EXECUTIVE OFFICE OF THE PRESIDENT
OFFICE OF SCIENCE AND TECHNOLOGY POLICY
WASHINGTON, D.C. 20502

April 13, 2012

Dear STEM Education Stakeholder,

We are pleased to present the "2010 Federal STEM Education Inventory Data Set."

Section 101 of the America COMPETES Reauthorization Act of 2010, signed into law by President Obama in the first days of 2011, charged the Office of Science and Technology Policy (OSTP) with establishing a Committee on STEM Education, or CoSTEM, under the National Science and Technology Council. Over the past 15 months, the CoSTEM has made significant progress toward its two main responsibilities: (1) creating an inventory of federally sponsored STEM education programs and activities, and (2) working with the Office of Management and Budget to coordinate these educational activities across Federal agencies.

In December 2011, the CoSTEM released an initial inventory report, the Federal Science, Technology, Engineering, and Mathematics (STEM) Education Portfolio (http://go.usa.gov/mM9), which analyzed a subset of the data that departments and agencies had collected on Federal STEM education investments in FY2010. The 2010 Federal STEM Education Inventory Data Set communicated here contains the information used in the STEM Education Portfolio report and additional information about individual STEM education investments not included in that initial report.

The CoSTEM, which devised the survey used for data collection, is composed of representatives from Federal agencies that work in STEM education. The CoSTEM members collaborated closely with staff from their home agencies to ensure that survey responses were accurate and complete. The resulting inventory data set is the most comprehensive compilation of federally funded STEM education efforts. While the committee is using this data set to inform its efforts to coordinate the goals and improve the effectiveness of these programs, we hope that researchers, students, teachers, and informal educators will also find this information to be of value. The data set is accompanied by the survey questions that generated it, and includes items about the goals, audience, specific STEM focus, and partnerships associated with particular investments, as well as where further details about the investments and measures of their educational impact can be found online.

While these Federal programs accounted for only about 0.3% of all educational dollars spent in the United States in 2010, their reach and impacts are wide-ranging as they leverage the unique assets of the Federal government to spur interest in STEM and support learners in their development into career-ready mathematicians, technologists, engineers and scientists. A wealth of resources and people outside the Federal agencies are devoted to these same goals, and it is the CoSTEM's hope that the publication of this data set will inform and inspire this larger community.

Sincerely,

The Federal Coordination in STEM Education Task Force Committee Co-Chairs

Carl Wieman,
Associate Director for
Science, OSTP

Bruce Fuchs,
Director of the Office of
Science Education, National
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Office of Science and Technology Policy, National Science and Technology Council, Committee on STEM Education

Guide to 2010 Federal STEM Education Inventory Data Set

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—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.

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 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: This data set includes information on all education investments with 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

Please provide the requested background information on the education investment.

Index Number: **[ ]**
Investment Name: **[ ]**
Agency: **[ ]**
Sub Agency: **[ ]**

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

_____

_____

B. **In what fiscal year was the investment initially funded?**

_____

C. **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)**

1. FY 2008 (actual) 2. FY 2009 (actual) 3. FY 2010 (actual)

_____ _____ _____

Please provide the requested background information on the education investment

If the investment is focused a*gency mission-specific workforce education* issues, answer item D and E. 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 undergraduate and graduate scholarships, experiential learning and practica, undergraduate internships, or institutional capacity-building in fields or degrees tightly aligned to an agency's mission. These do not include research fellowships/scholarships or traineeships at the postdoctoral level, or programs to retain current employees in STEM fields. We assume that nearly all postsecondary STEM education investments by mission agencies will be categorized as workforce investments

If the investment focuses on "broader" STEM education issues, skip to item F. "Broader" STEM education investements support formal and informal STEM education, STEM education research, fellowship/traineeship programs that are not intended to address the workforce needs of a specific agency (such as those supported by NSF and ED) and STEM education capacity-building to improve interest in and understanding of STEM concepts and enhance the broader national STEM workforce and not necessarily for the development of Agency workforce needs.

D. **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

General STEM: ☐ Agency Mission: ☐

E. **What workforce needs does the investment PRIMARILY address?**

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

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

F. **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.)

	1) Primary Objective	2) 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: _____ ☐ ☐

G. The STEM education research & development continuum can be conceived as five categories: Basic/foundational education research; Disciplinary education research; Small scale program implementation, Building capacity of people or organizations; and Large scale development. 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)

	1)Primary Approach	2)Secondary Approach	3)Approach Not Used
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	☐	☐	☐

H. **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	☐
Competition	☐
Engagement in authentic STEM experience (including research)	☐
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: _____	☐

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

Learner Type	Yes
1)Pre-K-20 learners	☐
Pre-K	☐
Elementary (K-5)	☐
Middle (6-8)	☐
High school (9-12)	☐
Undergraduate (13-16)	☐
Graduate (17-20)	☐
K-12 Classroom Teachers	☐
2) Pre-service pre-K	☐
Pre-service elementary school (K-5)	☐
Pre-service middle school (6-8)	☐
Pre-service high school (9-12)	☐
3) In-service pre-K	☐
In-service elementary (K-5)	☐
In-service middle school (6-8)	☐
In-service high school (9-12)	☐
4)Adult learners (other than educators, education, leaders, education researchers or policy makers)	☐

Audience or Beneficiary Type	Yes
6) K-12 staff/ leaders/ administrators	☐
Pre-K	☐
Elementary (K-5)	☐
Middle School (6-8)	☐
High School (9-12)	☐
7)Post-secondary instructiors/staff	☐
Undergraduate (13-16)	☐
Graduate (17-20)	☐
Post Graduate	☐
8)Post-secondary deans/leaders/administrators	☐
Undergraduate	☐
Graduate	☐
Post Graduate	☐
9)Informal STEM Educators	☐
Post-secondary	☐

		Undergraduate	☐
		Graduate	☐
		Post-Graduate	☐
		10) Informal STEM education leaders/program developers	☐
5)Education researchers	☐	11) Other _____	☐

J. **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	☐

K. **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 ☐

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

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	☐
No	☐

M. **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: _____ _____

N. **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)]	☐

O. **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)

	Yes
Federally funded research and development centers, experimental stations, other federal STEM research facilities (e.g., marine sanctuaries)	☐
Individuals (e.g., directly funded scholarships, grants, loans)	☐
Four-year institutions of higher education (bachelor- and/or graduate-degree-granting institutions)	☐
Two-year institutions of higher education or community colleges	☐
State systems of higher education	☐
State education agency or state government	☐
School districts or school	☐
Informal education institutions or organizations	☐
Professional societies	☐
Grants to STEM professionals or companies (e.g., education researchers, evaluation companies, non-federal STEM research labs)	☐
Other	☐

P. **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	☐

Q. **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 ☐

R. **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)

1) Federal agency 1	_____	_____
Federal agency 2	_____	_____
Federal agency 3	_____	_____
Federal agency 4	_____	_____
2) Non-federal group 1	_____	_____
Non-federal group 2	_____	_____
Non-federal group 3	_____	_____
Non-federal group 4	_____	_____
Not applicable	☐	

S. **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: ☐

T. **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	☐

U. **What outputs are measured?** (check all that apply)

Hours of tutoring, mentoring, or other service provided	☐
Number of degrees or certificates awarded	☐
Number of participants employed by your agency	☐
Number of participants employed in STEM fields	☐
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 or certificates awarded	☐
Other_____	☐

V. **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): _____	☐

W. **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: _____

X. **Has this investment undergone evaluation since FY 2005?**

Y. **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: _____	☐	☐	☐

Z. **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: _____	☐	☐	☐

AA. **In what fiscal year was the most recent evaluation completed?** _____

BB. **Are evaluation reports available online?**

Yes: ☐ No: ☐

If yes, please give URL: _____
