

Lifelong STEM Engagement

Request

As museums are key partners in ensuring Americans' lifelong engagement in STEM, we urge Congress to:

- support federal agency efforts to ensure all Americans have lifelong access to high quality STEM education;
- fully fund and authorize museums to participate in STEM engagement and informal STEM education programs across Federal science agencies, including the National Science Foundation (NSF), National Aeronautics and Space Administration (NASA), the National Oceanic and Atmospheric Administration (NOAA), and the National Institutes of Health (NIH), as well as the Departments of Agriculture, Defense, and Energy;
- fund the following programs at levels that exceed inflation-adjusted levels from recent years: NSF's Advancing Informal STEM Learning (AISL) program at \$65 million, NOAA's Office of Education at \$35 million, NASA's Office of STEM Engagement at \$130 million and Science Mission Directorate's Science Engagement and Partnerships Division at \$47 million, and NIH's Science Education Partnership Award (SEPA) program at \$22.5 million¹;
- regard museums and other institutions engaged in informal STEM education as vital components of the STEM education ecosystem, including by ensuring that such organizations are eligible for relevant Federal funding opportunities and represented at appropriate conversations convened by Federal agencies;
- support the Department of Education in its efforts to support and promote STEM learning through multiple offices, including its interagency partnerships with the Institute of Museum and Library Services (IMLS), National Park Service, NASA, and NOAA; and
- support IMLS in its priority areas of STEM and Making and its partnership with the Department of Education's 21st Century Community Learning Centers program.

Introduction

Museums, science centers, zoos, aquariums, botanical gardens, and other cultural institutions have an important role to play in increasing the understanding of, and engagement with, science, technology, engineering, and mathematics (STEM) among people of all ages. Museums are a part of the larger STEM learning ecosystem, working in partnership with schools, higher education, industry, and other community-based nonprofits to support people throughout their lives. In this brief, we use the term "lifelong STEM engagement" as it captures the diversity of museums' STEM activities—it includes early STEM learning; PreK–12 STEM education, both formal and informal; family engagement in STEM; as well as adult learning, workforce preparation, and community dialogue and deliberation on scientific issues.

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Many federal agencies have significant funding programs that museums utilize for STEM education and engagement initiatives. See, for example, the programs compiled in the 2018 five-year Federal STEM Strategic Plan.² These programs provide an opportunity for the museum community to deepen connections with Federal agencies by working in partnership to build strong foundations for STEM literacy among all Americans; increase diversity, equity, and inclusion in STEM and provide all Americans with lifelong access to high-quality STEM education; and prepare the STEM workforce for the future. There are additional opportunities to expand funding and support for the museum community by growing relationships with Federal agencies who have a need to engage the public in consideration of scientific issues (i.e. expanding beyond education and outreach-focused programs, offices, and divisions).

Talking Points

- Lifelong access to quality STEM education and learning opportunities prepares American citizens for careers of the future and informed civic decision-making; evidence for this need was illustrated by the COVID-19 pandemic where Americans are asked to consider scientific guidance and make personal decisions based upon scientific and public health information.
- Each year, hundreds of millions of Americans of all ages and backgrounds visit and/or participate in educational programming offered by museums, science centers, public gardens, zoos, aquariums, and other similar cultural institutions.³
 - Many of these institutions are among the most visited cultural institutions within their community and region, providing jobs and economic development.
- Museums spark interest and activate learning through educational exhibitions, thought-provoking collections, public dialogue and deliberations, and hands-on, experiential programming.
- Today, museums partner with and receive funding from a variety of Federal agencies, contributing to agency missions to educate Americans in STEM, seed tomorrow's workforce, and engage the public with current scientific research.
- Federal funding supports a wide variety of institutions, from rural nature centers to suburban museums to urban zoos and aquariums, supporting multiple goals, including:
 - Evidence-based STEM engagement within the institution and out in the community—from programs in K–12 schools to partnerships with military installations and Native American reservations.
 - Research on effective STEM learning in informal environments, particularly for populations underrepresented in STEM fields and from underserved communities.
 - Museum-based scientific research that makes major original contributions to the understanding of important issues such as climate, biodiversity, and the history of life, enriches exhibitions and programs and engages students and the public in current research.

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Background on Federal Agencies' STEM Engagement Work

NSF: The Division of Research on Learning in Formal and Informal Settings (DRL) within the Directorate for Education and Human Resources (EHR) is currently an important source of support for museums to research learning in informal education settings and has historically funded the development of innovative exhibitions, programs, and outreach models. Relevant programs within EHR/DRL include AISL, Innovative Technology Experiences for Students and Teachers (ITEST), STEM + Computing K-12 Education (STEM+C), Discovery Research PreK-12 (DRK12) and more. The NSF Directorates for Biological Sciences, Geosciences, and Social, Behavioral & Economic Sciences have all supported museums in the areas of field and collections-based research, collections improvements and digitization, database development, and educational programming. Through the Research Experiences for Undergraduates (REU) program, museums involve undergraduate college students in field and laboratory research. Finally, the broader impacts criterion for all NSF awards requires consideration of the benefits to society, including in areas of education and science engagement.

NASA: The Teams Engaging Affiliated Museums and Informal Institutions (TEAM II) program⁴ within NASA's Office of STEM Engagement and their Science Activation program, within the Science Mission Directorate's Science Engagement and Partnerships Division, directly support museums and museum networks.

NOAA: Two programs within NOAA's Office of Education—the Competitive Education Grant Program and Bay-Watershed Environmental Training (B-WET)—help zoos, aquariums, science centers, and museums bring real world examples of science to students nationwide. Other NOAA offices have community outreach, public engagement, and citizen science initiatives and programs.

NIH: The SEPA program builds relationships between the biomedical research community and educational organizations—including museums—that improve life science literacy. In addition, there is growing awareness of the importance of public engagement as a core aspect of several major initiatives that intersect with societal interests and public concerns, such as the BRAIN Initiative and the All of Us Research Program.

Other Federal Agencies: The Department of Energy, Department of Defense, and U.S. Department of Agriculture have programs which include STEM workforce development and which could benefit from strengthening public engagement in science that could be expanded in collaboration with museums.

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Funding History of Select Informal STEM Programs:

The budgets proposed by the Biden–Harris Administration have generally been supportive of programs of interest to the museum community. Amounts in the table below⁵ are in millions.

Appropriation	FY 16 (actual)	FY 17	FY 18	FY 19	FY 20	FY 21	FY 22 President's Request
NSF	\$7,464	\$7,472	\$7,767	\$8,075	\$8,278	\$8,487	TBD
EHR	\$880	\$880	\$902	\$910	\$940	\$968	TBD
AISL	\$63	\$63	\$63	-	\$63*	\$63*	TBD
NASA	\$19,285	\$19,653	\$20,736	\$21,500	\$22,629	\$23,271	TBD
Office of STEM Engagement	\$115	\$100	\$100	\$110	\$120	\$127	TBD
TEAM II	\$6.5	-	\$10	-	\$5*	-	TBD
Science Mission Directorate's Science Activation Program	\$37	\$37	\$44	\$45*	\$46*	\$46*	TBD
NOAA	\$5,766	\$5,675	\$5,909	\$5,425	\$5,352	\$5,431	TBD
Office of Education	\$27	\$27	\$28	\$29	\$30	\$33	TBD
Education Program Base**	\$5	\$5	\$5	\$5	\$5	-	TBD
B-WET	\$7.2	\$7.5	\$7.5	\$7.5	\$7.8	\$7.8	TBD
NIH	\$32,084	\$34,084	\$37,084	\$39,084	\$41,684	\$42,934	TBD
SEPA***	\$18.5	\$18.5	\$19.5	-	-	-	TBD

* No less than.

** The Environmental Literacy Grants are supported out of this funding.

*** The NIH SEPA program has not been called out explicitly in the Conference Report for the past several years.

¹ In FY 2018, the Conference Report stated that SEPA receive not less than \$19.5 million, a number based on the FY 2017 level “plus the proportional share of the general increase provided to NIGMS.” Minimum SEPA funding levels were not included in the FY 2019 and FY 2020 Conference Reports, but If SEPA were to have been similarly granted proportional increases to the NIH budget in those years, FY 2021 funding would be \$22.5 million. www.congress.gov/crec/2018/03/22/CREC-2018-03-22-bk3.pdf

² See 2020 Progress Report on the Implementation of the Federal STEM Education Strategic Plan: <https://trumpwhitehouse.archives.gov/wp-content/uploads/2017/12/Progress-Report-Federal-Implementation-STEM-Education-Strategic-Plan-Dec-2020.pdf>

³ See the 2019 report, Encountering Science in America, from the American Academy of Arts and Science here: www.amacad.org/publication/encountering-science

⁴ TEAM II is formerly known as the Competitive Program for Science Museums, Planetariums, and NASA Visitor Centers (CP4SMPVC).

⁵ Primary source of budget numbers: www.aip.org/fyi/federal-science-budget-tracker