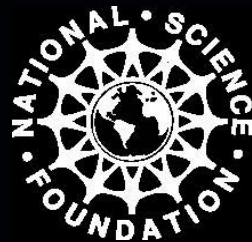


Directorate for Education  
and Human Resources:  
*An Overview of NSF's Current  
Role in K-12 STEM Education*



Donald E. Thompson, Assistant Director (Acting)  
NSB Commission on 21st Century Education in STEM  
August 3, 2006

# Overview of Presentation

- NSF's current role in K-12 STEM Education
- EHR Evaluation Criteria for the Effectiveness of the Programs
- Examples of Model Programs

# NSF's Role in K-12 STEM Education

To sponsor research and development on STEM education that will produce scaleable and testable models that can be utilized by schools and other agencies to promote a diverse and well-prepared workforce of STEM professionals.



**Cornell graduate student  
works with elementary students  
in the Bronx, New York**

# What Works

- Partnerships and Collaborations
- Teacher Recruitment, Professional Development, and Retention
- Student Learning and Teacher Content Knowledge
- Scientific Literacy

# *Division of Research on Learning in Formal and Informal Settings (DRL)*

- **Discovery Research K-12 (DR-K12)**

*(formerly IMD, TPC, and CLT)*

- Improves science teaching and learning in the elementary grades through research, development, and evaluation

- **Informal Science Education (ISE)**

- Invests in projects that develop and implement informal learning experiences in STEM

# *Division of Research on Learning in Formal and Informal Settings (DRL)*

- **Information Technology Experiences for Students and Teachers (ITEST)**
  - Provides opportunities for students and teachers (grades 7-12) to learn about, experience, and use information technology (IT) in the context of STEM education.

# *Division of Research on Learning in Formal and Informal Settings (DRL)*

- **NSF Academies for Young Scientists (NSFAYS)**
  - Engages students in scientific inquiry and helps teachers develop strategies to support K-12 discovery learning

# *Division of Research on Learning in Formal and Informal Settings (DRL)*

- **Research and Evaluation on Education in Science and Engineering (REESE)**

*(formerly ROLE, EREC, and IERI)*

- Enhances STEM learning through basic & applied research and evaluation

# *Division of Undergraduate Education (DUE)*

- **Math & Science Partnership (MSP)**
  - Improves the achievement of all K-12 students in mathematics and science, and significantly reduce achievement gaps in the mathematics and science performance of diverse student populations

# *Division of Undergraduate Education (DUE)*

- **Advanced Technological Education (ATE)**
  - Supports the improvement of technological education
- **National STEM Education Digital Library (NSDL)**
  - Creates, develops, and sustains a national digital library supporting science, technology, engineering, and mathematics (STEM) education

# *Division of Undergraduate Education (DUE)*

- **Robert Noyce Scholarship Program  
(NOYCE)**

- Encourages talented STEM undergraduate students and postgraduate professionals to become K-12 math and science teachers through scholarships, stipends, and programmatic support

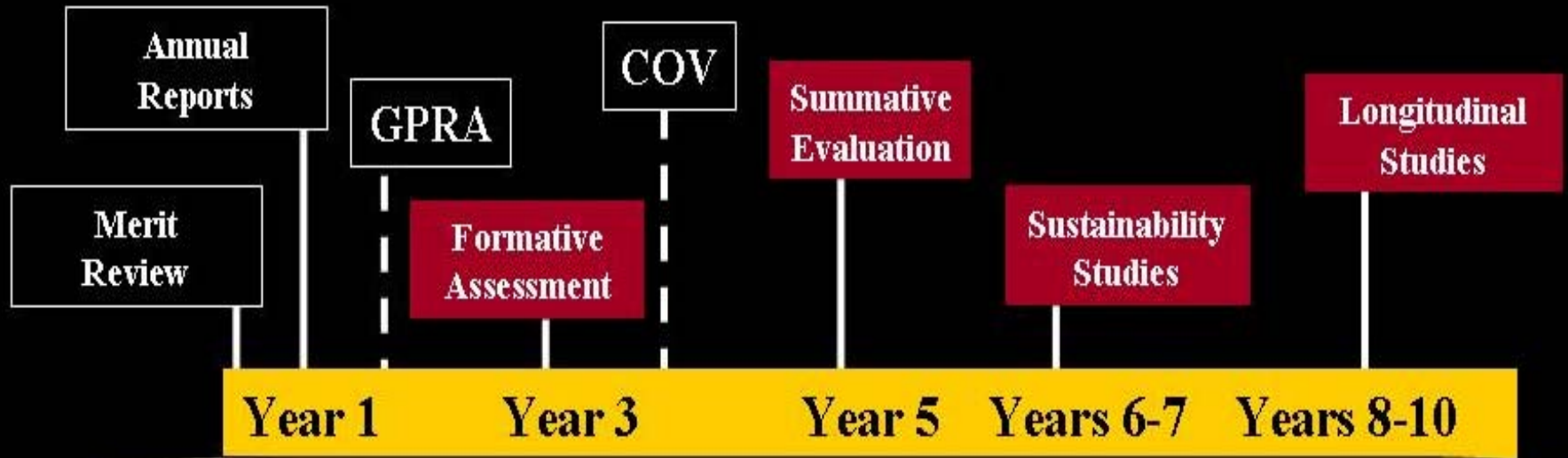
# *Division of Graduate Education (DUE)*

- **Graduate Teaching Fellows in K-12 Education (GK-12)**
  - Enriches learning for K-12 students and to expose teachers and K-12 students to cutting edge research

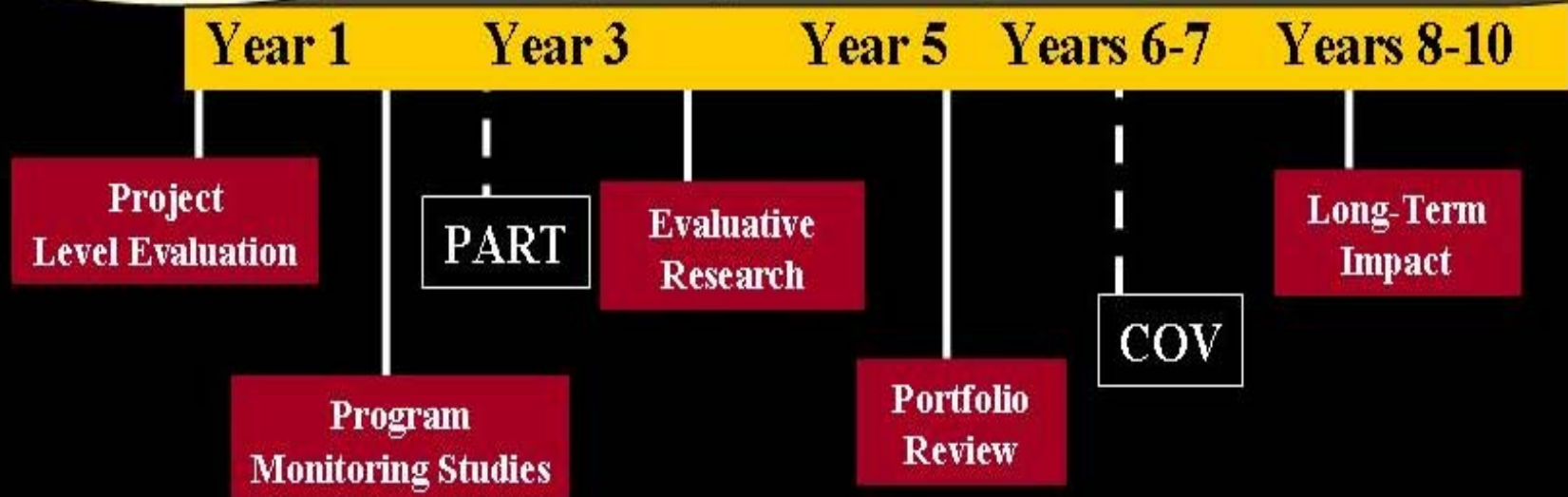
# Functions of Evaluation

- To require evaluation of programs and projects
- To coordinate data collection efforts for performance monitoring/assessment
- To coordinate the management of ongoing and/or required program and thematic evaluation studies
- To commission new and different approaches to evaluate cross-directorate efforts
- To provide training opportunities and tools to build capacity internally and in the field
- To coordinate federal reporting requirements
- To synthesize and communicate evaluation findings to various stakeholders

# Evaluation in the NSF's Directorate for Education and Human Resources



## Evaluation Timeline **Capacity Building of Evaluation**



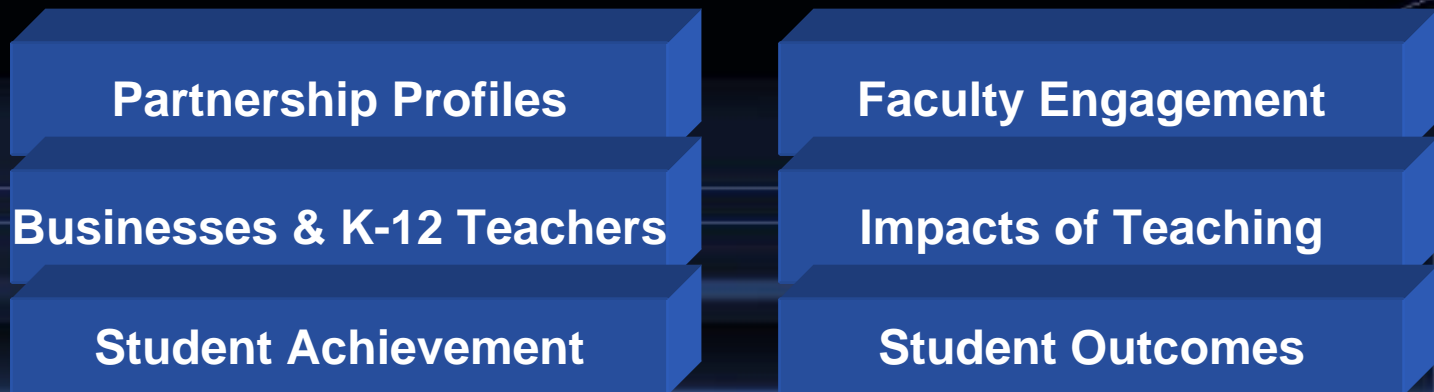
# EHR Model Programs

# Math Science Partnership (MSP) Program: *Portfolio*

- 48 funded Partnership projects
- 32 Research, Evaluation & Technical Assistance (RETA) awards
- MSP Management Information System (MSP-MIS) for core data collection from all funded Partnerships
- MSP awards and contractual commitments to date exceed \$580 million, of which \$9.5 million is currently committed to data collection and evaluation at the program level

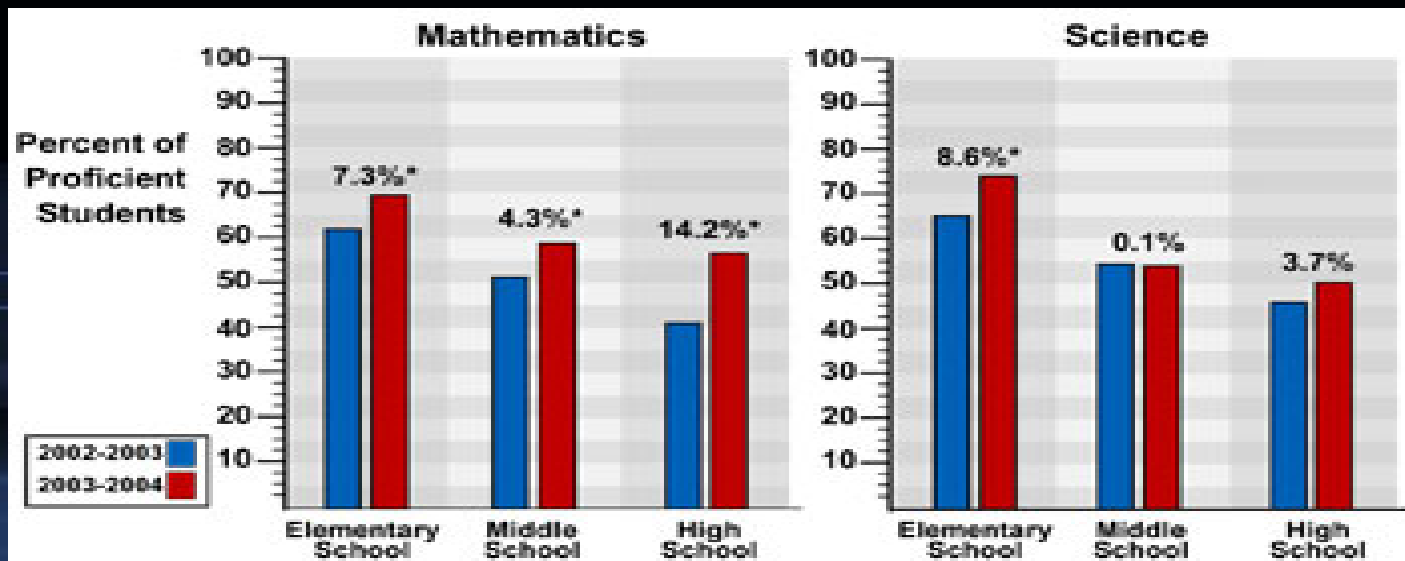
# Math Science Partnership (MSP) Program: *Assessment Methodologies*

- Each Partnership project has a third-party evaluation.
- Each Partnership feeds data to the MSP-MIS annually, enabling (a) program-level aggregation of a range of data common to all Partnership projects and (b) the tracking of changes in MSP profiles.



# Math Science Partnership (MSP) Program: *Impacts*

In a first *analysis of student data*, elementary, middle and high school students showed significant improvements in mathematics proficiency test scores during the 2002-2003 and 2003-2004 school years. During the same period, MSP elementary school students showed significant gains in science proficiency.



# Informal Science Education: *Portfolio*

**Initiated in FY1983                      247 Active Awards**

**Total Funding for FY2005: \$63 Million**

- 66 Museum Exhibits
- 61 Television, films, radio and webcast shows
- 39 Science and/or math programs for youth
- 30 Research and/or programs for professionals
- 51 Other (Planning grants, conferences, technology, nanotechnology)

# Informal Science Education: *Program Review and Evaluation*

- Summative program evaluation completed by COSMOS

Findings: ISE program is meeting all its expressed goals based on evidence obtained from site visits, focus groups, existing project evaluations, and surveys:

- Increasing the number of youth engaged in informal science activities, especially those from underrepresented groups
- Promoting linkages between formal and informal science education and among a variety of informal science organizations, and
- Improving the science literacy of children and adults.

# ISE Impacts: *Program Reach*

- Museum project visitors average 75,000,000 million visitors annually
- Television, radio and webcast show projects reaches more than 100,000,000 million annually
- Research Programs for professionals and Science/Math programs for youths engage nearly 2,000,000 people
- Film projects report project dissemination to more than 870 theaters and an estimated 5.08 million viewers

# Lessons Learned: *Innovative Models for K-12 STEM Education*

- **Discovery Research K-12 (DR-K12)**
- **NSF Academies for Young Scientists (NSFAYS)**
- **Research and Evaluation on Education in Science and Engineering (REESE)**
- **Integration of Research and Education**
- **Cyberlearning**