Progress Report on the Federal Implementation of the STEM Education Strategic Plan

A Report by the

OFFICE OF SCIENCE AND TECHNOLOGY POLICY

October 2019

About the National Science and Technology Council

The National Science and Technology Council (NSTC) is the principal means by which the Executive Branch coordinates science and technology policy across the diverse entities that make up the Federal research and development enterprise. A primary objective of the NSTC is to ensure science and technology policy decisions and programs are consistent with the President's stated goals. The NSTC prepares research and development strategies that are coordinated across Federal agencies aimed at accomplishing multiple national goals. The work of the NSTC is organized under committees that oversee subcommittees and working groups focused on different aspects of science and technology. More information is available at http://www.whitehouse.gov/ostp/nstc.

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The Office of Science and Technology Policy (OSTP) was established by the National Science and Technology Policy, Organization, and Priorities Act of 1976 to provide the President and others within the Executive Office of the President with advice on the scientific, engineering, and technological aspects of the economy, national security, homeland security, health, foreign relations, the environment, and the technological recovery and use of resources, among other topics. OSTP leads interagency science and technology policy coordination efforts, assists the Office of Management and Budget (OMB) with an annual review and analysis of Federal research and development in budgets, and 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. More information is available at http://www.whitehouse.gov/ostp.

About the Federal Coordination in STEM Education Subcommittee

Federal Coordination in STEM Education (FC-STEM) is a subcommittee of the Committee on STEM Education (CoSTEM), which was established pursuant to the requirements of Section 101 of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. §6621). In accordance with the Act, CoSTEM reviews science, technology, engineering, and mathematics (STEM) education programs, investments, and activities, and the respective assessments of each, in Federal agencies to ensure that they are effective; coordinates, with the Office of Management and Budget, STEM education programs, investments, and activities throughout the Federal agencies; and develops and implements through the participating agencies a STEM education strategic plan, to be updated every five years. FC-STEM advises and assists CoSTEM and serves as a forum to facilitate the formulation and implementation of the strategic plan.

About this Document

This document is an annual progress report on efforts by the Federal Government to implement the five-year strategic plan for STEM education released by CoSTEM in December 2018. It is responsive to the requirements of Section 101(c) of the America COMPETES Reauthorization Act of 2010 (42 U.S.C. §6621). The intent of the progress report is to provide Congress and the wider STEM education stakeholder community with a window into ongoing and planned Federal activities, with the goal of leading by example toward the North Star vision of the strategic plan. The report includes an analysis of actions developed by the agencies of FC-STEM in support of the strategic plan's objectives, a discussion of major focus areas across the Federal STEM education community, a description of the ways Federal agencies will work together to address common challenges, and an inventory of Federal STEM education programs.

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Dear Reader,

Science, technology, engineering, and mathematics (STEM) have served as the spark for ingenuity and innovation, driving American success since the beginning of our history. Students well equipped with STEM knowledge and skills not only provide a workforce prepared for meeting tomorrow's challenges to ensure National security and economic strength, but also are able to function more effectively in our increasingly technologically sophisticated society irrespective of their chosen career. Although awareness of and engagement in STEM have increased across the Federal Government, academia, the private sector, and community-based organizations, additional effort is needed to be more focused, efficient, and strategic so that workers are prepared for STEM jobs of the future. In addition to providing an equipped STEM workforce, this effort will enhance STEM diversity and improve STEM literacy in society.

The National Science and Technology Council (NSTC), through the Committee on STEM Education (CoSTEM), engaged the broad national community in developing a five-year "North Star" plan, which was released in December 2018. Subsequently, CoSTEM has been coordinating with Federal agencies to implement this plan, ensuring that all Americans have access to high-quality STEM education. This progress report provides an update on those activities. Additionally, as originally planned, organizations across the country are aligning their STEM efforts with the North Star plan.

This progress is extremely exciting and reflects the shared view of the value of STEM education and training to our Nation, and also demonstrates the power of coordination in achieving important national goals. Through the NSTC, I am committed to coordinating the continual implementation of this Strategy and Action Plan across executive branch departments and agencies to build a STEM-ready Nation.

Sincerely,

Dr. Kelvin K. Droegemeier
Director, Office of Science and Technology Policy

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List of Abbreviations and Acronyms

APHIS	USDA Animal and Plant Health Inspection Service		ENG	NSF Directorate for Engineering
			EPA	Environmental Protection Agency
BLM	DOI Bureau of Land Management		ETA	DOL Employment and Training Administration
CISE	NSF Directorate for Computing and Information Science and Engineering		FAA	DOT Federal Aviation Administration
			FC-STEM	Federal Coordination in STEM Education Subcommittee
CNCS	Corporation for National Community Service			
CoSTEM	Committee on STEM Education		FHWA	DOT Federal Highway Administration
DHS	Department of Homeland Security			
DNDO	DHS Domestic Nuclear Detection Office		HHS	Department of Health and Human Services
DOC	Department of Commerce		HRSA	HHS Health Resources and Services Administration
DOD	Department of Defense			
DOE	Department of Energy		IES	ED Institute of Education Sciences
DOI	Department of the Interior		INCLUDES	NSF Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science
DOL	Department of Labor			
DOT	Department of Transportation			
ED	Department of Education			
EE	EPA Office of Environmental Education		IT	information technology
			IWG	interagency working group
EERE	DOE Office of Energy Efficiency and Renewable Energy		IWGIS	Interagency Working Group on Inclusion in STEM
EERE/AMO	EERE/Advance Manufacturing Office		MPS	NSF Directorate for Mathematical and Physical Sciences
EERE/BTO	EERE/Building Technologies Office		NASA	National Aeronautics and Space Administration
EERE/VTO	EERE/Vehicle Technologies Office		NIFA	USDA National Institute of Food and Agriculture
EERE/WETO	EERE/Wind Energy Technologies Office			
			NIH	HHS National Institutes of Health
EHR	NSF Directorate for Education and Human Resources		NIH/NCI	NIH National Cancer Institute
			NIH/NHLBI	NIH National Heart, Lung, and Blood Institute
EM	DOE Office of Environmental Management		NIH/NIGMS	NIH National Institute of General Medical Sciences

NIH/OITE	NIH Office of Intramural Training and Education
NIST	DOC National Institute of Standards and Technology
NNSA	DOE National Nuclear Security Administration
NOAA	DOC National Oceanic and Atmospheric Administration
NRC	Nuclear Regulatory Commission
NSF	National Science Foundation
NSTC	National Science and Technology Council
NUREG	NRC Office of Nuclear Regulatory Research
ODASA(R&T)	DOD Office of the Deputy Assistant Secretary of the Army for Research and Technology
OESE	ED Office of Elementary and Secondary Education
OIA	NSF Office of Integrative Activities
OII	ED Office of Innovation and Improvement
OISE	NSF Office of International Science and Engineering
OMB	Office of Management and Budget
ONR	DOD Office of Naval Research
OPE	ED Office of Postsecondary Education
ORD	EPA Office of Research and Development
OS	DOE Office of Science
OS/ASCR	OS/Advanced Scientific Computing Research

OS/BES	OS/Basic Energy Sciences
OS/HEP	OS/High Energy Physics
OS/NP	OS/Nuclear Physics
OS/WDTS	OS/Workforce Development for Teachers and Scientists
OSD	DOD Office of the Secretary of Defense
OSD/P&R/M&RA	OSD/Personnel and Readiness/Manpower and Reserve Affairs
OSTP	Office of Science and Technology Policy
OUSD(R&E)	DOD Office of the Under Secretary of Defense for Research and Engineering
SBCR	NRC Office of Small Business and Civil Rights
SBIR	Small Business Innovation Research program
SI	Smithsonian Institution
SMD	NASA Science Mission Directorate
STEM	science, technology, engineering, and mathematics
STEMIE	ED STEM Inclusion for Innovation in Early Education Center
TA IWG	Transparency and Accountability IWG
USDA	Department of Agriculture
USGS	DOI United States Geological Survey
VA	Department of Veterans Affairs

Introduction

Science, technology, engineering, and mathematics (STEM) have been the foundation for discovery and technological innovation throughout American history. Having a well-prepared and diverse STEM workforce will assure that tomorrow's breakthroughs happen here in America and continue to strengthen our national security and grow our economy. At the same time, STEM skills are increasingly important for all people to succeed in the workplace and in their everyday lives. A stronger STEM workforce will be fully realized when all members of society have equitable access to STEM education, especially by those who are historically underrepresented or underserved in STEM.

Only through a strong, nationwide collaboration around common educational goals will the United States ensure that all Americans have access to high-quality STEM education throughout their lifetimes.

In December 2018, the National Science and Technology Council's (NSTC) Committee on STEM Education (CoSTEM) released *Charting a Course for Success: America's Strategy for STEM Education*,[1] a five-year strategic plan for STEM education, hereafter referred to as the Strategic Plan.

The Federal Government plays an important role in fostering educational excellence and has an opportunity to lead by example in the broader STEM education community by successfully implementing the Strategic Plan. This document describes ongoing efforts across the Federal Government as it works to realize the goals and objectives of the Strategic Plan. It is meant to serve as an update on the Federal implementation process, in accordance with the Strategic Plan's focus on operating with transparency and accountability, and as a resource for the education stakeholder community. The Strategic Plan is being implemented by the Federal agencies engaged in STEM education, under the guidance of CoSTEM and its Federal Coordination in STEM Education (FC-STEM) Subcommittee, and pursuant to the requirements of the Strategic Plan. With this said, this Strategic Plan can serve as a "North Star" to the broader STEM education community to chart a course for collective success. Community engagement supporting this Plan amplifies its impact in building a well-prepared and diverse STEM workforce.

Additionally, this document is meant to fulfill the requirements under the America COMPETES Act Reauthorization of 2010[2] that the Office of Science and Technology Policy (OSTP) transmit a report annually to Congress at the time of the President's budget request providing an update on the STEM Education Federal portfolio performance and an inventory of federal STEM Education investments.

This report gathered information from all Federal agencies that have investments in STEM education during FY19. These agencies include Corporation for the Department of Agriculture, Department of Commerce, Department of Defense, Department of Education, Department of Energy, Department of Health and Human Services, Department of Homeland Security, Department of the Interior, Department of Labor, Department of Transportation, Department of Veterans Affairs, Corporation for National Community Service, Environmental Protection Agency, National Aeronautics and Space Administration, National Science Foundation, Nuclear Regulatory Commission, and the Smithsonian Institution.

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[1] The Strategic Plan is available at https://www.whitehouse.gov/wp-content/uploads/2018/12/STEM-Education-Strategic-Plan-2018.pdf.

[2] The America COMPETES Reauthorization Act of 2010 is available at https://www.congress.gov/bill/111th-congress/house-bill/5116.

Five-Year Strategic Plan for STEM Education

The Strategic Plan presents a vision for a future where all Americans will have lifelong access to high-quality STEM education and the United States will be the global leader in STEM literacy, innovation, and employment. It is intended to serve as a "North Star" for the broader STEM community as it collectively charts a course for the Nation's success and is responsive to the requirements of Section 101 of the America COMPETES Reauthorization Act of 2010.

Three goals are being actively pursued to support the Strategic Plan's overarching vision:
- ➢ **Build Strong Foundations for STEM Literacy** by ensuring that every American has the opportunity to master basic STEM concepts and to become digitally literate.
- ➢ **Increase Diversity, Equity, and Inclusion in STEM** and provide all Americans with lifelong access to high-quality STEM education, especially those historically underserved and underrepresented in STEM fields and employment.
- ➢ **Prepare the STEM Workforce for the Future**—both college-educated STEM practitioners and those working in skilled trades that do not require a four-year degree—by creating authentic learning experiences that encourage and prepare learners to pursue STEM careers.

The Strategic Plan is organized around four pathways, representing a cross-cutting set of approaches to improve STEM education that will help fulfill its vision and achieve its three goals:
- ➢ **Develop and Enrich Strategic Partnerships –** Strengthen relationships between educational institutions, industry, community organizations to leverage resources for the purpose of providing the student with meaningful learning opportunities.
- ➢ **Engage Students where Disciplines Converge** – Draw on knowledge and methods across disciplines to solve complex, real world problems in STEM using innovation, creativity, and initiative.
- ➢ **Build Computational Literacy** – Design integrated approaches to teaching and learning computational thinking and promote digital literacy and cyber safety.
- ➢ **Operate with Transparency and Accountability** – Develop and apply metrics that assess progress in meaningful ways and disseminate them to external stakeholders.

The first three pathways focus on education and are hereafter referred to as the 'educational pathways,' while the fourth, Transparency and Accountability, commits the Federal Government to open, evidence-based practices and decision-making in its STEM programs, investments, and activities. Each pathway is broken into objectives that detail focus areas for Federal implementation efforts and contain specific priority actions to guide those efforts.
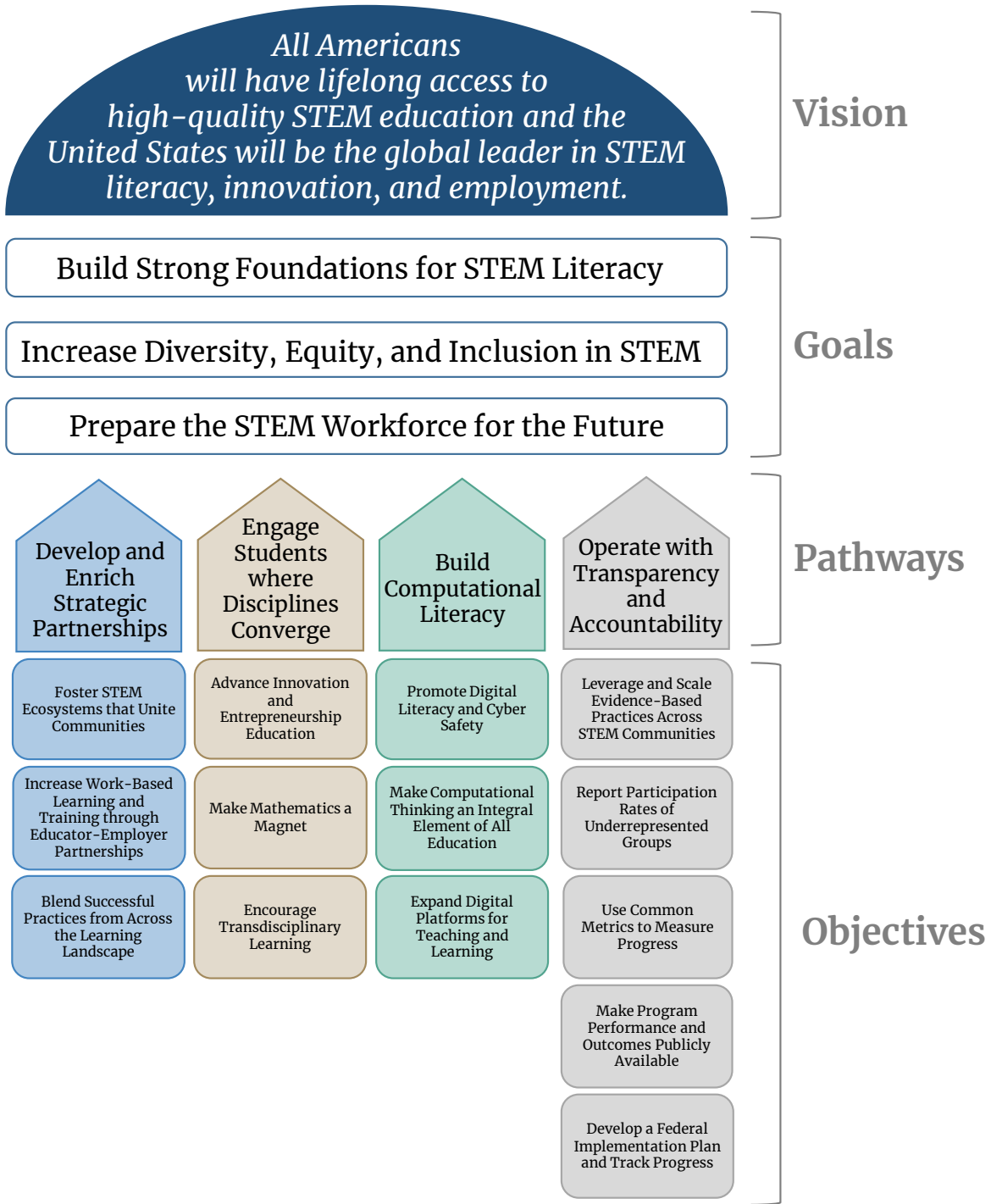
*All Americans
will have lifelong access to
high-quality STEM education and the
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literacy, innovation, and employment.*

Vision

Build Strong Foundations for STEM Literacy

Goals

Increase Diversity, Equity, and Inclusion in STEM

Prepare the STEM Workforce for the Future

Pathways

Develop and Enrich Strategic Partnerships	Engage Students where Disciplines Converge	Build Computational Literacy	Operate with Transparency and Accountability
Foster STEM Ecosystems that Unite Communities	Advance Innovation and Entrepreneurship Education	Promote Digital Literacy and Cyber Safety	Leverage and Scale Evidence-Based Practices Across STEM Communities
Increase Work-Based Learning and Training through Educator-Employer Partnerships	Make Mathematics a Magnet	Make Computational Thinking an Integral Element of All Education	Report Participation Rates of Underrepresented Groups
Blend Successful Practices from Across the Learning Landscape	Encourage Transdisciplinary Learning	Expand Digital Platforms for Teaching and Learning	Use Common Metrics to Measure Progress
			Make Program Performance and Outcomes Publicly Available
			Develop a Federal Implementation Plan and Track Progress

Objectives

Figure 1. Schematic illustrating the organizational structure of the five-year strategic plan for STEM education, developed by the National Science and Technology Council's Committee on STEM Education and released in December 2018. The plan's vision is supported by three aspirational goals. Four pathways contain objectives to guide efforts by the Federal government and wider STEM education community to realize the strategic plan's vision and goals.

Update on Federal Implementation Efforts

Identification of Actions in Alignment with the New Strategic Plan:

As an initial step in the implementation process, FC-STEM conducted a data call through which agencies identified actions that support the objectives under the Strategic Plan's three educational pathways. These actions include programs and investments, as well as activities, in order to include important and impactful efforts, such as mentoring and community outreach by Federal scientists and engineers that are not captured well in budgetary data. These actions include expansions of previously initiated efforts that align with the objectives as well as new programs and reorientations of existing ones. All future actions are subject to budgetary constraints and other approvals.

Figure 2 shows how these agency actions are distributed across the Strategic Plan's three educational pathways. Stronger relationships across educational institutions, industry, and community-based organizations support the development of the student, in addition to computational literacy and convergence across disciplines, through more meaningful learning experiences. It should be noted that actions in each pathway vary substantially across many parameters, including the number of participants, geographical footprint, duration, level of funding, etc. For example, some actions represent the convening of workshops that target small subsets of STEM education practitioners or outreach to specific underrepresented groups, while others represent large programs with thousands of student participants across the U.S. The data in Figure 2 illustrates the scope and breadth of attention devoted to implementing all of the objectives in the Strategic Plan. More detail about the actions developed in support of the Strategic Plan's pathways can be found in the final section of this document.
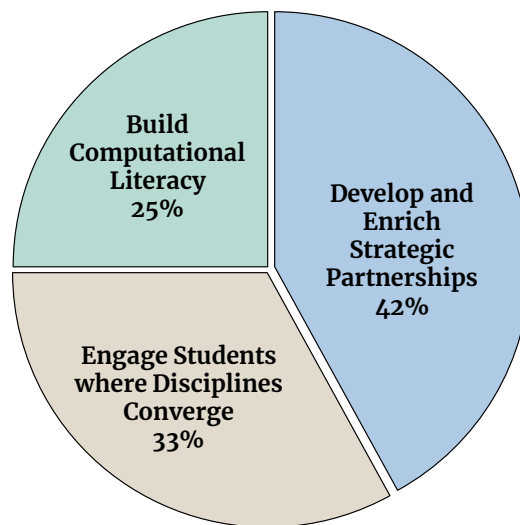

Figure 2. The agencies of FC-STEM identified actions – including programs, investments, and activities – that will help achieve the objectives of the Strategic Plan's three educational pathways. This chart illustrates how those actions are distributed across pathways.

The Strategic Plan's three goals are inextricably woven into its three educational pathways, intersecting with and being supported by the pathways' objectives in myriad ways. When developing implementation actions, agencies designed each action to support one of the Strategic Plan's objectives, but also tied each action to the goal it most closely supported. Figure 3 illustrates how actions cross over to support both its pathways and goals. Actions from across the educational pathways will help achieve the goal of increasing diversity, equity, and inclusion during the Strategic Plan's implementation.
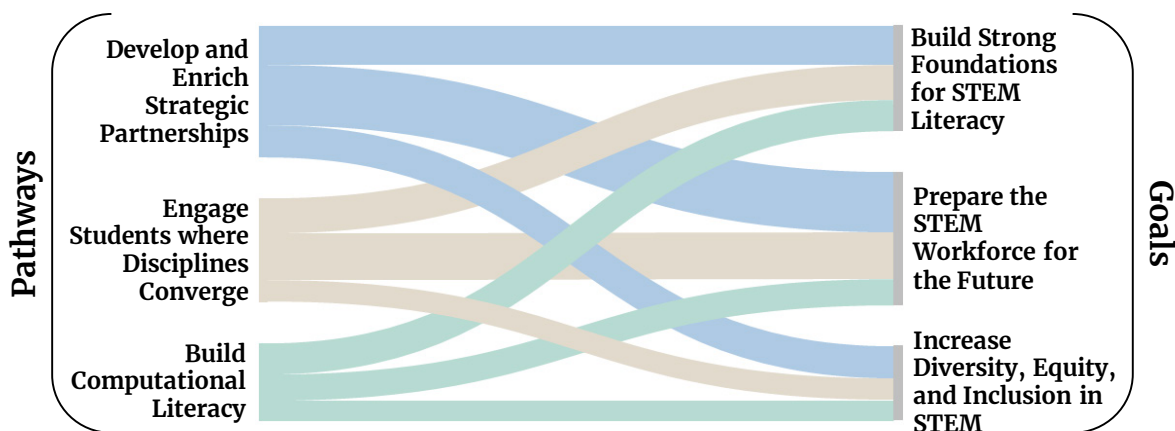
Figure 3. Correlation of agency implementation actions from the educational pathway they support to the primary goal they will help achieve. Actions supporting each of the Strategic Plan's three educational pathways (left side) are mapped to the goals (right side). The widths of the connecting bands are scaled to indicate the relative number of actions each band represents.

FY 2019 Inventory

Each year after the President's Budget is released, OSTP publishes an annual progress report that includes a government-wide inventory of Federal STEM education investments as required by the America COMPETES Act. In December 2011, OSTP published the first Federal STEM Education Inventory developed by CoSTEM. Since FY 2013, OMB and agencies have used the OSTP Federal STEM Education Inventory as the standard method of reporting on Federal STEM education activities. The Inventory is provided in Appendix 2.

While various definitions of "STEM" exist, for the purposes of this inventory, STEM includes physical and natural sciences, technology, engineering, mathematics, and computer science disciplines, topics, or issues (including environmental science, environmental stewardship, artificial intelligence, quantum information sciences, and cybersecurity).

Organizational Structure for Implementation

The identification of actions aligned with the new strategic plan served as a foundation on which CoSTEM could build its implementation structure. In FY19, CoSTEM stood-up a new implementation structure to support work toward the goals and objectives of the strategic plan.

Coordination of Federal STEM education programs is overseen by CoSTEM, the highest level, interagency body in the Federal government devoted to STEM education. CoSTEM also convenes the broader STEM community through stakeholder meetings and events to gain valuable input to guide its work. FC-STEM is a subcommittee of CoSTEM, charged with facilitating the formulation and implementation of the Strategic Plan. Interagency working groups (IWGs), organized by four pathways, lay a foundation for interagency efforts to strategically and collectively implement action items.

Federal Coordination in STEM (FC-STEM)

The purpose of the FC-STEM is to advise and assist the CoSTEM and the Director of the OSTP on developing strategic partnerships in STEM education across Federal agencies. The FC-STEM serves as a forum for discussion and policy coordination to facilitate implementation of the 5-Year STEM Education Strategic Plan. FC-STEM members are leaders in STEM education at their agencies, and the group convenes regularly for strategic planning in support of Federal STEM education programs.

FC-STEM agencies are committed to working together to improve STEM education by sharing best practices, leveraging the expertise and resources of Federal partners, and coordinating activities in support of common educational goals. Interagency collaboration will be a critical factor in successfully implementing the Strategic Plan. Of the numerous actions identified by agencies in support of the Strategic Plan's implementation, 30 percent are collaborative endeavors with other Federal agencies, State or local governments, private sector partners, and other stakeholders in STEM education.

Agencies are also working together to maximize the impact of their efforts. For example, NSF is leading an interagency expansion of its Inclusion across the Nation of Communities of Learners of Underrepresented Discoverers in Engineering and Science (INCLUDES) program, one of the NSF Big Ideas that facilitates partnerships, communication and cooperation, to build on and scale up what works in broadening participation programs to reach underserved populations nationwide. ED, NASA, NIH, NOAA, and USGS are exploring how they can add their external stakeholder networks to the INCLUDES platform and leverage opportunities to use the INCLUDES program to better communicate their STEM education programs and funding resources to the public. A special Federal agency-only session at the INCLUDES National Network Convening in May 2019 helped to kick off the interagency expansion.

The FC-STEM, as a body, is collectively developing action items to accomplish its goals in support of the 5-year STEM Education Strategic Plan. The first of these actions is working with hiring authorities to help participants in STEM work-based learning programs transition into permanent Federal employees. FC-STEM will host a series of interagency roundtable discussions on how to increase the use of the flexible hiring authorities provided by the Federal Pathways employment program to hire and retain STEM talent. Additionally, FC-STEM will lead the interagency effort to establish a single, searchable, user-friendly online resource for STEM education-related Federal activities, resources, and funding opportunities. Feedback will be gathered from internal and external stakeholders to determine what critical features are needed.

Interagency Working Groups (IWGs)

Five IWGs are supporting FC-STEM as it implements the Strategic Plan and are bringing together members who are representing the Federal government's foremost experts in STEM education. Four of the IWGs are concentrating their efforts on one of each of the four pathways outlined in the Strategic Plan. These pathways include Strategic Partnerships, Convergence, Computational Literacy, and Transparency & Accountability. The first three mentioned previously are distinguished as educational pathways as they target impacting teaching and learning. A fifth IWG, the Interagency Working Group on Inclusion in STEM (IWGIS), was chartered by the NSTC in response to Section 308 of the 2017 American Innovation and Competitiveness Act,[3] and will continue to focus on broadening participation in STEM as described in more detail below. For the IWGs devoted to the three educational pathways, as

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[3] American Innovation and Competitiveness Act, Pub. L. No. 114-329, 130 Stat. 2969 (2017).

well as IWGIS, the aggregated set of agency implementation actions provided a valuable data source. These four IWGs surveyed the agency actions developed in support of the objectives in their pathway, and focused their initial work plans on areas with (1) large numbers of actions, where already strong engagement by agencies may provide opportunities for better coordination and collaboration and (2) small numbers of actions but broad agency equities, where increased Federal activity may serve unmet needs. The IWG for the 'Operate with Transparency and Accountability' pathway is focused on evaluation and metrics in STEM education programs.

The five interagency working groups coordinate to ensure complementary efforts that further the goals and objectives of the strategic plan. A model of the relationships between these groups is shown in Figure 4. The sections that follow provide an overview of the foci for each IWG, highlight some of the actions agencies are taking that support the work of the IWG, and provide an overview of the work that the IWGs have prioritized to pursue collaboratively.
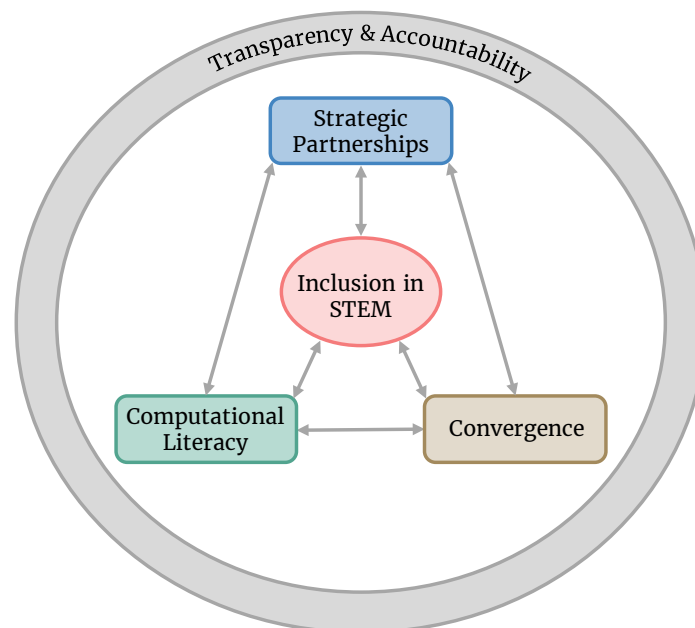

Figure 4. Organizational structure and coordination between the five IWGs of FC-STEM. IWGs devoted to the Strategic Plan's three educational pathways (boxes) will work with each other and with IWGIS (center oval) in order to ensure implementation activities promote inclusion, diversity, and equity. The Transparency and Accountability IWG will work to promote best practices, dissemination of resources, and data collection efforts across all of the other IWG efforts.

Develop and Enrich Strategic Partnerships (Strategic Partnerships IWG)

Partnerships among Federal agencies, educational institutions, employers, libraries, museums, and other community organizations leverage resources and expertise across STEM ecosystems to maximize the impact of educational efforts. These connections broaden and enhance the education of today's learners by providing authentic STEM experiences, successful career and educational transitions, and opportunities for diverse mentorship.

Under the Strategic Partnerships IWG, federal agencies plan to help foster local STEM ecosystems through a variety of mechanisms, including by opening their unique research facilities to learners and by harnessing the talent and mentoring abilities of their world-class scientists and engineers. For example, the Department of Defense builds connections with local communities by supporting more

than 1,200 FIRST Robotics teams. Each team is mentored by a DOD scientist or engineer who provides a valuable connection to the DOD science and technology ecosystem. In an effort to reach students who are traditionally underrepresented in STEM, DOD prioritizes support for teams with military dependents and students from Title 1 schools. At DOE, its National Laboratories and other facilities engage over 250,000 K-12 students a year through programs that range from direct classroom instruction in STEM and instructional materials to STEM demonstrations and in-house tours of scientific facilities.

Federal agencies are also providing opportunities in 2019 for work-based learning by students and educators through internships, apprenticeships, on-the-job training, externships, and other cooperative employer-educator partnerships. DOE is expanding the number of work-based learning and training opportunities available to undergraduate students at the DOE National Laboratories. Through internships for students from community colleges and four-year universities working on projects that span the DOE mission areas, participants gain hands-on experience in research and technology development under the mentorship of DOE laboratory staff. Also, NOAA is offering over 200 internships, scholarships and other experiential training for post-secondary students, while the DOD is supporting over 2,000 STEM internships at more than 60 Defense laboratories and facilities.

SI, through its Leadership and Assistance for Science Education Reform model, works with school districts across the country to connect K-12 educators with local community partners who collectively implement strategic STEM education reform that includes the following five pillars: STEM curriculum; professional development for STEM teachers; assessment; materials support; and community engagement.

DOL currently funds training with a significant STEM component through its H-1B Technical Skills Training Grants which prepare Americans for high skill jobs, reducing the dependence on foreign labor. The industries and occupations that can be targeted with this funding are those for which employers are using H-1B visas to hire foreign workers, such as information technology (IT) and IT-related industries, health care, and advanced manufacturing, all of which include STEM occupations.

The IWG tasked with fostering strategic partnerships is striving to establish additional connections between Federal STEM professionals and Federal facilities with local and regional STEM ecosystems to provide opportunities for mentorship, educator professional development, and community engagement. Additionally, it is working to expand the availability of high-quality, paid internships, apprenticeships, and teacher externships within Federal agencies and ensure that mentors are trained to provide effective educational experiences.

Engage Students where Disciplines Converge (Convergence IWG)

Federal scientists and engineers are experts at solving complex, real-world STEM problems. When incorporated into STEM learning, these problems engage students by drawing on knowledge and methods from across disciplines and promoting initiative and creativity. By contributing their real-world expertise and integrating transdisciplinary techniques into STEM learning, Federal agencies can help the education community create a STEM-literate population and prepare Americans for the rapidly evolving workplace.

Under the Convergence IWG, agencies are working to foster educational opportunities that advance innovation and entrepreneurship, where the convergence of ideas at the intersection of different fields gives rise to new technologies, including through competitions, challenges, and educator upskilling opportunities that engage participants in mission-focused areas. The U.S. Patent and Trademark Office offers transdisciplinary professional development opportunities across the nation to help educators in

K-12 foster innovation and entrepreneurship through intellectual property creation and protection. DOE's Collegiate Wind Competition, Solar Decathlon, and Advanced Vehicle Technology Competition present undergraduate learners with energy-related design challenges. DOE also runs the National Science Bowl, a nationwide academic competition for middle and high school students that tests students' knowledge in all areas of science and mathematics. At the NIH, the Design by Biomedical Undergraduate Teams Challenge spurs teams of undergraduate students to focus on solving real-world problems in healthcare. The NSF Community College Innovation Challenge is a competition for community college teams to use STEM to innovate solutions to real-world problems. NASA's Artemis Student Challenges enable students to contribute to the research and technology required to return humans to the surface of the Moon sustainably.

To encourage interest in and enthusiasm for mathematics among STEM learners, agencies are integrating mathematics and statistics into STEM training and making datasets accessible for STEM educators to use in applied contexts. For example, the U.S. Census Bureau's Statistics in Schools program strives to make Federal data more accessible by providing classroom-ready math activities for teachers to educate students about the value and everyday use of statistics. This program is capitalizing on the approaching 2020 Census in order to increase awareness and recruit educational partners.

The Convergence IWG is striving to foster transdisciplinary learning through educator upskilling while providing educators with access to shared best practices, models, and current research on transdisciplinary approaches in STEM teaching and learning. Additionally, STEM competitions for students and teachers will provide platforms for innovation and creativity through federally funded programs. In collaboration with the strategic partnerships IWG, students will be able to participate in experiential learning opportunities through internships, fellowships, scholarships, or other work-based training.

Build Computational Literacy (Computational Literacy IWG)

Federal agencies are well positioned to help Americans of all ages and backgrounds harness the benefits of digital technology and be critical and ethical participants in the digital economy. By developing integrated approaches to teaching and learning computational thinking and supporting new digital technology-based learning environments, agencies can advance mission-critical goals like promoting cyber safety and encouraging responsible data management.

Under the Computational Literacy IWG, the Federal Government is working alongside the education community to promote digital literacy and cyber safety, including by training future STEM workers in digital ethics and privacy. NSF committed $10 million to the newly launched Data Science Corps in FY 2019 to promote data literacy; build capacity to harness data at the local, state and national levels; and provide basic training in data science to the existing workforce across communities. The program will provide practical experiences, teach new skills, and offer teaching opportunities in a variety of settings to data scientists and data science students. NIH is working to ensure that the next generation of researchers is prepared to take advantage of the promise of data science for advancing human health, by making plans to routinely incorporate the teaching of computational skills and the principles of responsible data use into all of its programs for undergraduate and graduate students. ED included a computer science competitive preference priority in several fiscal year 2019 discretionary grant competitions. One of those was the new Perkins Innovation and Modernization Grant Program to test new ideas that can help better prepare students for success in the workforce.

Agencies are also supporting the development of new and improved digital platforms for education, through R&D funding and by incorporating innovative tools into programs and activities. NOAA is using telepresence-enabled ocean exploration for three expeditions in the Atlantic Ocean in fiscal year 2019 as part of its STEM outreach, including more than 80 live interactions between the NOAA Ship Okeanos Explorer and aquaria/science museums and other groups. Watching expeditions in real-time highlights the transdisciplinary teamwork between experts from multiple fields. NOAA will also use these expeditions to underpin professional development workshops for about 700 teachers to help them bring STEM-based ocean exploration lessons and activities to K-12 classrooms. At ED, the Institute of Education Sciences (IES) has awarded 23 organizations a total sum of $10.2 million to develop and test commercially viable education technology products, with funding provided by ED's Small Business Innovation Research program (ED/IES SBIR). Over the past fifteen years, the SBIR program has made more than 200 awards for the development of education technology, including apps, games, programs, dashboards, assessments and more, and products developed with ED/IES SBIR funds are being used in thousands of schools across the nation.

The computational literacy interagency working group is striving to promote and provide best practices of computational literacy in STEM education through multiple mechanisms. Additionally, the support of fundamental research and dissemination of promising content in digital fluency, cyber safety, computational thinking and digital platforms will attract a more diverse and inclusive community of participants for the future STEM workforce.

Diversity, Equity, and Inclusion in STEM (Inclusion in STEM IWG)

Increasing diversity, equity, and inclusion in STEM and providing all Americans with lifelong access to high-quality STEM education is one of the Strategic Plan's three central goals and is key for achieving the other two. When an organization's workforce is diverse in terms of gender, race, socioeconomic status, ethnicity, ability, geography, religion, etc., and provides an inclusive environment that values diversity, the organization better retains talent and is more innovative and productive. Broadening participation is a fundamental prerequisite for making high-quality STEM education accessible to all Americans and will maximize the creative capacity of tomorrow's workforce.

An analysis of the implementation actions that support the Strategic Plan's goal of increasing diversity, equity, and inclusion reveals a few common themes. Agencies are planning to build stronger partnerships with institutions that serve underrepresented groups. At NSF, the addition of a "New to NSF" track to its Hispanic-Serving Institution program will encourage those institutions without a prior record of NSF funding to engage in improving STEM education for their students. ED also has several Minority-Serving Institutions programs that support STEM as well as the recently funded Office of Special Education and Rehabilitative Services STEM Inclusion for Innovation in Early Education Center (STEMIE) to improve access and participation in STEM learning for young children with disabilities. STEMIE will also disseminate these practices and supports to early childhood programs, administrators, providers, families of children with disabilities, and institutions of higher education.

Efforts across FC-STEM agencies will be supported by IWGIS. The IWGIS has met regularly to identify research, best practices, and policies for increasing participation in STEM among underrepresented groups, and it is well positioned to contribute to the Strategic Plan's implementation. By looking across activities designed to promote diversity and inclusion at individual agencies, and by working with FC-STEM and other IWGs, the IWGIS will help identify promising programs, partnerships, and strategies to leverage unique agency capabilities in support of diversity and inclusion.

Operate with Transparency and Accountability (Transparency and Accountability IWG – TA IWG)

Measuring and reporting progress, impact, and success in the Federal implementation of the Strategic Plan is essential for achieving transparency and accountability. Across the Federal STEM education enterprise, agencies are working to: develop and apply metrics that assess progress in meaningful ways; identify and scale evidence-based practices; collect data on educational programs, such as performance evaluations, program outcomes, and participation rates for underrepresented groups; and disseminate information to external stakeholders.

To inform this effort, the TA IWG collected information from STEM agencies to baseline current capabilities at each agency, collect definitions of key terms, outline challenges to future efforts, and solicit recommendations for collective action. The TA IWG is using the aggregated results to identify priority focus areas and develop a work plan to address them.

The complexity of Federal investments in STEM education dictates the multiplicity of approaches that are being pursued to implement the Strategic Plan, and it is an essential consideration for the interagency development of metrics, operational definitions of terms, and best practices. This complexity will require creative and flexible approaches that focus on key points of intersection between programs to help establish and enhance returns on these investments. Metrics may also take available resources into consideration, to account for the fact that budgets vary widely across the inventory of Federal STEM education programs.

Based on agency responses, an important first step for the TA IWG will be to coordinate standard definitions for terms like 'participant' and 'rural status' that currently differ across agencies and programs. Standard definitions will lay the groundwork for common metrics, by ensuring that data can be meaningfully aggregated, accurately interpreted, and readily used to compare similar programs.

Finally, the TA IWG will also develop recommendations to FC-STEM on the most effective approach for disseminating program data to external stakeholders. Dissemination platforms may build off existing resources like the searchable online portals for Federally sponsored opportunities for STEM undergraduates and graduate students developed by DOE, the progress reports on the Federal STEM education enterprise prepared by OSTP, or the online repository and dashboard display tools for program demographic data metrics hosted by the NIH's annual Data Book.

Measuring Progress

Tracking progress and measuring the impact of actions undertaken to achieve the objectives of the Strategic Plan is an essential part of the interagency implementation effort and will also help realize the Strategic Plan's goals of cross-agency coordination and accountability in STEM education. Metrics and criteria for success will be developed at different scales and through multiple mechanisms.

Each of the actions identified by agencies to support the implementation of the Strategic Plan is accompanied by criteria for monitoring its progress. These criteria are unique to each action and frequently take into account action-specific characteristics like duration and scope. For example, for an action that funds research on the most effective approaches for blending successful learning practices, milestones may include securing funding, issuing a call for proposals, and selecting and awarding a grant. In contrast, for actions that seek to establish additional connections between Federal STEM professionals and Federal facilities and local and regional STEM ecosystems, progress may be measured in volunteer hours by staff, the number of tours and participants, and demonstrations at participating Federal facilities.

The Federal investment in STEM education encompasses a complex portfolio of programs, from short-term K-12 outreach meant to engage and inspire learners early in their educational journeys, to professional development that provides educators with authentic STEM experiences, to graduate fellowships that support trainees in higher education as they gain the technical skills needed to make the great discoveries and innovations of tomorrow. Given the breadth of Federal STEM investments, there are challenges to designing metrics that are commonly applicable across Federal STEM education programs and also yield data that can be aggregated and meaningfully interpreted. For example, even similar activities conducted by different agencies may have different rationales and goals, reach different audiences, and differing measures of success. As mentioned earlier, the TA IWG will support the development of common metrics that are appropriate and meaningful to the programs that leverage them.

Conclusion

Since the release of *Charting a Course for Success: America's Strategy for STEM Education* in December 2018, significant steps have been taken towards implementation of the plan. Agencies are striving to align their programs to the goals and/or pathways identified in the plan and described earlier in this report.

Interagency working groups have been meeting frequently. These groups are comprised of participants from FC-STEM agencies and provide opportunities for improved collaboration, coordination, and dissemination of Federal STEM education efforts. Development of work plans is currently underway in each IWG to achieve objectives towards actions of implementation. In many cases, input will be gathered from internal and external stakeholders regarding evidence-based practices in order to integrate these practices and disseminate them for broader reach.

While duplication and fragmentation of STEM programs have been diminished over time, a conscious effort toward open communication across Federal agencies seeks to reduce the risk of this occurring in the future. FC-STEM understands the importance of stewardship of Federal STEM education funding to maximize efficiency while ensuring programs meet the needs of diverse populations.

The goals and pathways outlined in the 5-year STEM Education Strategic Plan have provided a course toward a future in which all Americans will have lifelong access to high-quality STEM education, and the United States will be the global leader in STEM literacy, innovation, and employment. CoSTEM, FC-STEM, and OSTP have demonstrated solid commitment to implementing the Strategic Plan. The vision and support of the United States Congress in committing resources to Federal STEM education programs multiplies the reach of this plan.

Appendix 1. Agency STEM Program Alignment to Pathways and Objectives

GOALS FOR AMERICAN STEM EDUCATION

★ Build Strong Foundations for STEM Literacy ★

★ Increase Diversity, Equity, and Inclusion in STEM ★

★ Prepare the STEM Workforce for the Future ★

Pathways	Objectives	DOC	DOD	DOE	DOI	DOL	DOS	DOT	ED	EPA	HHS	NASA	NSF	SI	USDA
Develop and Enrich Strategic Partnerships	Foster STEM Ecosystems that Unite Communities	●	●	●	●		●	●	●	●	●	●	●	●	●
	Increase Work-Based Learning and Training through Educator-Employer Partnerships	●	●	●	●	●		●	●	●	●	●	●	●	●
	Blend Successful Practices from Across the Learning Landscape	●	●	●			●	●	●				●	●	●
Engage Students where Disciplines Converge	Advance Innovation and Entrepreneurship Education	●	●	●			●	●	●	●	●		●		●
	Make Mathematics a Magnet	●	●	●					●				●		●
	Encourage Transdisciplinary Learning	●	●	●	●			●	●	●	●	●	●	●	●
Build Computational Literacy	Promote Digital Literacy and Cyber Safety	●	●				●		●		●		●		●
	Make Computational Thinking An Integral Element of All Education	●	●	●	●				●		●		●	●	
	Expand Digital Platforms for Teaching and Learning	●		●					●				●	●	●
Operate with Transparency and Accountability	Leverage and Scale Evidence-Based Practices Across STEM Communities	▬													
	Report Participation Rates of Underrepresented Groups	▬													
	Use Common Metrics to Measure Progress	▬													
	Make Program Performance and Outcomes Publicly Available	▬													
	Develop a Federal Implementation Plan and Track Progress	▬													

The table above is an updated version of the original included in the Strategic Plan. The dots indicate the objectives for which each agency has developed mission-specific implementation actions. All actions are subject to budgetary constraints and other approvals. Agencies will collectively address the five objectives of the Strategic Plan's Transparency and Accountability pathway, as indicated by the shaded rows.

Appendix 2. FY 2019 STEM Inventory of Programs

Below is a list of STEM investments and funding levels provided by OMB's 2019 data call on Federal STEM education programs. Programs were included if they had any funding in FY 2018 or FY 2019. An "X" indicates a program fully aligns with the goal; a "/" indicates partial alignment. The information on how each program aligns with the goals was collected by FC-STEM. Note that zero funding for a fiscal year is not an indicator of either zero or non-zero funding in prior years. Two new agencies were included in this year's inventory: DOL and VA. Two agencies, CNCS and VA, and one sub-agency, HHS HRSA, are not currently represented on FC-STEM and were not asked for information on goal alignment.

STEM Education Program Data

Agency	Sub-Agency/ Office	Program Name	FY 2018 Actual ($, millions)	FY 2019 Estimated ($, millions)	FY 2020 President's Budget ($, millions)	Goal: Build Strong Foundations for STEM Literacy	Goal: Prepare the STEM Workforce for the Future	Goal: Increase Diversity, Equity, and Inclusion in STEM
CNCS		CNCS STEM Programs	41.0	70.5	0.0			
USDA	APHIS	AgDiscovery	1.1	1.0	1.0	X	/	
USDA	NIFA	1890 Facilities Grant Program	19.7	19.7	0.0	/	X	X
USDA	NIFA	1890 Institutions Capacity Building Grants Program: Extension	6.4	6.4	6.2	/	/	X
USDA	NIFA	1890 Institutions Capacity Building Grants Program: Teaching	6.4	6.4	6.2	X	X	X
USDA	NIFA	4-H Science, 4-H Youth Development Program	25.3	26.6	25.3	X	X	/
USDA	NIFA	Agriculture in the Classroom	0.6	0.6	0.0	X	/	/
USDA	NIFA	Alaska Native-Serving and Native Hawaiian-Serving Institutions Education Competitive Grants Program	3.2	3.2	0.0	X	X	X
USDA	NIFA	Hispanic serving Institutions Education Grants Program	9.2	9.2	9.2	X	X	X
USDA	NIFA	Insular Programs	3.0	2.0	0.0			
USDA	NIFA	Multicultural Scholars, Graduate Fellowship and Institution Challenge Grants	9.0	9.0	0.0			
USDA	NIFA	NIFA Fellowship Grants Program	24.1	32.1	49.0		X	

Agency	Sub-Agency/ Office	Program Name	FY 2018 Actual ($, millions)	FY 2019 Estimated ($, millions)	FY 2020 President's Budget ($, millions)	Goal: Build Strong Foundations for STEM Literacy	Goal: Prepare the STEM Workforce for the Future	Goal: Increase Diversity, Equity, and Inclusion in STEM
USDA	NIFA	Secondary Postsecondary Agriculture Education Challenge Grants (SPECA)	0.9	0.9	0.0	X	X	/
USDA	NIFA	Women and Minorities in Science, Technology, Engineering and Mathematics Fields Program (WAMS)	0.4	0.4	0.0	X	X	X
DOC	NIST	NIST Summer Institute for Middle School Teachers	0.3	0.3	0.3	X	X	/
DOC	NIST	STEM Pipeline for the Next Generation Scientists and Engineers.	0.8	1.0	1.0		X	X
DOC	NIST	Summer Undergraduate Research Fellowship (SURF)	0.7	0.8	0.8	X	X	/
DOC	NOAA	Competitive Education Grants (including Environmental Literacy Grants)	3.0	3.0	0.0	X		
DOC	NOAA	Dr. Nancy Foster Scholarship Program	0.5	0.6	0.5			X
DOC	NOAA	Educational Partnership Program with Minority Serving Institutions	15.5	16.0	0.0		X	/
DOC	NOAA	Ernest F. Hollings Undergraduate Scholarship Program	6.3	5.7	4.5		X	
DOC	NOAA	National Sea Grant College Program	1.3	1.7	0.0		/	X
DOC	NOAA	NOAA Bay Watershed Education and Training (B-WET)	7.5	7.5	0.0	X		/
DOC	NOAA	NOAA Teacher at Sea Program	0.6	0.6	0.6	X		
DOD		National Defense Education Program (NDEP) Military Child STEM Educational Programs	8.9	0.0	0.0	X	X	X
DOD	Army ODASA(R&T)	Army Educational Outreach Program (AEOP)	9.4	10.0	10.2	X	X	X
DOD	ONR	Navy - Science and Engineering Apprenticeship Program (SEAP)	0.8	0.9	0.9	X	X	
DOD	ONR	Navy Historically Black Colleges and Universities/Minority Institutions Research and Education Partnership	4.4	0.0	0.0	X	X	X

Agency	Sub-Agency/ Office	Program Name	FY 2018 Actual ($, millions)	FY 2019 Estimated ($, millions)	FY 2020 President's Budget ($, millions)	Goal: Build Strong Foundations for STEM Literacy	Goal: Prepare the STEM Workforce for the Future	Goal: Increase Diversity, Equity, and Inclusion in STEM
DOD	ONR	The Naval Research Enterprise Intern Program (NREIP)	4.2	5.2	5.2		X	
DOD	OSD/ P&R/M&RA	DOD STARBASE Program	30.0	30.0	0.0	X	X	/
DOD	OUSD(R&E)	National Defense Education Program (NDEP) K-12 component	5.1	41.5	9.6	X	X	X
DOD	OUSD(R&E)	National Defense Education Program (NDEP) Science, Mathematics and Research for Transformation (SMART)	58.7	67.9	71.0	/	X	X
DOD	OUSD(R&E)	National Defense Science and Engineering Graduate (NDSEG) Fellowship Program	43.1	45.0	45.0	X	X	X
ED	IES	Research in Special Education	8.5	8.3	8.1	/	/	
ED	IES	Research, Development, and Dissemination	42.4	32.6	30.1	/		
ED	OESE	21st Century Community Learning Centers	4.7	3.6	0.0	/		/
ED	OII	Investing in Innovation	60.0	60.0	100.0	X	X	
ED	OPE	Developing Hispanic Serving Institutions STEM and articulation programs	93.4	93.8	0.0		X	X
ED	OPE	Graduate Assistance in Areas of National Need (GAANN)	23.0	23.0	23.0		X	X
ED	OPE	Minority Science and Engineering Improvement Program	11.0	11.1	9.6		X	X
ED	OPE	Strengthening Predominantly Black Institutions	7.0	7.0	0.0		X	X
ED	OPE	Teacher Loan Forgiveness	99.1	98.7	100.2	/	/	
ED	OPE	Upward Bound Math and Science Program	67.7	64.0	64.0	X	X	X
DOE	EERE/AMO	Industrial Assessment Centers	10.0	10.0	0.0		X	
DOE	EERE/AMO	Wide Bandgap Power Electronics Traineeship	2.5	3.5	2.6		X	
DOE	EERE/BTO	Solar Decathlon	2.0	2.5	0.0		X	
DOE	EERE/VTO	Advanced Vehicle Competitions	2.5	2.5	2.5		X	
DOE	EERE/WETO	Wind for Schools	0.8	1.1	0.2	/	X	

Agency	Sub-Agency/ Office	Program Name	FY 2018 Actual ($, millions)	FY 2019 Estimated ($, millions)	FY 2020 President's Budget ($, millions)	Goal: Build Strong Foundations for STEM Literacy	Goal: Prepare the STEM Workforce for the Future	Goal: Increase Diversity, Equity, and Inclusion in STEM
DOE	EM	HBCU Mathematics, Science & Technology, Engineering and Research Workforce Development Program	5.0	6.0	6.0		X	X
DOE	NNSA	Stewardship Science Academic Alliances (SSAA) Grants and Cooperative Agreements	34.0	33.4	24.6		X	
DOE	NNSA and EM	Minority Serving Institution Partnership Program (MSIPP)	19.8	20.0	20.0		X	X
DOE	NNSA and OS	Computational Sciences Graduate Fellowship (CSGF)	1.5	2.0	2.0		X	
DOE	Office of Economic Impact and Diversity	Minority Educational Institution Student Partnership Program	1.2	1.0	1.6		X	X
DOE	Office of Fossil Energy	Special Recruitment Programs/Mickey Leland Fellowship	0.7	0.7	0.7		X	X
DOE	Office of Nuclear Energy	Integrated University Program	5.0	5.0	0.0		X	
DOE	OS/ASCR	Computational Sciences Graduate Fellowship	10.0	10.0	10.0		X	
DOE	OS/HEP	U.S. Particle Accelerator Training	1.0	1.0	1.0		X	
DOE	OS/NP and OS/BES	American Chemical Society Summer School in Nuclear and Radiochemistry	0.6	0.6	0.6		X	
DOE	OS/WDTS	Community College Internship (formerly Community College Institute of Science and Technology)	1.0	1.0	1.1		X	
DOE	OS/WDTS	Graduate Student Research Program	2.5	3.5	2.6		X	
DOE	OS/WDTS	National Science Bowl	2.9	2.9	2.9	X		
DOE	OS/WDTS	Science Undergraduate Laboratory Internships	8.3	10.3	9.1		X	
DOE	OS/WDTS	Visiting Faculty Program (formerly Faculty and Student Teams)	1.7	1.7	1.7		X	X
HHS	HRSA	Health Careers Opportunity Program	14.2	14.2	0.0			

Agency	Sub-Agency/ Office	Program Name	FY 2018 Actual ($, millions)	FY 2019 Estimated ($, millions)	FY 2020 President's Budget ($, millions)	Goal: Build Strong Foundations for STEM Literacy	Goal: Prepare the STEM Workforce for the Future	Goal: Increase Diversity, Equity, and Inclusion in STEM
HHS	NIH	Ruth L. Kirschstein National Research Service Award Institutional Research Training Grants (T32, T35)	288.8	297.9	268.0		X	/
HHS	NIH	Ruth L. Kirschstein NRSA for Individual Predoctoral Fellows, including Underrepresented Racial/Ethnic Groups, Students from Disadvantaged Backgrounds, and Predoctoral Students with Disabilities	91.7	98.1	89.4		X	X
HHS	NIH/NCI	Cancer Education Grants Program	21.4	24.9	24.9		X	/
HHS	NIH/NHLBI	Short-Term Research Education Program to Increase Diversity in Health-Related Research	5.1	5.2	5.2		X	X
HHS	NIH/NHLBI	Summer Institute for Training in Biostatistics	1.5	1.6	1.6		X	
HHS	NIH/NIGMS	Bridges to the Baccalaureate Program	8.6	8.9	7.6		X	X
HHS	NIH/NIGMS	Bridges to the Doctorate	2.2	2.3	2.0		X	X
HHS	NIH/NIGMS	Initiative for Maximizing Student Development	23.9	24.7	21.3		X	X
HHS	NIH/NIGMS	MARC U-STAR NRSA Program	19.3	20.5	17.6		X	X
HHS	NIH/NIGMS	PREP (Postbaccalaureate Research Education Program)	10.36	11.40	9.8		X	X
HHS	NIH/NIGMS	RISE (Research Initiative for Scientific Enhancement)	18.0	18.6	16.0		X	X
HHS	NIH/NIGMS	Science Education Partnership Award	20.4	21.0	18.1	X		/
HHS	NIH/NIGMS	Short Courses on Mathematical, Statistical, and Computational Tools for Studying Biological Systems	1.1	0.6	0.0		X	/
HHS	NIH/OITE	Graduate Program Partnerships	12.7	13.1	13.4		X	
HHS	NIH/OITE	Post-baccalaureate Intramural Research Training Award Program	41.6	46.7	47.4		X	
HHS	NIH/OITE	Student Intramural Research Training Award Program	8.8	8.9	9.1		X	

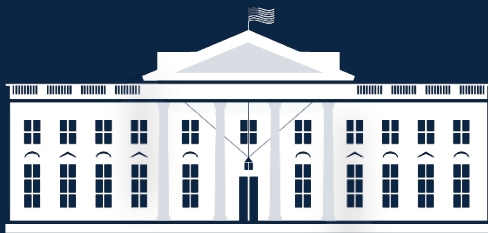| Agency	Sub-Agency/ Office	Program Name	FY 2018 Actual ($, millions)	FY 2019 Estimated ($, millions)	FY 2020 President's Budget ($, millions)	Goal: Build Strong Foundations for STEM Literacy	Goal: Prepare the STEM Workforce for the Future	Goal: Increase Diversity, Equity, and Inclusion in STEM
HHS	NIH/OITE	Undergraduate Scholarship Program for Individuals from Disadvantaged Backgrounds	3.8	4.0	3.4		X	X
DHS	DNDO	National Nuclear Forensics Expertise Development Program	5.2	7.1	7.1	X		
DOI	BLM	Conservation and Land Management Internship Program	1.2	0.5	0.0		X	/
DOI	USGS	EDMAP	0.5	0.5	0.5		X	
DOL	ETA	H-1B Training Activities	0.0	73.6	40.0	/	/	/
DOT	FAA	Air Transportation Centers of Excellence	33.2	24.4	44.7	X	X	X
DOT	FHWA	Dwight David Eisenhower Transportation Fellowship Program	1.9	2.0	2.0		X	X
DOT	FHWA	Garrett A. Morgan Technology and Transportation Education Program	0.4	0.4	0.4	X	X	X
DOT	FHWA	National Summer Transportation Institute Program (NSTI)	2.7	2.4	2.7	X	X	X
DOT	FHWA	Summer Transportation Institute Program for Diverse Groups (STIPDG)	1.3	1.3	1.5		X	X
DOT	FHWA	University Transportation Centers Program	68.8	69.8	77.5	X	X	X
VA		Edith Nourse Rogers STEM Scholarship	0.0	25.0	75.0			
VA		Veteran Employment Through Technology Education Courses (VET TEC)	0.0	15.0	15.0			
EPA	EE	Environmental Education Grants	3.3	3.3	0.0	/	/	
EPA	EE	National Environmental Education and Training Partnership	2.2	2.2	0.0	/		
EPA	ORD	Cooperative Training Partnership in Environmental Sciences Research	0.4	0.0	0.0		X	

Agency	Sub-Agency/ Office	Program Name	FY 2018 Actual ($, millions)	FY 2019 Estimated ($, millions)	FY 2020 President's Budget ($, millions)	Goal: Build Strong Foundations for STEM Literacy	Goal: Prepare the STEM Workforce for the Future	Goal: Increase Diversity, Equity, and Inclusion in STEM
EPA	ORD	People, Prosperity & the Planet (P#) Award: A National Student Design Competition for Sustainability	1.0	1.2	0.0	/	/	
NASA	Office of STEM Engagement	Minority University Research and Education Project (MUREP)	32.0	33.0	0.0		X	X
NASA	Office of STEM Engagement	NextGen STEM Project (NGS)	10.0	12.0	0.0	/	X	/
NASA	Office of STEM Engagement	Space Grant - National Space Grant College and Fellowship Program	40.0	44.0	0.0	X	X	/
NASA	SMD	Global Learning and Observations to Benefit the Environment (GLOBE) Program	6.0	6.0	6.0	X		/
NASA	SMD	SMD Science Activation Program	44.0	45.0	45.6	X		/
NSF	CISE	CyberTraining	6.3	6.0	5.0	/	X	/
NSF	CISE, EHR and MPS	Harnessing the Data Revolution (HDR): Data Science Corps (DSC)	0.0	7.0	3.0	/	X	/
NSF	EHR	Advanced Technological Education (ATE)	66.1	66.0	75.0		X	
NSF	EHR	Advancing Informal STEM Learning (AISL), formerly Informal Science Education (ISE)	62.1	62.5	58.9	X		X
NSF	EHR	Alliances for Graduate Education and the Professoriate (AGEP)	8.0	8.0	7.5		X	X
NSF	EHR	Cybercorps: Scholarship for Service (SFS)	55.1	55.0	55.1	/	X	X
NSF	EHR	Discovery Research K-12 (DR-K12)	88.6	88.2	95.0	X		X
NSF	EHR	Excellence Awards in Science and Engineering (EASE)	5.7	4.3	4.0		X	X
NSF	EHR	Hispanic-Serving Institutions	44.9	40.0	15.0		X	X
NSF	EHR	Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)	34.9	35.0	33.0		X	X

Agency	Sub-Agency/ Office	Program Name	FY 2018 Actual ($, millions)	FY 2019 Estimated ($, millions)	FY 2020 President's Budget ($, millions)	Goal: Build Strong Foundations for STEM Literacy	Goal: Prepare the STEM Workforce for the Future	Goal: Increase Diversity, Equity, and Inclusion in STEM
NSF	EHR	Improving Undergraduate STEM Education	99.1	107.0	93.1	X		
NSF	EHR	Innovative Technology Experiences for Students and Teachers (ITEST)	35.9	30.0	30.0	X	X	X
NSF	EHR	Louis Stokes Alliances for Minority Participation (LSAMP)	46.0	46.0	46.0		X	X
NSF	EHR	NSF Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM)	156.4	90.0	90.0		X	X
NSF	EHR	Research Experiences for Undergraduates (REU)	87.5	81.8	76.4		X	X
NSF	EHR	Robert Noyce Scholarship (Noyce) Program	64.5	64.5	47.0		X	
NSF	EHR	Tribal Colleges and Universities Program (TCUP)	14.0	15.0	13.2		X	X
NSF	EHR and CISE	Computer Science for All (CSforAll)	0.0	0.0	20.0	X	X	X
NSF	EHR and CISE	STEM+C Partnerships	64.4	61.9	0.0	X	X	X
NSF	EHR and OIA	Graduate Research Fellowship Program (GRFP)	284.9	284.5	256.9		X	X
NSF	ENG	Emerging Frontiers in Research and Innovation (EFRI) Research Experience and Mentoring (REM)	1.1	1.1	0.8	X	X	X
NSF	ENG and CISE	Research Experiences for Teachers (RET) in Engineering and Computer Science	7.7	6.2	5.8	X	X	X
NSF	NSF	NSF INCLUDES	18.0	20.0	20.0	/	X	X
NSF	NSF	NSF Research Traineeships (NRT)	53.9	53.5	49.5		X	X
NSF	OISE	International Research Experiences for Students (IRES)	11.5	12.0	13.0		X	/
NRC	NUREG	Integrated University Program	15.0	15.0	0.0			
NRC	SBRC	Minority Serving Institutions Program (MSIP)	1.0	0.0	0.0			
SI		STEM Informal Education and Instruction	5.1	5.1	5.1	X	/	X

FY 2019 Enacted Inventory Summary (includes investments with >$0 FY 2019 enacted)

Agency	Number of Programs	FY 2019 Estimated Budget ($, millions)
Corporation for National Community Service	1	70
Department of Agriculture	13	118
Department of Commerce	10	37
Department of Defense	7	200
Department of Education	10	402
Department of Energy	20	119
Department of Health and Human Services	18	623
Department of Homeland Security	1	7
Department of the Interior	2	1
Department of Labor	1	74
Department of Transportation	6	100
Department of Veterans Affairs	2	40
Environmental Protection Agency	3	7
National Aeronautics and Space Administration	5	140
National Science Foundation	24	1,245
Nuclear Regulatory Commission	1	15
Smithsonian Institution	1	5
Grand Total	**125**	**3,203**