

# Successful K-12 STEM Education

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# WHAT YOU ALREADY KNOW

# About current conditions:

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- Data on student achievement and teaching capacity is complex and nuanced with some gains in some places for some populations.
- Time devoted to teaching science during the elementary and middle school day is falling and lags behind time devoted to language arts and mathematics.
- 24 x 7 learning (in school and out) is not well understood.

# And about achievements.

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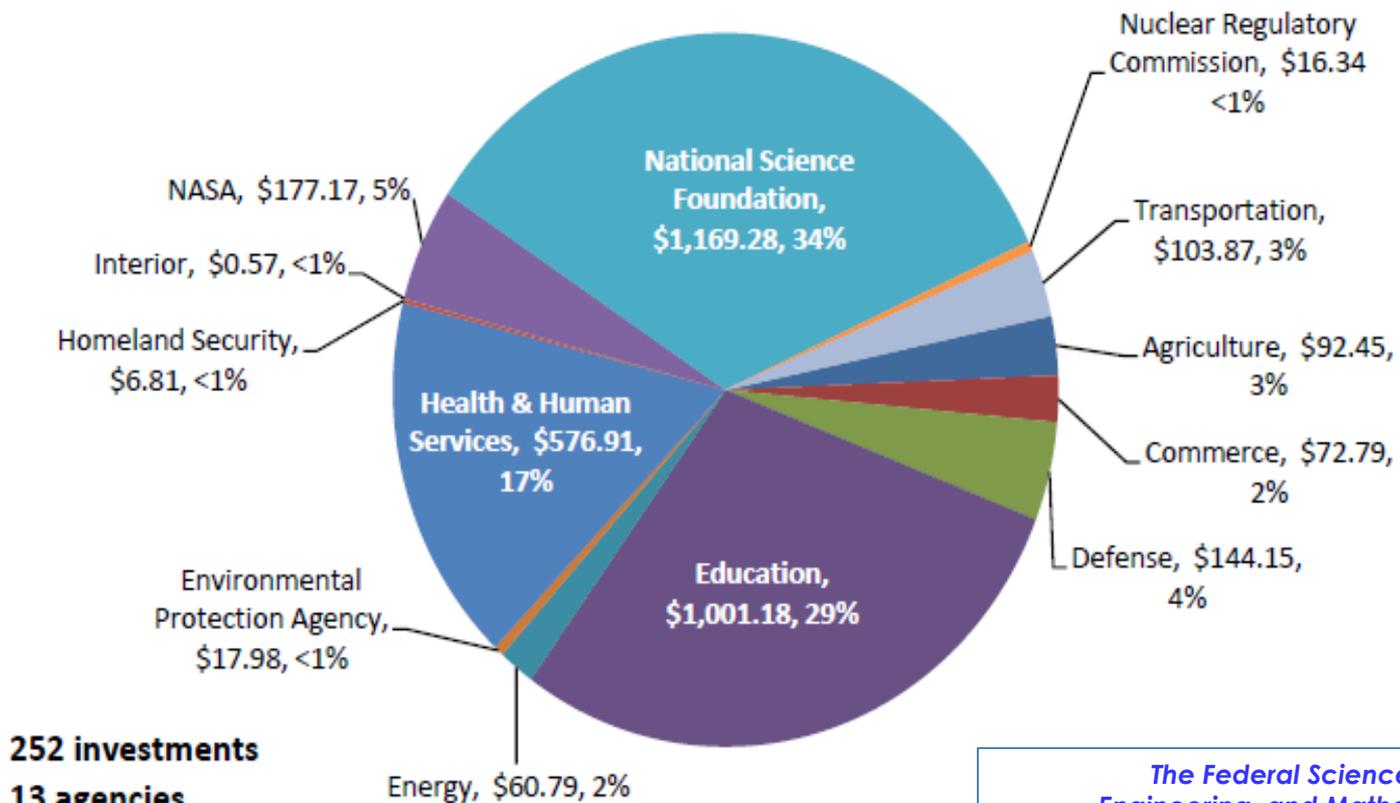
- 8<sup>th</sup> graders continued to show gains in mathematics scores in 2011.
- 12<sup>th</sup> graders continued to show gains in mathematics scores between 2007 and 2009.
- Most high school teachers in mathematics and science taught in field (2007).
- Very young children are capable of learning abstract concepts earlier than we had believed. And our brains remain “plastic” longer, so it is never too early or too late to learn. The question is how?

# WHAT CAN NSF DO?

# Federal Investment in STEM Education

Figure 3: Federal STEM Education Investments by Agency

## Federal STEM Education Investments by Agency (\$3,440 M)



252 investments

13 agencies

*The Federal Science, Technology, Engineering, and Mathematics (STEM) Education Portfolio, December 2011, p. 10*

# NSF's STEM Investments Complement the Department of Education's

Figure B10: DOEd Investments in STEM by Objective

## Department of Education Investments by Objective (\$1,001 M)

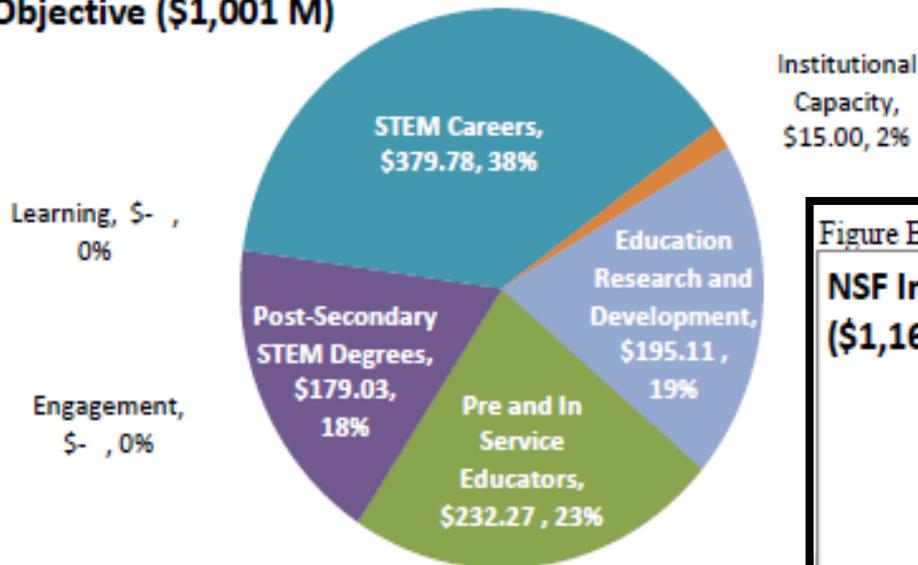
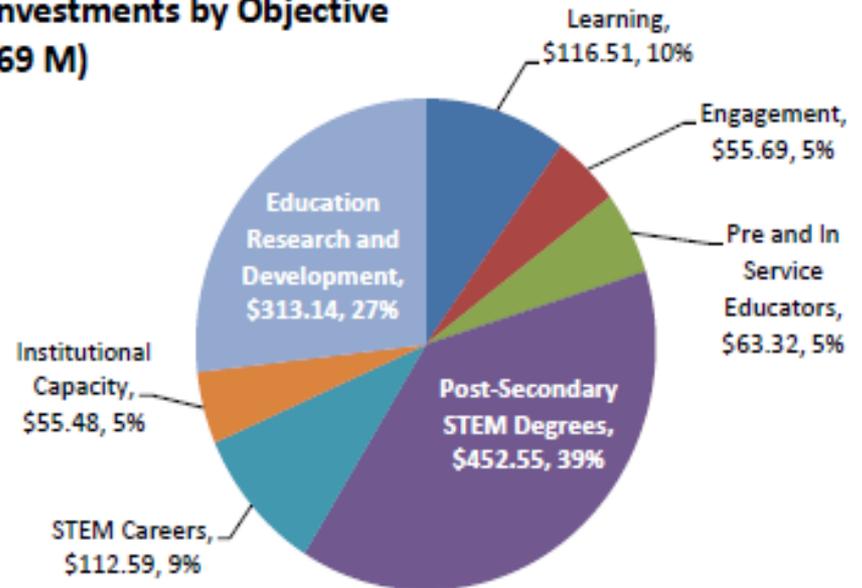


Figure B22: NSF Investments in STEM by Objective

## NSF Investments by Objective (\$1,169 M)



*The Federal Science, Technology, Engineering, and Mathematics (STEM) Education Portfolio, December 2011, pp. 62, 68.*

# NSF can:

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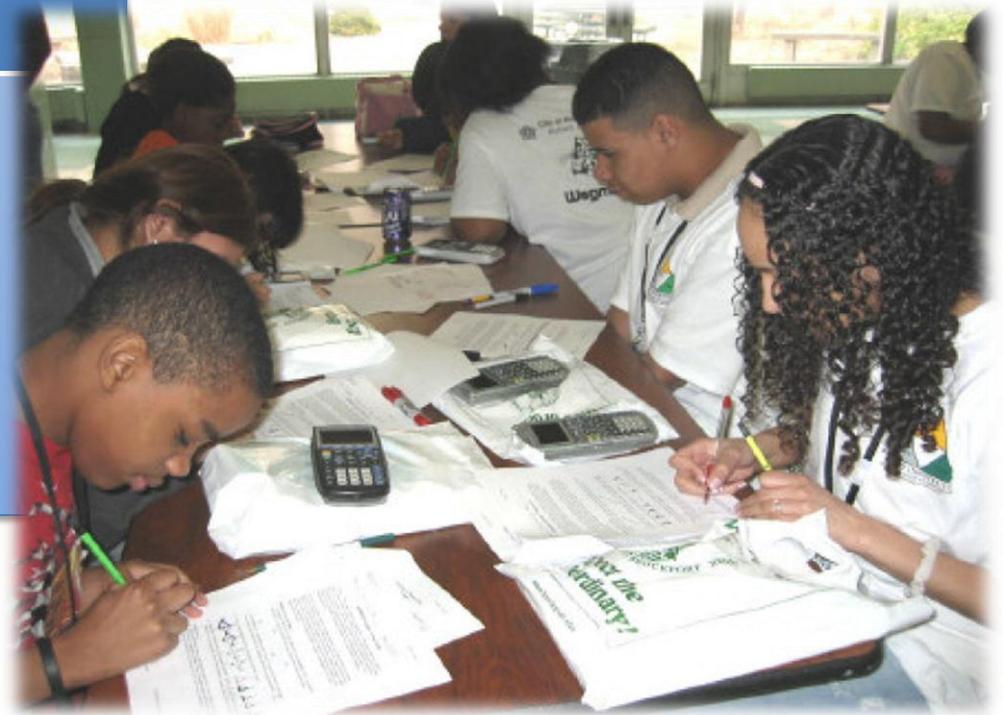
- Call attention to emerging and important areas of research, e.g.:
  - Pre-K – 5 year olds
  - Learning opportunities outside the classroom
- Leverage investments in educational research and learning and development with exciting science investments.
- Build partnerships across agencies, sectors, and jurisdictions.
- Facilitate sharing and building knowledge with practitioners.

# EHR FY 2013 Congressional Budget Request

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**Total FY 2013:  
\$875.61 million**

**Change Over  
FY 2012 Estimate:  
+5.6%  
+\$46.61 million**

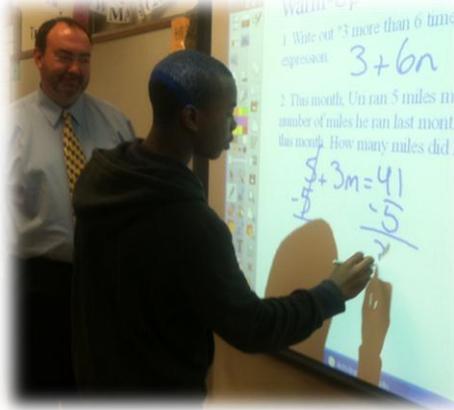


# EHR 2013

Research &  
Development  
Core

Leadership

Expeditions



- ✓ STEM Learning and STEM Learning Environments
- ✓ Broadening Participation and Institutional Capacity in STEM
- ✓ STEM Professional Workforce Preparation



# Leadership



*Accelerating the development of the next generation of diverse well qualified STEM researchers and educators*

# Expeditions

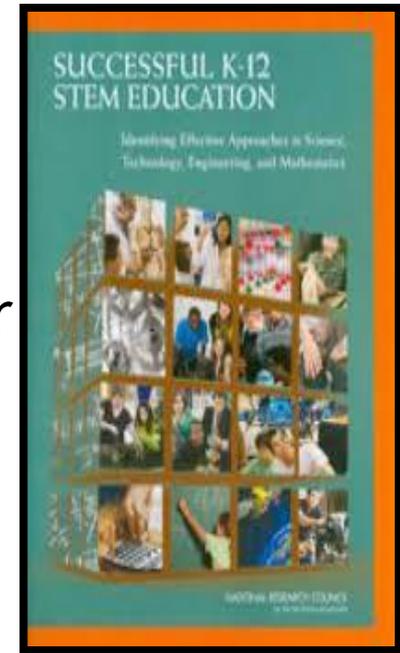


*Catalytic and high-return activities that have the potential to transform science and engineering education and create the world-class workforce needed to compete in the twenty-first century: done in partnership, internally and externally.*

# WHAT ARE WE DOING TODAY?

# Follow-Up to Successful K-12 STEM Education Report

- Organize regional meetings (Seattle, Las Vegas, Chicago, Baltimore)
- Establish NSF-wide “think tank” to examine K-12
- Launch K-16 math initiative and other coordination between NSF and Department of Ed
- Create evaluation framework for measuring report’s recommendations through award to NRC.



# Where We Need Additional Research

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- Learning progressions in science and mathematics
- Implementation of common core state standards in mathematics and (later) science
- Transition points, Pre-K, elementary-middle, high school-postsecondary, in/outside of school.
- Role of districts in implementing improved STEM education
- Creation of research and implementation agenda WITH practitioners
- ?

# Thank You!

## Contact Information

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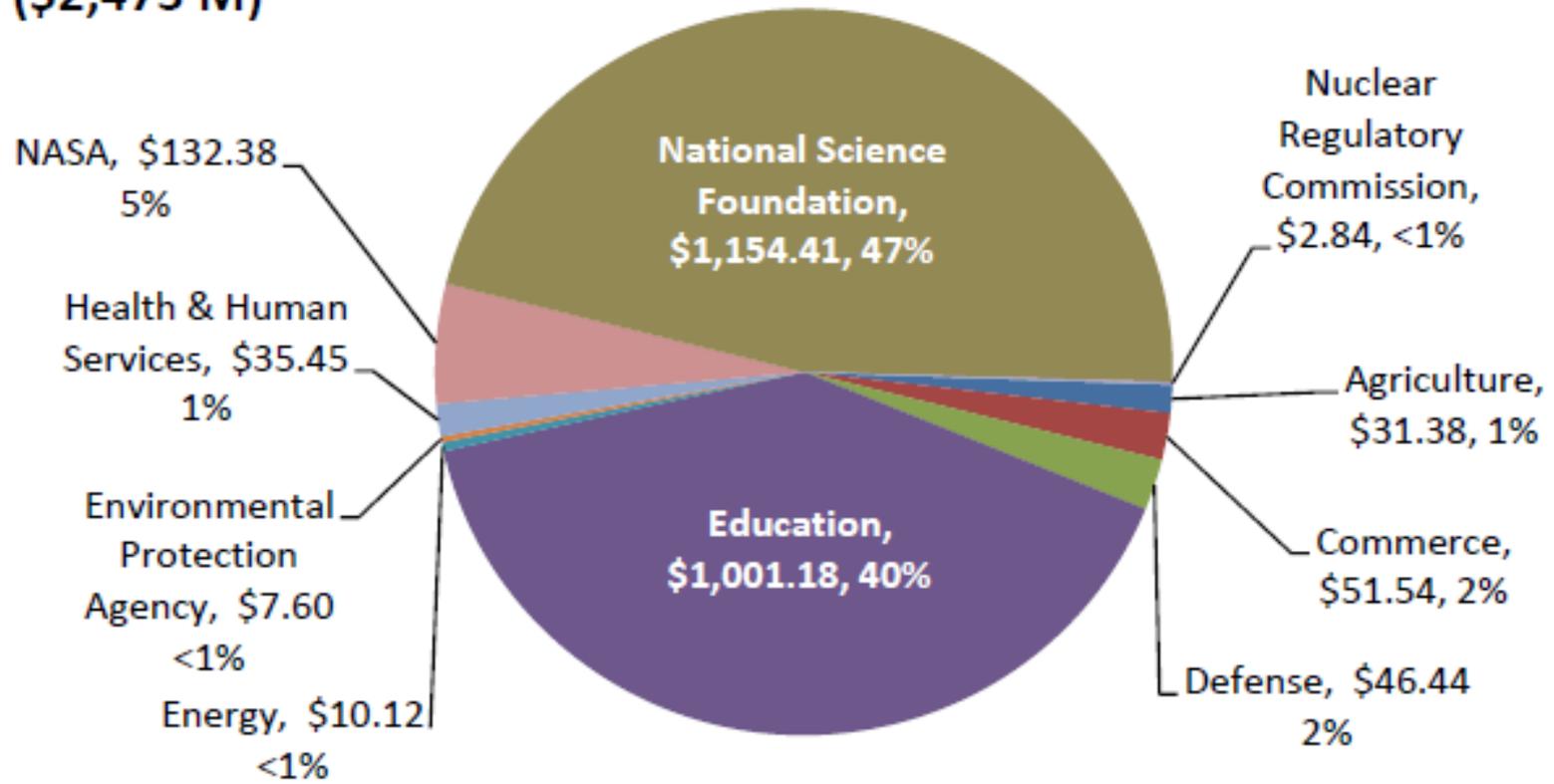
www.nsf.gov

Keyword: EHR



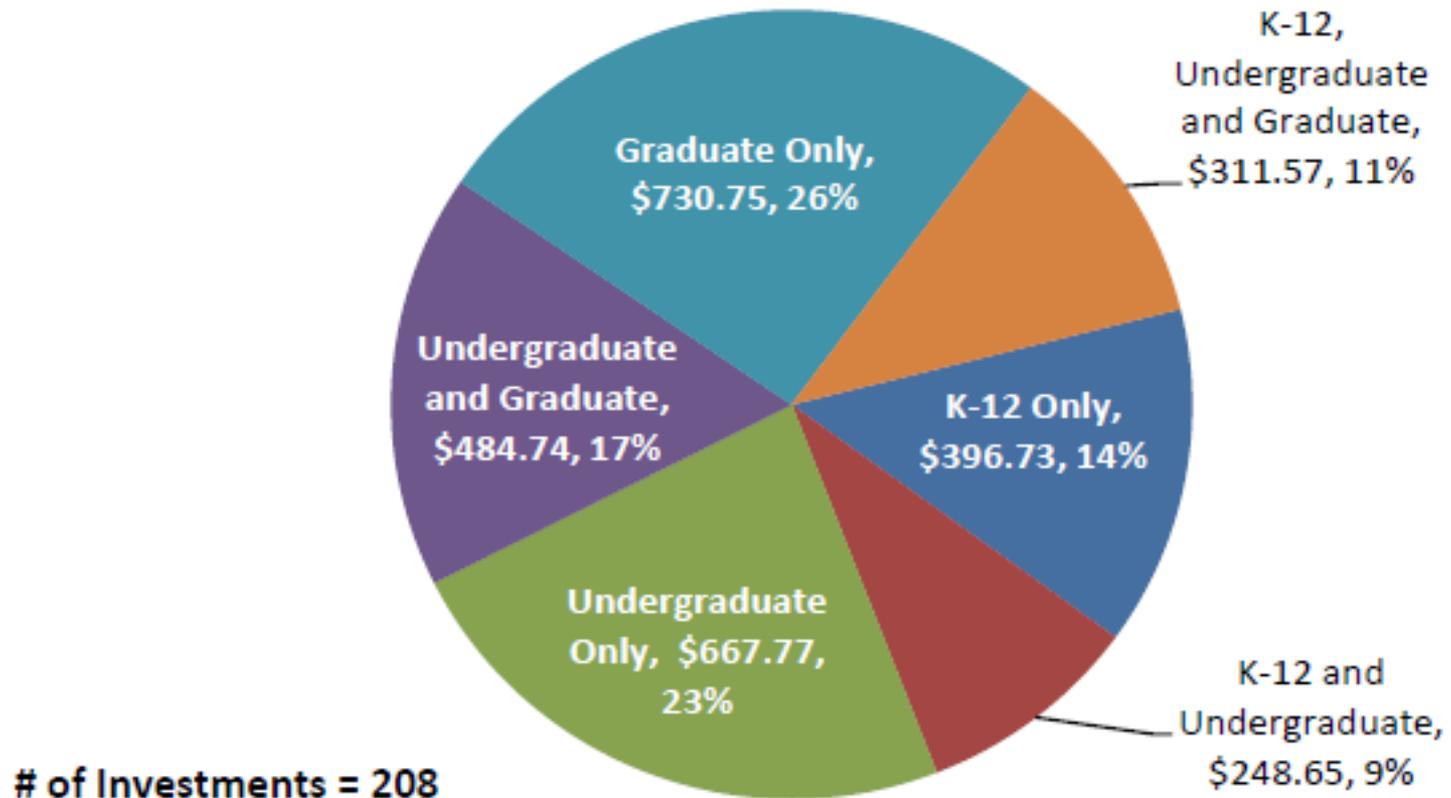
# Co-STEM major findings

**Funding for Broader STEM Education by Agency  
(\$2,473 M)**



# Co-STEM Major Findings

## Audience Level Among Investments Serving K-20 Learners (\$2,840 M)



# Co-STEM Major Findings

**Science Focused by Scientific Field  
(\$245 M)**

