THE FEDERAL SCIENCE, TECHNOLOGY, ENGINEERING, AND MATHEMATICS (STEM) EDUCATION PORTFOLIO

A Report from the

Federal Inventory of STEM Education
Fast-Track Action Committee

Committee on STEM Education

National Science and Technology Council

DECEMBER 2011

About the National Science and Technology Council

The National Science and Technology Council (NSTC) was established by Executive Order on November 23, 1993. This Cabinet-level Council is the principal means within the executive branch to coordinate science and technology policy across the diverse entities that make up the Federal research and development enterprise. Chaired by the President, the membership of the NSTC is made up of the Vice President, the Director of the Office of Science and Technology Policy, Cabinet Secretaries and Agency Heads with significant science and technology responsibilities, and other White House officials.

A primary objective of the NSTC is the establishment of clear national goals for Federal science and technology investments in a broad array of areas spanning virtually all the mission areas of the executive branch. The Council prepares research and development strategies that are coordinated across Federal agencies to form investment packages aimed at accomplishing multiple national goals. The work of the NSTC is organized under five *primary committees:* Science, Technology, Engineering, and Mathematics Education; Science; Technology; Environment, Natural Resources and Sustainability; and Homeland and National Security. Each of these committees oversees subgroups focused on different aspects of science and technology and working to coordinate across the Federal government.

For additional information concerning the work of the National Science and Technology Council please visit www.ostp.gov/cs/nstc.

About the Office of Science and Technology Policy

The Office of Science and Technology Policy (OSTP) advises the President on the effects of science and technology on domestic and international affairs. The office serves as a source of scientific and technological analysis and judgment for the President with respect to major policies, plans and programs of the Federal government. OSTP leads an interagency effort to develop and implement sound science and technology policies and budgets. The office works with the private sector to ensure Federal investments in science and technology contribute to economic prosperity, environmental quality, and national security. For more information, visit http://www.ostp.gov.

About the Committee on Science, Technology, Engineering, and Mathematics (STEM) Education

The NSTC Committee on STEM Education (CoSTEM) coordinates Federal programs and activities in support of STEM education pursuant to the requirements of Sec. 101 of the America COMPETES Reauthorization Act of 2010.[1] The responsibilities of the CoSTEM cover education and workforce policy issues and research and development efforts that focus on STEM education issues at the Pre-K-12, undergraduate, graduate, and lifelong learning levels, as well as current and projected STEM workforce needs, trends, and issues. The three functions of the CoSTEM are to review Federal STEM education activities and programs and the respective assessments of each; coordinate, with the Office of Management and Budget, STEM education activities and programs throughout Federal agencies; and develop and implement through the participating agencies a 5-year STEM education strategic plan, to be updated every 5 years.

About this document

This report details the results of the initial CoSTEM inventory of Federal STEM education investments. The Fast-Track Action Committee on Federal Investment in STEM Education was chartered to develop the inventory process, analyze the inventory results, and draft the inventory report with the oversight of the CoSTEM. The membership of the fast-track action committee included representatives from the same 11 Federal agencies that comprise the CoSTEM. This report includes detailed information on STEM education investments in order to identify duplication, overlap, and fragmentation in the Federal STEM education portfolio, illustrate distinct characteristics of investments, identify areas of potential synergy across and within agencies, support the sharing of effective STEM education strategies and evaluation techniques, increase awareness of education investments within and across Federal agencies, and support the development of a Federal five-year strategic STEM education plan.

Copyright Information

1. Pub. L. No. 111-358

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November 11, 2011

Dear Colleague:

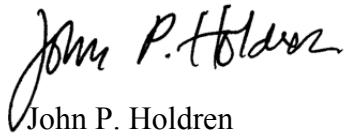
High-quality science, technology, engineering, and mathematics (STEM) education is critical for the prosperity and security of our Nation. The America COMPETES Reauthorization Act of 2010 called for the formation of a National Science and Technology Committee on STEM Education (CoSTEM) and charged it with developing a five-year strategic plan to advance the state of American STEM education.

Many different Federal agencies are involved in STEM education. The first step in the development and implementation of the strategic plan was to carefully inventory the current efforts of the agencies. The report of that inventory, *The Federal Science, Technology, Engineering, and Mathematics (STEM) Education Portfolio,* gives the clearest and most complete picture of the Federal investment in STEM education to date. The report also provides a detailed analysis of duplication, overlap, and fragmentation among the Nation's STEM education programs.

These results provide essential input for developing a strategic plan that will help Federal agencies contribute to improved STEM education in an effective and well-coordinated manner. The path forward will be laid out in the five-year Federal STEM education strategic plan that the CoSTEM will release in early 2012.

I am pleased to release this Federal STEM education inventory report as part of the Administration's comprehensive effort to improve the Nation's STEM education. I look forward to working with the Congress, agencies, the private sector, and the public to realize that goal.

Sincerely,



John P. Holdren
Assistant to the President for Science and Technology
Director, Office of Science and Technology Policy

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Department and Agency Abbreviations

Department of Agriculture . . . . . USDA

Department of Commerce . . . . . DOC

Department of Defense . . . . . DOD

Department of Education . . . . . DOEd

Department of Energy . . . . . DOE

Department of Health and Human Services . . . . . HHS

Department of Homeland Security . . . . . DHS

Department of the Interior . . . . . DOI

Department of Transportation . . . . . DOT

Environmental Protection Agency . . . . . EPA

National Aeronautics and Space Administration . . . . . NASA

National Institute of Standards and Technology (part of DOC) . . . . . NIST

National Institutes of Health (part of HHS) . . . . . NIH

National Oceanic and Atmospheric Administration (part of DOC) . . . . . NOAA

National Science Foundation . . . . . NSF

National Science and Technology Council . . . . . NSTC

Nuclear Regulatory Commission . . . . . NRC

Office of Science and Technology Policy . . . . . OSTP

United States Geological Survey (part of DOI) . . . . . USGS

Executive Summary

The need for high quality science, technology, engineering, and mathematics (STEM) education has been touted by numerous reports that link our Nation's future economic success and security to a highly skilled STEM workforce. National studies and international comparisons have repeatedly shown that STEM education in the United States needs to be improved. The Federal government provides support for a large number of STEM education programs that previous reports have described as potentially duplicative, overlapping, or uncoordinated. To address these issues, Congress, in the America COMPETES Act, called on the Office of Science and Technology Policy to create an interagency committee to catalogue all Federal investments in STEM education and analyze the amount of duplication, overlap, and fragmentation across programs. This report summarizes the findings of the effort to catalogue Federal investments in STEM education and will inform the five-year strategic plan to improve the effectiveness of Federal STEM education efforts.

The Committee on STEM Education (CoSTEM) carried out a detailed inventory of Federal agencies' spending on STEM education.[2] This inventory differs from previous such inventories in several ways. A consistent unit of analysis was used across all agencies (henceforth labeled as an "investment"); the design and implementation of the inventory survey included extensive agency involvement; and a more thorough and detailed characterization of each agency's investments was obtained. The result of these differences is a clearer and more complete picture of the Federal investment in STEM education than has previously been available.

Our analysis indicates that the critical issue related to Federal investments in STEM education is not whether the total number of investments is too large or whether today's programs are overly redundant with one another. Rather, the primary issue is how to strategically focus the limited Federal dollars available so they will have a more significant impact in areas of national priority.

It is important to recognize that the measures tallied in this report are but a subset of those that will be used by CoSTEM to develop a roadmap for achieving a more strategically targeted portfolio of STEM education investments within and across the Federal agencies. The inventory results suggest that there may be a number of possible approaches to improving the Federal STEM education portfolio including: consolidating programs, creating joint solicitations across agencies, and developing structures and procedures for sharing program data and performance measurement and evaluation tools. The results reported in this report along with a number of other factors, including measures of effectiveness for various program types, must and will come into play in the creation of a strategic plan. As called for in the America COMPETES Act, that plan will be released in early 2012.

All told, this inventory found that Federal agencies are making some 252 distinct investments in STEM education for a total budgetary commitment of $3.4 billion. The quality and granularity of these data not only assures that these numbers are more accurate than others derived previously but also allows an unprecedented look at how much overlap and duplication there may be among these programs. To make this assessment the CoSTEM used definitions and measures of overlap and duplication previously established by the U.S. Government Accountability Office. The overlap and redundancy analysis

2. See Box 1.1 on page 7 for the definition of STEM Education used in the inventory.

results suggest there is only modest overlap in investments and no duplication among the STEM education investments, as defined by GAO. That does not mean that there are not opportunities for better alignment and deployment of STEM resources.

Duplication

Duplicative investments focus on the same primary objective, audiences, products or services, and fields within STEM.

Overlap

Overlapping investments share the same primary objective, and have at least one type of audience, product or service, and field within STEM in common. Investments that share a number of audiences, products or services, and fields of STEM in common overlap more than those with fewer features in common.

This examination reveals that the label "STEM education" encompasses an enormous multidimensional landscape covering many different audiences, objectives, STEM fields, educational products, geographical regions, and funding sources. The small proportion of the overall funding for STEM education provided by Federal agencies supports investments that cover a small fraction of the STEM education landscape. To put the current investment in perspective, Federal investment in STEM education today is less than 1 percent of the $1.1 trillion spent annually on education in the United States. To maximize the impact of Federal investments in STEM education the CoSTEM will scrutinize how these resources are allocated in order to ensure Federal investments are focused on the most important needs and most effective strategies. The STEM education inventory provides a useful baseline to inform the Administration's strategic planning and budget allocation decisions.

Some of the major findings that will be used to develop the roadmap and strategic portfolio are as follows:

1. Of the total of $3.4 billion spent by Federal agencies on STEM education investments, $967 million (28%) is spent on activities that target the specific workforce needs of science mission agencies. As these agencies' missions are quite different from one another, their workforce needs are also quite different—whether they are for a national workforce of biomedical researchers to fulfill the mission of the National Institutes of Health or a workforce of transportation engineers needed to fulfill the mission of the Department of Transportation. This finding does not rule out the possibility that in some cases there may be overlapping skill-set needs among disparate workforces, which could be addressed by joint training opportunities or other collaborative endeavors.
2. The remaining $2.5 billion (72%) is spent on broader STEM education, and this spending is dominated by the expenditures of the National Science Foundation (47% of that $2.5 billion, or $1.2 billion) and the Department of Education (40% of the $2.5 billion, or $1 billion).
3. The Federal government spends $1.1 billion on investments that have the primary goal of targeting groups that are underrepresented in STEM. In addition, nearly every other STEM education investment has this as a secondary goal.
4. Twenty-four investments, with a total budget of $312 million, have the primary goal of improving teacher effectiveness, with most of that funding going to teacher professional development. Improving teacher effectiveness is a secondary goal of an additional 101 investments. Together,

improving teacher effectiveness is a primary or secondary objective of 49 percent (125 of 252) of all Federal STEM education investments.

5. Of the broader STEM education investments, 86 percent (119 of 139) have been evaluated since 2005 to identify how they can be improved, to test their impact, or both. Summative evaluations (evaluations of impact) have been conducted on 59 of those investments. Thirty-three of the summative evaluations were either randomized control trials (8 evaluations) or pre-post designs with matched comparison groups (25 evaluations)—evaluation designs that can illustrate causality. The other 26 summative evaluations used other designs. Agency mission-specific workforce education investments have been less thoroughly evaluated; only 40 percent (46 of 113) of these investments have been subject to any kind of outcome data collection.

Introduction

It has long been apparent that multiple agencies in the Federal government carry out many different activities in science, technology, engineering, and mathematics (STEM) education. With this realization have come questions: how many individual programs are there, how are they similar to or different from one another, how much money is being spent, and what is the money being spent on? Although there have been several previous attempts to answer these questions, none has proven fully satisfactory.

Goals and Purpose

The America COMPETES Reauthorization Act of 2010[3] called for the creation of a National Science and Technology Council (NSTC) Committee to inventory Federal STEM education programs and a five-year STEM education strategic plan. The NSTC Committee on STEM Education (CoSTEM) was created on February 1, 2011, to carry out these tasks. It includes representatives from 11 Federal agencies, as well as the Office of Science and Technology Policy (OSTP) and the Office of Management and Budget (OMB) (see membership list on page ii). CoSTEM is tasked with coordinating an inventory data call and producing an associated report on an annual basis. This report is the inaugural annual report of the inventory of Federal investments in STEM education.

The overarching goals of this first CoSTEM inventory are to

1. accurately characterize Federal STEM education programs;
2. identify areas of potential synergy across and within agencies;
3. identify duplication, overlap, and fragmentation across programs;
4. support the development of a Federal five-year strategic STEM education plan;
5. support sharing of effective STEM education program strategies and evaluation techniques across the Federal agencies; and
6. increase awareness of STEM education programs within and across Federal agencies.

Process

The NSTC Fast-Track Action Committee on Federal Investment in STEM Education (FI-STEM) was chartered by the CoSTEM to develop and administer the inventory survey and prepare this report, with oversight by the CoSTEM. The FI-STEM included members from the 11 Federal agencies represented on the CoSTEM, and from OSTP. The FI-STEM met eight times between March 24, 2011, and August 30, 2011 to discuss the structure and definitions to be used for the inventory survey, set criteria for what to include in the inventory, pilot the online data entry site, and draft this report.

Early in the inventory process the FI-STEM identified promising practices and pitfalls by reviewing the previous inventory efforts of the OMB, the Government Accountability Office (GAO), individual agencies,

3. Pub. L. No. 111-358 (http://www.gpo.gov/fdsys/pkg/PLAW-111publ358/pdf/PLAW-111publ358.pdf).

and non-governmental organizations. One of the most important lessons from previous inventories is that agencies have different definitions of "programs," "projects," and "activities." These differences led to an inconsistent unit of analysis across agencies. In addition, previous inventories collected information on a limited and incomplete number of program characteristics. This made it difficult to distinguish unique and critical aspects of the programs. To address these issues, the FI-STEM developed a consistent set of definitions, a common unit of analysis (an "investment"), and an extensive survey containing questions on many different characteristics. A comparison of the American Competitiveness Council (ACC) inventory of 2007 and the current NSTC inventory processes and results is summarized in Table 1.

The FI-STEM also took into account that the GAO was simultaneously developing a similar inventory of Federal STEM education efforts. The FI-STEM and GAO attempted to make their inventories similar to minimize the time demands on agencies. This resulted in similar criteria for inclusion and many similar questions in the inventories. However, the surveys and units of analysis are not identical because of the differences in the goals and requirements of the NSTC and GAO inventories. The GAO inventory report is scheduled to be released early in 2012.

The final CoSTEM inventory survey was developed through an iterative process by FI-STEM members who, in consultation with other staff of their agencies, discussed and revised criteria for inclusion, definitions of key terms, and specific survey items. Once finalized, the inventory survey was uploaded to a secure data entry site (hosted by NIH) and thoroughly tested. Each agency developed its own process for identifying the appropriate staff to complete the online survey and review its inventory entries for accuracy. These steps occurred from March 24, 2011 to May 20, 2011.

Nearly all the information was entered into the online system between May 24, 2011 and June 10, 2011, with the remainder was submitted by early August 2011. To verify the quality of the information provided, OSTP staff met with staff from each agency to review each inventory entry. This resulted in edits to about 20 percent of the entries to correct for errors, which were primarily due to misinterpretations of survey items. At the conclusion of the data approval process, the inventory results were made accessible to all Federal agencies that submitted information.

While each agency has reviewed and provided a preliminary confirmation of the funding levels for its STEM education investments, this information is undergoing final review by agency budget offices. All budget numbers should be interpreted as preliminary and subject to change.

The FI-STEM is exploring a mechanism to provide other individuals and/or groups (e.g., local education agencies, Federal STEM education grantees, non-government education organizations, and the general public) access to the inventory data while maintaining the necessary security and privacy. OSTP staff analyzed the data with assistance from the Science and Technology Policy Institute.

Table 1: Comparison of ACC and NSTC Inventory Process and Results

Topic	ACC STEM Inventory	NSTC Committee on STEM Education Inventory
Unit of Analysis	Collected information on "programs," the definition of which was interpreted differently by each agency. Some agencies reported a few large programs that actually encompassed many smaller units, while others listed all the smaller units separately.	Used a common unit of analysis defined within and across all agencies. The unit of analysis led to STEM education being inventoried at a finer level of granularity within some agencies. As an example NASA is now reporting 62 investments instead of 4 programs, and HHS is reporting 36 investments instead of 5 programs.
Definition of STEM Education	Agencies used different criteria for what to list as a "STEM education program." Some agencies listed only programs primarily concerned with STEM education while others included all education or research programs that had some STEM education part, however small.	Used a detailed, consistent definition that captures only those investments whose primary goals are STEM education. This definition means that post-doctoral fellowship investments, broader education investments not focused on STEM, and faculty or university research investments that include some support for undergraduate or graduate student research were not included in the NSTC inventory. This leads to differences between what is included in the ACC and NSTC inventories.
Program Details	Collected only general information on program goals, budget, range of objectives, and target audience. Many "programs" were thus listed as all-encompassing, without any distinctions among them.	Collected detailed information on investments (e.g. primary objective, secondary objectives, services provided, products developed, geographical region served, number and level of people/organizations served, investment duration, investment focus [research or capacity-building or implementation], focal STEM discipline, organization/individual funded to do the implementation, partnering organizations, values of the outputs and outcomes, and type of evaluations conducted)
Total number of programs/ investments	110	252
Total funding	$3.6 billion	$3.4 billion

Criteria for Inclusion

The inventory collected basic information on all federally funded activities in FY2010 that met the criteria for STEM education in Box 1.1. The basic information collected on all investments included the budget, the agency, the investment name, the funding mechanism (e.g., earmark, American Recovery and Reinvestment Act [ARRA]), whether it was evaluated, and whether it targeted groups underrepresented

in STEM. Detailed information was collected on investments that could be part of a strategic coordination process (i.e., current and consistent funding dedicated to STEM education at or above $300,000 annually[4]).

Detailed information was not collected for one-time, ad hoc, or inconsistently funded investments such as earmarks or end-of-year residual budget funds, because these funding streams either tightly dictate how agencies can spend the money or are not consistently renewed across funding cycles. The detailed analysis provided in later sections is for investments that met the criteria for collecting detailed information.

The definitions, unit of analysis, and criteria used set clear bounds on what was included in this inventory (Box 1.1). There are other types of activities carried out by agencies that may contribute to STEM education and have been included to varying degrees in previous inventories, but fall beyond the bounds of this inventory. These include:

- Investments that fund STEM research and can support undergraduate or graduate students who assist in carrying out this research, if the primary goal and measure of success is the scientific research that is produced.
- Investments that support general education and may include STEM as one of many education topics (including more than two non-STEM areas) that could be supported (e.g. Pell Grants or Title I grants).
- Volunteer activities by agency staff, such as classroom visits or judging STEM competitions that do not involve spending Federal STEM investment dollars.
- Investments to promote awareness of agency STEM education investments.
- Post-doctoral research awards or fellowships.[5]

The 11 agencies on the CoSTEM, the Nuclear Regulatory Commission, and the Department of Homeland Security all had STEM education investments that met the criteria for inclusion in the inventory. Discussions between OSTP staff and other agencies that were cited in previous reports as supporting STEM education—including the Department of Labor, the Smithsonian Institution, and the Institute of Museum and Library Sciences—revealed that their investments in STEM education did not meet the criteria for inclusion in the CoSTEM inventory. For example, the Smithsonian Institution has a large number of education activities, many of which cover STEM topics. However, it is not officially an executive agency, and its STEM education activities are funded by trust fund dollars, not federal appropriations.

4. The decision to only collect detailed information on investments with FY 2010 budget at or above $300,000 was based on the judgment of the FI-STEM. The group's belief was that the level of funding needed for an investment to have adequate capacity to be included in the strategic coordination process. In addition, the ACC inventory only included one program with a budget less than $300,000. The decision to not collect budget numbers for FY 2011 was based on the fact that many agencies did not have detailed budget numbers available for FY 2011 at the time the inventory data were collected.

5. The FI-STEM determined that the funding and success of these investments are primarily intended to support science research. Education is not the primary goal of these investments; rather education is a tangential activity that occurs to support the research objectives. Categorizing funding for these investments as STEM education would be misleading. However, a review of the quality of education supported by such investments may be warranted because so many STEM postsecondary students are supported by this type of investment.

Box 1.1: Criteria and Definitions

STEM: For the purposes of this inventory, STEM includes physical and natural sciences, technology, engineering, and mathematics disciplines, topics, or issues (including environmental science education or environmental stewardship). We recognize that various different and usually broader definitions are used for "STEM." This relatively narrow definition has been chosen to constrain the focus of the inventory to specific areas that have similar educational contexts, issues, and challenges, in order to maximize the inventory's usefulness in characterizing and improving the effectiveness of the Federal spending intended to address this particular set of educational contexts, issues, and challenges.

Investment (the unit of analysis in the detailed survey): A funded STEM education activity that has a dedicated budget of more than $300,000 in FY 2010 and staff to manage the budget. This budget may be part of a budget for a larger program. Activities that are one-time or irregular expenditure of overhead funds are excluded.

STEM Education: Formal or informal6 (in school or out) education that is primarily focused on physical and natural sciences, technology, engineering, and mathematics disciplines, topics, or issues (including environmental science education or environmental stewardship). All the investments included in this STEM education inventory have one of the following as a **primary objective**:

- **Learning:** Develop STEM skills, practices, or knowledge of students or the public.
- **Engagement:** Increase learners' interest in STEM, their perception of its value to their lives, and/or their ability to participate in STEM.
- **Pre- and In-Service Educator/Education Leader Performance:** Train or retain STEM educators (K-12 pre-service or in-service, postsecondary, and informal) and education leaders to improve their content knowledge and pedagogical skills.
- **Postsecondary STEM Degrees:** Increase the number of students who enroll in STEM majors, complete STEM credentials or degree programs, or are prepared to enter STEM careers or advanced education.
- **STEM Careers:** Prepare people to enter into the STEM workforce with training or certification (where STEM discipline specific knowledge and skill are the primary focus of the education investment).
- **STEM System Reform:** Improve STEM education through a focus on education system reform.
- **Institutional Capacity:** Support advancement and development of STEM personnel, programs, and infrastructure in educational institutions such as universities, informal education institutions, state education agencies, and local education agencies.
- **Education Research and Development:** Develop evidence-based STEM education models and practices.

For the purposes of this inventory, activities that have the following **primary objectives** are **not** considered to be a STEM education investment:

- Providing post-doctoral research fellowships/scholarships.
- Focusing on subjects other than STEM subjects or including STEM subjects as one of many possible focal subjects (more than two other non-STEM areas).
- Focusing on broad education system reform that encompasses far more than STEM education.
- Supporting one-time or ad hoc STEM education investments.
- Engaging in volunteer activities by Federal employees (e.g. judging STEM competitions, visiting classrooms).
- Providing outreach for education (raising awareness of education programs) or communication about an agency and its activities.
- Distributing STEM education products that are no longer part of a funded education investment.
- Supporting knowledge, interest, or skills not specific to STEM disciplines.

6. See Appendix E: Glossary for definition.

The criteria and definitions for this inventory led to two key differences between this and the ACC inventory report. First, unlike the ACC inventory, this inventory does not include information regarding post-doctoral awards or fellowship investments. Second, the different unit of analysis provided a finer breakdown of the investments, resulting in a greater number of distinct items being listed and characterized. For example, whereas in the ACC report NASA reported 4 STEM programs; in this inventory NASA reported the component pieces of those 4 STEM programs and the STEM investments in the NASA mission directorates—62 investments in total. The involvement of agency staff in defining the unit of analysis, identifying STEM investments in their agency, and ensuring the unit of analysis was consistently applied by those completing the inventory survey made it possible to collect information at the same level of granularity across and within the agencies.

The difference in the number of investments in this inventory (252) and the number of programs in the ACC inventory (110) is not solely due to the granularity at which agencies reported their efforts. Some agencies (e.g., NIH and DOD) reported a great number of investments in this inventory because this inventory process allowed a more thorough examination by the agencies of their investments, and because some now have more mature systems to track their education investments within the various branches of their agencies. Also as previously noted, a number of the programs listed in the ACC inventory, such as postdoctoral research fellowships, did not meet the criteria for inclusion in this inventory.

Survey Structure

The inventory classifies Federal agency STEM education investments into two broad categories:

1. **Agency mission-specific workforce education investments** are designed to develop or train the STEM workforce of the agency or the STEM workforce in fields directly related to the agency's mission (e.g., aerospace engineering, national security science, nuclear regulatory science). These typically include graduate scholarships, undergraduate internships, or institutional capacity-building in fields or degrees tightly aligned to an agency's mission.
2. **"Broader" STEM education investments** support formal and informal STEM education investments, STEM education research, and STEM education capacity-building to improve interest in and understanding of STEM concepts and enhance the broader national STEM workforce.

This is a natural division, since investments in the first category are agency specific, and they have minimal overlap and duplication by design. In this set of investments there is limited value to cross-agency strategic planning.

The inventory survey included five sections:

- **Section 1:** background information (i.e., name, agency, primary staff contact info).
- **Section 2:** descriptive information on broader STEM investment (i.e. objectives, audiences, number served).
- **Section 3:** funding information on broader STEM investments (FY 2008- FY 2011[7]).

7. FY 2011 budget request information was collected because the enacted FY 2011 budget information was not available at the time of the data collection. Enacted FY 2011 budget information was not available due to the timing of the final FY 2011 appropriation. In addition, many of the STEM education investments are not allocated as line-item budget entries. In these cases the budget for the education investments is set through agency processes that occur after Congress enacts an appropriation.

- **Section 4:** evaluation information on broader STEM investments.
- **Section 5:** information on agency mission-specific workforce education investments (the inventory survey is included in Appendix D).

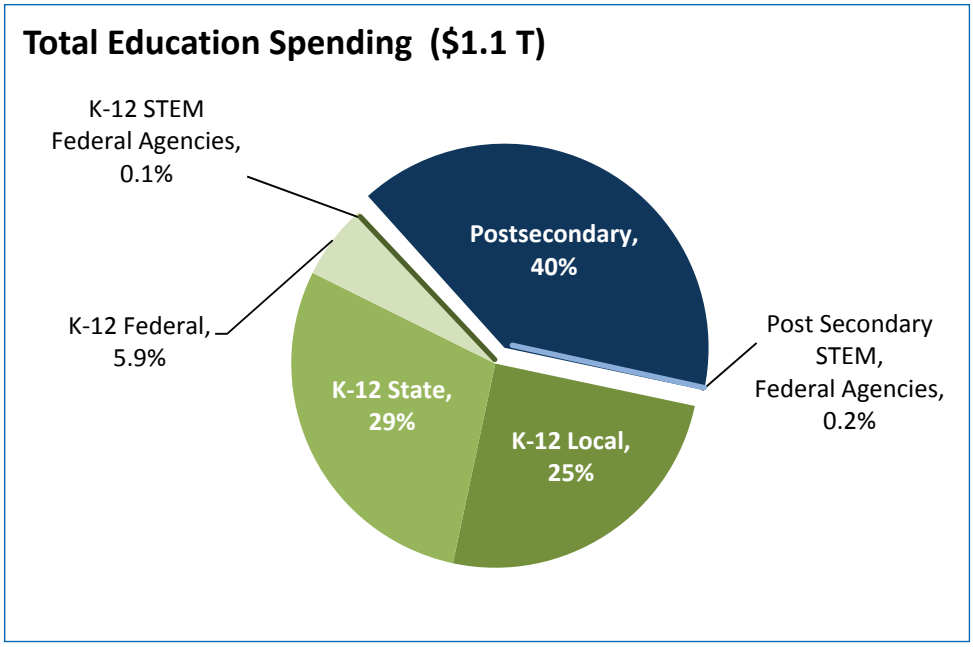
All items on the survey were developed to clearly characterize the individual investments while minimizing the amount of time and effort needed by agency staff to complete the survey. Fewer questions were asked about agency mission-specific workforce investments because many of the questions related to the broader STEM education investment were not relevant. In addition, there was less concern regarding overlap, redundancy, and fragmentation of agency mission-specific workforce education investments, because these investments focus on the specific STEM fields that are needed for agencies to carry out their respective missions, which are inherently distinct.

Results

Federal Agencies' Piece of the 'Education Pie'

The investments by the Federal government in STEM education are a small sliver of the total education funding pie (Figure 1).[8] The FI-STEM group identified over $3.4 billion in STEM education investments by Federal agencies for FY 2010. To put this number in perspective, about $1.1 trillion was spent in the United States on formal education (K-12 and postsecondary) during the school year ending in 2010.[9] This was 7.9 percent of the United States gross domestic product for that year. Approximately 60 percent ($650 billion) of this educational spending went to K-12 education, while the remainder supported postsecondary education. Of the $650 billion for K-12 education, $57 billion comes from the Federal government.

Figure 1: Total Education Spending in the United States



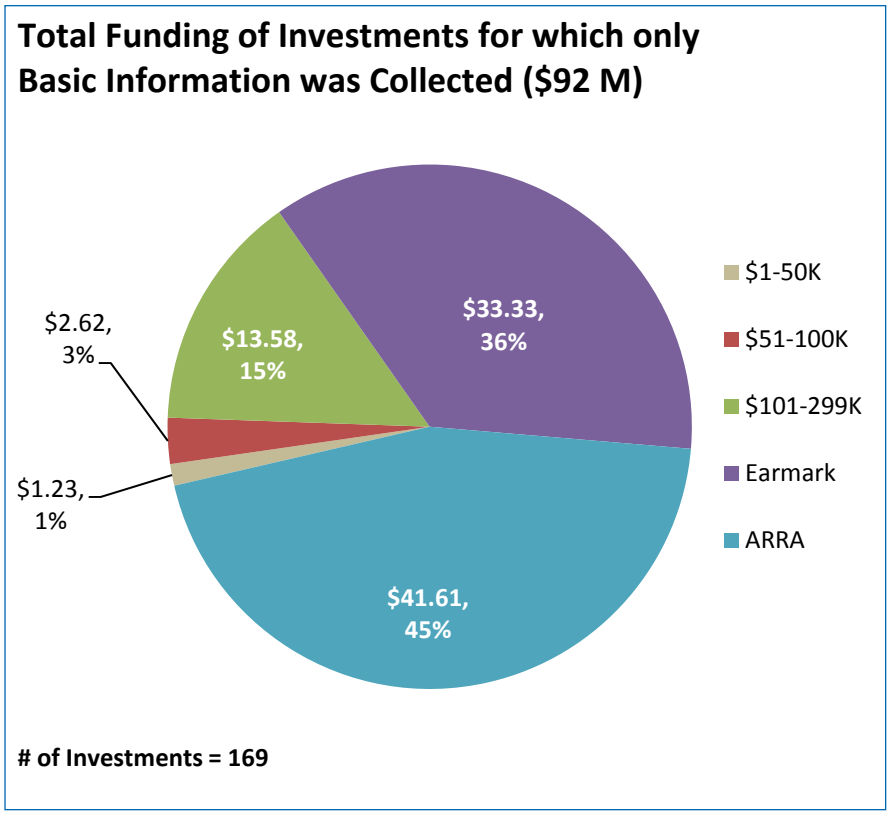
8. All percentages shown in charts are representative of the percentage total number of funding or investments represented in that particular chart.

9. The $1.1 trillion figure comes from the Department of Education's Digest of Education Statistics Table 29. This includes expenditures of all educational institutions in 2009 dollars. U.S. Department of Education (2010). http://nces.ed.gov/programs/digest/d10/tables/dt10_028.asp.

Total Federal STEM Education Investment

Of the 421 STEM investments—totaling $3.53 billion—reported during the inventory process, 252 investments—totaling $3.44 billion—met the inventory survey criteria for full characterization. The remaining 169 investments—totaling $92 million—were funded through earmarks, ARRA, or with a budget under $300,000 and thus did not meet the criteria. Approximately 80 percent ($75 million) of the $92 million from the investments that did not meet the criteria for inclusion in the survey were funded through earmarks or ARRA (Figure 2).

Figure 2: Distribution of the Investments for which only Basic Information was Collected according to Type of Funding and by Investment Size

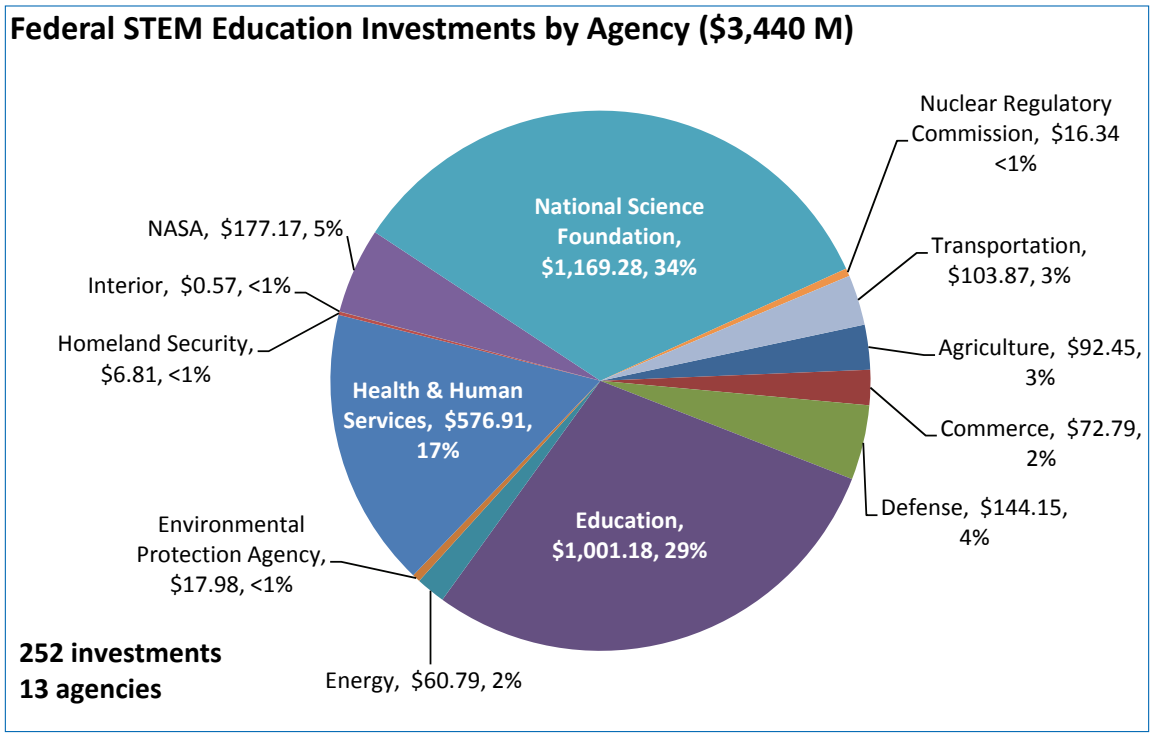


The remainder of the report focuses on the 252 STEM education investments that are each over $300,000 and were not funded by earmarks or ARRA. A list of the 252 investments is provided in Appendix A. Agency specific breakouts of these 252 STEM education investments with regard to education, primary objective, and targeting of underrepresented groups are provided in Appendix B.

Overview of STEM Education Investments[10]

As shown in Figure 3, the majority (80%) of STEM education funding among Federal agencies comes from the National Science Foundation (NSF; 34%), the Department of Education (DOEd; 29%), and the Department of Health and Human Services[11] (HHS; 17%). No other agency accounts for more than 5 percent of the total funding.

Figure 3: Federal STEM Education Investments by Agency



Three agencies dedicate at least 10 percent of their agency-wide research and development funding to STEM education investments (Table 2). NSF has the greatest proportion of their research and development (R&D) budget dedicated to STEM education—it is a science research agency whose organic act includes education. However, it is interesting to note the large proportion of the Department of Transportation and Nuclear Regulation Commission R&D budgets that target STEM education. Likewise, it is notable how small a percentage of the Department of Education's total budget is dedicated to investments that primarily focus on STEM.

10. While each agency has reviewed and provided a preliminary confirmation of the funding levels for its STEM education investments, this information is undergoing final review by agency budget offices. All budget numbers should be interpreted as preliminary and subject to change.

11. The HHS STEM funding comes primarily from its National Institutes of Health (NIH).

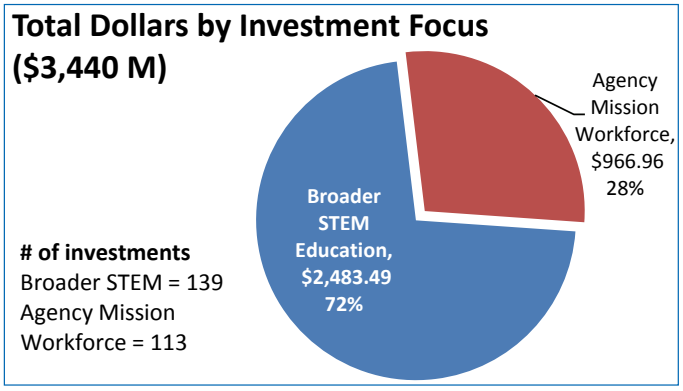
Table 2: Investments as a Percent of R&D by Agency

	Investment $ (in millions)	% of Agency R&D Budget[12] *(except for DOEd)*	# of Invest.
USDA	$ 92.45	3.5%	17
DOC	$ 72.79	5.4%	19
DOD	$ 144.15	0.2%	16
DOEd	$ 1,001.18	*1.0%* [13]	15
DOE	$ 60.79	0.6%	25
EPA	$ 17.98	2.8%	8
HHS	$ 576.91	1.8%	36
DHS	$ 6.81	0.8%	4
DOI	$ 0.57	0.1%	1
NASA	$ 177.17	1.9%	62
NSF	$ 1,169.28	21.5%	40
NRC	$ 16.34	20.2%	4
DOT	$ 103.87	9.7%	5
TOTAL	**$3,440.29**		**252**

Investment Focus

One-hundred and thirteen of the investments are for agency mission-specific workforce education, but these 113 investments only account for 28 percent of the funding (Figure 4), with the remainder of the investments and funding targeted to broader STEM education. The NSF and DOEd provide the majority of funding for broader STEM education investments (87%; Figure 5). HHS provides the majority of funding for Agency mission-specific workforce investments (56%), and the Department of Defense (DOD) and the Department of Transportation (DOT) are the only other agencies that contribute at least 10 percent to the Federal funding of this type of investment (Figure 6).

Figure 4: Total Dollars by Investment Focus



12. Office of Management and Budget, *Budget of the U.S. Government FY 2012*, Historical Tables and Analytical Perspectives.

13. Percentage derived from the total Department of Education budget, not the agency's R&D budget.

Figure 5: Funding for Broader STEM Education by Agency

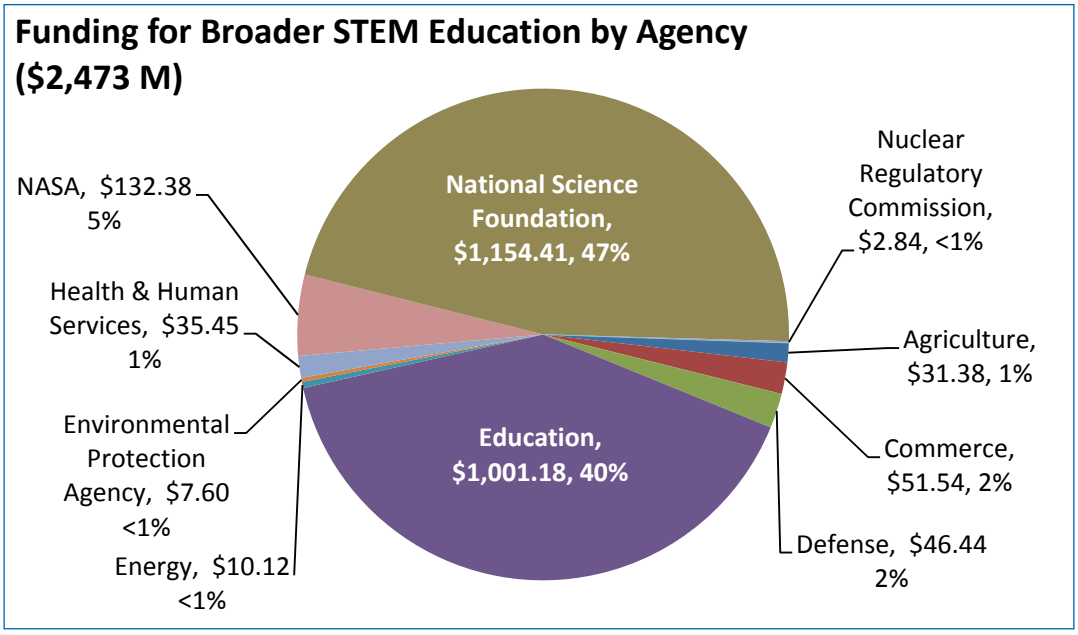
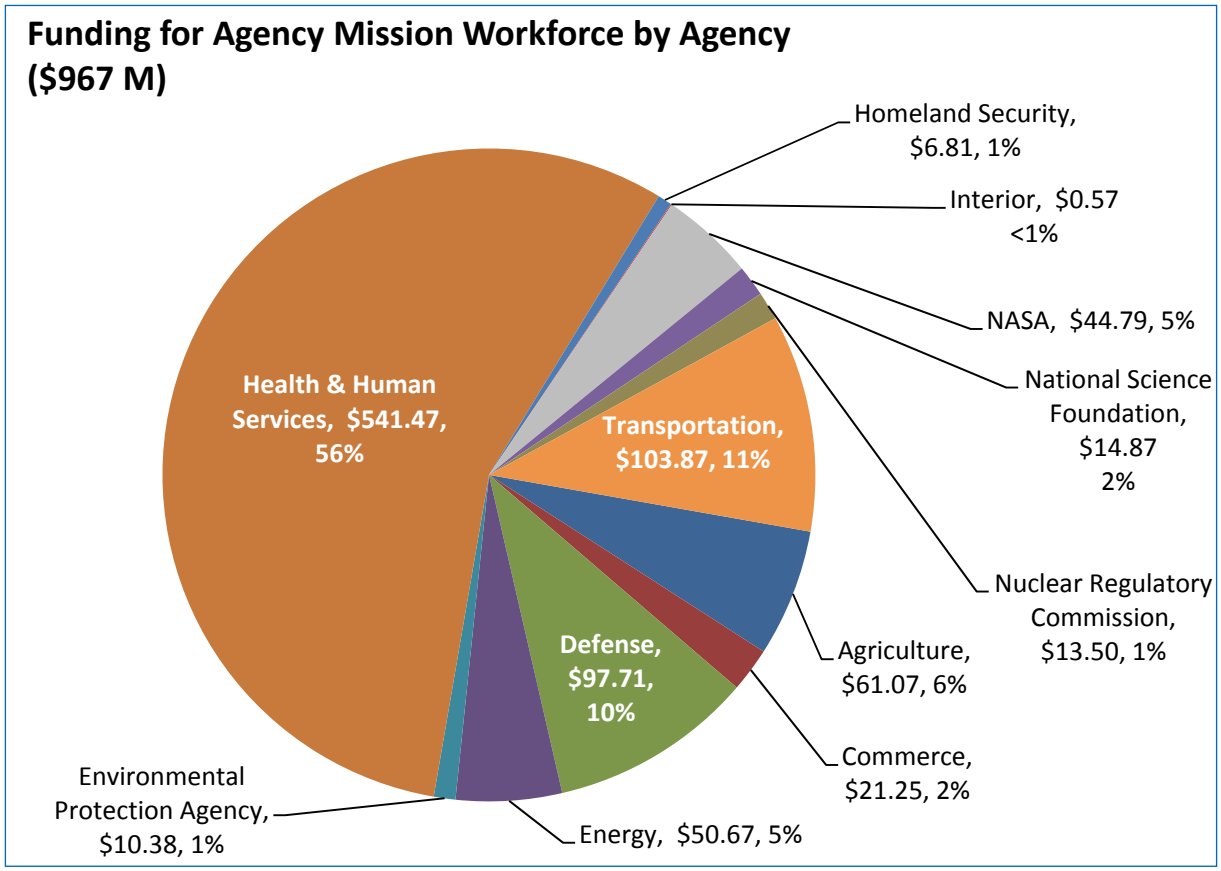


Figure 6: Funding for Agency Mission-Specific Workforce Education by Agency



Primary Objectives

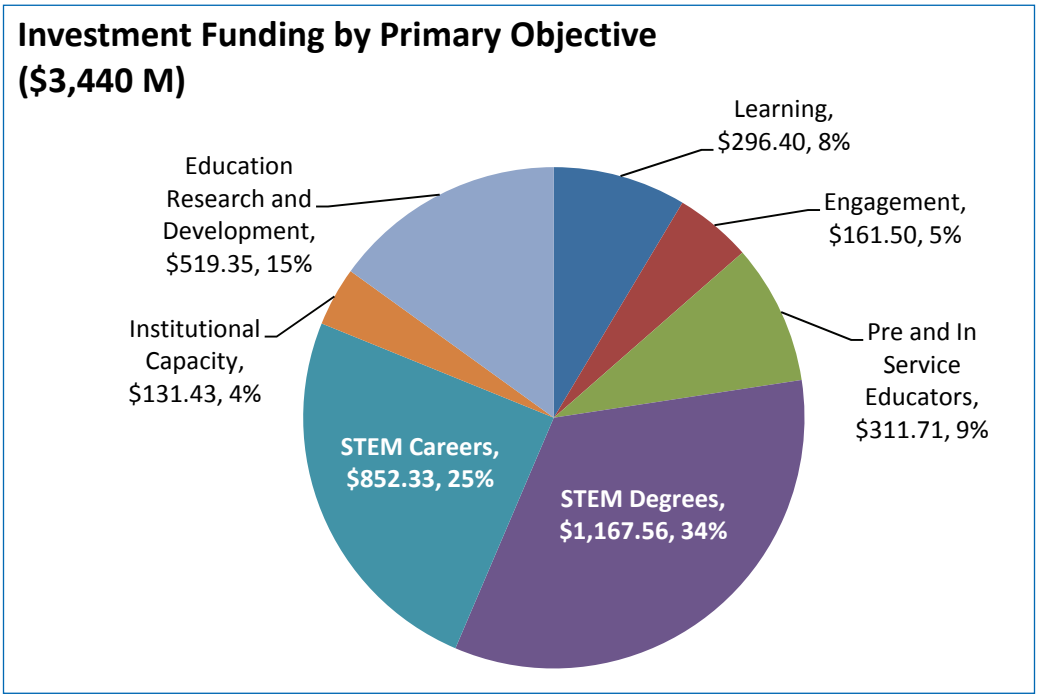
The survey required agencies to identify a single primary objective for each investment[14] and allowed agencies to identify multiple secondary objectives for each investment. There were eight predefined objectives and agencies were permitted to select "other" as a secondary objective. The eight objectives were:

- **Learning:** Develop STEM skills, practices, or knowledge of students or the public.
- **Engagement:** Increase learners' interest in STEM, perception of its value to their lives, and/or their ability to participate in STEM.
- **Pre- and In-Service Educator/Education-Leader Performance:** Train or retain STEM educators (K-12 pre-service or in-service, postsecondary, and informal) and education leaders to improve their content knowledge and pedagogical skills.
- **Postsecondary STEM Degrees:** Increase the number of students who enroll in STEM majors, complete STEM credentials or degree programs, or are prepared to enter STEM careers or advanced education.
- **STEM Careers:** Prepare people to enter STEM workforce with training or certification (where STEM discipline specific knowledge and skills are the primary focus of the education investment; STEM educator training and development investments should select the Pre-and In-Service Educator/Education Leader Performance objective listed above).
- **Institutional Capacity:** Support advancement and development of STEM personnel, programs, and infrastructure in educational institutions such as universities, informal education institutions, state education agencies, and local education agencies.
- **STEM System Reform:** Improve STEM education through a focus on education system reform.
- **Education Research and Development:** Develop evidence-based STEM education models and practices.

Fifty-nine percent of the total Federal funding of STEM education was for investments with Postsecondary STEM Degrees or STEM Careers as the primary objective (Figure 7). The remaining 41 percent of the funding was spread across all other primary objectives (with the exception of STEM System Reform, which was not selected as a primary objective for any investment).

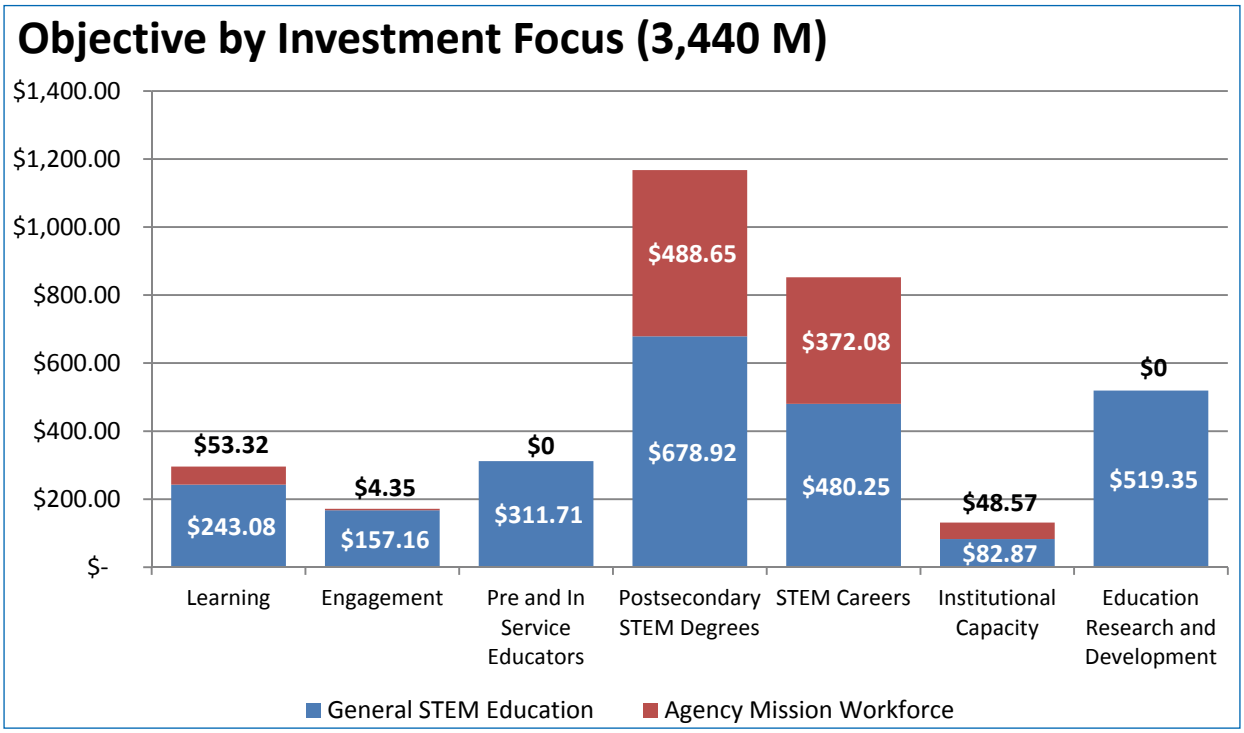
14. For the purposes of this inventory, a primary objective was defined as the primary desired outcome, or the basis for evaluating the education investment under ideal circumstances.

Figure 7: Investment Funding by Primary Objective



Nearly all agency mission-specific workforce education funding (89%) is dedicated to the primary objectives of Postsecondary STEM Degrees and STEM Careers, but this funding is slightly less than half of all funding for those two objectives (Figure 8).

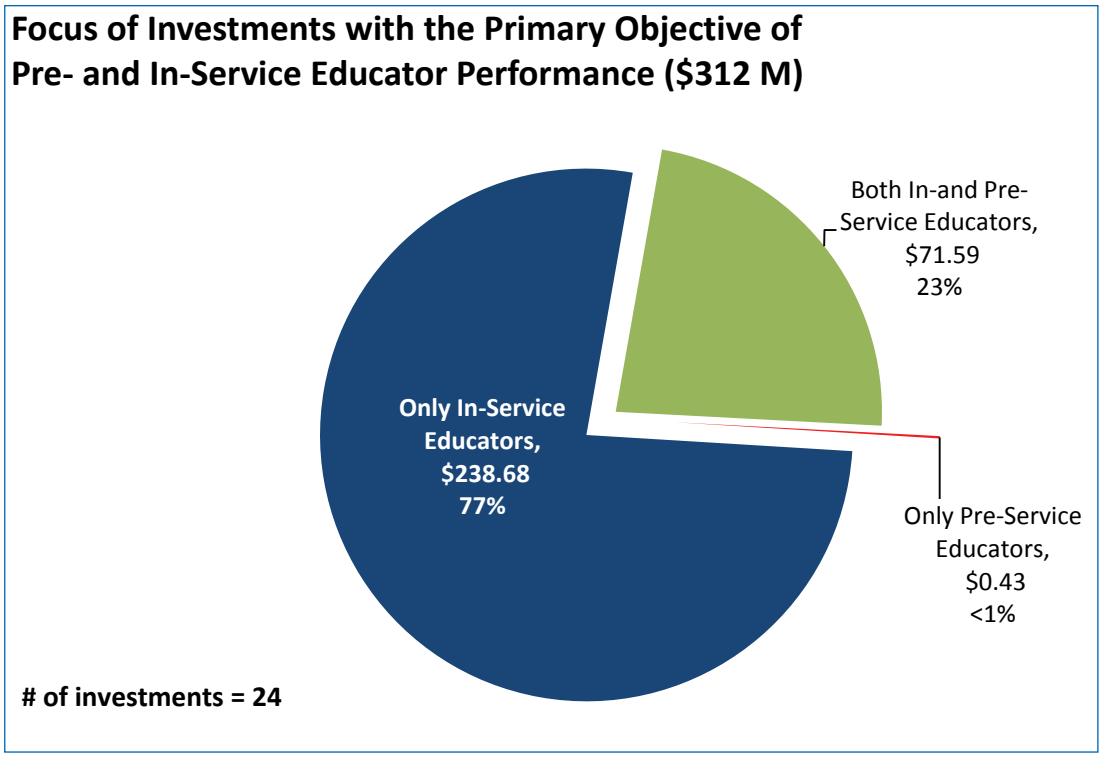
Figure 8: Primary Objective by Investment Focus



Educator Performance

Figure 9 shows how the 24 investments with the primary objective of Pre- and In-Service Educator Performance are distributed. The 12 investments that supported professional development (PD) for in-service educators accounted for 77 percent of the funding from these 24 investments, while the 11 investments that supported both teacher PD and pre-service educators accounted for nearly all of the remaining funding. Only one investment focused solely on professional development for pre-service educators. As discussed in the next section, another 101 investments have Pre- and In-Service Educator Performance as one of their secondary objectives. Thus, Pre- and In-Service Educator Support is a primary or secondary objective of 125 of all 252 (49%) Federal STEM education investments, and it is the primary objective of 24 of those.

Figure 9: Focus of Investments with the Primary Objective of Serving Pre- and In-Service Educator Performance



Secondary Objectives

At least two secondary objectives were identified for 187 investments (74%). Table 3 illustrates the percentage of secondary objectives that were selected across each of the primary objectives. The three most commonly selected secondary objectives were Learning (137), Pre- and In-Service Educator Support (101), and Engagement (81). Learning was selected as a secondary objective for at least 50 percent of all investments across all primary objectives. The most common combinations of primary and secondary objectives were Engagement and Learning (79%), Learning and Engagement (77%), Postsecondary STEM Degrees and STEM Careers (77%), STEM Careers and Postsecondary STEM Degrees (71%), Postsecondary STEM Degrees and Learning (72%), Pre- and In-Service Educator Support and Learning (71%), and Pre- and In-Service Educator Support and Engagement (71%).

Table 3: Primary Objectives by Secondary Objectives for Investments[15]

Primary Objective	Total	Secondary Objective: Institutional Capacity	Engagement	Learning	Pre- and In-Service Educator/ Education Leader Performance	Postsecondary STEM Degrees	Education Research and Development	STEM Careers	STEM System Reform	Other
Institutional Capacity	20		50%	55%	25%	55%	10%	20%	5%	25%
Engagement	42	21%		79%	62%	31%	14%	33%	7%	14%
Learning	48	42%	77%		56%	54%	29%	40%	19%	13%
Pre- and In-Service Educator/Education Leader Performance	24	38%	71%	71%		42%	17%	29%	8%	21%
Postsecondary STEM Degrees	71	46%	54%	72%	18%		15%	77%	8%	13%
Education Research and Development	12	42%	50%	50%	50%	17%		17%	25%	8%
STEM Careers	35	34%	43%	54%	11%	71%	9%		6%	11%
Total		14	81	137	101	26	48	36	48	23

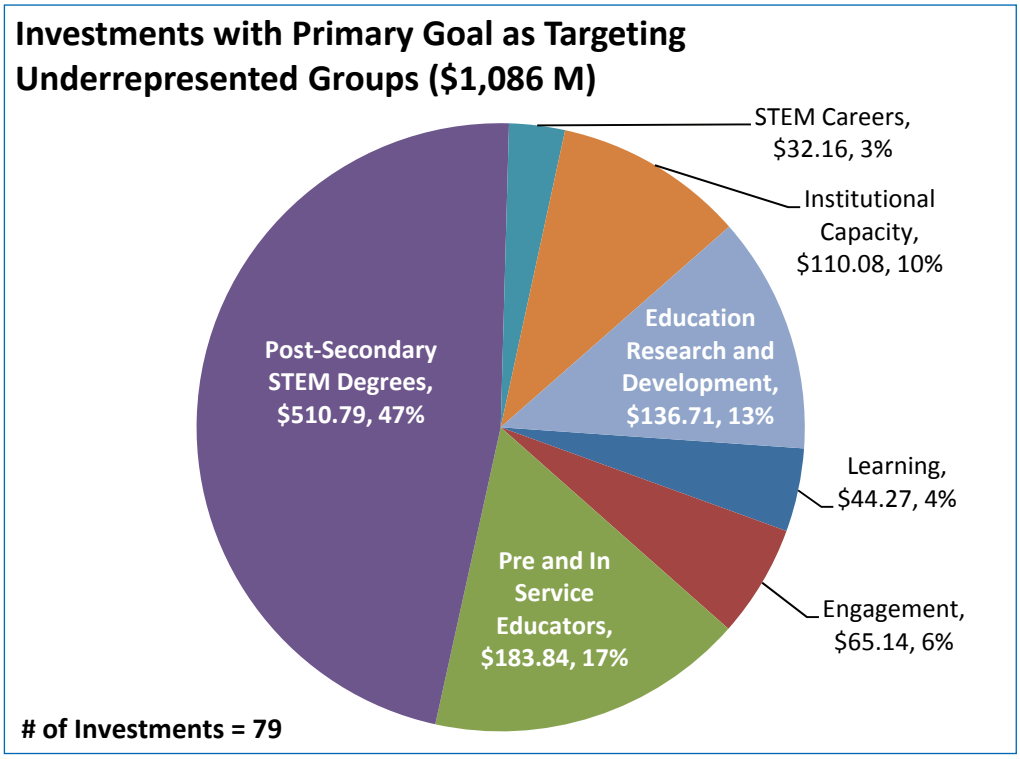
15. The percentages are the number of investments with a particular primary objective (vertical) that selected a particular secondary objective (horizontal). For example, the cell where the primary objective of "institutional capacity" intersects with the secondary objective of "engagement" indicates that 50 percent of the investments with "institutional capacity" as a primary objective have "engagement" as a secondary objective. "Warmer" colors correspond to higher percentages.

Serving Groups that are Underrepresented in STEM

Seventy-nine investments—which account for over a billion dollars per year and 31 percent of the funding for STEM education—have as their primary goal the targeting of groups that are underrepresented in STEM, while nearly every other investment also has this as a goal. Seventy-five percent of the investments that are primarily targeted to supporting groups that are underrepresented in STEM fields are focused on broader STEM education as opposed to agency mission-specific workforce education.

The largest concentration of funding for underrepresented groups (47%) is for investments that target postsecondary STEM degrees as their primary objective (Figure 10). The next largest concentrations of funding are for improving Pre- and In-Service Educator Support (17%) and Institutional Capacity (10%).

Figure 10: Distribution by Primary Objective of Investments Targeting Groups Underrepresented in STEM



Fifty-seven of the investments that have targeting groups that are underrepresented in STEM as their primary goal serve a broad range of underrepresented groups, including ethnic and racial minority groups, women and girls, the economically disadvantaged, persons with disabilities, and people from rural or urban communities (Table 4). Of the 22 investments that focused on a narrower set of underrepresented groups, the most funding was dedicated to investments that targeted the economically disadvantaged ($194 million), Hispanics or Latinos ($111 million), and Blacks or African Americans ($91 million).

Table 4: Investments Focusing on Groups Underrepresented in STEM by Target Group

	Investment $ (in millions)	# of Investments
Broad Range of Underrepresented Groups[16]	**$ 754.73**	**57**
Total Investments with a Specific Focus[17]	**$ 329.96**	**22**
Black or African American	$ 90.89	7
Hispanic or Latino	$ 111.47	3
Native Hawaiian/ Other Pacific Islander	$ 17.25	3
American Indian/ Native American	$ 18.00	3
Economically disadvantaged	$ 193.54	7
Women and Girls[18]	$ 13.28	3
Men and Boys	$ 15.00	1
Persons with Disabilities	$ 21.56	2
Rural	$ 14.21	4
Urban	$ 3.06	1
Total	**1085.99**	**79**

Thirty-three percent ($319 million) of the funding targeting underrepresented groups goes to supporting Minority Serving Institutions (MSI; Table 5). Thirty-six percent of the funding for MSIs can be awarded to any type of MSI. The remaining funding is targeted to specific types: Historically Black Colleges and Universities (HBCU), Hispanic Serving Institutions (HSI), Alaska Native Serving Institutions, Native Hawaiian Serving Institutions, and Tribal Colleges and Universities. The largest amount of funding is directed to HSIs ($112 million).

Table 5: Education Investments that Fund Minority Serving Institutions

	Investment $ (in millions)	# of Investments
All Types MSIs	**$ 126.55**	**18**
Specific MSI[19]	**$192.79**	**10**
HBCUs	$ 65.47	5
HSIs	$ 112.17	3
Alaska Native Serving	$ 16.41	2
Native Hawaiian Serving	$ 16.41	2
Tribal Colleges & Universities	$ 17.77	3
Total	$ 319.34	28

DOEd, NSF, and HHS account for 84 percent of the total funding of STEM education investments that have supporting groups that are underrepresented in STEM as their primary goal (Figure 11).

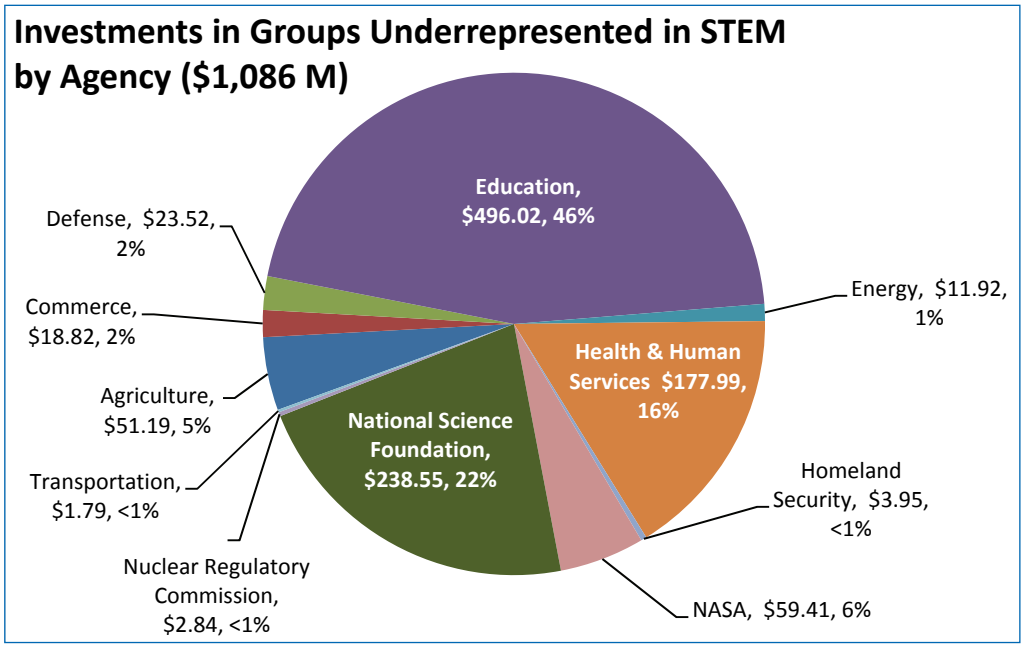
16. These are the investments that targeted any group traditionally underrepresented in STEM or more than two ethnic or racial groups traditionally underrepresented in STEM.

17. More than one specific underrepresented group of focus was selected for some investments.

18. There are 14 additional investments ($64.67 million) targeting a broad range of underrepresented groups that include women and girls as a potential audience.

19. More than one specific MSI of focus was selected for some investments.

Figure 11: Investments in Groups Underrepresented in STEM by Agency



A substantial fraction of five agencies' total funding for STEM education—DOEd (50%), NSF (20%), NRC (17%), NASA (17%), and DOD (14%)—supports investments targeting groups that are underrepresented in STEM.

Audiences Served

STEM education initiatives are designed for a many different audiences. In addition, investments often address the needs of multiple audiences. The inventory results indicate that the most frequently served audience are pre-K to grade 20 learners. Below is the frequency that each audience was selected and the amount of funding dedicated to those investments.

- Learners age Pre-K to Grade 20 (208 investments; $2,840 million).
- K-12 Classroom Teachers (94 investments; $1,199 million).
- K-12 Staff/Leaders/Administrators (25 investments, $453 million).
- Postsecondary Instructors (65 investments, $926 million).
- Postsecondary Dean/Leaders/Administrators (36 investments, $516 million).
- Education Researchers (16 investments, $324 million).
- Informal STEM Educators (58 investments, $425 million).
- Informal STEM Education Leaders/Program Developers (20 investments, $230 million).
- Adults (47 investments, $500 million).
- Other (42 investments, $534 million).

Subcategories were included so that the grade level of the learners, teachers, instructors, and staff/leaders/administrators could be identified with greater precision (i.e., pre-K, elementary school, middle school, high school, undergraduate, graduate, and post-graduate). In addition, the subcategories were included for the level of training of K-12 classroom educators (i.e., pre-service or in-service).

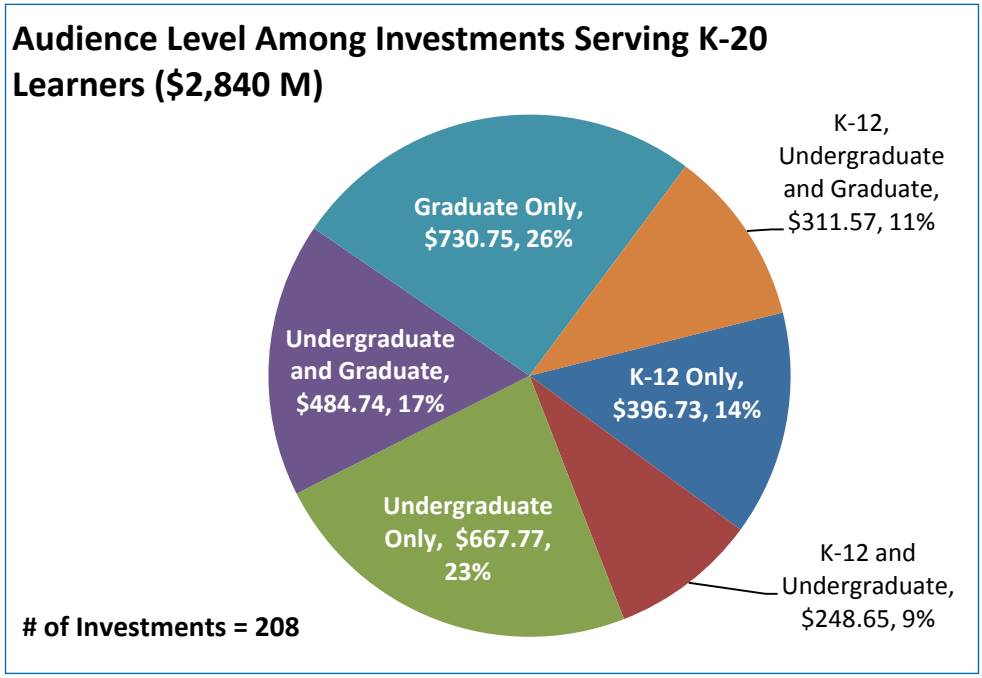
The majority of investments (64%) and funding (54%) served at least two primary categories of audience types. The broad scope of the audiences served by investments is even more apparent when accounting for the audience subcategories. Seventy-seven percent of investments accounting for 65 percent of STEM education funding have more than one subcategory of audience type. As seen in Table 6, the investments generally have a broad range of audiences regardless of their primary objectives. However, as would be expected, the audience of the majority of investments with the primary objective of Postsecondary STEM Degrees and STEM Careers is undergraduate and/or graduate school level learners.

Table 6: Funding Amount and Number of Investments within Audience Type by Objective

Goal / Audience		Learning	Engagement	Pre- and In-Service Educators	Postsecondary STEM Degrees	STEM Careers	Institutional Capacity	Education R&D
K-12 learners	$	$ 150.37	$ 139.86	$ 66.51	$ 168.63	$ 11.33	$ 11.33	$ 408.73
	N	31	35	9	7	3	2	6
Undergrad learners	$	$ 126.21	$ 63.63	$ 59.80	$ 649.74	$ 507.04	$ 73.93	$ 232.38
	N	23	19	5	52	19	9	4
Graduate learners	$	$ 124.18	$ 34.12	$ 55.70	$ 804.80	$ 381.60	$ 23.05	$ 103.60
	N	17	9	2	46	24	4	2
K-12 Teachers	$	$ 235.94	$ 102.41	$ 311.71	$ 133.70	$ 8.97	$ 7.70	$ 399.04
	N	29	26	24	6	1	2	6
University Faculty	$	$ 154.21	$ 27.58	$ 65.05	$ 383.15	$ 102.07	$ 76.26	$ 118.08
	N	17	8	7	16	4	9	4
Informal Educators	$	$ 181.00	$ 61.24	$ 7.93	$ 48.20	$ -	$ 14.30	$ 112.23
	N	22	17	10	3	-	3	3
Adults	$	$ 88.67	$ 32.69	$ 1.82	$ 251.49	$ -	$ 14.30	$ 111.52
	N	17	13	4	8	-	3	2

Among investments with K-20 aged learners as an audience, the majority of funding was for investments that at least partially supported postsecondary students (86%, Figure 12). Forty-two percent of the investments with postsecondary-aged students as an audience support both undergraduate and graduate students.

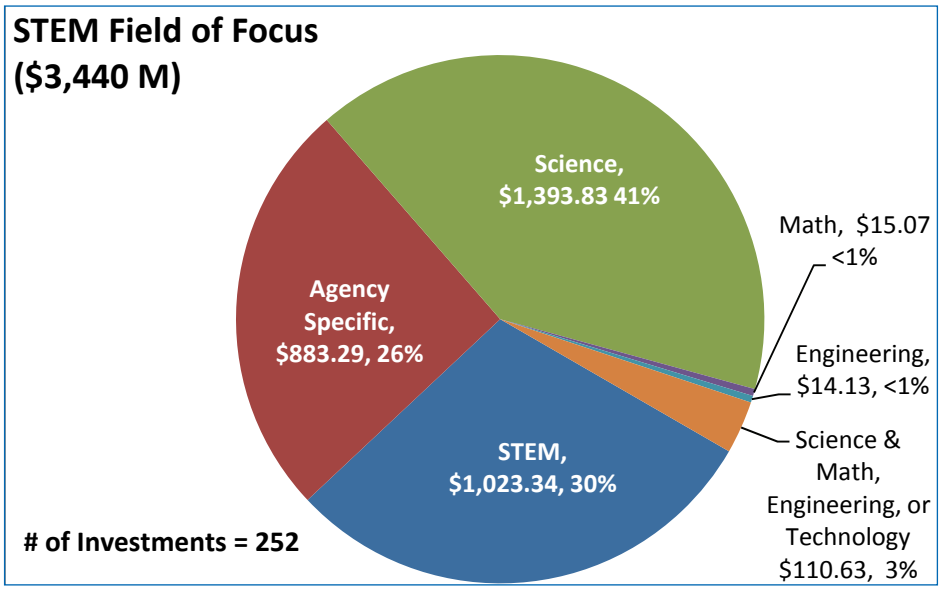
Figure 12: Audience Level Among Investments Serving K-20 Learners



STEM Fields

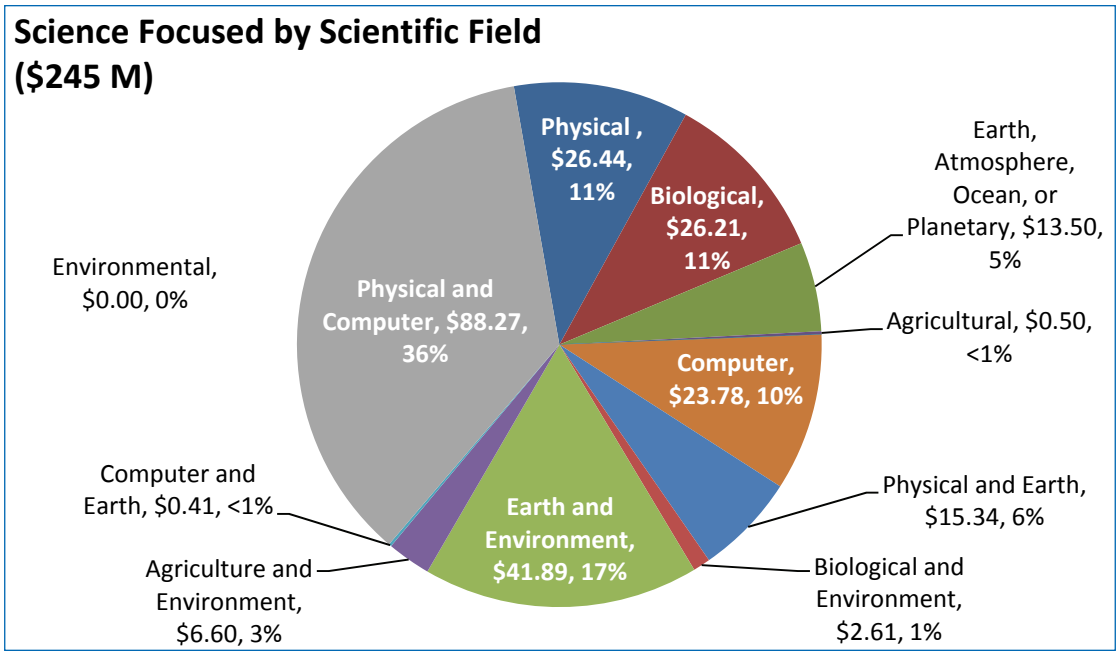
For the broader STEM education programs, the STEM field covered varied. Agency mission-specific workforce investments are each focused on specific fields related to the agency's mission. The broader STEM education investments tend to cover a range of fields (Figure 13), dominated by all fields of STEM (30%) or multiple fields of science (41%). Only one investment was focused solely on mathematics, and only two investments solely covered engineering. The small number of investments focused solely on mathematics is notable given its importance to success in all STEM fields.

Figure 13: STEM Field of Focus



Of the 49 investments that focused on one or two specific scientific fields, 53 percent of the funding was for physical science, either as a stand-alone field (11%), or a discipline taught along with computer or Earth sciences (Figure 14).

Figure 14: Science Focused Investments by Scientific Field



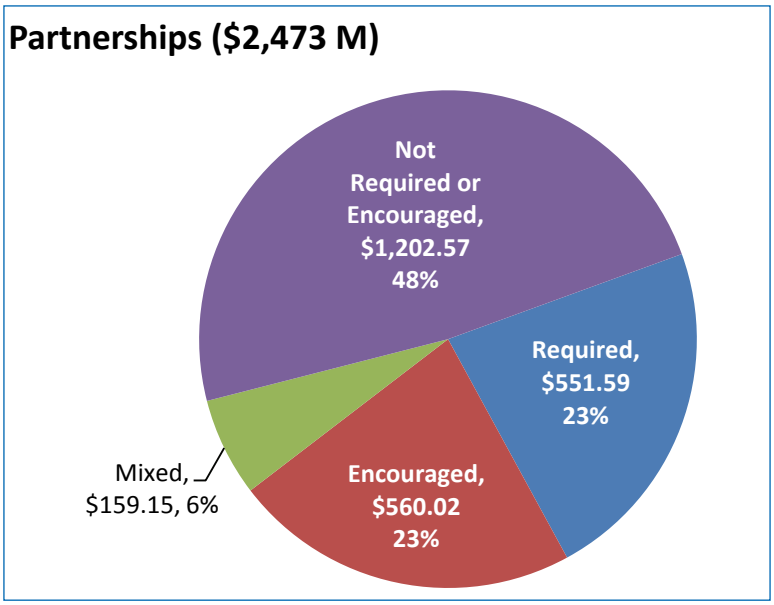
Geographic Region[20]

Only six investments ($24 million) target audiences in specific regions. The remaining broader STEM education funding supported investments that are available nationally.

Partnerships and Interagency Collaboration[21]

About half of the broader STEM education investments required and/or encouraged partnerships (Figure 15). Twenty-five of the investments—accounting for 15 percent of the funding for broader STEM investments—are jointly funded by two or more Federal agencies.

Figure 15: Partnerships[22] within the Investments



20. Geographic region information was only collected for broader STEM Education investments.

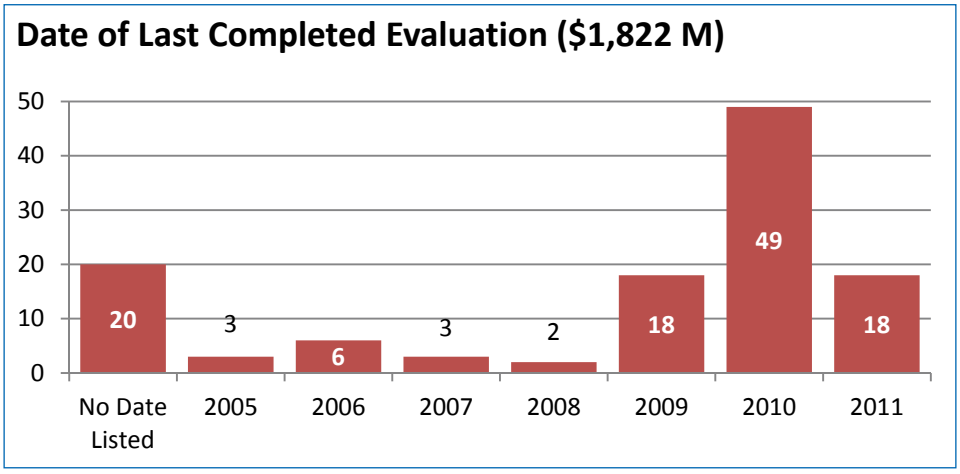
21. Partnership and Interagency Collaboration information was only collected for broader STEM Education investments.

22. The component parts of some investments had different requirements for partnerships. Within some investments partnerships were required by some component parts and encouraged by other component parts. These investments fell into the "mixed" partnership category.

Evaluation

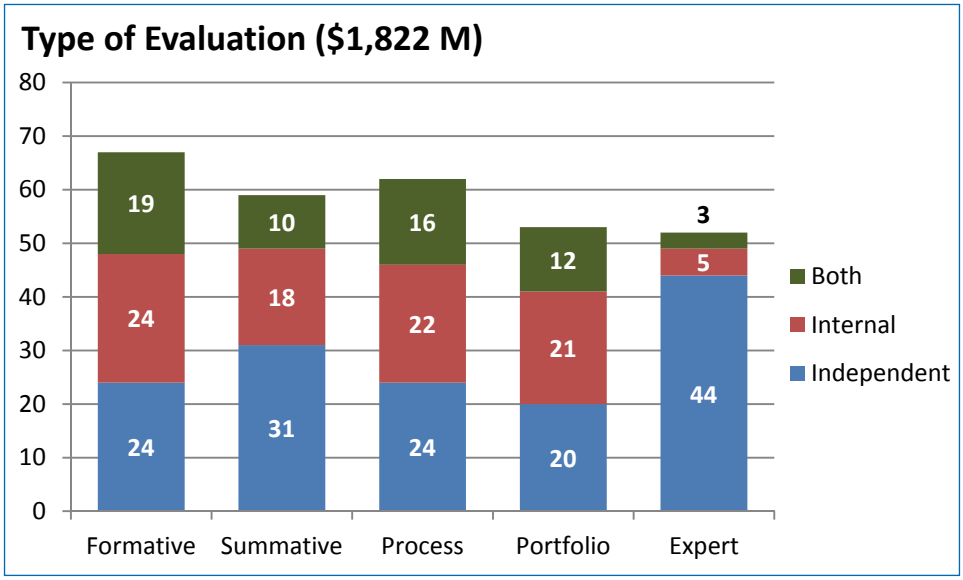
Agencies have conducted evaluations on 119 (86%) of the broader STEM investments since 2005, with 49 percent conducting evaluations in 2010 or 2011 (Figure 16). Forty-six (40%) of the agency mission-specific workforce education investments collect outcome data.

Figure 16: Date of Last Complete Evaluation



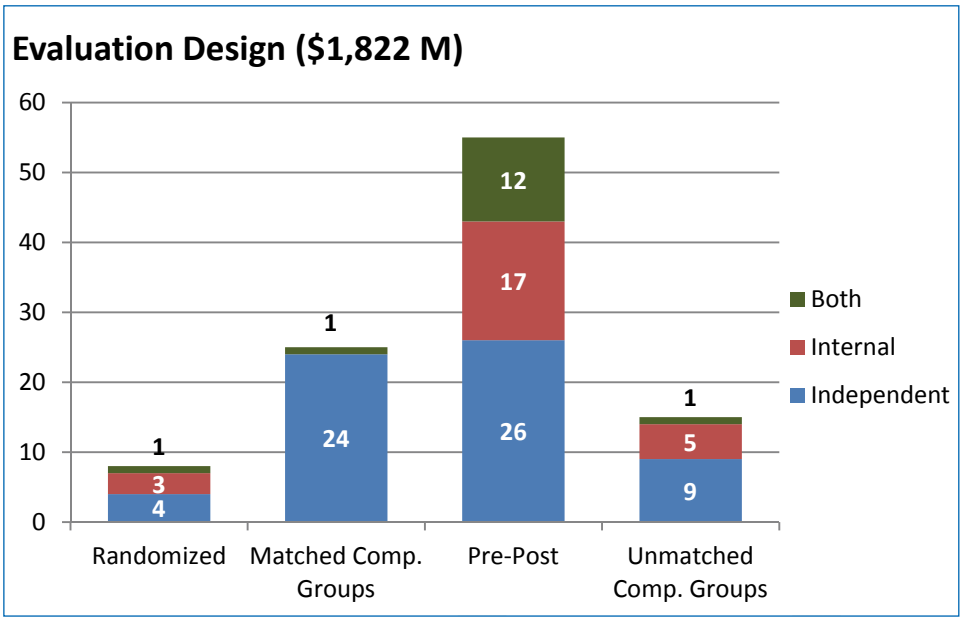
The investments utilized a wide range of evaluation types (Figure 17). The most common evaluation type was formative evaluations, which are systematic studies conducted regularly, or built into the activities, to assess whether a project, activity, or grantee is reaching stated goals in order to guide ongoing improvements. Of the broader STEM education investments, 42 percent (59 investments) have undergone summative assessments. Summative evaluations are systematic studies to determine the success or effectiveness of the investment.

Figure 17: Type of Evaluation



While a range of evaluation designs were used, the most commonly used design was a pre-post gain comparison design without matched comparison groups (46 evaluations) (Figure 18). The number of investments that used more rigorous evaluation designs, either a randomized control trial (8 investments) or pre-post gain comparison with matched comparison groups (25 investments), is more than three times the number reported in the ACC report (10 programs).

Figure 18: Evaluation Design



Duplication, Overlap, Fragmentation, and Gaps[23]

Congress specifically required that the NSTC inventory of STEM education include an analysis of duplication, overlap, and fragmentation of investments in STEM education, because of recent reports citing the need to address these issues across all Government programs. These reports cited duplication, overlap, and fragmentation as potential areas where the government could be streamlined to function more efficiently. The GAO 2011 report '*Opportunities to Reduce Potential Duplication in Government Programs, Save Tax Dollars, and Enhance Revenue*' identified 82 distinct Federal programs to increase teacher quality, 9 of which targeted teachers of STEM subjects. This section of the report provides the most detailed analysis of duplication, overlap, and fragmentation to date across Federal STEM education investments.

Our detailed statistical analysis of duplication, overlap, and fragmentation was conducted on the 139 broader STEM education investments. The 113 agency mission-specific workforce investments were not included in that detailed analysis, because these investments target specific areas within STEM fields that align with mission-specific workforce needs of the agencies and the industries that support the mission of the agencies. Each of these investments (by definition) targets unique agency and agency-related workforce needs, so the only areas where overlap could exist are where the mission of the agencies overlap.

To identify areas of duplication, overlap, and fragmentation, we used similar variables as in the GAO 2011 report:

1. **Question 2.2:** "What are the primary and secondary objectives of the education investment?(Please select only one primary objective)"[24]
2. **Question 2.5:** "Who is the primary target audience or beneficiary of this investment? (Check all that apply)"
3. **Question 2.4:** "What services or products are part of the education investment? (Check all that apply)"
4. **Question 2.12:** "What STEM fields does the education investment focus on? (Check all that apply)"

The list of response choices associated with each of the four questions can be found in the Survey (see Appendix D). Responses labeled as "Other" in any of the questions were excluded from the analysis, because all entries in the "Other" field were unique for each investment. The responses to these four questions are a very limited subset of the information available on these investments, but serve as an efficient first step to use these questions in distinguishing differences between investments. The second

23. The Science and Technology Policy Institute conducted most of the data analysis and created all figures and tables for this section of the report.

24. Only responses regarding primary objectives were analyzed.

step in our analysis was to look at all sets of investments that gave identical responses to these four questions and the degree of similarity of investments based on the other characteristics of the investments.

For this analysis, responses to the STEM field of focus question were aggregated as follows:

1. If "STEM" is selected, credit is also given for "science," "technology," "engineering," and "mathematics."
2. If "science," "technology," "engineering," and "mathematics" are selected then credit is also given for "STEM."
3. If more than two science sub-fields responses are given, credit is also given for "science," i.e., it is equivalent to selecting "science."

Borrowing from definitions used in previous GAO reports,[25] the following definitions are used in the current report:

- **Duplication:** Investments with identical responses selected on the survey items. We use the term "tentatively duplicative" to refer to investments that provided identical responses to these four specific survey items.
- **Overlap:** Investments that have at least one response option in common on all four survey questions (i.e., if one investment covered physics, mathematics, and engineering, and a second investment covered environmental science, physics, and technology, they would be categorized as overlapping on that variable. They would need to also overlap on primary objective, audience, and products or services to be classified as "overlapping investments"). It is important to recognize that, as used here, the term "overlap" means any degree of similarity, and does not imply duplication.
- **Fragmentation:** Multiple Federal agencies supporting overlapping investments.

Duplication

To measure duplication, a "hierarchical agglomerate clustering technique" was used. This technique searches for the combination of investments that are "tentatively duplicative" by pairing each investment with the investment(s) with which it had the most responses to these four questions in common. Pairs of investments with identical responses are "tentatively duplicative."

Using this quick analytical strategy, only seven out of the 139 investments were found to be "tentatively duplicative". The seven "tentatively duplicative" investments group into three sets (Table 7). A closer look at the three sets of investments reveals that one set of investments is actually a jointly funded investment, and the other two sets of investments include investments that are doing quite different things.

The first set of "tentatively duplicative" investments is, in fact, a single investment, the Global Learning and Observation to Benefit the Environment (GLOBE) program, which was identically listed by two

25. GAO (March, 2011). Opportunities to reduce potential duplication in Government programs, save tax dollars, and enhance revenue. http://www.gao.gov/new.items/d11318sp.pdf.

agencies that fund it jointly. It is operated as a single investment run by the University Corporation for Atmospheric Research (UCAR).

The second "tentatively duplicative" set contained two investments: the Research, Development, and Dissemination investment at DOEd, and the Research on Gender in Science and Engineering investment at NSF. The investments responded identically to the four items used for the duplication analysis, largely because they are both investments devoted to research and the dissemination of research results. However, a more detailed analysis of the two investments reveals large differences.

The NSF investment has a narrow focus—research to increase understanding of gender-based differences in STEM education and workforce participation, and improving female interest and participation in STEM careers. In addition, the investment supports the diffusion of research-based innovations and extension services in education that will lead to a larger, more diverse domestic science and engineering workforce. The DOEd investment supports research covering a much broader set of educational issues for a broader range of purposes. Only a very small fraction, if any, of this research overlaps the research area of the NSF investment.

The third set of investments includes three of NASA's Science Mission Directorate (SMD) education and public outreach (E/PO) forums. NASA's E/PO forums are teams of scientists and educators within particular fields of research that support and coordinate its STEM E/PO community. The forums facilitate communication and collaboration within the SMD-funded E/PO investments to optimize the utilization of SMD resources. The three investments drew scientists and educators to respective forums from distinct research communities (heliophysics, planetary science, or earth science), and involve activities that differ in content.

Table 7: Tentatively Duplicative Investments

Group	Investment #	Investment Name	Agency	Primary Objective
1	0092	Global Learning and Observations to Benefit the Environment	NASA	Engagement
1	0286	Global Learning and Observations to Benefit the Environment	DOC	Engagement
2	0180	Research, Development and Dissemination	DOEd	Education Research and Development
2	0321	Research on Gender in Science and Engineering	NSF	Education Research and Development
3	0080	Heliophysics Education and Outreach Forum	NASA	Institutional Capacity
3	0099	Planetary Science Education and Outreach Forum	NASA	Institutional Capacity
3	0105	Earth Science Education and Outreach Forum	NASA	Institutional Capacity

This analysis of duplication reveals that two investments are really the same education program supported by two agencies; only five investments are potentially duplicative when considering only four of the numerous possible characteristics of STEM investments. A cursory examination of the other characteristics of these five investments shows that each is quite distinct. Thus, we conclude that there is no duplication within the 252 Federal STEM investments. This perhaps surprising result makes sense when one realizes the broad and diverse range of activities that are carried out under the label "STEM education."

Overlap

The previous GAO report and ACC reports all indicate that overlap is not necessarily wasteful, but that it may be difficult to identify by the general characteristics of an education investment. The GAO provided this example to illustrate the difficulty in assessing whether overlap of STEM education investments should be viewed negatively:

> "For example, a local school district could use funds from the Foreign Language Assistance program to pay for professional development for a teacher who will be implementing a new foreign language course, and this teacher could also attend a summer seminar on best practices for teaching the foreign language at a Language Resource Center. Second, by design, individual teachers may benefit from federally funded training or financial support at different points in their careers. Specifically, the teacher from this example could also receive teacher certification through a program funded by the Teachers for a Competitive Tomorrow program. Further, both broad and narrowly targeted programs exist simultaneously, meaning that the same teacher who receives professional development funded from any one or more of the above three programs might also receive professional development that is funded through Title I, Part A. The actual content of these professional development activities may differ though, since the primary goal of each program is different. In this example, it would be difficult to know whether the absence of any one of these programs would make a difference in terms of the teacher's ability to teach the new language effectively."[26]

Thus, while it is relatively simple to identify STEM education investments with common characteristics serving similar audiences, a closer look at seemingly overlapping investments is required to understand the complexities of these investments and their potential relationships. Understanding these complexities is essential to making informed decisions about what actions could be taken to improve the impact and efficiency of seemingly overlapping investments.

As a first step to identify whether there is overlap among the 139 broader STEM education initiatives, pairs of similar investments were identified. Using responses to the four questions on page 28 (questions 2.2, 2.4, 2.5, and 2.12) an algorithm was developed to determine all possible ways in which any of the 139 broader STEM education investments could overlap another investment. As stated above, only one primary objective could be selected, while multiple primary target audiences, services or products, and STEM fields could be selected, allowing for many additional combinations of overlap on the latter three questions (2.4, 2.5, and 2.12). The algorithm searched iteratively to identify all investments which had

26. GAO (March, 2011), p. 147.

at least one response in common on all four survey questions with a given investment. This approach identified the investments that overlap with at least one other investment, but it does identify investments that overlap in the same way.

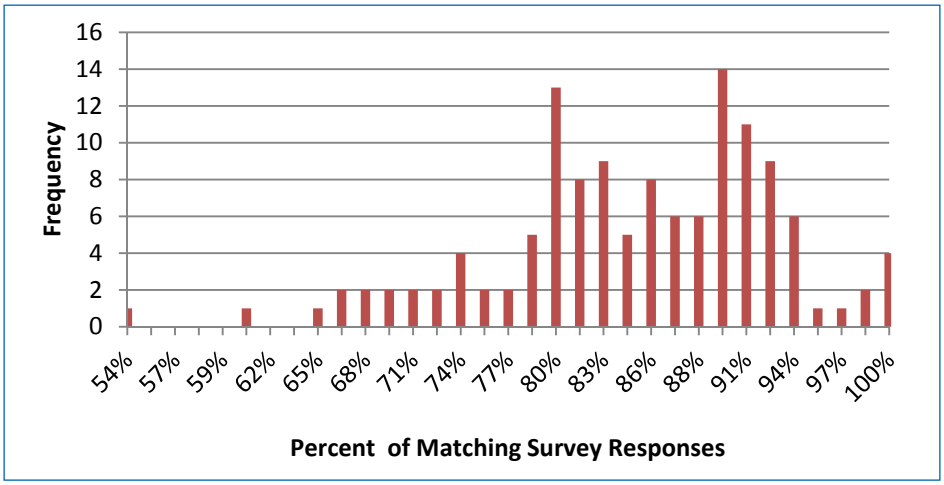
The results of the algorithm illustrate that all but ten investments met the overlap criteria. The response pattern for these ten investments was unique because only "other" was selected on 2.4, 2.5, or 2.12.

Three measures of similarity were used to explore the amount of overlap in response patterns across the 129 broader STEM investments that were found to overlap with at least one other investment:

- **Maximum similarity:** The maximum degree of similarity between overlapping investments is the highest proportion of identical survey responses that a given investment has with any other investment.
- **Degree of pair-wise similarity:** The proportion of identical response patterns between all 1,049 overlapping investment pairs.
- **Quintuplet or Sextuplet similarity:** The groups of 5 or 6 investments that are at least 75 percent similar.

The maximum degree of similarity across all 129 broader STEM investments that overlap with at least one other investment ranged from 54 percent to 100 percent[27] (Figure 19). This indicates that the overlapping investments had a response pattern that was highly similar to the response pattern of at least one other investment.

Figure 19: Maximum Similarity in Response Patterns with One Other Investment[28]



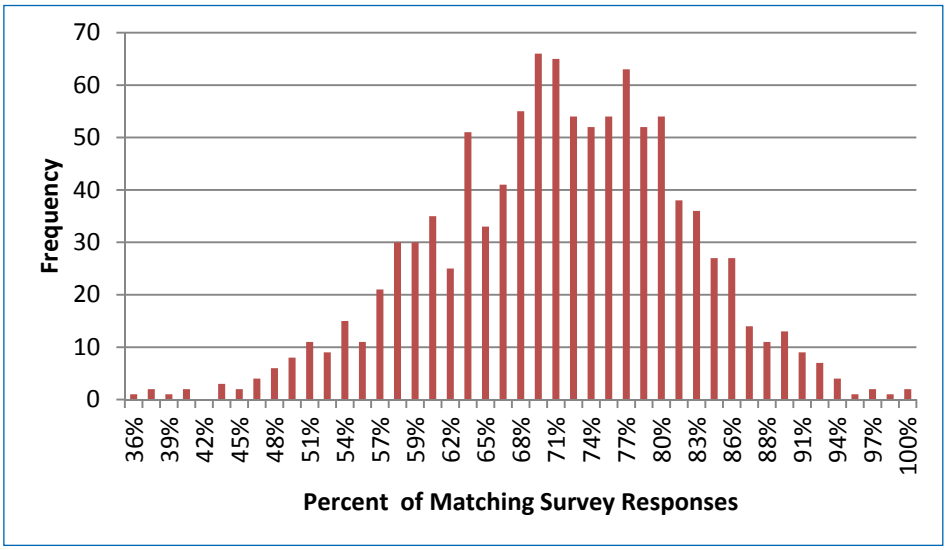
To further explore the degree of overlap across investments, the degree of pair-wise similarity was calculated. While there is a wide range in the degree of similarity across all overlapping pairs, the majority (727 out of 1,048 pairs) of overlapping investments had response patterns with a degree of similarity

27. The seven "tentatively duplicative" investments are those that had identical response patterns or 100% similarity on these four items.

28. Using this analysis approach only four investments had 100% similar response patterns with at least one other program; however the duplication analysis revealed seven investments with responses that were identical to a least one other investment. The difference in the results is caused by lack of a response on item 2.5 for three investments identified as "tentatively duplicative." Thus, these three investments could not have a response in common with any other investment on item 2.5, which, by definition, means these three investments are non-overlapping.

between 57 percent and 77 percent (Figure 20). This suggests that there may be enough investments that are sufficiently similar that collaboration and coordination across investments could lead to increased effectiveness and efficiency.

Figure 20: Percent of Similarity Among all Overlapping Pairs of Investments



Whether the degree of similarity illustrated in Figure 19 and Figure 20 is meaningful is impossible to tell without closely examining the 1,192 pairs of similar investments. Even then, the implications of pairs of overlapping investments on policy decisions would be minimal, because each pair only represents two investments with similar characteristics on four questions.

Sets of five or more overlapping investments are more meaningful, because sharing lessons learned and developing cost saving policies across larger groups of investments could lead to greater efficiencies. To find such larger sets of overlapping investments, we searched for sets of five or more investments where at least 75 percent of responses on items 2.2, 2.4. 2.5, and 2.12 are the same. Seventy-five percent was used as a somewhat arbitrary cut-off point for a level of similarity to examine, because the number of potential combinations of five similar investments is exponentially larger than the number of possible pairs of similar investments. For example, there are 2,860 groups of five investments with responses that were 50 percent similar.

There are eight groups of five investments with responses that were at least 75 percent similar. The primary objective of all of these investments is Engagement (Table 9). There is one group of six investments with responses that were at least 75 percent similar. The primary objective of this group of investments is Postsecondary STEM Degrees.

A closer look at the eight groups of overlapping investments with Engagement as the primary objective shows that the same investments are in multiple groups. There are 11 investments within these 8 groups of overlapping investments. Six investments are in five or more of the groups. Two investments are in two of the groups. Thus, there is likely a high level of similarity across the eight groups.

Overall, it seems clear that coordination and collaboration within nine overlapping groups of 5 and 6 investments is warranted and could lead to improved impact and efficiency.

Table 8: Groups of at least Five Investments with 75 Percent Identical Responses

Group	Agency	Primary Objective	Investment Name	Percent Match
1	NASA	Engagement	EFP - Education Flight Projects	77%
	NASA		Mars E/PO Informal Ed	
	NASA		LEARN - Learning Environment and Research Network	
	DOD		Iridescent Learning	
	DOD		SeaPerch	
2	NASA	Engagement	EFP - Education Flight Projects	77%
	NASA		Mars E/PO Informal Ed	
	NASA		LEARN - Learning Environment and Research Network	
	DOD		Iridescent Learning	
	NSF		Innovative Technology Experiences for Students and Teachers (ITEST)	
3	NASA	Engagement	EFP - Education Flight Projects	77%
	NASA		Mars E/PO Informal Ed	
	NASA		LEARN - Learning Environment and Research Network	
	DOD		SeaPerch	
	NSF		Innovative Technology Experiences for Students and Teachers (ITEST)	
4	NASA	Engagement	Mars E/PO Informal Ed	77%
	NASA		INSPIRE - Interdisciplinary National Science Program Incorporating Research and Education Experience	
	DOD		Iridescent Learning	
	DOD		SeaPerch	
	DOD		DOD STARBASE Program	
5	NASA	Engagement	EFP - Education Flight Projects	75%
	NASA		Mars E/PO Informal Ed	
	NASA		NES - NASA Explorer Schools	
	NASA		LEARN - Learning Environment and Research Network	
	DOD		SeaPerch	
6	NASA	Engagement	EFP - Education Flight Projects	75%
	NASA		Mars E/PO Informal Ed	
	DOD		Iridescent Learning	
	DOD		SeaPerch	
	NSF		Innovative Technology Experiences for Students and Teachers (ITEST)	
7	NASA	Engagement	EFP - Education Flight Projects	75%
	NASA		NES - NASA Explorer Schools	
	NASA		LEARN - Learning Environment and Research Network	
	DOD		National Science Center (NSC)	
	NSF		Innovative Technology Experiences for Students and Teachers (ITEST)	
8	NASA	Engagement	EFP - Education Flight Projects	75%
	NASA		INSPIRE - Interdisciplinary National Science Program Incorporating Research and Education Experience	
	DOD		Iridescent Learning	
	DOD		Navy - Science and Engineering Apprenticeship Program (SEAP)	
	NSF		Innovative Technology Experiences for Students and Teachers (ITEST)	
9	NSF	STEM Degrees	Graduate Research Fellowship Program (GRFP)	75%
	NSF		Integrative Graduate Education and Research Traineeship (IGERT) Program	
	NSF		East Asia & Pacific Summer Institutes for U.S. Graduate Students (EAPSI)	
	NSF		Enhancing the Mathematical Sciences Workforce in the 21st Century (EMSW21)	
	ED		Graduate Assistance in Areas of National Need (GAANN)	
	NSF		NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)	

Fragmentation

Areas of potential fragmentation were identified by reviewing how many agencies supported investments in each of the nine groups of overlapping investments with responses to items 2.2, 2.4. 2.5, and 2.12 that were 75 percent identical. Any of these groups of investments that included investments from more than one agency was said to be "tentatively fragmented."

Fragmentation was tentatively found in all but one of the groups of five or six overlapping investments (Table 9). The group with STEM Degrees as the primary objective included investments from both NSF and DOEd. All eight groups of with Engagement as a primary objective included investments from both NASA and DOD, and three of these groups also included an NSF investment. These groups represent opportunities for agency collaboration and coordination that could strategically align investments across agencies. However, the level of fragmentation identified using this approach is difficult to quantify, because it is unclear whether the "tentatively fragmented" groups of investments are similar enough that they could be aligned or whether coordination and collaboration is already occurring across the agencies. However, this analysis identifies groups that should be examined more carefully for potential collaborations.

Gaps

While the previous sections illustrate the ways in which Federal STEM investments are similar to each other, it is also important to assess how much of the STEM education ecosystem is covered by these investments and where gaps exist. The amount of coverage was calculated by first identifying the total number of potential unique response patterns across the 14 questions on investment characteristics. The questions included in the analysis include:

- Primary objective
- Secondary objective
- Primary approach
- Secondary approach
- Services or practices
- Primary audience
- Groups underserved in STEM
- Type of minority institution
- Duration of service or practice
- Geographic region
- STEM field of focus
- Organization or individual that does the work
- Joint Federal support
- Partnership requirements

The total number of possible response patterns is 2^{122} or 5 trillion-trillion-trillion (5×10^{36}). The total number of observed response patterns (137) was then divided by the total number of possible response patterns. Thus, only a miniscule proportion (less than 1 billion-trillion-trillionth, or) of possible response patterns was found in the inventory responses. Obviously, there is no possible way that the Federal STEM education portfolio could cover all the possible areas of the multi-dimensional STEM education landscape. Thus, the inventory taskforce looked for gaps in the Federal STEM education portfolio that are informative in a practical sense. Tables of the response patterns across pairs of questions that might reveal meaningful gaps were created for many sets of questions. Meaningful gaps were found in the following tables:

- Question 2.6 x Question 2.12—"Underrepresented groups in STEM fields" by "STEM field of focus" among broader STEM education investments.
- Question 2.5 x Question 2.12—"Primary audience" by "STEM field of focus" for broader STEM education investments with Pre- and In-Service Educator Performance as the primary objective.

Tables 9 and 10 present the results of the "practical" gap analysis. Red shading indicates that inventory includes no programs at the intersection of two variables; pink shading indicates that the inventory includes one program at the intersection of two variables.

It is interesting to note that:

- There are not many broader STEM education investments that focus on supporting a specific underrepresented group in a specific area of science (Table 9).
- There are few investments that have undergraduate or graduate instructors as an audience across all STEM fields among broader STEM education investments that have Pre- and In-Service Educator Support as the primary objective (Table 10).

Important policy decisions include determining which of these gaps are best filled by the efforts of the Federal government, with what combinations of investments, and by which agencies. The five-year strategic planning group will utilize this information to identify which gaps the Federal agencies can fill and what combination of agencies has the resources and expertise to fill these gaps.

Table 9: Underrepresented Groups in STEM Fields by STEM Field of Focus Among Broader STEM Education Investments

Field	STEM Field	Multiple Fields of Science	Physical Science	Biological Science	Earth Science	Agricultural Science	Environmental Science	Computer Science	Technology	Engineering	Mathematics
Total Investments Addressing Underrepresented or Underserved	20	27	10	7	10	1	8	5	26	28	29
Traditionally Underrepresented or Underserved (no specific focus)	12	15	5	4	5	0	4	2	14	15	15
Hispanic or Latino	4	5	2	2	1	0	2	1	5	5	5
Black or African American	6	7	3	1	1	1	3	2	8	8	8
Native Hawaiian/ Other Pacific Islander	4	5	1	2	1	0	2	1	5	5	5
American Indian/ Alaska Native	4	4	1	1	0	0	1	1	5	5	5
Economically Disadvantaged	4	5	2	2	0	0	1	1	5	6	6
Female	3	3	2	1	1	0	1	2	5	5	5
Male	1	1	0	0	0	0	0	0	1	1	1
Persons with Disabilities	2	3	1	2	1	0	2	1	3	2	3
Rural	1	1	1	1	1	0	1	0	2	2	2
Urban	2	2	1	1	0	0	1	0	2	2	2

Table 10: Primary Audience (Educator Options Only) by STEM Field of Focus for Investments with Pre- and In-Service Educator Support as a Primary Objective Among Broader STEM Education Investments

Audience	STEM Field	Multiple Fields of Science	Physical Science	Biological Science	Earth Science	Agricultural Science	Environmental Science	Computer Science	Technology	Engineering	Mathematics
Pre-service pre-K Teachers	0	0	0	0	0	1	0	1	1	1	0
Pre-service elementary school (K-5) Teachers	2	3	1	1	1	1	1	2	4	4	3
Pre-service middle school (6-8) Learners	3	6	3	2	4	1	2	3	6	7	5
Pre-service high school (9-12) Teachers	3	6	3	2	4	1	2	3	6	7	5
In-service pre-K Teachers	1	1	0	0	0	1	0	1	2	2	1
In-service elementary (K-5) Teachers	3	6	3	2	5	1	2	2	5	6	5
In-service middle school (6-8) Teachers	5	11	6	5	11	1	5	3	7	10	8
In-service high school (9-12) Teachers	4	10	6	4	10	1	5	4	7	10	7
Undergraduate Instructors (13-16)	1	3	1	2	5	0	3	2	3	3	2
Graduate Instructors (17-20)	1	2	1	1	2	0	1	1	2	2	2
Post Graduate Instructors	0	0	0	0	1	0	0	0	0	0	0
Education Researchers	0	0	0	0	0	0	0	0	0	0	0
Undergraduate Leaders	1	1	0	0	0	0	0	0	1	1	1
Graduate Leaders	0	0	0	0	0	0	0	0	0	0	0
Post Graduate Leaders	0	0	0	0	0	0	0	0	0	0	0
Informal STEM Educators	1	3	3	2	6	1	3	1	2	3	1

Conclusions

The NSTC inventory of Federal STEM education investments is the most detailed inventory of its type, reflecting the unprecedented degree of interagency involvement in its design and implementation. Eleven Federal agencies that provide support for STEM education collaboratively reviewed previous inventories, defined the type of investments in STEM education that should be included in the present inventory, and identified critical characteristics of STEM education investments that warranted inclusion. These steps allowed this inventory to distinguish itself from previous ones in that it only includes investments that primarily focus on STEM, does not include post-doctoral awards or fellowship investments, and collects information on STEM education at a consistent granularity across and within Federal agencies.

The inventory indicates that there are clearly ways in which the Federal portfolio of STEM education programs can be improved. However, the critical issue related to Federal investments in STEM education is not whether the total number of investments is too large or whether today's programs are overly redundant with one another. Rather, the primary issue is how to strategically focus the limited Federal dollars available within the vast landscape of opportunity so they will have the most significant impacts possible in areas of national priority. The strategic plan, to be released in early 2012, will provide approaches to creating a portfolio of Federal investments in STEM education that is coordinated across agencies and aligned to a common set of priority goals, and include metrics to assess whether these goals are being accomplished.

The inventory includes detailed information on 252 investments that account for $3.4 billion in Federal spending across 11 Federal agencies. In addition, basic information was collected on 169 investments that account for $92 million in Federal spending. Detailed information was not collected on these 169 STEM education investments, because they were funded either through earmarks or ARRA funds, or with individual budgets of less than $300,000.

Importantly, a detailed examination of the inventory data indicates very little overlap and no duplication among Federal STEM education investments. The CoSTEM identified overlapping investments by searching for groupings of five investments that were at least 75 percent similar in their responses to four key inventory items. Of the 17,000 possible groupings of five investments with that degree of similarity, only eight such groups were found (in addition to one such grouping that included six investments) — evidence of just how little overlap there is among the Nation's STEM education investments. Further analysis of investment overlaps by the Committee on STEM will guide the development of policies aimed at improving coordination, collaboration, and efficiency across Federal STEM education investments. Even with improved efficiencies, the relatively small sliver of the Nation's $1.1 trillion in education spending that is devoted to STEM education—less than 1 percent of that total—cannot have a significant impact unless it is more strategically targeted.

The analysis of the inventory did reveal various findings that will be used to inform the development of the Five-Year Federal STEM Education Strategic Plan. However, it is important to recognize that the measures tallied in this report are but a subset of those that will be used by CoSTEM to develop a roadmap for achieving a more strategically targeted portfolio of STEM education investments within and across

the Federal agencies. The issues with the Federal portfolio of STEM education illustrated in the inventory can be address in a number a manners such as: consolidating programs, creating joint solicitations across agencies, and developing structures and procedures for sharing program data and performance measurement and evaluation tools. The results reported here and a number of other factors, including measures of effectiveness for various program types, must and will come into play in the strategies in the strategic plan that will be developed to improve the Federal STEM education portfolio. As called for in the America COMPETES Act, that plan will be released in early 2012.

The major findings in this report that will be used to formulate the Strategic Plan include:

Agency Specific Workforce Investments: Of the total of $3.4 billion spent by Federal agencies on STEM education in FY 2010, $967 million (28%) is spent on activities that target the specific workforce needs of mission agencies. As the agency missions differ, the workforce needs also vary.

Broader STEM Education Investments: There is $2.5 billion (72%) spent on broader STEM education, and this spending is dominated by the expenditures of the NSF (47%) and the Department of Education (40%).

Underrepresented Groups in STEM: The Federal government spends $1.1 billion on investments that have the primary goal of targeting groups that are underrepresented in STEM, while nearly every other STEM education investment has this as a secondary goal.

Pre- and In-Service Educator Support: Twenty-four investments, with a total budget of $312 million, have the primary goal of improving teacher effectiveness, with most of that funding going to teacher professional development. Improving teacher effectiveness is a secondary goal of an additional 101 investments. Together, improving teacher effectiveness is a primary or secondary objective of 49 percent of all Federal STEM education investments.

Evaluation: A large percent (86%) of the broader STEM education investments, 86 percent have been evaluated since 2005 to identify how investments can be improved, to test their impact, or both. Summative evaluations (evaluations of impact) have been conducted on 59 of those investments. Thirty-three of the summative evaluations were either randomized control trials (8 evaluations) or pre-post designs with matched comparison groups (25 evaluations)—evaluation designs that can illustrate causality. The other 26 summative evaluations used other designs. Agency mission-specific workforce education investments have been less thoroughly evaluated; only 40 percent (46 of 113) of these investments have been subject to any kind of outcome data collection.

Appendix A:
List of Investments

Appendix A: STEM Education Investments[29]

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0326	Agriculture	AgDiscovery	-	-	0.49	-	Agency Mission Workforce	Engagement	No
0291	Agriculture	1890 Facilities Grant Program	16.58	17.28	19.00	-	Agency Mission Workforce	Institutional Capacity	Yes
0272	Agriculture	1890 Institutions Capacity Building Grants Program: Teaching	5.17	0.00	9.26	-	Agency Mission Workforce	Institutional Capacity	Yes
0289	Agriculture	1890 Institutions Capacity Building Grants Program: Extension	0.00	0.00	6.60	-	Broader STEM	Institutional Capacity	Yes
0295	Agriculture	Hispanic serving Institutions Education Grants Program	5.80	6.33	9.33	-	Agency Mission Workforce	Institutional Capacity	Yes
0271	Agriculture	Agriculture in the Classroom	0.50	0.50	0.50	-	Broader STEM	Pre- and in-service Educator/ Education Leader Performance	No
0208	Agriculture	Agriculture in the Classroom Secondary Postsecondary Agriculture Education Challenge Grants	0.98	0.98	0.98	-	Agency Mission Workforce	Learning	No
0209	Agriculture	Higher Education Challenge Grants	5.39	5.65	5.65	-	Agency Mission Workforce	Learning	No
0279	Agriculture	Alaska Native-Serving and Native Hawaiian-Serving Institutions Education Competitive Grants Program	3.06	3.06	3.06	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0287	Agriculture	Distance Education Grants for Institutions of Higher Education in Insular Areas	-	-	0.72	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0214	Agriculture	Higher Education Multicultural Scholars Program	1.46	0.96	1.13	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0210	Agriculture	New Era Rural Technology Competitive Grants Program	0.00	0.75	0.88	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0285	Agriculture	Resident Instruction Grants Program for Institutions of Higher Education in Insular Areas	0.71	0.76	0.86	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0296	Agriculture	Food and Agricultural Sciences National Needs Graduate and Postgraduate Fellowship Grant Program	2.80	2.90	2.90	-	Agency Mission Workforce	STEM Careers	No

29. While each agency has reviewed and provided a preliminary confirmation of the funding levels for its STEM education investments, this information is undergoing final review by agency budget offices. All budget numbers should be interpreted as preliminary and subject to change.

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0284	Agriculture	National Institute of Food and Agriculture Fellowship Grants Program	0.00	0.00	6.46	-	Agency Mission Workforce	STEM Careers	No
0215	Agriculture	Women and Minorities in Science, Technology, Engineering and Mathematics Fields Program	0.00	0.00	0.36	-	Agency Mission Workforce	STEM Careers	Yes
0275	Agriculture	4-H Science, 4-H Youth Development Program	26.37	26.32	24.28	-	Broader STEM	Learning	No
	Agriculture	**Total**	**68.81**	**65.49**	**92.45**				
0204	Commerce	Educational Partnership Program with Minority Serving Institutions	13.92	14.98	14.31	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0299	Commerce	Ernest F. Hollings Undergraduate Scholarship Program	3.97	5.60	5.60	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0298	Commerce	Summer Undergraduate Research Fellowship	0.51	0.63	0.74	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0311	Commerce	Dr. Nancy Foster Scholarship Program	0.47	0.62	0.60	-	Agency Mission Workforce	STEM Careers	Yes
0218	Commerce	Climate Communications and Education	1.26	1.26	1.65	-	Broader STEM	Engagement	No
0286	Commerce	Global Learning and Observations to Benefit the Environment	0.00	0.00	3.00	-	Broader STEM	Engagement	No
0294	Commerce	National Weather Service Outreach Program	1.25	2.53	3.07	-	Broader STEM	Engagement	Yes
0278	Commerce	Office of National Marine Sanctuaries Education Program	1.60	1.74	1.79	-	Broader STEM	Engagement	No
0297	Commerce	Satellite and Information Service	6.36	2.98	3.18	-	Broader STEM	Engagement	No
0201	Commerce	Environmental Literacy Grants program	3.83	7.70	10.39	-	Broader STEM	Learning	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0292	Commerce	National Estuarine Research Reserve System	2.82	3.50	4.00	-	Broader STEM	Learning	No
0280	Commerce	National Sea Grant College Program	9.73	9.39	9.38	-	Broader STEM	Learning	No
0207	Commerce	NOAA Bay Watershed Education and Training	9.55	9.70	9.70	-	Broader STEM	Learning	No
0274	Commerce	NOAA Fisheries Education Program	2.24	2.24	2.31	-	Broader STEM	Learning	No
0293	Commerce	Coral Reef Conservation Program	0.83	0.83	0.84	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	Yes
0200	Commerce	National Ocean Service Education	0.58	0.57	0.43	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0290	Commerce	NIST Summer Institute for Middle School Teachers	0.10	0.20	0.30	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0300	Commerce	NOAA Office of Ocean Exploration and Research (Education Only)	0.00	0.90	0.90	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0273	Commerce	NOAA Teacher at Sea Program	0.19	0.60	0.60	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
	Commerce	**Total**	**59.20**	**65.96**	**72.79**				
0128	Defense	University Nanosatellite Program	1.50	1.60	1.60	-	Agency Mission Workforce	Learning	No
0134	Defense	Awards to Stimulate and Support Undergraduate Research Experiences	4.50	4.50	4.50	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0130	Defense	National Defense Education Program Science, Mathematics And Research for Transformation	19.00	33.00	47.00	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0133	Defense	National Defense Science and Engineering Graduate Fellowship Program	33.09	36.34	36.81	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0124	Defense	The Naval Research Enterprise Intern Program	1.20	1.20	1.90	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0119	Defense	Historically Black Colleges and Universities/ Minority Institutions Research and Education Partnership	1.50	1.50	1.50	-	Agency Mission Workforce	STEM Careers	Yes
0313	Defense	Stokes Educational Scholarship Program		1.50	1.60	-	Agency Mission Workforce	STEM Careers	No
0125	Defense	Uniformed Services University of the Health Sciences	0.51	0.53	0.45	-	Agency Mission Workforce	STEM Careers	No
0131	Defense	University Laboratory Initiative	2.60	2.30	2.35	-	Agency Mission Workforce	STEM Careers	No
0109	Defense	Army Educational Outreach Program	7.44	7.86	7.72	-	Broader STEM	Engagement	No
0126	Defense	DOD STARBASE Program	20.00	19.00	20.00	-	Broader STEM	Engagement	Yes
0120	Defense	Iridescent Learning			1.12	-	Broader STEM	Engagement	Yes
0129	Defense	National Defense Education Program K-12 component	1.00	15.00	14.00	-	Broader STEM	Engagement	No
0132	Defense	National Science Center	1.84	1.86	1.98	-	Broader STEM	Engagement	No
0121	Defense	Navy - Science and Engineering Apprenticeship Program	0.27	0.31	0.70	-	Broader STEM	Engagement	No
0123	Defense	SeaPerch	0.45	0.75	0.90	-	Broader STEM	Engagement	Yes
	Defense	**Total**	**94.90**	**127.25**	**144.15**				
0182	Education	High School Longitudinal Study of 2009	6.45	5.14	6.15	-	Broader STEM	Education R&D	No
0184	Education	Investing in Innovation			110.50	-	Broader STEM	Education R&D	Yes
0181	Education	Research in Special Education	2.45	10.67	14.64	-	Broader STEM	Education R&D	Yes
0180	Education	Research, Development, and Dissemination	76.30	52.22	63.81	-	Broader STEM	Education R&D	No
0189	Education	Strengthening Predominantly Black Institutions	15.00	15.00	15.00	-	Broader STEM	Institutional Capacity	Yes

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0190	Education	Developing Hispanic Serving Institutions STEM and articulation programs	100.00	100.00	100.00	-	Broader STEM	Post-Secondary STEM Degrees	Yes
0191	Education	Fund for the Improvement of Postsecondary Education	13.90	3.50	3.65	-	Broader STEM	Post-Secondary STEM Degrees	No
0187	Education	Graduate Assistance in Areas of National Need	30.00	31.00	31.00	-	Broader STEM	Post-Secondary STEM Degrees	Yes
0188	Education	Minority Science and Engineering Improvement Program	8.58	8.58	9.50	-	Broader STEM	Post-Secondary STEM Degrees	Yes
0193	Education	Upward Bound Math and Science Program	31.19	35.20	34.87	-	Broader STEM	Post-Secondary STEM Degrees	Yes
0183	Education	Mathematics and Science Partnerships	179.00	179.00	180.50	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	Yes
0192	Education	Teacher Loan Forgiveness	15.44	38.63	49.77	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0185	Education	Teachers for a Competitive Tomorrow: Programs for Baccalaureate Degrees in STEM or Critical Foreign Languages, with Concurrent Teacher Certification	1.00	1.00	1.00	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0186	Education	Teachers for a Competitive Tomorrow: Programs for Master's Degrees STEM or Critical Foreign Language Education	1.00	1.00	1.00	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0327	Education	National Science and Mathematics to Retain Talent Grants	194.00	341.00	379.78	-	Broader STEM	STEM Careers	No
	Education	**Total**	**674.31**	**821.93**	**1001.18**				
0154	Energy	Mickey Leland Energy		0.48	0.50	-	Agency Mission Workforce	Engagement	Yes
0152	Energy	Minority Educational Institution Student Partnership Program	0.55	0.66	0.84	-	Agency Mission Workforce	Engagement	Yes
0170	Energy	Faculty and Student Teams	0.25	1.54	1.02	-	Agency Mission Workforce	Institutional Capacity	Yes
0166	Energy	American Chemical Society Summer School in Nuclear and Radiochemistry	0.52	0.53	0.55	-	Agency Mission Workforce	Learning	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0157	Energy	Solar Decathlon	2.30	6.40	5.00	-	Agency Mission Workforce	Learning	No
0167	Energy	Computational Science Graduate Fellowship	6.80	6.80	7.80	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0165	Energy	Global Change Education Program	1.47	1.42	1.42	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0156	Energy	Graduate Automotive Technology Education	0.50	0.95	1.00	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0150	Energy	Integrated University Program	0.00	5.00	5.00	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0171	Energy	Office of Science Graduate Fellowship Program	0.00	0.00	5.00	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0174	Energy	Science Undergraduate Laboratory Internships	2.58	2.50	3.80	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0318	Energy	Wind for Schools	0.37	0.46	0.63	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0175	Energy	Community College Institute of Science and Technology	0.32	0.29	0.69	-	Agency Mission Workforce	STEM Careers	No
0164	Energy	Fusion Energy Sciences Graduate Fellowship Program	0.75	0.80	0.70	-	Agency Mission Workforce	STEM Careers	No
0161	Energy	HBCU Mathematics, Science & Technology, Engineering and Research Workforce Development Program	-	-	8.97	-	Agency Mission Workforce	STEM Careers	Yes
0158	Energy	Industrial Assessment Centers	3.40	3.30	6.10	-	Agency Mission Workforce	STEM Careers	No
0160	Energy	Minority University Research Associates Program	0.00	0.00	0.59	-	Agency Mission Workforce	STEM Careers	Yes
0163	Energy	National Undergraduate Fellowship Program in Plasma Physics and Fusion Energy Sciences	0.37	0.37	0.37	-	Agency Mission Workforce	STEM Careers	No
0153	Energy	Technical Career Intern Program	-	0.70	0.70	-	Agency Mission Workforce	STEM Careers	No
0172	Energy	National Science Bowl	1.67	1.76	2.45	-	Broader STEM	Learning	No
0169	Energy	DOE Academies Creating Teacher Scientists	1.85	3.77	3.72	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0162	Energy	Plasma/Fusion Science Educator Programs	0.73	0.77	0.77	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0173	Energy	Pre-Service Teacher Program	0.19	0.21	0.43	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0168	Energy	QuarkNet	0.75	0.75	0.75	-	Broader STEM	Pre- and In-Service Educator/	No
0155	Energy	Advanced Vehicle Competitions	1.39	1.75	2.00	-	Broader STEM	STEM Careers	No
	Energy	**Total**	**26.75**	**41.22**	**60.79**				
0141	Environmental Protection Agency	Greater Research Opportunities Fellowships for Undergraduate Environmental Study	0.60	1.30	1.50	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0144	Environmental Protection Agency	Science to Achieve Results Graduate Fellowship Program	8.22	4.24	6.39	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0139	Environmental Protection Agency	Cooperative Training Partnership in Environmental Sciences Research	2.00	1.50	1.50	-	Agency Mission Workforce	STEM Careers	No
0142	Environmental Protection Agency	National Network for Environmental Management Studies Fellowship Program		0.32	0.39	-	Agency Mission Workforce	STEM Careers	No
0145	Environmental Protection Agency	University of Cincinnati/EPA Research Training Grant	0.60	0.60	0.60	-	Agency Mission Workforce	STEM Careers	No
0143	Environmental Protection Agency	People, Prosperity & the Planet-Award: A National Student Design Competition for Sustainability	1.30	1.20	2.00	-	Broader STEM	Engagement	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0146	Environmental Protection Agency	Environmental Education Grants	3.40	3.40	3.40	-	Broader STEM	Learning	No
0147	Environmental Protection Agency	National Environmental Education and Training Partnership	2.00	2.00	2.20	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
	Environmental Protection Agency	**Total**	**18.12**	**14.56**	**17.98**				
0240	Health & Human Services	Short Term Educational Experiences for Research in the Environmental health Sciences for Undergraduates and High School Students	0.57	0.76	0.57	-	Agency Mission Workforce	Engagement	No
0233	Health & Human Services	Cancer Education Grants Program	6.75	7.31	6.76	-	Agency Mission Workforce	Learning	No
0259	Health & Human Services	Clinical Research Training Program	1.00	1.00	1.10	-	Agency Mission Workforce	Learning	No
0234	Health & Human Services	National Cancer Institute Cancer Education and Career Development Program	16.21	18.99	20.44	-	Agency Mission Workforce	Learning	No
0225	Health & Human Services	Short Courses in Integrative and Organ Systems Pharmacology	0.68	0.75	0.67	-	Agency Mission Workforce	Learning	No
0246	Health & Human Services	Short Courses in Population Research (Education Programs for Population Research R25)	0.70	0.92	0.75	-	Agency Mission Workforce	Learning	No
0224	Health & Human Services	Short Courses on Mathematical, Statistical, and Computational Tools for Studying Biological Systems	0.32	0.33	0.70	-	Agency Mission Workforce	Learning	No
0250	Health & Human Services	Student Intramural Research Training Award Program	5.78	5.12	5.87	-	Agency Mission Workforce	Learning	No
0269	Health & Human Services	Training in Computational Neuroscience: From Biology to Model and Back Again	1.44	2.88	1.44	-	Agency Mission Workforce	Learning	No
0228	Health & Human Services	Bridges to the Baccalaureate Program	4.00	7.26	6.46	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0229	Health & Human Services	Bridges to the Doctorate	1.29	2.18	2.98	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0226	Health & Human Services	Initiative for Maximizing Student Development	16.44	22.34	21.41	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0223	Health & Human Services	Minority Access to Research Awards Undergraduate Student Training in Academic Research, National Research Service Awards Program	16.76	21.25	21.25	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0325	Health & Human Services	National Heart Lung and Blood Institute HBCU Research Scientist Award	0.48	0.49	0.48	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0238	Health & Human Services	National Heart Lung and Blood Institute Minority Undergraduate Biomedical Education Program	0.48	0.49	0.48	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0245	Health & Human Services	National Institute of Neurological Disorders and Stroke: Diversity Research Education Grants in Neuroscience	0.25	0.71	0.82	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0312	Health & Human Services	National Library of Medicine Institutional Grants for Research Training in Biomedical Informatics	10.33	14.66	10.14	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0249	Health & Human Services	Post-baccalaureate Intramural Research Training Award Program	21.54	21.48	24.81	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0230	Health & Human Services	Post-baccalaureate Research Education Program	3.03	6.73	5.78	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0219	Health & Human Services	Research Supplements to Promote Diversity in Health-Related Research	70.56	83.43	68.98	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0227	Health & Human Services	Research Initiative for Scientific Enhancement	18.57	25.69	24.44	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0236	Health & Human Services	Short-Term Research Education Program to Increase Diversity in Health-Related Research	2.05	3.17	4.19	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0235	Health & Human Services	Summer Institute for Training in Biostatistics	0.00	1.45	1.45	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0252	Health & Human Services	Undergraduate Scholarship Program for Individuals from Disadvantaged Backgrounds	2.20	2.30	2.40	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0262	Health & Human Services	Center for Cancer Research/Johns Hopkins University Master of Science in Biotechnology Concentration in Molecular Targets and Drug Discovery Technologies	0.41	0.43	0.45	-	Agency Mission Workforce	STEM Careers	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0247	Health & Human Services	Graduate Program Partnerships	17.60	16.60	16.70	-	Agency Mission Workforce	STEM Careers	No
0220	Health & Human Services	Ruth L. Kirschstein National Research Service Award Institutional Research Training Grants (T32, T35)	259.08	266.47	230.84	-	Agency Mission Workforce	STEM Careers	No
0221	Health & Human Services	Ruth L. Kirschstein NRSA for Individual Predoctoral Fellows, including Underrepresented Racial/Ethnic Groups, Students from Disadvantaged Backgrounds, and Predoctoral Students with Disabilities	47.57	55.55	56.88	-	Agency Mission Workforce	STEM Careers	No
0251	Health & Human Services	Technical Intramural Research Training Award	2.14	2.14	2.24	-	Agency Mission Workforce	STEM Careers	No
0270	Health & Human Services	Mathematics and Science Cognition and Learning Program	4.70	10.10	10.40	-	Broader STEM	Education R&D	No
0258	Health & Human Services	Office of Science Education K-12 Program	2.10	2.11	2.27	-	Broader STEM	Engagement	No
0256	Health & Human Services	Curriculum Supplement Series	0.76	0.36	0.34	-	Broader STEM	Learning	No
0231	Health & Human Services	National Center for Research Resources Science Education Partnership Award	16.18	22.21	18.32	-	Broader STEM	Learning	Yes
0242	Health & Human Services	National Institute of Allergy and Infectious Disease Science Education Awards	0.35	0.71	1.06	-	Broader STEM	Learning	No
0265	Health & Human Services	Science Education Drug Abuse Partnership Award	2.16	2.46	2.30	-	Broader STEM	Learning	No
0267	Health & Human Services	Small Business Innovation Research Grants	0.26	0.00	0.76	-	Broader STEM	Learning	No
	Health & Human Services	**Total**	**554.72**	**630.80**	**576.91**				
0316	Homeland Security	Summer Research Team Program	0.17	0.27	0.55	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0314	Homeland Security	Homeland Security STEM Career Development Grant Program	3.50	2.50	2.50	-	Agency Mission Workforce	STEM Careers	No
0317	Homeland Security	Homeland Security STEM Summer Intern Program	0.18	0.22	0.36	-	Agency Mission Workforce	STEM Careers	No
0315	Homeland Security	Scientific Leadership Awards Program	3.80	3.80	3.40	-	Agency Mission Workforce	STEM Careers	Yes

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
	Homeland Security	**Total**	**7.65**	**6.80**	**6.81**				
0205	Interior	EDMAP-Educational Component of the National Cooperative Geologic Mapping Program	0.49	0.52	0.57	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
	Interior	**Total**	**0.49**	**0.52**	**0.57**				
0108	NASA	Career Exploration Project	1.16	1.15	1.30	-	Agency Mission Workforce	Engagement	Yes
0046	NASA	Innovation in Aeronautics Instruction Competition	1.10	1.10	1.10	-	Agency Mission Workforce	Institutional Capacity	No
0104	NASA	Minority University Research and Education Program: Small Projects	1.50	1.80	1.70	-	Agency Mission Workforce	Institutional Capacity	Yes
0049	NASA	NASA Science and Technology Institute for Minority Institutions	2.00	1.96	2.46	-	Agency Mission Workforce	Institutional Capacity	Yes
0060	NASA	Reduced Gravity Student Flight Opportunity Project		0.36	0.36	-	Agency Mission Workforce	Learning	No
0094	NASA	Summer Undergraduate Research Fellowships Program	0.33	0.29	0.32	-	Agency Mission Workforce	Learning	No
0045	NASA	Aeronautics Scholarship	1.80	1.80	1.80	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0203	NASA	Curriculum Improvement Partnership Award for the Integration of Research into the Undergraduate Curriculum	2.75	2.71	3.11	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0064	NASA	Exploration Systems Mission Directorate: Space Grant Project	1.36	1.55	1.03	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0086	NASA	Innovation in Higher Education STEM Education			0.96	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0050	NASA	Jenkins Pre-Doctoral Fellowship Program	2.56	2.53	2.63	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0106	NASA	NASA Langley Aerospace Research Summer Scholars Program	1.00	1.10	1.30	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0103	NASA	Lewis Educational Research Collaborative Internship Project (College)	0.76	0.97	0.90	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0107	NASA	Motivating Undergraduates in Science and Technology	1.90	1.90	2.40	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0093	NASA	NASA Tribal College and University Project	1.62	1.68	1.59	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0078	NASA	University Research Centers	13.93	14.57	14.06	-	Agency Mission Workforce	Post-Secondary STEM Degrees	Yes
0051	NASA	Undergraduate Student Research Project	4.00	3.48	2.97	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0082	NASA	Graduate Student Researchers Program	5.20	4.30	4.40	-	Agency Mission Workforce	STEM Careers	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0059	NASA	Systems Engineering Educational Discovery	0.29	0.37	0.41	-	Agency Mission Workforce	STEM Careers	No
0067	NASA	Learning Technologies Project	1.28	0.84	0.71	-	Broader STEM	Education R&D	No
0052	NASA	21st Century Explorer	0.30	0.30	0.30	-	Broader STEM	Engagement	Yes
0101	NASA	Aqua (Earth science satellite mission) Education		0.48	0.43	-	Broader STEM	Engagement	No
0212	NASA	Chandra	1.92	1.85	1.82	-	Broader STEM	Engagement	No
0043	NASA	Competitive Program for Science Museums and Planetariums	7.80	7.00	7.00	-	Broader STEM	Engagement	No
0053	NASA	Education Flight Projects	1.20	3.11	2.99	-	Broader STEM	Engagement	No
0092	NASA	Global Learning and Observations to Benefit the Environment		4.40	3.00	-	Broader STEM	Engagement	No
0076	NASA	GRAIL (Science satellite mission) Education	0.20	0.31	0.41	-	Broader STEM	Engagement	Yes
0102	NASA	Interdisciplinary National Science Program Incorporating Research and Education Experience	2.85	3.42	2.52	-	Broader STEM	Engagement	No
0047	NASA	K-12 Competitive Grants Opportunity	11.60	13.00	3.70	-	Broader STEM	Engagement	Yes
0096	NASA	Learning Environment and Research Network	2.40	3.00	3.00	-	Broader STEM	Engagement	No
0090	NASA	Mars Education/Public Outreach: Informal Education	0.99	0.77	0.81	-	Broader STEM	Engagement	No
0083	NASA	NASA Aerospace Scholars			0.30	-	Broader STEM	Engagement	No
0095	NASA	NASA Explorer Schools	8.09	4.31	4.99	-	Broader STEM	Engagement	No
0066	NASA	Terra (Earth observation satellite) Education		0.45	0.30	-	Broader STEM	Engagement	No
0088	NASA	NASA Visitor Centers	5.80	7.80	6.50	-	Broader STEM	Engagement	No
0056	NASA	Astrophysics Education/Public Outreach Forum		0.99	1.00	-	Broader STEM	Institutional Capacity	No
0105	NASA	Earth Science Education/Public Outreach Forum		0.76	0.87	-	Broader STEM	Institutional Capacity	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0080	NASA	Heliophysics Education/Public Outreach Forum		0.82	0.73	-	Broader STEM	Institutional Capacity	No
0087	NASA	NASA Administrator's Fellowship Project	1.20	0.42	0.30	-	Broader STEM	Institutional Capacity	Yes
0044	NASA	NASA Informal Education Opportunities	0.00	0.00	2.00	-	Broader STEM	Institutional Capacity	No
0099	NASA	Planetary Science Education/Public Outreach Forum		0.92	0.89	-	Broader STEM	Institutional Capacity	No
0079	NASA	Aura (atmospheric chemistry and dynamics) Education		0.38	0.37	-	Broader STEM	Learning	No
0040	NASA	Cassini (mission to Saturn) Education	1.55	1.70	1.65	-	Broader STEM	Learning	Yes
0073	NASA	Dawn Education	0.30	0.27	0.36	-	Broader STEM	Learning	No
0100	NASA	Opportunities in Education and Public Outreach for Earth and Space Science	0.79	4.58	6.91	-	Broader STEM	Learning	Yes
0097	NASA	Global Climate Change Education	7.00	10.00	10.00	-	Broader STEM	Learning	No
0074	NASA	Hinode (solar optical telescope) Education	0.35	0.35	0.35	-	Broader STEM	Learning	No
0048	NASA	Hubble Space Telescope Education	1.42	1.35	1.25	-	Broader STEM	Learning	No
0041	NASA	Juno (mission to Jupiter) Education	0.58	1.21	1.31	-	Broader STEM	Learning	Yes
0091	NASA	Mars Education/Public Outreach Formal: Education	1.20	1.00	1.30	-	Broader STEM	Learning	No
0075	NASA	MESSENGER (mission to Mercury) Education	0.43	0.36	0.30	-	Broader STEM	Learning	No
0069	NASA	NASA Education Technologies Services	1.40	1.30	1.00	-	Broader STEM	Learning	No
0055	NASA	Science Engineering Mathematics and Aerospace Academy	2.51	1.91	3.09	-	Broader STEM	Learning	Yes
0061	NASA	Summer of Innovation			10.00	-	Broader STEM	Learning	Yes
0057	NASA	National Space Grant College and Fellowship Program	39.71	38.30	44.50	-	Broader STEM	Post-Secondary STEM Degrees	No
0089	NASA	Aerospace Education Services Project	4.90	5.50	2.50	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	Yes

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0068	NASA	eEducation Small Projects/Central Operation of Resources for Educators	0.60	0.49	0.40	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0062	NASA	Kepler (survey of the Milky Way) Education	0.23	0.58	0.50	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0042	NASA	Landsat Data Continuity Mission: Education	0.14	0.54	0.30	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0098	NASA	Simulation-Based Aerospace Engineering Teacher Professional Development	-	-	0.39	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0054	NASA	Stratospheric Observatory for Infrared Astronomy Education and Public Outreach	0.24	0.36	0.60	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0070	NASA	National Space Biomedical Research Institute	0.72	0.74	0.75	-	Broader STEM	STEM Careers	No
	NASA	**Total**	**152.94**	**169.45**	**177.17**				
0018	National Science Foundation	Federal Cyber Service: Scholarship for Service	11.37	14.88	14.87	-	Agency Mission Workforce	STEM Careers	No
0028	National Science Foundation	Discovery Research K-12	99.25	108.41	118.38	-	Broader STEM	Education R&D	No
0033	National Science Foundation	Engineering Education	11.50	22.90	13.74	-	Broader STEM	Education R&D	No
0030	National Science Foundation	Informal Science Education	64.45	65.72	65.85	-	Broader STEM	Education R&D	No
0019	National Science Foundation	Math and Science Partnership	47.87	85.99	57.93	-	Broader STEM	Education R&D	No
0029	National Science Foundation	Research and Evaluation on Education in Science and Engineering	41.70	42.60	45.70	-	Broader STEM	Education R&D	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0321	National Science Foundation	Research on Gender in Science and Engineering	10.13	11.40	11.57	-	Broader STEM	Education R&D	Yes
0002	National Science Foundation	Broadening Participation in Computing	14.00	14.00	14.00	-	Broader STEM	Engagement	Yes
0017	National Science Foundation	Excellence Awards in Science and Engineering	5.57	5.15	5.18	-	Broader STEM	Engagement	Yes
0007	National Science Foundation	Global Learning and Observations to Benefit the Environment	1.10	1.12	1.10	-	Broader STEM	Engagement	No
0319	National Science Foundation	Innovative Technology Experiences for Students and Teachers	28.72	27.86	20.85	-	Broader STEM	Engagement	No
0004	National Science Foundation	Opportunities for Enhancing Diversity in the Geosciences	4.57	11.79	4.18	-	Broader STEM	Engagement	Yes
0023	National Science Foundation	Polar Research and Education	2.29	2.42	1.38	-	Broader STEM	Engagement	No
0013	National Science Foundation	Undergraduate Research and Mentoring in the Biological Sciences	5.09	4.68	9.00	-	Broader STEM	Engagement	Yes
0001	National Science Foundation	Centers for Ocean Sciences Education Excellence	5.24	7.19	5.70	-	Broader STEM	Institutional Capacity	No
0003	National Science Foundation	Computer and Information Science and Engineering Pathways to Revitalized Undergraduate Computing Education	5.00	5.00	4.37	-	Broader STEM	Institutional Capacity	No
0036	National Science Foundation	Historically Black Colleges and Universities Undergraduate Program	29.74	31.13	32.06	-	Broader STEM	Institutional Capacity	Yes
0035	National Science Foundation	Tribal Colleges and Universities Program	12.80	13.39	13.35	-	Broader STEM	Institutional Capacity	Yes
0324	National Science Foundation	Cyberinfrastructure Training, Education, Advancement, and Mentoring	9.9	0.00	4.85	-	Broader STEM	Learning	Yes
0016	National Science Foundation	Climate Change Education	0.00	9.95	10.24	-	Broader STEM	Learning	No
0005	National Science Foundation	Geoscience Education	1.63	2.74	2.02	-	Broader STEM	Learning	No
0010	National Science Foundation	Graduate Teaching Fellows in K-12 Education	54.60	58.84	55.97	-	Broader STEM	Learning	No

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0031	National Science Foundation	Nanotechnology Undergraduate Education in Engineering	1.08	2.00	1.83	-	Broader STEM	Learning	No
0015	National Science Foundation	Transforming Undergrad Education in STEM	37.28	40.86	41.60	-	Broader STEM	Learning	No
0014	National Science Foundation	Advanced Technological Education	51.46	51.85	64.51	-	Broader STEM	Post-Secondary STEM Degrees	No
0012	National Science Foundation	East Asia & Pacific Summer Institutes for U.S. Graduate Students	1.75	1.52	1.74	-	Broader STEM	Post-Secondary STEM Degrees	No
0026	National Science Foundation	Enhancing the Mathematical Sciences Workforce in the 21st Century	19.46	26.95	15.07	-	Broader STEM	Post-Secondary STEM Degrees	No
0008	National Science Foundation	Graduate Research Fellowship Program	96.02	162.43	136.13	-	Broader STEM	Post-Secondary STEM Degrees	No
0009	National Science Foundation	Integrative Graduate Education and Research Traineeship Program	64.76	77.99	69.70	-	Broader STEM	Post-Secondary STEM Degrees	No
0027	National Science Foundation	Interdisciplinary Training for Undergraduates in Biological and Mathematical Sciences	2.32	2.71	2.70	-	Broader STEM	Post-Secondary STEM Degrees	No
0025	National Science Foundation	International Research Experiences for Students	2.71	4.22	3.43	-	Broader STEM	Post-Secondary STEM Degrees	No
0037	National Science Foundation	Louis Stokes Alliances for Minority Participation	40.47	42.50	44.55	-	Broader STEM	Post-Secondary STEM Degrees	Yes
0320	National Science Foundation	NSF Scholarships in Science, Technology, Engineering, and Mathematics	92.40	61.22	75.96	-	Broader STEM	Post-Secondary STEM Degrees	Yes
0038	National Science Foundation	Research in Disabilities Education	5.93	6.88	6.92	-	Broader STEM	Post-Secondary STEM Degrees	Yes
0022	National Science Foundation	Science, Technology, Engineering, and Mathematics Talent Expansion Program	29.48	29.09	31.64	-	Broader STEM	Post-Secondary STEM Degrees	No
0006	National Science Foundation	Geoscience Teacher Training	3.00	3.00	2.98	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0032	National Science Foundation	Research Experiences for Teachers in Engineering and Computer Science	3.97	5.79	5.41	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0021	National Science Foundation	Robert Noyce Scholarship Program	55.05	115.00	54.93	-	Broader STEM	Pre- and In-Service Educator/ Education Leader Performance	No
0034	National Science Foundation	Alliances for Graduate Education and the Professoriate	15.85	17.18	16.73	-	Broader STEM	STEM Careers	Yes

Invest. #	Agency	Investment	FY 08	FY 09	FY 10	FY 11	Type	Primary Objective	Under-represented Groups
0020	National Science Foundation	Research Experiences for Undergraduates	62.67	100.47	80.99	-	Broader STEM	STEM Careers	No
	National Science Foundation	**Total**	**1,052.14**	**1,298.23**	**1,169.28**				
0213	Nuclear Regulatory Commission	Nuclear Education Curriculum Development Program	4.72	4.72	4.70	-	Agency Mission Workforce	Institutional Capacity	No
0282	Nuclear Regulatory Commission	Integrated University Program - Scholarship and Fellowship Program	0.00	8.40	6.60	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0283	Nuclear Regulatory Commission	Integrated University Program - Trade School Scholarships	0.00	1.80	2.20	-	Agency Mission Workforce	STEM Careers	No
0310	Nuclear Regulatory Commission	Minority Serving Institutions Program	1.00	1.42	2.84	-	Broader STEM	Post-Secondary STEM Degrees	Yes
	Nuclear Regulatory Commission		**5.72**	**16.34**	**16.34**				
0306	Transportation	Summer Transportation Institute Program for Diverse Groups	0.64	0.65	0.65	-	Agency Mission Workforce	Engagement	Yes
0303	Transportation	Garrett A. Morgan Technology and Transportation Education Program	1.11	1.13	1.14	-	Agency Mission Workforce	Learning	Yes
0308	Transportation	Air Transportation Centers of Excellence	13.20	14.10	16.40	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0302	Transportation	Dwight David Eisenhower Transportation Fellowship Program	1.96	1.99	2.01	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
0301	Transportation	University Transportation Centers Program	74.44	83.45	83.67	-	Agency Mission Workforce	Post-Secondary STEM Degrees	No
	Transportation	**Total**	**91.36**	**101.32**	**103.87**				
	Grand Total		**2807.10**	**3360.45**	**3440.29**				

Appendix B: Agency Details

Environmental Protection Agency

Figure B1: EPA Investments by Type of Education

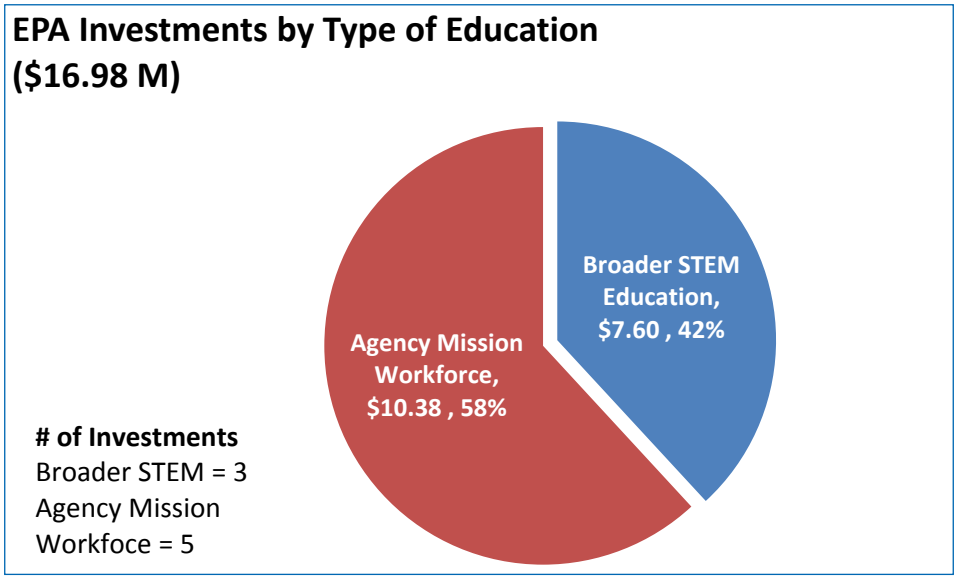


Figure B2: EPA Investments by Objective

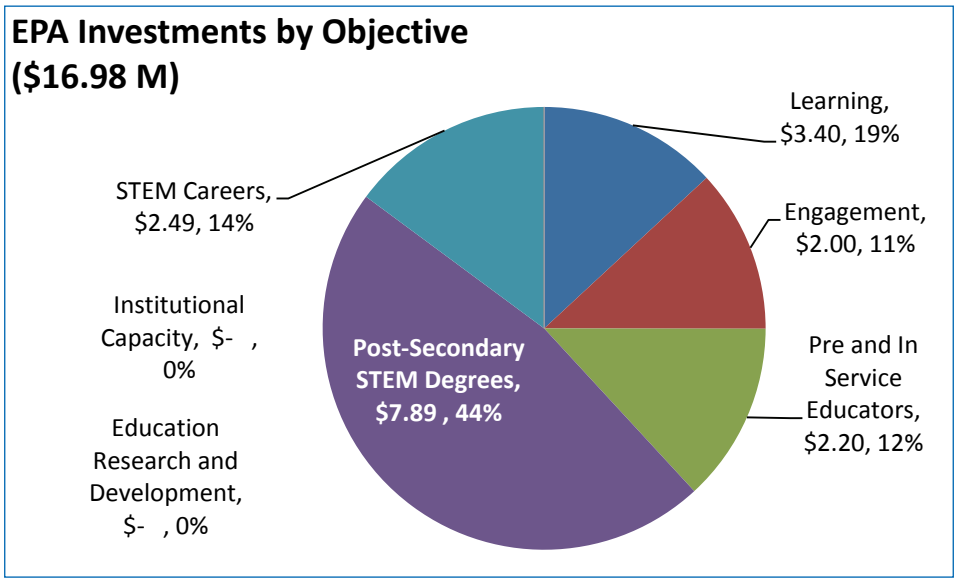


Table B1: Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 0	0	$ 0	0	$ 0	0

Department of Agriculture

Figure B3: USDA Investments by Type of Education

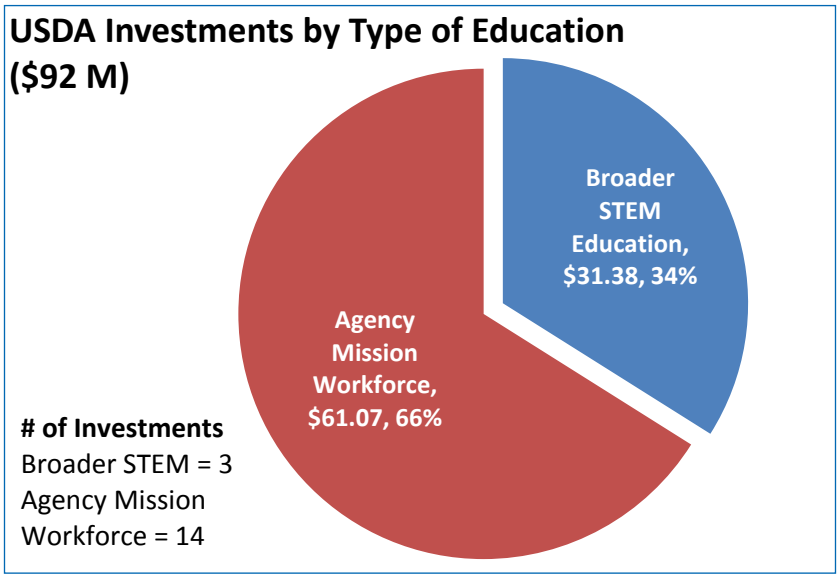


Figure B4: USDA Investments by Objective

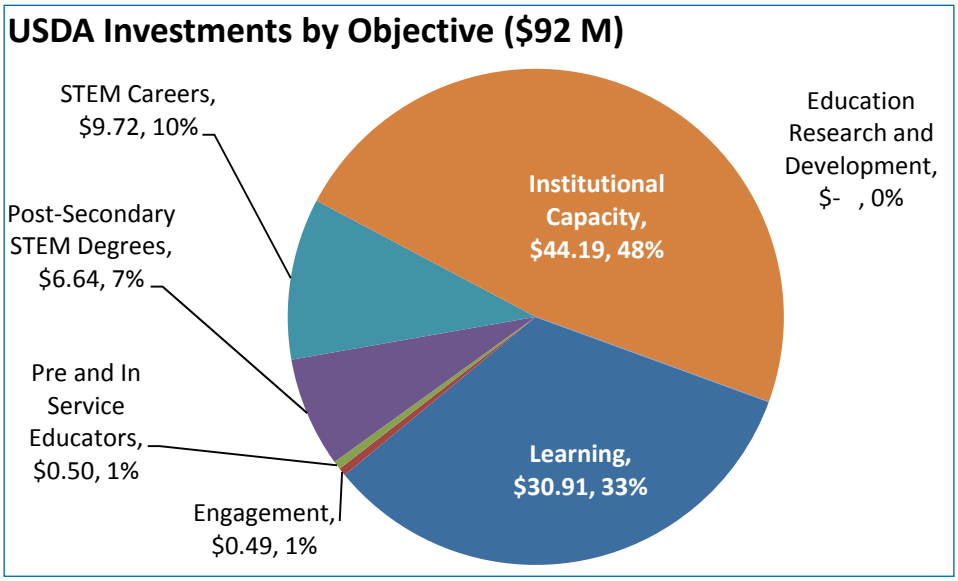


Table B2: USDA Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 6.60	1	$ 44.59	9	$ 51.19	10

Department of Commerce

Figure B5: DOC Investments by Type of Education

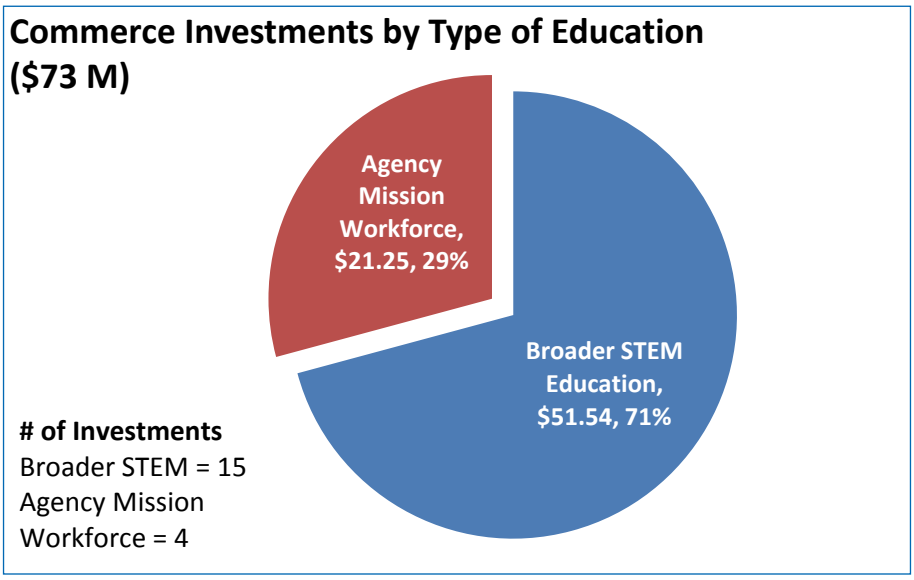


Figure B6: DOC Investments by Objective

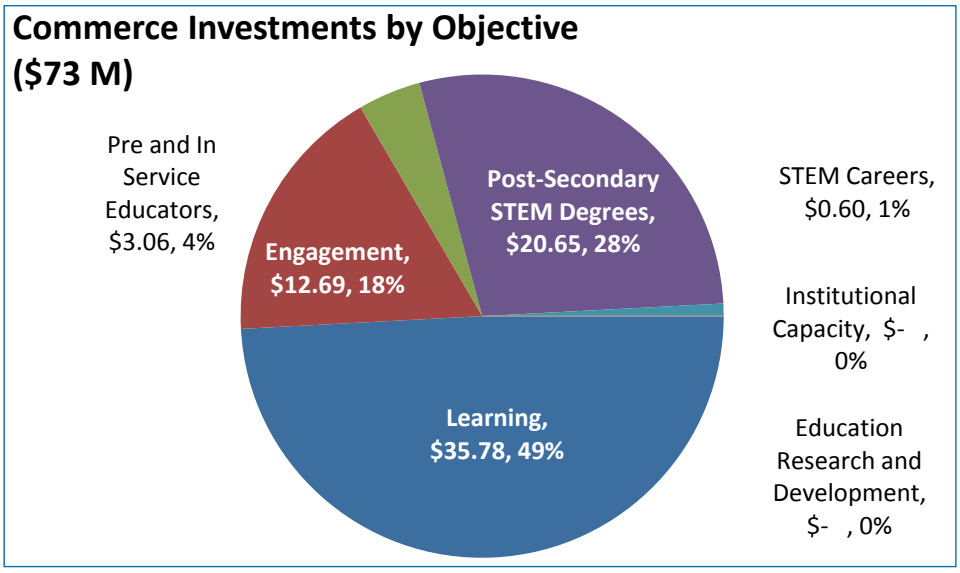


Table B3: DOC Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 3.91	2	$ 14.91	2	$ 18.82	4

Department of Defense

Figure B7: DOD Investments by Type of Education

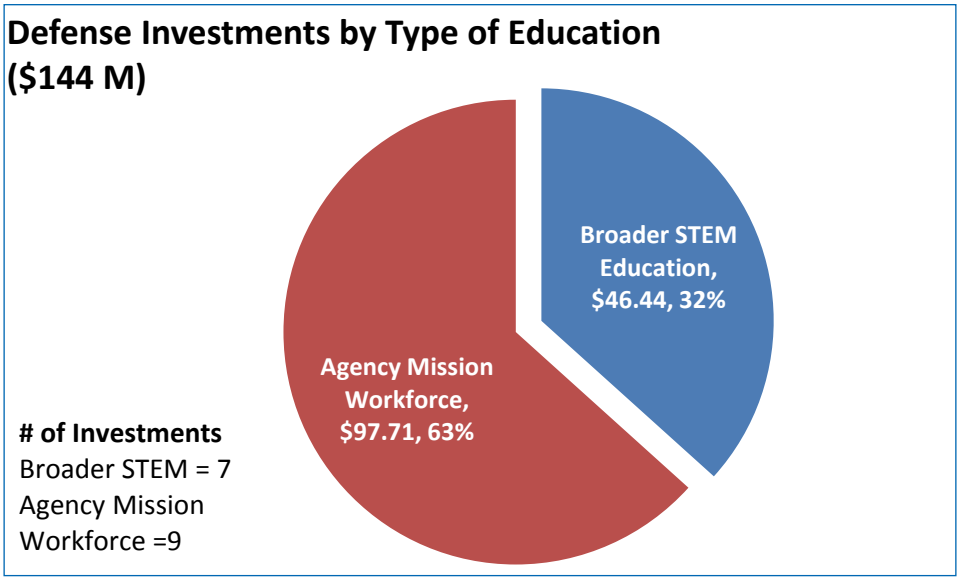


Figure B8: DOD Investments by Objective

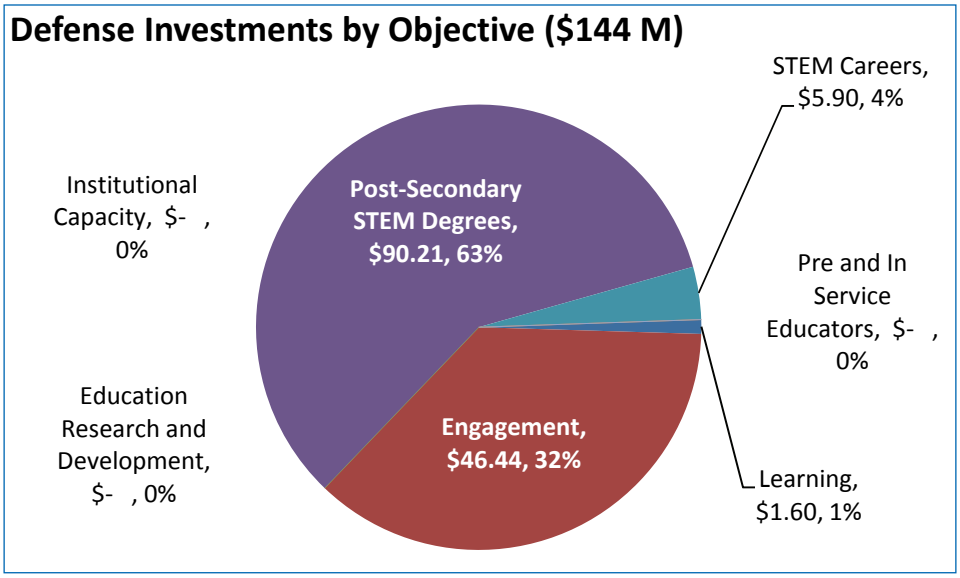


Table B4: DOD Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 22.02	3	$ 1.50	1	$ 23.52	4

Department of Education

Figure B9: DOEd Investments by Type of Education

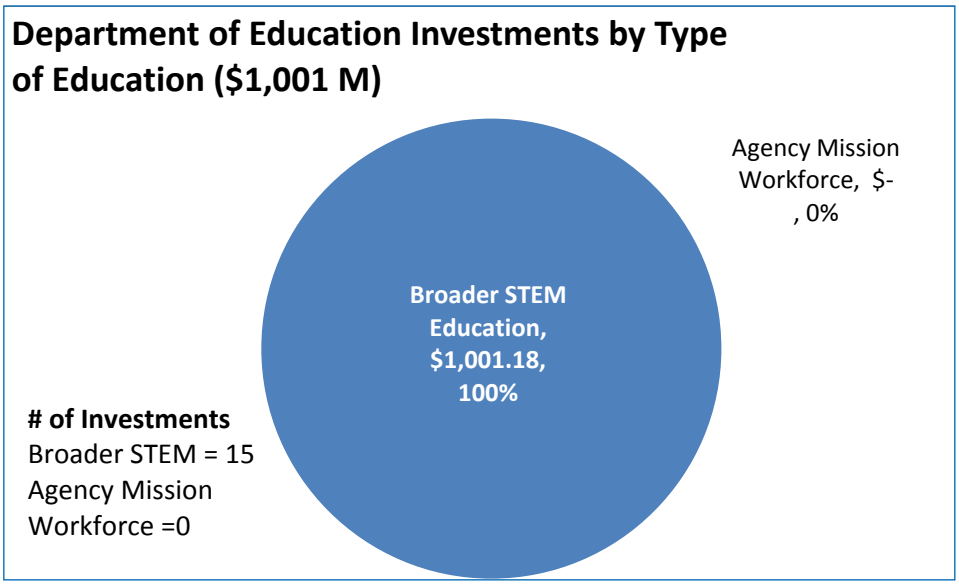


Figure B10: DOEd Investments by Objective

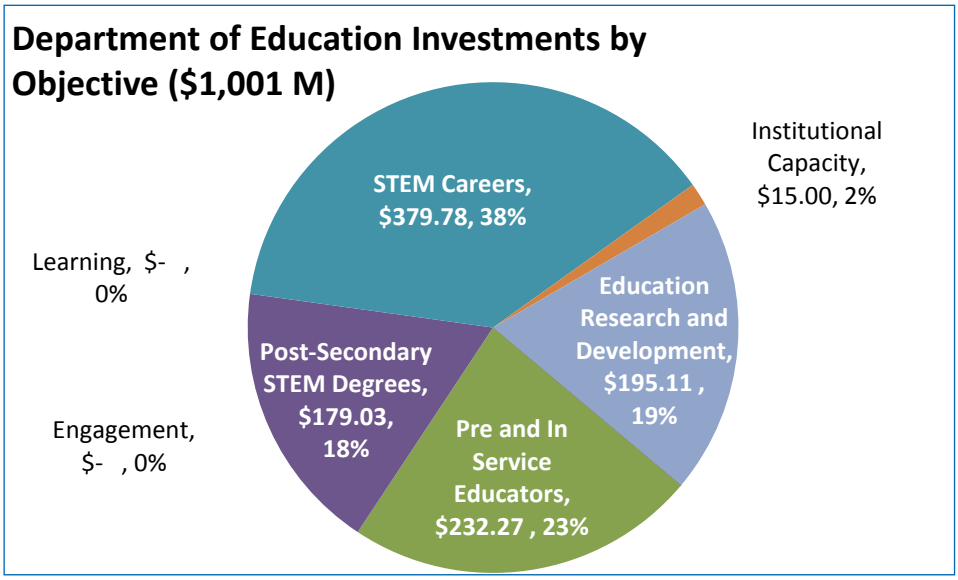


Table B5: DOEd Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 496.02	8	$0	0	$ 496.02	8

Department of Energy

Figure B11: DOE Investments by Type of Education

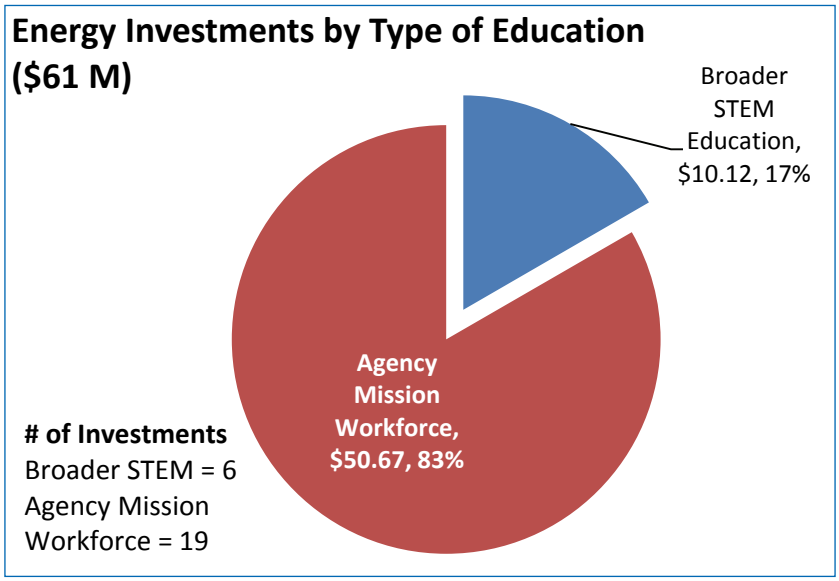


Figure B12: DOE Investments by Objective

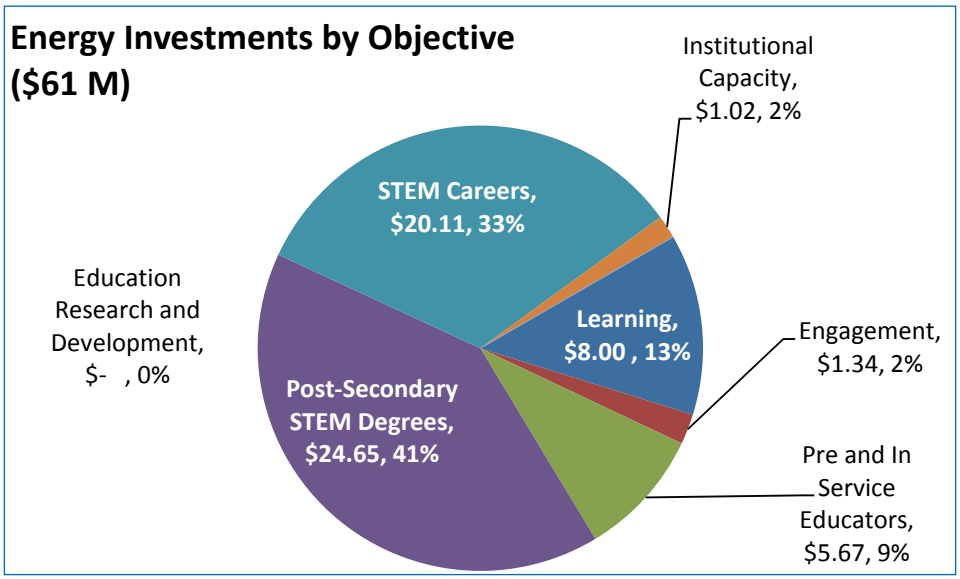


Table B6: DOE Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 0	0	$ 11.92	5	$ 11.92	5

Department of Health & Human Services

Figure B13: HHS Investments by Type of Education

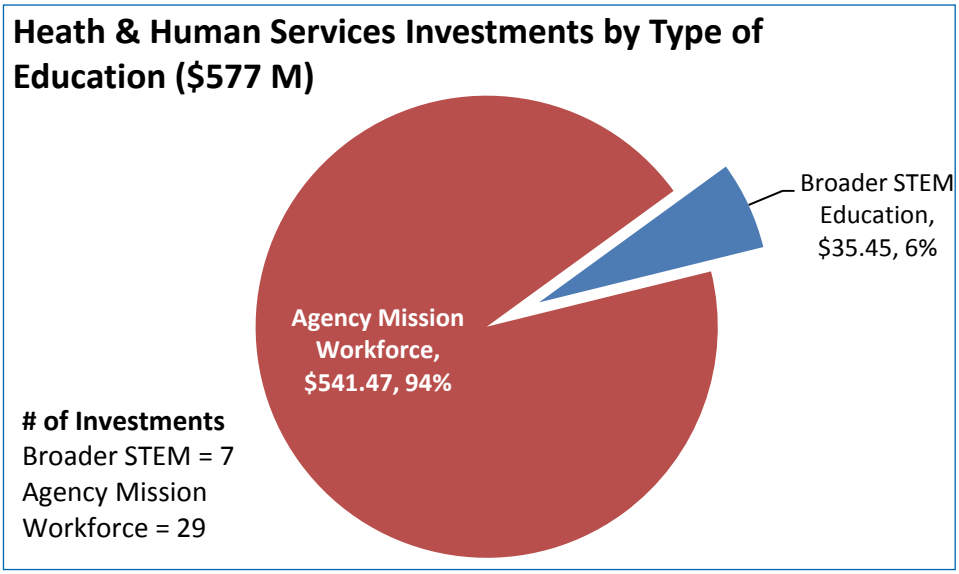


Figure B14: HHS Investments by Objective

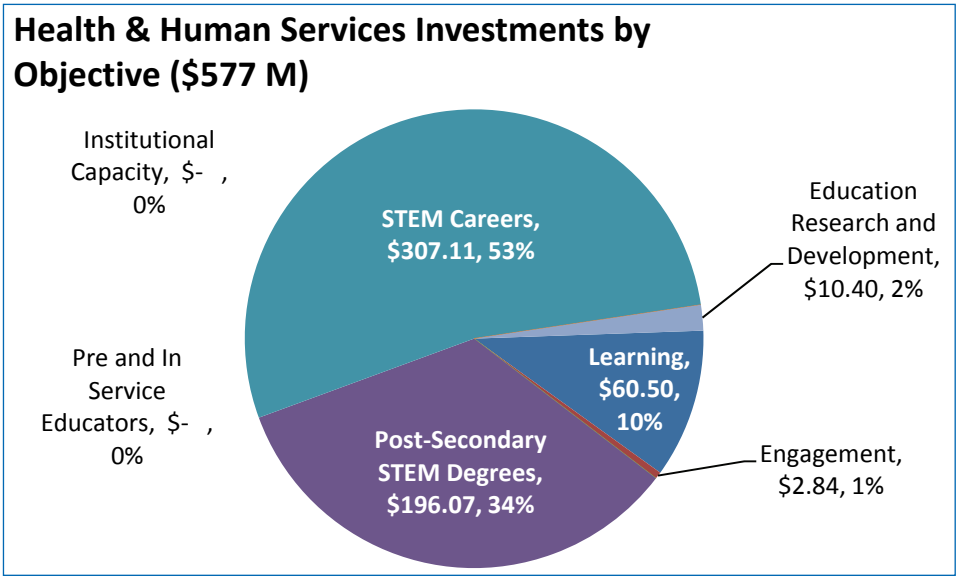


Table B7: HHS Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 18.32	1	$ 159.66	12	$ 177.99	13

Department of Homeland Security

Figure B15: DHS Investments by Type of Education

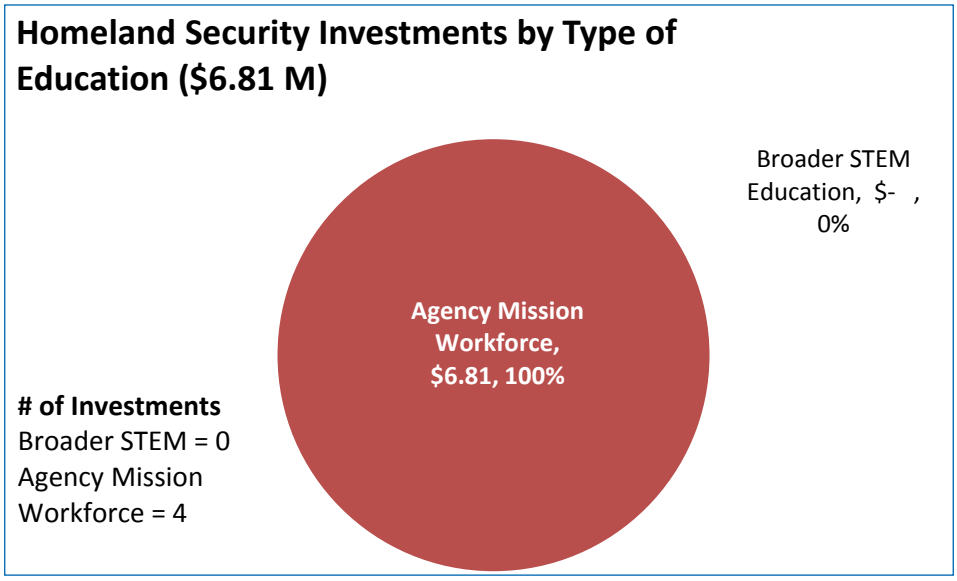


Figure B16: DHS Investments by Objective

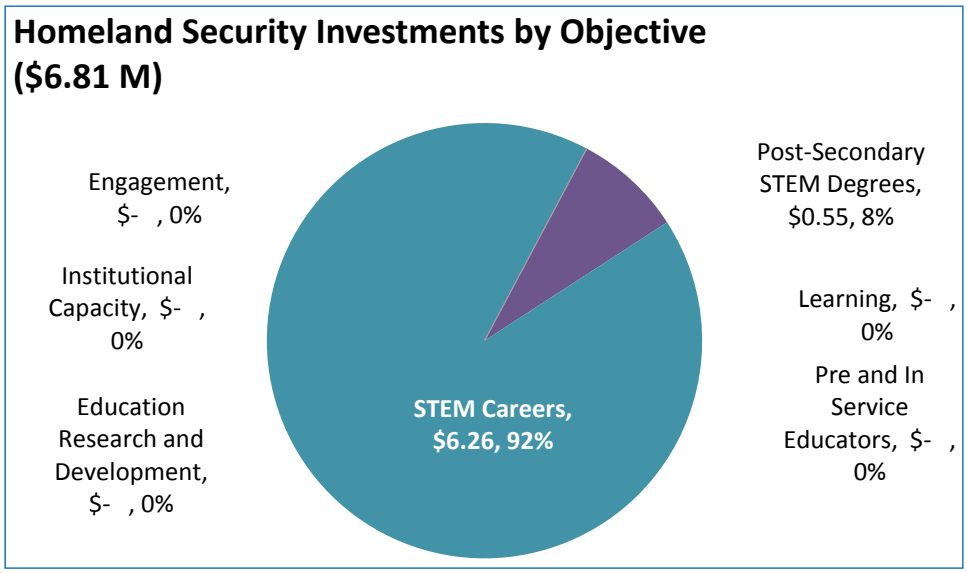


Table B8: DHS Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 0	0	$ 3.95	2	$ 3.95	2

Department of the Interior

Figure B17: DOI Investments by Type of Education

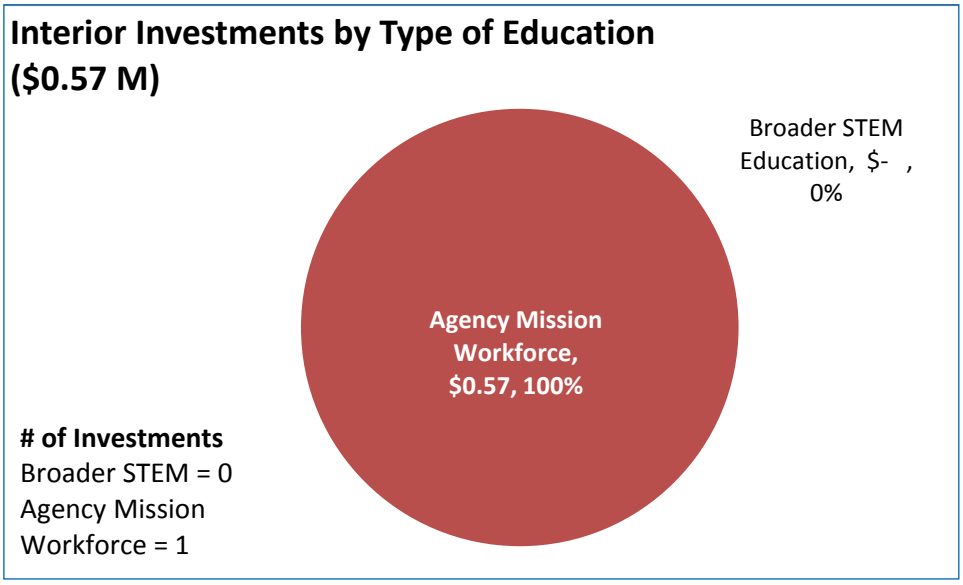


Figure B18: DOI Investments by Objective

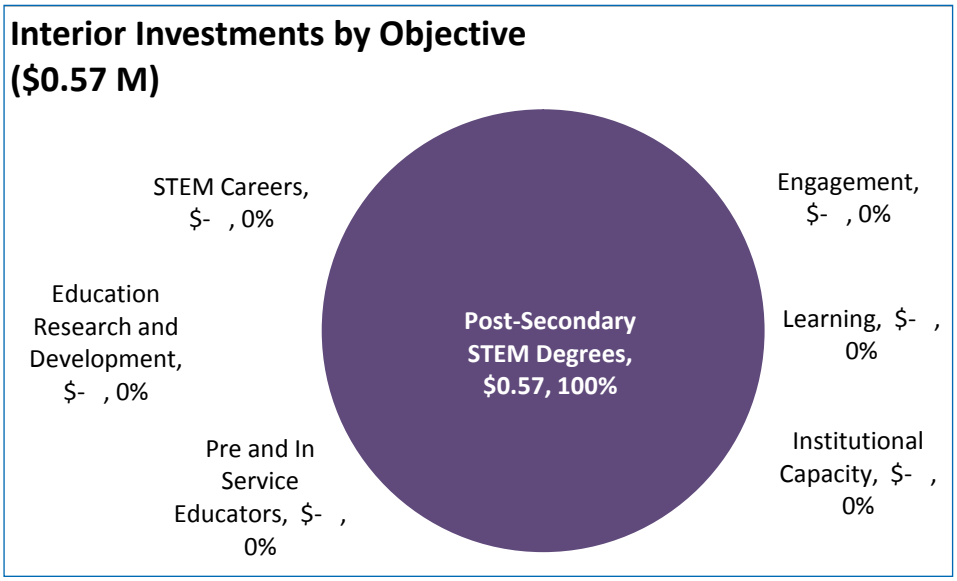


Table B9: DOI Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 0	0	$ 0	0	$ 0	0

National Aeronautics and Space Administration

Figure B19: NASA Investments by Type of Education

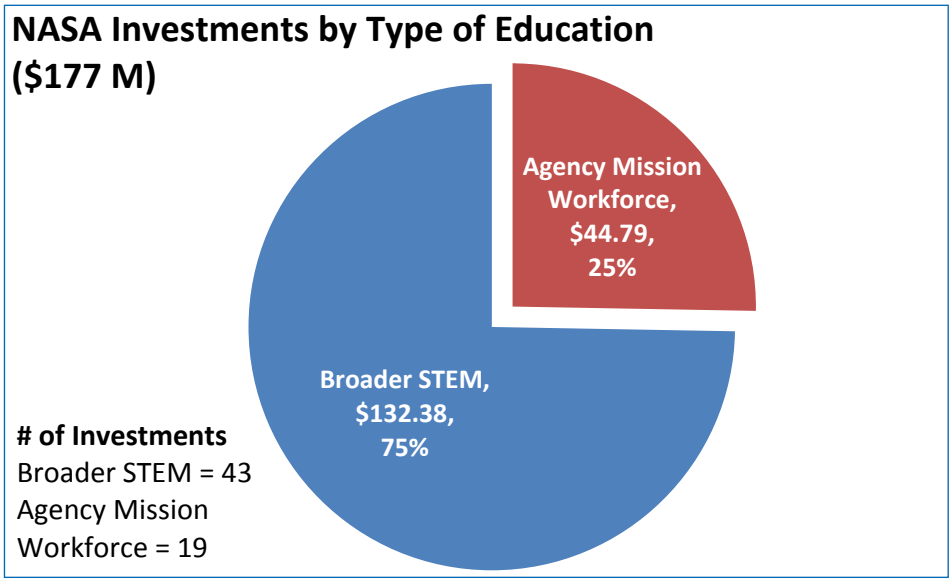


Figure B20: NASA Investments by Objective

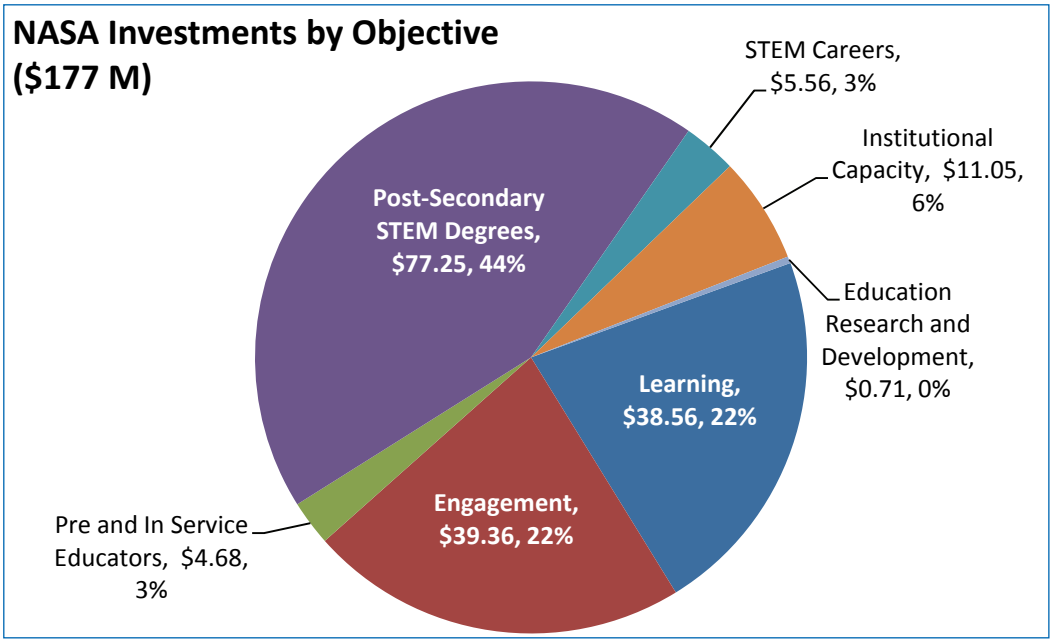


Table B10: NASA Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 30.17	10	$ 29.24	8	$ 59.41	18

National Science Foundation

Figure B21: NSF Investments by Type of Education

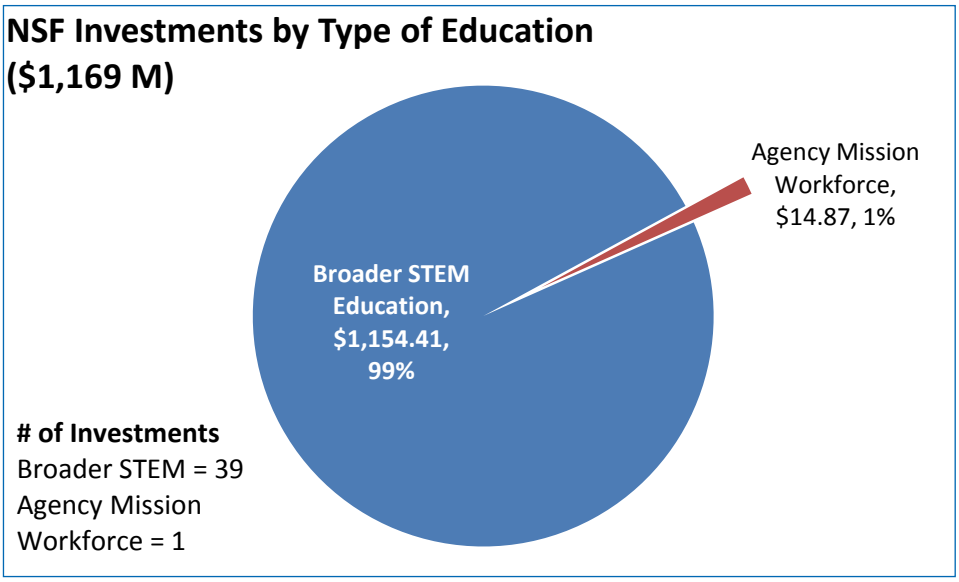


Figure B22: NSF Investments by Objective

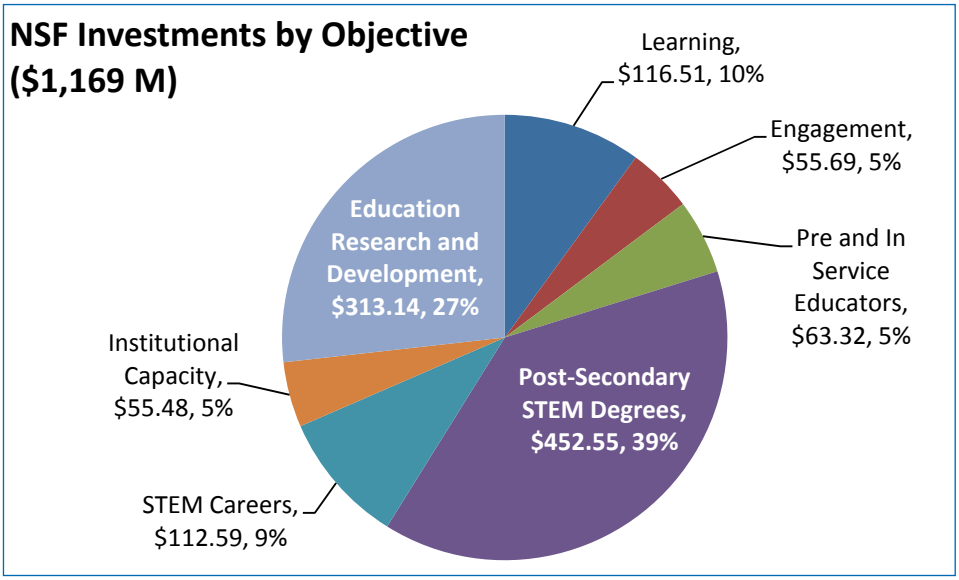


Table B11: NSF Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 238.55	12	$ 0	0	$ 238.55	12

Nuclear Regulatory Commission

Figure B23: NRC Investments by Type of Education

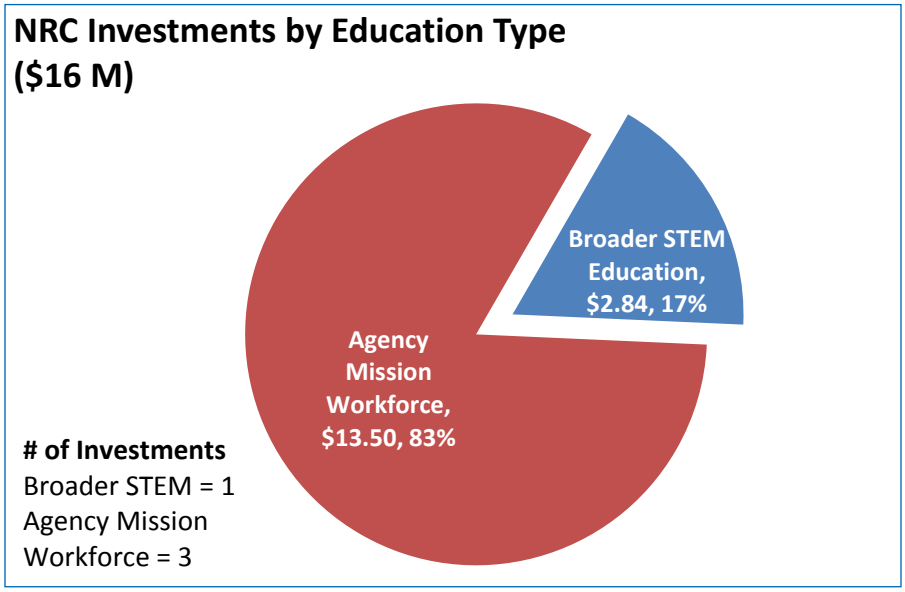


Figure B24: NRC Investments by Objective

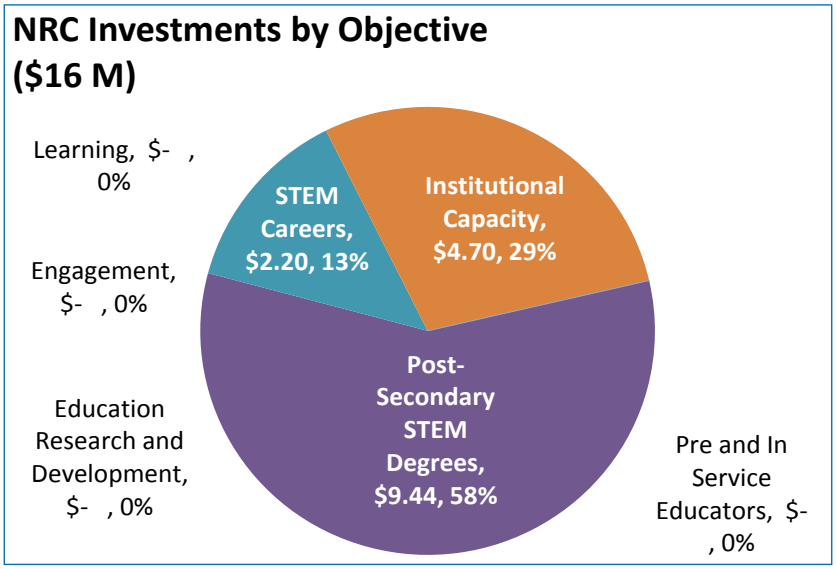


Table B12: NRC Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 2.84	1	$ 0	0	$ 2.84	1

Department of Transportation

Figure B25: DOT Investments by Type of Education

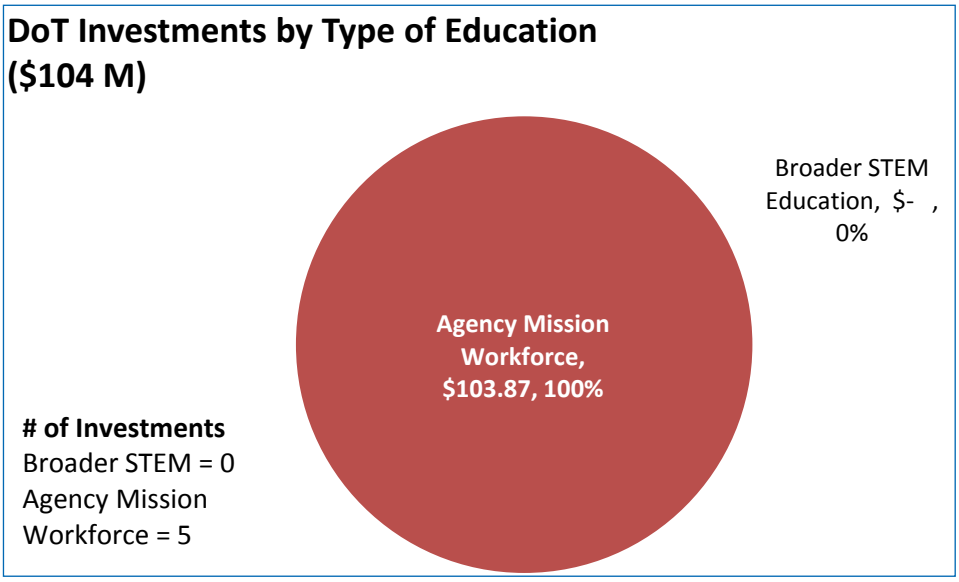


Figure B26: DOT Investments by Objective

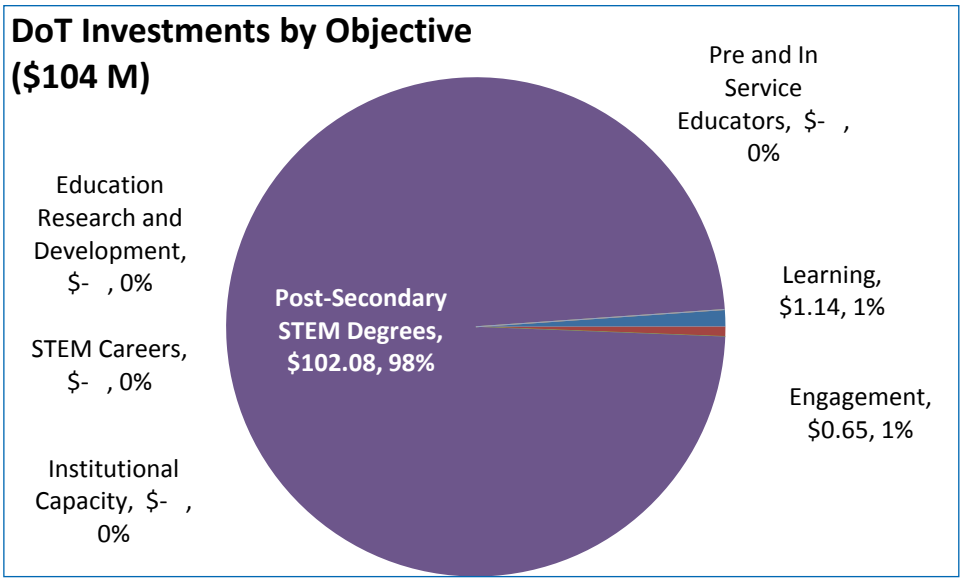


Table B13: DOT Investments Targeting Groups Underrepresented in STEM

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Underrepresented Groups	$ 0	0	$ 1.79	2	$ 1.79	2

Appendix C:
Supplementary Figures and Tables

Table C1: STEM Education Focus by Agency

	Broader STEM		Agency Mission Workforce	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
USDA	$ 31.38	3	$ 61.07	14
DOC	$ 51.54	15	$ 21.25	4
DOD	$ 46.44	7	$ 97.71	9
DOEd	$ 1,001.18	15		
DOE	$ 10.12	6	$ 50.67	19
EPA	$ 7.60	3	$ 10.38	5
HHS	$ 35.45	7	$541.47	29
DHS			$ 6.81	4
DOI			$ 0.57	1
NASA	$ 132.38	43	$ 44.79	19
NSF	$ 1,154.41	39	$ 14.87	1
NRC	$ 2.84	1	$ 13.50	3
DOT			$ 103.87	5
Total	**$ 2,473.33**	**139**	**$ 966.96**	**113**

Table C2: Funding and Number of Investments by Primary Objective

	Broader STEM		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Learning	$ 243.08	32	$ 53.32	16	$ 296.40	48
Engagement	$ 157.16	36	$4.35	6	$ 161.50	42
Pre- and In-Service Educators	$ 311.71	24	$0	0	$ 311.71	24
Post-Secondary STEM Degrees	$ 678.92	18	$488.65	53	$ 1,167.56	71
STEM Careers	$ 480.25	5	$372.08	30	$ 852.33	35
Institutional Capacity	$ 82.87	12	$48.57	8	$ 137.43	20
Education Research and Development	$ 519.35	12	$0	0	$ 519.35	12

Table C3: Investments with a Primary Goal of Broadening Participation by Primary Objective

	Broader STEM		Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Learning	$ 46.13	7	$ 1.14	1	$ 47.27	8
Engagement	$ 61.85	11	$ 3.29	4	$ 65.14	15
Pre- and In-Service Educators	$ 183.84	3	$ 0	0	$ 183.84	3
Post-Secondary STEM Degrees	$ 305.84	8	$ 204.94	24	$ 510.79	32
STEM Careers	$ 16.73	1	$15.43	6	$ 32.16	7
Institutional Capacity	$ 67.31	5	$ 42.77	6	$ 110.08	11
Education Research and Development	$ 136.71	3	$ 0	0	$ 136.71	3

Table C4: Investments with a Primary Objective of Supporting In- and Pre-Service Teacher Education by Agency

		Only Educator Prep	Only Educator PD	Both Prep and PD	Totals
Agriculture	Funding Total	$ -	$ -	$ 0.50	$ 0.50
	Investment Count	-	-	1	1
Commerce	Funding Total	$ -	$ 2.16	$ 0.90	$ 3.06
	Investment Count	-	4	1	5
Education	Funding Total	$ -	$ 230.27	$ 2.00	$ 232.27
	Investment Count	-	2	2	4
Energy	Funding Total	$ 0.43	$ 4.47	$ 0.77	$ 5.67
	Investment Count	1	2	1	4
Environmental Protection Agency	Funding Total	$ -	$ -	$ 2.20	$ 2.20
	Investment Count	-	-	1	1
NASA	Funding Total	$ -	$ 1.78	$ 2.90	$ 4.68
	Investment Count	-	4	2	6
National Science Foundation	Funding Total	$ -	$ -	$ 63.32	$ 63.32
	Investment Count	-	-	3	3
TOTAL	Funding Total	**$ 0.43**	**$ 238.68**	**$ 71.59**	**$ 311.71**
	Investment Count	**1**	**12**	**11**	**24**

Table C5: Support for Underserved Groups in STEM by Agency

	Broader STEM Education		Agency Mission Workforce		Total	
	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.	Investment $ (in millions)	# of Invest.
Agriculture	$ 6.60	1	$ 44.59	9	$51.19	10
Commerce	$ 3.91	2	$ 14.91	2	$18.82	4
Defense	$ 22.02	3	$ 1.50	1	$23.52	4
Education	$ 496.02	8	$ 0	-	$496.02	8
Energy	$ 0	0	$ 11.92	5	$11.92	5
Health & Human Services	$ 18.32	1	$ 159.66	12	$177.99	13
Homeland Security	$ 0	0	$ 3.95	2	$3.95	2
NASA	$ 30.17	10	$ 29.24	8	$59.41	18
National Science Foundation	$ 238.55	12	$ 0	0	$238.55	12
Nuclear Regulatory Commission	$ 2.84	1	$ 0	0	$2.84	1
Transportation	$ 0	0	$ 1.79	2	$1.79	2
Total	**$ 818.42**	**38**	**$ 267.57**	**41**	**$1,085.99**	**79**

Table C6: Investments by Level of K-20 Learner by Agency

		K-12 Only	K-12 & Undergrad	Undergrad Only	Undergrad & Graduate	Graduate Only	K-12, Undergrad, & Graduate	Totals by Agency
USDA	$	$ 25.26	$ 0.98	$ 7.66	$ 13.18	$ 9.36	$ 9.69	$ 66.13
	#	3	1	3	3	2	2	14
DOC	$	$ 27.60	$ 1.79	$ 6.34	$ -	$ 0.60	$ 33.07	$ 69.40
	#	6	1	2	-	1	5	15
DOD	$	$ 38.70	$ 7.74	$ 6.10	$ 48.90	$ 39.61	$ -	$ 141.05
	#	6	1	2	2	3	-	14
DOEd	$	$ 145.37	$ -	$ 395.78	$ 100.00	$ 31.00	$ -	$ 672.15
	#	2	-	3	1	1	-	7
DOE	$	$ 3.20	$ -	$ 5.88	$ 21.34	$ 14.05	$ 11.59	$ 56.05
	#	2	-	4	9	4	3	18
EPA	$	$ -	$ -	$ 1.50	$ 2.99	$ 7.89	$ 3.40	$ 15.78
	#	-	-	1	3	2	1	7
HHS	$	$ 22.78	$ 13.24	$ 28.19	$ 133.07	$ 340.95	$ 5.87	$ 544.08
	#	5	3	3	11	10	1	33
DHS	$	$ -	$ -	$ 0.36	$ 6.45	$ -	$ -	$ 6.81
	#	-	-	1	3	-	-	4
DOI	$	$ -	$ -	$ -	$ 0.57	$ -	$ -	$ 0.57
	#	-	-	-	1	-	-	1
NASA	$	$ 39.47	$ 25.56	$ 13.95	$ 23.26	$ 7.03	$ 9.50	$ 118.77
	#	18	10	9	8	2	3	50
NSF	$	$ 93.21	$ 199.33	$ 199.82	$ 109.33	$ 280.27	$ 235.61	$ 1,117.57
	#	4	5	7	4	5	9	34
NRC	$	$ -	$ -	$ 2.20	$ 6.60	$ -	$ 2.84	$ 11.64
	#	-	-	1	1	-	1	3
DOT	$	$ 1.14	$ -	$ -	$ 19.06	$ -	$ -	$ 20.20
	#	1	-	-	3	-	-	4
TOTAL	**$**	**$ 396.73**	**$ 248.65**	**$ 667.77**	**$ 484.74**	**$ 730.75**	**$ 311.57**	**$ 2,840.20**
	#	**47**	**21**	**36**	**49**	**30**	**25**	**208**

Table C7: Investments by STEM Field

	Investment $ (in millions)	# of Invest.
Aspects of STEM Related to the Agency Mission	$ 883.29	112
STEM	$1,023.46	42
Science	$1,393..83	82
Math	$15.07	1
Engineering	$14.13	2
Science + T, E, or M	$110.63	13
Total	**$3,440.29**	**252**

Appendix D:
NSTC Inventory Survey

Office of Science and Technology Policy, National Science and Technology Council, Committee on STEM Education

Inventory of Federal STEM Education

Introduction

The America COMPETES Reauthorization Act of 2010 calls for OSTP to establish, maintain, and periodically update an inventory of federal investments in science, technology, engineering, and mathematics (STEM) education as part of a five-year federal STEM education strategic plan. To complete the inventory, OSTP is seeking information from federal departments and agencies. This inventory will capture information on STEM education investments to illustrate distinct program characteristics, create learning communities within and across federal agencies (for improving implementation and evaluation of education investments), identify areas of potential synergy across and within agencies, and support the development of a federal five-year strategic STEM education plan. The inventory process will occur on a cyclical basis to ensure that the information is up-to-date. The inventory will be accessible electronically by all agencies and will include a mechanism for staff to search for investments with specific characteristics. The search function is one mechanism that will promote learning communities and greater awareness of education investments within and across federal agencies.

The inventory should include federal agency-funded pre-kindergarten (Pre-K) through graduate STEM education and out- of-school STEM education for people of all ages. A detailed set of criteria for what to include in the inventory and related definitions are listed below.

The inventory effort is led by the Task Force on Federal Investments in STEM Education, which is comprised of representatives from 11 Federal agencies.

STEM education inventories have been conducted in the past by OMB, GAO, and individual agencies. This effort builds on previous inventories in many ways, but OSTP hopes that this inventory will be more useful to agencies and outside stakeholders (a public interface for the inventory is under consideration) and will be less time consuming to complete. For example, this form has been pre-populated with information about existing STEM education from the previous inventories to minimize the level of effort required of federal agencies to complete the inventory survey.

Please complete this questionnaire **June 10th**. Be aware that OSTP may request support documentation to selected questions after your responses are reviewed. Thank you for your time and assistance.

Contact

If you have questions or difficulties completing the questionnaire, please contact:

Michael Feder: Michael_A_Feder@ostp.eop.gov, or at 202-456-6059 on Mondays and Wednesdays from 4-6 pm EST and on Fridays from 12-1pm EST.

Definitions

Before you begin, please read the following definitions of STEM and STEM Education, and Education Investment carefully to determine whether you need to complete the survey. Contact Michael Feder if you have any questions regarding these definitions.

STEM: For the purposes of this inventory STEM includes physical and natural sciences, technology, engineering, and mathematics disciplines, topics, or issues (including environmental science education or environmental stewardship). OSTP recognizes that various different and usually broader definitions are used for "STEM." This relatively narrow definition has been chosen to constrain the focus of the inventory to specific areas that have similar educational contexts, issues, and challenges in order to maximize the inventory's usefulness in characterizing what the federal government is doing to address these educational contexts, issues, and challenges. Investments in physical and natural sciences, technology, engineering, or mathematics education that also include education on related social science topics should also be described in full within the inventory (do not disaggregate information on social sciences).

STEM Education: Formal or informal education that is primarily focused on physical and natural sciences, technology, engineering, and mathematics disciplines, topics, or issues (including environmental science education or environmental stewardship). For the purposes of this inventory, STEM education has one of the following as the primary objective:

- Learning: Develop STEM skills, practices, or knowledge of students or the public;
- Engagement: Increase learners' engagement, interest in STEM and their perception of its value to their lives, or their ability or participate in STEM.
- Pre and In Service Educator/Education Leader Performance: Train or retain STEM educators (K-12 pre-service or in-service, post-secondary, and informal) and education leaders to improve their content knowledge and pedagogical skills;
- Post-Secondary STEM Degrees: Increase the number of students who enroll in STEM majors, complete STEM credentials or degree programs, or are prepared to enter STEM careers or advanced education;
- STEM Careers: Prepare people to enter STEM workforce with training or certification (where STEM discipline specific knowledge and skill are the primary focus of the education investment)
- STEM System Reform: Improve STEM education through a focus on education system reform;
- Institutional Capacity: Support advancement and development of STEM personnel, programs, and infrastructure in educational institutions such as universities, informal education institutions, state education agencies, and local education agencies; or
- Education Research and Development: Develop evidence-based STEM education models and practices.

For the purposes of this inventory **do not enter** information about STEM education that **primarily**:

- Provides post-doctoral research fellowships/scholarships;
- Focuses on subjects other than STEM or includes STEM as one of many possible focal subjects (more than two other non-STEM areas);
- Supports one-time or ad hoc STEM education investments;
- Involves engagement in volunteer activities (e.g. judging STEM competitions, and visiting classrooms);
- Provides outreach for education (raising awareness of education programs) or communication (providing information through various media);
- Relates to STEM education products that are no longer part of a funded education investment;
- Focuses on broad education system reform and does not have a primary focus on improving STEM education
- Does not support specific knowledge, interest, or skills specific to STEM disciplines.

Education Investment: Within and across federal agencies there are different definitions of a program, project, and/or activity. To avoid confusion, please report information on all education investments. An education investment has a dedicated budget for education of more than $300K (potentially part of a budget for a larger program, but excluding a one-time or irregular expenditure of overhead funds), staff to manage the budget, and was funded in FY 2010.

Inventory Questionnaire

Section 1: Education Investment Background Information

Please provide the requested background information on the education investment.

Investment Name: [ ]

Agency: [ ]

Sub Agency: [ ]

Investment ID:[30] (ID assigned by agency for tracking or other purposes) [ ]

Catalogue of Federal Domestic Assistance: [ ]

1.1 Please give a brief description of the education investment and its objectives.

_____

_____

1.2 Provide the Web address for the education investment, if one exists.

_____

1.3 Provide contact information for up to two managers/directors of the education investment.

Name: _____

E-mail: _____

Office phone _____

Name: _____

E-mail: _____

Office phone: _____

30. May not be applicable to all agencies.

1.4 What core expertise could the education investment's staff share with other federal agency education staff? (check all that apply)

	Yes		Yes
Instructional material development	☐	Alignment of materials to education standards	☐
Instructional material implementation	☐		
Professional development design and implementation	☐	Development of logic models or theories of action	☐
Promotional campaigns for education products	☐		
STEM teaching and learning research	☐	Establish connection between the formal and informal education systems	☐
Evidence based instructional practices	☐		
K-12	☐	Leverage funding from federal and non-federal entities	☐
Higher education	☐		
Informal education	☐	Scale up effective efforts	☐
Teacher professional development	☐	Identify and connect to subject matter expertise	☐
Evaluation			
Formative evaluation	☐	Establish and maintain partnerships with:	
Summative evaluation	☐	Other federal agencies	☐
Portfolio evaluation	☐	Schools or school systems	☐
Evaluation of informal education	☐	Non-federal companies or organizations	☐
Process or implementation evaluation	☐	Minority institutions	☐
Tutoring or mentoring	☐	Request for proposals development	☐
Engage agency staff in outreach efforts	☐	Peer-review best practices	☐
Use of social media/social network tools	☐	Conduct proposal merit review section process	☐
Run STEM competitions	☐	Other :_____	☐
Design efforts for minority, high needs, or underserved populations	☐		

1.5 What issues or topics would you like to learn more about through conversation with experts or groups of experts from your or other agencies? (check all that apply)

	Yes		Yes
Instructional material development	☐	Alignment of materials to education standards	☐
Instructional material implementation	☐		
Professional development design and implementation	☐	Development of logic models or theories of action	☐
Promotional campaigns for education products	☐		
STEM teaching and learning research	☐	Establish connection between the formal and informal education systems	☐
Evidence based instructional practices			
K-12	☐	Leverage funding from federal and non-federal entities	☐
Higher education	☐		
Informal education	☐	Scale up effective efforts	☐
Teacher professional development	☐	Identify and connect to subject matter expertise	☐
Evaluation			
Formative evaluation	☐	Establish and maintain partnerships with:	☐
Summative evaluation	☐	Other federal agencies	☐
Portfolio evaluation	☐	Schools or school systems	☐
Evaluation of informal education	☐	Non-federal companies or organizations	☐
Process or implementation evaluation	☐	Minority institutions	☐
Tutoring or mentoring	☐	Request for proposals development	☐
Engage agency staff in outreach efforts	☐	Peer review best practices	☐
Use of social media/social network tools	☐	Conduct proposal merit review section process	☐
Run STEM competitions	☐	Other_____	☐
Design efforts for minority, high needs, or underserved populations	☐		

Section 2: Descriptive Education Investment Information

Please provide the requested background information on the education investment

2.1. Is this education investment designed to develop or train the STEM workforce of your agency or the STEM workforce in fields directly related to your agency's mission (e.g., aerospace engineering, national security science, nuclear regulatory science)? Workforce development programs include investments such as graduate scholarships, undergraduate internships, or institutional capacity building only when the investments are in fields or degrees tightly aligned to your agency's mission. We assume that nearly all postsecondary STEM education investments by mission agencies will be categorized as workforce investments (If yes skip to Section 5: STEM workforce training)

Yes: ☐ (skip to Section 5) No: ☐ (Continue to 2.2)

2.2 What are the primary and secondary objectives of the education investment? (Please select only one primary objective. You may select multiple secondary objectives if appropriate. The primary objective of the education investment characterizes the primary desired outcome, or is the basis for evaluating the education investment under ideal circumstances. A secondary objective is an objective that contributes to accomplishing the outcomes of the education investment and it may or may not be desirable to evaluate whether the secondary objective is being achieved.)

	Primary Objective	Secondary Objective
Learning: Develop STEM skills, practices, or knowledge of students or the public	☐	☐
Engagement: Increase learners' engagement, interest in STEM and their perception of its value to their lives, or their ability or participate in STEM.	☐	☐
Pre and In Service Educator/Education Leader Performance: Train or retain STEM educators (K-12 pre-service or in-service, post-secondary, and informal) and education leaders to improve the content knowledge and pedagogical skills of STEM educators.	☐	☐
Post-Secondary STEM Degrees: Increase the number of students who enroll in STEM majors, complete STEM credentials or degree programs, or are prepared to enter STEM careers or advanced education.	☐	☐
STEM Careers: Prepare people to enter STEM workforce with training or certification (where STEM discipline specific knowledge and skill are the primary focus of the education investment; STEM educator training and development investments should select the *Pre and In Service Educator/Education Leader Performance* objective listed above)	☐	☐
Institutional Capacity: Support advancement and development of STEM personnel, programs, and infrastructure in educational institutions such as universities, informal education institutions, state education agencies, and local education agencies.	☐	☐
STEM System Reform: Improve STEM education through a focus on education system reform	☐	☐
Develop evidence-based STEM education models and practices.	☐	☐
Other: _____	☐	☐

2.3 We are interested in where this STEM education investment falls on the R & D continuum. The STEM education R & D continuum can be conceived as being composed of five categories: Basic/foundational education research; Disciplinary education research; Small scale program implementation, Building capacity of people or organizations; and Large scale development. Some education investments may fall squarely in one of these categories or cut across various categories. Please identify where your education investment primarily falls on the R & D continuum, and what other categories it also covers. (check one per row)

	Primary Approach	Secondary Approach	Not a Primary or Secondary Approach
Basic Education Research: on STEM learning, teaching, or education practices/materials/technology	☐	☐	☐
Disciplinary Learning and Teaching: research and development interwoven to improve STEM learning and teaching, within a single STEM discipline or across specific disciplines (e.g. learning trajectories research)	☐	☐	☐
Small-Scale Implementing: techniques, models, resources, and/or technologies used with a relatively small group of learners or educators in one or several (<10) classrooms, museums, schools, etc.	☐	☐	☐
Building Capacity of People or Organizations: development of human and institutional capacity to develop, test, adapt and implement effective STEM education work	☐	☐	☐
Large Scale Deploying: techniques, models, resources, and/or technologies implemented at the state, regional, or national scale	☐	☐	☐

2.4 What services or products are part of the education investment? (check all that apply)

	Yes
Direct classroom instruction to students	☐
Instructional material development	☐
Online education resource sites (e.g., online digital libraries)	☐
Fellowship or scholarships (for educators or students)	☐
Internship (short-term STEM employment)	☐
Recognition awards	☐
STEM competition	☐
Engagement in authentic STEM experience (including research)	☐
STEM learning program (i.e., after-school, weekend, or summer program)	☐
Tutoring, mentoring, or other learner support	☐
Training or professional development	☐
Loan forgiveness	☐
Education research to improve STEM teaching and learning	☐
Assessment implementation	☐
Assessment development	☐
Institutional support for infrastructure (to strengthen STEM education capabilities though expansion of facilities, classrooms, technology, and other physical infrastructure)	☐
Institutional support for leadership, management, and administrative activities	☐
Other: _____	☐

2.5 Who is the PRIMARY target audience or beneficiary of this investment? (check all that apply)

Audience or Beneficiary Type	Yes	Audience or Beneficiary Type	Yes
Pre-K-20 learners	☐	K-12 staff/ leaders/ administrators	☐
Pre-K	☐	Pre-K	☐
Elementary (K-5)	☐	Elementary (K-5)	☐
Middle (6-8)	☐	Middle School (6-8)	☐
High school (9-12)	☐	High School (9-12)	
Undergraduate (13-16)	☐		
Graduate (17-20)	☐		
K-12 Classroom Teachers	☐	Post-secondary instructors	☐
Pre-service pre-K	☐	Undergraduate (13-16)	☐
Pre-service elementary school (K-5)	☐	Graduate (17-20)	☐
Pre-service middle school (6-8)	☐	Post Graduate	☐
Pre-service high school (9-12)	☐	Post-secondary deans/leaders/administrators	☐
In-service pre-K	☐	Undergraduate	☐
In-service elementary (K-5)	☐	Graduate	☐
In-service middle school (6-8)	☐	Post Graduate	☐
In-service high school (9-12)	☐		
Adult learners (other than educators, education, leaders, education researchers or policy makers)	☐	Informal STEM Educators	☐
		Informal STEM education leaders/program developers	☐
Education researchers	☐	Other _____	☐

2.6 Does the education investment primarily focus on underrepresented, underserved, or high needs groups in STEM fields (as opposed to targeting the entire population with importance attached to serving underrepresented groups)? (check all that apply)

	Yes
Traditionally underrepresented or underserved groups (and not focused on a specific group; should not select any items below)	☐
Hispanic or Latino	☐
Black or African American	☐
Native Hawaiian / Other Pacific Islander	☐
American Indian / Alaska Native	☐
Economically disadvantaged	☐
Female	☐
Male	☐
Persons with disabilities	☐
Rural	☐
Urban	☐
Other [Audience]	☐
Not applicable	☐

2.7 Is this investment limited to any of the following? (check all that apply)

U.S. citizens ☐

Permanent residents ☐

Nationals (persons born in or having ties with an outlying possession of the United States, such as American Samoa) ☐

No ☐

2.8 **How many students, educators, researchers, or other individuals are served by the education investment each year?** (Provide information for all years where data are available and only in the categories in which numbers served are tracked; insert Don't know if the numbers served in a particular category are tracked but you do not have access to that information; insert n/a if this information was not collected in 2008, 2009, or 2010)

	FY 2008	FY 2009	FY 2010
PreK-12 students			
PreK-12 teachers and staff			
Undergraduate/ Graduate students			
Postsecondary faculty and staff			
Informal educators and staff			
Non-faculty STEM professionals			
Parents or families			
Adult learners			

How many institutions are served by the education investment each year? (Provide information for all years where data are available and only in the categories in which numbers served are tracked; select Don't know if the numbers served in a particular category are tracked but you do not have access to that information)'

	FY 2008	FY 2009	FY 2010
PreK-12 schools			
Postsecondary institutions			
Informal education institutions and organizations			

2.9 **Does the education investment primarily or entirely fund Minority Institutions?**

	Yes
All types of Minority Institutions	☐
Historically Black Colleges or Universities	☐
Hispanic-Serving Institutions	☐
Alaska Native-Serving Institutionsw	☐
Native Hawaiian-Serving Institutions	☐
Tribal Colleges and Universities	☐
No	☐

2.10 What is the duration of the education experience that was produced by the education investment? (provide information on all that apply)

	Duration of: From	To	Unit of time	Don't know	n/a
Scholarship or fellowship	_____	_____	_____	☐	☐
Professional development	_____	_____	_____	☐	☐
Instructional materials (the duration of time that the materials are implemented for)	_____	_____	_____	☐	☐
STEM learning program (i.e., summer, weekend, after-school program)	_____	_____	_____	☐	☐
Student or teacher research experience	_____	_____	_____	☐	☐
Tutoring, mentoring, or other learner support	_____	_____	_____	☐	☐
Research grant	_____	_____	_____	☐	☐
Other **[insert activity type]**	_____	_____	_____	☐	☐

2.11 Is the education investment targeted to a geographic region? (all that apply)

	Yes	
National scope/not targeted to a geographic region	☐	
State	☐	List states: _____
Regional	☐	List regions: _____
Geographic areas	☐	Describe geographic areas: _____
Community surrounding federally funded research and development centers, military bases, etc.	☐	Describe community surrounding: _____ _____

2.12 What STEM fields does the education investment focus on? (check all that apply)

	Yes
STEM (no specific subject or field required)	☐
Science (no specific subject or field required)	☐
Physical sciences (including physics, chemistry, astronomy, materials science)	☐
Biological science	☐
Earth, atmospheric, ocean, or planetary science	☐
Agricultural science	☐
Environmental science	☐
Computer science	☐
Technology (no specific subject or field required)	☐
Engineering (no specific subject or field required)	☐
Mathematics or statistics	☐
Other [Insert Specfic Focus (e.g., Defense Science)]	☐

Section 3: Education Funding Information

Please respond to these questions with information pertaining to the education investment's STEM activities *only*.

3.1 **What type of organization or individual is funded to implement the projects or activities under this education investment (e.g., conducts research, develops curricular resources, provides mentoring, or implements professional development)?** (check all that apply)

3.2 **How is external funding allocated?** (check all that apply)

	Yes
Formula (to government entities)	☐
Competitive (grants or contracts)	☐
Non-competitive (grants or contracts)	☐
Other [insert type]	☐
Not applicable	☐

3.3 **Would it require legislative action to change the direction of the education investment** (OSTP is interested in knowing whether the education unit is tightly constrained by congressional legislation)?

Yes ☐ No ☐ Don't know ☐

3.4 **In what fiscal year was the investment initially funded?**

_____

3.5 **How much federal funding was allocated to the education investment?** (If the investment includes non-STEM education funding, report only the part of the budget dedicated to STEM education)

FY 2008 (actual)	FY 2009 (actual)	FY 2010 (actual)	FY 2011 (planned)
_____	_____	_____	_____

3.6 **In FY 2010, did other federal agencies (or subagencies) or non-federal groups contribute funding to this investment?** (If you are aware of the amount that other agencies or groups contributed, please include that information. If this information is not readily available enter Don't Know; Don't know will probably be the response for the vast majority of the education investments.)

	Name	Amount (insert $ or Don't know)
Federal agency 1	_____	_____
Federal agency 2	_____	_____
Federal agency 3	_____	_____
Federal agency 4	_____	_____
Non-federal group 1	_____	_____
Non-federal group 2	_____	_____
Non-federal group 3	_____	_____
Non-federal group 4	_____	_____
Not applicable	☐	

3.7 **Are partnerships required or encouraged** (e.g., investments where the proposal-review process is set up to rate applicants that include partnerships higher than applicants that do not include partnerships)?

Required: ☐ Encouraged: ☐ Mixed: ☐ No: ☐

3.8 If partnerships are required or encouraged, what type of groups do the funded organizations partner with? (check all that apply)

	Yes
Four-year institutions of higher education (bachelor- and/or graduate-degree-granting institutions)	☐
Two-year institution of higher education or community college	☐
Minority institution (MI)	☐
All types of Minority Institutions	☐
Historically Black Colleges or Universities	☐
Hispanic-Serving Institutions	☐
Alaska Native-Serving Institutions	☐
Native Hawaiian-Serving Institutions	☐
Tribal Colleges and Universities	☐
State systems of higher education	☐
Local education agency	☐
State education agency	☐
School district or school	☐
Informal education institution or organization	☐
Professional society	☐
Education research, policy, or evaluation organizations	☐
Federal agency	☐
Federally funded research and development center, experimental station, or other federal STEM research facility (e.g. marine sanctuaries)	☐
Other [Insert Organization Type]	☐
Not applicable	☐

Section 4: Evaluation Information

Please respond to these questions with information pertaining to the education investment's STEM activities only.

4.1 What outputs are measured? (check all that apply)

	Yes
Number of learners (any age) served	☐
Number of educators served	☐
Number of adults served	☐
Number of K-12 schools served	☐
Number of school districts served	☐
Number institutions of higher education served	☐
Number of materials distributed or downloaded from websites	☐
Number of contact hours by audience	☐
Hours of tutoring, mentoring, or other service provided	☐
Number of degrees awarded	☐
Other [Insert Organization Type]	☐

4.2 What outcome measures have been tracked or monitored? (check all that apply)

	Yes
None	☐
Learner performance (e.g., attendance, test scores, pass rates, achieving selected performance levels, or grade point average)	☐
Number or percent of learners who pursue coursework in STEM fields	☐
Learner educational attainment (includes obtaining a GED, high school diploma, or post-secondary degree)	☐
Number or percent of learners who took a job in a STEM field	☐
Educator improvement and performance in STEM education instruction	☐
Number or percent of qualified educators teaching STEM education	☐
Number or percent of institutions with expanded institutional capacity for STEM education (increase in classes, educators, research opportunities for learners, infrastructure, etc.)	☐
Number or percent of research projects funded to enhance the quality of STEM education programs	☐
Number or percent of recommendations implemented to enhance the quality of STEM programs	☐
Other outcome(s)_____	☐

4.3 What measurement instruments (e.g., SAT scores, dropout rates, standardized educator observation instruments, self- or evaluator-developed instruments) are used to measure outcomes?

Measurement instrument 1:_____

Measurement instrument 2:_____

Measurement instrument 3: _____

4.4 What type of evaluation has this investment undergone since FY 2005? (check all that apply)

	Independent	Internal	No
Formative evaluation (including field testing)	☐	☐	☐
Summative evaluation	☐	☐	☐
Process or implementation evaluation	☐	☐	☐
Portfolio evaluation/review	☐	☐	☐
Expert review (e.g., expert panel, NRC study)	☐	☐	☐
Other:_____	☐	☐	☐

4.5 What evaluation designs have been used in the evaluations of this investment since FY 2005? (check all that apply)

	Independent	Internal	No
Randomized (experimental)	☐	☐	☐
Matched comparison groups (quasi-experimental)	☐	☐	☐
Pre-post (no comparison group)	☐	☐	☐
Comparison group without matching	☐	☐	☐
Other:_____	☐	☐	☐

4.6 In what fiscal year was the most recent evaluation completed?_____

4.7 Are evaluation reports available on line?

Yes: _____ No: ☐

Section 5: STEM Workforce Investment (complete only if you answered "Yes" to Question 2.1)

Please respond to these questions with information pertaining to the investment's STEM activities *only*.

5.1 What workforce needs does the investment PRIMARILY address?

Agency workforce needs (STEM workforce employed by your agency) ☐

Agency mission-specific workforce needs (STEM workforce employed in fields directly related to your agency's mission) ☐

5.2 What are the primary and secondary objectives of the education investment?

(Please select only one primary objective. You may select multiple secondary objectives if appropriate. The primary objective of the education investment characterizes the primary desired outcome, or is the basis for evaluating the education investment under ideal circumstances. A secondary objective is an objective that contributes to accomplishing the outcomes of the education investment and it may or may not be desirable to evaluate whether the secondary objective is being achieved.)

	Primary Objective	Secondary Objective
Learning: Develop STEM skills, practices, or knowledge of students or the public	☐	☐
Engagement: Increase learners' engagement, interest in STEM and their perception of its value to their lives, or their ability or participate in STEM.	☐	☐
Pre and In Service Educator/Education Leader Performance: Train or retain STEM educators (K-12 pre-service or in-service, post-secondary, and informal) and education leaders to improve the content knowledge and pedagogical skills of STEM educators.	☐	☐
Post-Secondary STEM Degrees: Increase the number of students who enroll in STEM majors, complete STEM credentials or degree programs, or are prepared to enter STEM careers or advanced education.	☐	☐
STEM Careers: Prepare people to enter STEM workforce with training or certification (where STEM discipline specific knowledge and skill are the primary focus of the education investment; STEM educator training and development investments should select the Pre and In Service Educator/Education Leader Performance objective listed above)	☐	☐
Institutional Capacity: Support advancement and development of STEM personnel, programs, and infrastructure in educational institutions such as universities, informal education institutions, state education agencies, and local education agencies.	☐	☐
STEM System Reform: Improve STEM education through a focus on education system reform	☐	☐
Education Research and Development: Develop evidence-based STEM education models and practices.	☐	☐
Other: _____	☐	☐

5.3 What services or products are part of the education investment? (check all that apply)

	Yes
Direct classroom instruction to students	☐
Instructional material development	☐
Online education resource sites (e.g., online digital libraries)	☐
Fellowship or scholarships (for educators or students)	☐
Internship (short-term STEM employment)	☐
Recognition awards	☐
STEM competition	☐
Engagement in authentic STEM experience (including research)	☐
STEM learning program (i.e., after-school, weekend, or summer program)	☐
Tutoring, mentoring, or other learner support	☐
Training or professional development	☐
Loan forgiveness	☐
Education research to improve STEM teaching and learning	☐
Assessment implementation	☐
Assessment development	☐
Institutional support for infrastructure (to strengthen STEM education capabilities though expansion of facilities, classrooms, technology, and other physical infrastructure)	☐
Institutional support for leadership, management, and administrative activities	☐
Other: [Describe Activity,Service, Product]	☐

5.4 What STEM jobs or fields does the investment focus on?

_____

5.5 Does the training investment develop STEM skills or knowledge?

Yes: ☐ No: ☐

5.6 Which of the following target populations or groups primarily benefit from this investment? (check all that apply)

Audience or Beneficiary Type	Yes	Audience or Beneficiary Type	Yes
Pre-6-20 learners	☐	K-12 staff/ leaders/ administrators	☐
Middle (6-8)	☐	Middle School (6-8)	☐
High school (9-12)	☐	High School (9-12)	☐
Undergraduate (13-16)	☐	Post-secondary instructors	☐
Graduate (17-20)	☐	Undergraduate (13-16)	☐
K-12 Classroom Teachers	☐	Graduate (17-20)	☐
Pre-service middle school (6-8)	☐	Post Graduate	☐
Pre-service high school (9-12)	☐	Post-secondary deans/leaders/ administrators	☐
In-service middle school (6-8)	☐	Undergraduate	☐
In-service high school (9-12)	☐	Graduate	☐
		Post Graduate	☐
Adult learners (other than educators, education, leaders, education researchers or policy makers)	☐	Informal STEM Educators	☐
Other: _____	☐	Informal STEM education leaders/ program developers	☐

5.7 Does the education investment primarily focus on underrepresented, underserved, or high needs groups in STEM fields (as opposed to targeting the entire population with importance attached to serving underrepresented groups)? (check all that apply)

	Yes
Traditionally underrepresented or underserved groups (and not focused on a specific group; should not select any items below)	☐
Hispanic or Latino	☐
Black or African American	☐
Native Hawaiian / Other Pacific Islander	☐
American Indian / Alaska Native	☐
Economically disadvantaged	☐
Female	☐
Male	☐
Persons with disabilities	☐
Rural	☐
Urban	☐
Other [Audience]	☐
No	☐

5.8 Is this investment limited to any of the following? (check all that apply)

- U.S. citizens ☐
- Permanent residents ☐
- Nationals (people born in or having ties to an outlying possession of the United States, such as American Samoa) ☐
- No ☐

5.9 Would it require legislative action to change the direction of the investment (OSTP is interested in knowing whether the education investment is tightly constrained by congressional legislation)?

Yes : ☐ No: ☐ Don't know: ☐

5.10 What is the duration of the workforce training experience that was produced by the education investment? (provide information on all that apply)
[insert duration of workforce trainging experience]

5.11 In what fiscal year was the education investment initially funded?
[insert year]

5.12 How much federal funding was allocated to the education investment?

FY 2008 (actual)	FY 2009 (actual)	FY 2010 (actual)	FY 2011 (planned)
_____	_____	_____	_____

5.13 What impacts are measured? (check all that apply)

- None ☐
- Number of learners (any age) served ☐
- Number of educators served ☐
- Number of degrees or certificates earned ☐
- Number of participants employed by your agency ☐
- Number of participants employed in STEM fields ☐
- Other _____ ☐

5.14 How many students and/or institutions were supported by this investment?

	FY 2008	FY 2009	FY 2010
Undergraduate Students	_____	_____	_____
Graduate Students	_____	_____	_____
Postsecondary institutions	_____	_____	_____
Other _____	_____	_____	_____

Appendix E: Glossary

Experimental Evaluation Design: Characterized by random assignment and generally the strongest study design for determining with a high degree of confidence whether the intervention alone caused observed outcomes.

Expert Review: Systematic review of an education investment by an individual or a group with expertise relevant to the education investment (e.g., panel reviews or National Research Council studies).

Formal Education: Learning or delivery of learning within a structured education system that requires students to demonstrate proficiency. Formal learning environments include publicly and privately-funded organizations that 1) serve students in pre-K through graduate school, and 2) provide learners with degrees, certifications, transcripts, or other evidence of participation.

Formative Evaluation: Systematic studies conducted regularly or built into the activities to assess whether a project, activity, or grantee is reaching stated goals in order to guide ongoing improvements. They are often conducted by experts external to the project, inside or outside the funded organization, as well as by project managers.

Informal Education: Learning outside the established formal education system designed to promote interest, understanding, or engagement. Informal learning environments (e.g. aquaria, nature centers, and radio) may serve learners of all ages and are generally defined by having learner choice in the extent and type of participation, low or no consequence assessment, and structures that build on the learners' motivations, culture, and competence. Along with investments typically identified as informal education, after-school and extension efforts (sometimes labeled "non-formal") should be identified as informal education within this inventory.

Instructional Materials: All materials that are designed for use by learners and educators as a learning resource and that help learners acquire facts, skills, or opinions or develop cognitive processes. Instructional materials may be printed or non-printed, and may include textbooks, technology-based materials, other educational materials, and tests. Instructional materials range from a series of lessons or activities to individual experiments or lessons. In general they are instructional units that are smaller than or can be parts of an education curriculum. They may also include support tools such as coaching protocols, discussion guides, data analysis procedures, online sharing forums, and tools to help school leaders implement educational reforms.

Minority Institution: Is defined by the Higher Education Act as an institution of higher education whose enrollment of a single minority or a combination of minorities exceeds 50 percent of the total enrollment. There are five types of minority institutions specified by the Department of Education: Hispanic-Serving Institutions, Tribal Colleges and Universities, Historically Black Colleges and Universities, Alaska Native-Serving Institutions, and Native Hawaiian-Serving Institutions.

Outcome: Desired affect that an education effort is designed to have (e.g., improved understanding of a STEM concept, changes in instructional practices, or an increased number of students pursuing STEM degrees or careers).

Outcomes Measurement: Ongoing monitoring and reporting of the results of the products and services delivered by the education investment or accomplishments of the education investment, particularly progress toward pre-established goals. It is typically conducted by program or agency management.

Output: Direct products of education efforts, usually measured in terms of the volume of work accomplished or the number of classes taught, people served, or educational materials distributed. Outputs are not ends in themselves; rather, they are products that lead to a desired outcome.

Outreach for Education: Efforts designed to promote develop relationships, and build awareness of education products.

Program Evaluation: Systematic studies conducted periodically or on an ad hoc basis to assess how well a program is working (not to assess individual activities or grantees within that education investment). They are often conducted by experts external to the program, inside or outside the agency, as well as by program managers. A program evaluation typically examines achievement of program objectives in the context of other aspects of program performance or in the context in which the program occurs.

Portfolio Evaluation/Review: Systematic study of the summative outcomes of a group of related programs that are the component parts of a larger education portfolio.

Process or Implementation Evaluation: An evaluation that focuses on program implementation and operation. It can answer questions about the fidelity of implementation; identify processes or procedures used to implement the program; and assess program operation and performance in relation to the fidelity of implementation.

Quasi-Experimental Evaluation Design: Characterized by minimal control over the allocation of treatments or other factors being studied. Evaluations that use this design often create matched comparison groups or measurements at successive time intervals (time series analysis).

Summative Evaluation: Systematic study of a program at its conclusion. This type of evaluation is conducted to determine: the success or effectiveness of the program, the impact on participants, cost effectiveness, and whether the program should be repeated or replicated.

National Science and Technology Council
Committee on STEM Education