

APPENDIX 2

INSTRUMENT FOR EVALUATING MATERIALS

Framework for Review Instructional Materials for Elementary School Science¹

Title: _____

Author(s): _____

Publisher: _____ **Copyright date:** _____

Reviewed by: _____ **Date:** _____

I. Descriptors

a. Write a brief description of the components of the curriculum upon which this review is based (e.g., teachers guide, student books, hands-on materials, multimedia material). That is, what materials did you receive and include in your review?

b. Write a brief description of the purpose and broad goals of these materials. That is, what were the stated purposes and what were the actual purposes of the materials?

c. What grade levels do the materials serve?

___ K ___ 1 ___ 2 ___ 3 ___ 4 ___ 5

d. Are the instructional materials designed to

___ provide a complete multi-year program for elementary school science.

___ provide a complete one-year course for elementary school science.

___ provide multiple modules or units that could be used to supplement other course materials for elementary school science.

___ provide a single module or collection of activities that could be used to supplement other course materials for elementary school science.

___ other (explain):

¹ NOTE: This framework is adapted from an instrument developed by Inverness Research under contract to the National Science Foundation. The framework was refined as part of a panel review of NSF-supported materials for middle school science, which was limited to projects that provide at least a year-long course of study.

e. What are the major domains/topics of content covered by these materials?

II. Quality of the Science

Directions: For each item, circle the number corresponding with your response to the question. Write an explanation for your rating of each item below the item.

a. Does the content in the instructional materials align well with all eight areas of the Content Standards as described in the National Science Education Standards (NSES)?
(See attached guidelines)

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Omits substantial content included in NSES and/or includes substantial content not recommended in NSES | | Some misalignment of content with recommendations in NSES | | The curriculum aligns well with content recommendations in NSES |

b. Are the science concepts presented in the instructional materials accurate and correct?
[Provide examples of major errors where they are evident. Attach extra page if necessary.]

| | | | | |
|---------------------------|-------------|--|-------------|--------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Substantial, major errors | | Mostly correct, with some minor errors | | Scientifically accurate, and correct |

c. Do the instructional materials adequately present the major concepts in the standards and adequately demonstrate and model the processes of science?

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Major concepts and processes not addressed | | Major concepts and processes somewhat addressed | | Major concepts and processes addressed well |

d. Does the science presented in the instructional materials reflect current disciplinary knowledge?

| | | | | |
|-------------|-------------|-------------|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
|-------------|-------------|-------------|-------------|---|

The ideas are out of date

Somewhat current

Current

e. Do the instructional materials accurately represent views of science as inquiry as described in the National Science Education Standards?

1 2 3 4 5
Poor examples of inquiry Mixed quality Rich and accurate examples of inquiry

f. Do the instructional materials accurately present the history of science?

1 2 3 4 5
Poor portrayal of history of science Mixed quality Rich and accurate portrayal of history of science

g. Do the materials emphasize technology as an area of study?

1 2 3 4 5
Little or no emphasis Some emphasis Rich and well designed emphasis

h. Do the materials emphasize the personal and societal dimensions of science?

1 2 3 4 5
Little or no emphasis Some emphasis Rich and well designed emphasis

i. Do the materials emphasize the content of life science?

1 2 3 4 5
 Little or no emphasis Some emphasis Rich and well designed emphasis

j. Do the materials emphasize the content of earth science?

1 2 3 4 5
 Little or no emphasis Some emphasis Rich and well designed emphasis

k. Do the materials emphasize the content of physical science?

1 2 3 4 5
 Little or no emphasis Some emphasis Rich and well designed emphasis

l. Do the instructional materials provide sufficient activities for students to develop a good understanding of key science concepts?

1 2 3 4 5
 Too few learning activities Activities provide some opportunity for students to learn some important concepts Activities provide many rich opportunities to learn key science concepts

m. Do the instructional materials provide sufficient opportunities for students to apply their understanding of the concepts (i.e., designing of solutions to problems or issues)?

1 2 3 4 5
Very few application activities Some application activities Very rich in application activities

n. Do the instructional materials present an accurate picture of the nature of science as a dynamic endeavor?

1 2 3 4 5
The image of science is out-of-date, inaccurate, or non-existent. The image of science is of mixed quality. The image of science is current and accurate.

o. Do the materials develop an appropriate breadth and depth of science content?

1 2 3 4 5
Too narrow or too broad Somewhat balanced Good balance of breadth and depth

p. What is the overall quality of the science presented in the instructional materials?

1 2 3 4 5
Low Medium High

III. The Pedagogical Design

a. Do the instructional materials provide a logical progression for developing conceptual understanding in science?

1 2 3 4 5
No logical progression of ideas Somewhat logical progression of ideas Logical progression of ideas that builds conceptual understanding

b. Do the instructional materials provide students the opportunity to make conjectures, gather evidence, and develop arguments to support, reject, and revise their preconceptions and explanations for natural phenomena?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

c. To what extent do the instructional materials engage students in doing science inquiry?

1 2 3 4 5
Very few or very contrived activities for students to do science inquiry Some good activities for students to do science inquiry Many rich and authentic opportunities for students to do science inquiry

d. To what extent do the instructional materials engage students in doing technology problem solving?

1 2 3 4 5
Very few or very contrived activities for students to do technology problem solving Some good activities for students to do technology problem solving Many rich and authentic opportunities for students to do technology problem solving

e. To what extent does the curriculum engage students in activities that help them connect science to everyday issues and events?

1 2 3 4 5
Very few or very contrived activities for students to make connections Some good activities for students to make connections Many rich and authentic opportunities for students to make connections

f. How would you rate the overall developmental appropriateness of the instructional materials, given its intended audience of ALL students at the targeted level(s)?

1 2 3 4 5
Not developmentally appropriate Somewhat developmentally appropriate Developmentally appropriate

g. Do the materials reflect current knowledge about effective teaching and learning practices (e.g., active learning, inquiry, community of learners) based on research related to science education?

1 2 3 4 5
Do not reflect current knowledge about teaching and learning Somewhat reflective of current knowledge about teaching and learning Reflect well current knowledge about teaching and learning

h. Do the instructional materials provide students the opportunity to clarify, refine, and consolidate their ideas, and to communicate them through multiple modes?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

i. Do the instructional materials provide students the opportunity to think and communicate scientifically?

1 2 3 4 5
No opportunity Some opportunity Rich and well
designed opportunity

j. Do the instructional materials provide students with activities connecting science with other subject areas?

1 2 3 4 5
No opportunity Some opportunity Rich and well
designed opportunity

k. Are the instructional materials likely to be interesting, engaging, and effective for students?

1 2 3 4 5
Not at all interesting Somewhat interesting Interesting and engaging

l. Are the instructional materials likely to be interesting, engaging, and effective for girls and boys?

1 2 3 4 5
No sensitivity Some sensitivity Sensitive to
to gender issues to gender issues gender issues

m. Are the instructional materials likely to be interesting, engaging, and effective for underrepresented and underserved students (e.g., gender, ethnic, urban, rural, with disabilities)?

1 2 3 4 5
No sensitivity Some sensitivity Sensitive to
to underrepresented and to underrepresented and underrepresented and
underserved students underserved students underserved students

n. Does assessment have explicit purposes connected to decisions to be made by teachers (e.g., prior knowledge, conceptual understanding, grades)?

| | | | | |
|------------------|---------|-------------------------|---------|-----------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Unclear purposes | | Somewhat clear purposes | | Clear statement of purposes |

o. Do assessments focus on the curriculum's important content and skills?

| | | | | |
|---------------------|---------|---------------------|---------|---------------------|
| 1 | 2 | 3 | 4 | 5 |
| Poor correspondence | | Fair correspondence | | Full correspondence |

p. Do the instructional materials include multiple kinds of assessments (e.g., performance, paper/pencil, portfolios, student interviews, embedded, projects)?

| | | | | |
|--|---------|------------------------------------|---------|-------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Little or no student assessment provided | | Some variety of student assessment | | Complete student assessment package |

q. Are the assessment practices fair to all students?

| | | | | |
|----------------|---------|--------------|---------|-------------|
| 1 | 2 | 3 | 4 | 5 |
| Fair for a few | | Fair to most | | Fair to all |

r. Do the instructional materials include adequate and appropriate uses of a variety of educational technologies (e.g., video, computers, telecommunications)?

1 2 3 4 5
Little or no educational technology included Some appropriate educational technology included Many appropriate applications of educational technology included

s. What is the overall quality of the pedagogical design of these instructional materials?

1 2 3 4 5
Low Medium High

t. To what extent are the purposes of the materials clear to students?

1 2 3 4 5
Purposes are unclear Purposes are somewhat clear Purposes are clear

IV. Implementation and System Support

a. Will the teachers find the materials interesting and engaging?

1 2..... 3..... 4..... 5
Dry and boring Somewhat interesting Interesting and engaging
and engaging

b. Do the instructional materials include information and guidance to assist the teacher in implementing the lessons?

1 2..... 3..... 4..... 5
No teacher support Some teacher support Rich and useful teacher
support

c. Do the instructional materials provide information about the kind of resources and support system required to facilitate the district implementation of the science materials?

1 2..... 3..... 4..... 5
No materials support Some materials support Rich and useful materials
support

d. Do the instructional materials provide information about how to establish a safe science learning environment?

1 2..... 3..... 4..... 5
No safety information Some safety information Rich and useful safety
information

e. Do the instructional materials provide information about the kinds of professional development experiences needed by teachers to implement the materials?

1 2 3 4 5
Little or no information provided Partial information provided Rich and useful information provided

f. Do the materials provide guidance in how to link the materials with the district and state assessment frameworks and programs?

1 2 3 4 5
No guidance Some guidance Rich and useful guidance

g. Do the materials provide guidance and assistance for involving administrators, parents, and the community at large actively in supporting school science?

1 2 3 4 5
No guidance Some guidance Rich and useful guidance

h. Overall, are the materials usable by, realistic in expectations of, and supportive of teachers?

1 2 3 4 5
Teacher unfriendly Somewhat teacher friendly Teacher friendly

V. Major Strengths and Weaknesses

a. In your opinion what are the three major strengths of this curriculum?

b. In your opinion, what are the three major weaknesses of this curriculum?

VI. Overall Quality, Value, and Contribution

a. In your opinion what is the overall quality of these materials relative to:

| | low | high |
|--|---------------------------|-------------|
| - turning students on to science? | 1.....2.....3.....4.....5 | |
| - making students think? | 1.....2.....3.....4.....5 | |
| - quality of science content? | 1.....2.....3.....4.....5 | |
| - quality of pedagogy? | 1.....2.....3.....4.....5 | |
| - quality of classroom assessments? | 1.....2.....3.....4.....5 | |
| - encouraging teachers to teach differently? | 1.....2.....3.....4.....5 | |

b. In your opinion, what is the overall quality of these instructional materials?

1 2 3 4 5
 Low Medium High

c. To what extent would you encourage the dissemination, adoption, and implementation of this curriculum?

1 2 3 4 5
 Not worthy of dissemination, adoption, nor implementation OK to disseminate, adopt, and implement **if revised** OK to disseminate, adopt, and implement **as is**

Use this page for additional notations:

Guidelines for Section II.

The following is a brief outline of the National Science Education Standards. It should be used to guide your responses to Section II.

| |
|--|
| CONTENT STANDARD |
| A. Science as Inquiry |
| 1. Abilities necessary to do science inquiry |
| 2. Understandings about scientific inquiry |
| B. Physical Science |
| 1. Properties of objects and materials |
| 2. Position and motion of objects |
| 3. Light, heat, electricity, and magnetism |
| C. Life Science |
| 1. The characteristics of organisms |
| 2. Life cycles of organisms |
| 3. Organisms and environments |
| D. Earth and Space Science |
| 1. Properties of Earth materials |
| 2. Objects in the sky |
| E. Science and Technology |
| 1. Abilities to distinguish between natural objects and objects made by humans |
| 2. Abilities of technological design |
| 3. Understandings about science and technology |
| F. Science in Personal and Social Perspectives |
| 1. Personal health |
| 2. Characteristics and changes in populations |
| 3. Types of resources |
| 4. Changes in environments |
| 5. Science and technology in local challenges |
| G. History and Nature of Science |
| 1. Science as a human endeavor |
| H. Unifying concepts and processes |
| 1. Order and organization |
| 2. Evidence, models, and explanation |
| 3. Change, constancy, and measurement |
| 4. Evolution and equilibrium |
| 5. Form and function |

Framework for Review

Instructional Materials for Middle School Science¹

Title: _____
Author(s): _____
Publisher: _____ *Copyright date:* _____
Reviewed by: _____ *Date:* _____

I. Descriptors

a. Write a brief description of the components of the curriculum upon which this review is based (e.g., teachers guide, student books, hands-on materials, multimedia material). That is, what materials did you receive and include in your review?

b. Write a brief description of the purpose and broad goals of these materials. That is, what were the stated purposes and what were the actual purposes of the materials?

c. What grade levels do the materials serve?
____5 ____6 ____7 ____8

d. Are the instructional materials designed to
____ provide a complete multi-year program for middle school science.
____ provide a complete one-year course for middle school science.
____ provide multiple modules or units that could be used to supplement other course materials for middle school science.
____ provide a single module or collection of activities that could be used to supplement other course materials for middle school science.
____ other (explain):

¹ *NOTE: This framework is adapted from an instrument developed by Inverness Research under contract to the National Science Foundation. The framework was refined as part of a panel review of NSF-supported materials for middle school science, which was limited to projects that provide at least a year-long course of study.*

e. What are the major domains/topics of content covered by these materials?

II. Quality of the Science

Directions: For each item, circle the number corresponding with your response to the question. Write an explanation for your rating of each item below the item.

a. Does the content in the instructional materials align well with all eight areas of the Content Standards as described in the National Science Education Standards (NSES)?
(See attached guidelines)

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Omits substantial content included in NSES and/or includes substantial content not recommended in NSES | | Some misalignment of content with recommendations in NSES | | The curriculum aligns well with content recommendations in NSES |

b. Are the science concepts presented in the instructional materials accurate and correct?
[Provide examples of major errors where they are evident. Attach extra page if necessary.]

| | | | | |
|---------------------------|-------------|--|-------------|--------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Substantial, major errors | | Mostly correct, with some minor errors | | Scientifically accurate, and correct |

c. Do the instructional materials adequately present the major concepts in the standards and adequately demonstrate and model the processes of science?

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Major concepts and processes not addressed | | Major concepts and processes somewhat addressed | | Major concepts and processes addressed well |

d. Does the science presented in the instructional materials reflect current disciplinary knowledge?

| | | | | |
|---------------------------|-------------|------------------|-------------|---------|
| 1 | 2 | 3 | 4 | 5 |
| The ideas are out of date | | Somewhat current | | Current |

e. Do the instructional materials accurately represent views of science as inquiry as described in the National Science Education Standards?

| | | | | |
|--------------------------|---|---------------|---|---------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Poor examples of inquiry | | Mixed quality | | Rich and accurate examples of inquiry |

f. Do the instructional materials accurately present the history of science?

| | | | | |
|--------------------------------------|---|---------------|---|---|
| 1 | 2 | 3 | 4 | 5 |
| Poor portrayal of history of science | | Mixed quality | | Rich and accurate portrayal of history of science |

g. Do the materials emphasize technology as an area of study?

| | | | | |
|-----------------------|---|---------------|---|---------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Little or no emphasis | | Some emphasis | | Rich and well designed emphasis |

h. Do the materials emphasize the content of earth science?

| | | | | |
|-----------------------|---|---------------|---|---------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Little or no emphasis | | Some emphasis | | Rich and well designed emphasis |

i. Do the materials emphasize the content of physical science?

| | | | | |
|-----------------------|---|---------------|---|---------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Little or no emphasis | | Some emphasis | | Rich and well designed emphasis |

j. Do the instructional materials provide sufficient activities for students to develop a good understanding of key science concepts?

1 2 3 4 5
 Too few learning Activities provide Activities provide

k. Do the instructional materials provide sufficient opportunities for students to apply their understanding of the concepts (i.e., designing of solutions to problems or issues)?

1 2 3 4 5
 Very few Some Very rich in
 application activities application activities application activities

l. Do the instructional materials present an accurate picture of the nature of science as a dynamic endeavor?

1 2 3 4 5
 The image of science is The image of The image of
 out-of-date, inaccurate, science is of science is current
 or non-existent. mixed quality. and accurate.

m. Do the materials develop an appropriate breadth and depth of science content?

1 2 3 4 5
 Too narrow Somewhat Good balance of
 or too broad balanced breadth and depth

n. What is the overall quality of the science presented in the instructional materials?

1 2 3 4 5
 Low Medium High

III. The Pedagogical Design

a. Do the instructional materials provide a logical progression for developing conceptual understanding in science?

1 2 3 4 5
No logical progression of ideas Somewhat logical progression of ideas Logical progression of ideas that builds conceptual understanding

b. Do the instructional materials provide students the opportunity to make conjectures, gather evidence, and develop arguments to support, reject, and revise their preconceptions and explanations for natural phenomena?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

c. To what extent do the instructional materials engage students in doing science inquiry?

1 2 3 4 5
Very few or very contrived activities for students to do science inquiry Some good activities for students to do science inquiry Many rich and authentic opportunities for students to do science inquiry

d. To what extent do the instructional materials engage students in doing technology problem solving?

1 2 3 4 5
Very few or very contrived activities for students to do technology problem solving Some good activities for students to do technology problem solving Many rich and authentic opportunities for students to do technology problem solving

e. To what extent does the curriculum engage students in activities that help them connect science to everyday issues and events?

1 2 3 4 5
Very few or very contrived activities for students to make connections Some good activities for students to make connections Many rich and authentic opportunities for students to make connections

f. How would you rate the overall developmental appropriateness of the instructional materials, given its intended audience of ALL students at the targeted level(s)?

1 2 3 4 5
Not developmentally appropriate Somewhat developmentally appropriate Developmentally appropriate

g. Do the materials reflect current knowledge about effective teaching and learning practices (e.g., active learning, inquiry, community of learners) based on research related to science education?

1 2 3 4 5
Do not reflect current knowledge about teaching and learning Somewhat reflective of current knowledge about teaching and learning Reflect well current knowledge about teaching and learning

h. Do the instructional materials provide students the opportunity to clarify, refine, and consolidate their ideas, and to communicate them through multiple modes?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

i. Do the instructional materials provide students the opportunity to think and communicate scientifically?

| | | | | |
|----------------|---------|------------------|---------|---------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| No opportunity | | Some opportunity | | Rich and well designed opportunity |

j. Do the instructional materials provide students with activities connecting science with other subject areas?

| | | | | |
|----------------|---------|------------------|---------|---------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| No opportunity | | Some opportunity | | Rich and well designed opportunity |

k. Are the instructional materials likely to be interesting, engaging, and effective for students?

| | | | | |
|------------------------|---------|----------------------|---------|--------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Not at all interesting | | Somewhat interesting | | Interesting and engaging |

l. Are the instructional materials likely to be interesting, engaging, and effective for girls and boys?

| | | | | |
|------------------------------------|---------|--------------------------------------|---------|-------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| No sensitivity to gender issues | | Some sensitivity to gender issues | | Sensitive to gender issues |

m. Are the instructional materials likely to be interesting, engaging, and effective for underrepresented and underserved students (e.g., gender, ethnic, urban, rural, with disabilities)?

| | | | | |
|---|---------|---|---------|--|
| 1 | 2 | 3 | 4 | 5 |
| No sensitivity to underrepresented and underserved students | | Some sensitivity to underrepresented and underserved students | | Sensitive to underrepresented and underserved students |

n. Does assessment have explicit purposes connected to decisions to be made by teachers (e.g., prior knowledge, conceptual understanding, grades)?

1 2. 3. 4. 5
Unclear purposes Somewhat clear purposes Clear statement of purposes

o. Do assessments focus on the curriculum's important content and skills?

1 2. 3. 4. 5
Poor correspondence Fair correspondence Full correspondence

p. Do the instructional materials include multiple kinds of assessments (e.g., performance, paper/pencil, portfolios, student interviews, embedded, projects)?

1 2. 3. 4. 5
Little or no student assessment provided Some variety of student assessment Complete student assessment package

q. Are the assessment practices fair to all students?

1 2. 3. 4. 5
Fair for a few Fair to most Fair to all

r. Do the instructional materials include adequate and appropriate uses of a variety of educational technologies (e.g., calculators, video, computers, telecommunications)?

1 2 3 4 5
Little or no educational technology included Some appropriate educational technology included Many appropriate applications of educational technology included

s. What is the overall quality of the pedagogical design of these instructional materials?

1 2 3 4 5
Low Medium High

t. To what extent are the purposes of the materials clear to students?

1 2 3 4 5
Purposes are unclear Purposes are somewhat clear Purposes are clear

IV. Implementation and System Support

a. Will the teachers find the materials interesting and engaging?

12.....3.....4.....5
Dry and boring Somewhat interesting Interesting and engaging
and engaging

b. Do the instructional materials include information and guidance to assist the teacher in implementing the lessons?

12.....3.....4.....5
No teacher support Some teacher support Rich and useful teacher
support

c. Do the instructional materials provide information about the kind of resources and support system required to facilitate the district implementation of the science materials?

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Teacher unfriendly Somewhat teacher friendly Teacher friendly

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|--|---------------------------|-------------|
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| - quality of science content? | 1.....2.....3.....4.....5 | |
| - quality of pedagogy? | 1.....2.....3.....4.....5 | |
| - quality of classroom assessments? | 1.....2.....3.....4.....5 | |
| - encouraging teachers to teach differently? | 1.....2.....3.....4.....5 | |

b. In your opinion, what is the overall quality of these instructional materials?

1 2 3 4 5
 Low Medium High

c. To what extent would you encourage the dissemination, adoption, and implementation of this curriculum?

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| 1. The characteristics of organisms |
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| 3. Organisms and environments |
| D. Earth and Space Science |
| 1. Properties of Earth materials |
| 2. Objects in the sky |
| E. Science and Technology |
| 1. Abilities to distinguish between natural objects and objects made by humans |
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| 3. Understandings about science and technology |
| F. Science in Personal and Social Perspectives |
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| 2. Characteristics and changes in populations |
| 3. Types of resources |
| 4. Changes in environments |
| 5. Science and technology in local challenges |
| G. History and Nature of Science |
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| H. Unifying concepts and processes |
| 1. Order and organization |
| 2. Evidence, models, and explanation |
| 3. Change, constancy, and measurement |
| 4. Evolution and equilibrium |
| 5. Form and function |

Framework for Review Instructional Materials for High School Science¹

Title: _____
Author(s): _____
Publisher: _____ **Copyright date:** _____
Reviewed by: _____ **Date:** _____

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c. What grade levels do the materials serve?

___ 9 ___ 10 ___ 11 ___ 12

d. Are the instructional materials designed to

___ provide a complete multi-year program for high school science.

___ provide a complete one-year course for high school science.

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___ provide a single module or collection of activities that could be used to supplement other course materials for high school science.

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of inquiry quality examples of inquiry

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of history of science quality portrayal of history of
science

g. Do the materials emphasize technology as an area of study?

1 2 3 4 5
Little or no Some emphasis Rich and well
emphasis designed emphasis

h. Do the materials emphasize the personal and societal dimensions of science?

1 2 3 4 5
Little or no Some emphasis Rich and well
emphasis designed emphasis

i. Do the materials emphasize the content of life science?

1 2 3 4 5
Little or no emphasis Some emphasis Rich and well designed emphasis

j. Do the materials emphasize the content of earth science?

1 2 3 4 5
Little or no emphasis Some emphasis Rich and well designed emphasis

k. Do the materials emphasize the content of physical science?

1 2 3 4 5
Little or no emphasis Some emphasis Rich and well designed emphasis

l. Do the instructional materials provide sufficient activities for students to develop a good understanding of key science concepts?

1 2 3 4 5
Too few learning activities Activities provide some opportunity for students to learn some important concepts Activities provide many rich opportunities to learn key science concepts

m. Do the instructional materials provide sufficient opportunities for students to apply their understanding of the concepts (i.e., designing of solutions to problems or issues)?

1 2 3 4 5
Very few application activities Some application activities Very rich in application activities

n. Do the instructional materials present an accurate picture of the nature of science as a dynamic endeavor?

1 2 3 4 5
The image of science is out-of-date, inaccurate, or non-existent The image of science is of mixed quality The image of science is current and accurate

o. Do the materials develop an appropriate breadth and depth of science content?

1 2 3 4 5
Too narrow or too broad Somewhat balanced Good balance of breadth and depth

p. What is the overall quality of the science presented in the instructional materials?

1 2 3 4 5
Low Medium High

III. The Pedagogical Design

a. Do the instructional materials provide a logical progression for developing conceptual understanding in science?

| | | | | |
|---------------------------------|-------------|---------------------------------------|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| No logical progression of ideas | | Somewhat logical progression of ideas | | Logical progression of ideas that builds conceptual understanding |

b. Do the instructional materials provide students the opportunity to make conjectures, gather evidence, and develop arguments to support, reject, and revise their preconceptions and explanations for natural phenomena?

| | | | | |
|----------------|-------------|------------------|-------------|------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| No opportunity | | Some opportunity | | Rich and well designed opportunity |

c. To what extent do the instructional materials engage students in doing science inquiry?

| | | | | |
|--|-------------|---|-------------|--|
| 1 | 2 | 3 | 4 | 5 |
| Very few or very contrived activities for students to do science inquiry | | Some good activities for students to do science inquiry | | Many rich and authentic opportunities for students to do science inquiry |

d. To what extent do the instructional materials engage students in doing technology problem solving?

| | | | | |
|---|-------------|--|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Very few or very contrived activities for students to do technology problem solving | | Some good activities for students to do technology problem solving | | Many rich and authentic opportunities for students to do technology problem solving |

e. To what extent does the curriculum engage students in activities that help them connect science to everyday issues and events?

1 2 3 4 5
Very few or very contrived activities for students to make connections Some good activities for students to make connections Many rich and authentic opportunities for students to make connections

f. How would you rate the overall developmental appropriateness of the instructional materials, given its intended audience of ALL students at the targeted level(s)?

1 2 3 4 5
Not developmentally appropriate Somewhat developmentally appropriate Developmentally appropriate

g. Do the materials reflect current knowledge about effective teaching and learning practices (e.g., active learning, inquiry, community of learners) based on research related to science education?

1 2 3 4 5
Do not reflect current knowledge about teaching and learning Somewhat reflective of current knowledge about teaching and learning Reflect well current knowledge about teaching and learning

h. Do the instructional materials provide students the opportunity to clarify, refine, and consolidate their ideas, and to communicate them through multiple modes?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

r. Do the instructional materials include adequate and appropriate uses of a variety of educational technologies (e.g., calculators, video, computers, telecommunications)?

1 2 3 4 5
Little or no educational technology included Some appropriate educational technology included Many appropriate applications of educational technology included

s. What is the overall quality of the pedagogical design of these instructional materials?

1 2 3 4 5
Low Medium High

t. To what extent are the purposes of the materials clear to students?

1 2 3 4 5
Purposes are unclear Purposes are somewhat clear Purposes are clear

e. Do the instructional materials provide information about the kinds of professional development experiences needed by teachers to implement the materials?

1 2 3 4 5
Little or no information provided Partial information provided Rich and useful information provided

f. Do the materials provide guidance in how to link the materials with the district and state assessment frameworks and programs?

1 2 3 4 5
No guidance Some guidance Rich and useful guidance

g. Do the materials provide guidance and assistance for involving administrators, parents, and the community at large actively in supporting school science?

1 2 3 4 5
No guidance Some guidance Rich and useful guidance

h. Overall, are the materials usable by, realistic in expectations of, and supportive of teachers?

1 2 3 4 5
Teacher unfriendly Somewhat teacher friendly Teacher friendly

V. Major Strengths and Weaknesses

a. In your opinion what are the three major strengths of this curriculum?

b. In your opinion, what are the three major weaknesses of this curriculum?

VI. Overall Quality, Value, and Contribution

a. In your opinion what is the overall quality of these materials relative to:

| | low | high |
|--|---------------------------|-------------|
| - turning students on to science? | 1.....2.....3.....4.....5 | |
| - making students think? | 1.....2.....3.....4.....5 | |
| - quality of science content? | 1.....2.....3.....4.....5 | |
| - quality of pedagogy? | 1.....2.....3.....4.....5 | |
| - quality of classroom assessments? | 1.....2.....3.....4.....5 | |
| - encouraging teachers to teach differently? | 1.....2.....3.....4.....5 | |

b. In your opinion, what is the overall quality of these instructional materials?

| | | | | |
|---------|---------|---------|---------|------|
| 1 | 2 | 3 | 4 | 5 |
| Low | | Medium | | High |

c. To what extent would you encourage the dissemination, adoption, and implementation of this curriculum?

| | | | | |
|---|---------|--|---------|--|
| 1 | 2 | 3 | 4 | 5 |
| Not worthy of dissemination, adoption, nor implementation | | OK to disseminate adopt, and implement if revised | | OK to disseminate, adopt, and implement as is |

Use this page for additional notations:

Guidelines for Section II.

The following is a brief outline of the National Science Education Standards. It should be used to guide your responses to Section II.

| |
|---|
| CONTENT STANDARD |
| A. Science as Inquiry |
| 1. Abilities necessary to do science inquiry |
| 2. Understandings about scientific inquiry |
| B. Physical Science |
| 1. Structure of the atom |
| 2. Structure and properties of matter |
| 3. Chemical reactions |
| 4. Forces and motions |
| 5. Conservation of energy and increase in disorder |
| 5. Interactions of energy and matter |
| C. Life Science |
| 1. The cell |
| 2. The molecular basis of heredity |
| 3. Biological evolution |
| 4. The interdependence of organisms |
| 5. Matter, energy, and organization in living systems |
| 5. The nervous system and behavior of organisms |
| D. Earth and Space Science |
| 1. Energy in the Earth system |
| 2. Geochemical cycles |
| 3. Origin and evolution of the Earth |
| 4. Origin and evolution of the universe |
| E. Science and Technology |
| 1. Abilities of technological design |
| 2. Understandings about science and technology |
| F. Science in Personal and Social Perspectives |
| 1. Personal and community health |
| 2. Population growth |
| 3. Natural resources |
| 4. Environmental quality |
| 5. Natural and human-induced hazards |
| 5. Science and technology in local, national, and global challenges |
| G. History and Nature of Science |
| 1. Science as a human endeavor |
| 2. Nature of scientific knowledge |
| 3. Historical perspectives |

| |
|---|
| H. Unifying concepts and processes |
| 1. Order and organization |
| 2. Evidence, models, and explanation |
| 3. Change, constancy, and measurement |
| 4. Evolution and equilibrium |
| 5. Form and function |

Framework for Review Instructional Materials for Elementary School Mathematics¹

Title: _____

Author(s): _____

Publisher: _____ **Copyright date:** _____

Reviewed by: _____ **Date:** _____

I. Descriptors

a. Write a brief description of the components of the curriculum upon which this review is based (e.g., teachers guide, student books, hands-on materials, multimedia material). That is, what materials did you receive and include in your review?

b. Write a brief description of the purpose and broad goals of these materials. That is, what were the stated purposes and what were the actual purposes of the materials?

c. What grade levels do the materials serve?

___ K

___ 1

___ 2

___ 3

___ 4

___ 5

d. Are the instructional materials designed to

___ provide a complete multi-year program for elementary school mathematics.

___ provide a complete one-year course for elementary school mathematics.

___ provide multiple modules or units that could be used to supplement other course materials for elementary school mathematics.

___ provide a single module or collection of activities that could be used to supplement other course materials for elementary school mathematics.

___ other (explain):

¹ *NOTE: This framework is adapted from an instrument developed by Inverness Research under contract to the National Science Foundation. The framework was refined as part of a panel review of NSF-supported materials for middle school science, which was limited to projects that provide at least a year-long course of study.*

e. What are the major domains/topics of content covered by these materials?

II. Quality of the Mathematics

Directions: For each item, circle the number corresponding with your response to the question. Write an explanation for your rating of each item below the item.

a. Does the content in the instructional materials align well with all thirteen areas of the Curriculum Standards as described in the National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics (NCTM)?
(See attached guidelines)

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Omits substantial content included in NCTM and/or includes substantial content not recommended in NCTM | | Some misalignment of content with recommendations in NCTM | | The curriculum aligns well with content recommendations in NCTM |

b. Are the mathematics concepts presented in the instructional materials accurate and correct? [Provide examples of major errors where they are evident. Attach extra page if necessary.]

| | | | | |
|---------------------------|-------------|--|-------------|--------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Substantial, major errors | | Mostly correct, with some minor errors | | Mathematically accurate, and correct |

c. Do the instructional materials adequately present the major concepts and adequately demonstrate and model the processes of mathematics?

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Major concepts and processes not addressed | | Major concepts and processes somewhat addressed | | Major concepts and processes addressed well |

d. Do the instructional materials accurately represent views of mathematical problem solving as described in the NCTM Curriculum and Evaluation Standards for School Mathematics?

| | | | | |
|-----------------------------------|-------------|---------------|-------------|--|
| 1 | 2 | 3 | 4 | 5 |
| Poor portrayal of problem solving | | Mixed quality | | Rich and accurate portrayal of problem solving |

e. Do the materials use technology as a tool for learning mathematics?

| | | | | |
|---------------------|-------------|---------------|-------------|-------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Little or no use | | Some emphasis | | Rich and well designed use |

f. Do the materials emphasize communication about mathematics through a variety of modalities?

| | | | | |
|---|-------------|-----------------------------------|-------------|--|
| 1 | 2 | 3 | 4 | 5 |
| Little or no emphasis, few modalities | | Some emphasis, some modalities | | Rich and well designed emphasis, varied modalities |

g. Do the materials appropriately address mathematical reasoning?

| | | | | |
|-----------------------------|-------------|----------------------------------|-------------|-------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Not appropriately addressed | | Somewhat appropriately addressed | | Appropriately addressed |

h. Do the materials appropriately address computation?

| | | | | |
|-----------------------------|-------------|----------------------------------|-------------|-------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Not appropriately addressed | | Somewhat appropriately addressed | | Appropriately addressed |

i. Do the materials appropriately address estimation?

| | | | | |
|-----------------------------|-------------|----------------------------------|-------------|-------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Not appropriately addressed | | Somewhat appropriately addressed | | Appropriately addressed |

j. Do the materials appropriately address number sense and numeration?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

k. Do the materials appropriately address concepts of whole number operation?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

l. Do the materials appropriately address whole number computation?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

m. Do the materials appropriately address geometry and spatial sense?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

n. Do the materials appropriately address measurement?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

o. Do the materials appropriately address statistics and probability?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

p. Do the materials emphasize fractions and decimals?

1 2 3 4 5
Little or no emphasis Some emphasis Rich and well designed emphasis

q. Do the instructional materials provide sufficient activities for students to develop a good understanding of key mathematics concepts?

1 2 3 4 5
Too few learning activities Activities provide some opportunity for students to learn some important concepts Activities provide many rich opportunities to learn key mathematics concepts

r. Do the instructional materials provide sufficient opportunities for students to apply their understanding of the concepts (i.e., designing of solutions to problems or issues)?

1 2 3 4 5
Very few application activities Some application activities Very rich in application activities

s. Do the materials develop an appropriate breadth and depth of mathematics content?

1 2 3 4 5
Too narrow or too broad Somewhat balanced Good balance of breadth and depth

t. What is the overall quality of the mathematics presented in the instructional materials?

12.....3.....4.....5
Low Medium High

III. The Pedagogical Design

a. Do the instructional materials provide a logical progression for developing conceptual understanding in mathematics?

1 2 3 4 5
No logical progression of ideas Somewhat logical progression of ideas Logical progression of ideas that builds conceptual understanding

b. Do the instructional materials provide students the opportunity to formulate, solve, and reflect critically on problems?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

c. To what extent are the mathematical concepts embedded in learner-appropriate contexts?

1 2 3 4 5
Very few or very contrived activities for students to do mathematical problem solving Some good activities for students to do mathematical problem solving Many rich and authentic opportunities for students to do mathematical problem solving

d. How would you rate the overall developmental appropriateness of the instructional materials, given its intended audience of ALL students at the targeted level(s)?

1 2 3 4 5
Not developmentally appropriate Somewhat developmentally appropriate Developmentally appropriate

e. Do the materials reflect current (that is, within the last 5 years) knowledge about effective teaching and learning practices (e.g., active learning, inquiry, community of learners) based on research related to mathematics education?

1 2 3 4 5
Do not reflect current knowledge about teaching and learning Somewhat reflective of current knowledge about teaching and learning Reflect well current knowledge about teaching and learning

f. Do the instructional materials provide students the opportunity to clarify, refine, and consolidate their ideas?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

g. Do the instructional materials provide students with activities connecting mathematics with other subject areas?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

h. Are the instructional materials likely to be interesting, engaging, and effective for girls and boys?

1 2 3 4 5
No sensitivity to gender issues Some sensitivity to gender issues Sensitive to gender issues

i. Are the instructional materials likely to be interesting, engaging, and effective for underrepresented and underserved students (e.g., ethnic, urban, rural, with disabilities)?

1 2 3 4 5
No sensitivity to underrepresented and underserved students Some sensitivity to underrepresented and underserved students Sensitive to underrepresented and underserved students

j. Does assessment have explicit purposes connected to decisions to be made by teachers (e.g., prior knowledge, conceptual understanding, grades)?

1 2 3 4 5
Unclear purposes Somewhat clear purposes Clear statement of purposes

k. Do assessments focus on the curriculum's important content and skills?

1 2 3 4 5
Poor correspondence Fair correspondence Full correspondence

l. Do the instructional materials include multiple kinds of assessments (e.g., performance, paper/pencil, portfolios, student interviews, embedded, projects)?

1 2 3 4 5
Little or no student assessment provided Some variety of student assessment Complete student assessment package

m. Are the assessment practices fair to all students?

1 2 3 4 5
Fair for a few Fair to most Fair to all

n. Do the instructional materials include adequate and appropriate uses of a variety of educational technologies (e.g., calculators, video, computers, telecommunications)?

1 2 3 4 5
Little or no educational technology included Some appropriate educational technology included Many appropriate applications of educational technology included

o. What is the overall quality of the pedagogical design of these instructional materials?

1 2 3 4 5
Low Medium High

e. Do the materials provide guidance in how to link the materials with the district and state assessment frameworks and programs?

1 2 3 4 5
No guidance Some guidance Rich and useful guidance

f. Do the materials provide guidance and assistance for involving administrators, parents, and the community at large actively in supporting school mathematics?

1 2 3 4 5
No guidance Some guidance Rich and useful guidance

g. Overall, are the materials usable by, realistic in expectations of, and supportive of teachers?

1 2 3 4 5
Teacher unfriendly Somewhat teacher friendly Teacher friendly

V. Major Strengths and Weaknesses

a. In your opinion, what are the three major strengths of this curriculum?

b. In your opinion, what are the three major weaknesses of this curriculum?

VI. Overall Quality, Value, and Contribution

a. In your opinion, what is the overall quality of these materials relative to:

| | low | high |
|--|---------------------------|-------------|
| - turning students on to mathematics? | 1.....2.....3.....4.....5 | |
| - making students think? | 1.....2.....3.....4.....5 | |
| - quality of mathematics content? | 1.....2.....3.....4.....5 | |
| - quality of pedagogy? | 1.....2.....3.....4.....5 | |
| - quality of classroom assessments? | 1.....2.....3.....4.....5 | |
| - encouraging teachers to teach differently? | 1.....2.....3.....4.....5 | |

b. In your opinion, what is the overall quality of these instructional materials?

1 2 3 4 5
 Low Medium High

c. To what extent would you encourage the dissemination, adoption, and implementation of this curriculum?

1 2 3 4 5
 Not worthy of dissemination, adoption, nor implementation OK to disseminate, adopt, and implement **if revised** OK to disseminate, adopt, and implement **as is**

Use this page for additional notations:

Guidelines for Section II.

The following is a brief outline of the National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics. It should be used to guide your responses to Section II.

| |
|---|
| CONTENT STANDARD |
| A. Mathematics as Problem Solving |
| 1. Use problem solving approaches to investigate and understand mathematical content |
| 2. Formulate problems from everyday and mathematical situations |
| 3. Develop and apply strategies to solve a wide variety of problems |
| 4. Verify and interpret results with respect to the original problem |
| 5. Acquire confidence in using mathematics meaningfully |
| B. Mathematics as Communication |
| 1. Relate physical materials, pictures, and diagrams to mathematical ideas |
| 2. Reflect on and clarify their thinking about mathematical ideas and situations |
| 3. Relate their everyday language to mathematical language and symbols |
| 4. Realize that representing, discussing, reading, writing, and listening to mathematics are a vital part of learning and using mathematics |
| C. Mathematics as Reasoning |
| 1. Draw logical conclusions about mathematics |
| 2. Use models, known facts, properties, and relationships to explain their thinking |
| 3. Justify their answers and solution processes |
| 4. Use patterns and relationships to analyze mathematical situations |
| 5. Believe that mathematics makes sense |
| D. Mathematical Connections |
| 1. Link conceptual and procedural knowledge |
| 2. Relate various representations of concepts or procedures to one another |
| 3. Recognize relationships among different topics in mathematics |
| 4. Use mathematics in other curriculum areas |
| 5. Use mathematics in their daily lives |
| E. Estimation |
| 1. Explore estimation strategies |
| 2. Recognize when an estimate is appropriate |
| 3. Determine the reasonableness of results |
| 4. Apply estimation in working with quantities, measurement, computation, and problem solving |
| F. Number Sense and Numeration |
| 1. Construct number meanings through real-world experiences and the use of physical materials |
| 2. Understand our numeration system by relating counting, grouping, and place-value concepts |
| 3. Develop number sense |
| 4. Interpret the multiple uses of numbers encountered in the real world |

| |
|--|
| CONTENT STANDARD |
| <i>(Continued)</i> |
| G. Concepts of Whole Number Operations |
| 1. Develop meaning for the operations by modeling and discussing a rich variety of problem situations |
| 2. Relate the mathematical language and symbolism of operations to problem situations and informal language |
| 3. Recognize that a wide variety of problem structures can be represented by a single operation |
| 4. Develop operation sense |
| H. Whole Number Computation |
| 1. Model, explain, and develop reasonable proficiency with basic facts and algorithms |
| 2. Use a variety of mental computation and estimation techniques |
| 3. Use calculators in appropriate computational situations |
| 4. Select and use computation techniques appropriate to specific problems and determine whether the results are reasonable |
| I. Geometry and Spatial Sense |
| 1. Describe, model, draw, and classify shapes |
| 2. Investigate and predict the results of combining, subdividing, and changing shapes |
| 3. Develop spatial sense |
| 4. Relate geometric ideas to number and measurement ideas |
| 5. Recognize and appreciate geometry in their world |
| J. Measurement |
| 1. Understand the attributes of length, capacity, weight, mass, area, volume, time, temperature, and angle |
| 2. Develop the process of measuring and concepts related to units of measurement |
| 3. Make and use estimates of measurement |
| 4. Make and use measurements in problem and everyday situations |
| K. Statistics and Probability |
| 1. Collect, organize, and describe data |
| 2. Construct, read, and interpret displays of data |
| 3. Formulate and solve problems that involve collecting and analyzing data |
| 4. Explore concepts of chance |
| L. Fractions and Decimals |
| 1. Develop concepts of fractions, mixed numbers, and decimals |
| 2. Develop number sense for fractions and decimals |
| 3. Use models to relate fractions to decimals and to find equivalent fractions |
| 4. Use models to explore operations on fractions and decimals |
| 5. Apply fractions and decimals to problem situations |
| M. Patterns and Relationships |
| 1. Recognize, describe, extend, and create a wide variety of patterns |
| 2. Represent and describe mathematical relationships |
| 3. Explore the use of variables and open sentences to express relationships |

Framework for Review

Instructional Materials for Middle School Mathematics¹

Title: _____
Author(s): _____
Publisher: _____ *Copyright date:* _____
Reviewed by: _____ *Date:* _____

I. Descriptors

a. Write a brief description of the components of the curriculum upon which this review is based (e.g., teachers guide, student books, hands-on materials, multimedia material). That is, what materials did you receive and include in your review?

b. Write a brief description of the purpose and broad goals of these materials. That is, what were the stated purposes and what were the actual purposes of the materials?

c. What grade levels do the materials serve?
____ 5 ____ 6 ____ 7 ____ 8

d. Are the instructional materials designed to
____ provide a complete multi-year program for middle school mathematics.
____ provide a complete one-year course for middle school mathematics.
____ provide multiple modules or units that could be used to supplement other course materials for middle school mathematics.
____ provide a single module or collection of activities that could be used to supplement other course materials for middle school mathematics.
____ other (explain):

¹ *NOTE: This framework is adapted from an instrument developed by Inverness Research under contract to the National Science Foundation. The framework was refined as part of a panel review of NSF-supported materials for middle school science, which was limited to projects that provide at least a year-long course of study.*

e. What are the major domains/topics of content covered by these materials?

II. Quality of the Mathematics

Directions: For each item, circle the number corresponding with your response to the question. Write an explanation for your rating of each item below the item.

a. Does the content in the instructional materials align well with all thirteen areas of the Curriculum Standards as described in the National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics (NCTM)?
(See attached guidelines)

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Omits substantial content included in NCTM and/or includes substantial content not recommended in NCTM | | Some misalignment of content with recommendations in NCTM | | The curriculum aligns well with content recommendations in NCTM |

b. Are the mathematics concepts presented in the instructional materials accurate and correct? [Provide examples of major errors where they are evident. Attach extra page if necessary]

| | | | | |
|---------------------------|-------------|--|-------------|--------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Substantial, major errors | | Mostly correct, with some minor errors | | Mathematically accurate, and correct |

c. Do the instructional materials adequately present the major concepts and adequately demonstrate and model the processes of mathematics?

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Major concepts and processes not addressed | | Major concepts and processes somewhat addressed | | Major concepts and processes addressed well |

d. Do the instructional materials accurately represent views of mathematical problem solving as described in the NCTM Curriculum and Evaluation Standards for School Mathematics?

1 2 3 4 5
Poor portrayal of problem solving Mixed quality Rich and accurate portrayal of problem solving

e. Do the materials use technology as a tool for learning mathematics?

1 2 3 4 5
Little or no use Some emphasis Rich and well designed use

f. Do the materials emphasize communication about mathematics through a variety of modalities?

1 2 3 4 5
Little or no emphasis, few modalities Some emphasis, some modalities Rich and well designed emphasis, varied modalities

g. Do the materials appropriately address mathematical reasoning?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

h. Do the materials appropriately address computation?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

i. Do the materials appropriately address estimation?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

j. Do the materials appropriately address number and number relationships?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

k. Do the materials appropriately address number systems and number theory?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

l. Do the materials appropriately address patterns?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

m. Do the materials appropriately address functions?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

n. Do the materials appropriately address algebra?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

o. Do the materials appropriately address geometry?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

p. Do the materials appropriately address measurement?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

q. Do the materials appropriately address statistics?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

r. Do the materials appropriately address probability?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

s. Do the instructional materials provide sufficient activities for students to develop a good understanding of key mathematics concepts?

12.....3.....4.....5
Too few learning activities Activities provide some opportunity for students to learn some important concepts Activities provide many rich opportunities to learn key mathematics concepts

III. The Pedagogical Design

a. Do the instructional materials provide a logical progression for developing conceptual understanding in mathematics?

1 2 3 4 5
No logical progression of ideas Somewhat logical progression of ideas Logical progression of ideas that builds conceptual understanding

b. Do the instructional materials provide students the opportunity to formulate, solve, and reflect critically on problems?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

c. To what extent are the mathematical concepts embedded in learner-appropriate contexts?

1 2 3 4 5
Very few or very contrived activities for students to do mathematical problem solving Some good activities for students to do mathematical problem solving Many rich and authentic opportunities for students to do mathematical problem solving

d. How would you rate the overall developmental appropriateness of the instructional materials, given its intended audience of ALL students at the targeted level(s)?

1 2 3 4 5
Not developmentally appropriate Somewhat developmentally appropriate Developmentally appropriate

e. Do the materials reflect current (that is, within the last 5 years) knowledge about effective teaching and learning practices (e.g., active learning, inquiry, community of learners) based on research related to mathematics education?

1 2 3 4 5
Do not reflect current knowledge about teaching and learning Somewhat reflective of current knowledge about teaching and learning Reflect well current knowledge about teaching and learning

f. Do the instructional materials provide students the opportunity to clarify, refine, and consolidate their ideas?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

g. Do the instructional materials provide students with activities connecting mathematics with other subject areas?

1 2 3 4 5
No opportunity Some opportunity Rich and well designed opportunity

h. Are the instructional materials likely to be interesting, engaging, and effective for girls and boys?

1 2 3 4 5
No sensitivity to gender issues Some sensitivity to gender issues Sensitive to gender issues

i. Are the instructional materials likely to be interesting, engaging, and effective for underrepresented and underserved students (e.g., ethnic, urban, rural, with disabilities)?

12.....3.....4.....5
No sensitivity to underrepresented and served students Some sensitivity to underrepresented and underserved students Sensitive to underrepresented under- and underserved students

j. Does assessment have explicit purposes connected to decisions to be made by teachers (e.g., prior knowledge, conceptual understanding, grades)?

12.....3.....4.....5
Unclear purposes Somewhat clear purposes Clear statement of purposes

k. Do assessments focus on the curriculum's important content and skills?

12.....3.....4.....5
Poor correspondence Fair correspondence Full correspondence

l. Do the instructional materials include multiple kinds of assessments (e.g., performance, paper/pencil, portfolios, student interviews, embedded, projects)?

12.....3.....4.....5
Little or no student assessment provided Some variety of student assessment Complete student assessment package

V. Major Strengths and Weaknesses

a. In your opinion, what are the three major strengths of this curriculum?

b. In your opinion, what are the three major weaknesses of this curriculum?

VI. Overall Quality, Value, and Contribution

a. In your opinion, what is the overall quality of these materials relative to:

| | low | high |
|--|---------------------------|-------------|
| - turning students on to mathematics? | 1.....2.....3.....4.....5 | |
| - making students think? | 1.....2.....3.....4.....5 | |
| - quality of mathematics content? | 1.....2.....3.....4.....5 | |
| - quality of pedagogy? | 1.....2.....3.....4.....5 | |
| - quality of classroom assessments? | 1.....2.....3.....4.....5 | |
| - encouraging teachers to teach differently? | 1.....2.....3.....4.....5 | |

b. In your opinion, what is the overall quality of these instructional materials?

1 2 3 4 5
 Low Medium High

c. To what extent would you encourage the dissemination, adoption, and implementation of this curriculum?

1 2 3 4 5
 Not worthy of dissemination, adoption, nor implementation OK to disseminate, adopt, and implement **if revised** OK to disseminate, adopt, and implement **as is**

Use this page for additional notations:

Guidelines for Section II.

The following is a brief outline of the National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics. It should be used to guide your responses to Section II.

| |
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| CONTENT STANDARD |
| A. Mathematics as Problem Solving |
| 1. Use problem solving approaches to investigate and understand mathematical content |
| 2. Formulate problems from within and outside mathematics |
| 3. Develop and apply a variety of strategies to solve problems, with emphasis on multistep and nonroutine problems |
| 4. Verify and interpret results with respect to the original problem situation |
| 5. Generalize solutions and strategies to new problem situations |
| 6. Acquire confidence in using mathematics meaningfully |
| B. Mathematics as Communication |
| 1. Model situations using oral, written, concrete, pictorial, graphical, and algebraic methods |
| 2. Reflect on and clarify their own thinking about mathematical ideas and situations |
| 3. Develop common understandings of mathematical ideas, including the role of definitions |
| 4. Use the skills of reading, listening, and viewing to interpret and evaluate mathematical ideas |
| 5. Discuss mathematical ideas and make conjectures and convincing arguments |
| 6. Appreciate the value of mathematical notation and its role in the development of mathematical ideas |
| C. Mathematics as Reasoning |
| 1. Recognize and apply deductive and inductive reasoning |
| 2. Understand and apply reasoning processes, with special attention to spatial reasoning and reasoning with proportions and graphs |
| 3. Make and evaluate mathematical conjectures and arguments |
| 4. Validate their own thinking |
| 5. Appreciate the pervasive use and power of reasoning as a part of mathematics |
| D. Mathematical Connections |
| 1. See mathematics as an integrated whole |
| 2. Explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations |
| 3. Use a mathematical idea to further their understanding of other mathematical ideas |
| 4. Apply mathematical thinking and modeling to solve problems that arise in other disciplines, such as art, music, psychology, science, and business |
| 5. Value the role of mathematics in our culture and society |
| E. Number and Number Relationships |
| 1. Understand, represent, and use numbers in a variety of equivalent forms (integer, fraction, decimal, percent, exponential, and scientific notation) in real-world and mathematical problem situations |
| 2. Develop number sense for whole numbers, fractions, decimals, integers, and rational numbers |
| 3. Understand and apply ratios, proportions, and percents in a wide variety of situations |
| 4. Investigate relationships among fractions, decimals, and percents |
| 5. Represent numerical relationships in one- and two-dimensional graphs |

| |
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| CONTENT STANDARD <i>(Continued)</i> |
| F. Number Systems and Number Theory |
| 1. Understand and appreciate the need for numbers beyond the whole numbers |
| 2. Develop and use order relations for whole numbers, fractions, decimals, integers, and rational numbers |
| 3. Extend their understanding of whole number operations to fractions, decimals, integers, and rational numbers |
| 4. Understand how the basic arithmetic operations are related to one another |
| 5. Develop and apply number theory concepts (e.g., primes, factors, and multiples) in real-world and mathematical problem situations |
| G. Computation and Estimation |
| 1. Compute with whole numbers, fractions, decimals, integers, and rational numbers |
| 2. Develop, analyze, and explain procedures for computation and techniques for estimation |
| 3. Develop, analyze, and explain methods for solving proportions |
| 4. Select and use an appropriate method for computing from among mental arithmetic, paper-and-pencil, calculator, and computer methods |
| 5. Use computation, estimation, and proportions to solve problems |
| 6. Use estimation to check the reasonableness of results |
| H. Patterns and Functions |
| 1. Describe, extend, analyze, and create a wide variety of patterns |
| 2. Describe and represent relationships with tables, graphs, and rules |
| 3. Analyze functional relationships to explain how a change in one quantity results in a change in another |
| 4. Use patterns and functions to represent and solve problems |
| I. Algebra |
| 1. Understand the concepts of variable, expression, and equation |
| 2. Represent situations and number patterns with tables, graphs, verbal rules, and equations and explore the interrelationships of these representations |
| 3. Analyze tables and graphs to identify properties and relationships |
| 4. Develop confidence in solving linear equations using concrete, informal, and formal methods |
| 5. Investigate inequalities and nonlinear equations informally |
| 6. Apply algebraic methods to solve a variety of real-world and mathematical problems |
| J. Statistics |
| 1. Systematically collect, organize, and describe data |
| 2. Construct, read, and interpret tables, charts, and graphs |
| 3. Make inferences and convincing arguments that are based on data analysis |
| 4. Evaluate arguments that are based on data analysis |
| 5. Develop an appreciation for statistical methods as powerful means for decision making |
| K. Probability |
| 1. Model situations by devising and carrying out experiments or simulations to determine probabilities |
| 2. Model situations by constructing a sample space to determine probabilities |
| 3. Appreciate the power of using a probability model by comparing experimental results with mathematical expectations |

| |
|--|
| CONTENT STANDARD |
| <i>(Continued)</i> |
| L. Geometry |
| 1. Identify, describe, compare, and classify geometric figures |
| 2. Visualize and represent geometric figures with special attention to developing spatial sense |
| 3. Explore transformations of geometric figures |
| 4. Represent and solve problems using geometric models |
| 5. Understand and apply geometric properties and relationships |
| 6. Develop an appreciation of geometry as a means of describing the physical world |
| M. Measurement |
| 1. Extend their understanding of the process of measurement |
| 2. Estimate, make, and use measurements to describe and compare phenomena |
| 3. Select appropriate units and tools to measure to the degree of accuracy required in a particular situations |
| 4. Understand the structure and use of systems of measurement |
| 5. Extend their understanding of the concepts of perimeter, area, volume, angle measure, capacity, and weight and mass |
| 6. Develop the concepts of rates and other derived and indirect measurements |
| 7. Develop formulas and procedures for determining measures to solve problems |

Framework for Review Instructional Materials for High School Mathematics¹

Title: _____
Author(s): _____
Publisher: _____ *Copyright date:* _____
Reviewed by: _____ *Date:* _____

I. Descriptors

a. Write a brief description of the components of the curriculum upon which this review is based (e.g., teachers guide, student books, hands-on materials, multimedia material). That is, what materials did you receive and include in your review?

b. Write a brief description of the purpose and broad goals of these materials. That is, what were the stated purposes and what were the actual purposes of the materials?

c. What grade levels do the materials serve?

___ 9 ___ 10 ___ 11 ___ 12

d. Are the instructional materials designed to

___ provide a complete multi-year program for high school mathematics.

___ provide a complete one-year course for high school mathematics.

___ provide multiple modules or units that could be used to supplement other course materials for high school mathematics.

___ provide a single module or collection of activities that could be used to supplement other course materials for high school mathematics.

___ other (explain):

¹ *NOTE: This framework is adapted from an instrument developed by Inverness Research under contract to the National Science Foundation. The framework was refined as part of a panel review of NSF-supported materials for middle school science, which was limited to projects that provide at least a year-long course of study.*

e. What are the major domains/topics of content covered by these materials?

II. Quality of the Mathematics

Directions: For each item, circle the number corresponding with your response to the question. Write an explanation for your rating of each item below the item.

a. Does the content in the instructional materials align well with all thirteen areas of the Curriculum Standards as described in the National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics (NCTM)?
(See attached guidelines)

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Omits substantial content included in NCTM and/or includes substantial content not recommended in NCTM | | Some misalignment of content with recommendations in NCTM | | The curriculum aligns well with content recommendations in NCTM |

b. Are the mathematics concepts presented in the instructional materials accurate and correct? [Provide examples of major errors where they are evident. Attach extra page if necessary]

| | | | | |
|---------------------------|-------------|--|-------------|--------------------------------------|
| 1 | 2 | 3 | 4 | 5 |
| Substantial, major errors | | Mostly correct, with some minor errors | | Mathematically accurate, and correct |

c. Do the instructional materials adequately present the major concepts and adequately demonstrate and model the processes of mathematics?

| | | | | |
|--|-------------|---|-------------|---|
| 1 | 2 | 3 | 4 | 5 |
| Major concepts and processes not addressed | | Major concepts and processes somewhat addressed | | Major concepts and processes addressed well |

d. Do the instructional materials accurately represent views of mathematical problem solving as described in the NCTM Curriculum and Evaluation Standards for School Mathematics?

1 2 3 4 5
Poor portrayal of problem solving Mixed quality Rich and accurate portrayal of problem solving

e. Do the materials use technology as a tool for learning mathematics?

1 2 3 4 5
Little or no use Some emphasis Rich and well designed use

f. Do the materials emphasize communication about mathematics through a variety of modalities?

1 2 3 4 5
Little or no emphasis, few modalities Some emphasis, some modalities Rich and well designed emphasis, varied modalities

g. Do the materials appropriately address mathematical reasoning?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

h. Do the materials appropriately address computation?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

i. Do the materials appropriately address estimation?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

j. Do the materials appropriately address number systems?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

k. Do the materials appropriately address patterns?

12.....3.....4.....5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

l. Do the materials appropriately address functions?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

m. Do the materials appropriately address algebra?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

n. Do the materials appropriately address geometry?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

o. Do the materials appropriately address measurement?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

p. Do the materials appropriately address statistics?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

q. Do the materials appropriately address probability?

1 2 3 4 5
Not appropriately addressed Somewhat appropriately addressed Appropriately addressed

r. Do the instructional materials provide sufficient activities for students to develop a good understanding of key mathematics concepts?

1 2 3 4 5
Too few learning activities Activities provide some opportunity for students to learn some important concepts Activities provide many rich opportunities to learn key mathematics concepts

s. Do the instructional materials provide sufficient opportunities for students to apply their understanding of the concepts (i.e., designing of solutions to problems or issues)?

1 2 3 4 5
Very few application activities Some application activities Very rich in application activities

t. Do the materials develop an appropriate breadth **and** depth of mathematics content?

1 2 3 4 5
Too narrow or too broad Somewhat balanced Good balance of breadth and depth

u. What is the overall quality of the mathematics presented in the instructional materials?

1 2 3 4 5
Low Medium High

III. The Pedagogical Design

a. Do the instructional materials provide a logical progression for developing conceptual understanding in mathematics?

1 2 3 4 5
 No logical progression of ideas Somewhat logical progression of ideas Logical progression of ideas that builds conceptual understanding

b. Do the instructional materials provide students the opportunity to formulate, solve, and reflect critically on problems?

1 2 3 4 5
 No opportunity Some opportunity Rich and well designed opportunity

c. To what extent are the mathematical concepts embedded in learner-appropriate contexts?

1 2 3 4 5
 Very few or very contrived activities for students to do mathematical problem solving Some good activities for students to do mathematical problem solving Many rich and authentic opportunities for students to do ~~mathematical~~ ~~problem solving~~ ~~problem solving~~

d. How would you rate the overall developmental appropriateness of the instructional materials, given its intended audience of ALL students at the targeted level(s)?

1 2 3 4 5
 Not developmentally appropriate Somewhat developmentally appropriate Developmentally appropriate

e. Do the materials reflect current (that is, within the last 5 years) knowledge about effective teaching and learning practices (e.g., active learning, inquiry, community of learners) based on research related to mathematics education?

12.....3.....4.....5
Do not reflect current knowledge about teaching and learning Somewhat reflective of current knowledge about teaching and learning Reflect well current knowledge about teaching and learning

f. Do the instructional materials provide students the opportunity to clarify, refine, and consolidate their ideas?

12.....3.....4.....5
No opportunity Some opportunity Rich and well designed opportunity

g. Do the instructional materials provide students with activities connecting mathematics with other subject areas?

12.....3.....4.....5
No opportunity Some opportunity Rich and well designed opportunity

h. Are the instructional materials likely to be interesting, engaging, and effective for girls and boys?

12.....3.....4.....5
No sensitivity to gender issues Some sensitivity to gender issues Sensitive to gender issues

i. Are the instructional materials likely to be interesting, engaging, and effective for underrepresented and underserved students (e.g., ethnic, urban, rural, with disabilities)?

1 2 3 4 5
No sensitivity to underrepresented and served students Some sensitivity to underrepresented and underserved students Sensitive to underrepresented and under- and underserved students

j. Does assessment have explicit purposes connected to decisions to be made by teachers (e.g., prior knowledge, conceptual understanding, grades)?

1 2 3 4 5
Unclear purposes Somewhat clear purposes Clear statement of purposes

k. Do assessments focus on the curriculum's important content and skills?

1 2 3 4 5
Poor correspondence Fair correspondence Full correspondence

l. Do the instructional materials include multiple kinds of assessments (e.g., performance, paper/pencil, portfolios, student interviews, embedded, projects)?

1 2 3 4 5
Little or no student assessment provided Some variety of student assessment Complete student assessment package

V. Major Strengths and Weaknesses

a. In your opinion, what are the three major strengths of this curriculum?

b. In your opinion, what are the three major weaknesses of this curriculum?

VI. Overall Quality, Value, and Contribution

a. In your opinion, what is the overall quality of these materials relative to:

| | low | high |
|--|---------------------------|-------------|
| - turning students on to mathematics? | 1.....2.....3.....4.....5 | |
| - making students think? | 1.....2.....3.....4.....5 | |
| - quality of mathematics content? | 1.....2.....3.....4.....5 | |
| - quality of pedagogy? | 1.....2.....3.....4.....5 | |
| - quality of classroom assessments? | 1.....2.....3.....4.....5 | |
| - encouraging teachers to teach differently? | 1.....2.....3.....4.....5 | |

b. In your opinion, what is the overall quality of these instructional materials?

1 2 3 4 5
 Low Medium High

c. To what extent would you encourage the dissemination, adoption, and implementation of this curriculum?

1 2 3 4 5
 Not worthy of dissemination, adoption, nor implementation OK to disseminate, adopt, and implement if revised OK to disseminate, adopt, and implement as is

Use this page for additional notations:

Guidelines for Section II.

The following is a brief outline of the National Council of Teachers of Mathematics Curriculum and Evaluation Standards for School Mathematics. It should be used to guide your responses to Section II.

| |
|---|
| CONTENT STANDARD |
| A. Mathematics as Problem Solving |
| 1. Use, with increasing confidence, problem solving approaches to investigate and understand mathematical content |
| 2. Apply integrated mathematical problem-solving strategies to solve problems from within and outside mathematics |
| 3. Recognize and formulate problems from situations within and outside mathematics |
| 4. Apply the process of mathematical modeling to real-world problem situations |
| B. Mathematics as Communication |
| 1. Reflect upon and clarify their thinking about mathematical ideas and relationships |
| 2. Formulate mathematical definitions and express generalizations discovered through investigations |
| 3. Express mathematical ideas orally and in writing |
| 4. Read written presentations of mathematics with understanding |
| 5. Ask clarifying and extending questions related to mathematics they have read or heard about |
| 6. Appreciate the economy, power, and elegance of mathematical notation and its role in the development of mathematical ideas |
| C. Mathematics as Reasoning |
| 1. Make and test conjectures |
| 2. Formulate counterexamples |
| 3. Follow logical arguments |
| 4. Judge the validity of arguments |
| 5. Construct simple valid arguments |
| If college-intending, |
| 6. Construct proofs for mathematical assertions, including indirect proofs and proofs by mathematical induction |
| D. Mathematical Connections |
| 1. Recognize equivalent representations of the same concept |
| 2. Relate procedures in one representation to procedures in an equivalent representation |
| 3. Use and value the connections among mathematical topics |
| 4. Use and value the connections between mathematics and other disciplines |
| E. Algebra |
| 1. Represent situations that involve variable quantities with expressions, equations, inequalities, and matrices |
| 2. Use tables and graphs as tool to interpret expressions, equations, and inequalities |
| 3. Operate on expressions and matrices, and solve equations and inequalities |
| 4. Appreciate the power of mathematical abstraction and symbolism |
| If college-intending, |
| 5. Use matrices to solve linear systems |
| 6. Demonstrate technical facility with algebraic transformations, including techniques based on the theory of equations |

| |
|---|
| CONTENT STANDARD <i>(Continued)</i> |
| F. Functions |
| 1. Model real-world phenomena with a variety of functions |
| 2. Represent and analyze relationships using tables, verbal rules, equations, and graphs |
| 3. Translate among tabular, symbolic, and graphical representations of functions |
| 4. Recognize that a variety of problem situations can be modeled by the same type of function |
| 5. Analyze the effects of parameter changes on the graphs of functions |
| If college-intending, |
| 6. Understand operations on, and the general properties and behavior of, classes of functions |
| G. Geometry from a Synthetic Perspective |
| 1. Interpret and draw three-dimensional objects |
| 2. Represent problem situations with geometric models and apply properties of figures |
| 3. Classify figures in terms of congruence and similarity and apply these relationships |
| 4. Deduce properties of, and relationships between, figures from given assumptions |
| If college-intending, |
| 5. Develop an understanding of an axiomatic system through investigating and comparing various geometrics |
| H. Geometry From an Algebraic Perspective |
| 1. Translate between synthetic and coordinate representations |
| 2. Deduce properties of figures using transformations and using coordinates |
| 3. Identify congruent and similar figures using transformations |
| 4. Analyze properties of Euclidean transformations and relate translations to vectors |
| If college-intending, |
| 5. Deduce properties of figures using vectors |
| 6. Apply transformations, coordinates, and vectors in problem solving |
| I. Trigonometry |
| 1. Apply trigonometry to problem situations involving triangles |
| 2. Explore periodic real-world phenomena using the sine and cosine functions |
| If college-intending, |
| 3. Understand the connection between trigonometric and circular functions |
| 4. Use circular functions to model periodic real-world phenomena |
| 5. Apply general graphing techniques to trigonometric functions |
| 6. Solve trigonometric equations and verify trigonometric identities |
| 7. Understand the connections between trigonometric functions and polar coordinates, complex numbers, and series |
| J. Statistics |
| 1. Construct and draw inferences from charts, tables, and graphs that summarize data from real-world situations |
| 2. Use curve fitting to predict from data |
| 3. Understand and apply measures of central tendency, variability, and correlation |
| 4. Understand sampling and recognize its role in statistical claims |
| 5. Design a statistical experiment to study a problem, conduct the experiment, and interpret and communicate the outcomes |
| 6. Analyze the effects of data transformations on measures of central tendency and variability |
| If college-intending, |

| |
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| CONTENT STANDARD <i>(Continued)</i> |
| K. Probability |
| 1. Use experimental or theoretical probability, as appropriate, to represent and solve problems involving uncertainty |
| 2. Use simulations to estimate probabilities |
| 3. Understand the concept of a random variable |
| 4. Create and interpret discrete probability distributions |
| 5. Describe, in general terms, the normal curve and use its properties to answer questions about sets of data that are assumed to be normally distributed |
| If college-intending, |
| 6. Apply the concept of a random variable to generate and interpret probability distributions including binomial, uniform, normal, and chi square |
| L. Discrete Mathematics |
| 1. Represent problem situations using discrete structures such as finite graphs, matrices, sequences, and recurrence relations |
| 2. Represent and analyze finite graphs using matrices |
| 3. Develop and analyze algorithms |
| 4. Solve enumeration and finite probability problems |
| If college-intending, |
| 5. Represent and solve problems using linear programming and difference equations |
| 6. Investigate problem situations that arise in connection with computer validation and the application of algorithms |
| M. Conceptual Underpinnings of Calculus |
| 1. Determine maximum and minimum points of a graph and interpret the results in problem situations |
| 2. Investigate limiting processes by examining infinite sequences and series and areas under curves |
| If college-intending, |
| 3. Understand the conceptual foundations of limit, the area under a curve, the rate of change, and the slope of a tangent line, and their applications in other disciplines |
| 4. Analyze the graphs of polynomial, rational, radical, and transcendental functions |
| N. Mathematical Structure |
| 1. Compare and contrast the real number system and its various subsystems with regard to their structural characteristics |
| 2. Understand the logic of algebraic procedures |
| 3. Appreciate that seemingly different mathematical systems may be essentially the same |
| If college-intending, |
| 4. Develop the complex number system and demonstrate facility with its operation |
| 5. Prove elementary theorems within various mathematical structures, such as groups and fields |
| 6. Develop an understanding of the nature and purpose of axiomatic systems |