	152	130	100	263	272	315	340	72	76	91	122	211	D	409	392	162	21	31	61	8	–111	263	–137	–77	178
So./Central America	64	48	54	59	85	73	D	84	69	5	*	*	*	1	D	D	D	D	59	48	54	59	83	NA	D	NA	NA
Brazil	19	7	14	8	8	6	7	8	8	*	*	*	*	*	*	2	2	2	19	7	14	8	8	6	5	6	6
Mexico	14	13	18	23	31	29	28	33	22	3	*	*	*	*	1	*	1	D	11	13	18	23	30	28	28	32	NA
All other	31	28	22	28	46	38	D	43	39	2	NA	NA	NA	1	D	D	D	D	29	28	22	28	45	38	D	NA	NA
Africa	D	22	24	22	34	27	36	26	21	*	4	*	0	*	*	*	1	*	0	18	24	22	34	27	36	25	21
Middle East	D	18	17	22	25	21	33	21	38	2	3	4	3	4	5	9	9	15	–2	15	13	19	21	16	24	12	23
Asia & the Pacific	936	1,185	1,248	1,465	1,638	1,704	1,966	2,077	2,382	95	112	120	160	140	152	200	283	299	841	1,073	1,128	1,305	1,498	1,552	1,766	1,794	2,083
Hong Kong	4	6	7	6	6	11	12	8	21	1	*	*	0	*	*	2	3	D	3	6	7	6	6	11	10	5	NA
India	18	40	26	21	14	34	D	28	35	*	*	*	*	*	*	0	*	*	18	40	26	21	14	34	NA	28	35
Indonesia	5	5	8	11	20	13	20	20	14	0	*	0	0	0	*	0	0	*	5	5	8	11	20	13	20	20	14
Japan	723	883	897	1,028	1,219	1,268	1,434	1,373	1,501	88	108	109	141	138	145	191	262	280	635	775	788	887	1,081	1,123	1,243	1,111	1,221
Malaysia	*	*	2	2	2	7	18	19	D	0	0	0	0	0	0	*	0	*	NA	0	2	2	2	7	18	19	NA
The Philippines	3	4	4	4	2	3	D	1	5	0	*	1	0	0	*	*	*	*	3	4	3	4	2	3	NA	1	5
Singapore	30	13	8	19	21	20	20	73	32	*	0	0	0	*	D	*	*	*	30	13	8	19	21	20	20	73	32
South Korea	34	107	167	249	225	220	278	416	585	*	*	D	D	*	1	1	6	D	34	107	167	249	225	219	277	410	NA
Taiwan	21	46	34	55	57	42	34	39	65	*	*	D	1	*	2	2	2	*	21	46	34	54	57	40	32	37	65
All other	98	81	95	70	72	86	D	100	D	6	4	10	D	2	D	4	10	NA	92	77	85	70	70	86	NA	90	NA
All other	145	112	116	56	15	16	NA	11	20	28	40	47	7	58	NA	NA	NA	NA	117	72	69	52	13	NA	NA	NA	NA

* = less than $500,000; D = withheld to avoid disclosing operations of individual companies; NA = not available

NOTE: Industrial processes include patents and other proprietary inventions and technology.

[a]German data prior to 1990 are for the former West Germany only. Beginning in 1990, these data are also for the former East Germany.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business*, Vol. 76, No. 11 (November 1996): 90-93.

See figure 6-13.

Appendix table 6-9.
R&D performance in the United States, by industry: 1973-94
(Millions of current purchasing power parity dollars)

Industry	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total, all industries	21,250	22,887	24,206	26,997	29,825	33,304	38,226	44,505	51,810	58,650	65,268	74,800	84,239	87,823	92,155	97,015	102,055	109,727	116,952	119,110	117,400	119,595
Total manufacturing	20,535	22,119	23,471	26,151	28,867	32,075	36,686	42,690	49,904	56,178	61,931	69,895	77,525	80,377	84,311	86,502	88,024	88,934	88,506	90,177	90,932	96,307
Food, drink & tobacco	269	298	335	355	415	472	528	620	638	779	827	1,082	1,136	1,286	1,206	1,229	1,275	1,414	1,277	1,386	1,345	1,476
Textiles, footwear & leather	64	69	70	82	83	89	101	115	116	136	150	182	218	246	243	260	260	297	283	275	313	344
Wood, cork & furniture	71	84	88	107	123	126	139	148	161	159	152	143	147	144	137	173	197	245	210	247	259	269
Paper & printing	194	237	249	313	333	387	445	495	566	566	552	593	576	541	604	788	879	1,059	1,235	1,245	1,643	1,723
Chemicals	3,040	3,541	3,907	4,285	4,611	5,133	5,877	6,844	8,335	9,516	10,219	11,027	11,436	11,582	12,139	13,816	15,134	16,750	18,382	18,981	20,706	20,701
Industrial chemicals	1,418	1,643	1,766	1,925	2,085	2,272	2,521	2,859	3,540	4,112	4,272	4,608	5,056	5,185	5,535	6,161	6,261	7,004	7,587	7,437	8,248	7,557
Pharmaceuticals	698	807	981	1,091	1,117	1,308	1,517	1,777	2,085	2,492	2,913	3,319	3,484	3,658	4,100	4,906	5,808	6,287	7,061	7,944	9,146	9,633
Petroleum refining	498	622	693	767	918	1,060	1,262	1,552	1,936	2,141	2,258	2,312	2,220	2,018	1,897	1,997	2,180	2,306	2,498	2,277	2,152	1,950
Rubber & plastics products	426	469	467	502	491	493	577	656	775	771	776	788	676	721	607	752	885	1,153	1,236	1,323	1,161	1,561
Stone, clay & glass	199	217	233	263	287	324	356	406	460	513	624	733	835	950	995	738	637	616	483	510	538	591
Basic metal industries	308	358	443	506	538	560	634	728	878	987	1,085	717	740	803	730	637	686	739	714	522	669	690
Ferrous metals	163	181	215	256	284	314	375	443	555	613	637	381	324	345	252	253	251	238	228	224	289	247
Nonferrous metals	145	177	228	250	254	246	259	285	323	374	448	336	416	458	478	384	435	501	486	298	380	443
Fabricated metal products and machinery	16,232	17,138	17,941	20,023	22,234	24,718	28,318	32,970	38,306	43,003	47,780	55,040	62,076	64,443	67,874	68,440	68,507	67,201	65,297	66,351	64,628	69,645
Fabricated metal products	291	313	324	358	386	384	455	550	624	625	701	842	829	895	783	881	904	939	974	1,017	1,158	1,111
Nonelectrical machinery	816	882	976	1,085	1,225	1,400	1,611	1,939	2,417	2,411	2,392	2,404	2,394	2,396	2,428	2,682	2,729	2,753	3,555	3,534	3,431	4,004
Office machinery & computers	1,733	2,103	2,220	2,402	2,655	2,883	3,214	3,962	4,401	5,667	6,635	8,100	9,822	9,794	9,347	10,444	11,705	11,693	11,220	11,404	9,313	9,664
Electrical machinery	1,834	2,047	2,121	2,382	2,295	2,476	2,775	3,048	3,476	2,858	2,815	1,848	1,277	1,250	1,239	1,419	2,126	3,444	3,091	2,722	2,537	2,664
Electronic equipment & components	3,068	2,964	2,984	3,254	3,591	4,031	5,049	6,127	6,853	8,065	9,866	11,930	13,155	13,730	14,609	12,709	11,192	9,956	10,324	10,638	10,812	12,674
Shipbuilding	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Motor vehicles	2,405	2,389	2,340	2,778	3,358	3,879	4,509	4,955	4,806	4,797	5,318	6,057	6,984	9,732	9,279	10,085	11,020	10,256	10,388	9,924	11,793	13,406
Aerospace	5,052	5,278	5,713	6,339	7,033	7,536	8,041	9,198	11,968	14,451	15,406	18,858	22,231	21,050	24,458	24,168	22,331	20,635	16,629	17,158	15,056	14,260
Transport equipment	72	87	90	94	120	131	159	162	147	199	381	399	371	493	509	522	508	470	411	412	409	421
Instruments	961	1,075	1,173	1,331	1,571	1,998	2,505	3,029	3,614	3,930	4,266	4,602	5,013	5,103	5,222	5,530	5,992	7,055	8,705	9,542	10,119	11,441
Other manufacturing	158	177	205	217	243	266	288	364	444	519	541	379	361	382	383	420	449	613	624	660	831	868
Total services	715	768	735	845	958	1,229	1,540	1,815	1,906	2,472	3,337	4,905	6,714	7,446	7,844	10,513	14,031	20,793	28,446	28,933	26,468	23,288

SOURCE: Organisation for Economic Co-operation and Development, Analytical Business Enterprise R&D Database (Paris: April 1997).

See figure 6-15.

Appendix table 6-10.
R&D performance in Japan, by industry: 1973-94
(Millions of current purchasing power parity dollars)

Industry	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total, all industries	5,052	5,559	6,037	6,643	7,445	8,322	10,249	12,536	15,257	17,703	20,411	23,284	27,283	28,313	30,945	35,483	41,400	47,450	50,304	51,203	49,123	49,590
Total manufacturing	4,792	5,287	5,692	6,289	7,027	7,889	9,725	11,906	14,580	16,978	19,545	22,296	26,282	27,278	29,862	34,176	39,891	45,575	48,418	49,016	46,892	47,373
Food, drink & tobacco	137	135	165	180	204	223	287	389	419	500	536	603	670	741	921	961	1,102	1,205	1,164	1,242	1,363	1,291
Textiles, footwear & leather	82	73	81	74	67	88	126	136	271	227	228	270	287	290	317	358	409	452	474	635	505	424
Wood, cork & furniture	12	15	22	26	29	34	41	44	52	57	92	60	56	72	77	88	151	126	160	147	168	177
Paper & printing	99	63	69	62	70	71	74	86	87	121	166	195	233	233	263	335	398	442	473	400	394	405
Chemicals	1,135	1,299	1,419	1,516	1,702	1,831	2,290	2,845	3,172	3,661	4,180	4,720	5,282	5,562	6,371	7,164	8,199	8,900	9,769	10,412	10,208	10,365
Industrial chemicals	674	787	813	855	937	979	1,203	1,470	1,677	1,962	2,169	2,527	2,730	2,968	3,408	3,804	4,314	4,612	4,944	5,148	5,058	5,058
Pharmaceuticals	250	277	341	387	425	489	680	757	918	1,051	1,298	1,339	1,570	1,582	1,814	2,046	2,293	2,643	3,047	3,446	3,414	3,494
Petroleum refining	50	54	61	64	95	90	100	259	171	191	223	254	313	317	334	368	423	471	457	482	444	438
Rubber & plastics products	161	181	204	210	244	273	306	359	406	457	491	600	668	695	815	946	1,169	1,175	1,321	1,336	1,292	1,375
Stone, clay & glass	108	133	150	184	186	212	280	332	353	410	507	595	800	868	848	976	1,113	1,102	1,341	1,148	1,077	1,009
Basic metal industries	310	375	413	453	475	517	614	806	998	1,117	1,164	1,268	1,566	1,691	1,666	1,819	1,987	2,275	2,628	2,452	2,358	2,085
Ferrous metals	231	281	320	352	366	392	461	587	713	801	833	871	1,104	1,181	1,168	1,227	1,348	1,556	1,859	1,668	1,552	1,313
Nonferrous metals	78	94	93	101	109	125	152	219	284	316	331	397	462	510	498	591	639	720	769	783	805	773
Fabricated metal products and machinery	2,858	3,134	3,307	3,724	4,214	4,822	5,919	7,128	9,086	10,723	12,504	14,384	17,176	17,578	19,140	22,197	26,220	30,715	32,008	32,167	30,426	31,144
Fabricated metal products	80	81	105	143	136	145	210	208	272	284	371	378	472	438	452	440	550	664	709	679	653	617
Nonelectrical machinery	466	647	683	663	843	764	936	1,174	1,389	1,596	1,772	1,997	2,300	2,341	2,536	2,779	3,389	4,104	4,334	4,265	4,349	4,615
Office machinery & computers	148	109	157	192	239	283	362	449	583	715	901	1,377	1,590	1,721	2,224	2,962	4,087	4,584	4,812	4,413	4,351	4,294
Electrical machinery	570	558	597	728	809	970	1,198	1,122	1,437	1,691	2,048	2,439	2,830	2,866	3,172	3,646	4,356	5,101	5,215	5,181	5,266	5,561
Electronic equipment & components	756	865	818	989	922	1,082	1,357	1,980	2,521	3,196	3,760	4,158	5,173	5,135	5,585	6,311	6,656	7,434	8,078	8,545	7,690	8,190
Shipbuilding	44	46	45	41	35	30	31	34	34	41	52	40	50	38	42	46	59	66	76	103	99	87
Motor vehicles	590	631	685	761	926	1,177	1,379	1,601	2,102	2,374	2,576	3,019	3,494	3,697	3,774	4,523	5,389	6,547	6,527	6,785	5,798	5,519
Aerospace	56	62	74	27	67	73	94	91	103	120	198	103	176	250	282	240	311	407	549	353	381	316
Transport equipment	28	12	14	26	36	46	54	72	113	119	117	111	165	170	100	75	85	89	89	92	95	104
Instruments	120	121	129	153	202	251	297	396	533	588	711	759	926	921	973	1,173	1,338	1,719	1,621	1,752	1,744	1,842
Other manufacturing	53	59	67	69	80	89	95	138	142	161	167	201	212	244	260	279	312	356	400	415	393	473
Total services	225	220	294	299	373	373	464	559	602	637	770	884	881	916	961	1,130	1,362	1,667	1,648	1,993	2,034	2,042

SOURCE: Organisation for Economic Co-operation and Development, Analytical Business Enterprise R&D Database (Paris: April 1997).

See figure 6-15.

Appendix table 6-11.
R&D performance in the European Union, by industry: 1973-94
(Millions of current purchasing power parity dollars)

Industry	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total, all industries	12,282	13,777	15,467	17,134	18,782	21,543	25,759	28,828	32,759	36,067	38,292	42,036	47,819	51,872	55,935	60,724	66,263	71,186	73,569	78,669	76,804	77,813
Total manufacturing	11,201	12,632	14,047	15,551	17,016	19,682	23,429	26,505	30,062	33,094	35,185	38,801	44,001	46,241	49,994	54,249	59,107	63,665	65,399	68,365	66,476	67,486
Food, drink & tobacco	247	297	328	363	390	452	520	574	594	632	646	750	826	887	938	981	1,134	1,214	1,245	1,368	1,408	1,413
Textiles, footwear & leather	133	161	161	158	152	173	181	167	169	178	192	220	235	245	241	248	252	262	341	365	397	447
Wood, cork & furniture	14	16	16	17	20	37	55	61	64	76	85	100	119	121	122	122	129	130	157	160	160	184
Paper & printing	82	88	95	101	109	128	155	172	188	206	221	245	263	281	307	318	362	400	394	393	379	422
Chemicals	2,824	3,232	3,707	4,149	4,554	5,071	5,776	6,516	7,586	8,339	8,748	9,536	10,724	11,396	12,698	14,138	15,417	16,632	16,783	17,889	17,596	17,667
Industrial chemicals	1,641	1,913	2,205	2,476	2,689	2,869	3,167	3,639	4,257	4,597	4,732	5,227	5,942	6,308	6,896	7,563	8,006	8,366	8,284	8,528	8,112	8,099
Pharmaceuticals	753	855	990	1,121	1,248	1,521	1,801	1,944	2,205	2,526	2,788	3,003	3,353	3,638	4,341	5,004	5,674	6,423	6,694	7,565	7,683	7,819
Petroleum refining	223	241	267	291	300	318	354	403	514	545	552	588	637	647	639	669	711	805	821	781	715	645
Rubber & plastics products	208	224	244	261	316	363	454	530	610	672	677	718	791	803	821	902	1,026	1,038	984	1,015	1,086	1,104
Stone, clay & glass	156	177	182	193	210	250	302	332	359	392	424	444	479	475	514	547	619	617	647	682	670	691
Basic metal industries	312	395	433	454	467	506	586	650	733	799	846	867	918	911	937	1,002	1,045	1,080	1,106	1,124	1,041	1,089
Ferrous metals	223	262	297	305	309	334	404	441	504	547	581	592	637	619	634	692	713	717	770	811	738	787
Nonferrous metals	89	133	135	149	159	172	182	208	229	252	265	275	281	292	303	309	332	363	336	313	303	302
Fabricated metal products and machinery	7,377	8,209	9,061	10,021	10,998	12,937	15,732	17,899	20,259	22,356	23,900	26,525	30,320	31,787	34,076	36,738	39,993	43,150	44,547	46,184	44,616	45,358
Fabricated metal products	117	139	164	189	222	305	415	490	574	688	754	802	900	928	957	1,019	1,086	1,231	1,110	1,128	1,125	1,184
Nonelectrical machinery	820	893	986	1,065	1,201	1,521	1,952	2,162	2,412	2,690	2,846	3,006	3,402	3,558	3,907	4,362	5,000	5,079	5,267	5,819	5,670	5,899
Office machinery & computers	374	415	481	596	731	816	932	1,004	1,166	1,326	1,460	1,755	2,074	2,107	2,302	2,604	2,851	2,980	3,118	3,036	2,761	2,470
Electrical machinery	993	1,159	1,282	1,400	1,462	1,650	1,867	2,059	2,320	2,578	2,722	3,115	3,751	4,220	4,439	4,508	4,437	4,445	5,232	5,249	5,214	5,251
Electronic equipment & components	1,796	2,077	2,378	2,637	2,934	3,649	4,520	5,262	5,993	6,583	7,138	7,786	8,685	8,843	9,652	10,317	11,042	11,888	11,294	11,719	11,446	11,967
Shipbuilding	86	88	88	92	95	93	86	90	95	110	122	140	145	158	152	139	157	196	180	240	233	239
Motor vehicles	1,263	1,361	1,489	1,667	1,901	2,211	2,673	2,993	3,371	3,816	4,192	4,696	5,288	5,656	6,147	6,925	7,751	8,592	9,306	10,170	10,262	10,425
Aerospace	1,695	1,825	1,920	2,074	2,117	2,303	2,823	3,310	3,730	3,914	3,997	4,492	5,246	5,455	5,621	5,892	6,649	7,553	7,681	7,392	6,403	6,358
Transport equipment	24	28	29	44	63	62	66	75	90	108	132	153	155	161	171	175	167	207	322	294	312	339
Instruments	209	224	242	258	273	327	397	453	509	543	537	579	675	702	727	795	852	980	1,036	1,137	1,190	1,225
Other manufacturing	56	58	64	94	117	129	120	134	110	118	122	114	118	138	162	156	156	179	180	199	207	216
Total services	749	868	1,003	1,128	1,300	1,387	1,518	1,618	1,849	2,093	2,289	2,454	2,853	4,634	4,948	5,614	6,292	6,626	7,147	8,613	9,114	9,121

NOTE: The member countries of the European Union are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

SOURCE: Organisation for Economic Co-operation and Development, Analytical Business Enterprise R&D Database (Paris: April 1997).

See figure 6-15.

Appendix table 6-12.
Number of U.S. patents granted, by inventor residence, inventor sector, and year of grant: 1963-95

Inventor residence/sector	Total 1963-95	1963-82	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL	2,401,282	1,234,646	57,888	56,860	67,200	71,661	70,860	82,952	77,924	95,537	90,364	96,513	97,441	98,342	101,675	101,419
Inventor residence																
U.S. origin	1,497,969	865,097	33,896	32,871	38,367	39,555	38,126	43,520	40,496	50,185	47,387	51,182	52,252	53,231	56,065	55,739
Foreign origin	903,313	369,549	23,992	23,989	28,833	32,106	32,734	39,432	37,428	45,352	42,977	45,331	45,189	45,111	45,610	45,680
Argentina	698	417	18	21	20	11	17	18	16	20	17	16	20	24	32	31
Australia	9,010	3,584	266	237	292	340	374	389	416	503	432	463	410	378	467	459
Austria	8,653	4,083	229	267	256	318	357	345	337	399	393	359	370	313	289	338
Belgium	8,626	4,459	224	205	240	240	243	295	302	359	313	324	324	350	351	397
Brazil	874	330	27	19	20	30	27	34	29	36	41	61	40	57	60	63
Bulgaria	465	246	13	19	22	21	21	32	23	16	27	10	5	5	4	1
Canada	43,063	20,252	990	1,000	1,206	1,342	1,314	1,594	1,489	1,959	1,862	2,035	1,964	1,944	2,008	2,104
China	545	107	0	1	2	1	9	23	47	52	47	52	41	53	48	62
Czechoslovakia	2,090	1,637	50	38	33	54	35	46	33	34	39	27	17	13	19	15
Denmark	5,026	2,521	121	125	150	187	182	204	151	221	158	210	193	197	207	199
Finland	4,843	1,330	125	116	167	200	210	275	232	230	304	331	360	293	312	358
France	72,156	35,247	1,975	1,895	2,162	2,400	2,369	2,874	2,661	3,140	2,866	3,030	3,029	2,908	2,779	2,821
Germany	188,830	91,571	5,467	5,477	6,323	6,718	6,856	7,885	7,353	8,353	7,612	7,680	7,310	6,893	6,732	6,600
Hong Kong	843	243	18	14	24	25	31	34	41	48	52	50	60	60	57	86
Hungary	2,242	901	112	106	111	108	131	127	94	129	93	85	88	61	46	50
India	492	231	4	14	12	10	18	12	14	14	23	22	24	30	27	37
Ireland	862	268	24	18	29	30	28	38	43	65	54	55	55	53	50	52
Israel	4,866	1,317	114	109	162	179	189	245	238	326	299	305	335	314	350	384
Italy	26,920	11,960	752	625	794	919	995	1,183	1,076	1,297	1,260	1,209	1,271	1,286	1,215	1,078
Japan	313,267	77,458	8,149	8,793	11,110	12,746	13,209	16,557	16,158	20,168	19,525	21,027	21,926	22,293	22,384	21,764
Liechtenstein	473	274	19	12	16	13	16	16	10	11	15	11	16	11	16	17
Luxembourg	567	198	26	27	24	37	31	22	29	29	17	27	26	28	22	24
Mexico	1,614	1,076	35	32	42	32	37	49	44	39	32	28	39	45	44	40
Netherlands	22,609	11,104	619	626	726	766	722	922	806	1,060	959	992	854	801	853	799
New Zealand	1,107	452	44	38	50	33	52	68	55	58	52	41	44	39	37	44
Norway	2,890	1,415	65	66	87	90	81	135	121	126	112	111	108	117	126	130
Poland	626	451	26	20	15	11	14	13	8	14	17	8	5	8	8	8
South Africa	2,615	1,238	73	60	82	96	88	107	103	134	115	105	97	93	101	123
South Korea	4,649	102	14	26	30	41	46	84	97	159	225	404	538	779	943	1,161
Spain	2,798	1,219	49	50	69	78	97	115	126	131	130	153	133	159	141	148
Sweden	23,939	13,370	685	623	701	857	883	948	777	837	768	716	627	635	706	806
Switzerland	38,553	21,623	1,147	1,017	1,174	1,233	1,212	1,373	1,245	1,363	1,284	1,335	1,196	1,126	1,169	1,056
Taiwan	9,229	316	88	65	99	174	208	343	457	591	732	904	1,000	1,189	1,443	1,620
United Kingdom	85,837	51,143	2,132	1,930	2,269	2,494	2,405	2,775	2,579	3,094	2,789	2,799	2,425	2,294	2,234	2,475
U.S.S.R.	6,963	5,129	209	222	214	147	116	121	96	161	174	178	66	65	53	12
Venezuela	414	135	10	5	11	15	21	24	20	23	20	25	22	31	23	29
Others (113 countries)	4,059	2,142	73	71	89	110	90	107	102	153	119	143	151	166	254	289
Inventor sector																
U.S. corporation	1,145,904	654,518	25,783	25,677	29,999	31,181	29,490	33,726	31,437	38,664	36,093	39,133	40,307	41,826	44,035	44,035
U.S. government	44,445	29,623	1,005	1,048	1,235	1,139	1,022	981	733	880	983	1,183	1,161	1,166	1,258	1,028
U.S. individual	365,564	211,276	8,553	7,574	8,911	9,265	9,477	10,887	10,122	13,028	12,542	13,207	12,751	12,281	12,805	12,885
Foreign corporation	711,249	269,314	18,856	19,246	23,238	25,957	26,545	32,371	30,960	37,506	35,548	37,594	38,237	38,401	38,788	38,688
Foreign government	9,638	3,748	369	339	438	483	479	555	453	441	423	472	463	434	296	245
Foreign individual	124,482	66,167	3,322	2,976	3,379	3,636	3,847	4,432	4,219	5,018	4,775	4,924	4,522	4,234	4,493	4,538

SOURCE: U.S. Patent and Trademark Office, *Patenting Trends in the United States, 1963-95* (Washington, DC: 1996).

See figures 6-16, 6-17, and 6-18.

Appendix table 6-13.
Patent classes most emphasized by inventors from the United States patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	United States 1985	United States 1995	Activity index 1985	Activity index 1995
166	Wells	336	338	306	285	1.783	1.667
606	Surgery	154	602	103	484	1.310	1.590
604	Surgery	298	843	232	674	1.524	1.581
607	Surgery: light, thermal, and electrical application	94	293	71	211	1.479	1.424
585	Chemistry of hydrocarbon compounds	225	223	168	158	1.462	1.401
206	Special receptacle or package	262	404	183	280	1.368	1.370
128	Surgery	290	846	164	582	1.107	1.360
220	Receptacles	182	230	101	155	1.087	1.332
248	Supports	211	247	135	166	1.253	1.329
380	Cryptography	47	204	34	137	1.416	1.328
052	Static structures (e.g., buildings)	313	315	201	207	1.257	1.299
426	Food or edible material: processes, compositions, and products	438	479	287	309	1.283	1.275
273	Amusement devices: games	108	331	65	213	1.178	1.272
134	Cleaning and liquid contact with solids	84	224	58	144	1.352	1.271
436	Chemistry: analytical and immunological testing	126	280	90	180	1.399	1.271
326	Electronic digital logic circuitry	115	333	67	211	1.141	1.253
435	Chemistry: molecular biology and microbiology	385	1,346	229	852	1.165	1.252
530	Chemistry: natural resins or derivatives; peptides	134	271	85	171	1.242	1.248
342	Communications: directive radio wave systems and devices	109	274	57	172	1.024	1.241
395	Information processing system organization	550	3,025	355	1,874	1.264	1.225
062	Refrigeration	423	515	240	315	1.111	1.209
210	Liquid purification or separation	452	782	254	478	1.100	1.209
239	Fluid sprinkling, spraying, and diffusing	230	240	132	146	1.124	1.203
424	Drug, bio-affecting and body treating compositions	404	1,166	221	705	1.071	1.195
015	Brushing, scrubbing, and general cleaning	135	229	84	138	1.218	1.192
362	Illumination	171	330	109	199	1.248	1.192
379	Telephonic communications	244	733	147	438	1.180	1.181
297	Chairs and seats	154	223	69	132	0.877	1.170
361	Electricity: electrical systems and devices	463	763	269	450	1.138	1.166
200	Electricity: circuit makers and breakers	273	207	159	122	1.140	1.165
340	Communications: electrical	381	598	184	351	0.946	1.161
137	Fluid handling	531	427	324	250	1.195	1.158
235	Registers	106	321	46	187	0.850	1.152
029	Metal working	604	699	365	404	1.183	1.143
536	Organic compounds—part of the class 532–570 series	95	320	39	183	0.804	1.131
174	Electricity: conductors and insulators	201	349	120	199	1.169	1.127
280	Land vehicles	285	581	93	331	0.639	1.126
439	Electrical connectors	496	810	349	459	1.378	1.120
073	Measuring and testing	938	1,100	526	619	1.098	1.113
053	Package making	289	351	138	197	0.935	1.110
324	Electricity: measuring and testing	409	893	237	501	1.135	1.109
315	Electric lamp and discharge devices: systems	236	332	145	185	1.203	1.102
162	Paper making and fiber liberation	163	208	75	115	0.901	1.093
502	Catalyst, solid sorbent, or support therefor: product	425	302	279	167	1.285	1.093
341	Coded data generation or conversion	170	280	84	152	0.968	1.073
330	Amplifiers	247	241	119	130	0.943	1.067
427	Coating processes	555	691	298	370	1.051	1.059
385	Optical waveguides	178	504	100	269	1.100	1.055
568	Organic compounds—part of the class 532–570 series	365	302	221	160	1.186	1.048
156	Adhesive bonding and miscellaneous chemical manufacture	546	779	327	412	1.173	1.046
414	Material or article handling	316	324	170	171	1.053	1.044

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-6.

Appendix table 6-14.
Patent classes most emphasized by inventors from Japan patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	Japan 1985	Japan 1995	Activity index 1985	Activity index 1995
369	Dynamic information storage or retrieval	277	658	158	508	2.671	3.003
354	Photography	355	471	245	332	3.232	2.742
084	Music	101	220	63	151	2.921	2.670
355	Photocopying	422	753	213	489	2.364	2.526
358	Facsimile or television recording	248	629	169	395	3.191	2.443
400	Typewriting machines	212	206	86	118	1.900	2.228
365	Static information storage and retrieval	228	897	95	489	1.951	2.121
360	Dynamic magnetic information storage or retrieval	476	789	271	411	2.666	2.026
257	Active solid-state devices (e.g., transistors, solid-state diodes)	294	1,308	107	675	1.704	2.008
430	Radiation imagery chemistry: process, composition, or products	745	1,421	392	732	2.464	2.004
347	Incremental printing of symbolic information	320	486	184	247	2.693	1.977
359	Optics: systems (including communication) and element	549	1083	198	521	1.689	1.871
310	Electrical generator or motor structure	307	386	104	175	1.586	1.764
348	Television	569	1028	179	461	1.473	1.744
148	Metal treatment	225	352	68	156	1.415	1.724
345	Selective visual display systems	159	356	48	146	1.414	1.595
271	Sheet feeding or delivering	174	247	54	101	1.453	1.591
372	Coherent light generators	127	364	27	140	0.996	1.496
118	Coating apparatus	208	288	53	107	1.193	1.445
382	Image analysis	120	323	43	120	1.678	1.445
242	Winding, tensioning, or guiding	367	310	118	113	1.506	1.418
318	Electricity: motive power systems	361	371	120	134	1.557	1.405
123	Internal-combustion engines	1,103	727	558	260	2.369	1.391
333	Wave transmission lines and networks	167	213	29	75	0.813	1.370
364	Electrical computers and data processing systems	695	1,529	221	512	1.489	1.303
428	Stock material or miscellaneous articles	1,280	1,890	382	630	1.397	1.297
371	Error detection/correction and fault detection/recovery	142	431	28	141	0.923	1.273
425	Plastic article or earthenware shaping or treating	263	290	33	92	0.588	1.234
437	Semiconductor device manufacturing: process	380	1362	106	431	1.306	1.231
363	Electric power conversion systems	130	206	28	65	1.009	1.227
501	Compositions: ceramic	142	215	47	67	1.550	1.212
313	Electric lamp and discharge devices	221	282	50	87	1.059	1.200
303	Fluid-pressure and analogous brake systems	78	202	24	62	1.441	1.194
327	Miscellaneous active electrical nonlinear devices	302	627	88	192	1.364	1.191
356	Optics: measuring and testing	340	669	79	200	1.088	1.163
455	Telecommunications	158	403	40	120	1.185	1.158
523	Synthetic resins or natural rubbers—part of the class 520 series	277	210	58	62	0.980	1.149
429	Chemistry: electrical current producing apparatus, product and process	221	387	47	114	0.996	1.146
250	Radiant energy	538	993	149	287	1.297	1.124
395	Information processing system organization	550	3,025	131	871	1.115	1.120
341	Coded data generation or conversion	170	280	52	79	1.432	1.098
381	Electrical audio signal processing systems and devices	141	217	46	61	1.528	1.094
526	Synthetic resins or natural rubbers—part of the class 520 series	284	363	80	101	1.319	1.082
074	Machine element or mechanism	365	290	121	80	1.552	1.073
417	Pumps	306	237	64	65	0.979	1.067
525	Synthetic resins or natural rubbers—part of the class 520 series	551	726	132	199	1.122	1.066
439	Electrical connectors	496	810	38	219	0.359	1.052
060	Power plants	380	547	85	147	1.047	1.045
101	Printing	197	269	29	72	0.689	1.041
524	Synthetic resins or natural rubbers—part of the class 520 series	664	725	98	194	0.691	1.041
219	Electric heating	627	527	191	139	1.426	1.026

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-6.

Appendix table 6-15.
Patent classes most emphasized by inventors from Germany patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	Germany 1985	Germany 1995	Activity index 1985	Activity index 1995
303	Fluid-pressure and analogous brake systems	78	202	21	68	2.577	4.576
101	Printing	197	269	52	90	2.526	4.548
188	Brakes	182	223	23	61	1.210	3.719
198	Conveyors: power-driven	233	271	27	51	1.109	2.558
548	Organic compounds—part of the class 532–570 series	212	281	41	52	1.851	2.516
072	Metal deforming	299	235	34	41	1.088	2.372
546	Organic compounds—part of the class 532–570 series	209	232	23	40	1.053	2.344
123	Internal-combustion engines	1,103	727	167	123	1.449	2.300
271	Sheet feeding or delivering	174	247	22	38	1.210	2.091
378	X-ray or gamma ray systems or devices	122	234	27	35	2.118	2.033
425	Plastic article or earthenware shaping or treating	263	290	42	43	1.528	2.016
568	Organic compounds—part of the class 532-570 series	365	302	44	43	1.154	1.936
549	Organic compounds—part of the class 532-570 series	214	235	31	33	1.386	1.909
074	Machine element or mechanism	365	290	40	40	1.049	1.875
528	Synthetic resins or natural rubbers—part of the class 520 series	411	531	58	69	1.351	1.767
524	Synthetic resins or natural rubbers—part of the class 520 series	664	725	85	94	1.225	1.763
451	Abrading	195	209	25	27	1.227	1.756
242	Winding, tensioning, or guiding	367	310	60	40	1.565	1.754
423	Chemistry of inorganic compounds	590	390	85	49	1.379	1.708
525	Synthetic resins or natural rubbers—part of the class 520 series	551	726	51	87	0.886	1.629
252	Compositions	785	1,039	73	119	0.890	1.557
248	Supports	211	247	23	28	1.043	1.541
204	Chemistry: electrical and wave energy	326	426	21	45	0.617	1.436
417	Pumps	306	237	43	25	1.345	1.434
073	Measuring and testing	938	1,100	109	115	1.112	1.421
422	Chemical apparatus and process disinfecting, deodorizing, preserving, or sterilizing	211	526	27	55	1.225	1.421
106	Compositions: coating or plastic	207	393	36	41	1.664	1.418
297	Chairs and seats	154	223	27	23	1.678	1.402
222	Dispensing	249	339	21	34	0.807	1.363
239	Fluid sprinkling, spraying, and diffusing	230	240	23	24	0.957	1.359
075	Specialized metallurgical processes, compositions for	190	212	21	21	1.058	1.347
414	Material or article handling	316	324	32	32	0.969	1.343
205	Electrolysis: processes, compositions used therein	301	266	31	26	0.986	1.329
526	Synthetic resins or natural rubbers—part of the class 520 series	284	363	19	35	0.640	1.311
342	Communications: directive radio wave systems and devices	109	274	12	26	1.054	1.290
053	Package making	289	351	31	32	1.027	1.239
523	Synthetic resins or natural rubbers—part of the class 520 series	277	210	30	19	1.037	1.230
514	Drug, bio-affecting and body treating compositions	1,564	2,360	196	209	1.199	1.204
501	Compositions: ceramic	142	215	13	19	0.876	1.201
363	Electric power conversion systems	130	206	8	18	0.589	1.188
162	Paper making and fiber liberation	163	208	16	18	0.939	1.176
502	Catalyst, solid sorbent, or support therefor: product	425	302	20	26	0.450	1.170
310	Electrical generator or motor structure	307	386	36	33	1.122	1.162
210	Liquid purification or separation	452	782	43	66	0.911	1.147
137	Fluid handling	531	427	56	36	1.009	1.146
060	Power plants	380	547	44	46	1.108	1.143
118	Coating apparatus	208	288	26	24	1.196	1.133
015	Brushing, scrubbing, and general cleaning	135	229	21	19	1.489	1.128
280	Land vehicles	285	581	32	48	1.075	1.123
427	Coating processes	555	691	62	57	1.069	1.121
219	Electric heating	627	527	45	43	0.687	1.109
536	Organic compounds—part of the class 532–570 series	95	320	15	26	1.511	1.105

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-6.

Appendix table 6-16.
Patent classes most emphasized by inventors from Taiwan patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	Taiwan 1985	Taiwan 1995	Activity index 1985	Activity index 1995
437	Semiconductor device manufacturing: process	380	1,362	0	152	0.000	15.159
345	Selective visual display systems	159	356	0	10	0.000	3.816
074	Machine element or mechanism	365	290	0	8	0.000	3.747
297	Chairs and seats	154	223	0	6	0.000	3.655
313	Electric lamp and discharge devices	221	282	0	6	0.000	2.890
257	Active solid-state devices (e.g., transistors, solid-state diodes)	294	1,308	0	27	0.000	2.804
327	Miscellaneous active electrical nonlinear devices	302	627	0	12	0.000	2.600
362	Illumination	171	330	0	6	0.000	2.470
425	Plastic article or earthenware shaping or treating	263	290	0	5	0.000	2.342
248	Supports	211	247	0	4	0.000	2.200
200	Electricity: circuit makers and breakers	273	207	0	3	0.000	1.969
333	Wave transmission lines and networks	167	213	0	3	0.000	1.913
280	Land vehicles	285	581	0	8	0.000	1.870
084	Music	101	220	0	3	0.000	1.852
365	Static information storage and retrieval	228	897	0	12	0.000	1.817
375	Pulse or digital communications	177	573	0	7	0.000	1.659
385	Optical waveguides	178	504	0	6	0.000	1.617
439	Electrical connectors	496	810	0	9	0.000	1.509
156	Adhesive bonding and miscellaneous chemical manufacture	546	779	0	8	0.000	1.395
264	Plastic and nonmetallic article shaping or treating: process	493	693	0	7	0.000	1.372
568	Organic compounds—part of the class 532–570 series	365	302	0	3	0.000	1.349
206	Special receptacle or package	262	404	0	4	0.000	1.345
400	Typewriting machines	212	206	0	2	0.000	1.319
075	Specialized metallurgical processes, compositions for	190	212	0	2	0.000	1.281
501	Compositions: ceramic	142	215	0	2	0.000	1.264
382	Image analysis	120	323	0	3	0.000	1.262
273	Amusement devices: games	108	331	0	3	0.000	1.231
188	Brakes	182	223	0	2	0.000	1.218
015	Brushing, scrubbing, and general cleaning	135	229	0	2	0.000	1.186
427	Coating processes	555	691	0	6	0.000	1.179
072	Metal deforming	299	235	0	2	0.000	1.156
330	Amplifiers	247	241	0	2	0.000	1.127
372	Coherent light generators	127	364	0	3	0.000	1.120
271	Sheet feeding or delivering	174	247	0	2	0.000	1.100
429	Chemistry: electrical current producing apparatus, product, and process	221	387	0	3	0.000	1.053
423	Chemistry of inorganic compounds	590	390	1	3	6.917	1.045
205	Electrolysis: processes, compositions used therein	301	266	0	2	0.000	1.021
364	Electrical computers and data processing systems	695	1,529	0	11	0.000	0.977
029	Metal working	604	699	0	5	0.000	0.972
341	Coded data generation or conversion	170	280	0	2	0.000	0.970
204	Chemistry: electrical and wave energy	326	426	0	3	0.000	0.957
371	Error detection/correction and fault detection/recovery	142	431	0	3	0.000	0.945
524	Synthetic resins or natural rubbers—part of the class 520 series	664	725	0	5	0.000	0.937
359	Optics: systems (including communication) and element	549	1,083	0	7	0.000	0.878
052	Static structures (e.g., buildings)	313	315	0	2	0.000	0.862
370	Multiplex communications	276	800	0	5	0.000	0.849
326	Electronic digital logic circuitry	115	333	0	2	0.000	0.816
053	Package making	289	351	0	2	0.000	0.774
219	Electric heating	627	527	0	3	0.000	0.773
148	Metal treatment	225	352	0	2	0.000	0.772
528	Synthetic resins or natural rubbers—part of the class 520 series	411	531	0	3	0.000	0.767

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-7.

Appendix table 6-17.
Patent classes most emphasized by inventors from South Korea patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	South Korea 1985	South Korea 1995	Activity index 1985	Activity index 1995
313	Electric lamp and discharge devices	221	282	0	27	0.000	7.550
437	Semiconductor device manufacturing: process	380	1,362	0	123	0.000	7.122
348	Television	569	1,028	0	85	0.000	6.520
358	Facsimile or television recording	248	629	0	42	0.000	5.266
369	Dynamic information storage or retrieval	277	658	0	39	0.000	4.674
360	Dynamic magnetic information storage or retrieval	476	789	0	46	0.000	4.598
365	Static information storage and retrieval	228	897	0	44	0.000	3.868
242	Winding, tensioning, or guiding	367	310	0	13	0.000	3.307
219	Electric heating	627	527	0	22	0.000	3.292
371	Error detection/correction and fault detection/recovery	142	431	0	16	0.000	2.927
315	Electric lamp and discharge devices: systems	236	332	0	12	0.000	2.850
318	Electricity: motive power systems	361	371	0	13	0.000	2.763
381	Electrical audio signal processing systems and devices	141	217	0	7	0.000	2.544
257	Active solid-state devices (e.g., transistors, solid-state diodes)	294	1,308	0	38	0.000	2.291
341	Coded data generation or conversion	170	280	0	8	0.000	2.253
015	Brushing, scrubbing, and general cleaning	135	229	0	6	0.000	2.066
062	Refrigeration	423	515	0	13	0.000	1.991
340	Communications: electrical	381	598	0	15	0.000	1.978
327	Miscellaneous active electrical nonlinear devices	302	627	0	15	0.000	1.887
501	Compositions: ceramic	142	215	0	5	0.000	1.834
326	Electronic digital logic circuitry	115	333	0	7	0.000	1.658
400	Typewriting machines	212	206	0	4	0.000	1.531
528	Synthetic resins or natural rubbers—part of the class 520 series	411	531	1	10	8.178	1.485
355	Photocopying	422	753	0	14	0.000	1.466
084	Music	101	220	0	4	0.000	1.434
548	Organic compounds—part of the class 532-570 series	212	281	0	5	0.000	1.403
359	Optics: systems (including communication) and element	549	1,083	0	19	0.000	1.383
280	Land vehicles	285	581	0	9	0.000	1.222
380	Cryptography	47	204	0	3	0.000	1.160
347	Incremental printing of symbolic information	320	486	0	7	0.000	1.136
523	Synthetic resins or natural rubbers—part of the class 520 series	277	210	0	3	0.000	1.127
148	Metal treatment	225	352	0	5	0.000	1.120
345	Selective visual display systems	159	356	0	5	0.000	1.108
375	Pulse or digital communications	177	573	0	8	0.000	1.101
427	Coating processes	555	691	0	9	0.000	1.027
156	Adhesive bonding and miscellaneous chemical manufacture	546	779	0	10	0.000	1.012
524	Synthetic resins or natural rubbers—part of the class 520 series	664	725	0	9	0.000	0.979
372	Coherent light generators	127	364	0	4	0.000	0.867
361	Electricity: electrical systems and devices	463	763	0	8	0.000	0.827
333	Wave transmission lines and networks	167	213	0	2	0.000	0.740
134	Cleaning and liquid contact with solids	84	224	0	2	0.000	0.704
546	Organic compounds—part of the class 532-570 series	209	232	0	2	0.000	0.680
549	Organic compounds—part of the class 532-570 series	214	235	0	2	0.000	0.671
354	Photography	355	471	0	4	0.000	0.670
364	Electrical computers and data processing systems	695	1,529	0	13	0.000	0.670
239	Fluid sprinkling, spraying, and diffusing	230	240	0	2	0.000	0.657
330	Amplifiers	247	241	0	2	0.000	0.654
525	Synthetic resins or natural rubbers—part of the class 520 series	551	726	0	6	0.000	0.652
271	Sheet feeding or delivering	174	247	0	2	0.000	0.639
422	Chemical apparatus and process disinfecting, deodorizing, preserving, or sterilizing	211	526	0	4	0.000	0.600
356	Optics: measuring and testing	340	669	0	5	0.000	0.589
455	Telecommunications	158	403	0	3	0.000	0.587

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-7.

Appendix table 6-18.
Patents granted in selected countries, by inventor residence: 1985-95

Granting country	Total patents	Patents to non-residents as percentage of total	Percentage of patents granted to residents of: United States	Japan	Germany	France	United Kingdom	Italy	Sweden	India	Former Soviet Union	Other
1985												
Japan	50,100	15.5	46.4	0.0	19.6	6.4	5.4	1.5	2.3	0.0	1.4	17.0
Germany	33,377	60.4	29.2	23.9	0.0	12.4	6.7	2.8	2.8	0.0	1.7	20.5
France	37,530	73.8	27.4	15.8	25.9	0.0	5.9	4.1	2.4	0.0	1.3	17.0
United Kingdom	34,480	82.3	28.6	20.8	20.9	8.4	0.0	2.9	2.2	0.0	0.6	15.6
Italy	47,924	79.0	6.1	2.3	8.0	4.2	2.0	0.0	0.4	0.0	0.0	77.0
Canada	18,697	92.8	54.8	11.7	8.8	5.6	5.3	1.5	1.8	0.0	0.4	10.0
Mexico	1,374	93.4	56.3	6.6	7.6	7.0	4.0	2.6	1.5	0.0	0.5	14.0
Brazil	3,934	84.6	37.0	7.3	20.7	9.9	4.0	4.6	2.8	0.0	0.4	13.3
South Korea	2,268	84.6	30.4	42.3	6.2	5.4	3.5	1.8	1.4	0.0	0.0	9.1
Soviet Union	74,745	2.0	13.7	8.4	16.9	8.2	3.1	3.9	2.7	0.0	0.0	42.9
India	1,814	76.2	33.5	6.4	11.2	8.1	10.1	3.4	1.3	0.0	3.0	23.0
1990												
Japan	59,401	15.2	45.5	0.0	21.3	7.7	5.1	2.4	2.4	0.0	1.1	14.4
Germany	42,860	61.2	27.8	28.4	0.0	10.8	6.5	3.7	2.7	0.0	0.7	19.3
France	35,149	74.6	24.9	18.2	26.9	0.0	6.0	4.2	2.2	0.0	0.6	17.0
United Kingdom	32,179	86.4	25.6	20.8	22.8	9.1	0.0	3.2	2.0	0.0	0.4	15.9
Italy	17,794	98.7	23.7	9.4	28.5	12.4	6.8	0.0	2.4	0.0	0.1	16.7
Canada	14,187	92.2	52.2	13.7	8.3	6.0	5.4	2.0	1.8	0.0	0.3	10.3
Mexico	1,752	92.0	63.4	5.4	7.3	5.1	3.2	2.4	0.8	0.1	0.2	12.2
Brazil	3,355	86.5	41.4	6.6	16.1	9.4	7.4	4.4	2.3	0.0	0.7	11.8
South Korea	7,762	67.1	23.0	66.7	2.5	1.8	0.8	1.1	0.3	0.0	0.0	3.8
Soviet Union	84,658	1.4	12.0	8.1	18.8	7.8	3.6	6.7	3.8	0.0	0.0	39.2
India	1,611	81.0	35.3	9.3	14.6	6.2	7.8	3.1	1.2	0.0	3.4	19.1
1994												
Japan	82,400	11.7	50.1	0.0	18.9	6.5	4.1	2.5	1.8	0.0	0.0	16.3
Germany	57,803	64.1	28.2	32.5	0.0	9.8	5.9	4.0	2.0	0.0	0.0	17.4
France	54,964	75.3	25.0	23.5	25.5	0.0	5.3	3.9	1.6	0.0	0.0	15.2
United Kingdom	48,772	89.3	24.9	25.7	22.0	8.0	0.0	3.3	1.5	0.0	0.0	14.5
Italy	37,096	85.5	24.8	13.4	27.6	10.2	5.9	0.0	1.9	0.0	0.1	16.1
Canada	11,641	92.7	51.3	18.8	7.6	5.6	4.6	1.5	1.0	0.0	0.0	9.5
Mexico	4,367	93.4	58.0	4.3	9.7	5.1	4.3	2.4	1.1	0.0	0.0	14.9
Brazil	2,469	83.0	41.3	6.6	12.5	6.9	4.9	6.4	2.7	0.0	0.0	18.7
South Korea	11,683	50.6	22.9	62.6	3.9	2.5	1.1	0.8	0.5	0.0	0.0	5.8
Russian Federation	20,581	22.0	4.0	2.1	4.7	1.1	0.8	1.5	0.6	0.0	0.0	85.2
India	1,735	74.2	42.9	6.1	12.4	7.1	6.6	2.6	1.6	0.0	0.2	20.4

Appendix table 6-18.
Patents granted in selected countries, by inventor residence: 1985-95

Granting country	Total patents	Patents to non-residents as percentage of total	Percentage of patents granted to residents of: United States	Japan	Germany	France	United Kingdom	Italy	Sweden	India	Former Soviet Union	Other
1995												
Japan	109,100	13.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Germany	56,633	65.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
France	55,681	72.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
United Kingdom	48,350	89.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Italy	29,898	97.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canada	9,139	91.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mexico	3,538	95.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Brazil	2,659	80.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
South Korea	12,512	47.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Russian Federation	25,633	18.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
India	1,613	74.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = not available

NOTE: German data are for the former West Germany only.

SOURCE: World Intellectual Property Organization, "Industrial Property Statistics" (Geneva: 1985-95).

See figures 6-18 and 6-19.

Appendix table 6-19.
Venture capital under management in the United States and disbursements: 1969-95
(Millions of U.S. dollars)

	New capital committed	Total venture capital under management	Disbursements
1969	121	NA	100
1970	78	NA	83
1971	91	NA	134
1972	30	NA	128
1973	33	NA	201
1974	25	NA	100
1975	20	NA	92
1976	28	NA	107
1977	15	NA	159
1978	216	NA	288
1979	170	NA	457
1980	661	NA	608
1981	867	NA	1,155
1982	1,400	NA	1,454
1983	3,400	6,208	2,581
1984	3,200	9,497	2,771
1985	2,300	11,614	2,681
1986	3,300	14,693	3,242
1987	4,200	17,799	3,977
1988	2,947	20,217	3,847
1989	2,399	23,154	3,395
1990	1,847	24,139	1,922
1991	1,271	24,758	1,348
1992	2,548	25,868	2,540
1993	2,545	28,925	3,071
1994	3,765	32,670	2,741
1995	4,227	37,154	3,859

NA = not available

SOURCE: Venture Economics, *1996 Venture Capital Annual Review* (Boston: 1996).

See figure 6-23. *Science & Engineering Indicators – 1998*

Appendix table 6-20.
Capital commitments by limited partners to institutionally funded independent private venture capital funds: 1978-95
(Millions of U.S. dollars)

	Total	Corporations	Endowments & foundations	Foreign investors	Individuals & families	Insurance companies	Pension funds
1978	216	22	19	38	70	35	32
1979	170	28	17	26	39	7	53
1980	661	127	92	55	102	88	197
1981	867	142	102	90	201	132	200
1982	1,423	175	96	188	290	200	474
1983	3,408	415	267	531	715	410	1,070
1984	3,185	463	178	573	467	419	1,085
1985	2,327	274	181	548	303	254	767
1986	3,332	350	209	361	392	348	1,672
1987	4,184	460	418	544	502	628	1,632
1988	2,947	324	341	401	249	277	1,355
1989	2,399	483	296	299	146	303	872
1990	1,847	125	232	138	211	171	970
1991	1,271	55	306	149	156	69	536
1992	2,548	84	471	283	280	370	1,060
1993	2,545	206	271	109	187	268	1,504
1994	3,765	341	805	91	444	357	1,727
1995	4,227	87	959	NA	741	784	1,656

SOURCE: Venture Economics, *1996 Venture Capital Annual Review* (Boston: 1996).

Appendix table 6-21.
U.S. venture capital disbursements, by industry category: 1986-95

Industry category	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
					Millions of U.S. dollars disbursed					
Commercial communications	145	171	105	146	80	20	53	134	46	191
Telephone and data communications	346	306	369	342	268	169	366	384	294	399
Computer hardware and systems	550	523	422	354	259	168	138	98	171	183
Software and services	353	417	338	379	362	337	562	630	378	760
Other electronics	386	361	319	300	147	129	140	86	167	141
Biotechnology	183	265	322	245	181	112	261	283	303	205
Medical/health care related	335	481	451	522	380	152	442	437	473	547
Energy related	23	53	15	18	22	3	30	7	2	3
Industrial automation	73	55	31	28	16	3	7	30	16	26
Industrial products and machinery	118	183	198	192	77	47	77	54	56	125
Consumer related	285	642	425	392	225	135	196	314	173	405
Other products and services	445	520	852	477	284	83	271	613	663	874
Total	3,242	3,977	3,847	3,395	2,301	1,358	2,543	3,071	2,741	3,859
					Percentage of total venture capital disbursements					
Commercial communications	4	4	3	4	3	2	2	4	2	5
Telephone and data communications	10	8	9	10	12	12	14	13	11	10
Computer hardware and systems	17	13	11	10	11	12	5	3	6	5
Software and services	11	11	9	11	16	25	22	21	14	20
Other electronics	12	9	8	9	6	9	6	3	6	4
Biotechnology	6	7	8	7	8	8	10	9	11	5
Medical/health care related	10	12	12	15	17	11	17	14	17	14
Energy related	1	1	1	1	1	1	1	<1	<1	<1
Industrial automation	2	1	1	1	1	1	1	1	<1	<1
Industrial products and machinery	4	5	5	6	3	3	3	2	2	3
Consumer related	9	16	11	12	10	10	8	10	6	11
Other products and services	14	13	22	14	12	6	11	20	24	23
Total	100	100	100	100	100	100	100	100	100	100

NOTE: Details may not sum to totals because of rounding.

SOURCE: Venture Economics, *1996 Venture Capital Annual Review* (Boston: 1996).

See figure 6-24.

Appendix table 6-22.
U.S. venture capital disbursements, by stage: 1986-95

Stage	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Millions of U.S. dollars disbursed										
Seed	101	87	114	138	72	56	74	213	116	232
Startup	526	452	349	288	170	76	209	217	408	663
Other early stage	509	603	585	537	391	295	336	319	481	580
Expansion	1,416	1,773	1,510	1,596	1,194	734	1,400	1,668	1,232	1,614
Leveraged buyout/acquisition	601	804	1,127	710	414	46	176	172	166	338
Other	89	258	162	126	60	151	347	481	339	432
Total disbursements	3,242	3,977	3,847	3,395	2,301	1,358	2,542	3,070	2,741	3,859
Percentage of total venture capital disbursements										
Seed	3	2	3	4	3	4	3	7	4	6
Startup	16	11	9	8	7	6	8	7	15	17
Other early stage	16	15	15	16	17	22	13	10	18	15
Expansion	44	45	40	47	52	54	55	54	45	42
Leveraged buyout/acquisition	18	20	29	21	18	3	7	6	0	9
Other	3	7	4	4	3	11	14	16	12	11
Total	100	100	100	100	100	100	100	100	100	100

NOTE: Details may not sum to totals because of rounding.

SOURCE: Venture Economics, *1996 Venture Capital Annual Review* (Boston: 1996).

See figure 6-25.

Appendix table 6-23.
Leading indicators of technological competitiveness: 1996
(Index)

Region/country	National orientation	Socioeconomic infrastructure	Technological infrastructure	Productive capacity
Singapore	88.4	75.7	41.6	54.0
South Korea	78.9	64.6	44.4	50.6
Taiwan	90.2	75.8	42.9	49.9
China	65.3	44.8	39.3	32.8
India	57.4	46.0	39.3	49.1
Indonesia	54.8	35.2	17.8	19.6
Malaysia	81.0	62.5	31.9	43.1
Philippines	73.6	66.2	35.3	48.1
Thailand	63.5	48.7	28.2	33.1
Hungary	67.0	47.7	36.4	39.8
Poland	69.7	57.4	38.1	39.8
Russia	48.9	50.7	55.6	42.6
Argentina	41.5	49.4	27.4	31.0
Brazil	60.0	53.1	37.4	40.3
Mexico	54.8	45.5	30.2	31.7
Venezuela	56.6	55.2	38.4	40.7
South Africa	49.2	51.0	40.3	30.0

NOTES: For score and indicator calculations, raw data were transformed into scales of 0-100 for each indicator component and then averaged to generate comparable indicators with a 0-100 range. For survey items, 100 represents the highest response category for each question; for statistical data, 100 typically represents the value attained by the country with the largest value among the 30 countries included in the study. In the indicator formulations cited below, each term carries equal weight.

National orientation (NO)—evidence that a nation is taking directed action to achieve technological competitiveness. These actions could take place in the business, government, or cultural sector, or any combination of the three.
Indicator formulation: NO = Q1 + (Q2 + Q3)/2 + Q4 + F1V96
Data used: Published data from Frost and Sullivan's "Political Risk Letter" for 1996 rating each country's investment risk (F1V96); and survey data assessing each country's national strategy to promote high-tech development (Q1), social influences favoring technological change (Q2 and Q3), and entrepreneurial spirit (Q4).

Socioeconomic infrastructure (SE)—assesses the social and economic institutions that support and maintain the physical, human, organizational, and economic resources essential to the functioning of a modern, technology-based industrial nation.
Indicator formulation: SE = Q5 + Q10 + HMHS93
Data used: Published data on the percentage of students enrolled in secondary and tertiary education (HMHS93) from the Harbison-Myers Skills Index for 1993; and survey data assessing each country's efforts to attract foreign investment (Q10) and the mobility of capital (Q5).

Technological infrastructure (TI)—assesses the institutions and resources that contribute to a nation's capacity to develop, produce, and market new technology.
Indicator formulation: TI = (Q7 + Q8)/2 + Q9 + Q11 + EDP96 + S&E
Data used: Published data from UN Statistical Yearbook on the number of scientists and engineers involved in research (S&E), national purchases of electronic data processing equipment (EDP96) from *Elsevier Yearbook of World Electronics Data* (1996); and survey data assessing linkages of R&D to industry (Q9), output of indigenous academic science and engineering (Q7and Q8), and ability to make effective use of technological knowledge (Q11).

Productive capacity (PC)—assesses the phsical and human resources devoted to manufacturing products and the efficiency with which those resources are employed.
Indicator formulation: PC = Q6 + Q12 + Q13 + A2696
Data used: Published data on electronics production (A2696) from *Elsevier Yearbook of World Electronics Data* (1996); and survey data assessing the supply and quality of skilled labor (Q6), capability of the indigenous management (Q13), and the existence of indigenous suppliers of components for technology-intensive products (Q12).

SOURCE: J. David Roessner, Alan L. Porter, Nils Newman, and Honguang Xu, *1996 Indicators of Technology-Based Competitiveness of Nations, Summary Report,* report to the National Science Foundation under Purchase Order No. D22588X-00-0 (Atlanta: Georgia Institute of Technology, 1997).

See figure 6-27.

Appendix table 7-1.
Indices of issue interest: 1979-97
(Mean index scores)

Issue	1979	1981	1983	1985	1988	1990	1992	1995	1997
Foreign policy	49	59	54	59	58	68	62	48	47
New scientific discoveries	61	60	68	66	66	63	61	67	70
New technologies	59	58	65	64	64	64	64	66	69
Space exploration	–	47	50	52	56	50	47	50	55
Energy/nuclear power[a]	67	70	62	61	61	64	57	54	54
Medical discoveries	–	–	–	83	85	83	82	83	83
Environmental issues	–	–	–	–	–	80	77	74	72
Economic policy	59	71	74	69	69	70	74	68	68
Sample size	1,635	3,195	1,631	2,005	2,041	2,033	2,001	2,006	2,000

– = not asked

NOTES: Each index is a summary measure of respondent reports that they are “very interested,” “moderately interested,” or “not at all interested” in each specific issue. Responses are to the statement: “There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read to you a short list of issues, and for each one—as I read it—I would like you to tell me if you are very interested, moderately interested, or not at all interested.” The original responses were converted to a 0-100 index by assigning a value of 100 for a “very interested” response and a value of 50 for a “moderately interested” response.

[a]In 1990, 1992, 1995, and 1997 the question was worded “…issues about the use of nuclear energy to generate electricity.” From 1979 to 1985, the question was worded “…issues about energy policy.” In 1988, the question was worded “…issues about the use of nuclear power to generate electricity.”

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-1.

Appendix table 7-2.
Public interest in selected issues: 1979-97
(Percentages)

Issue	1979			1981			1983			1985			1988			1990			1992			1995			1997		
	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI
Foreign policy	22	53	24	35	47	18	30	47	22	33	51	16	33	50	16	48	40	12	38	47	15	21	53	26	22	50	28
New scientific discoveries	36	49	14	37	45	17	48	40	11	44	44	12	43	46	12	39	48	12	36	49	15	44	45	11	49	42	8
New technologies	33	51	15	33	50	16	42	45	12	39	49	12	40	48	12	39	49	12	37	53	10	43	46	27	47	43	10
Space exploration	–	–	–	25	44	31	27	45	28	29	46	25	34	44	22	26	48	26	22	50	28	25	49	26	32	45	22
Energy/nuclear power[a]	46	42	11	50	40	10	39	46	14	36	50	13	38	46	16	42	44	14	32	49	18	29	49	21	29	49	21
Medical discoveries	–	–	–	–	–	–	–	–	–	68	29	3	72	25	3	68	29	3	66	31	3	69	27	4	70	26	4
Environmental issues	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	64	31	5	59	36	5	53	41	6	52	40	8
Economic policy	35	48	17	52	37	10	57	33	10	48	41	11	48	42	10	50	40	10	56	36	8	47	42	11	47	42	11
Sample size	1,635			3,195			1,631			2,005			2,041			2,033			2,001			2,006			2,000		

VI = very interested; MI = moderately interested; NI = not at all interested; – = not asked

NOTES: Responses are to the statement: “There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read to you a short list of issues, and for each one—as I read it—I would like you to tell me if you are very interested, moderately interested, or not at all interested.” “Don't know” responses are not included. Percentages may not total 100 because of rounding.

[a]In 1990, 1992, 1995, and 1997 the question was worded “…issues about the use of nuclear energy to generate electricity.” From 1979 to 1985, the question was worded “…issues about energy policy.” In 1988, the question was worded “…issues about the use of nuclear power to generate electricity.”

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

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Appendix table 7-3.
Mean score on indices of interest in scientific and technological issues, by sex and level of education: 1997
(Mean index scores)

Sex and level of education	New scientific discoveries	New technologies	Medical discoveries	Space exploration	Nuclear energy	Environmental issues	Sample size
All adults	70	69	83	55	54	72	2,000
Sex							
Male	71	73	81	63	55	70	930
Female	70	65	86	49	54	75	1,070
Formal education							
Less than high school	61	56	79	42	54	70	420
High school graduate	70	70	85	56	53	73	1,188
Baccalaureate degree	78	75	86	66	58	74	257
Graduate/professional degree	84	80	87	67	62	79	135
Science/mathematics education[a]							
Low	64	62	83	48	51	71	1,112
Middle	75	73	85	58	57	74	509
High	84	81	85	72	61	74	379

NOTES: Each index is a summary measure of respondent reports that they are "very interested," "moderately interested," or "not at all interested" in each specific issue. A value of 100 was assigned to a "very interested" response, and a value of 50 was assigned to a "moderately interested" response.

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-2.

Appendix table 7-4.
Indices of issue informedness: 1979-97
(Mean index scores)

Issue	1979	1981	1983	1985	1988	1990	1992	1995	1997
Foreign policy	35	44	40	42	42	51	46	36	36
New scientific discoveries	36	38	40	43	42	42	39	42	49
New technologies	35	35	42	39	38	38	38	40	44
Space exploration	–	37	39	42	39	37	33	33	41
Energy/nuclear power[a]	47	51	47	44	37	37	32	29	31
Medical discoveries	–	–	–	53	52	53	51	52	56
Environmental issues	–	–	–	–	–	60	57	52	51
Economic policy	42	55	54	48	50	53	56	52	51
Sample size	1,635	3,195	1,631	2,005	2,041	2,033	2,001	2,006	2,000

– = not asked

NOTES: Each index is a summary measure of respondent reports that they are "very well-informed," "moderately well-informed," or "poorly informed" about each specific issue. Responses are to the statement: "Now I'd like to go through this list with you again, and for each issue I'd like you to tell me if you are very well-informed, moderately well-informed, or poorly informed." The original responses were converted to a 0-100 index by assigning a value of 100 for a "very well-informed" response and a value of 50 for a "moderately well-informed" response.

[a]In 1990, 1992, 1995, and 1997 the question was worded "…issues about the use of nuclear energy to generate electricity." From 1979 to 1985, the question was worded "…issues about energy policy." In 1988, the question was worded "…issues about the use of nuclear power to generate electricity."

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-3.

Appendix table 7-5.
Public informedness on selected issues: 1979-97
(Percentages)

Issue	1979			1981			1983			1985			1988			1990			1992			1995			1997		
	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI
Foreign policy	8	54	37	17	54	28	14	51	35	15	53	32	14	55	31	22	57	22	19	54	26	10	52	37	10	52	38
New scientific discoveries	10	52	37	13	49	38	13	53	34	13	59	27	14	55	31	14	55	31	12	54	34	13	58	29	19	58	23
New technologies	10	50	39	11	48	40	14	55	32	12	54	34	12	51	36	11	53	35	10	56	33	12	55	33	16	56	28
Space exploration	–	–	–	14	46	40	13	52	34	16	52	32	13	52	34	11	51	38	9	48	44	9	48	43	16	50	34
Energy/nuclear power[a]	18	58	23	23	56	21	19	56	24	16	55	29	13	47	39	12	50	38	10	43	46	9	40	51	10	41	49
Medical discoveries	–	–	–	–	–	–	–	–	–	24	57	18	22	59	19	24	57	20	22	58	21	23	57	20	28	56	16
Environmental issues	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	32	55	13	29	56	15	24	56	20	23	55	21
Economic policy	14	55	31	29	51	20	28	52	20	22	51	26	22	55	22	25	55	20	29	54	17	25	53	22	25	51	24
Sample size	1,635			3,195			1,631			2,005			2,041			2,033			2,001			2,006			2,000	

VI = very well-informed; MI = moderately well-informed; NI = poorly informed; – = not asked

NOTES: Responses are to the statement: “Now I'd like to go through this list with you again, and for each issue I'd like you to tell me if you are very well-informed, moderately well-informed, or poorly informed.” “Don't know” responses are not included. Percentages may not total 100 because of rounding.

[a]In 1990, 1992, 1995, and 1997 the question was worded “…issues about the use of nuclear energy to generate electricity.” From 1979 to 1985, the question was worded “…issues about energy policy.” In 1988, the question was worded “…issues about the use of nuclear power to generate electricity.”

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

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Appendix table 7-6.
Mean score on indices of informedness on scientific and technological issues, by sex and level of education: 1997
(Mean index scores)

Sex and level of education	New scientific discoveries	New technologies	Medical discoveries	Space exploration	Nuclear energy	Environmental issues	Sample size
All adults	49	44	56	41	31	51	2,000
Sex							
Male	51	47	52	49	33	52	930
Female	47	41	60	34	28	50	1,070
Formal education							
Less than high school	45	42	58	36	38	54	420
High school graduate	47	43	55	41	28	49	1,188
Baccalaureate degree	55	49	57	46	29	52	257
Graduate/professional degree	60	54	61	50	34	58	135
Science/mathematics education[a]							
Low	44	41	56	37	30	50	1,112
Middle	48	45	54	43	30	53	509
High	63	54	61	53	32	53	379

NOTES: Each index is a summary measure of respondent reports that they are "very well-informed," "moderately well-informed," or "poorly informed" about each specific issue. A value of 100 was assigned to a "very well-informed" response, and a value of 50 was assigned to a "moderately well-informed" response.

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-2.

Appendix table 7-7.
Public attentiveness to selected issues: 1979-97
(Percentages)

Issue	1979	1981	1983	1985	1988	1990	1992	1995	1997
Foreign policy									
Attentive public	6	6	8	8	8	14	11	5	5
Interested public	16	29	23	25	25	34	27	16	18
Residual public	78	65	70	67	67	52	62	79	77
New scientific discoveries									
Attentive public	7	9	9	8	8	8	7	7	11
Interested public	29	28	40	36	34	31	29	37	38
Residual public	64	63	52	56	57	61	64	56	51
New inventions & technologies									
Attentive public	6	8	8	8	7	7	6	6	9
Interested public	27	26	34	31	33	32	30	37	38
Residual public	67	67	58	61	60	61	63	57	53
Science and technology policy[a]									
Attentive public	9	12	13	12	11	11	10	10	14
Interested public	37	35	48	44	42	40	40	47	46
Residual public	54	54	39	45	46	49	50	43	40
Space exploration									
Attentive public	–	7	7	9	8	6	5	5	8
Interested public	–	18	20	20	26	20	17	20	24
Residual public	–	75	73	71	66	74	78	75	68
Energy/nuclear power[b]									
Attentive public	–	–	15	9	8	8	6	4	4
Interested public	–	–	25	28	30	34	26	25	25
Residual public	–	–	61	63	62	58	68	71	71
Medical discoveries									
Attentive public	–	–	–	17	16	16	17	15	19
Interested public	–	–	–	51	56	52	49	53	52
Residual public	–	–	–	32	28	32	34	31	29
Environmental issues									
Attentive public	–	–	–	–	–	20	18	13	12
Interested public	–	–	–	–	–	43	41	40	40
Residual public	–	–	–	–	–	36	41	48	48
Economic policy									
Attentive public	9	12	19	16	15	17	19	15	14
Interested public	26	40	38	32	33	34	38	32	32
Residual public	65	48	43	52	52	50	44	53	54
Sample size	1,635	3,195	1,631	2,005	2,041	2,033	2,001	2,006	2,000

– = not asked

NOTES: Responses are to the statements: “There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read to you a short list of issues, and for each one—as I read it—I would like you to tell me if you are very interested, moderately interested, or not at all interested”; “Now I'd like to go through this list with you again, and for each issue I'd like you to tell me if you are very well-informed, moderately well-informed, or poorly informed”; and “Now let me change the topic slightly and ask you how you get information. First, how often do you read a newspaper: every day, a few times a week, once a week, or less than once a week? Are there any magazines that you read regularly, that is, most of the time? What magazine would that be? Is there another magazine that you read regularly? What magazine would that be?” Percentages may not total 100 because of rounding.

To be classified as attentive to a given issue area, respondents must indicate that they are “very interested” in that area, that they are “very well-informed” about it, and that they regularly read a daily newspaper or relevant national magazine. Citizens who report that they are “very interested” in an issue area, but who do not think that they are “very well-informed” about it, are classified as the “interested public.” All other individuals are classified as members of the “residual public” for that issue area.

[a]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[b]In 1990, 1992, 1995, and 1997 the question was worded “…issues about the use of nuclear energy to generate electricity.” From 1979 to 1985, the question was worded “…issues about energy policy.” In 1988, the question was worded “…issues about the use of nuclear power to generate electricity.”

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-4.

Appendix table 7-8.
Public attentiveness to scientific and technological issues, by sex and level of education: 1997
(Percentages)

Sex and level of education	New scientific discoveries		New technologies		Science and technology policy[a]		Medical discoveries		Space exploration		Nuclear energy		Environmental issues		Sample size
	AP	IP	AP	IP	AP	IP	AP	IP	AP	IP	AP	IP	AP	IP	
All adults	11	38	9	38	14	46	19	52	8	24	4	25	12	40	2,000
Sex															
Male	12	39	11	43	16	49	15	51	14	28	5	24	14	35	930
Female	9	38	7	34	13	43	23	53	4	20	3	26	11	45	1,070
Formal education															
Less than high school	9	32	9	25	15	34	21	43	6	18	6	27	10	41	420
High school graduate	9	39	8	40	12	49	16	56	8	24	3	24	11	41	1,188
Baccalaureate degree	15	43	10	46	18	51	24	48	13	30	5	26	16	37	257
Graduate/professional degree	23	47	22	41	30	49	24	51	16	25	8	29	22	40	135
Science/mathematics education[b]															
Low	7	34	6	33	10	42	18	51	6	19	3	24	11	41	1,112
Middle	9	43	9	41	14	50	16	57	7	27	6	25	12	41	509
High	22	47	17	47	28	50	25	48	17	34	6	27	17	37	379

AP = attentive public; IP = interested public

NOTES: Responses are to the statements: "There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read to you a short list of issues, and for each one—as I read it—I would like you to tell me if you are very interested, moderately interested, or not at all interested"; "Now I'd like to go through this list with you again, and for each issue I'd like you to tell me if you are very well-informed, moderately well-informed, or poorly informed"; and "Now let me change the topic slightly and ask you how you get information. First, how often do you read a newspaper: every day, a few times a week, once a week, or less than once a week? Are there any magazines that you read regularly, that is, most of the time? What magazine would that be? Is there another magazine that you read regularly? What magazine would that be?"

To be classified as attentive to a given issue area, respondents must indicate that they are "very interested" in that area, that they are "very well-informed" about it, and that they regularly read a daily newspaper or relevant national magazine. Citizens who report that they are "very interested" in an issue area, but who do not think that they are "very well-informed" about it, are classified as the "interested public." All other individuals are classified as members of the "residual public" for that issue area.

[a]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[b]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-5.

Appendix table 7-9.
U.S. public understanding of scientific vocabulary and concepts, by selected characteristics: 1997
(Percentages)

Characteristic	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Sample size
All adults	82	71	84	62	39	44	43	32	78	44	93	51	59	75	73	48	22	11	13	11	2,000
Sex																					
Male	89	80	88	54	56	53	36	39	86	50	94	53	67	88	82	58	26	17	16	16	930
Female	76	64	81	69	24	36	49	26	71	38	92	49	53	64	64	40	18	7	11	6	1,070
Formal education																					
Less than high school	75	55	77	41	25	25	20	25	67	38	91	37	44	61	51	29	8	1	5	1	420
High school graduate	82	71	86	66	35	42	43	30	78	40	93	52	61	76	75	49	18	9	12	9	1,188
Baccalaureate degree	88	88	89	72	62	66	64	43	86	55	93	60	69	84	86	62	48	28	25	21	257
Graduate/ professional degree	90	92	85	75	68	70	71	49	96	68	96	69	78	90	91	72	49	30	23	33	135
Science/mathematics education[a]																					
Low	76	60	80	57	28	29	33	28	72	38	92	42	54	67	62	35	9	3	9	4	1,112
Middle	86	78	91	64	40	49	47	30	80	41	92	58	61	81	81	56	25	12	12	11	509
High	93	94	87	77	70	79	67	45	92	64	96	68	73	89	93	77	56	36	27	31	379
Attentiveness to science and technology[b]																					
Attentive public	89	86	89	61	56	56	49	45	87	63	94	59	66	78	85	66	36	21	23	23	288
Interested public	85	75	84	66	43	49	47	34	81	46	93	54	64	78	76	51	25	14	14	11	918
Residual public	75	61	82	58	27	33	36	25	71	35	92	45	52	70	64	39	13	5	8	6	794

NOTE: Understanding is determined by correct responses to the following statements:

A = "The center of the earth is very hot." (True); B = "All radioactivity is man-made." (False); C = "The oxygen we breathe comes from plants." (True); D = "It is the father's gene which decides whether the baby is a boy or a girl." (True); E = "Lasers work by focusing soundwaves." (False); F = "Electrons are smaller than atoms." (True); G = "Antibiotics kill viruses as well as bacteria." (False); H = "The universe began with a huge explosion." (True); I = "The continents on which we live have been moving their location for millions of years and will continue to move in the future." (True); J = "Human beings, as we know them today, developed from earlier species of animals." (True); K = "Cigarette smoking causes lung cancer." (True); L = "The earliest humans lived at the same time as the dinosaurs." (False); M = "Radioactive milk can be made safe by boiling it." (False); N = "Which travels faster: light or sound?" (Light); O = "Does the earth go around the sun, or does the sun go around the earth?" (earth around the sun); P = "How long does it take for the earth to go around the sun: one day, one month, or one year?" (One year); Q = "Please tell me, in your own words, what is DNA?"; R = "Please tell me, in your own words, what is a molecule?"; S = "Please tell me, in your own words, what is the Internet?"; T = "Please tell me, in your own words, what is radiation?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-6.

Appendix table 7-10.
Mean score on Index of Scientific Construct Understanding, by selected characteristics: 1997
(Mean index scores)

Characteristic	Mean score
All adults	55
Sex	
Male	62
Female	49
Formal education	
Less than high school	44
High school graduate	54
Baccalaureate degree	68
Graduate/professional degree	72
Science/mathematics education[a]	
Low	47
Middle	58
High	74
Attentiveness to science and technology[b]	
Attentive public	65
Interested public	58
Residual public	48

NOTE: The Index of Scientific Construct Understanding is a composite measure of the public understanding of scientific terms and concepts. In 1997, this measure included responses to the following true/false questions: "All radioactivity is man-made"; "Electrons are smaller than atoms"; "The earliest humans lived at the same time as the dinosaurs"; and "The continents on which we live have been moving their location for millions of years and will continue to move in the future." The following short-answer items were also included: "Which travels faster: light or sound?"; "Does the earth go around the sun, or does the sun go around the earth?"; and "How long does it take for the earth to go around the sun: one day, one month, or one year?" Coded verbatim responses to the following open-ended questions were also included: "Please tell me, in your own words, what is DNA?"; "Please tell me, in your own words, what is a molecule?"; and "Please tell me, in your own words, what is radiation?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

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Appendix table 7-11.
Public understanding of the nature of scientific inquiry, by selected characteristics: 1997
(Percentages)

Characteristic	Percentage
All adults	27
Sex	
Male	29
Female	25
Formal education	
Less than high school	8
High school graduate	27
Baccalaureate degree	46
Graduate/professional degree	54
Science/mathematics education[a]	
Low	16
Middle	30
High	55
Attentiveness to science and technology[b]	
Attentive public	35
Interested public	31
Residual public	20

NOTE: Responses are to the following questions: "Now, think about this situation. A doctor tells a couple that their *genetic makeup* means that they've got *one in four chances* of having a child with an inherited illness. Does this mean that if their first three children are healthy, the fourth will have the illness? Does this mean that if their first child has the illness, the next three will not? Does this mean that each of the couple's children will have the same risk of suffering from the illness? Does this mean that if they have only three children, none will have the illness?" "Now, let me turn to a slightly different type of question. When you read news stories, you see certain sets of words and terms. We are interested in how many people recognize certain kinds of terms, and I would like to ask you a few brief questions in that regard. First, some articles refer to the results of a scientific study. When you read or hear the term 'scientific study,' do you have a clear understanding of what it means, a general sense of what it means, or little understanding of what it means? *(if clear understanding or general sense):* In your own words, could you tell me what it means to study something scientifically?" "Now, please think about this situation. Two scientists want to know if a certain drug is effective against high blood pressure. The first scientist wants to give the drug to 1,000 people with high blood pressure and see how many of them experience lower blood pressure. The second scientist wants to give the drug to 500 people with high blood pressure, and not give the drug to another 500 people with high blood pressure, and see how many in both groups experience lower blood pressure levels. Which is the better way to test this drug? Why is it better to test the drug this way?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-9.

Appendix table 7-12.
Mean score on Index of Scientific Construct Understanding in 14 industrialized nations: Most recent year

Country (year)	Mean index score	Sample size
United States (1997)	55	2,000
United States (1995)	55	2,000
United States (1990)	54	2,033
Denmark (1992)	55	1,000
The Netherlands (1992)	54	1,000
Great Britain (1992)	53	1,000
France (1992)	52	1,000
Germany (1992)	51	2,000
Belgium (1992)	49	1,000
Italy (1992)	47	1,000
Canada (1989)	46	2,000
Spain (1992)	45	1,000
Ireland (1992)	42	1,000
Greece (1992)	37	1,000
Japan (1991)	36	1,457
Portugal (1992)	33	1,000

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); J.D. Miller, "Public Understanding of Science and Technology in OECD Countries: A Comparative Analysis," paper presented to the 1996 OECD Symposium on Public Understanding of Science and Technology, Tokyo; and J.D. Miller, R. Pardo, and F. Niwa, *Public Attitudes Toward Science and Technology: A Comparative Study of the European Union, the United States, Japan, and Canada* (Madrid: BBV Foundation, 1997).

See figure 7-10. *Science & Engineering Indicators – 1998*

Appendix table 7-13.
General attitudes toward science and technology, by selected characteristics: 1992, 1995, and 1997
(Mean index scores)

Characteristic	1992			1995			1997		
	P[a]	R[b]	P/R	P[a]	R[b]	P/R	P[a]	R[b]	P/R
All adults	67	38	1.76	68	39	1.74	70	37	1.89
Sex									
Male	68	39	1.74	69	38	1.82	71	35	2.03
Female	67	38	1.76	67	40	1.68	69	39	1.77
Formal education									
Less than high school	64	49	1.31	63	51	1.24	69	45	1.53
High school graduate	67	39	1.72	68	39	1.74	69	38	1.82
Baccalaureate degree	70	27	2.59	71	29	2.45	74	28	2.64
Graduate/professional degree	71	24	2.96	73	24	3.04	75	24	3.13
Science/mathematics education[c]									
Low	66	43	1.53	67	44	1.52	69	42	1.64
Middle	67	38	1.76	69	35	1.97	71	34	2.09
High	71	24	2.96	71	28	2.54	75	27	2.78
Attentiveness to science and technology[d]									
Attentive public	71	36	1.97	74	30	2.47	75	30	2.50
Interested public	70	36	1.94	69	38	1.82	73	35	2.09
Residual public	65	41	1.59	65	42	1.55	66	43	1.54

P = Index of Scientific Promise; R = Index of Scientific Reservations; P/R = ratio of scores on the two indices

[a]The Index of Scientific Promise includes responses to the following statements: "Now I would like to read you some statements like those you might find in a newspaper or magazine article. For each statement, please tell me if you generally agree or disagree. If you feel especially strongly about a statement, please tell me that you strongly agree or strongly disagree. First, science and technology are making our lives healthier, easier, and more comfortable—do you strongly agree, agree, disagree, or strongly disagree? Most scientists want to work on things that will make life better for the average person—do you strongly agree, agree, disagree, or strongly disagree? With the application of science and new technology, work will become more interesting—do you strongly agree, agree, disagree, or strongly disagree? Because of science and technology, there will be more opportunities for the next generation—do you strongly agree, agree, disagree, or strongly disagree?"

[b]The Index of Scientific Reservations includes responses to the following statements: "Now I would like to read you some statements like those you might find in a newspaper or magazine article. For each statement, please tell me if you generally agree or disagree. If you feel especially strongly about a statement, please tell me that you strongly agree or strongly disagree. We depend too much on science and not enough on faith—do you strongly agree, agree, disagree, or strongly disagree? It is not important for me to know about science in my daily life—do you strongly agree, agree, disagree, or strongly disagree? Science makes our way of life change too fast—do you strongly agree, agree, disagree, or strongly disagree? Now for a different type of question. People have frequently noted that scientific research has produced both beneficial and harmful consequences. Would you say that, on balance, the benefits of scientific research have outweighed the harmful results, or have the harmful results of scientific research been greater than its benefits? *(if benefits greater):* Would you say that the balance has been strongly in favor of beneficial results, or only slightly? *(if harms greater):* Would you say that the balance has been strongly in favor of harmful results, or only slightly?"

[c]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[d]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 7-14.
Responses to items in the Index of Scientific Promise and the Index of Scientific Reservations: 1997
(Percentages)

Item	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
Index of Scientific Promise					
Science and technology are making our lives healthier, easier, and more comfortable	29	60	2	7	2
Most scientists want to work on things that will make life better for the average person	11	68	4	15	2
With the application of science and new technology, work will become more interesting	9	63	6	21	1
Because of science and technology, there will be more opportunities for the next generation	13	68	4	14	1
Index of Scientific Reservations					
We depend too much on science and not enough on faith	12	35	6	39	8
It is not important for me to know about science in my daily life	2	12	1	58	27
Science makes our way of life change too fast	4	32	2	55	6
	B>>H	**B>H**	**B=H**	**H>B**	**H>>B**
Have the benefits of scientific research outweighed the harmful results or have the harmful results outweighed the benefits?	47	28	13	8	4

B>>H = benefits strongly outweigh the harmful results; B>H = benefits outweigh the harmful results; B=H = benefits equal the harmful results; H>B = harmful results outweigh the benefits; H>>B = harmful results strongly outweigh the benefits

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 7-15.
Responses to and mean scores on the Attitude Toward Organized Science Scale, by selected characteristics: 1983-97

Response and characteristic	1983	1985	1988	1990	1992	1995	1997
			Percentage of the public				
Agree that "science and technology are making our lives healthier easier, and more comfortable"	84	86	87	84	85	86	89
Agree that "the benefits of science are greater than any harmful effects"	57	68	76	72	73	72	75
Disagree that "science makes our way of life change too fast"	50	53	59	60	63	60	61
Disagree that "we depend too much on science and not enough on faith"	43	39	43	44	45	44	48
			Mean ATOSS score				
All adults	2.3	2.5	2.7	2.6	2.7	2.6	2.7
Sex							
Male	2.2	2.4	2.6	2.5	2.7	2.7	2.9
Female	2.5	2.6	2.8	2.8	2.6	2.5	2.6
Formal education							
Less than high school	1.8	1.8	2.2	1.8	2.0	2.0	2.2
High school graduate	2.4	2.6	2.8	2.7	2.7	2.6	2.7
Baccalaureate degree	2.9	3.1	3.2	3.1	3.3	3.3	3.2
Graduate/professional degree	2.9	3.1	3.1	3.2	3.3	3.4	3.4
Science/mathematics education[a]							
Low	NA	NA	NA	2.4	2.5	2.3	2.5
Middle	NA	NA	NA	2.9	2.7	2.9	2.9
High	NA	NA	NA	3.3	3.3	3.2	3.3
Attentiveness to science and technology[b]							
Attentive public	2.6	2.8	3.0	2.8	2.9	3.1	3.0
Interested public	2.4	2.6	2.8	2.7	2.8	2.7	2.9
Residual public	2.1	2.3	2.5	2.5	2.5	2.4	2.4
Sample size	1,631	2,005	2,041	2,033	997	2,006	2,000

ATOSS = Attitude Toward Organized Science Scale; NA = not available

NOTES: Responses are to the following statement: "Now I would like to read you some statements like those you might find in a newspaper or magazine article. For each statement, please tell me if you generally agree or disagree. If you feel especially strongly about a statement, please tell me that you strongly agree or strongly disagree." The scale is a count of agreement with the first two items and disagreement with the second two items.

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated* Codebook (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 7-16.
General attitudes toward science and technology in 14 industrialized nations: Most recent year
(Mean index scores)

Country (year)	Index of Scientific Promise	Index of Scientific Reservation	Ratio of indices
United States (1997)	70	37	1.89
United States (1995)	68	39	1.74
United States (1992)	67	38	1.76
Canada (1989)	72	56	1.29
Italy (1992)	69	54	1.28
Ireland (1992)	69	55	1.26
Great Britain (1992)	68	56	1.21
France (1992)	68	56	1.21
Belgium (1992)	64	54	1.19
Denmark (1992)	72	61	1.18
The Netherlands (1992)	69	59	1.17
Germany (1992)	70	60	1.17
Spain (1992)	71	62	1.15
Portugal (1992)	71	67	1.06
Greece (1992)	75	74	1.01
Japan (1991)	55	56	0.98

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); unpublished tabulations; and J. D. Miller, R. Pardo, and F. Niwa, *Public Attitudes Toward Science and Technology: A Comparative Study of the European Union, the United States, Japan, and Canada* (Madrid: BBV Foundation, 1997).

Appendix table 7-17.
Public assessments of funding of scientific research by the Federal Government, by selected characteristics: 1985-97
(Percentages)

Characteristic	1985	1988	1990	1992	1995	1997
All adults						
Strongly agree	9	16	17	14	19	22
Agree	70	65	62	63	61	57
Don't know	5	4	4	3	3	3
Disagree	16	14	15	18	17	15
Strongly disagree	0	1	2	2	2	3
Male						
Strongly agree	11	20	23	17	19	24
Agree	71	63	60	62	60	54
Don't know	2	2	2	2	2	3
Disagree	15	13	13	17	18	16
Strongly disagree	1	2	2	2	1	3
Female						
Strongly agree	8	11	13	11	15	20
Agree	68	68	65	64	62	59
Don't know	8	6	5	4	5	4
Disagree	16	14	16	19	16	15
Strongly disagree	0	1	1	2	2	2
Less than high school graduate						
Strongly agree	5	6	10	10	8	20
Agree	65	66	59	61	59	50
Don't know	9	7	8	5	7	5
Disagree	21	18	20	21	24	22
Strongly disagree	0	3	3	3	2	3
High school graduate						
Strongly agree	8	17	18	12	16	19
Agree	72	66	65	64	63	60
Don't know	4	3	2	3	3	3
Disagree	15	13	14	19	17	15
Strongly disagree	1	1	1	2	1	3
Baccalaureate degree						
Strongly agree	19	26	27	22	24	31
Agree	68	62	60	64	62	56
Don't know	2	3	2	2	2	2
Disagree	10	8	10	12	11	10
Strongly disagree	1	1	1	0	1	1
Graduate/professional degree						
Strongly agree	20	29	31	26	43	40
Agree	70	61	58	53	46	51
Don't know	2	2	4	5	2	2
Disagree	8	7	6	14	8	5
Strongly disagree	0	1	1	2	1	2
Attentive public for science and technology[a]						
Strongly agree	17	27	35	28	35	46
Agree	76	62	50	61	48	42
Don't know	0	2	4	1	1	1
Disagree	6	8	10	9	14	7
Strongly disagree	1	1	1	1	2	4

NOTE: Responses are to the question: "Even if it brings no immediate benefits, scientific research which advances the frontiers of knowledge is necessary and should be supported by the Federal Government. Do you strongly agree, agree, disagree, or strongly disagree?"

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 7-18.
Public attitudes toward federal support of basic scientific research, by general attitudes on science and technology and selected characteristics: 1997
(Percentages)

Characteristic	Disagree	Unsure	Agree	Sample size	Gamma[a]
INDEX OF SCIENTIFIC PROMISE[b]					
All adults	18	3	79	2,000	–
Low score on Index of Scientific Promise	37	9	54	241	
Moderate score on Index of Scientific Promise	25	4	71	626	0.54
High score on Index of Scientific Promise	10	1	89	1,133	
Less than high school graduate	25	5	70	421	–
Low score	35	18	47	57	
Moderate score	39	4	57	147	0.51
High score	14	1	85	217	
High school graduate	18	4	78	1,188	–
Low score	41	7	52	152	
Moderate score	23	5	72	379	0.54
High score	10	2	88	657	
Baccalaureate degree	10	2	88	393	–
Low score	21	6	73	33	
Moderate score	14	2	84	100	0.42
High score	7	1	92	260	
INDEX OF SCIENTIFIC RESERVATIONS[c]					
All adults	18	3	79	2,000	–
Low score on Index of Scientific Reservations	9	1	90	831	
Moderate score on Index of Scientific Reservations	23	4	73	806	-0.43
High score on Index of Scientific Reservations	27	6	67	363	
Less than high school graduate	25	4	71	421	–
Low score	8	0	92	79	
Moderate score	37	5	58	218	-0.07
High score	16	6	78	122	
High school graduate	18	3	79	1,188	–
Low score	9	2	89	493	
Moderate score	20	4	76	478	-0.47
High score	33	7	60	217	
Baccalaureate degree	10	1	89	393	–
Low score	8	1	91	254	
Moderate score	10	3	87	109	-0.27
High score	21	4	75	24	

[a]The ordinal correlation coefficient gamma is a measure of the bivariate relationship between two ordinal variables. It is equivalent to R^2 for two interval variables. See L.A. Goodman and W.H. Kruskal "Measures of Association for Cross-Classifications," *Journal of the American Statistical Association* Vol. 49 (1954): 732-64; and H.L. Costner, "Criteria for Measures of Association," *American Sociological Review* Vol. 30, No. 3 (1965): 341-53.

[b]The Index of Scientific Promise scores are classified as follows: low = 0-49; moderate = 50-74; and high = 75-100.

[c]The Index of Scientific Reservations scores are classified as follows: low = 0-29; moderate = 30-54; and high = 55+.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-11.

Appendix table 7-19.
Public confidence in the people running various institutions: 1973-96
(Percentages)

Institution	1973	1974	1975	1976	1977	1978	1980	1982	1983	1984	1986	1987	1988	1989	1990	1991	1993	1994	1996
Average[a]	30	33	26	29	31	24	26	26	24	27	25	28	26	25	25	29	22	22	23
Medicine	54	60	50	54	51	46	52	45	51	50	46	52	51	46	46	48	39	41	45
Scientific community	37	45	39	43	41	36	41	38	41	44	39	45	39	40	37	41	37	38	39
U.S. Supreme Court	31	33	31	35	35	28	25	30	27	33	30	36	35	34	35	37	31	30	28
Military	32	40	35	39	36	29	28	31	29	36	31	34	34	32	33	60	42	37	37
Education	37	49	31	37	41	28	30	33	29	28	28	35	29	30	27	30	22	25	23
Major companies	29	31	19	22	27	22	27	23	24	30	24	30	25	24	25	20	21	25	23
Organized religion	35	44	24	30	40	31	35	32	28	31	25	29	20	22	23	25	23	24	25
Exec. branch of Fed. Govt.	29	14	13	13	28	12	12	19	13	18	21	18	16	20	23	26	12	11	10
Banks & financial institutions	–	–	32	39	42	33	32	27	24	31	21	27	27	19	18	12	15	18	25
Congress	23	17	13	14	19	13	9	13	10	12	16	16	15	17	15	18	7	8	8
Press	23	26	24	28	25	20	22	18	13	17	18	18	18	17	15	16	11	8	11
TV	18	23	18	19	17	14	16	14	12	13	15	12	14	14	14	14	12	9	10
Organized labor	15	18	10	12	15	11	15	12	8	8	8	10	10	9	11	11	8	10	11
Sample size	1,504	1,484	1,490	1,499	1,530	1,532	1,468	1,506	1,599	989	1,470	1,466	997	1,035	899	1,017	1,057	2,011	1,925

– = not asked

NOTES: Percentages represent those respondents expressing a “great deal of confidence” when asked the following: “I am going to name some institutions in this country. As far as the people running these institutions are concerned, would you say that you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?” Survey was not conducted in 1979 and 1981, and the question was not asked in 1985.

[a]Average does not include banks and financial institutions.

SOURCE: J.A. Davis and T.W. Smith, G*eneral Social Surveys, Cumulative Codebook* (Chicago: University of Chicago, National Opinion Research Center, annual series).

See figure 7-12.

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Appendix table 7-20.
Public assessments of scientific research, by selected characteristics: 1979-97

Characteristic	1979	1981	1985	1988	1990	1992	1995	1997
				Percentages				
All adults								
Benefits strongly outweigh harmful results	46	42	44	57	47	42	43	47
Benefits slightly outweigh harmful results	24	28	24	25	25	31	29	28
Benefits equal harmful results	19	13	13	5	15	11	16	13
Harmful results slightly outweigh benefits	7	12	13	9	10	12	10	8
Harmful results strongly outweigh benefits	4	5	6	4	3	4	3	4
Male								
Benefits strongly outweigh harmful results	51	48	48	59	54	45	47	52
Benefits slightly outweigh harmful results	23	27	23	25	24	30	28	27
Benefits equal harmful results	16	11	10	5	9	9	13	10
Harmful results slightly outweigh benefits	7	10	13	7	9	11	9	7
Harmful results strongly outweigh benefits	3	5	6	4	4	5	4	
Female								
Benefits strongly outweigh harmful results	42	37	40	55	40	40	39	42
Benefits slightly outweigh harmful results	25	28	26	25	26	31	30	29
Benefits equal harmful results	23	16	14	6	20	13	19	15
Harmful results slightly outweigh benefits	6	14	14	10	11	12	10	10
Harmful results strongly outweigh benefits	4	5	6	4	3	4	3	4
Less than high school graduate								
Benefits strongly outweigh harmful results	26	26	20	37	24	24	18	30
Benefits slightly outweigh harmful results	25	23	21	30	25	33	30	28
Benefits equal harmful results	32	25	26	9	30	17	34	21
Harmful results slightly outweigh benefits	12	18	20	17	17	20	14	18
Harmful results strongly outweigh benefits	5	9	13	7	4	7	3	3
High school graduate								
Benefits strongly outweigh harmful results	50	43	47	59	49	41	44	46
Benefits slightly outweigh harmful results	26	31	26	25	27	32	30	30
Benefits equal harmful results	16	10	10	5	11	10	13	13
Harmful results slightly outweigh benefits	5	12	13	7	10	12	10	6
Harmful results strongly outweigh benefits	3	4	4	4	3	5	3	5
Baccalaureate or higher degree								
Benefits strongly outweigh harmful results	69	64	67	80	72	66	67	67
Benefits slightly outweigh harmful results	18	22	23	16	18	22	23	23
Benefits equal harmful results	8	7	2	1	6	8	6	6
Harmful results slightly outweigh benefits	2	4	6	2	2	3	3	3
Harmful results strongly outweigh benefits	3	2	2	1	2	2	1	1
Attentive public for science and technology								
Benefits strongly outweigh harmful results	67	63	59	62	61	48	64	64
Benefits slightly outweigh harmful results	16	20	17	23	19	27	21	19
Benefits equal harmful results	8	5	7	6	10	12	8	6
Harmful results slightly outweigh benefits	4	8	13	6	6	9	3	8
Harmful results strongly outweigh benefits	5	4	4	3	4	4	4	3
				Sample size				
All adults	1,635	1,536	2,005	975	2,033	997	2,006	2,000
Male	773	724	950	475	964	464	953	930
Female	862	812	1,054	500	1,070	533	1,053	1,070
Less than high school graduate	465	385	507	259	495	215	418	420
High school graduate	932	886	1,147	546	1,202	579	1,196	1,188
Baccalaureate or higher degree	238	264	349	170	336	203	392	392
Attentive public for science and technology[a]	154	381	235	116	229	94	195	288

NOTES: Responses are for the following statements: "People have frequently noted that scientific research has produced both beneficial and harmful consequences. Would you say that, on balance, the benefits of scientific research have outweighed the harmful results, or have the harmful results of scientific research been greater than its benefits? Would you say that the balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of harmful results or only slightly?" Percentages may not total 100 because of rounding.

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-13.

Appendix table 7-21.
Public assessments of nuclear power, by selected characteristics: 1985-97

Characteristic	1985	1988	1990	1992	1995	1997
			Percentages			
All adults						
Benefits strongly outweigh harmful results	28	18	24	17	21	22
Benefits slightly outweigh harmful results	22	24	23	30	22	23
Benefits equal harmful results	6	11	12	11	14	18
Harmful results slightly outweigh benefits	13	17	13	15	21	17
Harmful results strongly outweigh benefits	31	30	28	27	21	20
Male						
Benefits strongly outweigh harmful results	38	23	31	21	29	28
Benefits slightly outweigh harmful results	22	27	24	34	23	26
Benefits equal harmful results	4	7	8	7	8	13
Harmful results slightly outweigh benefits	9	15	11	10	21	13
Harmful results strongly outweigh benefits	27	28	26	28	19	20
Female						
Benefits strongly outweigh harmful results	19	14	17	14	14	17
Benefits slightly outweigh harmful results	22	21	21	27	21	20
Benefits equal harmful results	8	14	16	14	20	22
Harmful results slightly outweigh benefits	16	19	16	18	23	20
Harmful results strongly outweigh benefits	35	32	30	27	22	21
Less than high school graduate						
Benefits strongly outweigh harmful results	28	15	21	10	15	20
Benefits slightly outweigh harmful results	24	25	21	37	16	17
Benefits equal harmful results	8	17	23	11	25	25
Harmful results slightly outweigh benefits	14	19	13	13	28	21
Harmful results strongly outweigh benefits	26	24	22	29	16	17
High school graduate						
Benefits strongly outweigh harmful results	27	18	23	19	21	22
Benefits slightly outweigh harmful results	21	23	23	26	23	23
Benefits equal harmful results	6	9	9	11	13	16
Harmful results slightly outweigh benefits	13	17	14	16	21	16
Harmful results strongly outweigh benefits	33	33	31	28	23	23
Baccalaureate or higher degree						
Benefits strongly outweigh harmful results	29	22	32	19	28	25
Benefits slightly outweigh harmful results	21	25	23	34	26	26
Benefits equal harmful results	3	7	7	10	8	14
Harmful results slightly outweigh benefits	13	14	13	14	18	17
Harmful results strongly outweigh benefits	3	32	25	23	19	18
Attentive public for science and technology[a]						
Benefits strongly outweigh harmful results	35	26	30	24	28	25
Benefits slightly outweigh harmful results	20	24	27	30	24	25
Benefits equal harmful results	1	9	6	10	10	11
Harmful results slightly outweigh benefits	12	16	9	9	22	17
Harmful results strongly outweigh benefits	32	25	28	27	18	22

Appendix table 7-21.
Public assessments of nuclear power, by selected characteristics: 1985-97

Characteristic	1985	1988	1990	1992	1995	1997
			Sample size			
All adults	2,005	2,041	2,033	997	2,006	2,000
Male	950	958	964	464	953	930
Female	1,054	1,084	1,070	533	1,053	1,070
Less than high school graduate	507	530	495	215	418	420
High school graduate	1,143	1,158	1,202	579	1,196	1,188
Baccalaureate or higher degree	349	353	336	203	392	392
Attentive public for science and technology	235	233	229	94	195	288

NOTES: In 1985, 1988, 1990, 1995 and 1997, the question was worded, "In the current debate over the use of nuclear reactors to generate electricity, there is a broad agreement that there are some risks and some benefits associated with nuclear power. In your opinion, have the benefits associated with nuclear power outweighed the harmful results, or have the harmful results associated with nuclear power been greater than its benefits? Would you say that the balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of harmful results or only slightly?" In 1992, the question was worded, "In the current debate over the use of nuclear reactors to generate electricity, there is broad agreement that there are some costs and some benefits associated with nuclear power. In your opinion, are the costs associated with nuclear power greater than the benefits, or are the benefits associated with nuclear power greater than the costs? Would you say that the benefits have substantially exceeded the costs or only slightly exceeded the costs? Would you say that the costs substantially exceeded the benefits or only slightly exceed the benefits?" Percentages may not total 100 because of rounding.

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-14.

Appendix table 7-22.
Public assessments of genetic engineering, by selected characteristics: 1985-97

Characteristic	1985	1990	1995	1997
	Percentages			
All adults				
Benefits strongly outweigh harmful results	23	20	21	19
Benefits slightly outweigh harmful results	26	27	22	23
Benefits equal harmful results	12	16	22	22
Harmful results slightly outweigh benefits	14	19	23	20
Harmful results strongly outweigh benefits	25	18	12	16
Male				
Benefits strongly outweigh harmful results	26	21	24	23
Benefits slightly outweigh harmful results	28	31	22	26
Benefits equal harmful results	11	14	21	20
Harmful results slightly outweigh benefits	13	18	22	17
Harmful results strongly outweigh benefits	22	16	10	14
Female				
Benefits strongly outweigh harmful results	19	19	18	16
Benefits slightly outweigh harmful results	25	23	22	21
Benefits equal harmful results	14	17	22	23
Harmful results slightly outweigh benefits	15	21	23	22
Harmful results strongly outweigh benefits	27	20	15	18
Less than high school graduate				
Benefits strongly outweigh harmful results	19	16	10	15
Benefits slightly outweigh harmful results	29	27	19	18
Benefits equal harmful results	16	25	30	23
Harmful results slightly outweigh benefits	12	17	29	30
Harmful results strongly outweigh benefits	24	15	13	14
High school graduate				
Benefits strongly outweigh harmful results	21	19	20	18
Benefits slightly outweigh harmful results	24	27	21	24
Benefits equal harmful results	13	12	21	21
Harmful results slightly outweigh benefits	15	21	23	18
Harmful results strongly outweigh benefits	27	21	14	19
Baccalaureate or higher degree				
Benefits strongly outweigh harmful results	33	29	35	27
Benefits slightly outweigh harmful results	29	28	30	28
Benefits equal harmful results	7	15	16	21
Harmful results slightly outweigh benefits	13	15	14	14
Harmful results strongly outweigh benefits	18	13	6	10
Attentive public for science and technology[a]				
Benefits strongly outweigh harmful results	37	32	42	36
Benefits slightly outweigh harmful results	28	30	22	24
Benefits equal harmful results	9	9	16	13
Harmful results slightly outweigh benefits	12	12	13	16
Harmful results strongly outweigh benefits	14	17	7	11
Attentive public for medical research				
Benefits strongly outweigh harmful results	29	31	34	27
Benefits slightly outweigh harmful results	24	27	21	25
Benefits equal harmful results	12	12	17	18
Harmful results slightly outweigh benefits	11	17	18	18
Harmful results strongly outweigh benefits	24	13	9	12

Appendix table 7-22.
Public assessments of genetic engineering, by selected characteristics: 1985-97

Characteristic	1985	1990	1995	1997
	Sample size			
All adults	2,005	2,033	2,006	2,000
Male	950	964	953	930
Female	1,054	1,070	1,053	1,070
Less than high school graduate	507	495	418	420
High school graduate	1,143	1,179	1,196	1,188
Baccalaureate or higher degree	349	359	392	392
Attentive public for science and technology	235	229	195	288
Attentive public for medical research	349	337	310	377

NOTES: In 1985, the question was worded, "Some persons have argued that the creation of new life forms through genetic engineering constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your opinion, are the risks of genetic engineering greater than the benefits, or are the benefits of genetic engineering research greater than the risks? Would you say that the benefits are substantially greater than the risks, or only slightly greater than the risks? Would you say that the risks are substantially greater than the benefits or only slightly greater than the benefits?" In 1990, the question was worded, "Some persons have argued that the creation of new life forms through genetic engineering research constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your opinion, are the risks of genetic engineering research greater than its benefits, or are the benefits of genetic engineering research greater than its risks? Would you say that the benefits have substantially exceeded the risks or only slightly exceeded the risks? Would you say that the risks have substantially exceeded the benefits or only slightly exceeded the benefits?" In 1995, the question was worded, "Some persons have argued that the creation of new life forms through genetic engineering research constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your opinion, have the benefits of genetic engineering research outweighed the harmful results, or have the harmful results of genetic engineering research been greater than its benefits? Would you say that balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of harmful results or only slightly?" In 1997, half of the respondents were asked the question used in 1995. The other half were asked: "Some persons have argued that the modification of existing life forms through genetic engineering research constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your opinion, have the benefits of engineering research outweighed the harmful results, or have the harmful results of genetic engineering research been greater than its benefits? Would you say that the balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of harmful results or only slightly?" Percentages may not total 100 because of rounding.

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-15.

Appendix table 7-23.
Public assessments of space exploration, by selected characteristics: 1985-97

Characteristic	1985	1988	1990	1992	1995	1997
			Percentages			
All adults						
Benefits strongly outweigh costs	27	22	18	17	22	24
Benefits slightly outweigh costs	27	25	25	26	24	24
Benefits equal costs	7	9	9	9	8	10
Costs slightly outweigh benefits	15	18	17	22	17	17
Costs strongly outweigh benefits	24	26	31	26	28	25
Male						
Benefits strongly outweigh costs	33	28	23	33	28	31
Benefits slightly outweigh costs	31	27	26	26	25	25
Benefits equal costs	6	10	8	8	6	8
Costs slightly outweigh benefits	12	13	16	16	16	15
Costs strongly outweigh benefits	18	22	27	27	24	21
Female						
Benefits strongly outweigh costs	21	16	14	11	17	18
Benefits slightly outweigh costs	24	23	24	25	23	23
Benefits equal costs	8	9	10	11	10	12
Costs slightly outweigh benefits	17	23	17	27	18	18
Costs strongly outweigh benefits	30	29	35	26	32	29
Less than high school graduate						
Benefits strongly outweigh costs	22	16	15	14	14	18
Benefits slightly outweigh costs	25	26	20	29	20	21
Benefits equal costs	10	9	17	12	13	16
Costs slightly outweigh benefits	17	21	16	24	21	24
Costs strongly outweigh benefits	26	29	32	21	31	21
High school graduate						
Benefits strongly outweigh costs	26	21	17	15	23	23
Benefits slightly outweigh costs	28	25	25	25	24	23
Benefits equal costs	6	9	7	9	6	9
Costs slightly outweigh benefits	14	18	17	23	17	16
Costs strongly outweigh benefits	26	27	34	28	30	29
Baccalaureate or higher degree						
Benefits strongly outweigh costs	36	33	27	22	32	31
Benefits slightly outweigh costs	28	26	28	26	27	29
Benefits equal costs	6	10	7	6	8	8
Costs slightly outweigh benefits	13	15	16	18	14	12
Costs strongly outweigh benefits	17	16	22	28	20	20
Attentive public for science and technology[a]						
Benefits strongly outweigh costs	39	38	26	28	32	44
Benefits slightly outweigh costs	27	28	33	26	25	22
Benefits equal costs	7	6	4	11	7	6
Costs slightly outweigh benefits	13	10	14	20	16	11
Costs strongly outweigh benefits	14	21	23	15	20	17
Attentive public for space exploration						
Benefits strongly outweigh costs	49	46	36	38	52	57
Benefits slightly outweigh costs	25	30	36	44	23	19
Benefits equal costs	8	4	3	3	4	6
Costs slightly outweigh benefits	11	7	11	6	12	10
Costs strongly outweigh benefits	7	13	14	9	9	8

Appendix table 7-23.
Public assessments of space exploration, by selected characteristics: 1985-97

Characteristic	1985	1988	1990	1992	1995	1997
			Sample size			
All adults	2,005	2,041	2,033	1,004	2,006	2000
Male	950	958	964	486	953	930
Female	1,054	1,084	1,070	533	1,053	1070
Less than high school graduate	507	530	495	215	418	420
High school graduate	1,147	1,158	1,202	623	1,196	1188
Baccalaureate or higher degree	349	353	336	203	392	392
Attentive public for science and technology	235	233	229	105	195	288
Attentive public for space exploration	184	163	123	51	99	168

NOTES: Responses are to the following questions: "Many current issues in science and technology may be viewed as a judgment of relative benefits. Thinking first about the space program, some persons have argued that the costs of the space program may have exceeded its benefits, while other people have argued that the benefits of space exploration have exceeded its costs. In your opinion, have the costs of space exploration exceeded its benefits, or have the benefits of space exploration exceeded its costs? Would you say that the benefits have substantially exceeded the costs, or only slightly exceeded the costs? Would you say that the costs have substantially exceeded the benefits or only slightly exceeded the benefits?" Percentages may not total 100 because of rounding.

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-16.

Appendix table 7-24.
Public use of various sources of information, by selected characteristics: 1997
(Percentages)

Characteristic	Read newspaper every day	Read at least 1 news magazine regularly	Watch TV news 1+hr/day	Listen to radio news 1+hr/day	Public library: 1 visit/yr	Public library: 5 visits/yr	Read at least 1 science magazine/ month	Watch 1+ science TV programs/ month	Visit science museums 1+/year	Purchase 1+ books/yr: Any	Purchase 1+ books/yr: Science	World Wide Web 1+ hrs/wk	Sample size
All adults	46	14	68	28	70	45	15	53	60	61	31	15	2,000
Sex													
Male	49	15	63	29	68	41	20	56	63	55	32	20	930
Female	43	14	72	27	72	48	11	50	59	66	29	10	1,070
Formal education													
Less than high school	41	6	80	31	52	31	9	45	34	33	9	4	420
High school graduate	44	14	67	27	71	43	14	55	64	62	31	11	1,188
Baccalaureate degree	53	22	59	27	87	68	25	57	78	85	51	35	257
Grad./professional degree	59	27	54	27	84	63	29	52	75	87	56	37	135
Science/mathematics education[a]													
Low	43	10	74	26	59	33	9	48	48	48	18	4	1,112
Middle	47	18	65	34	82	57	14	56	75	70	38	19	509
High	53	22	54	27	85	63	33	62	78	86	58	38	379
Attentiveness to science & tech.[b]													
Attentive public	79	25	70	27	78	60	41	64	68	75	44	30	288
Interested public	38	14	68	28	74	48	13	56	66	65	35	15	918
Residual public	42	11	68	32	62	35	7	44	51	51	20	9	794
Access to cable/satellite TV													
Have cable TV	49	15	68	27	72	45	15	57	62	62	31	17	1,331
Have satellite dish	52	10	64	20	50	29	21	56	55	60	32	17	97
Have neither[c]	35	13	69	33	69	47	14	42	57	58	29	10	572

NOTE: Responses are to the statements: "How often do you read a newspaper: every day, a few times a week, once a week, or less than once a week?"; "Are there any magazines that you read regularly, that is, most of the time? What magazine would that be?"; "Altogether, on an average day, about how many hours would you say that you watch television? About how many of those hours are news reports or news shows?"; "Now, let me ask you about your use of museums, zoos, and similar institutions. I am going to read you a short list of places and ask you to tell me how many times you visited each type of place during the last year, that is, the last 12 months. If you did not visit any given place, just say none. A natural history museum—how many times did you visit it during the last year? A zoo or an aquarium—how many times did you visit it during the last year? A science or technology museum—how many times did you visit it during the last year? A public library—how many times did you visit it during the last year?"; "Do you watch any television shows that focus primarily on science or nature? Which science or nature show do you watch most often? About how many times a month do you watch this show?"; and "On an average day, about how many hours would you say that you listen to a radio? About how many of those hours are news reports or news shows?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[c]This category includes 79 respondents who reported that they did not watch any television.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-17.

Appendix table 7-25.
Public use of information on an annual basis, by selected characteristics: 1997

Characteristic	Hours/year watching/listening to					Copies read/year			Visits/year		Number borrowed/year		
	Total TV	TV news	Science TV	Total radio	Radio news	News-papers	News maga-zines	Science maga-zines	Science museum	Public library	Books	Video-tapes	Sample size
All adults	1,075	432	72	944	228	196	3.0	1.7	2.2	11.0	12.1	2.0	2,000
Sex													
Male	992	387	82	986	262	206	2.8	2.5	2.0	9.2	7.7	1.3	930
Female	1,147	471	62	906	198	186	2.8	1.1	2.1	11.8	15.9	2.0	1,070
Formal education													
Less than high school	1,495	553	48	904	207	178	1.7	1.0	1.0	7.6	5.5	0.5	420
High school graduate	1,040	426	81	1,030	233	192	2.5	1.5	2.0	10.0	11.6	1.4	1,188
Baccalaureate degree	743	314	72	798	234	219	4.0	3.0	3.4	16.8	20.0	3.0	257
Grad./professional degree	718	335	59	584	232	238	6.2	4.0	3.3	15.9	21.1	2.2	135
Science/math education[a]													
Low	1,235	489	63	887	208	185	2.0	1.0	2.0	7.7	8.8	1.1	1,112
Middle	973	394	86	1,138	259	200	3.3	1.5	2.9	13.2	13.3	1.6	509
High	744	317	79	850	243	220	4.6	4.1	3.3	15.3	19.9	3.0	379
Attentiveness to science and technology[b]													
Attentive public	1,093	500	102	957	254	298	6.5	5.2	3.1	16.7	18.0	2.3	288
Interested public	1,044	443	84	931	238	171	2.5	1.4	2.5	11.1	13.0	1.5	918
Residual public	1,105	395	46	954	205	186	1.8	0.9	1.7	8.0	8.8	1.0	794
Access to cable/satellite TV													
Have cable TV	1,149	459	84	955	217	209	3.0	1.7	2.0	10.6	11.5	1.0	1,331
Have satellite dish	1,154	373	109	1,050	177	218	1.4	3.2	2.0	7.5	9.6	1.4	97
Have neither[c]	889	379	35	899	261	160	2.3	1.7	2.2	11.0	13.9	2.3	572

NOTE: Responses are to the statements: "Altogether, on an average day, about how many hours would you say that you watch television? About how many of those hours are news reports or news shows?" "Now, let me ask you about your use of museums, zoos, and similar institutions. I am going to read you a short list of places and ask you to tell me how many times you visited each type of place during the last year, that is, the last 12 months. If you did not visit any given place, just say none. A natural history museum—how many times did you visit it during the last year? A zoo or an aquarium—how many times did you visit it during the last year? A science or technology museum—how many times did you visit it during the last year? A public library—how many times did you visit it during the last year?"; "During the last 12 months, did you borrow any books from the public library? (if yes):About how many books did you borrow during the last year?" "During the last 12 months, did you borrow any videotapes from the public library? (if yes):About how many videotapes did you borrow during the last year?" "Do you watch any television shows that focus primarily on science or nature? Which science or nature show do you watch most often? About how many times a month do you watch this show?"; and "On an average day, about how many hours would you say that you listen to a radio? About how many of those hours are news reports or news shows?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[c]This category includes 79 respondents who reported that they did not watch any television.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations prepared for the National Science Foundation, Science Resources Studies Division.

See figures 7-18 and 7-19.

Appendix table 7-26.
Public's access to computers from work and home, by selected characteristics: 1983-97

Characteristic	1983	1985	1988	1990	1995	1997
			Percentages			
All adults						
No access	70	66	62	58	46	43
Access from work or home	27	28	29	30	33	34
Access from work and home	3	6	9	12	21	23
Male						
No access	68	62	59	55	41	42
Access from work or home	28	30	30	30	34	32
Access from work and home	4	8	11	15	25	26
Female						
No access	72	69	66	61	50	44
Access from work or home	26	26	28	31	33	36
Access from work and home	2	5	6	8	17	20
Less than high school graduate						
No access	94	87	92	85	80	79
Access from work or home	6	13	8	14	18	18
Access from work and home	0	0	0	1	2	3
High school graduate						
No access	66	65	58	55	42	40
Access from work or home	31	30	35	34	38	39
Access from work and home	3	5	7	11	20	21
Baccalaureate or higher degree						
No access	47	40	33	29	18	12
Access from work or home	45	43	41	41	36	38
Access from work and home	8	17	26	30	46	50
Attentive public for science and technology[a]						
No access	61	56	50	44	31	34
Access from work or home	29	33	35	31	31	36
Access from work and home	10	11	15	25	38	30
			Sample size			
All adults	631	2,005	2,041	2,033	2,006	2,000
Male	775	950	958	964	953	930
Female	856	1,054	1,084	1,070	1,053	1,070
Less than high school graduate	404	507	530	495	418	420
High school graduate	941	1,147	1,158	1,202	1,196	1188
Baccalaureate or higher degree	282	349	353	336	392	392
Attentive public for science and technology	208	235	233	229	195	288

NOTE: In 1985, 1988, 1990, 1995 and 1997, the question was worded, "Do you use a computer in your work? About how many hours do you personally use your work computer in a typical week? Do you presently have a home computer in your household? About how many hours do you personally use your home computer in a typical week?" In 1983, the question was worded, "Do you use computers or word processing equipment in your work?..."

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figures 7-20 and 8-24.

Appendix table 7-27.
Public's access to and use of computers at home and work, by selected characteristics: 1997
(Percentages)

Characteristic	Use computer in work	Have computer at home	Computer at home & work	Computer at home or work	No computer	Home computer					Work computer		Use (hours/year)		
						Modem	On-line service	CD-ROM	E-mail address	Access WWW	E-mail address	Access WWW	Work computer	Home computer	On-line hrs/year
All adults	38	43	23	57	43	33	18	29	18	16	16	14	369	130	29
Sex															
Male	41	44	26	58	42	35	21	31	20	20	18	18	371	161	37
Female	35	41	20	56	44	33	15	26	15	13	14	11	368	102	22
Formal education															
Less than high school	6	19	3	21	79	13	1	8	6	5	1	2	31	51	4
High school graduate	39	42	21	60	40	31	17	29	17	14	12	11	390	119	26
Baccalaureate degree	67	67	47	87	13	54	35	49	31	32	40	36	695	237	60
Grad./professional degree	68	76	54	88	12	62	41	55	37	38	43	45	612	263	69
Science/math education[a]															
Low	22	29	12	40	60	20	9	17	8	7	5	5	221	71	12
Middle	51	53	32	72	28	42	23	38	25	22	22	18	439	162	31
High	64	68	44	88	12	56	37	51	36	36	38	35	709	257	74
Attentiveness to science and technology[b]															
Attentive public	42	54	30	66	34	47	26	40	30	30	23	23	465	225	55
Interested public	42	46	26	63	37	34	20	31	18	17	17	16	398	152	32
Residual public	31	34	18	48	52	26	13	22	13	10	12	9	301	69	16
Access to cable/satellite TV															
Have cable TV	41	46	25	61	39	36	20	32	20	18	17	15	401	143	32
Have satellite dish	39	45	21	63	37	33	17	31	18	19	12	10	308	134	39
Have neither[c]	30	35	17	47	53	24	12	21	12	11	12	13	306	97	20

WWW = World Wide Web

NOTE: Responses are to the statements: "Do you use a computer in your work? About how many hours do you personally use your work computer in a typical week? Do you have an e-mail address for use at work? Do you have access to the World Wide Web through your work computer? Do you presently have a home computer in your household? About how many hours do you personally use your home computer in a typical week? Do you have a CD-ROM reader in your home computer? Do you have a modem in your home computer? Do you presently subscribe to any network service like CompuServe, Prodigy, America Online, or any other dial-in-service? About how many hours a month do you use your dial-in or network service? Do you have an e-mail address that you use with your home computer? Do you ever access the World Wide Web through your home computer?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[c]This category includes 79 respondents who reported that they did not watch any television.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 8-1.
Uses of computers in the workplace: 1993

Application	Workers who use this application: Number (thousands)	Workers who use this application: Percentage
Analysis	13,018	25
Bookkeeping	13,236	26
Bulletin boards	4,315	8
Calendar scheduling	11,846	23
Communications	16,058	31
Computer-assisted design	3,856	8
Databases	17,556	34
Desktop publishing	5,933	12
Educational programs	4,689	9
E-mail	10,872	21
Games	2,930	6
Graphics	8,671	17
Inventory control	12,823	25
Invoicing	10,057	20
Learn to use	4,820	9
Programming	6,671	13
Sales	7,629	15
Spreadsheets	12,045	24
Telemarketing	1,656	3
Word processing	22,624	44
Other	9,841	19
Don't know	2,895	6
Total workers who use a computer	**51,106**	

SOURCE: U.S. Bureau of the Census, Current Population Survey, October 1993. Available from <<http://www.census.gov/population/socdemo/computer/compusea/text>>.

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Appendix table 8-2.
Index of real net information technologies capital stock in the private sector: 1960-95

	Office, computing, and accounting machinery	Communications equipment	All nonresidential durable equipment
1960	0.23	8.15	25.62
1961	0.24	9.27	26.18
1962	0.25	10.56	27.06
1963	0.29	11.56	28.12
1964	0.34	12.50	29.56
1965	0.40	13.69	31.67
1966	0.53	15.09	34.26
1967	0.65	16.46	36.44
1968	0.76	17.84	38.76
1969	0.93	19.64	41.32
1970	1.09	21.64	43.32
1971	1.28	23.25	45.08
1972	1.57	24.52	47.46
1973	1.90	26.43	50.92
1974	2.34	28.26	54.11
1975	2.64	29.63	55.89
1976	3.12	31.22	57.88
1977	3.78	34.23	60.81
1978	5.33	38.13	64.75
1979	7.57	43.01	68.95
1980	10.48	48.46	71.95
1981	14.25	53.71	74.76
1982	17.19	58.50	76.22
1983	22.87	62.70	77.86
1984	32.03	67.54	81.11
1985	41.88	72.67	84.45
1986	51.55	77.58	87.32
1987	59.61	81.59	89.63
1988	66.84	86.52	92.30
1989	75.82	90.75	95.03
1990	81.69	94.58	97.22
1991	87.31	97.21	98.39
1992	100.00	100.00	100.00
1993	119.03	102.20	102.72
1994	143.14	106.43	106.90
1995	178.09	112.78	111.89

NOTE: Index is chain-link index; values are expressed relative to 1992 dollars.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business* (May 1997), table 4, pp. 82-84.

See figure 8-2.

Appendix table 8-3.
Gross product by industry as a share of gross domestic product: 1959-94, selected years
(Percentages)

Industry	1959	1967	1977	1982	1987	1988	1989	1990	1991	1992	1993	1994
Goods, total	38.9	36.0	32.8	31.0	27.3	27.6	26.8	26.2	24.7	24.0	23.7	24.2
Agriculture, forestry, and fishing	4.0	3.0	2.7	2.4	1.9	1.8	1.9	1.9	1.7	1.8	1.6	1.7
Mining	2.5	1.8	2.7	4.6	1.9	2.0	1.8	2.0	1.7	1.5	1.4	1.3
Construction	4.7	4.7	4.6	4.0	4.6	4.6	4.5	4.3	3.9	3.7	3.7	3.9
Manufacturing	27.7	26.5	22.8	20.0	18.9	19.2	18.6	18.0	17.4	17.0	17.0	17.3
Services, total	48.8	49.8	51.9	53.9	59.1	59.7	59.6	59.8	61.0	61.3	61.6	62.0
Transportation and public utilities[a]	8.9	8.5	8.9	9.0	9.0	8.8	8.5	8.4	8.7	8.5	8.6	8.7
Wholesale trade	7.1	6.9	7.0	6.8	6.4	6.7	6.6	6.4	6.6	6.5	6.5	6.7
Retail trade	9.7	9.4	9.4	8.9	9.3	9.1	9.0	8.8	8.7	8.7	8.7	8.8
Finance, insurance, and real estate	13.6	14.1	14.0	15.6	17.7	17.7	17.7	17.8	18.3	18.4	18.5	18.4
Professional[b]	5.2	6.5	8.6	10.6	12.5	10.8	11.0	11.5	11.7	12.1	12.2	12.3
Personal[c]	3.4	3.5	3.1	3.1	3.4	3.5	3.4	3.6	3.5	3.6	3.5	3.6
Other[d]	0.9	0.9	0.8	0.8	0.9	3.2	3.7	3.6	3.4	3.5	3.5	3.6
Government	12.8	14.1	14.5	14.2	13.9	13.8	13.6	13.8	14.2	14.0	13.7	13.4

NOTE: Shares are based on current dollars.

[a]This includes communications.

[b]Professional services include business, health, legal, educational, social, and (through 1987) miscellaneous professional services.

[c]Personal services include hotels and lodging, personal, auto repair and services, miscellaneous repair, amusement and recreation, and private household services.

[d]Other services include motion pictures, membership organizations, and (after 1987) other.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business* (August 1996), table 11.

See figures 8-6 and 8-7.

Appendix table 8-4.
U.S. employment by industrial sector: 1950-90, selected years
(Percentages)

Industry	1950	1960	1970	1980	1990
Total	100.0	100.0	100.0	100.0	100.0
Extractive	14.4	8.1	4.6	4.5	3.5
Agriculture	12.7	7.0	3.7	3.6	2.8
Mining	1.7	1.1	0.8	1.0	0.6
Transformative	33.9	35.9	33.0	29.6	25.6
Constructive	6.2	6.2	6.0	6.2	6.5
Utilities	1.4	1.4	1.1	1.2	1.1
Manufacturing	26.2	28.3	25.9	22.2	18.0
Food	2.7	3.1	1.9	1.9	1.6
Textiles	2.2	3.3	1.3	0.8	0.6
Metal	3.6	3.9	3.1	2.7	1.8
Machinery	3.7	7.5	5.1	5.2	3.8
Chemical	1.7	1.8	1.5	1.6	1.3
Miscellaneous manufacturing	12.3	8.7	12.9	10.0	8.9
Distributive services	22.4	21.9	22.4	21.0	20.6
Transportation	5.3	4.4	3.9	3.7	3.5
Communication	1.2	1.3	1.5	1.5	1.3
Wholesale	3.5	3.6	4.0	3.9	3.9
Retail	12.3	12.5	12.9	11.9	11.8
Producer services	4.8	6.6	8.2	10.5	14.0
Banking	1.1	1.6	2.2	2.6	2.9
Insurance	1.4	1.7	1.8	1.9	2.1
Real estate	1.0	1.0	1.0	1.6	1.8
Engineering	0.2	0.3	0.4	0.6	0.7
Accounting	0.2	0.3	0.4	0.5	0.5
Miscellaneous business services	0.6	1.2	1.8	2.6	4.9
Legal services	0.4	0.5	0.5	0.8	1.0
Social services	12.4	16.3	22.0	23.7	24.9
Medical, health services	1.1	1.4	2.4	2.3	4.3
Hospital	1.8	2.7	3.7	5.3	4.0
Education	3.8	5.4	8.5	8.3	7.9
Welfare, religious services	0.7	1.0	1.2	1.6	2.6
Nonprofit organization	0.3	0.4	0.4	0.5	0.4
Postal service	0.8	0.9	1.0	0.7	0.7
Government	3.7	4.3	4.5	4.7	4.8
Miscellaneous social services	0.1	0.2	0.3	0.4	0.2
Personal services	12.1	11.3	10.0	10.5	11.5
Domestic services	3.2	3.1	1.7	1.3	0.9
Hotel	1.0	1.0	1.0	1.1	1.5
Eating, drinking places	3.0	2.9	3.2	4.4	4.8
Repair services	1.7	1.4	1.4	1.3	1.4
Laundry	1.2	1.0	0.8	0.4	0.5
Barber, beauty shops	–	0.8	0.9	0.7	0.7
Entertainment	1.0	0.8	0.8	1.0	1.3
Miscellaneous personal services	1.2	0.4	0.3	0.3	0.4

NOTE: Details may not add to totals because of rounding.

SOURCE: M. Castells, *The Rise of the Network Society* (Cambridge, MA: Basil Blackwell, 1996).

See figure 8-8.

Appendix table 8-5.
Workers who use a computer at work, by sector: 1993

Sector	Total employed in sector (thousands)	Workers in sector who use a computer	
		Number (thousands)	Percentage
Government	5,927	4,137	70
All industries	118,400	51,106	43
Agriculture	3,140	435	14
Mining	689	307	45
Construction	7,567	1,182	16
Manufacturing, total	19,605	8,178	42
Food	1,776	532	30
Tobacco	52	25	48
Apparel	970	143	15
Textiles	664	177	27
Leather and leather products	107	24	22
Lumber and wood	841	114	14
Furniture	665	161	24
Paper and allied products	740	339	46
Printing and publishing	1,705	857	50
Chemicals	1,220	729	60
Petroleum and coal	145	88	61
Rubber and plastics	791	293	37
Stone, clay, and glass	568	165	29
Primary metals	653	217	33
Fabricated metals	1,290	442	34
Non-electric machinery	2,238	1,233	55
Electric machinery	1,689	950	56
Motor vehicles	1,120	428	38
Aircraft	502	335	67
Other transportation	624	376	60
Photo equipment	680	406	60
Toys and sporting goods	128	44	34
Miscellaneous manufactures	437	100	23
Services, total	81,473	36,867	45
Transportation	5,410	1,866	34
Communications	1,637	1,283	78
Utilities	1,501	807	54
Wholesale trade	4,531	2,226	49
Retail trade	18,706	5,837	31
Banking and finance	3,417	2,888	85
Insurance and real estate	4,561	3,094	68
Professional services	31,020	16,515	53
Personal services	10,690	2,351	22
Business services	5,038	2,646	53

SOURCE: U.S. Bureau of the Census, Current Population Survey, October 1993. Available from <<http://www.census.gov/population/socdemo/computer/compusea/text>>.

See figure 8-9.

Appendix table 8-6.
Index of information technologies investments, by industry: 1991-92

Industry	Industry's share of GDP, 1992 (%)	Industry's IT investments 1991 ($ billion)	Industry's share of IT investments (%)	Investment Index
Manufacturing	17.0	25.30	16.6	0.98
Transportation	3.1	3.80	2.5	0.81
Communications	2.6	21.10	13.9	5.35
Utilities	2.8	8.00	5.3	1.89
Wholesale trade	6.5	17.00	11.2	1.72
Retail trade	8.7	17.90	11.8	1.36
Finance, insurance, and real estate	18.4	38.70	25.4	1.38
Professional and personal services	19.2	20.30	13.3	0.69

IT = information technologies

NOTE: Investment Index equals industry's share of IT investments divided by industry's share of GDP. An index of 1.00 reflects no over- or under-investing in IT relative to the size of the industry.

SOURCES: Industry investments from National Research Council, *Information Technology in the Service Society* (Washington, DC: National Academy Press, 1994), p. 2; share of GDP from U.S. Bureau of Economic Analysis, *Survey of Current Business* (August 1996), p. 137.

See figure 8-10.

Appendix table 8-7.
Technology in public schools: 1992-95

Technology	Number				Percentage of total	
	1992	1993	1994	1995	1992	1995
Schools with interactive videodisk players[a]	6,502	11,729	19,189	23,112	8	27
Elementary	2,921	5,986	10,043	12,326	6	24
Junior high	1,258	2,386	3,844	4,672	10	34
Senior high	2,106	3,129	5,026	5,805	14	34
Students represented (1,000)	5,781	9,064	13,434	16,060	14	36
Schools with modems[a]	13,597	18,471	24,277	28,275	16	34
Elementary	5,831	8,492	11,679	14,782	11	29
Junior high	2,608	3,431	4,531	5,393	20	39
Senior high	5,001	6,371	7,853	8,620	30	51
Students represented (1,000)	10,717	13,382	16,476	19,326	25	43
Schools with networks[a]	4,184	11,657	19,272	23,402	5	28
Elementary	1,583	4,683	8,477	11,155	3	22
Junior high	776	2,030	3,611	4,425	6	32
Senior high	1,736	4,895	7,104	8,042	10	48
Students represented (1,000)	3,754	8,043	12,713	15,160	9	34
Schools with CD-ROMs[a]	5,706	11,021	24,526	31,501	7	37
Elementary	1,897	4,457	11,794	16,816	4	33
Junior high	1,231	2,326	4,874	6,170	9	45
Senior high	2,543	4,168	7,724	9,063	15	64
Students represented (1,000)	5,298	8,534	15,576	19,501	12	44
Schools with satellite dishes[a]	1,129	8,812	12,580	14,290	1	17
Elementary	351	2,988	4,269	5,154	1	10
Junior high	166	1,503	2,497	3,004	1	22
Senior high	606	4,292	5,770	6,263	4	37
Students represented (1,000)	1,906	4,668	6,740	7,946	4	18
Schools with cable[a]	NA	47,745	58,652	62,593	NA	74
Elementary	NA	27,923	35,325	37,730	NA	73
Junior high	NA	9,266	10,696	11,416	NA	83
Senior high	NA	10,296	12,198	13,089	NA	78
Students represented (1,000)	NA	27,324	33,510	35,770	NA	80

NA = not available

NOTE: Elementary includes K-12; preschool, preschool through 8, K-6, and K-8. Junior high includes schools with grade spans of 4-6, 7-8, and 7-9. Senior high includes 7-12, 9-12, 10-12, vocational, technical, and alternative high schools.

[a]Includes schools for special education and adult education not shown separately.

SOURCE: U.S. Bureau of the Census, *Statistical Abstract of the United States 1996,* table 264 (Washington, DC: U.S. Government Printing Office, 1996); data based on surveys conducted by Quality Education Data, Inc.

Appendix table 8-8.
Student use of computers at home and at school, by sex, race/ethnicity, and household income: 1984 and 1993
(Percentages)

Characteristic	1984 total	1993					
		Total	Pre-K and K	Grades 1-8	Grades 9-12	1st to 4th year of college	5th or later year college
Computer use at school							
Total	27.3	59.0	26.2	68.9	58.2	55.2	52.1
Sex							
Male	29.0	59.4	25.9	69.5	56.5	57.5	56.7
Female	25.5	58.7	26.5	68.4	60.0	53.3	47.8
Race/ethnicity							
White	30.0	61.6	29.4	73.7	59.9	54.9	59.8
Black	16.8	51.5	16.5	56.5	54.5	56.9	57.9
Hispanic	18.6	52.3	19.2	58.4	54.1	51.9	53.7
Other	28.6	59.0	23.5	65.7	57.3	60.9	69.4
Household income							
Less than $5,000	18.7	51.2	19.6	55.0	50.6	61.7	66.7
$5,000 to $9,999	21.0	53.3	24.4	60.3	51.9	53.9	56.2
$10,000 to $14,999	22.4	56.4	20.1	64.7	56.7	50.7	76.1
$15,000 to $19,999	25.9	58.1	23.8	67.5	57.4	51.2	58.5
$20,000 to $24,999	26.7	56.4	23.7	64.3	53.0	57.4	52.4
$25,000 to $29,999	30.5	60.0	28.0	70.1	60.3	51.5	58.0
$30,000 to $34,999	30.5	59.1	23.7	69.6	59.7	51.7	45.3
$35,000 to $39,999	32.3	60.7	27.1	72.1	61.7	49.2	47.9
$40,000 to $49,999	32.8	59.3	28.5	70.3	57.2	53.9	48.6
$50,000 to $74,999	35.5	62.6	28.6	75.6	61.5	57.4	44.2
$75,000 or more	36.0	64.6	33.5	78.7	62.5	60.9	47.7
Institution type							
Public	27.4	60.2	30.1	68.6	58.1	53.9	54.1
Private	26.5	52.1	18.7	72.5	60.7	60.7	48.0
Computer use at home							
Total	11.5	27.0	15.6	24.7	28.7	32.8	52.6
Sex							
Male	14.0	27.4	15.1	24.8	28.2	36.6	56.1
Female	9.0	26.6	16.1	24.6	29.2	29.7	49.5
Race/ethnicity							
White	13.7	32.8	19.4	31.4	35.9	36.0	53.6
Black	4.9	10.9	4.2	9.0	10.4	19.4	48.1
Hispanic	3.6	10.4	5.7	7.5	9.8	22.0	52.2
Other	9.0	28.7	17.0	23.2	37.0	33.0	47.1
Household income							
Less than $5,000	2.9	9.7	1.1	4.1	6.8	25.6	45.2
$5,000 to $9,999	3.2	8.0	0.9	4.5	5.3	21.3	45.6
$10,000 to $14,999	5.0	11.4	4.6	6.4	8.7	29.8	50.0
$15,000 to $19,999	7.5	15.1	6.9	10.9	14.1	28.9	43.0
$20,000 to $24,999	9.9	16.8	7.4	13.1	17.9	27.7	49.6
$25,000 to $29,999	12.8	21.1	12.3	19.3	22.0	26.1	47.0
$30,000 to $34,999	15.8	24.1	18.7	20.5	29.1	26.4	44.4
$35,000 to $39,999	19.4	27.1	13.0	26.3	28.1	32.7	52.7
$40,000 to $49,999	20.4	32.2	21.6	32.9	33.9	32.5	45.9
$50,000 to $74,999	24.2	43.0	25.5	45.3	46.4	40.1	58.2
$75,000 or more	22.1	56.1	38.2	62.3	61.0	47.0	64.7
Institution type							
Public	11.2	25.3	12.1	23.0	27.2	31.9	50.0
Private	13.8	37.4	22.4	41.5	47.2	36.9	57.7

Appendix table 8-8.
Student use of computers at home and at school, by sex, race/ethnicity, and household income: 1984 and 1993
(Percentages)

Characteristic	1984 total	1993					
		Total	Pre-K and K	Grades 1-8	Grades 9-12	1st to 4th year of college	5th or later year of college
Computer use at home for school work							
Total	4.6	14.9	0.6	10.8	20.9	23.1	36.6
Sex							
Male	5.9	14.8	0.9	10.1	20.5	26.3	40.3
Female	3.3	15.0	0.4	11.5	21.4	20.5	33.2
Race/ethnicity							
White	5.4	18.2	0.8	13.8	26.5	25.7	37.8
Black	2.3	5.7	NA	4.0	6.9	11.5	30.1
Hispanic	1.4	5.6	NA	2.9	6.7	15.9	36.8
Other	3.8	16.0	1.1	9.3	27.0	23.7	29.2
Household income							
Less than $5,000	1.0	6.7	NA	2.5	4.0	18.7	36.0
$5,000 to $9,999	1.5	4.8	NA	1.1	3.6	16.1	35.5
$10,000 to $14,999	1.9	7.3	NA	2.6	5.6	25.9	34.6
$15,000 to $19,999	3.0	8.6	0.4	4.7	10.8	18.7	31.0
$20,000 to $24,999	3.1	9.8	0.7	5.1	12.6	22.9	35.0
$25,000 to $29,999	5.1	10.4	1.1	6.3	13.4	19.5	34.9
$30,000 to $34,999	4.9	13.0	0.8	8.1	21.9	18.0	35.1
$35,000 to $39,999	7.1	15.4	0.8	12.4	21.0	22.6	37.2
$40,000 to $49,999	9.2	17.1	1.1	14.7	24.2	22.2	32.1
$50,000 to $74,999	11.5	23.2	1.0	19.7	35.0	27.0	38.2
$75,000 or more	9.8	30.4	0.8	29.4	45.2	30.6	41.5
Institution type							
Public	4.5	14.2	0.5	10.1	19.8	22.7	34.7
Private	5.4	18.8	1.0	17.8	35.4	24.8	40.1

Pre-K and K = prekindergarten and kindergarten

SOURCE: U.S. Bureau of the Census, *Statistical Abstract of the United States, 1996,* table 263 (Washington, DC: U.S. Government Printing Office, 1996).

See figures 8-19 and 8-21.

Appendix table 8-9.
Adult use of computers at home, school, and work: 1993
(Percentages)

Characteristic	Uses computer anywhere	Has computer at home	Has computer at home and uses computer at home	Enrolled in school and uses computer at school	Has a job and uses computer at work
Age					
Persons over 18	36.0	25.6	65.6	53.8	45.8
18-21 years	45.9	30.4	62.5	62.3	25.8
22-24 years	43.5	25.4	68.9	53.1	42.1
25-34 years	44.4	25.3	73.8	45.2	49.1
35-44 years	46.7	34.2	68.4	43.0	50.8
45-54 years	43.8	34.4	64.0	40.4	49.8
55-64 years	24.2	19.9	55.9	31.9	37.3
65+ years	4.9	8.4	41.2	36.0	20.3
Race					
White	37.5	26.9	66.7	53.1	47.1
Black	25.0	13.8	56.8	54.8	36.1
Other	35.6	31.3	55.8	60.3	42.3
Hispanic origin					
Hispanic	22.0	12.9	61.3	50.0	29.3
Not Hispanic	37.2	26.7	65.8	54.1	47.2
Sex					
Male	36.2	27.1	70.0	55.9	40.3
Female	35.8	24.3	61.1	51.9	52.4
Marital status					
Married	37.5	29.4	65.3	40.5	48.2
Single	42.5	25.3	68.8	58.9	41.2
Divorced/widowed	23.7	14.0	61.3	45.8	43.1
Uses computer					
At work	100.0	43.2	79.4	48.9	100.0
At home	100.0	100.0	NA	55.9	73.0
Household type					
Married couple	38.6	30.4	64.4	54.2	46.8
Female householder	29.2	14.1	65.0	51.4	45.9
Male householder	33.8	20.0	76.5	55.4	41.2
Region					
Northeast	34.3	25.6	62.2	56.4	46.0
Midwest	37.2	25.1	64.9	30.0	45.8
South	33.8	22.1	65.3	51.8	44.3
West	39.6	31.8	69.3	47.3	48.2
Educational attainment					
Less than 9th grade	1.5	4.5	12.7	31.1	4.0
9th-11th grade	9.8	8.1	41.8	46.6	13.0
High school graduate	25.1	16.7	49.3	51.7	34.2
Some college/associate's degree	50.5	33.1	67.9	56.3	52.6
Bachelor's +	63.4	48.7	76.9	50.5	69.1
Employment					
Employed	49.8	30.8	66.5	43.6	43.2
Full time	51.4	30.6	69.4	37.6	49.6
Part time	41.9	31.4	68.0	57.5	28.1
Unemployed	17.5	22.1	67.0	51.0	NA
Not in labor force	11.5	16.1	52.1	62.9	NA
School enrollment					
Not enrolled	32.8	23.9	63.6	NA	45.5
Below college	47.9	22.0	71.8	46.3	11.9
College	74.7	47.4	77.7	54.6	53.0

Appendix table 8-9.
Adult use of computers at home, school, and work: 1993
(Percentages)

Characteristic	Uses computer anywhere	Has computer at home	Has computer at home and uses computer at home	Enrolled in school and uses computer at school	Has a job and uses computer at work
Family income					
Less than $10,000	11.4	6.8	68.6	53.6	18.3
$10,000-$14,999	15.2	8.4	64.8	55.3	23.7
$15,000-$19,999	23.0	12.5	62.4	50.9	31.7
$20,000-$24,999	27.7	15.3	62.3	56.6	36.0
$25,000-$34,999	36.5	21.2	64.3	50.9	42.8
$35,000-$49,999	46.3	31.3	55.4	51.0	50.6
$50,000-$74,999	60.3	45.9	67.1	54.4	61.5
$75,000 and over	65.4	61.7	68.0	58.8	67.0
Income not reported	24.4	20.2	57.2	53.3	39.5
Household size					
1-3 persons	33.7	21.2	69.6	51.9	47.5
4-5 persons	43.1	35.8	62.1	56.0	45.0
6-7 persons	30.4	28.6	52.3	56.2	33.7
8+ persons	17.6	22.1	48.3	49.8	19.5
Occupation					
Management and professional	69.6	47.9	77.0	46.7	67.7
Technical, sales, administration	63.6	31.6	69.2	50.7	65.5
Service	22.4	18.6	54.9	53.5	14.7
Precision, production, craft	26.0	21.6	56.8	44.0	23.2
Operators, labor	18.8	15.2	51.9	47.0	14.9
Farm, forest, fish	14.7	16.7	59.5	62.5	8.5
Never work/NILF/AF	10.7	15.4	50.9	61.8	NA
Industry					
Agriculture	19.1	19.9	64.9	51.3	13.5
Mining	44.7	30.7	64.0	(B)	46.1
Construction	20.2	21.4	57.3	49.1	16.8
Manufacturing	43.0	27.3	69.4	48.6	44.0
Transportation, communications, utilities	48.8	29.9	63.6	46.5	49.4
Wholesale/retail	40.8	25.4	61.8	53.1	37.0
Finance, insurance	74.6	36.0	72.4	38.4	79.3
Services	51.2	35.2	72.6	51.2	48.0
Forest/fisheries	36.1	28.8	(B)	(B)	35.2
Public administrator	70.6	34.1	74.0	32.2	73.7
Never work/NILF/AF	10.7	15.4	50.9	61.8	NA

AF = armed forces; (B) = less than 75,000 persons or 50 sample cases; NA = not applicable; NILF = not in labor force

NOTES: Persons of Hispanic origin may be of any race. The term “uses computer anywhere” means that the individual uses computer at home, at school, and/or at work; the term “with computer at home” means that there is a computer in the household.

SOURCE: U.S. Bureau of the Census, Current Population Survey, October 1993. Available from <<http://www.census.gov/population/socdemo/computer/compusea/text>>.

See figures 8-23 and 8-25.

Appendix table 8-10.
Commercial banks output per employee: 1967-95

Year	Index	Year	Index
1967	71.2	1981	78.7
1968	72.5	1982	81.0
1969	71.5	1983	87.6
1970	72.3	1984	90.7
1971	75.1	1985	94.6
1972	76.9	1986	97.0
1973	81.7	1987	100.0
1974	76.9	1988	101.4
1975	77.2	1989	99.6
1976	81.4	1990	102.6
1977	85.9	1991	104.5
1978	86.8	1992	106.4
1979	84.5	1993	115.5
1980	78.8	1994	115.8
		1995	121.7

NOTES: Commercial banks are Standard Industrial Classification code 602. Industry Productivity Index: 1987 = 100.

SOURCE: U.S. Bureau of Labor Statistics, Industry Productivity Index, <<http://stats.bls.gov/cgi-bin/dsrv>> (data extracted July 1997).

See figure 8-12. *Science & Engineering Indicators – 1998*

Appendix table 6-1.
Real gross domestic product, for selected countries: 1960-95
(Billions of 1995 U.S. dollars)

	United States	Canada	Japan	South Korea	Austria	Belgium	Denmark	France	Germany[a]	Italy	Nether-lands	Norway	Sweden	United Kingdom
1960	2,433.07	170.88	415.98	36.12	55.01	76.32	43.97	378.74	544.64	345.35	100.42	29.26	70.36	507.23
1961	2,484.81	176.24	476.54	38.23	57.93	80.11	46.56	399.60	569.86	373.69	103.33	31.04	74.36	520.29
1962	2,634.66	188.73	510.18	39.05	59.32	84.29	49.12	426.26	596.43	396.87	107.77	31.88	77.53	527.20
1963	2,747.51	198.52	563.76	42.62	61.74	87.96	49.35	449.05	613.21	419.14	111.33	33.08	81.66	548.05
1964	2,907.69	211.76	638.25	46.74	65.47	94.08	53.76	478.32	654.06	430.86	120.90	34.74	87.23	577.85
1965	3,092.62	225.73	671.01	49.42	67.34	97.43	56.34	501.18	689.08	444.94	127.31	36.58	90.56	592.48
1966	3,292.07	241.05	742.11	55.44	71.14	100.51	57.67	527.31	708.30	471.57	130.87	37.96	92.46	603.68
1967	3,378.13	248.12	822.07	58.71	73.28	104.40	59.64	552.03	706.12	505.42	137.81	40.34	95.57	617.52
1968	3,537.77	261.40	927.04	65.36	76.56	108.79	62.01	575.54	744.63	538.50	147.04	41.25	99.05	642.68
1969	3,644.70	275.40	1,040.77	74.42	81.36	116.01	65.93	615.77	800.18	571.34	157.04	43.11	104.01	655.93
1970	3,644.92	282.55	1,142.86	80.94	87.16	123.39	67.26	651.06	840.49	601.68	166.07	43.97	110.74	670.90
1971	3,765.30	298.82	1,193.03	87.81	91.61	127.92	69.06	682.20	866.19	613.08	173.46	45.98	111.79	684.23
1972	3,969.91	315.94	1,293.40	92.04	97.30	134.68	72.70	712.43	903.01	631.02	178.85	48.36	114.34	708.19
1973	4,197.97	340.31	1,397.29	103.82	102.06	142.64	75.34	751.19	946.04	672.30	187.88	50.34	118.88	760.31
1974	4,182.80	355.29	1,380.17	112.20	106.08	148.47	74.64	774.55	947.89	703.83	195.49	52.96	122.68	747.39
1975	4,157.95	364.53	1,422.84	119.64	105.70	146.26	74.15	772.39	936.02	688.72	195.78	55.17	125.82	742.01
1976	4,390.32	386.99	1,479.40	133.72	110.53	154.41	78.95	805.17	985.85	733.47	205.11	58.92	127.15	762.61
1977	4,603.54	400.98	1,544.35	147.51	115.55	155.15	80.23	831.07	1,013.90	754.67	209.90	61.03	125.12	780.63
1978	4,834.18	419.32	1,625.77	161.36	115.62	159.39	81.41	858.92	1,044.29	782.80	214.85	63.80	127.31	807.61
1979	4,974.35	435.55	1,714.93	172.87	121.10	162.79	84.30	886.76	1,088.41	827.21	219.63	67.04	132.20	830.20
1980	4,961.34	442.02	1,763.25	168.23	124.64	169.82	83.92	901.16	1,099.08	856.42	222.28	69.86	134.40	812.25
1981	5,082.90	458.25	1,819.15	178.67	124.28	167.06	83.18	911.76	1,100.17	860.48	221.16	70.47	134.39	801.77
1982	4,973.92	443.51	1,874.76	192.23	125.61	169.83	85.69	934.97	1,089.82	864.42	218.58	70.70	135.73	815.63
1983	5,174.45	457.54	1,918.30	214.33	128.11	170.08	87.85	941.47	1,108.99	874.95	222.32	73.98	138.11	845.62
1984	5,527.51	486.40	1,993.44	232.93	129.85	173.81	91.70	953.84	1,140.20	897.42	229.63	78.23	143.70	865.27
1985	5,733.31	509.59	2,081.24	248.18	133.05	175.10	95.64	971.79	1,163.35	922.64	236.70	82.36	146.47	897.76
1986	5,905.86	526.49	2,141.50	276.86	134.62	177.96	99.12	996.26	1,190.63	948.84	243.22	85.80	149.83	936.21
1987	6,076.37	548.42	2,230.56	308.75	136.85	181.74	99.41	1,018.68	1,208.23	978.22	246.66	87.51	154.55	981.27
1988	6,307.12	575.73	2,368.74	343.55	142.41	190.69	100.57	1,064.50	1,253.21	1,016.06	253.11	87.07	158.03	1,030.37
1989	6,519.59	589.81	2,483.18	365.48	147.86	197.26	101.14	1,109.77	1,298.64	1,045.35	264.96	87.86	161.78	1,052.86
1990	6,603.82	588.43	2,609.42	400.23	154.14	204.52	102.58	1,137.60	1,372.71	1,067.96	275.84	89.50	163.99	1,057.04
1991	6,539.60	577.91	2,713.01	436.78	158.52	207.74	103.96	1,146.48	1,441.98	1,080.12	282.11	92.29	162.16	1,036.31
1992	6,717.53	582.33	2,741.60	458.91	161.75	211.25	104.20	1,159.81	1,467.42	1,086.22	287.82	95.31	159.85	1,030.82
1993	6,870.29	595.26	2,745.11	485.30	162.34	208.39	105.74	1,144.38	1,438.83	1,073.67	290.02	97.95	156.30	1,052.18
1994	7,109.43	619.49	2,758.25	526.93	167.29	213.27	110.38	1,176.72	1,470.80	1,096.49	299.85	102.88	161.52	1,092.55
1995	7,253.80	633.90	2,781.74	574.11	170.34	217.39	113.45	1,202.09	1,494.22	1,129.04	306.27	106.24	167.29	1,119.85

NOTE: Country gross domestic products were determined with 1993 purchasing power parities using the Elteto-Köves-Szulc (EKS) aggregation method, which is the method used by the Organisation for Economic Co-operation and Development (OECD) and EUROSTAT in their official statistics. For a discussion of the properties of this aggregation method, see OECD, *Purchasing Power Parities and Real Expenditures, 1993: Volume 1, EKS Results* (Paris: 1995), p. 4.

[a]German data are for the former West Germany only.

SOURCE: U.S. Bureau of Labor Statistics, Office of Productivity and Technology, "Comparative Real Gross Domestic Product Per Capita and Per Employed Person, Fourteen Countries, 1960-1995" (Washington, DC: April 1997).

See figure 6-1.

Appendix table 6-2.
Real gross domestic product per capita, for selected countries: 1960-95
(1995 U.S. dollars)

	United States	Canada	Japan	South Korea	Austria	Belgium	Denmark	France	Germany[a]	Italy	Nether-lands	Norway	Sweden	United Kingdom
1960	13,460	9,542	4,460	1,444	7,806	8,338	9,598	8,290	9,825	7,053	8,745	8,170	9,406	9,685
1961	13,523	9,646	5,065	1,484	8,175	8,723	10,094	8,656	10,144	7,602	8,879	8,599	9,889	9,853
1962	14,120	10,139	5,371	1,473	8,320	9,141	10,571	9,070	10,494	8,007	9,132	8,760	10,253	9,893
1963	14,514	10,468	5,879	1,563	8,604	9,468	10,536	9,387	10,685	8,394	9,305	9,023	10,739	10,220
1964	15,150	10,958	6,587	1,670	9,063	10,032	11,389	9,897	11,282	8,542	9,971	9,404	11,386	10,703
1965	15,913	11,471	6,851	1,722	9,262	10,294	11,843	10,275	11,755	8,752	10,356	9,824	11,710	10,901
1966	16,745	12,024	7,507	1,883	9,716	10,549	12,021	10,721	11,975	9,206	10,508	10,113	11,842	11,048
1967	16,997	12,156	8,227	1,948	9,934	10,897	12,325	11,137	11,910	9,783	10,940	10,654	12,147	11,236
1968	17,623	12,610	9,172	2,120	10,324	11,310	12,741	11,530	12,515	10,347	11,555	10,801	12,515	11,640
1969	17,978	13,097	10,172	2,359	10,934	12,027	13,474	12,238	13,322	10,908	12,199	11,194	13,050	11,827
1970	17,772	13,250	11,019	2,510	11,672	12,786	13,647	12,823	13,858	11,402	12,743	11,339	13,769	12,060
1971	18,129	13,566	11,389	2,670	12,214	13,225	13,915	13,311	14,134	11,541	13,147	11,781	13,804	12,234
1972	18,911	14,178	12,181	2,747	12,897	13,871	14,564	13,780	14,642	11,795	13,417	12,295	14,078	12,624
1973	19,807	15,085	12,859	3,044	13,453	14,646	15,002	14,413	15,265	12,477	13,981	12,711	14,610	13,523
1974	19,555	15,532	12,529	3,234	13,960	15,200	14,795	14,764	15,275	12,940	14,434	13,289	15,034	13,290
1975	19,251	15,706	12,759	3,391	13,946	14,932	14,653	14,657	15,139	12,576	14,333	13,766	15,357	13,197
1976	20,131	16,456	13,119	3,730	14,610	15,739	15,562	15,218	16,022	13,319	14,892	14,635	15,464	13,566
1977	20,898	16,850	13,561	4,051	15,268	15,796	15,768	15,638	16,513	13,655	15,149	15,095	15,163	13,893
1978	21,714	17,445	14,147	4,365	15,289	16,215	15,951	16,092	17,028	14,118	15,414	15,721	15,383	14,376
1979	22,098	17,941	14,799	4,606	16,041	16,549	16,474	16,542	17,738	14,877	15,650	16,461	15,939	14,762
1980	21,786	17,973	15,096	4,413	16,509	17,245	16,382	16,725	17,852	15,387	15,711	17,098	16,173	14,419
1981	22,099	18,404	15,462	4,614	16,420	16,956	16,239	16,828	17,836	15,428	15,523	17,189	16,151	14,228
1982	21,419	17,598	15,827	4,888	16,580	17,231	16,740	17,158	17,681	15,437	15,273	17,183	16,304	14,483
1983	22,082	17,974	16,085	5,370	16,930	17,258	17,178	17,189	18,055	15,561	15,473	17,920	16,582	14,999
1984	23,383	18,925	16,609	5,765	17,152	17,636	17,939	17,334	18,638	15,928	15,921	18,896	17,238	15,313
1985	24,038	19,644	17,236	6,082	17,557	17,762	18,701	17,578	19,064	16,330	16,338	19,833	17,541	15,838
1986	24,538	20,092	17,627	6,718	17,742	18,045	19,356	17,936	19,497	16,771	16,697	20,588	17,902	16,468
1987	25,022	20,656	18,270	7,418	18,012	18,413	19,390	18,248	19,782	17,264	16,821	20,900	18,403	17,213
1988	25,737	21,407	19,319	8,174	18,700	19,221	19,604	18,969	20,394	17,900	17,148	20,683	18,731	18,027
1989	26,354	21,542	20,169	8,610	19,306	19,849	19,705	19,669	20,924	18,392	17,847	20,785	19,049	18,356
1990	26,420	21,174	21,122	9,336	19,943	20,520	19,954	20,051	21,702	18,757	18,455	21,101	19,160	18,364
1991	25,881	20,551	21,893	10,088	20,289	20,764	20,169	20,094	22,505	18,912	18,722	21,655	18,817	17,927
1992	26,299	20,403	22,053	10,490	20,440	21,030	20,148	20,215	22,623	18,994	18,958	22,235	18,441	17,771
1993	26,613	20,564	22,019	10,981	20,315	20,666	20,380	19,849	21,956	19,035	18,968	22,716	17,927	18,082
1994	27,273	21,175	22,073	11,804	20,834	21,083	21,201	20,323	22,333	19,393	19,495	23,724	18,394	18,710
1995	27,572	21,405	22,210	12,732	21,170	21,445	21,678	20,675	22,586	19,934	19,814	24,371	18,952	19,108

NOTE: Country gross domestic products were determined with 1993 purchasing power parities using the Elteto-Köves-Szulc (EKS) aggregation method, which is the method used by the Organisation for Economic Co-operation and Development (OECD) and EUROSTAT in their official statistics. For a discussion of the properties of this aggregation method, see OECD, *Purchasing Power Parities and Real Expenditures, 1993: Volume 1, EKS Results* (Paris: 1995), p. 4.

[a]German data are for the former West Germany only.

SOURCE: U.S. Bureau of Labor Statistics, Office of Productivity and Technology, "Comparative Real Gross Domestic Product Per Capita and Per Employed Person, Fourteen Countries, 1960-1995" (Washington, DC: April 1997).

See figure 6-1.

Appendix table 6-3.
Real gross domestic product per employed person, for selected countries: 1960-95
(1995 U.S. dollars)

	United States	Canada	Japan	South Korea	Austria	Belgium	Denmark	France	Germany[a]	Italy	Nether-lands	Norway	Sweden	United Kingdom
1960	35,627	NA	9,545	NA	17,219	21,993	21,664	19,190	20,897	NA	21,801	19,090	19,461	21,030
1961	36,371	NA	10,791	NA	17,990	22,916	22,607	20,249	21,564	NA	22,111	19,940	20,401	21,350
1962	37,893	NA	11,421	NA	18,571	23,744	23,493	21,605	22,492	NA	22,609	20,362	21,155	21,527
1963	38,972	NA	12,514	5,562	19,458	24,604	23,315	22,579	23,069	NA	23,041	21,039	22,171	22,324
1964	40,361	NA	13,960	5,993	20,663	25,945	24,887	23,789	24,585	NA	24,590	22,023	23,348	23,235
1965	41,900	NA	14,452	6,022	21,393	26,766	25,613	24,849	25,755	NA	25,675	22,996	24,074	23,586
1966	43,307	NA	15,646	6,582	22,826	27,514	25,776	25,951	26,555	NA	26,190	23,761	24,543	23,975
1967	43,411	NA	16,981	6,735	23,931	28,706	26,826	27,098	27,365	NA	27,664	25,074	25,643	24,810
1968	44,526	NA	18,793	7,140	25,329	29,945	27,582	28,337	28,833	NA	29,246	25,608	26,297	25,946
1969	44,771	NA	20,895	7,905	26,936	31,398	29,065	29,862	30,509	NA	30,723	26,530	27,104	26,481
1970	44,523	NA	22,685	8,305	28,743	33,368	29,445	31,151	31,645	NA	32,109	26,631	28,305	27,162
1971	45,816	NA	23,526	8,723	29,864	34,351	30,057	32,494	32,481	NA	33,339	27,597	28,628	28,111
1972	46,925	NA	25,451	8,717	31,495	36,243	30,993	33,735	33,727	NA	34,675	28,712	29,187	28,917
1973	48,037	NA	26,799	9,320	32,477	38,057	31,718	35,084	34,953	NA	36,410	29,696	30,232	30,449
1974	46,986	NA	26,567	9,684	33,474	39,020	31,527	35,863	35,451	NA	37,521	30,836	30,592	29,860
1975	47,236	NA	27,484	10,114	33,551	39,003	31,720	36,077	35,973	NA	37,869	31,512	30,766	29,799
1976	48,300	39,289	28,308	10,650	34,881	41,409	33,178	37,315	38,090	NA	39,445	32,572	30,985	30,875
1977	48,896	39,891	29,161	11,409	36,136	41,774	33,443	38,198	39,118	NA	39,529	32,896	30,429	31,566
1978	49,245	40,339	30,326	11,962	36,074	42,871	33,584	39,284	39,965	NA	40,084	33,784	30,846	32,395
1979	49,294	40,199	31,594	12,652	37,562	43,389	34,360	40,481	40,967	NA	40,226	34,956	31,571	32,879
1980	48,926	39,625	32,153	12,295	38,535	45,308	34,369	41,070	40,737	NA	39,482	35,621	31,746	32,503
1981	49,570	39,945	32,896	12,741	38,406	45,422	34,517	41,755	40,821	41,076	39,073	35,587	31,690	33,227
1982	48,905	39,920	33,562	13,369	39,318	46,785	35,400	42,701	40,925	41,401	38,824	35,651	32,069	34,155
1983	50,221	40,918	33,779	14,776	40,479	47,337	36,184	43,058	42,246	41,826	40,275	37,437	32,556	35,575
1984	51,551	42,381	34,905	16,143	41,049	48,468	37,131	44,011	43,365	42,732	41,079	39,346	33,594	35,814
1985	52,415	43,116	36,195	16,578	41,956	48,557	37,778	44,973	43,918	43,810	41,165	40,339	33,893	36,688
1986	52,806	43,254	36,935	17,856	42,272	49,011	38,154	45,924	44,334	44,835	41,647	40,779	34,457	38,027
1987	52,978	43,870	38,090	18,879	42,991	49,805	37,938	46,807	44,666	46,373	41,525	40,752	35,260	38,970
1988	53,819	44,640	39,777	20,366	44,473	51,509	38,609	48,481	45,971	48,048	42,540	40,853	35,565	39,554
1989	54,534	44,801	40,882	20,813	45,499	52,463	39,044	49,885	46,953	49,472	43,578	42,420	35,887	39,492
1990	54,595	44,433	42,121	22,131	46,530	53,624	40,002	50,611	48,201	49,955	43,509	43,569	36,043	39,368
1991	54,571	44,475	42,955	23,468	47,103	54,396	41,154	50,951	49,402	50,176	43,738	45,272	36,183	39,508
1992	55,767	45,079	42,931	24,203	47,849	55,563	41,510	51,921	49,819	50,897	43,281	46,888	37,330	39,939
1993	56,279	45,475	42,859	25,206	48,289	55,409	42,541	51,832	49,603	51,592	43,157	48,093	38,516	41,085
1994	56,978	46,345	43,030	26,563	49,693	57,106	44,664	53,335	51,310	53,587	44,554	49,930	40,209	42,298
1995	57,333	46,693	43,377	28,174	50,746	57,977	45,166	53,843	52,462	55,841	44,776	50,511	41,013	43,137

NA = not available

NOTE: Country gross domestic products were determined with 1993 purchasing power parities using the Elteto-Köves-Szulc (EKS) aggregation method, which is the method used by the Organisation for Economic Co-operation and Development (OECD) and EUROSTAT in their official statistics. For a discussion of the properties of this aggregation method, see OECD, *Purchasing Power Parities and Real Expenditures, 1993: Volume 1, EKS Results* (Paris: 1995), p. 4.

[a]German data are for the former West Germany only.

SOURCE: U.S. Bureau of Labor Statistics, Office of Productivity and Technology, "Comparative Real Gross Domestic Product Per Capita and Per Employed Person, Fourteen Countries, 1960-1995" (Washington, DC: April 1997).

See figure 6-1.

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
United States														
1970	249,584.0	39.9	NA	NA	6,664.1	46.3	3,233.6	44.0	3,425.6	51.6	NA	NA	NA	NA
1971	263,018.0	40.0	10,495.9	NA	6,992.5	47.8	3,072.0	48.3	3,795.8	53.3	24,356.2	86.7	NA	NA
1972	290,424.0	38.9	11,234.4	47.9	7,528.8	45.6	3,620.5	45.5	4,465.2	56.9	26,848.9	48.1	263,575.1	38.2
1973	323,403.0	37.4	12,165.5	42.1	8,796.2	44.3	4,022.8	44.5	4,736.4	54.2	29,721.0	44.7	293,682.0	36.8
1974	337,278.0	33.3	12,819.4	42.6	7,062.3	35.2	4,451.3	45.6	4,668.2	46.8	29,001.3	41.5	308,276.8	32.7
1975	354,689.0	34.8	13,172.8	41.3	8,791.1	43.7	4,827.9	55.9	5,408.9	49.5	32,200.7	45.0	322,488.3	34.1
1976	405,313.0	34.7	14,018.4	44.0	9,900.5	42.9	5,536.7	43.3	6,408.5	50.4	35,864.0	44.6	369,449.0	34.0
1977	462,365.0	34.5	15,814.7	47.0	12,683.5	43.4	6,661.2	40.4	6,728.6	47.7	41,888.0	44.8	420,477.0	33.8
1978	516,936.0	34.4	18,499.0	45.1	14,580.6	42.6	8,246.0	40.9	7,427.8	46.2	48,753.4	43.7	468,182.6	33.6
1979	571,281.0	33.5	20,217.6	37.7	15,332.4	38.4	9,853.0	38.3	8,099.3	48.1	53,502.2	39.3	517,778.8	33.0
1980	584,406.0	32.1	20,083.8	32.8	19,821.6	41.8	11,959.5	38.4	9,352.2	48.1	61,217.1	38.4	523,188.9	31.5
1981	652,014.0	32.7	30,723.8	46.1	23,437.1	44.2	13,745.7	39.1	10,958.3	50.3	78,864.9	44.6	573,149.1	31.6
1982	649,768.0	33.7	33,401.5	46.8	24,414.1	43.2	15,330.3	37.4	12,911.4	53.2	86,057.3	44.6	563,710.7	32.5
1983	690,088.0	33.8	37,898.5	49.4	29,013.1	45.0	17,314.5	37.7	14,703.9	54.2	98,930.0	46.1	591,158.0	32.3
1984	780,524.0	34.3	39,989.5	46.1	36,191.5	43.3	19,856.0	35.1	15,304.0	53.2	111,341.0	43.6	669,183.0	33.2
1985	802,938.0	35.0	43,277.1	45.2	40,016.8	44.5	20,101.8	35.4	17,315.7	55.7	120,711.4	44.1	682,226.6	33.8
1986	833,149.0	36.4	48,064.1	46.4	41,814.8	44.2	18,079.4	34.8	18,691.8	54.1	126,650.1	44.5	706,498.9	35.3
1987	889,047.0	36.4	47,786.5	43.4	48,234.5	51.9	17,187.1	32.5	20,683.6	54.3	133,891.7	45.6	755,155.3	35.1
1988	971,297.0	36.5	49,504.9	43.5	51,642.7	51.6	18,864.1	31.4	23,209.5	54.1	143,221.2	45.2	828,075.8	35.3
1989	1,013,420.0	36.0	51,646.4	43.6	56,792.5	54.1	19,512.1	32.5	25,769.1	53.1	153,720.1	46.3	859,699.9	34.6
1990	1,031,350.0	35.8	53,608.2	41.0	57,367.3	52.6	19,299.1	33.2	29,075.2	55.0	159,349.8	45.4	872,000.2	34.5
1991	1,028,060.0	36.2	47,616.7	36.3	60,357.8	53.1	16,819.8	31.3	33,416.9	55.5	158,211.2	44.1	869,848.8	35.1
1992	1,063,570.0	35.9	45,246.7	35.4	62,524.0	49.2	17,618.3	29.6	36,165.7	55.2	161,554.7	42.5	902,015.3	34.9
1993	1,116,530.0	36.1	39,487.0	32.6	70,890.2	51.1	17,458.4	27.9	38,624.2	56.4	166,459.8	42.6	950,070.2	35.1
1994	1,197,090.0	36.2	NA	NA	84,507.9	53.9	19,521.9	27.3	40,586.0	55.0	NA	NA	NA	NA
1995	1,287,710.0	36.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
Japan														
1970	26,402,200.0	32.8	44,334.4	44.3	1,470,640.0	37.5	312,745.0	36.2	549,674.0	55.8	2,377,393.4	40.5	24,024,806.6	32.2
1971	28,430,200.0	33.8	51,899.5	45.3	1,458,200.0	37.7	327,933.0	38.1	658,130.0	60.0	2,496,162.5	42.0	25,934,037.5	33.1
1972	31,917,900.0	34.3	62,418.6	45.3	1,738,620.0	39.1	365,772.0	39.5	672,480.0	61.4	2,839,290.6	43.0	29,078,609.4	33.7
1973	39,568,100.0	33.5	90,705.1	47.1	1,972,330.0	37.5	449,269.0	35.6	704,728.0	58.7	3,217,032.1	40.6	36,351,067.9	32.9
1974	45,137,200.0	30.8	108,524.0	48.5	2,078,780.0	37.0	581,084.0	36.1	619,336.0	42.4	3,387,724.0	38.0	41,749,476.0	30.3
1975	44,800,800.0	31.0	121,152.0	49.0	1,972,680.0	38.4	556,282.0	36.9	856,016.0	51.6	3,506,130.0	41.0	41,294,670.0	30.4
1976	51,100,500.0	30.9	133,580.0	49.5	2,618,840.0	36.0	600,145.0	39.2	995,602.0	55.0	4,348,167.0	39.9	46,752,333.0	30.2
1977	55,412,200.0	31.2	132,919.0	49.0	2,822,760.0	36.4	726,608.0	33.5	1,178,250.0	57.9	4,860,537.0	39.7	50,551,663.0	30.6
1978	60,545,300.0	32.6	148,533.0	49.0	2,928,110.0	36.2	836,794.0	33.5	1,502,180.0	67.5	5,415,617.0	41.3	55,129,683.0	32.0
1979	64,815,400.0	31.2	134,096.0	42.8	3,240,990.0	35.4	989,708.0	33.7	1,312,850.0	55.6	5,677,644.0	38.4	59,137,756.0	30.7
1980	70,232,300.0	29.0	153,506.0	44.4	3,932,900.0	33.2	1,179,570.0	33.5	1,476,360.0	52.4	6,742,336.0	36.4	63,489,964.0	28.3
1981	74,938,500.0	29.9	147,224.0	44.6	4,865,830.0	33.3	1,335,990.0	32.4	1,760,620.0	55.5	8,109,664.0	36.5	66,828,836.0	29.2
1982	78,467,500.0	30.9	176,235.0	42.7	5,393,120.0	35.3	1,542,630.0	34.0	1,928,100.0	55.9	9,040,085.0	38.2	69,427,415.0	30.1
1983	81,747,700.0	31.5	203,000.0	43.8	6,278,730.0	34.8	1,986,090.0	34.3	2,093,640.0	58.0	10,561,460.0	37.9	71,186,240.0	30.7
1984	89,244,900.0	31.9	231,453.0	45.0	8,146,470.0	34.7	2,342,440.0	32.7	2,046,000.0	57.0	12,766,363.0	36.7	76,478,537.0	31.2
1985	94,672,600.0	32.9	283,397.0	45.1	8,276,160.0	35.3	2,853,440.0	35.6	2,107,600.0	57.8	13,520,597.0	37.8	81,152,003.0	32.2
1986	95,817,400.0	35.0	265,439.0	44.0	8,308,320.0	35.3	2,912,310.0	36.6	2,326,180.0	61.7	13,812,249.0	38.5	82,005,151.0	34.4
1987	98,406,700.0	36.2	331,277.0	47.6	8,285,500.0	35.6	2,895,760.0	34.6	2,478,640.0	61.7	13,991,177.0	38.5	84,415,523.0	35.8
1988	105,000,000.0	35.9	297,266.0	41.4	9,291,270.0	35.2	3,117,800.0	34.6	2,526,560.0	60.1	15,232,896.0	37.8	89,767,104.0	35.6
1989	113,000,000.0	35.7	265,123.0	36.2	10,281,900.0	36.0	3,535,620.0	34.9	2,756,460.0	61.2	16,839,103.0	38.4	96,160,897.0	35.3
1990	121,000,000.0	35.6	262,173.0	35.1	10,973,200.0	36.3	3,946,330.0	35.0	2,778,640.0	60.3	17,960,343.0	38.3	103,039,657.0	35.2
1991	129,000,000.0	36.1	276,712.0	37.0	11,580,100.0	35.7	4,218,600.0	34.4	2,864,740.0	60.7	18,940,152.0	37.8	110,059,848.0	35.8
1992	128,000,000.0	37.1	316,265.0	38.9	10,349,400.0	35.5	4,007,420.0	33.7	2,992,610.0	61.4	17,665,695.0	37.8	110,334,305.0	37.0
1993	121,000,000.0	37.1	350,262.0	41.7	9,763,680.0	34.8	3,430,760.0	31.7	3,098,270.0	61.8	16,642,972.0	37.2	104,357,028.0	37.1
1994	117,000,000.0	37.2	NA	NA	9,629,530.0	35.5	3,189,820.0	34.2	3,115,700.0	NA	NA	NA	NA	NA
1995	120,000,000.0	37.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
Germany														
1970	259,450.0	40.0	934.6	33.7	NA	NA	4,018.1	79.7	NA	NA	NA	NA	NA	NA
1971	277,210.0	40.2	1,011.1	33.5	NA	NA	4,383.3	80.0	NA	NA	NA	NA	NA	NA
1972	295,650.0	40.4	1,159.2	37.5	NA	NA	5,033.5	80.6	NA	NA	NA	NA	NA	NA
1973	332,580.0	40.2	1,651.3	42.9	NA	NA	5,238.3	81.0	NA	NA	NA	NA	NA	NA
1974	354,320.0	38.0	1,647.1	38.9	NA	NA	5,311.6	79.6	NA	NA	NA	NA	NA	NA
1975	352,540.0	38.0	1,528.7	39.8	NA	NA	4,551.5	82.5	5,501.4	48.7	NA	NA	NA	NA
1976	387,270.0	37.4	1,744.7	45.8	21,028.0	50.0	4,934.4	83.1	6,050.4	47.9	33,757.5	52.4	353,512.5	36.4
1977	411,480.0	38.2	1,764.5	46.4	22,689.3	56.3	5,930.0	81.8	6,444.5	46.7	36,828.3	56.5	374,651.7	37.0
1978	435,350.0	38.9	2,491.1	55.0	22,894.1	56.4	5,951.5	81.6	6,993.3	50.4	38,330.1	57.8	397,019.9	37.7
1979	467,080.0	37.7	2,928.2	48.9	23,919.8	54.5	6,130.5	81.4	7,466.1	50.6	40,444.6	56.0	426,635.4	36.5
1980	476,250.0	35.8	3,272.1	38.1	25,281.6	54.0	6,236.4	77.8	7,356.0	47.1	42,146.1	53.3	434,103.9	34.7
1981	485,710.0	35.0	3,894.3	39.7	26,710.0	54.2	7,582.4	75.6	8,257.4	49.3	46,444.0	54.1	439,266.0	33.8
1982	496,010.0	35.2	3,938.0	34.2	29,017.4	54.6	8,595.1	81.5	8,579.9	50.5	50,130.4	54.4	445,879.6	33.9
1983	519,420.0	35.9	3,932.2	39.0	30,586.4	53.3	9,645.1	76.4	9,676.3	51.5	53,840.0	54.5	465,580.0	34.5
1984	542,600.0	35.2	4,261.0	42.4	31,774.7	52.2	10,732.0	63.7	9,902.6	49.2	56,670.3	52.5	485,929.7	33.9
1985	578,850.0	35.3	4,390.4	40.9	35,119.6	50.4	11,645.3	59.0	10,367.3	49.9	61,522.6	50.9	517,327.4	34.1
1986	620,440.0	38.0	4,716.0	44.5	37,748.9	49.7	12,199.6	62.4	11,770.7	53.3	66,435.2	51.8	554,004.8	36.8
1987	624,690.0	38.1	5,005.4	41.4	40,639.2	55.8	11,786.0	63.9	11,267.4	49.8	68,698.0	54.5	555,992.0	36.8
1988	652,670.0	37.7	5,534.7	45.9	43,421.3	57.2	12,208.3	63.3	12,339.5	50.3	73,503.8	55.8	579,166.2	36.2
1989	686,010.0	36.6	6,254.1	37.7	46,078.2	56.5	11,959.0	63.6	12,793.0	48.0	77,084.3	53.7	608,925.7	35.2
1990	741,550.0	37.0	6,751.8	36.3	48,472.8	54.1	12,635.2	61.0	13,462.0	47.1	81,321.8	51.6	660,228.2	35.7
1991	790,660.0	36.8	7,648.6	38.7	48,115.2	48.6	16,935.1	58.9	14,714.5	49.9	87,413.4	49.4	703,246.6	35.6
1992	799,090.0	37.1	7,585.2	42.7	48,153.7	48.0	14,677.4	55.4	15,746.1	49.7	86,162.4	48.9	712,927.6	36.0
1993	746,310.0	37.2	NA	NA	45,918.9	46.4	11,288.3	52.4	16,032.3	51.3	NA	NA	NA	NA
1994	765,980.0	36.9	NA	NA	46,476.6	45.8	12,332.2	49.4	16,747.5	51.0	NA	NA	NA	NA
1995	789,452.0	36.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
France														
1970	215,840.0	38.5	3,042.1	35.8	6,646.6	52.6	4,787.8	61.4	2,449.5	30.8	16,925.9	45.9	198,914.1	38.0
1971	238,979.0	38.7	3,373.1	36.0	7,610.5	52.3	4,958.0	59.9	2,828.0	30.9	18,769.6	45.4	220,209.4	38.3
1972	265,734.0	38.8	3,861.5	36.8	8,710.6	50.7	5,288.2	59.3	2,995.6	30.6	20,855.9	45.0	244,878.1	38.4
1973	302,922.0	38.2	4,261.5	35.6	10,425.4	50.0	4,959.0	55.4	3,491.6	31.1	23,137.5	43.7	279,784.5	37.8
1974	342,318.0	34.5	4,491.6	31.2	12,618.0	49.6	5,255.1	55.6	4,085.3	31.3	26,450.0	42.4	315,868.0	33.9
1975	381,286.0	37.4	6,030.2	36.3	14,605.9	49.4	5,772.4	53.6	4,753.1	31.0	31,161.6	43.1	350,124.4	36.9
1976	440,749.0	37.0	9,302.5	38.6	16,866.2	48.3	7,429.9	54.1	5,197.5	31.1	38,796.2	43.4	401,952.9	36.4
1977	496,403.0	37.5	10,401.0	39.1	19,146.8	47.4	8,815.8	54.1	5,831.0	31.2	44,194.6	43.3	452,208.4	37.0
1978	564,275.0	39.1	12,980.0	45.8	21,402.6	46.7	8,825.8	53.3	7,558.0	33.3	50,766.4	44.8	513,508.6	38.6
1979	635,601.0	38.1	13,802.0	42.0	25,020.7	43.2	9,718.4	51.3	8,308.0	34.4	56,849.1	42.5	578,751.9	37.7
1980	679,520.0	35.6	16,032.0	39.5	27,054.3	43.9	11,041.2	51.1	9,857.0	34.4	63,984.5	42.0	615,535.5	35.0
1981	733,461.0	34.8	20,108.0	37.9	30,620.0	45.3	13,287.8	50.6	11,377.0	33.3	75,392.8	41.6	658,068.2	34.1
1982	821,520.0	35.0	22,480.0	37.0	34,829.1	45.0	15,791.5	48.4	12,526.0	32.3	85,626.6	40.8	735,893.4	34.4
1983	900,970.0	35.6	27,250.0	40.8	39,133.7	43.2	18,105.4	45.2	15,256.0	34.2	99,745.1	41.2	801,224.9	35.0
1984	956,273.0	34.6	29,913.0	36.9	46,728.4	42.9	25,249.8	48.3	15,271.0	31.2	117,162.2	40.2	839,110.8	33.9
1985	1,033,130.0	35.3	31,005.0	38.1	49,149.9	41.0	28,660.3	47.6	16,247.9	30.0	125,063.1	39.6	908,066.9	34.8
1986	1,120,100.0	38.4	31,444.0	38.6	50,915.5	40.3	29,114.3	47.9	18,851.0	32.1	130,324.8	39.8	989,775.2	38.2
1987	1,143,220.0	38.1	30,661.0	36.8	54,579.1	40.5	27,852.4	47.3	20,368.0	33.3	133,460.5	39.5	1,009,759.5	37.9
1988	1,242,130.0	38.3	35,566.0	37.3	59,239.2	40.9	31,247.6	45.8	21,645.9	31.5	147,698.7	39.2	1,094,431.3	38.2
1989	1,324,620.0	37.3	38,809.0	35.0	62,245.9	39.4	33,131.6	43.6	21,884.0	29.1	156,070.5	37.2	1,168,549.5	37.3
1990	1,394,500.0	37.7	39,840.0	32.5	64,615.6	38.9	34,470.6	44.1	24,548.9	30.5	163,475.1	36.5	1,231,024.9	37.9
1991	1,409,770.0	37.7	39,877.0	32.0	66,026.1	37.4	34,360.4	42.7	25,742.9	30.4	166,006.4	35.6	1,243,763.6	38.0
1992	1,402,730.0	37.6	39,883.0	31.4	66,815.0	37.7	32,387.0	41.8	29,427.9	31.9	168,512.9	35.5	1,234,217.1	37.9
1993	1,380,290.0	38.7	40,646.0	33.6	66,032.0	38.2	28,850.0	40.6	32,935.8	33.9	168,463.8	36.5	1,211,826.2	39.0
1994	1,423,060.0	37.9	38,330.0	31.4	67,573.0	37.4	28,584.0	39.1	31,715.8	32.2	166,202.8	35.0	1,256,857.2	38.3
1995	1,478,010.0	37.6	42,874.0	34.7	71,080.0	37.2	29,687.0	38.0	32,670.0	31.2	176,311.0	35.4	1,301,699.0	37.9

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
United Kingdom														
1970	14,839.0	31.3	474.6	78.5	546.5	36.9	117.6	32.3	226.3	42.5	1,365.1	45.7	13,473.9	30.4
1971	16,093.0	32.0	534.0	81.1	638.1	38.1	115.7	34.2	259.8	44.8	1,547.5	47.6	14,545.5	30.9
1972	18,088.0	33.6	577.7	82.6	717.2	39.1	161.9	38.9	259.8	44.0	1,716.6	48.5	16,371.4	32.6
1973	20,969.0	33.1	606.0	79.8	840.9	37.8	181.8	35.8	292.1	41.0	1,920.8	45.7	19,048.2	32.2
1974	22,720.0	27.3	563.5	64.0	919.4	35.4	216.3	33.3	316.3	35.6	2,015.6	40.2	20,704.4	26.5
1975	27,657.0	29.7	764.3	69.2	1,136.4	39.7	301.0	39.6	412.2	39.3	2,614.0	45.3	25,043.0	28.7
1976	31,883.0	28.2	842.4	38.5	1,223.2	35.4	271.1	30.9	474.0	37.6	2,810.7	36.1	29,072.3	27.6
1977	38,512.0	29.2	896.4	38.6	1,483.2	38.2	352.1	35.9	669.5	41.6	3,401.1	38.7	35,110.9	28.5
1978	44,586.0	31.2	1,046.4	39.8	1,805.7	40.4	433.7	38.4	808.6	43.2	4,094.3	40.6	40,491.7	30.5
1979	49,395.0	29.9	1,159.5	35.5	1,906.6	38.0	570.5	38.4	921.2	41.0	4,557.8	37.9	44,837.2	29.2
1980	54,144.0	30.7	1,727.3	37.1	2,407.2	40.4	642.0	40.5	1,107.7	45.4	5,884.2	40.2	48,259.8	29.8
1981	55,834.0	31.3	1,861.6	35.1	2,578.7	39.9	621.1	42.5	1,192.1	45.2	6,253.5	39.4	49,580.5	30.5
1982	61,158.0	32.3	2,004.2	37.7	3,051.5	42.5	771.6	44.4	1,493.2	49.0	7,320.4	42.4	53,837.6	31.3
1983	64,738.0	31.8	2,305.5	41.0	3,296.0	40.2	921.1	40.0	1,553.8	47.5	8,076.4	41.6	56,661.6	30.7
1984	68,634.0	30.3	2,139.2	36.8	3,890.0	38.6	1,111.6	33.9	1,725.8	47.0	8,866.6	38.8	59,767.4	29.4
1985	76,801.0	31.7	2,228.8	33.1	4,222.1	40.0	1,509.1	35.1	1,988.4	49.3	9,948.3	38.8	66,852.7	30.8
1986	82,422.0	34.1	2,942.0	36.2	4,285.4	39.7	1,499.9	36.5	2,182.4	49.3	10,909.7	39.7	71,512.3	33.4
1987	89,902.0	33.1	3,028.1	34.1	4,459.8	38.5	1,791.9	34.7	2,526.0	50.3	11,805.7	38.5	78,096.3	32.5
1988	100,232.0	33.5	3,394.6	37.2	4,972.2	39.1	2,302.6	34.0	2,939.6	51.4	13,609.0	39.6	86,623.1	32.8
1989	107,166.0	32.9	4,200.7	38.6	4,867.5	35.8	2,398.2	30.6	3,175.9	50.0	14,642.2	37.9	92,523.8	32.2
1990	111,315.0	32.9	5,078.3	42.7	4,914.4	35.2	2,465.8	29.7	3,493.2	51.1	15,951.6	38.9	95,363.4	32.0
1991	106,896.0	32.6	4,770.9	39.6	4,744.9	36.2	2,331.7	28.1	3,801.1	50.5	15,648.6	38.2	91,247.5	31.8
1992	109,071.0	32.2	3,818.5	28.9	4,790.2	36.2	2,093.1	24.0	4,216.0	48.7	14,917.8	34.0	94,153.2	31.9
1993	113,940.0	32.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1994	121,272.0	32.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1995	128,631.0	32.4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
Italy														
1970	18,105,000.0	36.4	92,206.4	30.8	455,451.0	47.3	415,480.0	56.5	358,597.0	32.5	1,321,734.4	42.6	16,783,265.6	36.0
1971	19,452,000.0	36.4	110,424.0	30.4	518,762.0	48.5	369,564.0	59.7	386,415.0	32.8	1,385,165.0	42.9	18,066,835.0	36.0
1972	21,016,000.0	36.5	116,961.0	30.1	572,976.0	48.4	282,613.0	61.4	402,055.0	32.4	1,374,605.0	42.0	19,641,395.0	36.1
1973	26,064,000.0	36.6	115,832.0	28.2	660,403.0	50.7	227,590.0	66.2	420,390.0	34.9	1,424,215.0	43.7	24,639,785.0	36.2
1974	34,901,000.0	36.5	148,263.0	30.0	846,521.0	49.9	275,660.0	67.1	502,252.0	43.9	1,772,696.0	47.3	33,128,304.0	36.1
1975	38,436,000.0	36.6	205,515.0	27.1	920,971.0	46.5	312,219.0	64.4	606,728.0	41.4	2,045,433.0	43.6	36,390,567.0	36.2
1976	51,506,000.0	36.6	325,492.0	27.9	1,269,360.0	42.5	411,565.0	60.7	769,069.0	42.3	2,775,486.0	41.7	48,730,514.0	36.3
1977	61,862,000.0	36.6	407,608.0	29.5	1,583,880.0	39.6	488,671.0	58.2	839,007.0	41.3	3,319,166.0	40.2	58,542,834.0	36.4
1978	71,459,000.0	36.6	495,955.0	26.1	1,626,920.0	37.5	541,710.0	56.8	986,175.0	41.9	3,650,760.0	38.2	67,808,240.0	36.5
1979	87,935,000.0	36.6	626,340.0	27.5	1,916,120.0	37.8	772,625.0	58.3	1,191,210.0	42.2	4,506,295.0	39.2	83,428,705.0	36.5
1980	107,923,000.0	36.6	797,661.0	25.6	2,152,840.0	35.7	960,427.0	57.3	1,655,330.0	46.0	5,566,258.0	38.6	102,356,742.0	36.5
1981	124,119,000.0	36.0	1,191,630.0	25.7	2,617,300.0	37.7	1,174,270.0	55.1	1,825,950.0	44.8	6,809,150.0	38.3	117,309,850.0	35.9
1982	140,932,000.0	35.6	1,448,060.0	24.0	3,175,750.0	34.8	1,451,200.0	53.7	2,292,240.0	43.2	8,367,250.0	36.1	132,564,750.0	35.6
1983	156,417,000.0	35.6	1,574,680.0	31.2	4,114,330.0	51.9	1,685,190.0	62.5	3,600,430.0	61.4	10,974,630.0	51.0	145,442,370.0	34.8
1984	176,942,000.0	34.2	1,707,630.0	36.4	4,602,440.0	54.2	2,047,180.0	59.3	3,977,200.0	54.9	12,334,450.0	51.7	164,607,550.0	33.4
1985	196,484,000.0	34.2	1,864,080.0	26.8	4,901,630.0	41.9	2,732,170.0	76.4	4,745,400.0	50.2	14,243,280.0	45.0	182,240,720.0	33.5
1986	213,686,000.0	35.9	2,247,060.0	36.5	5,306,900.0	45.0	2,751,730.0	30.9	4,986,940.0	48.5	15,292,630.0	41.2	198,393,370.0	35.6
1987	230,093,000.0	35.8	2,321,930.0	40.3	5,816,800.0	46.4	2,914,680.0	31.5	5,598,060.0	43.0	16,651,470.0	41.1	213,441,530.0	35.4
1988	256,378,000.0	34.8	2,567,880.0	35.9	6,619,280.0	40.0	3,106,570.0	24.7	NA	NA	NA	NA	NA	NA
1989	279,654,000.0	33.8	3,273,600.0	45.2	7,884,310.0	49.3	3,308,120.0	31.2	NA	NA	NA	NA	NA	NA
1990	293,622,000.0	34.3	3,544,500.0	46.5	8,608,650.0	51.1	2,886,320.0	24.9	NA	NA	NA	NA	NA	NA
1991	300,246,000.0	34.9	3,285,340.0	45.9	8,860,790.0	52.5	2,904,940.0	30.3	NA	NA	NA	NA	NA	NA
1992	307,906,000.0	35.5	NA	NA	8,883,320.0	54.2	3,167,660.0	32.5	NA	NA	NA	NA	NA	NA
1993	310,429,000.0	35.3	NA	NA	8,520,540.0	53.5	3,085,930.0	33.1	NA	NA	NA	NA	NA	NA
1994	331,620,000.0	34.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1995	369,033,000.0	33.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
South Korea														
1970	581,700.0	25.8	NA	NA	16,885.7	40.7	312,745.0	36.2	11,706.0	39.2	341,336.7	36.5	240,363.3	18.2
1971	721,900.0	24.7	NA	NA	25,898.1	39.5	327,933.0	38.1	16,206.0	40.6	370,037.1	38.3	351,862.9	18.0
1972	937,000.0	25.0	NA	NA	39,020.8	33.7	365,772.0	39.5	17,120.5	36.4	421,913.3	38.8	515,086.7	19.4
1973	1,350,200.0	25.0	NA	NA	76,210.2	30.5	449,269.0	35.6	20,159.1	35.0	545,638.3	34.8	804,561.7	21.0
1974	1,970,300.0	23.2	NA	NA	154,792.0	34.0	581,084.0	36.1	34,424.8	40.4	770,300.8	35.9	1,199,999.2	19.0
1975	2,665,300.0	24.1	NA	NA	202,702.0	36.8	556,282.0	36.9	58,688.5	36.7	817,672.5	36.9	1,847,627.5	20.9
1976	3,862,400.0	25.3	NA	NA	307,050.0	32.8	600,145.0	39.2	84,443.9	43.2	991,638.9	37.2	2,870,761.1	22.7
1977	4,837,300.0	25.3	NA	NA	327,563.0	32.2	726,608.0	33.5	112,835.0	44.7	1,167,006.0	34.0	3,670,294.0	23.4
1978	6,513,900.0	25.3	NA	NA	436,609.0	28.4	836,794.0	33.5	148,212.0	45.2	1,421,615.0	32.6	5,092,285.0	23.9
1979	8,644,800.0	24.6	NA	NA	608,218.0	29.0	989,708.0	33.7	176,438.0	40.3	1,774,364.0	32.4	6,870,436.0	23.2
1980	10,743,100.0	22.8	NA	NA	700,517.0	29.7	1,179,570.0	33.5	266,539.0	43.4	2,146,626.0	33.0	8,596,474.0	21.2
1981	13,566,700.0	22.8	NA	NA	921,156.0	29.8	1,335,990.0	32.4	290,042.0	41.8	2,547,188.0	32.2	11,019,512.0	21.4
1982	15,376,400.0	23.2	NA	NA	974,522.0	29.8	1,542,630.0	34.0	380,122.0	44.7	2,897,274.0	33.5	12,479,126.0	21.7
1983	18,637,000.0	24.3	NA	NA	1,358,180.0	30.2	1,986,090.0	34.3	456,738.0	46.9	3,801,008.0	33.7	14,835,992.0	22.6
1984	21,989,100.0	24.6	NA	NA	1,890,080.0	30.9	2,342,440.0	32.7	517,734.0	45.7	4,750,254.0	32.9	17,238,846.0	23.0
1985	24,080,000.0	24.8	NA	NA	1,958,250.0	30.9	2,853,440.0	35.6	558,327.0	45.0	5,370,017.0	34.4	18,709,983.0	23.0
1986	29,449,400.0	25.5	NA	NA	2,722,600.0	28.1	2,912,310.0	36.6	681,001.0	50.1	6,315,911.0	33.2	23,133,489.0	24.0
1987	35,173,500.0	25.1	NA	NA	3,471,710.0	25.2	2,895,760.0	34.6	734,021.0	50.6	7,101,491.0	30.1	28,072,009.0	24.0
1988	42,679,200.0	26.3	NA	NA	4,395,730.0	26.1	3,117,800.0	34.6	989,079.0	46.5	8,502,609.0	30.4	34,176,591.0	25.4
1989	46,252,900.0	26.6	NA	NA	4,896,630.0	28.8	3,535,620.0	34.9	931,269.0	49.9	9,363,519.0	32.3	36,889,381.0	25.5
1990	52,351,000.0	26.5	NA	NA	5,855,520.0	30.8	3,946,330.0	35.0	923,660.0	38.7	10,725,510.0	32.8	41,625,490.0	25.3
1991	61,527,300.0	27.5	NA	NA	6,687,980.0	32.1	4,218,600.0	34.4	1,182,850.0	43.3	12,089,430.0	33.7	49,437,870.0	26.3
1992	66,711,400.0	27.7	NA	NA	6,947,920.0	32.4	4,007,420.0	33.7	1,357,870.0	43.7	12,313,210.0	33.8	54,398,190.0	26.6
1993	72,162,400.0	28.4	NA	NA	8,655,490.0	35.6	3,430,760.0	31.7	1,491,550.0	44.5	13,577,800.0	35.3	58,584,600.0	27.2
1994	82,131,900.0	29.1	NA	NA	10,401,400.0	36.0	3,189,820.0	34.2	1,669,010.0	47.2	15,260,230.0	36.5	NA	NA
1995	94,484,800.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix table 6-4.
High-technology manufacturing in selected industrialized countries, value added and domestic content: 1970-95

	Total manufacturing		Aircraft		Communications		Office & computers		Drugs & medicines		High-tech manufacturing		Other manufacturing	
	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]	Value added (millions of nat'l currency)	Value added/ production (percent)[a]
Spain														
1970	579,816.0	25.4	NA	NA	NA	NA	NA	NA	11,914.3	28.4	NA	NA	NA	NA
1971	656,537.0	25.9	NA	NA	NA	NA	NA	NA	11,983.0	21.0	NA	NA	NA	NA
1972	810,781.0	26.8	NA	NA	NA	NA	NA	NA	16,409.0	24.8	NA	NA	NA	NA
1973	1,005,790.0	27.4	NA	NA	NA	NA	NA	NA	21,130.4	26.7	NA	NA	NA	NA
1974	1,281,930.0	26.1	NA	NA	NA	NA	NA	NA	25,830.8	29.4	NA	NA	NA	NA
1975	1,430,960.0	27.1	NA	NA	NA	NA	NA	NA	29,614.5	31.3	NA	NA	NA	NA
1976	1,713,390.0	27.5	NA	NA	NA	NA	NA	NA	33,523.4	32.6	NA	NA	NA	NA
1977	2,148,850.0	28.6	NA	NA	NA	NA	NA	NA	43,109.3	36.8	NA	NA	NA	NA
1978	3,719,230.0	36.3	7,873.2	67.6	92,189.6	47.0	6,791.4	55.9	73,576.0	49.1	180,430.2	48.8	3,538,799.8	35.8
1979	4,229,370.0	36.8	10,448.9	76.9	94,687.3	48.4	8,194.6	53.0	87,042.0	51.9	200,372.8	51.1	4,028,997.2	36.3
1980	4,977,920.0	36.0	13,242.0	68.6	109,189.0	56.1	8,804.9	42.0	99,517.8	49.2	230,753.7	52.8	4,747,166.3	35.5
1981	5,321,120.0	35.8	18,693.7	65.8	113,029.0	56.9	14,861.5	43.8	121,279.0	52.6	267,863.2	54.5	5,053,256.8	35.1
1982	5,779,520.0	36.5	22,084.0	57.4	133,100.0	53.7	18,439.4	41.0	135,298.0	52.3	308,921.4	52.4	5,470,598.6	35.9
1983	6,541,970.0	36.4	25,394.5	64.2	155,770.0	55.0	20,476.0	48.9	147,872.0	53.1	349,512.5	54.3	6,192,457.5	35.7
1984	6,963,460.0	35.9	21,629.7	67.7	156,185.0	51.5	34,914.9	33.3	154,368.0	54.8	367,097.6	50.8	6,596,362.4	35.3
1985	7,531,800.0	36.2	26,964.2	70.2	154,470.0	50.2	42,962.5	30.1	187,252.0	55.6	411,648.7	49.8	7,120,151.3	35.7
1986	8,322,400.0	40.3	30,872.1	66.5	134,133.0	45.3	34,880.2	29.6	192,557.0	50.5	392,442.3	46.6	7,929,957.7	40.0
1987	9,029,700.0	40.7	35,729.1	60.2	144,252.0	44.3	31,444.4	29.4	217,789.0	50.9	429,214.5	46.7	8,600,485.5	40.5
1988	9,679,100.0	40.5	56,535.0	70.0	182,952.0	46.2	45,087.5	36.0	251,587.0	52.0	536,161.5	49.4	9,142,938.5	40.1
1989	10,675,100.0	40.3	58,861.1	61.6	221,873.0	44.3	55,574.4	42.4	320,233.0	54.5	656,541.5	50.0	10,018,558.5	39.8
1990	11,346,300.0	40.6	76,298.3	66.6	264,633.0	45.7	45,462.4	42.9	377,487.0	57.1	763,880.7	52.3	10,582,419.3	39.9
1991	12,011,700.0	40.9	61,303.8	63.9	240,803.0	46.0	64,162.5	41.0	453,695.0	57.5	819,964.3	52.4	11,191,735.7	40.3
1992	12,380,800.0	42.4	73,806.6	67.9	190,498.0	43.3	35,097.2	26.8	556,604.0	62.9	856,005.8	54.7	11,524,794.2	41.7
1993	12,653,100.0	43.1	NA	NA	229,692.0	44.2	56,937.3	38.1	526,134.0	65.0	NA	NA	NA	NA
1994	13,993,500.0	44.0	NA	NA	269,982.0	44.4	67,821.5	39.5	638,410.0	66.6	NA	NA	NA	NA
1995	16,293,000.0	45.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = not available

NOTE: For U.S. value added, the Organisation for Economic Co-operation and Development reports data supplied by the U.S. Bureau of Economic Analysis on "Gross Product Originating."

[a]The production data used in this calculation are valued in national currency and are maintained by the Organisation for Economic Co-operation and Development in its Structural Analysis Database. These data do not match the production data provided in appendix table 6-5, which are valued in 1987 U.S. dollars.

SOURCE: Organisation for Economic Co-operation and Development, Structural Analysis Database (1996 edition).

See text table 6-2.

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
All manufacturing industries																
Production																
All countries[a]	7,754,045	8,144,508	8,063,357	8,289,382	8,891,805	9,044,120	9,136,926	9,536,219	10,117,377	10,496,222	10,617,686	10,698,977	10,757,128	10,722,920	11,239,430	11,647,170
United States	2,070,477	2,201,960	2,077,227	2,143,027	2,326,374	2,282,612	2,300,127	2,465,600	2,568,882	2,553,131	2,544,395	2,485,743	2,622,845	2,685,838	2,859,185	2,949,769
Canada	173,666	188,763	173,291	183,293	208,511	222,268	230,649	237,541	247,747	243,392	229,974	217,454	223,449	242,460	256,594	267,526
Japan	1,387,623	1,486,046	1,550,489	1,594,840	1,713,927	1,791,557	1,734,699	1,747,725	1,898,321	2,034,442	2,188,385	2,316,907	2,226,411	2,082,610	2,108,386	2,149,120
Germany[b]	637,296	683,703	695,146	708,441	752,312	799,415	794,950	792,963	826,756	882,596	920,154	977,212	947,558	983,256	1,053,734	1,091,743
France	435,143	461,449	478,474	479,285	495,137	501,172	497,227	499,816	524,458	555,932	567,715	571,754	569,432	533,252	554,404	570,845
United Kingdom	348,576	339,809	345,213	358,294	389,559	402,759	400,410	422,852	438,471	448,461	445,029	410,934	435,123	432,630	454,420	472,542
Italy	303,334	312,897	304,996	319,591	347,187	342,220	338,427	345,702	366,457	376,611	366,952	361,669	355,602	347,457	355,722	367,267
China	262,631	243,072	237,225	249,783	244,522	249,616	249,996	274,338	339,767	384,841	313,891	330,941	402,398	541,573	590,053	650,192
South Korea	56,177	66,004	69,885	79,768	92,905	96,487	116,248	138,475	153,162	160,954	177,614	191,979	203,919	220,871	240,551	264,786
Taiwan	71,000	74,776	75,383	83,700	97,038	104,372	128,187	139,648	152,272	152,585	149,580	159,417	158,268	167,748	173,906	186,186
Singapore	13,158	15,048	14,732	15,201	17,375	16,696	19,175	24,209	30,229	28,545	30,165	32,001	33,044	36,695	40,449	44,775
Hong Kong	19,404	23,400	21,411	27,058	27,864	24,962	31,356	36,428	37,173	34,477	32,188	30,364	28,728	28,230	28,229	29,812
Exports																
All countries[a]	1,442,807	1,583,926	1,571,788	1,591,194	1,741,579	1,828,029	1,901,237	2,005,552	2,310,416	2,482,678	2,566,262	2,738,487	2,927,673	3,118,098	3,409,123	3,714,972
United States	205,076	215,057	196,520	180,829	190,702	190,464	200,625	223,520	264,049	305,129	325,537	348,973	375,126	377,147	416,582	467,518
Canada	44,565	50,655	51,778	55,429	66,920	70,194	77,883	76,625	86,283	83,531	87,029	88,615	97,605	105,809	122,345	138,911
Japan	167,319	193,214	193,229	200,055	228,986	240,658	239,059	236,189	256,177	271,250	282,871	286,565	289,159	278,073	278,147	294,184
Germany[b]	201,714	236,978	247,717	242,019	263,450	285,055	279,874	283,854	322,975	344,675	338,540	354,008	357,603	351,484	386,804	412,372
France	102,074	115,528	113,789	114,475	123,326	127,871	125,219	129,568	149,018	159,338	163,496	176,072	184,356	191,650	203,617	217,441
United Kingdom	97,352	92,825	93,078	91,172	98,780	105,171	116,086	121,666	144,213	146,143	153,904	167,575	168,925	174,021	179,349	195,422
Italy	82,515	94,925	95,392	96,995	103,152	112,328	111,828	112,926	127,040	136,181	133,165	136,445	141,531	164,161	176,868	191,834
China	14,390	16,860	16,614	16,623	18,414	15,966	20,939	25,122	38,878	38,979	54,583	63,869	77,492	87,194	107,234	119,935
South Korea	17,633	23,296	25,485	27,608	33,474	34,534	39,268	48,513	59,811	62,943	60,612	66,898	69,541	75,207	83,946	93,778
Taiwan	20,286	22,452	22,073	23,829	28,506	29,328	41,132	56,755	67,491	75,355	76,088	84,905	96,163	100,720	107,293	117,964
Singapore	11,180	12,492	13,177	14,857	17,006	16,498	21,250	25,985	36,375	42,896	45,966	52,626	58,917	69,654	84,947	96,015
Hong Kong	19,453	23,207	23,216	25,108	30,337	31,591	36,790	47,886	62,022	68,659	74,901	86,608	103,239	115,988	124,885	135,950
Imports																
All countries[a]	1,355,470	1,465,746	1,457,058	1,499,989	1,656,996	1,736,679	1,822,093	1,931,793	2,235,044	2,404,720	2,495,021	2,648,558	2,828,165	2,992,882	3,291,253	3,585,730
United States	173,649	204,481	210,587	250,310	324,929	353,212	366,596	365,466	384,887	406,655	396,489	387,994	435,854	489,119	537,703	576,158
Canada	51,245	58,682	50,260	57,261	68,601	71,350	72,911	78,075	90,093	98,754	99,412	100,695	101,563	108,776	123,213	133,322
Japan	47,230	50,930	50,371	52,093	58,471	59,425	70,600	87,645	113,298	127,516	134,680	139,263	140,617	152,266	174,714	197,470
Germany[b]	135,526	133,822	130,627	139,156	144,468	153,151	173,739	185,893	206,584	219,452	250,145	289,071	297,136	290,477	313,343	342,921
France	98,668	104,291	109,703	104,221	107,032	113,643	124,751	135,868	160,660	173,266	180,163	186,363	188,200	186,337	201,498	216,062
United Kingdom	96,239	99,963	101,659	108,492	116,296	121,566	123,549	133,840	168,970	172,383	169,094	163,460	170,521	180,254	191,518	202,162
Italy	66,758	65,862	65,581	64,155	71,448	77,953	83,583	95,307	109,066	118,417	123,532	128,218	132,604	118,890	128,266	139,186
China	14,289	14,604	13,657	16,984	27,482	44,783	40,395	38,940	52,564	53,141	51,077	62,607	80,836	115,361	124,715	137,863
South Korea	13,022	14,866	15,222	17,648	21,232	21,472	24,892	30,324	36,218	41,572	45,731	52,718	49,631	52,659	64,567	76,666
Taiwan	13,436	14,463	13,377	14,835	17,295	16,200	19,659	26,525	34,951	39,898	40,662	46,822	54,346	56,858	60,356	66,577
Singapore	17,715	19,565	21,087	21,974	22,851	21,341	22,172	26,592	33,912	39,341	45,575	51,359	56,768	66,698	77,497	86,354
Hong Kong	22,741	25,879	25,275	26,029	30,677	29,929	32,900	40,676	56,456	56,355	69,827	83,032	99,873	96,913	111,483	122,135

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Apparent consumption																
All countries[a]	8,147,070	8,555,504	8,477,702	8,736,480	9,393,800	9,572,261	9,702,883	10,146,039	10,833,030	11,273,876	11,427,213	11,549,155	11,671,095	11,684,724	12,288,728	12,804,129
United States	2,105,792	2,261,665	2,155,857	2,272,144	2,523,681	2,508,602	2,532,981	2,682,354	2,778,412	2,757,552	2,725,599	2,643,581	2,811,863	2,927,328	3,123,907	3,220,240
Canada	191,269	209,252	184,596	198,864	226,800	240,892	245,133	258,238	273,305	279,780	264,567	252,267	252,572	272,835	289,283	300,078
Japan	1,316,536	1,400,492	1,464,516	1,505,936	1,611,164	1,681,672	1,637,217	1,669,374	1,831,589	1,971,387	2,124,376	2,254,859	2,163,972	2,039,724	2,087,976	2,182,756
Germany[b]	662,759	688,175	690,524	715,405	752,801	796,702	815,768	823,871	857,135	914,116	985,762	1,073,180	1,049,783	1,081,847	1,155,929	1,205,635
France	460,046	482,285	506,017	500,939	513,261	522,694	531,883	542,524	578,030	614,728	630,507	631,857	625,556	582,411	609,991	629,634
United Kingdom	377,831	374,487	381,367	402,928	436,728	450,408	442,718	471,733	506,780	519,154	506,901	456,866	487,201	491,016	520,766	538,791
Italy	318,982	320,178	311,857	323,864	355,092	350,927	352,902	371,126	396,969	410,847	408,079	405,491	400,675	364,914	373,110	385,967
China	265,251	244,231	237,968	254,165	257,759	281,979	274,544	294,317	364,063	409,692	325,969	348,929	430,243	597,814	637,164	691,281
South Korea	56,204	63,763	66,428	77,074	89,479	92,618	112,718	133,738	146,083	156,805	179,355	193,297	199,274	214,988	239,496	264,353
Taiwan	70,785	74,193	74,079	82,941	95,695	101,771	121,311	129,701	144,767	145,201	142,585	153,140	153,145	162,367	167,531	178,265
Singapore	21,531	24,180	24,819	24,778	26,042	24,286	23,645	29,161	33,854	32,175	37,478	39,562	40,786	45,422	47,273	51,594
Hong Kong	27,721	32,092	29,514	34,537	36,153	31,610	37,154	41,834	48,264	42,738	47,983	51,656	54,002	48,229	53,933	56,504
High-tech industries[c]																
Production																
All countries[a]	591,039	641,913	678,200	729,533	842,787	874,602	907,164	933,213	1,041,079	1,107,432	1,146,496	1,193,049	1,200,246	1,196,162	1,305,495	1,401,256
United States	216,290	231,553	248,692	264,003	304,695	311,135	320,961	301,400	325,241	327,793	338,027	341,448	363,270	350,016	397,297	444,713
Canada	7,759	8,545	8,077	8,048	9,798	11,080	11,922	13,489	15,031	15,804	16,260	17,178	18,352	17,746	20,317	21,776
Japan	140,544	162,815	175,356	191,578	226,617	235,344	234,575	247,089	283,274	311,087	335,719	361,526	332,368	307,732	320,924	320,202
Germany[b]	47,362	52,883	56,008	62,082	68,079	66,461	65,832	64,024	67,679	75,599	80,798	89,459	85,107	92,529	101,167	106,078
France	26,839	31,102	33,899	32,944	37,722	37,474	37,132	39,629	44,027	48,399	50,140	54,040	52,605	51,125	53,478	56,041
United Kingdom	31,393	31,244	32,572	35,228	40,488	43,895	45,816	49,984	54,628	58,255	59,284	56,133	57,843	56,106	62,200	66,811
Italy	15,910	15,264	14,633	15,822	16,217	14,600	15,406	16,510	19,050	20,593	20,766	19,289	18,346	16,925	17,673	18,806
China	11,609	10,146	10,072	12,781	15,344	24,632	23,939	28,567	38,912	43,833	32,710	35,939	47,162	65,115	71,375	81,341
South Korea	4,107	4,958	5,155	6,813	9,253	9,399	13,326	17,568	21,245	21,526	24,172	24,895	25,946	29,781	34,913	39,632
Taiwan	5,423	5,889	6,020	7,626	9,921	10,437	15,697	19,238	21,880	22,797	23,497	25,258	25,655	31,117	29,779	33,325
Singapore	2,616	2,839	2,748	3,762	5,354	5,432	7,437	10,959	14,686	11,843	12,946	13,501	14,705	17,567	20,459	23,410
Hong Kong	2,333	3,138	2,949	3,670	3,927	2,833	3,856	5,127	5,724	5,019	4,761	4,192	4,288	4,076	4,236	4,688
Exports																
All countries[a]	136,339	158,619	164,430	181,571	215,190	229,221	245,438	272,562	332,394	375,482	403,546	451,551	487,091	523,124	598,881	670,822
United States	35,439	39,139	36,074	40,678	43,934	47,384	51,599	59,628	71,978	80,340	90,147	97,933	105,134	102,639	114,473	128,709
Canada	2,701	3,460	3,816	3,928	4,943	5,370	5,899	6,274	6,788	7,276	8,566	10,005	10,687	10,409	12,591	14,890
Japan	22,258	27,805	28,588	35,077	46,277	47,963	50,338	52,243	62,270	67,584	71,102	74,094	74,862	72,528	74,568	79,652
Germany[b]	14,373	20,405	23,033	22,191	25,195	26,494	23,678	24,426	29,445	33,649	32,459	37,419	36,414	37,051	42,519	46,100
France	7,099	9,063	11,695	10,728	12,907	13,207	12,829	14,719	17,657	20,586	20,296	25,356	26,414	28,196	30,200	32,907
United Kingdom	14,143	13,651	15,069	16,072	18,450	20,862	23,747	21,202	26,665	28,646	30,464	38,745	36,443	39,926	42,834	48,257
Italy	4,355	5,171	5,727	5,799	6,795	8,141	7,639	7,614	9,453	10,489	10,689	10,741	11,375	12,792	13,397	14,887
China	307	336	346	417	713	483	785	1,066	2,269	2,138	4,139	4,780	6,790	7,629	10,458	12,173
South Korea	1,878	2,280	2,229	3,073	4,311	4,486	6,780	9,445	12,967	14,710	14,607	16,798	17,814	18,922	22,893	27,707
Taiwan	2,707	3,009	2,744	3,307	4,214	3,882	6,063	10,035	13,452	15,824	17,016	19,670	23,664	26,072	29,820	34,606
Singapore	2,502	2,356	2,428	3,149	4,104	4,417	6,169	9,146	14,088	17,001	19,649	22,309	26,799	33,388	45,047	51,963
Hong Kong	2,554	2,988	2,754	3,627	5,061	4,745	5,132	7,173	10,660	11,706	13,366	15,036	17,696	20,667	24,888	28,111

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Imports																
All countries[a]	121,045	143,141	147,261	165,042	199,632	212,984	230,269	256,721	319,690	361,256	389,724	431,156	466,251	499,417	575,783	645,356
United States	16,953	22,576	24,361	33,224	47,650	50,088	52,738	55,719	64,431	73,906	73,855	78,537	93,060	102,881	116,797	134,379
Canada	5,080	6,207	5,632	6,577	8,493	8,319	9,038	10,222	13,424	13,412	14,828	16,889	17,784	17,539	20,050	23,422
Japan	4,726	5,561	5,332	6,293	6,666	7,491	8,854	10,333	13,279	15,595	18,425	19,171	20,650	23,595	29,425	34,607
Germany[b]	11,513	13,716	13,939	15,326	16,573	18,385	21,101	23,721	27,498	31,511	38,628	42,703	43,018	42,171	47,692	53,577
France	8,254	11,672	13,924	12,206	13,925	14,222	14,319	16,184	22,725	25,967	26,873	32,247	29,542	29,074	31,681	34,978
United Kingdom	10,758	11,441	11,922	14,014	15,892	17,097	17,117	19,775	25,832	29,351	30,230	29,489	30,848	34,268	36,872	38,520
Italy	5,378	6,070	6,150	6,167	7,665	8,752	9,594	11,323	14,115	14,814	16,652	17,785	17,489	15,596	17,024	18,575
China	851	948	784	1,288	3,129	6,104	3,943	4,832	6,321	6,246	6,176	7,866	11,375	16,050	19,394	21,000
South Korea	1,737	1,933	2,041	2,924	3,718	3,558	4,337	5,303	7,577	8,102	8,652	10,142	10,357	10,858	12,987	15,611
Taiwan	1,791	2,080	2,310	2,507	3,135	2,947	3,925	5,403	7,048	8,411	9,078	10,845	12,892	13,932	15,170	16,916
Singapore	2,977	2,974	3,274	4,494	5,121	5,127	5,461	7,120	9,638	11,980	14,448	16,711	18,864	23,358	30,015	34,259
Hong Kong	2,658	2,850	2,785	3,457	4,924	4,457	4,809	6,487	9,891	9,998	12,743	15,512	19,500	19,444	23,111	26,298
Apparent consumption																
All countries[a]	619,157	677,833	714,695	772,608	897,756	933,984	971,482	1,005,470	1,134,762	1,214,277	1,262,325	1,318,735	1,340,470	1,346,029	1,481,316	1,605,229
United States	209,338	227,781	248,830	269,964	322,943	329,573	339,302	317,448	341,871	348,450	352,266	355,396	387,151	385,506	439,082	494,936
Canada	10,807	12,137	10,826	11,664	14,557	15,360	16,517	19,013	23,404	23,786	24,687	26,601	28,179	27,542	31,145	33,801
Japan	129,530	148,735	160,516	173,148	200,698	209,092	208,036	220,705	252,792	279,200	304,202	328,645	300,448	280,427	298,039	315,218
Germany[b]	50,890	55,443	57,412	65,193	70,756	70,210	73,702	74,125	78,818	88,512	101,405	111,403	107,906	114,507	125,682	133,236
France	29,931	36,187	39,333	37,370	42,295	42,134	42,170	45,175	54,000	59,513	62,380	68,015	63,125	59,915	63,439	66,944
United Kingdom	31,537	32,453	33,186	37,234	42,571	45,428	45,225	53,658	60,166	65,691	66,050	56,351	60,851	59,867	66,685	69,149
Italy	18,452	17,983	17,088	18,247	19,510	18,132	20,084	22,923	27,076	28,656	30,528	30,149	28,487	24,265	26,145	27,616
China	12,179	10,786	10,542	13,696	17,840	30,311	27,205	32,494	43,342	48,300	35,469	39,911	53,173	75,306	82,854	88,637
South Korea	4,409	5,146	5,423	7,353	9,646	9,670	12,821	15,931	19,389	19,016	22,251	22,822	23,375	26,961	31,022	35,016
Taiwan	4,789	5,291	5,803	7,249	9,608	10,298	15,192	18,115	20,587	21,915	23,192	25,644	26,323	31,403	29,315	32,163
Singapore	3,373	3,691	3,839	5,443	6,778	6,617	7,403	10,044	12,189	9,222	10,607	11,063	10,720	12,563	12,429	13,526
Hong Kong	2,933	3,585	3,514	4,290	4,920	3,586	4,659	6,081	7,299	5,800	7,028	7,854	9,979	7,178	7,882	8,629
Aircraft																
Production																
All countries[a]	111,561	118,741	121,166	122,112	132,880	143,729	153,164	159,360	170,150	178,634	179,623	181,645	181,957	166,030	181,099	179,616
United States	70,590	74,755	76,806	78,648	85,599	92,782	101,477	103,600	108,325	108,401	113,407	114,356	110,582	92,320	104,937	99,486
Canada	2,226	2,394	1,835	1,613	2,037	2,377	2,813	3,021	3,534	3,915	4,219	3,820	3,509	3,121	4,181	4,245
Japan	2,999	3,463	3,588	3,687	3,977	4,426	4,232	5,026	5,560	5,518	5,464	5,356	5,655	5,461	5,152	5,048
Germany[b]	4,276	4,817	4,734	4,647	4,704	5,473	5,253	6,104	6,318	8,484	8,951	8,946	7,566	7,638	7,430	7,805
France	7,267	9,162	10,410	9,098	10,665	9,243	7,953	8,318	9,814	11,101	10,378	12,122	10,371	9,062	8,614	8,648
United Kingdom	10,519	10,511	10,119	10,309	10,387	11,730	13,478	14,341	14,737	16,242	16,543	15,614	16,318	15,082	15,417	15,955
Italy	3,236	3,138	3,123	2,877	2,934	2,991	3,207	3,205	3,977	4,112	3,423	3,112	2,864	2,552	2,615	2,653
China	3,875	2,982	2,989	3,792	3,808	5,609	5,169	6,086	6,403	7,951	4,783	5,549	11,238	17,489	19,019	21,125
South Korea	1	2	2	2	3	3	3	4	5	5	7	400	290	256	277	317
Taiwan	188	197	194	171	182	208	270	267	259	300	291	335	309	351	329	369
Singapore	92	100	131	173	201	282	306	324	372	297	334	337	454	463	485	539
Hong Kong	0	0	0	1	1	1	1	1	2	2	2	137	157	144	137	149

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Exports																
All countries[a]	32,240	40,196	40,149	38,138	39,462	42,051	42,187	40,918	50,264	61,317	65,301	81,445	80,037	69,519	65,930	63,765
United States	15,787	17,684	13,959	14,001	12,239	15,799	17,043	19,717	22,055	26,727	30,577	33,695	34,420	27,664	25,755	20,682
Canada	881	1,099	1,327	1,062	1,080	1,361	1,908	1,700	1,756	1,951	2,592	3,052	2,296	1,924	2,047	2,086
Japan	113	170	243	210	190	167	165	238	337	458	439	511	548	440	426	443
Germany[b]	2,562	6,612	8,637	6,945	7,725	6,487	3,281	3,546	5,569	7,933	6,932	9,239	8,930	7,769	7,399	8,123
France	1,675	2,719	3,457	3,083	4,228	3,444	2,629	3,165	4,963	6,888	5,978	9,097	9,359	9,289	9,481	9,864
United Kingdom	8,162	7,221	7,904	8,203	8,488	9,164	11,331	7,070	8,731	7,882	8,665	15,378	12,527	10,631	9,186	9,946
Italy	483	1,397	1,510	1,322	1,546	1,509	1,194	1,163	1,636	1,917	2,484	2,289	2,387	1,801	1,754	1,894
China	1	2	2	5	47	24	35	6	14	14	23	37	330	163	160	174
South Korea	135	174	65	95	165	279	342	79	121	198	184	231	247	256	246	242
Taiwan	1	1	0	0	1	2	1	2	4	12	16	45	25	35	32	36
Singapore	136	122	86	199	166	384	138	157	181	489	328	250	245	173	181	199
Hong Kong	38	17	23	41	29	37	58	43	59	47	60	50	68	60	52	48
Imports																
All countries[a]	24,744	32,735	31,189	29,274	30,961	33,611	34,717	32,796	45,356	55,752	61,041	70,481	69,421	60,131	58,036	55,130
United States	2,896	4,156	3,882	3,688	4,935	6,532	6,847	5,637	7,120	7,557	8,604	8,761	9,186	8,449	8,032	7,290
Canada	1,393	1,673	1,051	1,179	1,265	1,605	1,713	1,747	3,479	2,524	2,145	2,285	2,253	1,483	1,290	1,552
Japan	1,365	1,732	1,284	1,803	1,366	1,955	2,179	2,197	2,370	2,349	3,578	3,473	3,972	3,035	3,155	2,755
Germany[b]	1,343	3,174	2,939	3,110	2,728	2,859	3,231	3,089	3,910	4,932	6,571	6,556	6,751	5,384	4,872	5,251
France	1,962	4,664	6,410	4,474	5,138	4,590	3,035	3,395	6,525	8,975	8,399	13,183	10,128	8,375	7,608	7,917
United Kingdom	4,119	3,138	2,298	2,927	3,266	3,678	2,992	2,628	4,167	4,614	5,547	4,665	4,371	4,207	4,427	3,706
Italy	730	1,210	979	1,085	1,279	1,250	1,100	998	1,256	1,323	1,766	2,004	1,691	1,241	1,451	1,501
China	197	18	48	302	155	854	676	706	493	798	878	1,185	2,672	2,923	3,387	2,689
South Korea	395	480	306	344	694	600	545	563	1,294	1,335	1,106	1,698	1,761	1,755	1,737	2,126
Taiwan	291	350	640	394	340	429	225	173	179	537	560	1,265	1,359	1,777	1,523	1,683
Singapore	728	472	432	786	859	975	618	571	520	1,276	962	1,337	1,345	1,554	1,375	1,193
Hong Kong	252	140	256	217	239	247	554	393	236	394	580	641	640	775	483	530
Apparent consumption																
All countries[a]	114,369	125,019	126,205	126,323	138,069	149,600	159,553	164,616	181,867	193,813	197,091	197,882	198,231	179,800	195,298	188,953
United States	62,838	67,006	71,316	72,952	82,343	88,761	96,963	96,119	100,798	98,243	101,790	100,894	97,119	82,605	96,092	93,253
Canada	2,951	3,235	1,884	1,991	2,488	2,957	3,092	3,493	5,698	4,980	4,431	3,834	4,056	3,176	3,954	4,344
Japan	4,284	5,076	4,701	5,342	5,209	6,264	6,295	7,056	7,694	7,546	8,733	8,469	9,243	8,188	8,008	7,012
Germany[b]	4,303	4,634	3,319	4,251	3,542	5,050	6,802	7,377	7,395	9,383	11,987	10,825	9,802	8,815	8,296	8,631
France	8,006	11,839	14,300	11,328	12,732	11,332	9,079	9,418	12,749	15,104	14,464	18,744	13,753	10,750	9,394	9,404
United Kingdom	8,511	8,296	6,549	7,175	7,335	8,655	8,159	11,539	12,206	14,690	15,152	8,615	10,957	10,834	12,523	11,485
Italy	3,656	3,460	3,144	3,123	3,233	3,284	3,551	3,466	4,197	4,220	3,617	3,666	3,044	2,652	2,955	2,951
China	4,071	2,999	3,034	4,089	3,921	6,443	5,814	6,787	6,884	8,737	5,642	6,703	13,631	20,275	22,272	20,020
South Korea	354	414	245	281	542	471	492	532	1,189	1,221	1,035	1,937	1,902	1,899	1,901	2,208
Taiwan	478	547	834	565	521	635	494	439	436	827	838	1,563	1,648	2,099	1,826	1,976
Singapore	707	469	491	793	922	937	809	764	737	1,155	1,008	1,439	1,557	1,820	1,661	1,550
Hong Kong	224	129	240	188	218	220	512	363	195	362	538	741	746	849	559	583

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Office and computing machinery																
Production																
All countries[a]	89,805	99,954	110,386	124,913	155,235	161,471	160,899	174,946	200,527	217,434	229,330	234,965	238,019	243,951	260,766	285,557
United States	34,411	38,280	43,467	48,789	61,917	61,467	57,879	61,300	68,376	65,876	64,124	58,553	66,038	68,483	78,909	92,324
Canada	935	1,200	1,257	1,286	1,721	1,958	1,869	1,998	2,550	2,563	2,629	2,651	2,945	3,100	3,721	4,325
Japan	30,007	33,944	37,221	39,512	45,612	51,284	52,582	59,340	67,734	78,999	89,183	96,140	91,153	85,975	80,573	81,311
Germany[b]	6,015	7,074	8,099	10,116	13,028	11,721	10,286	9,318	9,951	10,280	10,748	14,799	13,036	15,368	17,346	18,295
France	4,668	5,068	5,043	5,923	6,862	7,211	7,519	8,190	8,353	8,821	8,608	9,365	9,776	10,119	10,670	11,408
United Kingdom	2,729	2,579	3,011	3,949	5,644	7,282	6,833	8,476	10,870	12,204	12,626	12,107	12,514	12,807	14,767	16,382
Italy	2,570	2,692	2,556	3,578	4,161	2,782	2,753	2,858	5,263	5,795	6,041	5,004	4,700	4,814	4,873	5,369
China	401	344	365	438	539	508	554	616	758	742	563	625	803	1,071	1,274	1,514
South Korea	49	62	53	176	367	489	823	839	1,189	1,261	1,368	1,444	1,449	2,826	4,024	4,712
Taiwan	222	267	296	502	883	1,011	2,063	3,046	3,374	3,558	3,870	4,167	4,304	4,885	4,956	5,695
Singapore	73	83	151	398	699	844	1,464	2,284	3,759	4,746	5,603	5,741	6,497	9,259	11,304	13,075
Hong Kong	127	179	187	463	663	396	453	581	990	1,279	2,084	2,139	1,906	1,740	1,773	1,993
Exports																
All countries[a]	25,953	29,754	33,229	42,445	56,513	64,657	71,643	85,254	106,119	119,139	127,802	138,337	152,726	168,741	192,292	219,557
United States	9,381	10,596	11,178	12,817	16,140	17,007	18,022	21,328	26,146	27,113	29,089	30,605	32,704	32,511	36,919	43,865
Canada	736	903	983	1,142	1,453	1,504	1,582	2,060	2,623	2,448	2,748	3,206	3,695	3,841	5,116	6,381
Japan	2,773	3,282	4,354	7,059	10,414	11,245	13,820	16,106	20,042	21,789	23,594	24,039	25,968	26,048	25,839	26,940
Germany[b]	2,943	3,689	4,026	4,779	5,669	7,280	7,338	7,219	7,726	8,614	8,490	9,076	8,435	8,846	10,007	10,714
France	1,607	2,022	2,021	2,567	3,154	3,543	3,954	4,610	4,862	5,293	5,040	5,693	6,039	6,180	6,778	7,503
United Kingdom	2,140	2,120	2,518	3,127	4,603	5,600	5,625	6,868	8,756	10,040	10,057	10,453	10,360	12,250	13,748	15,929
Italy	1,696	1,372	1,582	1,705	2,016	3,017	2,852	2,792	3,552	4,244	3,838	3,856	3,658	4,631	4,707	5,245
China	7	4	5	12	19	11	47	81	224	194	399	543	1,149	1,659	2,436	3,160
South Korea	77	91	127	249	481	655	1,094	1,636	2,590	2,918	2,690	2,889	3,029	3,471	3,448	4,458
Taiwan	191	246	283	478	927	1,181	2,164	4,083	5,897	7,550	9,156	11,176	14,008	15,033	16,969	19,638
Singapore	111	125	229	602	1,059	1,278	2,216	3,457	5,690	7,185	9,097	10,183	13,102	16,979	21,717	25,783
Hong Kong	463	580	526	952	1,571	1,347	1,300	1,738	2,539	2,790	3,234	3,950	4,975	5,379	6,152	6,693
Imports																
All countries[a]	25,288	29,142	32,600	41,793	55,771	63,637	70,479	84,095	104,784	117,522	126,056	136,517	150,459	165,556	189,097	215,887
United States	2,787	3,645	4,703	7,844	11,778	13,023	15,279	18,664	23,229	26,998	28,141	30,472	36,274	42,103	47,755	55,622
Canada	1,437	1,912	2,029	2,315	3,342	3,285	3,333	4,162	4,754	5,080	5,814	6,633	7,236	7,548	8,426	9,620
Japan	1,023	1,142	1,227	1,333	1,604	1,938	2,227	2,679	3,661	4,510	5,102	5,598	5,950	7,073	9,028	10,763
Germany[b]	3,128	3,385	3,502	4,415	5,391	6,565	7,553	8,906	10,332	12,182	14,034	15,878	16,570	16,469	18,200	20,821
France	2,526	2,801	3,246	3,798	4,364	5,017	5,820	6,479	7,946	8,253	8,299	8,229	8,789	9,208	10,851	12,422
United Kingdom	2,906	3,283	3,807	4,877	6,158	6,548	6,864	8,588	10,928	12,486	12,637	12,666	13,547	15,363	15,866	16,884
Italy	1,478	1,650	1,605	1,769	2,495	3,054	3,328	4,131	4,963	4,829	5,085	5,428	5,552	5,152	5,215	5,533
China	126	130	166	211	875	1,055	752	1,031	971	891	889	1,218	1,709	2,359	2,855	3,311
South Korea	157	172	268	410	422	583	900	904	1,340	1,498	1,723	1,830	1,600	1,813	2,382	2,989
Taiwan	143	187	230	299	411	456	689	945	1,384	1,598	1,774	1,974	2,270	2,266	2,608	3,014
Singapore	207	262	393	644	814	923	1,063	1,663	2,542	2,990	4,118	4,564	5,413	6,873	8,447	10,275
Hong Kong	463	439	437	634	1,021	927	780	1,081	1,657	1,654	2,030	2,507	3,655	3,480	4,342	4,988

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Apparent consumption																
All countries[a]	97,812	109,320	120,984	138,826	173,861	183,042	184,920	204,326	237,267	259,147	274,307	284,787	293,639	305,913	332,492	368,438
United States	30,869	34,793	40,665	48,043	62,893	63,131	61,144	65,774	74,241	74,905	73,028	68,840	80,792	89,240	102,472	119,265
Canada	1,830	2,433	2,544	2,741	3,959	4,116	4,002	4,624	5,375	5,822	6,382	6,878	7,419	7,777	8,463	9,303
Japan	29,069	32,767	35,375	35,870	39,883	45,310	45,092	50,700	57,311	68,201	77,712	84,851	78,868	74,767	71,474	77,020
Germany[b]	7,324	8,187	9,096	11,554	14,879	13,909	13,445	13,898	15,594	17,251	19,613	25,046	24,316	27,008	30,083	32,124
France	6,027	6,402	6,825	7,862	8,944	9,667	10,482	11,340	12,790	13,256	13,274	13,493	14,218	14,882	16,649	18,129
United Kingdom	3,923	4,097	4,734	6,305	8,184	9,425	9,206	11,640	14,831	16,685	17,212	16,480	17,724	18,400	19,901	21,057
Italy	2,971	3,466	3,153	4,259	5,371	3,921	4,266	5,209	7,970	7,930	8,688	7,982	7,923	7,019	7,116	7,569
China	523	472	529	642	1,404	1,558	1,281	1,605	1,615	1,535	1,250	1,571	1,942	2,613	2,936	3,403
South Korea	172	194	264	475	578	777	1,232	1,040	1,416	1,518	1,931	2,082	1,795	3,102	4,813	5,578
Taiwan	314	387	449	672	1,045	1,149	2,171	2,898	3,181	3,140	3,203	3,164	2,847	3,156	3,059	3,456
Singapore	188	241	353	539	631	702	681	1,068	1,563	1,755	2,149	1,831	1,008	2,001	1,684	1,927
Hong Kong	246	188	234	394	525	331	276	382	777	881	1,735	1,742	1,903	1,265	1,599	1,805
Communications equipment																
Production																
All countries[a]	290,897	316,247	334,407	365,048	431,324	442,150	458,007	454,985	518,277	556,090	578,249	611,493	610,338	614,213	680,801	744,334
United States	87,355	92,424	100,495	106,308	126,020	124,240	125,609	97,200	107,135	110,403	115,578	120,187	134,943	137,208	157,579	196,082
Canada	3,335	3,429	3,425	3,493	4,209	4,517	4,839	5,694	6,133	6,671	6,597	7,920	8,985	8,449	9,163	9,725
Japan	87,834	103,847	111,155	123,447	151,674	153,469	150,053	152,510	178,777	194,236	208,703	227,701	203,181	183,903	201,403	198,080
Germany[b]	27,867	29,829	31,258	34,603	36,251	35,366	37,412	36,809	39,401	43,781	48,374	52,638	51,935	55,766	61,628	64,086
France	11,223	12,322	12,930	12,766	14,900	15,381	15,847	17,356	19,590	21,162	23,340	24,218	23,252	21,942	23,970	25,160
United Kingdom	12,801	12,706	13,465	14,804	17,735	17,814	17,831	18,935	20,404	21,101	21,320	19,482	19,313	18,468	21,614	23,346
Italy	5,773	5,654	5,880	6,432	6,090	6,003	6,612	7,467	7,769	8,791	8,923	8,977	8,560	7,877	8,472	8,991
China	6,667	5,900	5,569	6,866	9,319	17,104	16,274	19,161	27,477	31,198	23,943	25,996	31,431	42,977	47,068	54,174
South Korea	3,116	3,907	3,950	5,362	7,407	7,348	10,752	14,904	17,635	18,273	20,409	20,845	21,883	24,296	28,107	31,880
Taiwan	4,806	5,193	5,235	6,655	8,518	8,839	12,896	15,549	17,825	18,581	18,969	20,380	20,637	25,459	24,074	26,819
Singapore	2,327	2,518	2,321	3,013	4,214	4,075	5,334	7,968	10,178	6,403	6,617	6,892	7,271	7,367	8,179	9,255
Hong Kong	2,154	2,893	2,702	3,163	3,200	2,382	3,335	4,476	4,659	3,668	2,616	1,849	2,156	2,131	2,271	2,487
Exports																
All countries[a]	60,780	68,814	69,104	79,904	97,205	98,693	105,677	120,119	145,809	165,038	179,309	197,561	216,166	241,355	293,514	336,549
United States	7,588	7,965	7,942	10,711	12,290	11,327	12,703	14,882	19,470	22,741	26,583	29,547	33,425	37,829	46,960	59,055
Canada	957	1,272	1,324	1,518	2,225	2,319	2,195	2,277	2,206	2,699	3,008	3,522	4,381	4,313	5,008	5,945
Japan	18,962	23,901	23,540	27,309	35,172	35,996	35,737	35,272	41,207	44,623	46,281	48,687	47,377	45,116	47,414	51,308
Germany[b]	6,152	6,893	7,126	7,146	8,199	8,810	9,027	9,612	11,417	12,408	12,332	13,838	13,627	14,404	18,288	19,840
France	2,195	2,445	2,600	3,008	3,401	3,911	3,853	4,560	5,234	5,591	6,418	7,461	7,517	8,632	9,785	11,095
United Kingdom	2,141	2,368	2,594	2,715	3,228	3,741	4,072	4,603	6,227	7,593	8,555	9,478	9,778	12,716	15,532	17,613
Italy	1,355	1,438	1,645	1,740	2,097	2,310	2,337	2,470	2,954	3,141	3,221	3,399	3,618	4,300	4,758	5,375
China	68	90	103	150	371	107	292	545	1,501	1,345	3,068	3,469	4,494	5,000	6,889	7,765
South Korea	1,645	1,984	2,006	2,696	3,627	3,504	5,270	7,655	10,181	11,507	11,641	13,567	14,408	15,061	19,046	22,837
Taiwan	2,488	2,721	2,424	2,793	3,253	2,669	3,859	5,902	7,495	8,193	7,781	8,375	9,551	10,941	12,749	14,861
Singapore	2,127	1,981	1,969	2,207	2,764	2,625	3,664	5,385	8,040	9,157	10,049	11,702	13,255	15,957	22,812	25,615
Hong Kong	1,901	2,208	2,023	2,444	3,281	3,157	3,518	5,061	7,655	8,486	9,664	10,523	12,070	14,703	18,117	20,735

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95
(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Imports																
All countries[a]	55,727	63,728	63,704	75,089	92,948	94,269	101,323	115,359	141,360	159,787	172,979	191,586	210,245	232,492	283,892	325,907
United States	10,562	13,842	14,661	20,440	29,458	28,897	28,899	29,672	32,147	37,334	35,043	36,932	44,765	48,983	57,347	67,408
Canada	1,862	2,190	2,068	2,558	3,343	2,935	3,426	3,738	4,515	5,157	6,129	7,150	7,292	7,362	9,116	10,970
Japan	1,134	1,257	1,242	1,651	2,110	1,943	2,453	3,303	4,660	6,308	7,493	7,780	8,187	10,631	14,213	17,864
Germany[b]	5,520	5,597	5,500	6,101	6,627	6,892	7,937	9,297	10,558	11,836	15,238	16,863	16,154	16,726	20,387	22,955
France	2,899	3,178	3,243	2,866	3,336	3,443	4,178	4,954	6,542	6,782	7,979	8,427	7,852	8,344	9,762	10,913
United Kingdom	3,075	4,176	4,719	5,143	5,305	5,611	5,905	7,149	9,005	10,513	10,303	10,180	10,638	11,937	13,629	14,711
Italy	2,415	2,306	2,437	2,244	2,714	3,090	3,562	4,537	5,800	6,545	7,470	7,934	7,451	6,316	7,703	8,590
China	510	766	518	720	2,013	4,074	2,340	2,810	4,437	4,249	4,012	4,935	6,463	10,214	12,557	14,319
South Korea	1,109	1,193	1,353	2,037	2,447	2,227	2,739	3,672	4,729	5,056	5,587	6,326	6,691	6,932	8,473	10,039
Taiwan	1,238	1,398	1,274	1,646	2,191	1,861	2,788	4,047	5,239	6,040	6,499	7,339	8,935	9,524	10,631	11,783
Singapore	1,928	2,117	2,318	2,940	3,317	3,090	3,631	4,728	6,405	7,532	9,198	10,640	11,913	14,655	19,883	22,459
Hong Kong	1,717	2,010	1,834	2,351	3,397	2,979	3,127	4,587	7,524	7,499	9,629	11,733	14,527	14,543	17,555	20,005
Apparent consumption																
All countries[a]	304,878	332,593	350,590	385,539	457,555	468,897	485,963	486,205	556,021	598,496	623,419	662,058	668,692	676,892	758,009	842,802
United States	92,798	100,904	109,824	119,569	147,252	145,571	146,040	116,970	126,352	132,664	133,042	137,632	157,714	161,353	184,154	224,877
Canada	4,471	4,657	4,493	4,906	5,874	5,705	6,615	7,723	8,995	9,810	10,483	12,448	13,022	12,612	14,570	15,776
Japan	75,559	88,220	95,788	105,850	129,019	130,088	127,380	131,023	154,478	169,194	183,689	201,279	178,098	162,871	182,354	193,040
Germany[b]	30,023	31,654	32,858	36,791	38,386	37,429	40,403	40,844	43,711	48,830	56,869	61,931	60,640	64,628	72,032	76,126
France	12,529	13,727	14,288	13,453	15,775	15,996	17,240	19,018	22,355	23,910	26,693	27,270	25,693	24,078	26,699	28,125
United Kingdom	14,329	15,172	16,310	17,985	20,708	20,722	20,794	22,759	24,912	26,131	25,449	22,826	22,903	21,243	24,055	25,699
Italy	7,332	7,052	7,279	7,579	7,481	7,635	8,699	10,445	11,704	13,353	14,359	14,765	13,726	11,478	13,172	14,039
China	7,113	6,582	5,991	7,449	10,999	21,082	18,355	21,493	30,608	34,282	25,315	27,964	34,070	48,964	53,848	60,930
South Korea	2,885	3,487	3,676	5,218	6,926	6,755	9,255	12,435	14,213	14,146	16,734	16,396	17,152	19,304	21,528	24,179
Taiwan	3,998	4,357	4,520	6,012	8,042	8,513	12,527	14,777	16,970	17,948	19,150	20,916	21,828	26,148	24,430	26,730
Singapore	2,478	2,981	2,995	4,111	5,225	4,978	5,913	8,211	9,889	6,312	7,450	7,792	8,155	8,742	9,084	10,048
Hong Kong	2,462	3,268	3,040	3,709	4,176	3,035	3,871	5,336	6,327	4,558	4,755	5,371	7,329	5,063	5,724	6,241
Drugs and medicines																
Production																
All countries[a]	98,776	106,970	112,241	117,460	123,348	127,252	135,094	143,922	152,126	155,274	159,293	164,947	169,931	171,968	182,830	191,749
United States	23,935	26,094	27,924	30,258	31,160	32,646	35,995	39,300	41,405	43,114	44,918	48,352	51,707	52,005	55,872	56,821
Canada	1,262	1,522	1,560	1,656	1,832	2,228	2,401	2,775	2,814	2,655	2,815	2,787	2,913	3,076	3,251	3,481
Japan	19,704	21,561	23,392	24,932	25,354	26,166	27,708	30,213	31,202	32,334	32,369	32,329	32,379	32,393	33,796	35,762
Germany[b]	9,203	11,164	11,917	12,716	14,096	13,901	12,882	11,794	12,009	13,054	12,725	13,075	12,569	13,757	14,764	15,891
France	3,681	4,550	5,516	5,157	5,296	5,639	5,813	5,764	6,270	7,315	7,815	8,336	9,206	10,002	10,224	10,825
United Kingdom	5,343	5,447	5,978	6,166	6,721	7,068	7,674	8,232	8,616	8,708	8,795	8,931	9,697	9,749	10,402	11,128
Italy	4,331	3,780	3,074	2,935	3,032	2,825	2,833	2,980	2,041	1,895	2,379	2,195	2,222	1,682	1,713	1,792
China	666	921	1,150	1,685	1,678	1,411	1,943	2,704	4,273	3,942	3,421	3,770	3,690	3,577	4,014	4,528
South Korea	940	987	1,150	1,273	1,476	1,558	1,748	1,820	2,416	1,986	2,388	2,206	2,324	2,403	2,505	2,722
Taiwan	208	232	295	298	338	379	469	376	421	358	367	376	404	422	421	442
Singapore	123	139	144	178	240	230	333	384	378	398	392	531	483	478	490	541
Hong Kong	52	66	60	43	63	54	67	69	73	69	60	67	69	61	56	59

Appendix table 6-5.
Global industry and trade data, by selected countries and industries: 1980-95

(Millions of 1987 U.S. dollars)

Activity and country	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Exports																
All countries[a]	17,365	19,856	21,948	21,085	22,010	23,820	25,931	26,271	30,203	29,988	31,134	34,209	38,162	43,509	47,145	50,951
United States	2,683	2,894	2,996	3,149	3,264	3,251	3,829	3,700	4,307	3,759	3,899	4,086	4,584	4,634	4,838	5,107
Canada	127	187	182	206	184	186	213	237	203	177	218	225	315	331	420	478
Japan	411	452	451	500	501	555	616	627	684	714	787	858	970	924	889	960
Germany[b]	2,717	3,211	3,244	3,321	3,602	3,917	4,031	4,049	4,733	4,694	4,706	5,267	5,422	6,033	6,826	7,423
France	1,623	1,877	3,617	2,071	2,124	2,309	2,393	2,384	2,598	2,815	2,860	3,104	3,499	4,094	4,156	4,445
United Kingdom	1,699	1,942	2,053	2,027	2,132	2,356	2,719	2,662	2,951	3,131	3,188	3,436	3,778	4,330	4,368	4,769
Italy	822	965	990	1,032	1,136	1,306	1,256	1,190	1,311	1,187	1,146	1,197	1,712	2,059	2,178	2,373
China	230	240	235	250	276	342	410	433	530	585	648	732	818	807	974	1,075
South Korea	21	30	32	33	38	48	73	75	75	87	92	110	130	134	154	170
Taiwan	28	41	37	36	33	31	39	48	57	68	64	74	80	64	70	71
Singapore	129	127	144	141	115	130	150	147	177	171	174	175	197	280	337	366
Hong Kong	152	184	183	190	180	204	256	331	406	384	407	513	583	525	567	636
Imports																
All countries[a]	15,287	17,536	19,768	18,886	19,952	21,467	23,750	24,470	28,190	28,195	29,647	32,572	36,126	41,238	44,758	48,432
United States	707	933	1,114	1,252	1,480	1,636	1,713	1,746	1,935	2,016	2,067	2,373	2,836	3,347	3,664	4,058
Canada	389	432	484	525	543	494	566	576	675	651	740	821	1,002	1,146	1,218	1,281
Japan	1,204	1,430	1,578	1,506	1,586	1,655	1,995	2,154	2,588	2,427	2,252	2,320	2,541	2,856	3,029	3,225
Germany[b]	1,522	1,561	1,997	1,700	1,827	2,068	2,380	2,429	2,699	2,561	2,785	3,407	3,543	3,592	4,233	4,550
France	867	1,029	1,026	1,068	1,087	1,170	1,286	1,356	1,711	1,958	2,196	2,408	2,774	3,146	3,459	3,726
United Kingdom	657	844	1,099	1,067	1,163	1,260	1,356	1,411	1,732	1,738	1,743	1,978	2,293	2,762	2,950	3,219
Italy	755	904	1,129	1,068	1,177	1,357	1,604	1,657	2,096	2,116	2,330	2,418	2,795	2,886	2,654	2,951
China	19	33	52	56	86	121	175	284	421	307	398	528	531	554	596	681
South Korea	76	88	114	132	155	149	152	163	213	213	236	289	304	359	396	457
Taiwan	118	144	165	167	194	202	223	237	245	236	244	267	328	366	407	437
Singapore	114	122	132	125	130	139	150	159	171	182	170	169	193	277	309	332
Hong Kong	225	261	258	254	267	304	348	426	475	451	504	631	678	646	730	776
Apparent consumption																
All countries[a]	102,098	110,902	116,917	121,920	128,271	132,446	141,045	150,322	159,607	162,822	167,508	174,009	179,908	183,424	195,517	205,037
United States	22,833	25,079	27,026	29,400	30,455	32,110	35,156	38,584	40,480	42,638	44,406	48,030	51,526	52,309	56,365	57,540
Canada	1,555	1,813	1,907	2,025	2,236	2,582	2,807	3,173	3,337	3,173	3,392	3,441	3,682	3,976	4,158	4,377
Japan	20,618	22,673	24,652	26,086	26,587	27,430	29,269	31,926	33,309	34,259	34,068	34,047	34,239	34,601	36,202	38,145
Germany[b]	9,240	10,968	12,139	12,597	13,949	13,822	13,053	12,006	12,118	13,048	12,936	13,600	13,148	14,056	15,271	16,354
France	3,370	4,218	3,920	4,726	4,845	5,139	5,369	5,399	6,106	7,243	7,949	8,508	9,461	10,204	10,696	11,286
United Kingdom	4,772	4,888	5,593	5,769	6,343	6,626	7,065	7,720	8,217	8,185	8,237	8,431	9,267	9,391	10,206	10,908
Italy	4,492	4,005	3,511	3,287	3,425	3,292	3,568	3,802	3,205	3,154	3,864	3,736	3,794	3,117	2,901	3,058
China	472	735	988	1,516	1,517	1,228	1,756	2,610	4,234	3,745	3,262	3,674	3,529	3,454	3,798	4,284
South Korea	999	1,050	1,239	1,379	1,600	1,668	1,842	1,924	2,570	2,130	2,552	2,407	2,526	2,656	2,780	3,051
Taiwan	303	343	430	436	505	557	660	575	621	539	560	584	668	736	773	818
Singapore	130	154	157	185	274	261	357	420	401	437	417	555	511	521	519	573
Hong Kong	165	191	183	157	197	208	226	251	248	237	264	321	319	321	369	387

[a]A total of 68 countries are included.

[b]German data are for the former West Germany only.

[c]High-tech industries include aircraft, office and computing machinery, communication equipment, and drugs and medicines.

SOURCE: WEFA/ICF Global Industry Service (Eddystone, PA: Spring 1997).

See figures 6-2, 6-3, 6-4, 6-5, 6-6, 6-7, 6-8, 6-9, and 6-10.

Appendix table 6-6.
U.S. trade in advanced technology products: 1990-96
(Millions of U.S. dollars)

Product category	1990	1991	1992	1993	1994	1995	1996
U.S. exports							
Total	94,727.6	101,641.5	107,091.3	108,356.6	120,743.3	138,416.5	154,909.2
Biotechnology	661.2	706.0	745.8	892.7	1,029.2	1,055.5	1,197.4
Life science	4,860.3	5,492.5	5,826.0	6,133.7	6,821.3	8,571.5	9,255.6
Opto-electronics	524.0	627.9	604.0	701.7	926.3	1,164.6	1,418.6
Computers and telecommunications	31,375.0	30,726.3	32,569.2	34,198.8	39,859.3	47,890.5	52,780.1
Electronics	7,535.5	8,925.6	9,968.4	11,987.4	16,235.6	31,391.7	36,548.0
Flexible manufacturing	3,095.7	3,251.4	3,412.6	4,039.0	5,191.0	7,469.6	8,583.6
Advanced materials	6,403.0	6,226.1	7,153.6	8,404.2	10,406.2	4,519.5	1,693.6
Aerospace	36,972.7	41,904.5	42,445.5	37,348.1	34,955.4	30,983.1	38,088.7
Weapons	687.9	851.7	784.1	745.1	730.6	1,040.5	1,466.9
Nuclear technology	1,260.5	1,304.2	1,502.4	1,375.6	1,560.6	1,272.0	1,258.9
Software technology	1,351.8	1,625.2	2,079.7	2,530.2	3,027.9	3,057.9	2,617.7
U.S. imports							
Total	59,381.2	63,252.1	71,871.5	81,233.1	98,116.5	124,787.0	130,361.6
Biotechnology	32.1	48.7	48.8	59.2	73.3	444.8	548.8
Life science	3,417.6	4,305.8	4,821.4	4,607.5	4,821.5	6,607.2	7,291.6
Opto-electronics	1,138.0	2,038.4	2,570.3	2,531.0	2,544.1	2,816.6	3,172.8
Computers and telecommunications	30,110.5	29,153.4	33,848.5	39,790.2	49,440.0	58,865.6	61,346.1
Electronics	10,955.3	12,391.7	14,205.3	17,824.2	25,507.3	38,232.6	36,756.8
Flexible manufacturing	1,676.6	1,789.7	1,684.5	2,222.2	2,899.7	4,947.5	5,740.7
Advanced materials	1,045.6	1,051.5	1,548.4	2,052.9	1,091.8	1,527.6	1,219.8
Aerospace	10,713.8	12,106.0	12,687.2	11,613.3	11,135.6	10,540.5	12,805.4
Weapons	129.9	167.8	156.9	164.7	143.9	205.0	265.5
Nuclear technology	4.5	3.0	5.2	7.9	22.7	39.8	626.1
Software technology	157.4	196.0	295.0	360.0	436.5	559.8	588.0
U.S. trade balance							
Total	35,346.4	38,389.4	35,219.8	27,123.6	22,626.8	13,629.5	24,547.6
Biotechnology	629.1	657.3	697.0	833.5	956.0	610.7	648.6
Life science	1,442.8	1,186.7	1,004.6	1,526.2	1,999.7	1,964.3	1,964.1
Opto-electronics	–613.9	–1,410.5	–1,966.3	–1,829.3	–1,617.8	–1,652.0	–1,754.2
Computers and telecommunications	1,264.5	1,572.9	–1,279.3	–5,591.4	–9,580.7	–10,975.1	–8,566.0
Electronics	–3,419.9	–3,466.1	–4,236.9	–5,836.8	–9,271.7	–6,840.9	–208.8
Flexible manufacturing	1,419.1	1,461.7	1,728.1	1,816.8	2,291.3	2,522.1	2,842.9
Advanced materials	5,357.5	5,174.6	5,605.3	6,351.3	9,314.4	2,991.9	473.8
Aerospace	26,258.9	29,798.5	29,758.3	25,734.8	23,819.7	20,442.7	25,283.3
Weapons	558.0	683.9	627.2	580.4	586.7	835.6	1,201.4
Nuclear technology	1,256.0	1,301.1	1,497.2	1,367.7	1,537.9	1,232.2	632.9
Software technology	1,194.5	1,429.2	1,784.7	2,170.3	2,591.4	2,498.1	2,029.7

SOURCE: U.S. Bureau of the Census, Foreign Trade Division <<http://www.fedstats.gov>>, 1997.

See figure 6-11.

Appendix table 6-7.
U.S. receipts and payments of royalties and fees associated with affiliated and unaffiliated foreign residents: 1987-95
(Millions of U.S. dollars)

	Total	Foreign residents	
		Affiliated	Unaffiliated
Receipts			
1987	9,914	7,629	2,285
1988	11,802	9,156	2,646
1989	13,064	10,207	2,857
1990	16,634	13,251	3,384
1991	18,107	14,395	3,712
1992	19,715	15,718	3,997
1993	20,323	15,707	4,616
1994	22,274	17,422	4,849
1995	26,953	21,619	5,333
Payments			
1987	1,844	1,296	547
1988	2,585	1,410	1,175
1989	2,602	1,778	824
1990	3,135	2,206	929
1991	4,076	2,996	1,080
1992	5,074	3,381	1,694
1993	4,765	3,364	1,401
1994	5,518	3,810	1,708
1995	6,312	5,148	1,163
Balance			
1987	8,070	6,333	1,738
1988	9,217	7,746	1,471
1989	10,462	8,429	2,033
1990	13,499	11,045	2,455
1991	14,031	11,399	2,632
1992	14,641	12,337	2,303
1993	15,558	12,343	3,215
1994	16,756	13,612	3,141
1995	20,641	16,471	4,170

NOTE: Details may not add to totals because of rounding.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business,* Vol. 76, No. 11 (November 1996).

See figure 6-12.

Appendix table 6-8.
U.S. receipts and payments of royalties and license fees generated from the exchange and use of industrial processes with unaffiliated foreign residents, by region/country: 1987-95
(Millions of U.S. dollars)

Region/country	Receipts									Payments									Balance								
	1987	1988	1989	1990	1991	1992	1993	1994	1995	1987	1988	1989	1990	1991	1992	1993	1994	1995	1987	1988	1989	1990	1991	1992	1993	1994	1995
All countries	1,678	1,962	2,051	2,333	2,434	2,525	2,820	3,043	3,316	459	525	612	665	796	818	1,054	1,056	819	1,219	1,437	1,439	1,668	1,638	1,707	1,776	1,987	2,497
Canada	87	60	62	79	62	47	41	53	49	9	11	8	16	11	10	8	11	8	78	49	54	63	51	37	33	42	41
Europe	446	517	530	630	575	637	642	771	737	320	355	433	482	637	635	820	734	482	126	162	97	148	–62	2	–178	37	255
European Union	353	410	378	500	475	498	496	601	652	248	279	342	360	426	417	472	420	401	105	131	36	140	49	81	24	181	251
France	73	82	52	78	91	64	89	129	68	33	37	51	54	73	D	92	104	109	40	45	1	24	18	64	–3	25	–41
Germany[a]	79	73	77	107	97	108	109	142	162	100	112	137	133	182	D	187	128	109	–21	–39	–60	–26	–85	108	–78	14	53
Italy	57	73	68	105	70	99	69	71	58	25	20	22	29	34	24	9	6	7	32	53	46	76	36	75	60	65	51
United Kingdom	60	67	81	91	106	103	103	114	109	72	90	102	111	106	125	123	104	95	–12	–23	–21	–20	0	–22	–20	10	14
All other	93	107	152	130	100	263	272	315	340	72	76	91	122	211	D	409	392	162	21	31	61	8	–111	263	–137	–77	178
So./Central America	64	48	54	59	85	73	D	84	69	5	*	*	*	1	D	D	D	D	59	48	54	59	83	NA	D	NA	NA
Brazil	19	7	14	8	8	6	7	8	8	*	*	*	*	*	*	2	2	2	19	7	14	8	8	6	5	6	6
Mexico	14	13	18	23	31	29	28	33	22	3	*	*	*	*	1	*	1	D	11	13	18	23	30	28	28	32	NA
All other	31	28	22	28	46	38	D	43	39	2	NA	NA	NA	1	D	D	D	D	29	28	22	28	45	38	D	NA	NA
Africa	D	22	24	22	34	27	36	26	21	*	4	*	0	*	*	*	1	*	0	18	24	22	34	27	36	25	21
Middle East	D	18	17	22	25	21	33	21	38	2	3	4	3	4	5	9	9	15	–2	15	13	19	21	16	24	12	23
Asia & the Pacific	936	1,185	1,248	1,465	1,638	1,704	1,966	2,077	2,382	95	112	120	160	140	152	200	283	299	841	1,073	1,128	1,305	1,498	1,552	1,766	1,794	2,083
Hong Kong	4	6	7	6	6	11	12	8	21	1	*	*	0	*	*	2	3	D	3	6	7	6	6	11	10	5	NA
India	18	40	26	21	14	34	D	28	35	*	*	*	*	*	*	0	*	*	18	40	26	21	14	34	NA	28	35
Indonesia	5	5	8	11	20	13	20	20	14	0	*	0	0	0	*	0	0	*	5	5	8	11	20	13	20	20	14
Japan	723	883	897	1,028	1,219	1,268	1,434	1,373	1,501	88	108	109	141	138	145	191	262	280	635	775	788	887	1,081	1,123	1,243	1,111	1,221
Malaysia	*	*	2	2	2	7	18	19	D	0	0	0	0	0	0	*	0	*	NA	0	2	2	2	7	18	19	NA
The Philippines	3	4	4	4	2	3	D	1	5	0	*	1	0	0	*	*	*	*	3	4	3	4	2	3	NA	1	5
Singapore	30	13	8	19	21	20	20	73	32	*	0	0	0	*	D	*	*	*	30	13	8	19	21	20	20	73	32
South Korea	34	107	167	249	225	220	278	416	585	*	*	D	D	*	1	1	6	D	34	107	167	249	225	219	277	410	NA
Taiwan	21	46	34	55	57	42	34	39	65	*	*	D	1	*	2	2	2	*	21	46	34	54	57	40	32	37	65
All other	98	81	95	70	72	86	D	100	D	6	4	10	D	2	D	4	10	NA	92	77	85	70	70	86	NA	90	NA
All other	145	112	116	56	15	16	NA	11	20	28	40	47	7	58	NA	NA	NA	NA	117	72	69	52	13	NA	NA	NA	NA

* = less than $500,000; D = withheld to avoid disclosing operations of individual companies; NA = not available

NOTE: Industrial processes include patents and other proprietary inventions and technology.

[a]German data prior to 1990 are for the former West Germany only. Beginning in 1990, these data are also for the former East Germany.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business*, Vol. 76, No. 11 (November 1996): 90-93.

See figure 6-13.

Appendix table 6-9.
R&D performance in the United States, by industry: 1973-94
(Millions of current purchasing power parity dollars)

Industry	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total, all industries	21,250	22,887	24,206	26,997	29,825	33,304	38,226	44,505	51,810	58,650	65,268	74,800	84,239	87,823	92,155	97,015	102,055	109,727	116,952	119,110	117,400	119,595
Total manufacturing	20,535	22,119	23,471	26,151	28,867	32,075	36,686	42,690	49,904	56,178	61,931	69,895	77,525	80,377	84,311	86,502	88,024	88,934	88,506	90,177	90,932	96,307
Food, drink & tobacco	269	298	335	355	415	472	528	620	638	779	827	1,082	1,136	1,286	1,206	1,229	1,275	1,414	1,277	1,386	1,345	1,476
Textiles, footwear & leather	64	69	70	82	83	89	101	115	116	136	150	182	218	246	243	260	260	297	283	275	313	344
Wood, cork & furniture	71	84	88	107	123	126	139	148	161	159	152	143	147	144	137	173	197	245	210	247	259	269
Paper & printing	194	237	249	313	333	387	445	495	566	566	552	593	576	541	604	788	879	1,059	1,235	1,245	1,643	1,723
Chemicals	3,040	3,541	3,907	4,285	4,611	5,133	5,877	6,844	8,335	9,516	10,219	11,027	11,436	11,582	12,139	13,816	15,134	16,750	18,382	18,981	20,706	20,701
Industrial chemicals	1,418	1,643	1,766	1,925	2,085	2,272	2,521	2,859	3,540	4,112	4,272	4,608	5,056	5,185	5,535	6,161	6,261	7,004	7,587	7,437	8,248	7,557
Pharmaceuticals	698	807	981	1,091	1,117	1,308	1,517	1,777	2,085	2,492	2,913	3,319	3,484	3,658	4,100	4,906	5,808	6,287	7,061	7,944	9,146	9,633
Petroleum refining	498	622	693	767	918	1,060	1,262	1,552	1,936	2,141	2,258	2,312	2,220	2,018	1,897	1,997	2,180	2,306	2,498	2,277	2,152	1,950
Rubber & plastics products	426	469	467	502	491	493	577	656	775	771	776	788	676	721	607	752	885	1,153	1,236	1,323	1,161	1,561
Stone, clay & glass	199	217	233	263	287	324	356	406	460	513	624	733	835	950	995	738	637	616	483	510	538	591
Basic metal industries	308	358	443	506	538	560	634	728	878	987	1,085	717	740	803	730	637	686	739	714	522	669	690
Ferrous metals	163	181	215	256	284	314	375	443	555	613	637	381	324	345	252	253	251	238	228	224	289	247
Nonferrous metals	145	177	228	250	254	246	259	285	323	374	448	336	416	458	478	384	435	501	486	298	380	443
Fabricated metal products and machinery	16,232	17,138	17,941	20,023	22,234	24,718	28,318	32,970	38,306	43,003	47,780	55,040	62,076	64,443	67,874	68,440	68,507	67,201	65,297	66,351	64,628	69,645
Fabricated metal products	291	313	324	358	386	384	455	550	624	625	701	842	829	895	783	881	904	939	974	1,017	1,158	1,111
Nonelectrical machinery	816	882	976	1,085	1,225	1,400	1,611	1,939	2,417	2,411	2,392	2,404	2,394	2,396	2,428	2,682	2,729	2,753	3,555	3,534	3,431	4,004
Office machinery & computers	1,733	2,103	2,220	2,402	2,655	2,883	3,214	3,962	4,401	5,667	6,635	8,100	9,822	9,794	9,347	10,444	11,705	11,693	11,220	11,404	9,313	9,664
Electrical machinery	1,834	2,047	2,121	2,382	2,295	2,476	2,775	3,048	3,476	2,858	2,815	1,848	1,277	1,250	1,239	1,419	2,126	3,444	3,091	2,722	2,537	2,664
Electronic equipment & components	3,068	2,964	2,984	3,254	3,591	4,031	5,049	6,127	6,853	8,065	9,866	11,930	13,155	13,730	14,609	12,709	11,192	9,956	10,324	10,638	10,812	12,674
Shipbuilding	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Motor vehicles	2,405	2,389	2,340	2,778	3,358	3,879	4,509	4,955	4,806	4,797	5,318	6,057	6,984	9,732	9,279	10,085	11,020	10,256	10,388	9,924	11,793	13,406
Aerospace	5,052	5,278	5,713	6,339	7,033	7,536	8,041	9,198	11,968	14,451	15,406	18,858	22,231	21,050	24,458	24,168	22,331	20,635	16,629	17,158	15,056	14,260
Transport equipment	72	87	90	94	120	131	159	162	147	199	381	399	371	493	509	522	508	470	411	412	409	421
Instruments	961	1,075	1,173	1,331	1,571	1,998	2,505	3,029	3,614	3,930	4,266	4,602	5,013	5,103	5,222	5,530	5,992	7,055	8,705	9,542	10,119	11,441
Other manufacturing	158	177	205	217	243	266	288	364	444	519	541	379	361	382	383	420	449	613	624	660	831	868
Total services	715	768	735	845	958	1,229	1,540	1,815	1,906	2,472	3,337	4,905	6,714	7,446	7,844	10,513	14,031	20,793	28,446	28,933	26,468	23,288

SOURCE: Organisation for Economic Co-operation and Development, Analytical Business Enterprise R&D Database (Paris: April 1997).

See figure 6-15.

Appendix table 6-10.
R&D performance in Japan, by industry: 1973-94
(Millions of current purchasing power parity dollars)

Industry	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total, all industries	5,052	5,559	6,037	6,643	7,445	8,322	10,249	12,536	15,257	17,703	20,411	23,284	27,283	28,313	30,945	35,483	41,400	47,450	50,304	51,203	49,123	49,590
Total manufacturing	4,792	5,287	5,692	6,289	7,027	7,889	9,725	11,906	14,580	16,978	19,545	22,296	26,282	27,278	29,862	34,176	39,891	45,575	48,418	49,016	46,892	47,373
Food, drink & tobacco	137	135	165	180	204	223	287	389	419	500	536	603	670	741	921	961	1,102	1,205	1,164	1,242	1,363	1,291
Textiles, footwear & leather	82	73	81	74	67	88	126	136	271	227	228	270	287	290	317	358	409	452	474	635	505	424
Wood, cork & furniture	12	15	22	26	29	34	41	44	52	57	92	60	56	72	77	88	151	126	160	147	168	177
Paper & printing	99	63	69	62	70	71	74	86	87	121	166	195	233	233	263	335	398	442	473	400	394	405
Chemicals	1,135	1,299	1,419	1,516	1,702	1,831	2,290	2,845	3,172	3,661	4,180	4,720	5,282	5,562	6,371	7,164	8,199	8,900	9,769	10,412	10,208	10,365
Industrial chemicals	674	787	813	855	937	979	1,203	1,470	1,677	1,962	2,169	2,527	2,730	2,968	3,408	3,804	4,314	4,612	4,944	5,148	5,058	5,058
Pharmaceuticals	250	277	341	387	425	489	680	757	918	1,051	1,298	1,339	1,570	1,582	1,814	2,046	2,293	2,643	3,047	3,446	3,414	3,494
Petroleum refining	50	54	61	64	95	90	100	259	171	191	223	254	313	317	334	368	423	471	457	482	444	438
Rubber & plastics products	161	181	204	210	244	273	306	359	406	457	491	600	668	695	815	946	1,169	1,175	1,321	1,336	1,292	1,375
Stone, clay & glass	108	133	150	184	186	212	280	332	353	410	507	595	800	868	848	976	1,113	1,102	1,341	1,148	1,077	1,009
Basic metal industries	310	375	413	453	475	517	614	806	998	1,117	1,164	1,268	1,566	1,691	1,666	1,819	1,987	2,275	2,628	2,452	2,358	2,085
Ferrous metals	231	281	320	352	366	392	461	587	713	801	833	871	1,104	1,181	1,168	1,227	1,348	1,556	1,859	1,668	1,552	1,313
Nonferrous metals	78	94	93	101	109	125	152	219	284	316	331	397	462	510	498	591	639	720	769	783	805	773
Fabricated metal products and machinery	2,858	3,134	3,307	3,724	4,214	4,822	5,919	7,128	9,086	10,723	12,504	14,384	17,176	17,578	19,140	22,197	26,220	30,715	32,008	32,167	30,426	31,144
Fabricated metal products	80	81	105	143	136	145	210	208	272	284	371	378	472	438	452	440	550	664	709	679	653	617
Nonelectrical machinery	466	647	683	663	843	764	936	1,174	1,389	1,596	1,772	1,997	2,300	2,341	2,536	2,779	3,389	4,104	4,334	4,265	4,349	4,615
Office machinery & computers	148	109	157	192	239	283	362	449	583	715	901	1,377	1,590	1,721	2,224	2,962	4,087	4,584	4,812	4,413	4,351	4,294
Electrical machinery	570	558	597	728	809	970	1,198	1,122	1,437	1,691	2,048	2,439	2,830	2,866	3,172	3,646	4,356	5,101	5,215	5,181	5,266	5,561
Electronic equipment & components	756	865	818	989	922	1,082	1,357	1,980	2,521	3,196	3,760	4,158	5,173	5,135	5,585	6,311	6,656	7,434	8,078	8,545	7,690	8,190
Shipbuilding	44	46	45	41	35	30	31	34	34	41	52	40	50	38	42	46	59	66	76	103	99	87
Motor vehicles	590	631	685	761	926	1,177	1,379	1,601	2,102	2,374	2,576	3,019	3,494	3,697	3,774	4,523	5,389	6,547	6,527	6,785	5,798	5,519
Aerospace	56	62	74	27	67	73	94	91	103	120	198	103	176	250	282	240	311	407	549	353	381	316
Transport equipment	28	12	14	26	36	46	54	72	113	119	117	111	165	170	100	75	85	89	89	92	95	104
Instruments	120	121	129	153	202	251	297	396	533	588	711	759	926	921	973	1,173	1,338	1,719	1,621	1,752	1,744	1,842
Other manufacturing	53	59	67	69	80	89	95	138	142	161	167	201	212	244	260	279	312	356	400	415	393	473
Total services	225	220	294	299	373	373	464	559	602	637	770	884	881	916	961	1,130	1,362	1,667	1,648	1,993	2,034	2,042

SOURCE: Organisation for Economic Co-operation and Development, Analytical Business Enterprise R&D Database (Paris: April 1997).

See figure 6-15.

Appendix table 6-11.
R&D performance in the European Union, by industry: 1973-94
(Millions of current purchasing power parity dollars)

Industry	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Total, all industries	12,282	13,777	15,467	17,134	18,782	21,543	25,759	28,828	32,759	36,067	38,292	42,036	47,819	51,872	55,935	60,724	66,263	71,186	73,569	78,669	76,804	77,813
Total manufacturing	11,201	12,632	14,047	15,551	17,016	19,682	23,429	26,505	30,062	33,094	35,185	38,801	44,001	46,241	49,994	54,249	59,107	63,665	65,399	68,365	66,476	67,486
Food, drink & tobacco	247	297	328	363	390	452	520	574	594	632	646	750	826	887	938	981	1,134	1,214	1,245	1,368	1,408	1,413
Textiles, footwear & leather	133	161	161	158	152	173	181	167	169	178	192	220	235	245	241	248	252	262	341	365	397	447
Wood, cork & furniture	14	16	16	17	20	37	55	61	64	76	85	100	119	121	122	122	129	130	157	160	160	184
Paper & printing	82	88	95	101	109	128	155	172	188	206	221	245	263	281	307	318	362	400	394	393	379	422
Chemicals	2,824	3,232	3,707	4,149	4,554	5,071	5,776	6,516	7,586	8,339	8,748	9,536	10,724	11,396	12,698	14,138	15,417	16,632	16,783	17,889	17,596	17,667
Industrial chemicals	1,641	1,913	2,205	2,476	2,689	2,869	3,167	3,639	4,257	4,597	4,732	5,227	5,942	6,308	6,896	7,563	8,006	8,366	8,284	8,528	8,112	8,099
Pharmaceuticals	753	855	990	1,121	1,248	1,521	1,801	1,944	2,205	2,526	2,788	3,003	3,353	3,638	4,341	5,004	5,674	6,423	6,694	7,565	7,683	7,819
Petroleum refining	223	241	267	291	300	318	354	403	514	545	552	588	637	647	639	669	711	805	821	781	715	645
Rubber & plastics products	208	224	244	261	316	363	454	530	610	672	677	718	791	803	821	902	1,026	1,038	984	1,015	1,086	1,104
Stone, clay & glass	156	177	182	193	210	250	302	332	359	392	424	444	479	475	514	547	619	617	647	682	670	691
Basic metal industries	312	395	433	454	467	506	586	650	733	799	846	867	918	911	937	1,002	1,045	1,080	1,106	1,124	1,041	1,089
Ferrous metals	223	262	297	305	309	334	404	441	504	547	581	592	637	619	634	692	713	717	770	811	738	787
Nonferrous metals	89	133	135	149	159	172	182	208	229	252	265	275	281	292	303	309	332	363	336	313	303	302
Fabricated metal products and machinery	7,377	8,209	9,061	10,021	10,998	12,937	15,732	17,899	20,259	22,356	23,900	26,525	30,320	31,787	34,076	36,738	39,993	43,150	44,547	46,184	44,616	45,358
Fabricated metal products	117	139	164	189	222	305	415	490	574	688	754	802	900	928	957	1,019	1,086	1,231	1,110	1,128	1,125	1,184
Nonelectrical machinery	820	893	986	1,065	1,201	1,521	1,952	2,162	2,412	2,690	2,846	3,006	3,402	3,558	3,907	4,362	5,000	5,079	5,267	5,819	5,670	5,899
Office machinery & computers	374	415	481	596	731	816	932	1,004	1,166	1,326	1,460	1,755	2,074	2,107	2,302	2,604	2,851	2,980	3,118	3,036	2,761	2,470
Electrical machinery	993	1,159	1,282	1,400	1,462	1,650	1,867	2,059	2,320	2,578	2,722	3,115	3,751	4,220	4,439	4,508	4,437	4,445	5,232	5,249	5,214	5,251
Electronic equipment & components	1,796	2,077	2,378	2,637	2,934	3,649	4,520	5,262	5,993	6,583	7,138	7,786	8,685	8,843	9,652	10,317	11,042	11,888	11,294	11,719	11,446	11,967
Shipbuilding	86	88	88	92	95	93	86	90	95	110	122	140	145	158	152	139	157	196	180	240	233	239
Motor vehicles	1,263	1,361	1,489	1,667	1,901	2,211	2,673	2,993	3,371	3,816	4,192	4,696	5,288	5,656	6,147	6,925	7,751	8,592	9,306	10,170	10,262	10,425
Aerospace	1,695	1,825	1,920	2,074	2,117	2,303	2,823	3,310	3,730	3,914	3,997	4,492	5,246	5,455	5,621	5,892	6,649	7,553	7,681	7,392	6,403	6,358
Transport equipment	24	28	29	44	63	62	66	75	90	108	132	153	155	161	171	175	167	207	322	294	312	339
Instruments	209	224	242	258	273	327	397	453	509	543	537	579	675	702	727	795	852	980	1,036	1,137	1,190	1,225
Other manufacturing	56	58	64	94	117	129	120	134	110	118	122	114	118	138	162	156	156	179	180	199	207	216
Total services	749	868	1,003	1,128	1,300	1,387	1,518	1,618	1,849	2,093	2,289	2,454	2,853	4,634	4,948	5,614	6,292	6,626	7,147	8,613	9,114	9,121

NOTE: The member countries of the European Union are Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, the Netherlands, Portugal, Spain, Sweden, and the United Kingdom.

SOURCE: Organisation for Economic Co-operation and Development, Analytical Business Enterprise R&D Database (Paris: April 1997).

See figure 6-15.

Appendix table 6-12.
Number of U.S. patents granted, by inventor residence, inventor sector, and year of grant: 1963-95

Inventor residence/sector	Total 1963-95	1963-82	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
TOTAL	2,401,282	1,234,646	57,888	56,860	67,200	71,661	70,860	82,952	77,924	95,537	90,364	96,513	97,441	98,342	101,675	101,419
Inventor residence																
U.S. origin	1,497,969	865,097	33,896	32,871	38,367	39,555	38,126	43,520	40,496	50,185	47,387	51,182	52,252	53,231	56,065	55,739
Foreign origin	903,313	369,549	23,992	23,989	28,833	32,106	32,734	39,432	37,428	45,352	42,977	45,331	45,189	45,111	45,610	45,680
Argentina	698	417	18	21	20	11	17	18	16	20	17	16	20	24	32	31
Australia	9,010	3,584	266	237	292	340	374	389	416	503	432	463	410	378	467	459
Austria	8,653	4,083	229	267	256	318	357	345	337	399	393	359	370	313	289	338
Belgium	8,626	4,459	224	205	240	240	243	295	302	359	313	324	324	350	351	397
Brazil	874	330	27	19	20	30	27	34	29	36	41	61	40	57	60	63
Bulgaria	465	246	13	19	22	21	21	32	23	16	27	10	5	5	4	1
Canada	43,063	20,252	990	1,000	1,206	1,342	1,314	1,594	1,489	1,959	1,862	2,035	1,964	1,944	2,008	2,104
China	545	107	0	1	2	1	9	23	47	52	47	52	41	53	48	62
Czechoslovakia	2,090	1,637	50	38	33	54	35	46	33	34	39	27	17	13	19	15
Denmark	5,026	2,521	121	125	150	187	182	204	151	221	158	210	193	197	207	199
Finland	4,843	1,330	125	116	167	200	210	275	232	230	304	331	360	293	312	358
France	72,156	35,247	1,975	1,895	2,162	2,400	2,369	2,874	2,661	3,140	2,866	3,030	3,029	2,908	2,779	2,821
Germany	188,830	91,571	5,467	5,477	6,323	6,718	6,856	7,885	7,353	8,353	7,612	7,680	7,310	6,893	6,732	6,600
Hong Kong	843	243	18	14	24	25	31	34	41	48	52	50	60	60	57	86
Hungary	2,242	901	112	106	111	108	131	127	94	129	93	85	88	61	46	50
India	492	231	4	14	12	10	18	12	14	14	23	22	24	30	27	37
Ireland	862	268	24	18	29	30	28	38	43	65	54	55	55	53	50	52
Israel	4,866	1,317	114	109	162	179	189	245	238	326	299	305	335	314	350	384
Italy	26,920	11,960	752	625	794	919	995	1,183	1,076	1,297	1,260	1,209	1,271	1,286	1,215	1,078
Japan	313,267	77,458	8,149	8,793	11,110	12,746	13,209	16,557	16,158	20,168	19,525	21,027	21,926	22,293	22,384	21,764
Liechtenstein	473	274	19	12	16	13	16	16	10	11	15	11	16	11	16	17
Luxembourg	567	198	26	27	24	37	31	22	29	29	17	27	26	28	22	24
Mexico	1,614	1,076	35	32	42	32	37	49	44	39	32	28	39	45	44	40
Netherlands	22,609	11,104	619	626	726	766	722	922	806	1,060	959	992	854	801	853	799
New Zealand	1,107	452	44	38	50	33	52	68	55	58	52	41	44	39	37	44
Norway	2,890	1,415	65	66	87	90	81	135	121	126	112	111	108	117	126	130
Poland	626	451	26	20	15	11	14	13	8	14	17	8	5	8	8	8
South Africa	2,615	1,238	73	60	82	96	88	107	103	134	115	105	97	93	101	123
South Korea	4,649	102	14	26	30	41	46	84	97	159	225	404	538	779	943	1,161
Spain	2,798	1,219	49	50	69	78	97	115	126	131	130	153	133	159	141	148
Sweden	23,939	13,370	685	623	701	857	883	948	777	837	768	716	627	635	706	806
Switzerland	38,553	21,623	1,147	1,017	1,174	1,233	1,212	1,373	1,245	1,363	1,284	1,335	1,196	1,126	1,169	1,056
Taiwan	9,229	316	88	65	99	174	208	343	457	591	732	904	1,000	1,189	1,443	1,620
United Kingdom	85,837	51,143	2,132	1,930	2,269	2,494	2,405	2,775	2,579	3,094	2,789	2,799	2,425	2,294	2,234	2,475
U.S.S.R.	6,963	5,129	209	222	214	147	116	121	96	161	174	178	66	65	53	12
Venezuela	414	135	10	5	11	15	21	24	20	23	20	25	22	31	23	29
Others (113 countries)	4,059	2,142	73	71	89	110	90	107	102	153	119	143	151	166	254	289
Inventor sector																
U.S. corporation	1,145,904	654,518	25,783	25,677	29,999	31,181	29,490	33,726	31,437	38,664	36,093	39,133	40,307	41,826	44,035	44,035
U.S. government	44,445	29,623	1,005	1,048	1,235	1,139	1,022	981	733	880	983	1,183	1,161	1,166	1,258	1,028
U.S. individual	365,564	211,276	8,553	7,574	8,911	9,265	9,477	10,887	10,122	13,028	12,542	13,207	12,751	12,281	12,805	12,885
Foreign corporation	711,249	269,314	18,856	19,246	23,238	25,957	26,545	32,371	30,960	37,506	35,548	37,594	38,237	38,401	38,788	38,688
Foreign government	9,638	3,748	369	339	438	483	479	555	453	441	423	472	463	434	296	245
Foreign individual	124,482	66,167	3,322	2,976	3,379	3,636	3,847	4,432	4,219	5,018	4,775	4,924	4,522	4,234	4,493	4,538

SOURCE: U.S. Patent and Trademark Office, *Patenting Trends in the United States, 1963-95* (Washington, DC: 1996).

See figures 6-16, 6-17, and 6-18.

Appendix table 6-13.
Patent classes most emphasized by inventors from the United States patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	United States 1985	United States 1995	Activity index 1985	Activity index 1995
166	Wells	336	338	306	285	1.783	1.667
606	Surgery	154	602	103	484	1.310	1.590
604	Surgery	298	843	232	674	1.524	1.581
607	Surgery: light, thermal, and electrical application	94	293	71	211	1.479	1.424
585	Chemistry of hydrocarbon compounds	225	223	168	158	1.462	1.401
206	Special receptacle or package	262	404	183	280	1.368	1.370
128	Surgery	290	846	164	582	1.107	1.360
220	Receptacles	182	230	101	155	1.087	1.332
248	Supports	211	247	135	166	1.253	1.329
380	Cryptography	47	204	34	137	1.416	1.328
052	Static structures (e.g., buildings)	313	315	201	207	1.257	1.299
426	Food or edible material: processes, compositions, and products	438	479	287	309	1.283	1.275
273	Amusement devices: games	108	331	65	213	1.178	1.272
134	Cleaning and liquid contact with solids	84	224	58	144	1.352	1.271
436	Chemistry: analytical and immunological testing	126	280	90	180	1.399	1.271
326	Electronic digital logic circuitry	115	333	67	211	1.141	1.253
435	Chemistry: molecular biology and microbiology	385	1,346	229	852	1.165	1.252
530	Chemistry: natural resins or derivatives; peptides	134	271	85	171	1.242	1.248
342	Communications: directive radio wave systems and devices	109	274	57	172	1.024	1.241
395	Information processing system organization	550	3,025	355	1,874	1.264	1.225
062	Refrigeration	423	515	240	315	1.111	1.209
210	Liquid purification or separation	452	782	254	478	1.100	1.209
239	Fluid sprinkling, spraying, and diffusing	230	240	132	146	1.124	1.203
424	Drug, bio-affecting and body treating compositions	404	1,166	221	705	1.071	1.195
015	Brushing, scrubbing, and general cleaning	135	229	84	138	1.218	1.192
362	Illumination	171	330	109	199	1.248	1.192
379	Telephonic communications	244	733	147	438	1.180	1.181
297	Chairs and seats	154	223	69	132	0.877	1.170
361	Electricity: electrical systems and devices	463	763	269	450	1.138	1.166
200	Electricity: circuit makers and breakers	273	207	159	122	1.140	1.165
340	Communications: electrical	381	598	184	351	0.946	1.161
137	Fluid handling	531	427	324	250	1.195	1.158
235	Registers	106	321	46	187	0.850	1.152
029	Metal working	604	699	365	404	1.183	1.143
536	Organic compounds—part of the class 532–570 series	95	320	39	183	0.804	1.131
174	Electricity: conductors and insulators	201	349	120	199	1.169	1.127
280	Land vehicles	285	581	93	331	0.639	1.126
439	Electrical connectors	496	810	349	459	1.378	1.120
073	Measuring and testing	938	1,100	526	619	1.098	1.113
053	Package making	289	351	138	197	0.935	1.110
324	Electricity: measuring and testing	409	893	237	501	1.135	1.109
315	Electric lamp and discharge devices: systems	236	332	145	185	1.203	1.102
162	Paper making and fiber liberation	163	208	75	115	0.901	1.093
502	Catalyst, solid sorbent, or support therefor: product	425	302	279	167	1.285	1.093
341	Coded data generation or conversion	170	280	84	152	0.968	1.073
330	Amplifiers	247	241	119	130	0.943	1.067
427	Coating processes	555	691	298	370	1.051	1.059
385	Optical waveguides	178	504	100	269	1.100	1.055
568	Organic compounds—part of the class 532–570 series	365	302	221	160	1.186	1.048
156	Adhesive bonding and miscellaneous chemical manufacture	546	779	327	412	1.173	1.046
414	Material or article handling	316	324	170	171	1.053	1.044

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-6.

Appendix table 6-14.
Patent classes most emphasized by inventors from Japan patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	Japan 1985	Japan 1995	Activity index 1985	Activity index 1995
369	Dynamic information storage or retrieval	277	658	158	508	2.671	3.003
354	Photography	355	471	245	332	3.232	2.742
084	Music	101	220	63	151	2.921	2.670
355	Photocopying	422	753	213	489	2.364	2.526
358	Facsimile or television recording	248	629	169	395	3.191	2.443
400	Typewriting machines	212	206	86	118	1.900	2.228
365	Static information storage and retrieval	228	897	95	489	1.951	2.121
360	Dynamic magnetic information storage or retrieval	476	789	271	411	2.666	2.026
257	Active solid-state devices (e.g., transistors, solid-state diodes)	294	1,308	107	675	1.704	2.008
430	Radiation imagery chemistry: process, composition, or products	745	1,421	392	732	2.464	2.004
347	Incremental printing of symbolic information	320	486	184	247	2.693	1.977
359	Optics: systems (including communication) and element	549	1083	198	521	1.689	1.871
310	Electrical generator or motor structure	307	386	104	175	1.586	1.764
348	Television	569	1028	179	461	1.473	1.744
148	Metal treatment	225	352	68	156	1.415	1.724
345	Selective visual display systems	159	356	48	146	1.414	1.595
271	Sheet feeding or delivering	174	247	54	101	1.453	1.591
372	Coherent light generators	127	364	27	140	0.996	1.496
118	Coating apparatus	208	288	53	107	1.193	1.445
382	Image analysis	120	323	43	120	1.678	1.445
242	Winding, tensioning, or guiding	367	310	118	113	1.506	1.418
318	Electricity: motive power systems	361	371	120	134	1.557	1.405
123	Internal-combustion engines	1,103	727	558	260	2.369	1.391
333	Wave transmission lines and networks	167	213	29	75	0.813	1.370
364	Electrical computers and data processing systems	695	1,529	221	512	1.489	1.303
428	Stock material or miscellaneous articles	1,280	1,890	382	630	1.397	1.297
371	Error detection/correction and fault detection/recovery	142	431	28	141	0.923	1.273
425	Plastic article or earthenware shaping or treating	263	290	33	92	0.588	1.234
437	Semiconductor device manufacturing: process	380	1362	106	431	1.306	1.231
363	Electric power conversion systems	130	206	28	65	1.009	1.227
501	Compositions: ceramic	142	215	47	67	1.550	1.212
313	Electric lamp and discharge devices	221	282	50	87	1.059	1.200
303	Fluid-pressure and analogous brake systems	78	202	24	62	1.441	1.194
327	Miscellaneous active electrical nonlinear devices	302	627	88	192	1.364	1.191
356	Optics: measuring and testing	340	669	79	200	1.088	1.163
455	Telecommunications	158	403	40	120	1.185	1.158
523	Synthetic resins or natural rubbers—part of the class 520 series	277	210	58	62	0.980	1.149
429	Chemistry: electrical current producing apparatus, product and process	221	387	47	114	0.996	1.146
250	Radiant energy	538	993	149	287	1.297	1.124
395	Information processing system organization	550	3,025	131	871	1.115	1.120
341	Coded data generation or conversion	170	280	52	79	1.432	1.098
381	Electrical audio signal processing systems and devices	141	217	46	61	1.528	1.094
526	Synthetic resins or natural rubbers—part of the class 520 series	284	363	80	101	1.319	1.082
074	Machine element or mechanism	365	290	121	80	1.552	1.073
417	Pumps	306	237	64	65	0.979	1.067
525	Synthetic resins or natural rubbers—part of the class 520 series	551	726	132	199	1.122	1.066
439	Electrical connectors	496	810	38	219	0.359	1.052
060	Power plants	380	547	85	147	1.047	1.045
101	Printing	197	269	29	72	0.689	1.041
524	Synthetic resins or natural rubbers—part of the class 520 series	664	725	98	194	0.691	1.041
219	Electric heating	627	527	191	139	1.426	1.026

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-6.

Appendix table 6-15.
Patent classes most emphasized by inventors from Germany patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	Germany 1985	Germany 1995	Activity index 1985	Activity index 1995
303	Fluid-pressure and analogous brake systems	78	202	21	68	2.577	4.576
101	Printing	197	269	52	90	2.526	4.548
188	Brakes	182	223	23	61	1.210	3.719
198	Conveyors: power-driven	233	271	27	51	1.109	2.558
548	Organic compounds—part of the class 532–570 series	212	281	41	52	1.851	2.516
072	Metal deforming	299	235	34	41	1.088	2.372
546	Organic compounds—part of the class 532–570 series	209	232	23	40	1.053	2.344
123	Internal-combustion engines	1,103	727	167	123	1.449	2.300
271	Sheet feeding or delivering	174	247	22	38	1.210	2.091
378	X-ray or gamma ray systems or devices	122	234	27	35	2.118	2.033
425	Plastic article or earthenware shaping or treating	263	290	42	43	1.528	2.016
568	Organic compounds—part of the class 532-570 series	365	302	44	43	1.154	1.936
549	Organic compounds—part of the class 532-570 series	214	235	31	33	1.386	1.909
074	Machine element or mechanism	365	290	40	40	1.049	1.875
528	Synthetic resins or natural rubbers—part of the class 520 series	411	531	58	69	1.351	1.767
524	Synthetic resins or natural rubbers—part of the class 520 series	664	725	85	94	1.225	1.763
451	Abrading	195	209	25	27	1.227	1.756
242	Winding, tensioning, or guiding	367	310	60	40	1.565	1.754
423	Chemistry of inorganic compounds	590	390	85	49	1.379	1.708
525	Synthetic resins or natural rubbers—part of the class 520 series	551	726	51	87	0.886	1.629
252	Compositions	785	1,039	73	119	0.890	1.557
248	Supports	211	247	23	28	1.043	1.541
204	Chemistry: electrical and wave energy	326	426	21	45	0.617	1.436
417	Pumps	306	237	43	25	1.345	1.434
073	Measuring and testing	938	1,100	109	115	1.112	1.421
422	Chemical apparatus and process disinfecting, deodorizing, preserving, or sterilizing	211	526	27	55	1.225	1.421
106	Compositions: coating or plastic	207	393	36	41	1.664	1.418
297	Chairs and seats	154	223	27	23	1.678	1.402
222	Dispensing	249	339	21	34	0.807	1.363
239	Fluid sprinkling, spraying, and diffusing	230	240	23	24	0.957	1.359
075	Specialized metallurgical processes, compositions for	190	212	21	21	1.058	1.347
414	Material or article handling	316	324	32	32	0.969	1.343
205	Electrolysis: processes, compositions used therein	301	266	31	26	0.986	1.329
526	Synthetic resins or natural rubbers—part of the class 520 series	284	363	19	35	0.640	1.311
342	Communications: directive radio wave systems and devices	109	274	12	26	1.054	1.290
053	Package making	289	351	31	32	1.027	1.239
523	Synthetic resins or natural rubbers—part of the class 520 series	277	210	30	19	1.037	1.230
514	Drug, bio-affecting and body treating compositions	1,564	2,360	196	209	1.199	1.204
501	Compositions: ceramic	142	215	13	19	0.876	1.201
363	Electric power conversion systems	130	206	8	18	0.589	1.188
162	Paper making and fiber liberation	163	208	16	18	0.939	1.176
502	Catalyst, solid sorbent, or support therefor: product	425	302	20	26	0.450	1.170
310	Electrical generator or motor structure	307	386	36	33	1.122	1.162
210	Liquid purification or separation	452	782	43	66	0.911	1.147
137	Fluid handling	531	427	56	36	1.009	1.146
060	Power plants	380	547	44	46	1.108	1.143
118	Coating apparatus	208	288	26	24	1.196	1.133
015	Brushing, scrubbing, and general cleaning	135	229	21	19	1.489	1.128
280	Land vehicles	285	581	32	48	1.075	1.123
427	Coating processes	555	691	62	57	1.069	1.121
219	Electric heating	627	527	45	43	0.687	1.109
536	Organic compounds—part of the class 532–570 series	95	320	15	26	1.511	1.105

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-6.

Appendix table 6-16.
Patent classes most emphasized by inventors from Taiwan patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	Taiwan 1985	Taiwan 1995	Activity index 1985	Activity index 1995
437	Semiconductor device manufacturing: process	380	1,362	0	152	0.000	15.159
345	Selective visual display systems	159	356	0	10	0.000	3.816
074	Machine element or mechanism	365	290	0	8	0.000	3.747
297	Chairs and seats	154	223	0	6	0.000	3.655
313	Electric lamp and discharge devices	221	282	0	6	0.000	2.890
257	Active solid-state devices (e.g., transistors, solid-state diodes)	294	1,308	0	27	0.000	2.804
327	Miscellaneous active electrical nonlinear devices	302	627	0	12	0.000	2.600
362	Illumination	171	330	0	6	0.000	2.470
425	Plastic article or earthenware shaping or treating	263	290	0	5	0.000	2.342
248	Supports	211	247	0	4	0.000	2.200
200	Electricity: circuit makers and breakers	273	207	0	3	0.000	1.969
333	Wave transmission lines and networks	167	213	0	3	0.000	1.913
280	Land vehicles	285	581	0	8	0.000	1.870
084	Music	101	220	0	3	0.000	1.852
365	Static information storage and retrieval	228	897	0	12	0.000	1.817
375	Pulse or digital communications	177	573	0	7	0.000	1.659
385	Optical waveguides	178	504	0	6	0.000	1.617
439	Electrical connectors	496	810	0	9	0.000	1.509
156	Adhesive bonding and miscellaneous chemical manufacture	546	779	0	8	0.000	1.395
264	Plastic and nonmetallic article shaping or treating: process	493	693	0	7	0.000	1.372
568	Organic compounds—part of the class 532–570 series	365	302	0	3	0.000	1.349
206	Special receptacle or package	262	404	0	4	0.000	1.345
400	Typewriting machines	212	206	0	2	0.000	1.319
075	Specialized metallurgical processes, compositions for	190	212	0	2	0.000	1.281
501	Compositions: ceramic	142	215	0	2	0.000	1.264
382	Image analysis	120	323	0	3	0.000	1.262
273	Amusement devices: games	108	331	0	3	0.000	1.231
188	Brakes	182	223	0	2	0.000	1.218
015	Brushing, scrubbing, and general cleaning	135	229	0	2	0.000	1.186
427	Coating processes	555	691	0	6	0.000	1.179
072	Metal deforming	299	235	0	2	0.000	1.156
330	Amplifiers	247	241	0	2	0.000	1.127
372	Coherent light generators	127	364	0	3	0.000	1.120
271	Sheet feeding or delivering	174	247	0	2	0.000	1.100
429	Chemistry: electrical current producing apparatus, product, and process	221	387	0	3	0.000	1.053
423	Chemistry of inorganic compounds	590	390	1	3	6.917	1.045
205	Electrolysis: processes, compositions used therein	301	266	0	2	0.000	1.021
364	Electrical computers and data processing systems	695	1,529	0	11	0.000	0.977
029	Metal working	604	699	0	5	0.000	0.972
341	Coded data generation or conversion	170	280	0	2	0.000	0.970
204	Chemistry: electrical and wave energy	326	426	0	3	0.000	0.957
371	Error detection/correction and fault detection/recovery	142	431	0	3	0.000	0.945
524	Synthetic resins or natural rubbers—part of the class 520 series	664	725	0	5	0.000	0.937
359	Optics: systems (including communication) and element	549	1,083	0	7	0.000	0.878
052	Static structures (e.g., buildings)	313	315	0	2	0.000	0.862
370	Multiplex communications	276	800	0	5	0.000	0.849
326	Electronic digital logic circuitry	115	333	0	2	0.000	0.816
053	Package making	289	351	0	2	0.000	0.774
219	Electric heating	627	527	0	3	0.000	0.773
148	Metal treatment	225	352	0	2	0.000	0.772
528	Synthetic resins or natural rubbers—part of the class 520 series	411	531	0	3	0.000	0.767

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-7.

Appendix table 6-17.
Patent classes most emphasized by inventors from South Korea patenting in the United States: 1985 and 1995

Patent class number and title		Patents granted to inventors from: All countries 1985	All countries 1995	South Korea 1985	South Korea 1995	Activity index 1985	Activity index 1995
313	Electric lamp and discharge devices	221	282	0	27	0.000	7.550
437	Semiconductor device manufacturing: process	380	1,362	0	123	0.000	7.122
348	Television	569	1,028	0	85	0.000	6.520
358	Facsimile or television recording	248	629	0	42	0.000	5.266
369	Dynamic information storage or retrieval	277	658	0	39	0.000	4.674
360	Dynamic magnetic information storage or retrieval	476	789	0	46	0.000	4.598
365	Static information storage and retrieval	228	897	0	44	0.000	3.868
242	Winding, tensioning, or guiding	367	310	0	13	0.000	3.307
219	Electric heating	627	527	0	22	0.000	3.292
371	Error detection/correction and fault detection/recovery	142	431	0	16	0.000	2.927
315	Electric lamp and discharge devices: systems	236	332	0	12	0.000	2.850
318	Electricity: motive power systems	361	371	0	13	0.000	2.763
381	Electrical audio signal processing systems and devices	141	217	0	7	0.000	2.544
257	Active solid-state devices (e.g., transistors, solid-state diodes)	294	1,308	0	38	0.000	2.291
341	Coded data generation or conversion	170	280	0	8	0.000	2.253
015	Brushing, scrubbing, and general cleaning	135	229	0	6	0.000	2.066
062	Refrigeration	423	515	0	13	0.000	1.991
340	Communications: electrical	381	598	0	15	0.000	1.978
327	Miscellaneous active electrical nonlinear devices	302	627	0	15	0.000	1.887
501	Compositions: ceramic	142	215	0	5	0.000	1.834
326	Electronic digital logic circuitry	115	333	0	7	0.000	1.658
400	Typewriting machines	212	206	0	4	0.000	1.531
528	Synthetic resins or natural rubbers—part of the class 520 series	411	531	1	10	8.178	1.485
355	Photocopying	422	753	0	14	0.000	1.466
084	Music	101	220	0	4	0.000	1.434
548	Organic compounds—part of the class 532-570 series	212	281	0	5	0.000	1.403
359	Optics: systems (including communication) and element	549	1,083	0	19	0.000	1.383
280	Land vehicles	285	581	0	9	0.000	1.222
380	Cryptography	47	204	0	3	0.000	1.160
347	Incremental printing of symbolic information	320	486	0	7	0.000	1.136
523	Synthetic resins or natural rubbers—part of the class 520 series	277	210	0	3	0.000	1.127
148	Metal treatment	225	352	0	5	0.000	1.120
345	Selective visual display systems	159	356	0	5	0.000	1.108
375	Pulse or digital communications	177	573	0	8	0.000	1.101
427	Coating processes	555	691	0	9	0.000	1.027
156	Adhesive bonding and miscellaneous chemical manufacture	546	779	0	10	0.000	1.012
524	Synthetic resins or natural rubbers—part of the class 520 series	664	725	0	9	0.000	0.979
372	Coherent light generators	127	364	0	4	0.000	0.867
361	Electricity: electrical systems and devices	463	763	0	8	0.000	0.827
333	Wave transmission lines and networks	167	213	0	2	0.000	0.740
134	Cleaning and liquid contact with solids	84	224	0	2	0.000	0.704
546	Organic compounds—part of the class 532-570 series	209	232	0	2	0.000	0.680
549	Organic compounds—part of the class 532-570 series	214	235	0	2	0.000	0.671
354	Photography	355	471	0	4	0.000	0.670
364	Electrical computers and data processing systems	695	1,529	0	13	0.000	0.670
239	Fluid sprinkling, spraying, and diffusing	230	240	0	2	0.000	0.657
330	Amplifiers	247	241	0	2	0.000	0.654
525	Synthetic resins or natural rubbers—part of the class 520 series	551	726	0	6	0.000	0.652
271	Sheet feeding or delivering	174	247	0	2	0.000	0.639
422	Chemical apparatus and process disinfecting, deodorizing, preserving, or sterilizing	211	526	0	4	0.000	0.600
356	Optics: measuring and testing	340	669	0	5	0.000	0.589
455	Telecommunications	158	403	0	3	0.000	0.587

NOTES: The activity index is the percentage of the patents in a class that are granted to inventors from one country, divided by the percentage of all patents that have inventors from that country in that year. Listing is limited to U.S. Patent and Trademark Office classes that received at least 200 patents from all countries in 1995.

SOURCE: U.S. Patent and Trademark Office, Office of Information Systems, TAF Program, *Country Activity Index Report, Corporate Patenting 1995,* report prepared for the National Science Foundation (Washington, DC: 1996).

See text table 6-7.

Appendix table 6-18.
Patents granted in selected countries, by inventor residence: 1985-95

Granting country	Total patents	Patents to non-residents as percentage of total	Percentage of patents granted to residents of: United States	Japan	Germany	France	United Kingdom	Italy	Sweden	India	Former Soviet Union	Other
1985												
Japan	50,100	15.5	46.4	0.0	19.6	6.4	5.4	1.5	2.3	0.0	1.4	17.0
Germany	33,377	60.4	29.2	23.9	0.0	12.4	6.7	2.8	2.8	0.0	1.7	20.5
France	37,530	73.8	27.4	15.8	25.9	0.0	5.9	4.1	2.4	0.0	1.3	17.0
United Kingdom	34,480	82.3	28.6	20.8	20.9	8.4	0.0	2.9	2.2	0.0	0.6	15.6
Italy	47,924	79.0	6.1	2.3	8.0	4.2	2.0	0.0	0.4	0.0	0.0	77.0
Canada	18,697	92.8	54.8	11.7	8.8	5.6	5.3	1.5	1.8	0.0	0.4	10.0
Mexico	1,374	93.4	56.3	6.6	7.6	7.0	4.0	2.6	1.5	0.0	0.5	14.0
Brazil	3,934	84.6	37.0	7.3	20.7	9.9	4.0	4.6	2.8	0.0	0.4	13.3
South Korea	2,268	84.6	30.4	42.3	6.2	5.4	3.5	1.8	1.4	0.0	0.0	9.1
Soviet Union	74,745	2.0	13.7	8.4	16.9	8.2	3.1	3.9	2.7	0.0	0.0	42.9
India	1,814	76.2	33.5	6.4	11.2	8.1	10.1	3.4	1.3	0.0	3.0	23.0
1990												
Japan	59,401	15.2	45.5	0.0	21.3	7.7	5.1	2.4	2.4	0.0	1.1	14.4
Germany	42,860	61.2	27.8	28.4	0.0	10.8	6.5	3.7	2.7	0.0	0.7	19.3
France	35,149	74.6	24.9	18.2	26.9	0.0	6.0	4.2	2.2	0.0	0.6	17.0
United Kingdom	32,179	86.4	25.6	20.8	22.8	9.1	0.0	3.2	2.0	0.0	0.4	15.9
Italy	17,794	98.7	23.7	9.4	28.5	12.4	6.8	0.0	2.4	0.0	0.1	16.7
Canada	14,187	92.2	52.2	13.7	8.3	6.0	5.4	2.0	1.8	0.0	0.3	10.3
Mexico	1,752	92.0	63.4	5.4	7.3	5.1	3.2	2.4	0.8	0.1	0.2	12.2
Brazil	3,355	86.5	41.4	6.6	16.1	9.4	7.4	4.4	2.3	0.0	0.7	11.8
South Korea	7,762	67.1	23.0	66.7	2.5	1.8	0.8	1.1	0.3	0.0	0.0	3.8
Soviet Union	84,658	1.4	12.0	8.1	18.8	7.8	3.6	6.7	3.8	0.0	0.0	39.2
India	1,611	81.0	35.3	9.3	14.6	6.2	7.8	3.1	1.2	0.0	3.4	19.1
1994												
Japan	82,400	11.7	50.1	0.0	18.9	6.5	4.1	2.5	1.8	0.0	0.0	16.3
Germany	57,803	64.1	28.2	32.5	0.0	9.8	5.9	4.0	2.0	0.0	0.0	17.4
France	54,964	75.3	25.0	23.5	25.5	0.0	5.3	3.9	1.6	0.0	0.0	15.2
United Kingdom	48,772	89.3	24.9	25.7	22.0	8.0	0.0	3.3	1.5	0.0	0.0	14.5
Italy	37,096	85.5	24.8	13.4	27.6	10.2	5.9	0.0	1.9	0.0	0.1	16.1
Canada	11,641	92.7	51.3	18.8	7.6	5.6	4.6	1.5	1.0	0.0	0.0	9.5
Mexico	4,367	93.4	58.0	4.3	9.7	5.1	4.3	2.4	1.1	0.0	0.0	14.9
Brazil	2,469	83.0	41.3	6.6	12.5	6.9	4.9	6.4	2.7	0.0	0.0	18.7
South Korea	11,683	50.6	22.9	62.6	3.9	2.5	1.1	0.8	0.5	0.0	0.0	5.8
Russian Federation	20,581	22.0	4.0	2.1	4.7	1.1	0.8	1.5	0.6	0.0	0.0	85.2
India	1,735	74.2	42.9	6.1	12.4	7.1	6.6	2.6	1.6	0.0	0.2	20.4

Appendix table 6-18.
Patents granted in selected countries, by inventor residence: 1985-95

Granting country	Total patents	Patents to non-residents as percentage of total	Percentage of patents granted to residents of: United States	Japan	Germany	France	United Kingdom	Italy	Sweden	India	Former Soviet Union	Other
1995												
Japan	109,100	13.1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Germany	56,633	65.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
France	55,681	72.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
United Kingdom	48,350	89.2	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Italy	29,898	97.7	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Canada	9,139	91.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mexico	3,538	95.8	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Brazil	2,659	80.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
South Korea	12,512	47.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Russian Federation	25,633	18.6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
India	1,613	74.3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

NA = not available

NOTE: German data are for the former West Germany only.

SOURCE: World Intellectual Property Organization, “Industrial Property Statistics” (Geneva: 1985-95).

See figures 6-18 and 6-19.

Appendix table 6-19.
Venture capital under management in the United States and disbursements: 1969-95
(Millions of U.S. dollars)

	New capital committed	Total venture capital under management	Disbursements
1969	121	NA	100
1970	78	NA	83
1971	91	NA	134
1972	30	NA	128
1973	33	NA	201
1974	25	NA	100
1975	20	NA	92
1976	28	NA	107
1977	15	NA	159
1978	216	NA	288
1979	170	NA	457
1980	661	NA	608
1981	867	NA	1,155
1982	1,400	NA	1,454
1983	3,400	6,208	2,581
1984	3,200	9,497	2,771
1985	2,300	11,614	2,681
1986	3,300	14,693	3,242
1987	4,200	17,799	3,977
1988	2,947	20,217	3,847
1989	2,399	23,154	3,395
1990	1,847	24,139	1,922
1991	1,271	24,758	1,348
1992	2,548	25,868	2,540
1993	2,545	28,925	3,071
1994	3,765	32,670	2,741
1995	4,227	37,154	3,859

NA = not available

SOURCE: Venture Economics, *1996 Venture Capital Annual Review* (Boston: 1996).

See figure 6-23. *Science & Engineering Indicators – 1998*

Appendix table 6-20.
Capital commitments by limited partners to institutionally funded independent private venture capital funds: 1978-95
(Millions of U.S. dollars)

	Total	Corporations	Endowments & foundations	Foreign investors	Individuals & families	Insurance companies	Pension funds
1978	216	22	19	38	70	35	32
1979	170	28	17	26	39	7	53
1980	661	127	92	55	102	88	197
1981	867	142	102	90	201	132	200
1982	1,423	175	96	188	290	200	474
1983	3,408	415	267	531	715	410	1,070
1984	3,185	463	178	573	467	419	1,085
1985	2,327	274	181	548	303	254	767
1986	3,332	350	209	361	392	348	1,672
1987	4,184	460	418	544	502	628	1,632
1988	2,947	324	341	401	249	277	1,355
1989	2,399	483	296	299	146	303	872
1990	1,847	125	232	138	211	171	970
1991	1,271	55	306	149	156	69	536
1992	2,548	84	471	283	280	370	1,060
1993	2,545	206	271	109	187	268	1,504
1994	3,765	341	805	91	444	357	1,727
1995	4,227	87	959	NA	741	784	1,656

SOURCE: Venture Economics, *1996 Venture Capital Annual Review* (Boston: 1996).

Appendix table 6-21.
U.S. venture capital disbursements, by industry category: 1986-95

Industry category	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Millions of U.S. dollars disbursed										
Commercial communications	145	171	105	146	80	20	53	134	46	191
Telephone and data communications	346	306	369	342	268	169	366	384	294	399
Computer hardware and systems	550	523	422	354	259	168	138	98	171	183
Software and services	353	417	338	379	362	337	562	630	378	760
Other electronics	386	361	319	300	147	129	140	86	167	141
Biotechnology	183	265	322	245	181	112	261	283	303	205
Medical/health care related	335	481	451	522	380	152	442	437	473	547
Energy related	23	53	15	18	22	3	30	7	2	3
Industrial automation	73	55	31	28	16	3	7	30	16	26
Industrial products and machinery	118	183	198	192	77	47	77	54	56	125
Consumer related	285	642	425	392	225	135	196	314	173	405
Other products and services	445	520	852	477	284	83	271	613	663	874
Total	3,242	3,977	3,847	3,395	2,301	1,358	2,543	3,071	2,741	3,859
Percentage of total venture capital disbursements										
Commercial communications	4	4	3	4	3	2	2	4	2	5
Telephone and data communications	10	8	9	10	12	12	14	13	11	10
Computer hardware and systems	17	13	11	10	11	12	5	3	6	5
Software and services	11	11	9	11	16	25	22	21	14	20
Other electronics	12	9	8	9	6	9	6	3	6	4
Biotechnology	6	7	8	7	8	8	10	9	11	5
Medical/health care related	10	12	12	15	17	11	17	14	17	14
Energy related	1	1	1	1	1	1	1	<1	<1	<1
Industrial automation	2	1	1	1	1	1	1	1	<1	<1
Industrial products and machinery	4	5	5	6	3	3	3	2	2	3
Consumer related	9	16	11	12	10	10	8	10	6	11
Other products and services	14	13	22	14	12	6	11	20	24	23
Total	100	100	100	100	100	100	100	100	100	100

NOTE: Details may not sum to totals because of rounding.

SOURCE: Venture Economics, *1996 Venture Capital Annual Review* (Boston: 1996).

See figure 6-24.

Appendix table 6-22.
U.S. venture capital disbursements, by stage: 1986-95

Stage	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Millions of U.S. dollars disbursed										
Seed	101	87	114	138	72	56	74	213	116	232
Startup	526	452	349	288	170	76	209	217	408	663
Other early stage	509	603	585	537	391	295	336	319	481	580
Expansion	1,416	1,773	1,510	1,596	1,194	734	1,400	1,668	1,232	1,614
Leveraged buyout/acquisition	601	804	1,127	710	414	46	176	172	166	338
Other	89	258	162	126	60	151	347	481	339	432
Total disbursements	3,242	3,977	3,847	3,395	2,301	1,358	2,542	3,070	2,741	3,859
Percentage of total venture capital disbursements										
Seed	3	2	3	4	3	4	3	7	4	6
Startup	16	11	9	8	7	6	8	7	15	17
Other early stage	16	15	15	16	17	22	13	10	18	15
Expansion	44	45	40	47	52	54	55	54	45	42
Leveraged buyout/acquisition	18	20	29	21	18	3	7	6	0	9
Other	3	7	4	4	3	11	14	16	12	11
Total	100	100	100	100	100	100	100	100	100	100

NOTE: Details may not sum to totals because of rounding.

SOURCE: Venture Economics, *1996 Venture Capital Annual Review* (Boston: 1996).

See figure 6-25.

Appendix table 6-23.
Leading indicators of technological competitiveness: 1996
(Index)

Region/country	National orientation	Socioeconomic infrastructure	Technological infrastructure	Productive capacity
Singapore	88.4	75.7	41.6	54.0
South Korea	78.9	64.6	44.4	50.6
Taiwan	90.2	75.8	42.9	49.9
China	65.3	44.8	39.3	32.8
India	57.4	46.0	39.3	49.1
Indonesia	54.8	35.2	17.8	19.6
Malaysia	81.0	62.5	31.9	43.1
Philippines	73.6	66.2	35.3	48.1
Thailand	63.5	48.7	28.2	33.1
Hungary	67.0	47.7	36.4	39.8
Poland	69.7	57.4	38.1	39.8
Russia	48.9	50.7	55.6	42.6
Argentina	41.5	49.4	27.4	31.0
Brazil	60.0	53.1	37.4	40.3
Mexico	54.8	45.5	30.2	31.7
Venezuela	56.6	55.2	38.4	40.7
South Africa	49.2	51.0	40.3	30.0

NOTES: For score and indicator calculations, raw data were transformed into scales of 0-100 for each indicator component and then averaged to generate comparable indicators with a 0-100 range. For survey items, 100 represents the highest response category for each question; for statistical data, 100 typically represents the value attained by the country with the largest value among the 30 countries included in the study. In the indicator formulations cited below, each term carries equal weight.

National orientation (NO)—evidence that a nation is taking directed action to achieve technological competitiveness. These actions could take place in the business, government, or cultural sector, or any combination of the three.
Indicator formulation: NO = Q1 + (Q2 + Q3)/2 + Q4 + F1V96
Data used: Published data from Frost and Sullivan's "Political Risk Letter" for 1996 rating each country's investment risk (F1V96); and survey data assessing each country's national strategy to promote high-tech development (Q1), social influences favoring technological change (Q2 and Q3), and entrepreneurial spirit (Q4).

Socioeconomic infrastructure (SE)—assesses the social and economic institutions that support and maintain the physical, human, organizational, and economic resources essential to the functioning of a modern, technology-based industrial nation.
Indicator formulation: SE = Q5 + Q10 + HMHS93
Data used: Published data on the percentage of students enrolled in secondary and tertiary education (HMHS93) from the Harbison-Myers Skills Index for 1993; and survey data assessing each country's efforts to attract foreign investment (Q10) and the mobility of capital (Q5).

Technological infrastructure (TI)—assesses the institutions and resources that contribute to a nation's capacity to develop, produce, and market new technology.
Indicator formulation: TI = (Q7 + Q8)/2 + Q9 + Q11 + EDP96 + S&E
Data used: Published data from UN Statistical Yearbook on the number of scientists and engineers involved in research (S&E), national purchases of electronic data processing equipment (EDP96) from *Elsevier Yearbook of World Electronics Data* (1996); and survey data assessing linkages of R&D to industry (Q9), output of indigenous academic science and engineering (Q7and Q8), and ability to make effective use of technological knowledge (Q11).

Productive capacity (PC)—assesses the phsical and human resources devoted to manufacturing products and the efficiency with which those resources are employed.
Indicator formulation: PC = Q6 + Q12 + Q13 + A2696
Data used: Published data on electronics production (A2696) from *Elsevier Yearbook of World Electronics Data* (1996); and survey data assessing the supply and quality of skilled labor (Q6), capability of the indigenous management (Q13), and the existence of indigenous suppliers of components for technology-intensive products (Q12).

SOURCE: J. David Roessner, Alan L. Porter, Nils Newman, and Honguang Xu, *1996 Indicators of Technology-Based Competitiveness of Nations, Summary Report,* report to the National Science Foundation under Purchase Order No. D22588X-00-0 (Atlanta: Georgia Institute of Technology, 1997).

See figure 6-27.

Appendix table 7-1.
Indices of issue interest: 1979-97
(Mean index scores)

Issue	1979	1981	1983	1985	1988	1990	1992	1995	1997
Foreign policy	49	59	54	59	58	68	62	48	47
New scientific discoveries	61	60	68	66	66	63	61	67	70
New technologies	59	58	65	64	64	64	64	66	69
Space exploration	–	47	50	52	56	50	47	50	55
Energy/nuclear power[a]	67	70	62	61	61	64	57	54	54
Medical discoveries	–	–	–	83	85	83	82	83	83
Environmental issues	–	–	–	–	–	80	77	74	72
Economic policy	59	71	74	69	69	70	74	68	68
Sample size	1,635	3,195	1,631	2,005	2,041	2,033	2,001	2,006	2,000

– = not asked

NOTES: Each index is a summary measure of respondent reports that they are “very interested,” “moderately interested,” or “not at all interested” in each specific issue. Responses are to the statement: “There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read to you a short list of issues, and for each one—as I read it—I would like you to tell me if you are very interested, moderately interested, or not at all interested.” The original responses were converted to a 0-100 index by assigning a value of 100 for a “very interested” response and a value of 50 for a “moderately interested” response.

[a]In 1990, 1992, 1995, and 1997 the question was worded “…issues about the use of nuclear energy to generate electricity.” From 1979 to 1985, the question was worded “…issues about energy policy.” In 1988, the question was worded “…issues about the use of nuclear power to generate electricity.”

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-1.

Appendix table 7-2.
Public interest in selected issues: 1979-97
(Percentages)

Issue	1979			1981			1983			1985			1988			1990			1992			1995			1997		
	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI
Foreign policy	22	53	24	35	47	18	30	47	22	33	51	16	33	50	16	48	40	12	38	47	15	21	53	26	22	50	28
New scientific discoveries	36	49	14	37	45	17	48	40	11	44	44	12	43	46	12	39	48	12	36	49	15	44	45	11	49	42	8
New technologies	33	51	15	33	50	16	42	45	12	39	49	12	40	48	12	39	49	12	37	53	10	43	46	27	47	43	10
Space exploration	–	–	–	25	44	31	27	45	28	29	46	25	34	44	22	26	48	26	22	50	28	25	49	26	32	45	22
Energy/nuclear power[a]	46	42	11	50	40	10	39	46	14	36	50	13	38	46	16	42	44	14	32	49	18	29	49	21	29	49	21
Medical discoveries	–	–	–	–	–	–	–	–	–	68	29	3	72	25	3	68	29	3	66	31	3	69	27	4	70	26	4
Environmental issues	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	64	31	5	59	36	5	53	41	6	52	40	8
Economic policy	35	48	17	52	37	10	57	33	10	48	41	11	48	42	10	50	40	10	56	36	8	47	42	11	47	42	11
Sample size	1,635			3,195			1,631			2,005			2,041			2,033			2,001			2,006			2,000		

VI = very interested; MI = moderately interested; NI = not at all interested; – = not asked

NOTES: Responses are to the statement: “There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read to you a short list of issues, and for each one—as I read it—I would like you to tell me if you are very interested, moderately interested, or not at all interested.” “Don't know” responses are not included. Percentages may not total 100 because of rounding.

[a]In 1990, 1992, 1995, and 1997 the question was worded “…issues about the use of nuclear energy to generate electricity.” From 1979 to 1985, the question was worded “…issues about energy policy.” In 1988, the question was worded “…issues about the use of nuclear power to generate electricity.”

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Science & Engineering Indicators – 1998

Appendix table 7-3.
Mean score on indices of interest in scientific and technological issues, by sex and level of education: 1997
(Mean index scores)

Sex and level of education	New scientific discoveries	New technologies	Medical discoveries	Space exploration	Nuclear energy	Environmental issues	Sample size
All adults	70	69	83	55	54	72	2,000
Sex							
Male	71	73	81	63	55	70	930
Female	70	65	86	49	54	75	1,070
Formal education							
Less than high school	61	56	79	42	54	70	420
High school graduate	70	70	85	56	53	73	1,188
Baccalaureate degree	78	75	86	66	58	74	257
Graduate/professional degree	84	80	87	67	62	79	135
Science/mathematics education[a]							
Low	64	62	83	48	51	71	1,112
Middle	75	73	85	58	57	74	509
High	84	81	85	72	61	74	379

NOTES: Each index is a summary measure of respondent reports that they are "very interested," "moderately interested," or "not at all interested" in each specific issue. A value of 100 was assigned to a "very interested" response, and a value of 50 was assigned to a "moderately interested" response.

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-2.

Appendix table 7-4.
Indices of issue informedness: 1979-97
(Mean index scores)

Issue	1979	1981	1983	1985	1988	1990	1992	1995	1997
Foreign policy	35	44	40	42	42	51	46	36	36
New scientific discoveries	36	38	40	43	42	42	39	42	49
New technologies	35	35	42	39	38	38	38	40	44
Space exploration	–	37	39	42	39	37	33	33	41
Energy/nuclear power[a]	47	51	47	44	37	37	32	29	31
Medical discoveries	–	–	–	53	52	53	51	52	56
Environmental issues	–	–	–	–	–	60	57	52	51
Economic policy	42	55	54	48	50	53	56	52	51
Sample size	1,635	3,195	1,631	2,005	2,041	2,033	2,001	2,006	2,000

– = not asked

NOTES: Each index is a summary measure of respondent reports that they are "very well-informed," "moderately well-informed," or "poorly informed" about each specific issue. Responses are to the statement: "Now I'd like to go through this list with you again, and for each issue I'd like you to tell me if you are very well-informed, moderately well-informed, or poorly informed." The original responses were converted to a 0-100 index by assigning a value of 100 for a "very well-informed" response and a value of 50 for a "moderately well-informed" response.

[a]In 1990, 1992, 1995, and 1997 the question was worded "…issues about the use of nuclear energy to generate electricity." From 1979 to 1985, the question was worded "…issues about energy policy." In 1988, the question was worded "…issues about the use of nuclear power to generate electricity."

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-3.

Appendix table 7-5.
Public informedness on selected issues: 1979-97
(Percentages)

Issue	1979			1981			1983			1985			1988			1990			1992			1995			1997		
	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI	VI	MI	NI
Foreign policy	8	54	37	17	54	28	14	51	35	15	53	32	14	55	31	22	57	22	19	54	26	10	52	37	10	52	38
New scientific discoveries	10	52	37	13	49	38	13	53	34	13	59	27	14	55	31	14	55	31	12	54	34	13	58	29	19	58	23
New technologies	10	50	39	11	48	40	14	55	32	12	54	34	12	51	36	11	53	35	10	56	33	12	55	33	16	56	28
Space exploration	–	–	–	14	46	40	13	52	34	16	52	32	13	52	34	11	51	38	9	48	44	9	48	43	16	50	34
Energy/nuclear power[a]	18	58	23	23	56	21	19	56	24	16	55	29	13	47	39	12	50	38	10	43	46	9	40	51	10	41	49
Medical discoveries	–	–	–	–	–	–	–	–	–	24	57	18	22	59	19	24	57	20	22	58	21	23	57	20	28	56	16
Environmental issues	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	32	55	13	29	56	15	24	56	20	23	55	21
Economic policy	14	55	31	29	51	20	28	52	20	22	51	26	22	55	22	25	55	20	29	54	17	25	53	22	25	51	24
Sample size	1,635			3,195			1,631			2,005			2,041			2,033			2,001			2,006			2,000	

VI = very well-informed; MI = moderately well-informed; NI = poorly informed; – = not asked

NOTES: Responses are to the statement: “Now I'd like to go through this list with you again, and for each issue I'd like you to tell me if you are very well-informed, moderately well-informed, or poorly informed.” “Don't know” responses are not included. Percentages may not total 100 because of rounding.

[a]In 1990, 1992, 1995, and 1997 the question was worded “…issues about the use of nuclear energy to generate electricity.” From 1979 to 1985, the question was worded “…issues about energy policy.” In 1988, the question was worded “…issues about the use of nuclear power to generate electricity.”

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Science & Engineering Indicators – 1998

Appendix table 7-6.
Mean score on indices of informedness on scientific and technological issues, by sex and level of education: 1997
(Mean index scores)

Sex and level of education	New scientific discoveries	New technologies	Medical discoveries	Space exploration	Nuclear energy	Environmental issues	Sample size
All adults	49	44	56	41	31	51	2,000
Sex							
Male	51	47	52	49	33	52	930
Female	47	41	60	34	28	50	1,070
Formal education							
Less than high school	45	42	58	36	38	54	420
High school graduate	47	43	55	41	28	49	1,188
Baccalaureate degree	55	49	57	46	29	52	257
Graduate/professional degree	60	54	61	50	34	58	135
Science/mathematics education[a]							
Low	44	41	56	37	30	50	1,112
Middle	48	45	54	43	30	53	509
High	63	54	61	53	32	53	379

NOTES: Each index is a summary measure of respondent reports that they are "very well-informed," "moderately well-informed," or "poorly informed" about each specific issue. A value of 100 was assigned to a "very well-informed" response, and a value of 50 was assigned to a "moderately well-informed" response.

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-2.

Appendix table 7-7.
Public attentiveness to selected issues: 1979-97
(Percentages)

Issue	1979	1981	1983	1985	1988	1990	1992	1995	1997
Foreign policy									
Attentive public	6	6	8	8	8	14	11	5	5
Interested public	16	29	23	25	25	34	27	16	18
Residual public	78	65	70	67	67	52	62	79	77
New scientific discoveries									
Attentive public	7	9	9	8	8	8	7	7	11
Interested public	29	28	40	36	34	31	29	37	38
Residual public	64	63	52	56	57	61	64	56	51
New inventions & technologies									
Attentive public	6	8	8	8	7	7	6	6	9
Interested public	27	26	34	31	33	32	30	37	38
Residual public	67	67	58	61	60	61	63	57	53
Science and technology policy[a]									
Attentive public	9	12	13	12	11	11	10	10	14
Interested public	37	35	48	44	42	40	40	47	46
Residual public	54	54	39	45	46	49	50	43	40
Space exploration									
Attentive public	–	7	7	9	8	6	5	5	8
Interested public	–	18	20	20	26	20	17	20	24
Residual public	–	75	73	71	66	74	78	75	68
Energy/nuclear power[b]									
Attentive public	–	–	15	9	8	8	6	4	4
Interested public	–	–	25	28	30	34	26	25	25
Residual public	–	–	61	63	62	58	68	71	71
Medical discoveries									
Attentive public	–	–	–	17	16	16	17	15	19
Interested public	–	–	–	51	56	52	49	53	52
Residual public	–	–	–	32	28	32	34	31	29
Environmental issues									
Attentive public	–	–	–	–	–	20	18	13	12
Interested public	–	–	–	–	–	43	41	40	40
Residual public	–	–	–	–	–	36	41	48	48
Economic policy									
Attentive public	9	12	19	16	15	17	19	15	14
Interested public	26	40	38	32	33	34	38	32	32
Residual public	65	48	43	52	52	50	44	53	54
Sample size	1,635	3,195	1,631	2,005	2,041	2,033	2,001	2,006	2,000

– = not asked

NOTES: Responses are to the statements: “There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read to you a short list of issues, and for each one—as I read it—I would like you to tell me if you are very interested, moderately interested, or not at all interested”; “Now I'd like to go through this list with you again, and for each issue I'd like you to tell me if you are very well-informed, moderately well-informed, or poorly informed”; and “Now let me change the topic slightly and ask you how you get information. First, how often do you read a newspaper: every day, a few times a week, once a week, or less than once a week? Are there any magazines that you read regularly, that is, most of the time? What magazine would that be? Is there another magazine that you read regularly? What magazine would that be?” Percentages may not total 100 because of rounding.

To be classified as attentive to a given issue area, respondents must indicate that they are “very interested” in that area, that they are “very well-informed” about it, and that they regularly read a daily newspaper or relevant national magazine. Citizens who report that they are “very interested” in an issue area, but who do not think that they are “very well-informed” about it, are classified as the “interested public.” All other individuals are classified as members of the “residual public” for that issue area.

[a]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[b]In 1990, 1992, 1995, and 1997 the question was worded “…issues about the use of nuclear energy to generate electricity.” From 1979 to 1985, the question was worded “…issues about energy policy.” In 1988, the question was worded “…issues about the use of nuclear power to generate electricity.”

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-4.

Appendix table 7-8.
Public attentiveness to scientific and technological issues, by sex and level of education: 1997
(Percentages)

Sex and level of education	New scientific discoveries		New technologies		Science and technology policy[a]		Medical discoveries		Space exploration		Nuclear energy		Environmental issues		Sample size
	AP	IP	AP	IP	AP	IP	AP	IP	AP	IP	AP	IP	AP	IP	
All adults	11	38	9	38	14	46	19	52	8	24	4	25	12	40	2,000
Sex															
Male	12	39	11	43	16	49	15	51	14	28	5	24	14	35	930
Female	9	38	7	34	13	43	23	53	4	20	3	26	11	45	1,070
Formal education															
Less than high school	9	32	9	25	15	34	21	43	6	18	6	27	10	41	420
High school graduate	9	39	8	40	12	49	16	56	8	24	3	24	11	41	1,188
Baccalaureate degree	15	43	10	46	18	51	24	48	13	30	5	26	16	37	257
Graduate/professional degree	23	47	22	41	30	49	24	51	16	25	8	29	22	40	135
Science/mathematics education[b]															
Low	7	34	6	33	10	42	18	51	6	19	3	24	11	41	1,112
Middle	9	43	9	41	14	50	16	57	7	27	6	25	12	41	509
High	22	47	17	47	28	50	25	48	17	34	6	27	17	37	379

AP = attentive public; IP = interested public

NOTES: Responses are to the statements: “There are a lot of issues in the news, and it is hard to keep up with every area. I'm going to read to you a short list of issues, and for each one—as I read it—I would like you to tell me if you are very interested, moderately interested, or not at all interested”; “Now I'd like to go through this list with you again, and for each issue I'd like you to tell me if you are very well-informed, moderately well-informed, or poorly informed”; and “Now let me change the topic slightly and ask you how you get information. First, how often do you read a newspaper: every day, a few times a week, once a week, or less than once a week? Are there any magazines that you read regularly, that is, most of the time? What magazine would that be? Is there another magazine that you read regularly? What magazine would that be?”

To be classified as attentive to a given issue area, respondents must indicate that they are “very interested” in that area, that they are “very well-informed” about it, and that they regularly read a daily newspaper or relevant national magazine. Citizens who report that they are “very interested” in an issue area, but who do not think that they are “very well-informed” about it, are classified as the “interested public.” All other individuals are classified as members of the “residual public” for that issue area.

[a]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[b]Respondents were classified as having a “high” level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as “middle” if they took six to eight such courses, and as “low” if they took five or fewer.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-5.

Appendix table 7-9.
U.S. public understanding of scientific vocabulary and concepts, by selected characteristics: 1997
(Percentages)

Characteristic	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	Sample size
All adults	82	71	84	62	39	44	43	32	78	44	93	51	59	75	73	48	22	11	13	11	2,000
Sex																					
Male	89	80	88	54	56	53	36	39	86	50	94	53	67	88	82	58	26	17	16	16	930
Female	76	64	81	69	24	36	49	26	71	38	92	49	53	64	64	40	18	7	11	6	1,070
Formal education																					
Less than high school	75	55	77	41	25	25	20	25	67	38	91	37	44	61	51	29	8	1	5	1	420
High school graduate	82	71	86	66	35	42	43	30	78	40	93	52	61	76	75	49	18	9	12	9	1,188
Baccalaureate degree	88	88	89	72	62	66	64	43	86	55	93	60	69	84	86	62	48	28	25	21	257
Graduate/ professional degree	90	92	85	75	68	70	71	49	96	68	96	69	78	90	91	72	49	30	23	33	135
Science/mathematics education[a]																					
Low	76	60	80	57	28	29	33	28	72	38	92	42	54	67	62	35	9	3	9	4	1,112
Middle	86	78	91	64	40	49	47	30	80	41	92	58	61	81	81	56	25	12	12	11	509
High	93	94	87	77	70	79	67	45	92	64	96	68	73	89	93	77	56	36	27	31	379
Attentiveness to science and technology[b]																					
Attentive public	89	86	89	61	56	56	49	45	87	63	94	59	66	78	85	66	36	21	23	23	288
Interested public	85	75	84	66	43	49	47	34	81	46	93	54	64	78	76	51	25	14	14	11	918
Residual public	75	61	82	58	27	33	36	25	71	35	92	45	52	70	64	39	13	5	8	6	794

NOTE: Understanding is determined by correct responses to the following statements:

A = "The center of the earth is very hot." (True); B = "All radioactivity is man-made." (False); C = "The oxygen we breathe comes from plants." (True); D = "It is the father's gene which decides whether the baby is a boy or a girl." (True); E = "Lasers work by focusing soundwaves." (False); F = "Electrons are smaller than atoms." (True); G = "Antibiotics kill viruses as well as bacteria." (False); H = "The universe began with a huge explosion." (True); I = "The continents on which we live have been moving their location for millions of years and will continue to move in the future." (True); J = "Human beings, as we know them today, developed from earlier species of animals." (True); K = "Cigarette smoking causes lung cancer." (True); L = "The earliest humans lived at the same time as the dinosaurs." (False); M = "Radioactive milk can be made safe by boiling it." (False); N = "Which travels faster: light or sound?" (Light); O = "Does the earth go around the sun, or does the sun go around the earth?" (earth around the sun); P = "How long does it take for the earth to go around the sun: one day, one month, or one year?" (One year); Q = "Please tell me, in your own words, what is DNA?"; R = "Please tell me, in your own words, what is a molecule?"; S = "Please tell me, in your own words, what is the Internet?"; T = "Please tell me, in your own words, what is radiation?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-6.

Appendix table 7-10.
Mean score on Index of Scientific Construct Understanding, by selected characteristics: 1997
(Mean index scores)

Characteristic	Mean score
All adults	55
Sex	
Male	62
Female	49
Formal education	
Less than high school	44
High school graduate	54
Baccalaureate degree	68
Graduate/professional degree	72
Science/mathematics education[a]	
Low	47
Middle	58
High	74
Attentiveness to science and technology[b]	
Attentive public	65
Interested public	58
Residual public	48

NOTE: The Index of Scientific Construct Understanding is a composite measure of the public understanding of scientific terms and concepts. In 1997, this measure included responses to the following true/false questions: "All radioactivity is man-made"; "Electrons are smaller than atoms"; "The earliest humans lived at the same time as the dinosaurs"; and "The continents on which we live have been moving their location for millions of years and will continue to move in the future." The following short-answer items were also included: "Which travels faster: light or sound?"; "Does the earth go around the sun, or does the sun go around the earth?"; and "How long does it take for the earth to go around the sun: one day, one month, or one year?" Coded verbatim responses to the following open-ended questions were also included: "Please tell me, in your own words, what is DNA?"; "Please tell me, in your own words, what is a molecule?"; and "Please tell me, in your own words, what is radiation?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

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Appendix table 7-11.
Public understanding of the nature of scientific inquiry, by selected characteristics: 1997
(Percentages)

Characteristic	Percentage
All adults	27
Sex	
Male	29
Female	25
Formal education	
Less than high school	8
High school graduate	27
Baccalaureate degree	46
Graduate/professional degree	54
Science/mathematics education[a]	
Low	16
Middle	30
High	55
Attentiveness to science and technology[b]	
Attentive public	35
Interested public	31
Residual public	20

NOTE: Responses are to the following questions: "Now, think about this situation. A doctor tells a couple that their *genetic makeup* means that they've got *one in four chances* of having a child with an inherited illness. Does this mean that if their first three children are healthy, the fourth will have the illness? Does this mean that if their first child has the illness, the next three will not? Does this mean that each of the couple's children will have the same risk of suffering from the illness? Does this mean that if they have only three children, none will have the illness?" "Now, let me turn to a slightly different type of question. When you read news stories, you see certain sets of words and terms. We are interested in how many people recognize certain kinds of terms, and I would like to ask you a few brief questions in that regard. First, some articles refer to the results of a scientific study. When you read or hear the term 'scientific study,' do you have a clear understanding of what it means, a general sense of what it means, or little understanding of what it means? *(if clear understanding or general sense):* In your own words, could you tell me what it means to study something scientifically?" "Now, please think about this situation. Two scientists want to know if a certain drug is effective against high blood pressure. The first scientist wants to give the drug to 1,000 people with high blood pressure and see how many of them experience lower blood pressure. The second scientist wants to give the drug to 500 people with high blood pressure, and not give the drug to another 500 people with high blood pressure, and see how many in both groups experience lower blood pressure levels. Which is the better way to test this drug? Why is it better to test the drug this way?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-9.

Appendix table 7-12.
Mean score on Index of Scientific Construct Understanding in 14 industrialized nations: Most recent year

Country (year)	Mean index score	Sample size
United States (1997)	55	2,000
United States (1995)	55	2,000
United States (1990)	54	2,033
Denmark (1992)	55	1,000
The Netherlands (1992)	54	1,000
Great Britain (1992)	53	1,000
France (1992)	52	1,000
Germany (1992)	51	2,000
Belgium (1992)	49	1,000
Italy (1992)	47	1,000
Canada (1989)	46	2,000
Spain (1992)	45	1,000
Ireland (1992)	42	1,000
Greece (1992)	37	1,000
Japan (1991)	36	1,457
Portugal (1992)	33	1,000

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); J.D. Miller, "Public Understanding of Science and Technology in OECD Countries: A Comparative Analysis," paper presented to the 1996 OECD Symposium on Public Understanding of Science and Technology, Tokyo; and J.D. Miller, R. Pardo, and F. Niwa, *Public Attitudes Toward Science and Technology: A Comparative Study of the European Union, the United States, Japan, and Canada* (Madrid: BBV Foundation, 1997).

See figure 7-10. *Science & Engineering Indicators – 1998*

Appendix table 7-13.
General attitudes toward science and technology, by selected characteristics: 1992, 1995, and 1997
(Mean index scores)

Characteristic	1992			1995			1997		
	P[a]	R[b]	P/R	P[a]	R[b]	P/R	P[a]	R[b]	P/R
All adults	67	38	1.76	68	39	1.74	70	37	1.89
Sex									
Male	68	39	1.74	69	38	1.82	71	35	2.03
Female	67	38	1.76	67	40	1.68	69	39	1.77
Formal education									
Less than high school	64	49	1.31	63	51	1.24	69	45	1.53
High school graduate	67	39	1.72	68	39	1.74	69	38	1.82
Baccalaureate degree	70	27	2.59	71	29	2.45	74	28	2.64
Graduate/professional degree	71	24	2.96	73	24	3.04	75	24	3.13
Science/mathematics education[c]									
Low	66	43	1.53	67	44	1.52	69	42	1.64
Middle	67	38	1.76	69	35	1.97	71	34	2.09
High	71	24	2.96	71	28	2.54	75	27	2.78
Attentiveness to science and technology[d]									
Attentive public	71	36	1.97	74	30	2.47	75	30	2.50
Interested public	70	36	1.94	69	38	1.82	73	35	2.09
Residual public	65	41	1.59	65	42	1.55	66	43	1.54

P = Index of Scientific Promise; R = Index of Scientific Reservations; P/R = ratio of scores on the two indices

[a]The Index of Scientific Promise includes responses to the following statements: "Now I would like to read you some statements like those you might find in a newspaper or magazine article. For each statement, please tell me if you generally agree or disagree. If you feel especially strongly about a statement, please tell me that you strongly agree or strongly disagree. First, science and technology are making our lives healthier, easier, and more comfortable—do you strongly agree, agree, disagree, or strongly disagree? Most scientists want to work on things that will make life better for the average person—do you strongly agree, agree, disagree, or strongly disagree? With the application of science and new technology, work will become more interesting—do you strongly agree, agree, disagree, or strongly disagree? Because of science and technology, there will be more opportunities for the next generation—do you strongly agree, agree, disagree, or strongly disagree?"

[b]The Index of Scientific Reservations includes responses to the following statements: "Now I would like to read you some statements like those you might find in a newspaper or magazine article. For each statement, please tell me if you generally agree or disagree. If you feel especially strongly about a statement, please tell me that you strongly agree or strongly disagree. We depend too much on science and not enough on faith—do you strongly agree, agree, disagree, or strongly disagree? It is not important for me to know about science in my daily life—do you strongly agree, agree, disagree, or strongly disagree? Science makes our way of life change too fast—do you strongly agree, agree, disagree, or strongly disagree? Now for a different type of question. People have frequently noted that scientific research has produced both beneficial and harmful consequences. Would you say that, on balance, the benefits of scientific research have outweighed the harmful results, or have the harmful results of scientific research been greater than its benefits? *(if benefits greater):* Would you say that the balance has been strongly in favor of beneficial results, or only slightly? *(if harms greater):* Would you say that the balance has been strongly in favor of harmful results, or only slightly?"

[c]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[d]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 7-14.
Responses to items in the Index of Scientific Promise and the Index of Scientific Reservations: 1997
(Percentages)

Item	Strongly agree	Agree	Don't know	Disagree	Strongly disagree
Index of Scientific Promise					
Science and technology are making our lives healthier, easier, and more comfortable	29	60	2	7	2
Most scientists want to work on things that will make life better for the average person	11	68	4	15	2
With the application of science and new technology, work will become more interesting	9	63	6	21	1
Because of science and technology, there will be more opportunities for the next generation	13	68	4	14	1
Index of Scientific Reservations					
We depend too much on science and not enough on faith	12	35	6	39	8
It is not important for me to know about science in my daily life	2	12	1	58	27
Science makes our way of life change too fast	4	32	2	55	6
	B>>H	**B>H**	**B=H**	**H>B**	**H>>B**
Have the benefits of scientific research outweighed the harmful results or have the harmful results outweighed the benefits?	47	28	13	8	4

B>>H = benefits strongly outweigh the harmful results; B>H = benefits outweigh the harmful results; B=H = benefits equal the harmful results; H>B = harmful results outweigh the benefits; H>>B = harmful results strongly outweigh the benefits

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 7-15.
Responses to and mean scores on the Attitude Toward Organized Science Scale, by selected characteristics: 1983-97

Response and characteristic	1983	1985	1988	1990	1992	1995	1997
			Percentage of the public				
Agree that "science and technology are making our lives healthier easier, and more comfortable"	84	86	87	84	85	86	89
Agree that "the benefits of science are greater than any harmful effects"	57	68	76	72	73	72	75
Disagree that "science makes our way of life change too fast"	50	53	59	60	63	60	61
Disagree that "we depend too much on science and not enough on faith"	43	39	43	44	45	44	48
			Mean ATOSS score				
All adults	2.3	2.5	2.7	2.6	2.7	2.6	2.7
Sex							
Male	2.2	2.4	2.6	2.5	2.7	2.7	2.9
Female	2.5	2.6	2.8	2.8	2.6	2.5	2.6
Formal education							
Less than high school	1.8	1.8	2.2	1.8	2.0	2.0	2.2
High school graduate	2.4	2.6	2.8	2.7	2.7	2.6	2.7
Baccalaureate degree	2.9	3.1	3.2	3.1	3.3	3.3	3.2
Graduate/professional degree	2.9	3.1	3.1	3.2	3.3	3.4	3.4
Science/mathematics education[a]							
Low	NA	NA	NA	2.4	2.5	2.3	2.5
Middle	NA	NA	NA	2.9	2.7	2.9	2.9
High	NA	NA	NA	3.3	3.3	3.2	3.3
Attentiveness to science and technology[b]							
Attentive public	2.6	2.8	3.0	2.8	2.9	3.1	3.0
Interested public	2.4	2.6	2.8	2.7	2.8	2.7	2.9
Residual public	2.1	2.3	2.5	2.5	2.5	2.4	2.4
Sample size	1,631	2,005	2,041	2,033	997	2,006	2,000

ATOSS = Attitude Toward Organized Science Scale; NA = not available

NOTES: Responses are to the following statement: "Now I would like to read you some statements like those you might find in a newspaper or magazine article. For each statement, please tell me if you generally agree or disagree. If you feel especially strongly about a statement, please tell me that you strongly agree or strongly disagree." The scale is a count of agreement with the first two items and disagreement with the second two items.

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated* Codebook (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 7-16.
General attitudes toward science and technology in 14 industrialized nations: Most recent year
(Mean index scores)

Country (year)	Index of Scientific Promise	Index of Scientific Reservation	Ratio of indices
United States (1997)	70	37	1.89
United States (1995)	68	39	1.74
United States (1992)	67	38	1.76
Canada (1989)	72	56	1.29
Italy (1992)	69	54	1.28
Ireland (1992)	69	55	1.26
Great Britain (1992)	68	56	1.21
France (1992)	68	56	1.21
Belgium (1992)	64	54	1.19
Denmark (1992)	72	61	1.18
The Netherlands (1992)	69	59	1.17
Germany (1992)	70	60	1.17
Spain (1992)	71	62	1.15
Portugal (1992)	71	67	1.06
Greece (1992)	75	74	1.01
Japan (1991)	55	56	0.98

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); unpublished tabulations; and J. D. Miller, R. Pardo, and F. Niwa, *Public Attitudes Toward Science and Technology: A Comparative Study of the European Union, the United States, Japan, and Canada* (Madrid: BBV Foundation, 1997).

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Appendix table 7-17.
Public assessments of funding of scientific research by the Federal Government, by selected characteristics: 1985-97
(Percentages)

Characteristic	1985	1988	1990	1992	1995	1997
All adults						
Strongly agree	9	16	17	14	19	22
Agree	70	65	62	63	61	57
Don't know	5	4	4	3	3	3
Disagree	16	14	15	18	17	15
Strongly disagree	0	1	2	2	2	3
Male						
Strongly agree	11	20	23	17	19	24
Agree	71	63	60	62	60	54
Don't know	2	2	2	2	2	3
Disagree	15	13	13	17	18	16
Strongly disagree	1	2	2	2	1	3
Female						
Strongly agree	8	11	13	11	15	20
Agree	68	68	65	64	62	59
Don't know	8	6	5	4	5	4
Disagree	16	14	16	19	16	15
Strongly disagree	0	1	1	2	2	2
Less than high school graduate						
Strongly agree	5	6	10	10	8	20
Agree	65	66	59	61	59	50
Don't know	9	7	8	5	7	5
Disagree	21	18	20	21	24	22
Strongly disagree	0	3	3	3	2	3
High school graduate						
Strongly agree	8	17	18	12	16	19
Agree	72	66	65	64	63	60
Don't know	4	3	2	3	3	3
Disagree	15	13	14	19	17	15
Strongly disagree	1	1	1	2	1	3
Baccalaureate degree						
Strongly agree	19	26	27	22	24	31
Agree	68	62	60	64	62	56
Don't know	2	3	2	2	2	2
Disagree	10	8	10	12	11	10
Strongly disagree	1	1	1	0	1	1
Graduate/professional degree						
Strongly agree	20	29	31	26	43	40
Agree	70	61	58	53	46	51
Don't know	2	2	4	5	2	2
Disagree	8	7	6	14	8	5
Strongly disagree	0	1	1	2	1	2
Attentive public for science and technology[a]						
Strongly agree	17	27	35	28	35	46
Agree	76	62	50	61	48	42
Don't know	0	2	4	1	1	1
Disagree	6	8	10	9	14	7
Strongly disagree	1	1	1	1	2	4

NOTE: Responses are to the question: "Even if it brings no immediate benefits, scientific research which advances the frontiers of knowledge is necessary and should be supported by the Federal Government. Do you strongly agree, agree, disagree, or strongly disagree?"

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 7-18.
Public attitudes toward federal support of basic scientific research, by general attitudes on science and technology and selected characteristics: 1997
(Percentages)

Characteristic	Disagree	Unsure	Agree	Sample size	Gamma[a]
INDEX OF SCIENTIFIC PROMISE[b]					
All adults	18	3	79	2,000	–
Low score on Index of Scientific Promise	37	9	54	241	
Moderate score on Index of Scientific Promise	25	4	71	626	0.54
High score on Index of Scientific Promise	10	1	89	1,133	
Less than high school graduate	25	5	70	421	–
Low score	35	18	47	57	
Moderate score	39	4	57	147	0.51
High score	14	1	85	217	
High school graduate	18	4	78	1,188	–
Low score	41	7	52	152	
Moderate score	23	5	72	379	0.54
High score	10	2	88	657	
Baccalaureate degree	10	2	88	393	–
Low score	21	6	73	33	
Moderate score	14	2	84	100	0.42
High score	7	1	92	260	
INDEX OF SCIENTIFIC RESERVATIONS[c]					
All adults	18	3	79	2,000	–
Low score on Index of Scientific Reservations	9	1	90	831	
Moderate score on Index of Scientific Reservations	23	4	73	806	-0.43
High score on Index of Scientific Reservations	27	6	67	363	
Less than high school graduate	25	4	71	421	–
Low score	8	0	92	79	
Moderate score	37	5	58	218	-0.07
High score	16	6	78	122	
High school graduate	18	3	79	1,188	–
Low score	9	2	89	493	
Moderate score	20	4	76	478	-0.47
High score	33	7	60	217	
Baccalaureate degree	10	1	89	393	–
Low score	8	1	91	254	
Moderate score	10	3	87	109	-0.27
High score	21	4	75	24	

[a]The ordinal correlation coefficient gamma is a measure of the bivariate relationship between two ordinal variables. It is equivalent to R^2 for two interval variables. See L.A. Goodman and W.H. Kruskal "Measures of Association for Cross-Classifications," *Journal of the American Statistical Association* Vol. 49 (1954): 732-64; and H.L. Costner, "Criteria for Measures of Association," *American Sociological Review* Vol. 30, No. 3 (1965): 341-53.

[b]The Index of Scientific Promise scores are classified as follows: low = 0-49; moderate = 50-74; and high = 75-100.

[c]The Index of Scientific Reservations scores are classified as follows: low = 0-29; moderate = 30-54; and high = 55+.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-11.

Appendix table 7-19.
Public confidence in the people running various institutions: 1973-96
(Percentages)

Institution	1973	1974	1975	1976	1977	1978	1980	1982	1983	1984	1986	1987	1988	1989	1990	1991	1993	1994	1996
Average[a]	30	33	26	29	31	24	26	26	24	27	25	28	26	25	25	29	22	22	23
Medicine	54	60	50	54	51	46	52	45	51	50	46	52	51	46	46	48	39	41	45
Scientific community	37	45	39	43	41	36	41	38	41	44	39	45	39	40	37	41	37	38	39
U.S. Supreme Court	31	33	31	35	35	28	25	30	27	33	30	36	35	34	35	37	31	30	28
Military	32	40	35	39	36	29	28	31	29	36	31	34	34	32	33	60	42	37	37
Education	37	49	31	37	41	28	30	33	29	28	28	35	29	30	27	30	22	25	23
Major companies	29	31	19	22	27	22	27	23	24	30	24	30	25	24	25	20	21	25	23
Organized religion	35	44	24	30	40	31	35	32	28	31	25	29	20	22	23	25	23	24	25
Exec. branch of Fed. Govt.	29	14	13	13	28	12	12	19	13	18	21	18	16	20	23	26	12	11	10
Banks & financial institutions	–	–	32	39	42	33	32	27	24	31	21	27	27	19	18	12	15	18	25
Congress	23	17	13	14	19	13	9	13	10	12	16	16	15	17	15	18	7	8	8
Press	23	26	24	28	25	20	22	18	13	17	18	18	18	17	15	16	11	8	11
TV	18	23	18	19	17	14	16	14	12	13	15	12	14	14	14	14	12	9	10
Organized labor	15	18	10	12	15	11	15	12	8	8	8	10	10	9	11	11	8	10	11
Sample size	1,504	1,484	1,490	1,499	1,530	1,532	1,468	1,506	1,599	989	1,470	1,466	997	1,035	899	1,017	1,057	2,011	1,925

– = not asked

NOTES: Percentages represent those respondents expressing a “great deal of confidence” when asked the following: “I am going to name some institutions in this country. As far as the people running these institutions are concerned, would you say that you have a great deal of confidence, only some confidence, or hardly any confidence at all in them?” Survey was not conducted in 1979 and 1981, and the question was not asked in 1985.

[a]Average does not include banks and financial institutions.

SOURCE: J.A. Davis and T.W. Smith, G*eneral Social Surveys, Cumulative Codebook* (Chicago: University of Chicago, National Opinion Research Center, annual series).

See figure 7-12.

Science & Engineering Indicators – 1998

Appendix table 7-20.
Public assessments of scientific research, by selected characteristics: 1979-97

Characteristic	1979	1981	1985	1988	1990	1992	1995	1997
				Percentages				
All adults								
Benefits strongly outweigh harmful results	46	42	44	57	47	42	43	47
Benefits slightly outweigh harmful results	24	28	24	25	25	31	29	28
Benefits equal harmful results	19	13	13	5	15	11	16	13
Harmful results slightly outweigh benefits	7	12	13	9	10	12	10	8
Harmful results strongly outweigh benefits	4	5	6	4	3	4	3	4
Male								
Benefits strongly outweigh harmful results	51	48	48	59	54	45	47	52
Benefits slightly outweigh harmful results	23	27	23	25	24	30	28	27
Benefits equal harmful results	16	11	10	5	9	9	13	10
Harmful results slightly outweigh benefits	7	10	13	7	9	11	9	7
Harmful results strongly outweigh benefits	3	5	6	4	4	5	4	
Female								
Benefits strongly outweigh harmful results	42	37	40	55	40	40	39	42
Benefits slightly outweigh harmful results	25	28	26	25	26	31	30	29
Benefits equal harmful results	23	16	14	6	20	13	19	15
Harmful results slightly outweigh benefits	6	14	14	10	11	12	10	10
Harmful results strongly outweigh benefits	4	5	6	4	3	4	3	4
Less than high school graduate								
Benefits strongly outweigh harmful results	26	26	20	37	24	24	18	30
Benefits slightly outweigh harmful results	25	23	21	30	25	33	30	28
Benefits equal harmful results	32	25	26	9	30	17	34	21
Harmful results slightly outweigh benefits	12	18	20	17	17	20	14	18
Harmful results strongly outweigh benefits	5	9	13	7	4	7	3	3
High school graduate								
Benefits strongly outweigh harmful results	50	43	47	59	49	41	44	46
Benefits slightly outweigh harmful results	26	31	26	25	27	32	30	30
Benefits equal harmful results	16	10	10	5	11	10	13	13
Harmful results slightly outweigh benefits	5	12	13	7	10	12	10	6
Harmful results strongly outweigh benefits	3	4	4	4	3	5	3	5
Baccalaureate or higher degree								
Benefits strongly outweigh harmful results	69	64	67	80	72	66	67	67
Benefits slightly outweigh harmful results	18	22	23	16	18	22	23	23
Benefits equal harmful results	8	7	2	1	6	8	6	6
Harmful results slightly outweigh benefits	2	4	6	2	2	3	3	3
Harmful results strongly outweigh benefits	3	2	2	1	2	2	1	1
Attentive public for science and technology								
Benefits strongly outweigh harmful results	67	63	59	62	61	48	64	64
Benefits slightly outweigh harmful results	16	20	17	23	19	27	21	19
Benefits equal harmful results	8	5	7	6	10	12	8	6
Harmful results slightly outweigh benefits	4	8	13	6	6	9	3	8
Harmful results strongly outweigh benefits	5	4	4	3	4	4	4	3
				Sample size				
All adults	1,635	1,536	2,005	975	2,033	997	2,006	2,000
Male	773	724	950	475	964	464	953	930
Female	862	812	1,054	500	1,070	533	1,053	1,070
Less than high school graduate	465	385	507	259	495	215	418	420
High school graduate	932	886	1,147	546	1,202	579	1,196	1,188
Baccalaureate or higher degree	238	264	349	170	336	203	392	392
Attentive public for science and technology[a]	154	381	235	116	229	94	195	288

NOTES: Responses are for the following statements: "People have frequently noted that scientific research has produced both beneficial and harmful consequences. Would you say that, on balance, the benefits of scientific research have outweighed the harmful results, or have the harmful results of scientific research been greater than its benefits? Would you say that the balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of harmful results or only slightly?" Percentages may not total 100 because of rounding.

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-13.

Appendix table 7-21.
Public assessments of nuclear power, by selected characteristics: 1985-97

Characteristic	1985	1988	1990	1992	1995	1997
			Percentages			
All adults						
Benefits strongly outweigh harmful results	28	18	24	17	21	22
Benefits slightly outweigh harmful results	22	24	23	30	22	23
Benefits equal harmful results	6	11	12	11	14	18
Harmful results slightly outweigh benefits	13	17	13	15	21	17
Harmful results strongly outweigh benefits	31	30	28	27	21	20
Male						
Benefits strongly outweigh harmful results	38	23	31	21	29	28
Benefits slightly outweigh harmful results	22	27	24	34	23	26
Benefits equal harmful results	4	7	8	7	8	13
Harmful results slightly outweigh benefits	9	15	11	10	21	13
Harmful results strongly outweigh benefits	27	28	26	28	19	20
Female						
Benefits strongly outweigh harmful results	19	14	17	14	14	17
Benefits slightly outweigh harmful results	22	21	21	27	21	20
Benefits equal harmful results	8	14	16	14	20	22
Harmful results slightly outweigh benefits	16	19	16	18	23	20
Harmful results strongly outweigh benefits	35	32	30	27	22	21
Less than high school graduate						
Benefits strongly outweigh harmful results	28	15	21	10	15	20
Benefits slightly outweigh harmful results	24	25	21	37	16	17
Benefits equal harmful results	8	17	23	11	25	25
Harmful results slightly outweigh benefits	14	19	13	13	28	21
Harmful results strongly outweigh benefits	26	24	22	29	16	17
High school graduate						
Benefits strongly outweigh harmful results	27	18	23	19	21	22
Benefits slightly outweigh harmful results	21	23	23	26	23	23
Benefits equal harmful results	6	9	9	11	13	16
Harmful results slightly outweigh benefits	13	17	14	16	21	16
Harmful results strongly outweigh benefits	33	33	31	28	23	23
Baccalaureate or higher degree						
Benefits strongly outweigh harmful results	29	22	32	19	28	25
Benefits slightly outweigh harmful results	21	25	23	34	26	26
Benefits equal harmful results	3	7	7	10	8	14
Harmful results slightly outweigh benefits	13	14	13	14	18	17
Harmful results strongly outweigh benefits	3	32	25	23	19	18
Attentive public for science and technology[a]						
Benefits strongly outweigh harmful results	35	26	30	24	28	25
Benefits slightly outweigh harmful results	20	24	27	30	24	25
Benefits equal harmful results	1	9	6	10	10	11
Harmful results slightly outweigh benefits	12	16	9	9	22	17
Harmful results strongly outweigh benefits	32	25	28	27	18	22

Appendix table 7-21.
Public assessments of nuclear power, by selected characteristics: 1985-97

Characteristic	1985	1988	1990	1992	1995	1997
			Sample size			
All adults	2,005	2,041	2,033	997	2,006	2,000
Male	950	958	964	464	953	930
Female	1,054	1,084	1,070	533	1,053	1,070
Less than high school graduate	507	530	495	215	418	420
High school graduate	1,143	1,158	1,202	579	1,196	1,188
Baccalaureate or higher degree	349	353	336	203	392	392
Attentive public for science and technology	235	233	229	94	195	288

NOTES: In 1985, 1988, 1990, 1995 and 1997, the question was worded, “In the current debate over the use of nuclear reactors to generate electricity, there is a broad agreement that there are some risks and some benefits associated with nuclear power. In your opinion, have the benefits associated with nuclear power outweighed the harmful results, or have the harmful results associated with nuclear power been greater than its benefits? Would you say that the balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of harmful results or only slightly?” In 1992, the question was worded, “In the current debate over the use of nuclear reactors to generate electricity, there is broad agreement that there are some costs and some benefits associated with nuclear power. In your opinion, are the costs associated with nuclear power greater than the benefits, or are the benefits associated with nuclear power greater than the costs? Would you say that the benefits have substantially exceeded the costs or only slightly exceeded the costs? Would you say that the costs substantially exceeded the benefits or only slightly exceed the benefits?” Percentages may not total 100 because of rounding.

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-14.

Appendix table 7-22.
Public assessments of genetic engineering, by selected characteristics: 1985-97

Characteristic	1985	1990	1995	1997
	Percentages			
All adults				
Benefits strongly outweigh harmful results	23	20	21	19
Benefits slightly outweigh harmful results	26	27	22	23
Benefits equal harmful results	12	16	22	22
Harmful results slightly outweigh benefits	14	19	23	20
Harmful results strongly outweigh benefits	25	18	12	16
Male				
Benefits strongly outweigh harmful results	26	21	24	23
Benefits slightly outweigh harmful results	28	31	22	26
Benefits equal harmful results	11	14	21	20
Harmful results slightly outweigh benefits	13	18	22	17
Harmful results strongly outweigh benefits	22	16	10	14
Female				
Benefits strongly outweigh harmful results	19	19	18	16
Benefits slightly outweigh harmful results	25	23	22	21
Benefits equal harmful results	14	17	22	23
Harmful results slightly outweigh benefits	15	21	23	22
Harmful results strongly outweigh benefits	27	20	15	18
Less than high school graduate				
Benefits strongly outweigh harmful results	19	16	10	15
Benefits slightly outweigh harmful results	29	27	19	18
Benefits equal harmful results	16	25	30	23
Harmful results slightly outweigh benefits	12	17	29	30
Harmful results strongly outweigh benefits	24	15	13	14
High school graduate				
Benefits strongly outweigh harmful results	21	19	20	18
Benefits slightly outweigh harmful results	24	27	21	24
Benefits equal harmful results	13	12	21	21
Harmful results slightly outweigh benefits	15	21	23	18
Harmful results strongly outweigh benefits	27	21	14	19
Baccalaureate or higher degree				
Benefits strongly outweigh harmful results	33	29	35	27
Benefits slightly outweigh harmful results	29	28	30	28
Benefits equal harmful results	7	15	16	21
Harmful results slightly outweigh benefits	13	15	14	14
Harmful results strongly outweigh benefits	18	13	6	10
Attentive public for science and technology[a]				
Benefits strongly outweigh harmful results	37	32	42	36
Benefits slightly outweigh harmful results	28	30	22	24
Benefits equal harmful results	9	9	16	13
Harmful results slightly outweigh benefits	12	12	13	16
Harmful results strongly outweigh benefits	14	17	7	11
Attentive public for medical research				
Benefits strongly outweigh harmful results	29	31	34	27
Benefits slightly outweigh harmful results	24	27	21	25
Benefits equal harmful results	12	12	17	18
Harmful results slightly outweigh benefits	11	17	18	18
Harmful results strongly outweigh benefits	24	13	9	12

Appendix table 7-22.
Public assessments of genetic engineering, by selected characteristics: 1985-97

Characteristic	1985	1990	1995	1997
	Sample size			
All adults	2,005	2,033	2,006	2,000
Male	950	964	953	930
Female	1,054	1,070	1,053	1,070
Less than high school graduate	507	495	418	420
High school graduate	1,143	1,179	1,196	1,188
Baccalaureate or higher degree	349	359	392	392
Attentive public for science and technology	235	229	195	288
Attentive public for medical research	349	337	310	377

NOTES: In 1985, the question was worded, "Some persons have argued that the creation of new life forms through genetic engineering constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your opinion, are the risks of genetic engineering greater than the benefits, or are the benefits of genetic engineering research greater than the risks? Would you say that the benefits are substantially greater than the risks, or only slightly greater than the risks? Would you say that the risks are substantially greater than the benefits or only slightly greater than the benefits?" In 1990, the question was worded, "Some persons have argued that the creation of new life forms through genetic engineering research constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your opinion, are the risks of genetic engineering research greater than its benefits, or are the benefits of genetic engineering research greater than its risks? Would you say that the benefits have substantially exceeded the risks or only slightly exceeded the risks? Would you say that the risks have substantially exceeded the benefits or only slightly exceeded the benefits?" In 1995, the question was worded, "Some persons have argued that the creation of new life forms through genetic engineering research constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your opinion, have the benefits of genetic engineering research outweighed the harmful results, or have the harmful results of genetic engineering research been greater than its benefits? Would you say that balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of harmful results or only slightly?" In 1997, half of the respondents were asked the question used in 1995. The other half were asked: "Some persons have argued that the modification of existing life forms through genetic engineering research constitutes a serious risk, while other persons have argued that this research may yield major benefits for society. In your opinion, have the benefits of engineering research outweighed the harmful results, or have the harmful results of genetic engineering research been greater than its benefits? Would you say that the balance has been strongly in favor of beneficial results or only slightly? Would you say that the balance has been strongly in favor of harmful results or only slightly?" Percentages may not total 100 because of rounding.

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-15.

Appendix table 7-23.
Public assessments of space exploration, by selected characteristics: 1985-97

Characteristic	1985	1988	1990	1992	1995	1997
			Percentages			
All adults						
Benefits strongly outweigh costs	27	22	18	17	22	24
Benefits slightly outweigh costs	27	25	25	26	24	24
Benefits equal costs	7	9	9	9	8	10
Costs slightly outweigh benefits	15	18	17	22	17	17
Costs strongly outweigh benefits	24	26	31	26	28	25
Male						
Benefits strongly outweigh costs	33	28	23	33	28	31
Benefits slightly outweigh costs	31	27	26	26	25	25
Benefits equal costs	6	10	8	8	6	8
Costs slightly outweigh benefits	12	13	16	16	16	15
Costs strongly outweigh benefits	18	22	27	27	24	21
Female						
Benefits strongly outweigh costs	21	16	14	11	17	18
Benefits slightly outweigh costs	24	23	24	25	23	23
Benefits equal costs	8	9	10	11	10	12
Costs slightly outweigh benefits	17	23	17	27	18	18
Costs strongly outweigh benefits	30	29	35	26	32	29
Less than high school graduate						
Benefits strongly outweigh costs	22	16	15	14	14	18
Benefits slightly outweigh costs	25	26	20	29	20	21
Benefits equal costs	10	9	17	12	13	16
Costs slightly outweigh benefits	17	21	16	24	21	24
Costs strongly outweigh benefits	26	29	32	21	31	21
High school graduate						
Benefits strongly outweigh costs	26	21	17	15	23	23
Benefits slightly outweigh costs	28	25	25	25	24	23
Benefits equal costs	6	9	7	9	6	9
Costs slightly outweigh benefits	14	18	17	23	17	16
Costs strongly outweigh benefits	26	27	34	28	30	29
Baccalaureate or higher degree						
Benefits strongly outweigh costs	36	33	27	22	32	31
Benefits slightly outweigh costs	28	26	28	26	27	29
Benefits equal costs	6	10	7	6	8	8
Costs slightly outweigh benefits	13	15	16	18	14	12
Costs strongly outweigh benefits	17	16	22	28	20	20
Attentive public for science and technology[a]						
Benefits strongly outweigh costs	39	38	26	28	32	44
Benefits slightly outweigh costs	27	28	33	26	25	22
Benefits equal costs	7	6	4	11	7	6
Costs slightly outweigh benefits	13	10	14	20	16	11
Costs strongly outweigh benefits	14	21	23	15	20	17
Attentive public for space exploration						
Benefits strongly outweigh costs	49	46	36	38	52	57
Benefits slightly outweigh costs	25	30	36	44	23	19
Benefits equal costs	8	4	3	3	4	6
Costs slightly outweigh benefits	11	7	11	6	12	10
Costs strongly outweigh benefits	7	13	14	9	9	8

Appendix table 7-23.
Public assessments of space exploration, by selected characteristics: 1985-97

Characteristic	1985	1988	1990	1992	1995	1997
			Sample size			
All adults	2,005	2,041	2,033	1,004	2,006	2000
Male	950	958	964	486	953	930
Female	1,054	1,084	1,070	533	1,053	1070
Less than high school graduate	507	530	495	215	418	420
High school graduate	1,147	1,158	1,202	623	1,196	1188
Baccalaureate or higher degree	349	353	336	203	392	392
Attentive public for science and technology	235	233	229	105	195	288
Attentive public for space exploration	184	163	123	51	99	168

NOTES: Responses are to the following questions: "Many current issues in science and technology may be viewed as a judgment of relative benefits. Thinking first about the space program, some persons have argued that the costs of the space program may have exceeded its benefits, while other people have argued that the benefits of space exploration have exceeded its costs. In your opinion, have the costs of space exploration exceeded its benefits, or have the benefits of space exploration exceeded its costs? Would you say that the benefits have substantially exceeded the costs, or only slightly exceeded the costs? Would you say that the costs have substantially exceeded the benefits or only slightly exceeded the benefits?" Percentages may not total 100 because of rounding.

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-16.

Appendix table 7-24.
Public use of various sources of information, by selected characteristics: 1997
(Percentages)

Characteristic	Read newspaper every day	Read at least 1 news magazine regularly	Watch TV news 1+hr/day	Listen to radio news 1+hr/day	Public library: 1 visit/yr	Public library: 5 visits/yr	Read at least 1 science magazine/ month	Watch 1+ science TV programs/ month	Visit science museums 1+/year	Purchase 1+ books/yr: Any	Purchase 1+ books/yr: Science	World Wide Web 1+ hrs/wk	Sample size
All adults	46	14	68	28	70	45	15	53	60	61	31	15	2,000
Sex													
Male	49	15	63	29	68	41	20	56	63	55	32	20	930
Female	43	14	72	27	72	48	11	50	59	66	29	10	1,070
Formal education													
Less than high school	41	6	80	31	52	31	9	45	34	33	9	4	420
High school graduate	44	14	67	27	71	43	14	55	64	62	31	11	1,188
Baccalaureate degree	53	22	59	27	87	68	25	57	78	85	51	35	257
Grad./professional degree	59	27	54	27	84	63	29	52	75	87	56	37	135
Science/mathematics education[a]													
Low	43	10	74	26	59	33	9	48	48	48	18	4	1,112
Middle	47	18	65	34	82	57	14	56	75	70	38	19	509
High	53	22	54	27	85	63	33	62	78	86	58	38	379
Attentiveness to science & tech.[b]													
Attentive public	79	25	70	27	78	60	41	64	68	75	44	30	288
Interested public	38	14	68	28	74	48	13	56	66	65	35	15	918
Residual public	42	11	68	32	62	35	7	44	51	51	20	9	794
Access to cable/satellite TV													
Have cable TV	49	15	68	27	72	45	15	57	62	62	31	17	1,331
Have satellite dish	52	10	64	20	50	29	21	56	55	60	32	17	97
Have neither[c]	35	13	69	33	69	47	14	42	57	58	29	10	572

NOTE: Responses are to the statements: "How often do you read a newspaper: every day, a few times a week, once a week, or less than once a week?"; "Are there any magazines that you read regularly, that is, most of the time? What magazine would that be?"; "Altogether, on an average day, about how many hours would you say that you watch television? About how many of those hours are news reports or news shows?"; "Now, let me ask you about your use of museums, zoos, and similar institutions. I am going to read you a short list of places and ask you to tell me how many times you visited each type of place during the last year, that is, the last 12 months. If you did not visit any given place, just say none. A natural history museum—how many times did you visit it during the last year? A zoo or an aquarium—how many times did you visit it during the last year? A science or technology museum—how many times did you visit it during the last year? A public library—how many times did you visit it during the last year?"; "Do you watch any television shows that focus primarily on science or nature? Which science or nature show do you watch most often? About how many times a month do you watch this show?"; and "On an average day, about how many hours would you say that you listen to a radio? About how many of those hours are news reports or news shows?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[c]This category includes 79 respondents who reported that they did not watch any television.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figure 7-17.

Appendix table 7-25.
Public use of information on an annual basis, by selected characteristics: 1997

Characteristic	Hours/year watching/listening to					Copies read/year			Visits/year		Number borrowed/year		Sample size
	Total TV	TV news	Science TV	Total radio	Radio news	News-papers	News maga-zines	Science maga-zines	Science museum	Public library	Books	Video-tapes	
All adults	1,075	432	72	944	228	196	3.0	1.7	2.2	11.0	12.1	2.0	2,000
Sex													
Male	992	387	82	986	262	206	2.8	2.5	2.0	9.2	7.7	1.3	930
Female	1,147	471	62	906	198	186	2.8	1.1	2.1	11.8	15.9	2.0	1,070
Formal education													
Less than high school	1,495	553	48	904	207	178	1.7	1.0	1.0	7.6	5.5	0.5	420
High school graduate	1,040	426	81	1,030	233	192	2.5	1.5	2.0	10.0	11.6	1.4	1,188
Baccalaureate degree	743	314	72	798	234	219	4.0	3.0	3.4	16.8	20.0	3.0	257
Grad./professional degree	718	335	59	584	232	238	6.2	4.0	3.3	15.9	21.1	2.2	135
Science/math education[a]													
Low	1,235	489	63	887	208	185	2.0	1.0	2.0	7.7	8.8	1.1	1,112
Middle	973	394	86	1,138	259	200	3.3	1.5	2.9	13.2	13.3	1.6	509
High	744	317	79	850	243	220	4.6	4.1	3.3	15.3	19.9	3.0	379
Attentiveness to science and technology[b]													
Attentive public	1,093	500	102	957	254	298	6.5	5.2	3.1	16.7	18.0	2.3	288
Interested public	1,044	443	84	931	238	171	2.5	1.4	2.5	11.1	13.0	1.5	918
Residual public	1,105	395	46	954	205	186	1.8	0.9	1.7	8.0	8.8	1.0	794
Access to cable/satellite TV													
Have cable TV	1,149	459	84	955	217	209	3.0	1.7	2.0	10.6	11.5	1.0	1,331
Have satellite dish	1,154	373	109	1,050	177	218	1.4	3.2	2.0	7.5	9.6	1.4	97
Have neither[c]	889	379	35	899	261	160	2.3	1.7	2.2	11.0	13.9	2.3	572

NOTE: Responses are to the statements: "Altogether, on an average day, about how many hours would you say that you watch television? About how many of those hours are news reports or news shows?" "Now, let me ask you about your use of museums, zoos, and similar institutions. I am going to read you a short list of places and ask you to tell me how many times you visited each type of place during the last year, that is, the last 12 months. If you did not visit any given place, just say none. A natural history museum—how many times did you visit it during the last year? A zoo or an aquarium—how many times did you visit it during the last year? A science or technology museum—how many times did you visit it during the last year? A public library—how many times did you visit it during the last year?"; "During the last 12 months, did you borrow any books from the public library? (if yes):About how many books did you borrow during the last year?" "During the last 12 months, did you borrow any videotapes from the public library? (if yes):About how many videotapes did you borrow during the last year?" "Do you watch any television shows that focus primarily on science or nature? Which science or nature show do you watch most often? About how many times a month do you watch this show?"; and "On an average day, about how many hours would you say that you listen to a radio? About how many of those hours are news reports or news shows?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[c]This category includes 79 respondents who reported that they did not watch any television.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations prepared for the National Science Foundation, Science Resources Studies Division.

See figures 7-18 and 7-19.

Appendix table 7-26.
Public's access to computers from work and home, by selected characteristics: 1983-97

Characteristic	1983	1985	1988	1990	1995	1997
			Percentages			
All adults						
No access	70	66	62	58	46	43
Access from work or home	27	28	29	30	33	34
Access from work and home	3	6	9	12	21	23
Male						
No access	68	62	59	55	41	42
Access from work or home	28	30	30	30	34	32
Access from work and home	4	8	11	15	25	26
Female						
No access	72	69	66	61	50	44
Access from work or home	26	26	28	31	33	36
Access from work and home	2	5	6	8	17	20
Less than high school graduate						
No access	94	87	92	85	80	79
Access from work or home	6	13	8	14	18	18
Access from work and home	0	0	0	1	2	3
High school graduate						
No access	66	65	58	55	42	40
Access from work or home	31	30	35	34	38	39
Access from work and home	3	5	7	11	20	21
Baccalaureate or higher degree						
No access	47	40	33	29	18	12
Access from work or home	45	43	41	41	36	38
Access from work and home	8	17	26	30	46	50
Attentive public for science and technology[a]						
No access	61	56	50	44	31	34
Access from work or home	29	33	35	31	31	36
Access from work and home	10	11	15	25	38	30
			Sample size			
All adults	631	2,005	2,041	2,033	2,006	2,000
Male	775	950	958	964	953	930
Female	856	1,054	1,084	1,070	1,053	1,070
Less than high school graduate	404	507	530	495	418	420
High school graduate	941	1,147	1,158	1,202	1,196	1188
Baccalaureate or higher degree	282	349	353	336	392	392
Attentive public for science and technology	208	235	233	229	195	288

NOTE: In 1985, 1988, 1990, 1995 and 1997, the question was worded, "Do you use a computer in your work? About how many hours do you personally use your work computer in a typical week? Do you presently have a home computer in your household? About how many hours do you personally use your home computer in a typical week?" In 1983, the question was worded, "Do you use computers or word processing equipment in your work?..."

[a]The attentive public for science and technology contains the attentive public for new scientific discoveries and the attentive public for new inventions and technologies.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

See figures 7-20 and 8-24.

Appendix table 7-27.
Public's access to and use of computers at home and work, by selected characteristics: 1997
(Percentages)

Characteristic	Use computer in work	Have computer at home	Computer at home & work	Computer at home or work	No computer	Home computer					Work computer		Use (hours/year)		
						Modem	On-line service	CD-ROM	E-mail address	Access WWW	E-mail address	Access WWW	Work computer	Home computer	On-line hrs/year
All adults	38	43	23	57	43	33	18	29	18	16	16	14	369	130	29
Sex															
Male	41	44	26	58	42	35	21	31	20	20	18	18	371	161	37
Female	35	41	20	56	44	33	15	26	15	13	14	11	368	102	22
Formal education															
Less than high school	6	19	3	21	79	13	1	8	6	5	1	2	31	51	4
High school graduate	39	42	21	60	40	31	17	29	17	14	12	11	390	119	26
Baccalaureate degree	67	67	47	87	13	54	35	49	31	32	40	36	695	237	60
Grad./professional degree	68	76	54	88	12	62	41	55	37	38	43	45	612	263	69
Science/math education[a]															
Low	22	29	12	40	60	20	9	17	8	7	5	5	221	71	12
Middle	51	53	32	72	28	42	23	38	25	22	22	18	439	162	31
High	64	68	44	88	12	56	37	51	36	36	38	35	709	257	74
Attentiveness to science and technology[b]															
Attentive public	42	54	30	66	34	47	26	40	30	30	23	23	465	225	55
Interested public	42	46	26	63	37	34	20	31	18	17	17	16	398	152	32
Residual public	31	34	18	48	52	26	13	22	13	10	12	9	301	69	16
Access to cable/satellite TV															
Have cable TV	41	46	25	61	39	36	20	32	20	18	17	15	401	143	32
Have satellite dish	39	45	21	63	37	33	17	31	18	19	12	10	308	134	39
Have neither[c]	30	35	17	47	53	24	12	21	12	11	12	13	306	97	20

WWW = World Wide Web

NOTE: Responses are to the statements: "Do you use a computer in your work? About how many hours do you personally use your work computer in a typical week? Do you have an e-mail address for use at work? Do you have access to the World Wide Web through your work computer? Do you presently have a home computer in your household? About how many hours do you personally use your home computer in a typical week? Do you have a CD-ROM reader in your home computer? Do you have a modem in your home computer? Do you presently subscribe to any network service like CompuServe, Prodigy, America Online, or any other dial-in-service? About how many hours a month do you use your dial-in or network service? Do you have an e-mail address that you use with your home computer? Do you ever access the World Wide Web through your home computer?"

[a]Respondents were classified as having a "high" level of science/mathematics education if they took nine or more high school and college science/math courses. They were classified as "middle" if they took six to eight such courses, and as "low" if they took five or fewer.

[b]The attentive public for science and technology combines the attentive public for new scientific discoveries and the attentive public for new inventions and technologies. Any individual who is not attentive to either of those issues but who is a member of the interested public for at least one of those issues is classified as a member of the interested public for science and technology. All other individuals are classified as members of the residual public for science and technology.

[c]This category includes 79 respondents who reported that they did not watch any television.

SOURCES: J.D. Miller and L. Kimmel, *Public Attitudes Toward Science and Technology, 1979-1997, Integrated Codebook* (Chicago: Chicago Academy of Sciences, International Center for the Advancement of Scientific Literacy, 1997); and unpublished tabulations.

Appendix table 8-1.
Uses of computers in the workplace: 1993

Application	Workers who use this application: Number (thousands)	Workers who use this application: Percentage
Analysis	13,018	25
Bookkeeping	13,236	26
Bulletin boards	4,315	8
Calendar scheduling	11,846	23
Communications	16,058	31
Computer-assisted design	3,856	8
Databases	17,556	34
Desktop publishing	5,933	12
Educational programs	4,689	9
E-mail	10,872	21
Games	2,930	6
Graphics	8,671	17
Inventory control	12,823	25
Invoicing	10,057	20
Learn to use	4,820	9
Programming	6,671	13
Sales	7,629	15
Spreadsheets	12,045	24
Telemarketing	1,656	3
Word processing	22,624	44
Other	9,841	19
Don't know	2,895	6
Total workers who use a computer	**51,106**	

SOURCE: U.S. Bureau of the Census, Current Population Survey, October 1993. Available from <<http://www.census.gov/population/socdemo/computer/compusea/text>>.

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Appendix table 8-2.
Index of real net information technologies capital stock in the private sector: 1960-95

	Office, computing, and accounting machinery	Communications equipment	All nonresidential durable equipment
1960	0.23	8.15	25.62
1961	0.24	9.27	26.18
1962	0.25	10.56	27.06
1963	0.29	11.56	28.12
1964	0.34	12.50	29.56
1965	0.40	13.69	31.67
1966	0.53	15.09	34.26
1967	0.65	16.46	36.44
1968	0.76	17.84	38.76
1969	0.93	19.64	41.32
1970	1.09	21.64	43.32
1971	1.28	23.25	45.08
1972	1.57	24.52	47.46
1973	1.90	26.43	50.92
1974	2.34	28.26	54.11
1975	2.64	29.63	55.89
1976	3.12	31.22	57.88
1977	3.78	34.23	60.81
1978	5.33	38.13	64.75
1979	7.57	43.01	68.95
1980	10.48	48.46	71.95
1981	14.25	53.71	74.76
1982	17.19	58.50	76.22
1983	22.87	62.70	77.86
1984	32.03	67.54	81.11
1985	41.88	72.67	84.45
1986	51.55	77.58	87.32
1987	59.61	81.59	89.63
1988	66.84	86.52	92.30
1989	75.82	90.75	95.03
1990	81.69	94.58	97.22
1991	87.31	97.21	98.39
1992	100.00	100.00	100.00
1993	119.03	102.20	102.72
1994	143.14	106.43	106.90
1995	178.09	112.78	111.89

NOTE: Index is chain-link index; values are expressed relative to 1992 dollars.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business* (May 1997), table 4, pp. 82-84.

See figure 8-2.

Appendix table 8-3.
Gross product by industry as a share of gross domestic product: 1959-94, selected years
(Percentages)

Industry	1959	1967	1977	1982	1987	1988	1989	1990	1991	1992	1993	1994
Goods, total	38.9	36.0	32.8	31.0	27.3	27.6	26.8	26.2	24.7	24.0	23.7	24.2
Agriculture, forestry, and fishing	4.0	3.0	2.7	2.4	1.9	1.8	1.9	1.9	1.7	1.8	1.6	1.7
Mining	2.5	1.8	2.7	4.6	1.9	2.0	1.8	2.0	1.7	1.5	1.4	1.3
Construction	4.7	4.7	4.6	4.0	4.6	4.6	4.5	4.3	3.9	3.7	3.7	3.9
Manufacturing	27.7	26.5	22.8	20.0	18.9	19.2	18.6	18.0	17.4	17.0	17.0	17.3
Services, total	48.8	49.8	51.9	53.9	59.1	59.7	59.6	59.8	61.0	61.3	61.6	62.0
Transportation and public utilities[a]	8.9	8.5	8.9	9.0	9.0	8.8	8.5	8.4	8.7	8.5	8.6	8.7
Wholesale trade	7.1	6.9	7.0	6.8	6.4	6.7	6.6	6.4	6.6	6.5	6.5	6.7
Retail trade	9.7	9.4	9.4	8.9	9.3	9.1	9.0	8.8	8.7	8.7	8.7	8.8
Finance, insurance, and real estate	13.6	14.1	14.0	15.6	17.7	17.7	17.7	17.8	18.3	18.4	18.5	18.4
Professional[b]	5.2	6.5	8.6	10.6	12.5	10.8	11.0	11.5	11.7	12.1	12.2	12.3
Personal[c]	3.4	3.5	3.1	3.1	3.4	3.5	3.4	3.6	3.5	3.6	3.5	3.6
Other[d]	0.9	0.9	0.8	0.8	0.9	3.2	3.7	3.6	3.4	3.5	3.5	3.6
Government	12.8	14.1	14.5	14.2	13.9	13.8	13.6	13.8	14.2	14.0	13.7	13.4

NOTE: Shares are based on current dollars.

[a]This includes communications.

[b]Professional services include business, health, legal, educational, social, and (through 1987) miscellaneous professional services.

[c]Personal services include hotels and lodging, personal, auto repair and services, miscellaneous repair, amusement and recreation, and private household services.

[d]Other services include motion pictures, membership organizations, and (after 1987) other.

SOURCE: U.S. Bureau of Economic Analysis, *Survey of Current Business* (August 1996), table 11.

See figures 8-6 and 8-7.

Appendix table 8-4.
U.S. employment by industrial sector: 1950-90, selected years
(Percentages)

Industry	1950	1960	1970	1980	1990
Total	100.0	100.0	100.0	100.0	100.0
Extractive	14.4	8.1	4.6	4.5	3.5
Agriculture	12.7	7.0	3.7	3.6	2.8
Mining	1.7	1.1	0.8	1.0	0.6
Transformative	33.9	35.9	33.0	29.6	25.6
Constructive	6.2	6.2	6.0	6.2	6.5
Utilities	1.4	1.4	1.1	1.2	1.1
Manufacturing	26.2	28.3	25.9	22.2	18.0
Food	2.7	3.1	1.9	1.9	1.6
Textiles	2.2	3.3	1.3	0.8	0.6
Metal	3.6	3.9	3.1	2.7	1.8
Machinery	3.7	7.5	5.1	5.2	3.8
Chemical	1.7	1.8	1.5	1.6	1.3
Miscellaneous manufacturing	12.3	8.7	12.9	10.0	8.9
Distributive services	22.4	21.9	22.4	21.0	20.6
Transportation	5.3	4.4	3.9	3.7	3.5
Communication	1.2	1.3	1.5	1.5	1.3
Wholesale	3.5	3.6	4.0	3.9	3.9
Retail	12.3	12.5	12.9	11.9	11.8
Producer services	4.8	6.6	8.2	10.5	14.0
Banking	1.1	1.6	2.2	2.6	2.9
Insurance	1.4	1.7	1.8	1.9	2.1
Real estate	1.0	1.0	1.0	1.6	1.8
Engineering	0.2	0.3	0.4	0.6	0.7
Accounting	0.2	0.3	0.4	0.5	0.5
Miscellaneous business services	0.6	1.2	1.8	2.6	4.9
Legal services	0.4	0.5	0.5	0.8	1.0
Social services	12.4	16.3	22.0	23.7	24.9
Medical, health services	1.1	1.4	2.4	2.3	4.3
Hospital	1.8	2.7	3.7	5.3	4.0
Education	3.8	5.4	8.5	8.3	7.9
Welfare, religious services	0.7	1.0	1.2	1.6	2.6
Nonprofit organization	0.3	0.4	0.4	0.5	0.4
Postal service	0.8	0.9	1.0	0.7	0.7
Government	3.7	4.3	4.5	4.7	4.8
Miscellaneous social services	0.1	0.2	0.3	0.4	0.2
Personal services	12.1	11.3	10.0	10.5	11.5
Domestic services	3.2	3.1	1.7	1.3	0.9
Hotel	1.0	1.0	1.0	1.1	1.5
Eating, drinking places	3.0	2.9	3.2	4.4	4.8
Repair services	1.7	1.4	1.4	1.3	1.4
Laundry	1.2	1.0	0.8	0.4	0.5
Barber, beauty shops	–	0.8	0.9	0.7	0.7
Entertainment	1.0	0.8	0.8	1.0	1.3
Miscellaneous personal services	1.2	0.4	0.3	0.3	0.4

NOTE: Details may not add to totals because of rounding.

SOURCE: M. Castells, *The Rise of the Network Society* (Cambridge, MA: Basil Blackwell, 1996).

See figure 8-8.

Appendix table 8-5.
Workers who use a computer at work, by sector: 1993

Sector	Total employed in sector (thousands)	Workers in sector who use a computer	
		Number (thousands)	Percentage
Government	5,927	4,137	70
All industries	118,400	51,106	43
Agriculture	3,140	435	14
Mining	689	307	45
Construction	7,567	1,182	16
Manufacturing, total	19,605	8,178	42
Food	1,776	532	30
Tobacco	52	25	48
Apparel	970	143	15
Textiles	664	177	27
Leather and leather products	107	24	22
Lumber and wood	841	114	14
Furniture	665	161	24
Paper and allied products	740	339	46
Printing and publishing	1,705	857	50
Chemicals	1,220	729	60
Petroleum and coal	145	88	61
Rubber and plastics	791	293	37
Stone, clay, and glass	568	165	29
Primary metals	653	217	33
Fabricated metals	1,290	442	34
Non-electric machinery	2,238	1,233	55
Electric machinery	1,689	950	56
Motor vehicles	1,120	428	38
Aircraft	502	335	67
Other transportation	624	376	60
Photo equipment	680	406	60
Toys and sporting goods	128	44	34
Miscellaneous manufactures	437	100	23
Services, total	81,473	36,867	45
Transportation	5,410	1,866	34
Communications	1,637	1,283	78
Utilities	1,501	807	54
Wholesale trade	4,531	2,226	49
Retail trade	18,706	5,837	31
Banking and finance	3,417	2,888	85
Insurance and real estate	4,561	3,094	68
Professional services	31,020	16,515	53
Personal services	10,690	2,351	22
Business services	5,038	2,646	53

SOURCE: U.S. Bureau of the Census, Current Population Survey, October 1993. Available from <<http://www.census.gov/population/socdemo/computer/compusea/text>>.

See figure 8-9.

Appendix table 8-6.
Index of information technologies investments, by industry: 1991-92

Industry	Industry's share of GDP, 1992 (%)	Industry's IT investments 1991 ($ billion)	Industry's share of IT investments (%)	Investment Index
Manufacturing	17.0	25.30	16.6	0.98
Transportation	3.1	3.80	2.5	0.81
Communications	2.6	21.10	13.9	5.35
Utilities	2.8	8.00	5.3	1.89
Wholesale trade	6.5	17.00	11.2	1.72
Retail trade	8.7	17.90	11.8	1.36
Finance, insurance, and real estate	18.4	38.70	25.4	1.38
Professional and personal services	19.2	20.30	13.3	0.69

IT = information technologies

NOTE: Investment Index equals industry's share of IT investments divided by industry's share of GDP. An index of 1.00 reflects no over- or under-investing in IT relative to the size of the industry.

SOURCES: Industry investments from National Research Council, *Information Technology in the Service Society* (Washington, DC: National Academy Press, 1994), p. 2; share of GDP from U.S. Bureau of Economic Analysis, *Survey of Current Business* (August 1996), p. 137.

See figure 8-10.

Appendix table 8-7.
Technology in public schools: 1992-95

Technology	Number				Percentage of total	
	1992	1993	1994	1995	1992	1995
Schools with interactive videodisk players[a]	6,502	11,729	19,189	23,112	8	27
Elementary	2,921	5,986	10,043	12,326	6	24
Junior high	1,258	2,386	3,844	4,672	10	34
Senior high	2,106	3,129	5,026	5,805	14	34
Students represented (1,000)	5,781	9,064	13,434	16,060	14	36
Schools with modems[a]	13,597	18,471	24,277	28,275	16	34
Elementary	5,831	8,492	11,679	14,782	11	29
Junior high	2,608	3,431	4,531	5,393	20	39
Senior high	5,001	6,371	7,853	8,620	30	51
Students represented (1,000)	10,717	13,382	16,476	19,326	25	43
Schools with networks[a]	4,184	11,657	19,272	23,402	5	28
Elementary	1,583	4,683	8,477	11,155	3	22
Junior high	776	2,030	3,611	4,425	6	32
Senior high	1,736	4,895	7,104	8,042	10	48
Students represented (1,000)	3,754	8,043	12,713	15,160	9	34
Schools with CD-ROMs[a]	5,706	11,021	24,526	31,501	7	37
Elementary	1,897	4,457	11,794	16,816	4	33
Junior high	1,231	2,326	4,874	6,170	9	45
Senior high	2,543	4,168	7,724	9,063	15	64
Students represented (1,000)	5,298	8,534	15,576	19,501	12	44
Schools with satellite dishes[a]	1,129	8,812	12,580	14,290	1	17
Elementary	351	2,988	4,269	5,154	1	10
Junior high	166	1,503	2,497	3,004	1	22
Senior high	606	4,292	5,770	6,263	4	37
Students represented (1,000)	1,906	4,668	6,740	7,946	4	18
Schools with cable[a]	NA	47,745	58,652	62,593	NA	74
Elementary	NA	27,923	35,325	37,730	NA	73
Junior high	NA	9,266	10,696	11,416	NA	83
Senior high	NA	10,296	12,198	13,089	NA	78
Students represented (1,000)	NA	27,324	33,510	35,770	NA	80

NA = not available

NOTE: Elementary includes K-12; preschool, preschool through 8, K-6, and K-8. Junior high includes schools with grade spans of 4-6, 7-8, and 7-9. Senior high includes 7-12, 9-12, 10-12, vocational, technical, and alternative high schools.

[a]Includes schools for special education and adult education not shown separately.

SOURCE: U.S. Bureau of the Census, *Statistical Abstract of the United States 1996,* table 264 (Washington, DC: U.S. Government Printing Office, 1996); data based on surveys conducted by Quality Education Data, Inc.

Appendix table 8-8.
Student use of computers at home and at school, by sex, race/ethnicity, and household income: 1984 and 1993
(Percentages)

Characteristic	1984 total	1993					
		Total	Pre-K and K	Grades 1-8	Grades 9-12	1st to 4th year of college	5th or later year college
Computer use at school							
Total	27.3	59.0	26.2	68.9	58.2	55.2	52.1
Sex							
Male	29.0	59.4	25.9	69.5	56.5	57.5	56.7
Female	25.5	58.7	26.5	68.4	60.0	53.3	47.8
Race/ethnicity							
White	30.0	61.6	29.4	73.7	59.9	54.9	59.8
Black	16.8	51.5	16.5	56.5	54.5	56.9	57.9
Hispanic	18.6	52.3	19.2	58.4	54.1	51.9	53.7
Other	28.6	59.0	23.5	65.7	57.3	60.9	69.4
Household income							
Less than $5,000	18.7	51.2	19.6	55.0	50.6	61.7	66.7
$5,000 to $9,999	21.0	53.3	24.4	60.3	51.9	53.9	56.2
$10,000 to $14,999	22.4	56.4	20.1	64.7	56.7	50.7	76.1
$15,000 to $19,999	25.9	58.1	23.8	67.5	57.4	51.2	58.5
$20,000 to $24,999	26.7	56.4	23.7	64.3	53.0	57.4	52.4
$25,000 to $29,999	30.5	60.0	28.0	70.1	60.3	51.5	58.0
$30,000 to $34,999	30.5	59.1	23.7	69.6	59.7	51.7	45.3
$35,000 to $39,999	32.3	60.7	27.1	72.1	61.7	49.2	47.9
$40,000 to $49,999	32.8	59.3	28.5	70.3	57.2	53.9	48.6
$50,000 to $74,999	35.5	62.6	28.6	75.6	61.5	57.4	44.2
$75,000 or more	36.0	64.6	33.5	78.7	62.5	60.9	47.7
Institution type							
Public	27.4	60.2	30.1	68.6	58.1	53.9	54.1
Private	26.5	52.1	18.7	72.5	60.7	60.7	48.0
Computer use at home							
Total	11.5	27.0	15.6	24.7	28.7	32.8	52.6
Sex							
Male	14.0	27.4	15.1	24.8	28.2	36.6	56.1
Female	9.0	26.6	16.1	24.6	29.2	29.7	49.5
Race/ethnicity							
White	13.7	32.8	19.4	31.4	35.9	36.0	53.6
Black	4.9	10.9	4.2	9.0	10.4	19.4	48.1
Hispanic	3.6	10.4	5.7	7.5	9.8	22.0	52.2
Other	9.0	28.7	17.0	23.2	37.0	33.0	47.1
Household income							
Less than $5,000	2.9	9.7	1.1	4.1	6.8	25.6	45.2
$5,000 to $9,999	3.2	8.0	0.9	4.5	5.3	21.3	45.6
$10,000 to $14,999	5.0	11.4	4.6	6.4	8.7	29.8	50.0
$15,000 to $19,999	7.5	15.1	6.9	10.9	14.1	28.9	43.0
$20,000 to $24,999	9.9	16.8	7.4	13.1	17.9	27.7	49.6
$25,000 to $29,999	12.8	21.1	12.3	19.3	22.0	26.1	47.0
$30,000 to $34,999	15.8	24.1	18.7	20.5	29.1	26.4	44.4
$35,000 to $39,999	19.4	27.1	13.0	26.3	28.1	32.7	52.7
$40,000 to $49,999	20.4	32.2	21.6	32.9	33.9	32.5	45.9
$50,000 to $74,999	24.2	43.0	25.5	45.3	46.4	40.1	58.2
$75,000 or more	22.1	56.1	38.2	62.3	61.0	47.0	64.7
Institution type							
Public	11.2	25.3	12.1	23.0	27.2	31.9	50.0
Private	13.8	37.4	22.4	41.5	47.2	36.9	57.7

Appendix table 8-8.
Student use of computers at home and at school, by sex, race/ethnicity, and household income: 1984 and 1993
(Percentages)

Characteristic	1984 total	1993					
		Total	Pre-K and K	Grades 1-8	Grades 9-12	1st to 4th year of college	5th or later year of college
Computer use at home for school work							
Total	4.6	14.9	0.6	10.8	20.9	23.1	36.6
Sex							
Male	5.9	14.8	0.9	10.1	20.5	26.3	40.3
Female	3.3	15.0	0.4	11.5	21.4	20.5	33.2
Race/ethnicity							
White	5.4	18.2	0.8	13.8	26.5	25.7	37.8
Black	2.3	5.7	NA	4.0	6.9	11.5	30.1
Hispanic	1.4	5.6	NA	2.9	6.7	15.9	36.8
Other	3.8	16.0	1.1	9.3	27.0	23.7	29.2
Household income							
Less than $5,000	1.0	6.7	NA	2.5	4.0	18.7	36.0
$5,000 to $9,999	1.5	4.8	NA	1.1	3.6	16.1	35.5
$10,000 to $14,999	1.9	7.3	NA	2.6	5.6	25.9	34.6
$15,000 to $19,999	3.0	8.6	0.4	4.7	10.8	18.7	31.0
$20,000 to $24,999	3.1	9.8	0.7	5.1	12.6	22.9	35.0
$25,000 to $29,999	5.1	10.4	1.1	6.3	13.4	19.5	34.9
$30,000 to $34,999	4.9	13.0	0.8	8.1	21.9	18.0	35.1
$35,000 to $39,999	7.1	15.4	0.8	12.4	21.0	22.6	37.2
$40,000 to $49,999	9.2	17.1	1.1	14.7	24.2	22.2	32.1
$50,000 to $74,999	11.5	23.2	1.0	19.7	35.0	27.0	38.2
$75,000 or more	9.8	30.4	0.8	29.4	45.2	30.6	41.5
Institution type							
Public	4.5	14.2	0.5	10.1	19.8	22.7	34.7
Private	5.4	18.8	1.0	17.8	35.4	24.8	40.1

Pre-K and K = prekindergarten and kindergarten

SOURCE: U.S. Bureau of the Census, *Statistical Abstract of the United States, 1996,* table 263 (Washington, DC: U.S. Government Printing Office, 1996).

See figures 8-19 and 8-21.

Appendix table 8-9.
Adult use of computers at home, school, and work: 1993
(Percentages)

Characteristic	Uses computer anywhere	Has computer at home	Has computer at home and uses computer at home	Enrolled in school and uses computer at school	Has a job and uses computer at work
Age					
Persons over 18	36.0	25.6	65.6	53.8	45.8
18-21 years	45.9	30.4	62.5	62.3	25.8
22-24 years	43.5	25.4	68.9	53.1	42.1
25-34 years	44.4	25.3	73.8	45.2	49.1
35-44 years	46.7	34.2	68.4	43.0	50.8
45-54 years	43.8	34.4	64.0	40.4	49.8
55-64 years	24.2	19.9	55.9	31.9	37.3
65+ years	4.9	8.4	41.2	36.0	20.3
Race					
White	37.5	26.9	66.7	53.1	47.1
Black	25.0	13.8	56.8	54.8	36.1
Other	35.6	31.3	55.8	60.3	42.3
Hispanic origin					
Hispanic	22.0	12.9	61.3	50.0	29.3
Not Hispanic	37.2	26.7	65.8	54.1	47.2
Sex					
Male	36.2	27.1	70.0	55.9	40.3
Female	35.8	24.3	61.1	51.9	52.4
Marital status					
Married	37.5	29.4	65.3	40.5	48.2
Single	42.5	25.3	68.8	58.9	41.2
Divorced/widowed	23.7	14.0	61.3	45.8	43.1
Uses computer					
At work	100.0	43.2	79.4	48.9	100.0
At home	100.0	100.0	NA	55.9	73.0
Household type					
Married couple	38.6	30.4	64.4	54.2	46.8
Female householder	29.2	14.1	65.0	51.4	45.9
Male householder	33.8	20.0	76.5	55.4	41.2
Region					
Northeast	34.3	25.6	62.2	56.4	46.0
Midwest	37.2	25.1	64.9	30.0	45.8
South	33.8	22.1	65.3	51.8	44.3
West	39.6	31.8	69.3	47.3	48.2
Educational attainment					
Less than 9th grade	1.5	4.5	12.7	31.1	4.0
9th-11th grade	9.8	8.1	41.8	46.6	13.0
High school graduate	25.1	16.7	49.3	51.7	34.2
Some college/associate's degree	50.5	33.1	67.9	56.3	52.6
Bachelor's +	63.4	48.7	76.9	50.5	69.1
Employment					
Employed	49.8	30.8	66.5	43.6	43.2
Full time	51.4	30.6	69.4	37.6	49.6
Part time	41.9	31.4	68.0	57.5	28.1
Unemployed	17.5	22.1	67.0	51.0	NA
Not in labor force	11.5	16.1	52.1	62.9	NA
School enrollment					
Not enrolled	32.8	23.9	63.6	NA	45.5
Below college	47.9	22.0	71.8	46.3	11.9
College	74.7	47.4	77.7	54.6	53.0

Appendix table 8-9.
Adult use of computers at home, school, and work: 1993
(Percentages)

Characteristic	Uses computer anywhere	Has computer at home	Has computer at home and uses computer at home	Enrolled in school and uses computer at school	Has a job and uses computer at work
Family income					
Less than $10,000	11.4	6.8	68.6	53.6	18.3
$10,000-$14,999	15.2	8.4	64.8	55.3	23.7
$15,000-$19,999	23.0	12.5	62.4	50.9	31.7
$20,000-$24,999	27.7	15.3	62.3	56.6	36.0
$25,000-$34,999	36.5	21.2	64.3	50.9	42.8
$35,000-$49,999	46.3	31.3	55.4	51.0	50.6
$50,000-$74,999	60.3	45.9	67.1	54.4	61.5
$75,000 and over	65.4	61.7	68.0	58.8	67.0
Income not reported	24.4	20.2	57.2	53.3	39.5
Household size					
1-3 persons	33.7	21.2	69.6	51.9	47.5
4-5 persons	43.1	35.8	62.1	56.0	45.0
6-7 persons	30.4	28.6	52.3	56.2	33.7
8+ persons	17.6	22.1	48.3	49.8	19.5
Occupation					
Management and professional	69.6	47.9	77.0	46.7	67.7
Technical, sales, administration	63.6	31.6	69.2	50.7	65.5
Service	22.4	18.6	54.9	53.5	14.7
Precision, production, craft	26.0	21.6	56.8	44.0	23.2
Operators, labor	18.8	15.2	51.9	47.0	14.9
Farm, forest, fish	14.7	16.7	59.5	62.5	8.5
Never work/NILF/AF	10.7	15.4	50.9	61.8	NA
Industry					
Agriculture	19.1	19.9	64.9	51.3	13.5
Mining	44.7	30.7	64.0	(B)	46.1
Construction	20.2	21.4	57.3	49.1	16.8
Manufacturing	43.0	27.3	69.4	48.6	44.0
Transportation, communications, utilities	48.8	29.9	63.6	46.5	49.4
Wholesale/retail	40.8	25.4	61.8	53.1	37.0
Finance, insurance	74.6	36.0	72.4	38.4	79.3
Services	51.2	35.2	72.6	51.2	48.0
Forest/fisheries	36.1	28.8	(B)	(B)	35.2
Public administrator	70.6	34.1	74.0	32.2	73.7
Never work/NILF/AF	10.7	15.4	50.9	61.8	NA

AF = armed forces; (B) = less than 75,000 persons or 50 sample cases; NA = not applicable; NILF = not in labor force

NOTES: Persons of Hispanic origin may be of any race. The term “uses computer anywhere” means that the individual uses computer at home, at school, and/or at work; the term “with computer at home” means that there is a computer in the household.

SOURCE: U.S. Bureau of the Census, Current Population Survey, October 1993. Available from <<http://www.census.gov/population/socdemo/computer/compusea/text>>.

See figures 8-23 and 8-25.

Appendix table 8-10.
Commercial banks output per employee: 1967-95

Year	Index	Year	Index
1967	71.2	1981	78.7
1968	72.5	1982	81.0
1969	71.5	1983	87.6
1970	72.3	1984	90.7
1971	75.1	1985	94.6
1972	76.9	1986	97.0
1973	81.7	1987	100.0
1974	76.9	1988	101.4
1975	77.2	1989	99.6
1976	81.4	1990	102.6
1977	85.9	1991	104.5
1978	86.8	1992	106.4
1979	84.5	1993	115.5
1980	78.8	1994	115.8
		1995	121.7

NOTES: Commercial banks are Standard Industrial Classification code 602. Industry Productivity Index: 1987 = 100.

SOURCE: U.S. Bureau of Labor Statistics, Industry Productivity Index, <<http://stats.bls.gov/cgi-bin/dsrv>> (data extracted July 1997).

See figure 8-12.