



BILLING CODE 7555-01-P

NATIONAL SCIENCE FOUNDATION

Notice of Request for Information on STEM Education

AGENCY: National Science Foundation.

ACTION: Notice of Request for Information.

SUMMARY: On behalf of the National Science and Technology Council's (NSTC's) Committee on STEM Education (CoSTEM) and in coordination with the White House Office of Science and Technology Policy (OSTP), the National Science Foundation (NSF) requests input related to the implementation of the Federal STEM Education Strategic Plan, *Charting a Course For Success: America's Strategy for STEM Education*.

DATES: Interested persons are invited to submit comments on or before 11:59 p.m. ET, **[INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION]**.

ADDRESSES: Comments submitted in response to this notice may be submitted online to: CoSTEM@nsf.gov. Email submissions should be machine-readable [PDF, Word] and not copy-protected. **Submissions in the subject line of the email message should include "Individual/Organization Name: STEM RFI Response" (e.g., Johnson High School: STEM RFI Response).**

Instructions: Response to this RFI is voluntary. Each individual or organization is requested to submit only one response. Submission must not exceed 6 pages in 12 point or larger font, with a page number provided on each page. Responses should include the name of the person(s) or organization(s) filing the comment. Comments containing references, studies, research, and other empirical data

that are not widely published should include copies or electronic links of the referenced materials.

Please indicate on the first page of the response which question(s), identified by category and question number, you are responding to. Please only respond to the questions that are relevant to you and/or your stakeholders and provide a brief description of the perspective from which you are sharing (e.g., I am a teacher, parent, or represent a non-profit STEM organization). If responding to more than one question, please identify the category and question number(s) (e.g., “Federal STEM Education Online Resource, questions 1-2”, “Diversity, Equity, and Inclusion in STEM, question 4”, “Strategic Partnerships, questions 9-11”, etc.) with specific response(s) directly below it.

No proprietary information, copyrighted information, or personally identifiable information should be submitted in response to this RFI.

In accordance with Federal Acquisition Regulation 15.201(e), “RFIs may be used when the Government does not presently intend to award a contract, but wants to obtain price, delivery, other market information, or capabilities for planning purposes. Responses to these notices are not offers and cannot be accepted by the Government to form a binding contract.” Additionally, those submitting responses are solely responsible for all expenses associated with response preparation.

FOR FURTHER INFORMATION CONTACT: For additional information, please direct your questions to Cindy Hasselbring, OSTP, STEM@ostp.eop.gov, 202-456-4245.

SUPPLEMENTARY INFORMATION: This request is in alignment with 42 U.S.C. 6621(b)(5) of the America COMPETES Reauthorization Act of 2010, Public Law 111-358, which calls for CoSTEM to develop, implement, and update every 5 years a STEM Education Strategic Plan. This information request also addresses current and future changes in education systems that have been impacted by the COVID-19 pandemic. Information gathered from this request may be used to guide future Federal STEM education resource development.

Categories in this Request for Information focus on the following elements of the Federal STEM Education Strategic Plan:

- Future opportunities in STEM education;
- Develop STEM education digital resources;
- Increase diversity, equity, and inclusion in STEM;
- Engage students where disciplines converge;
- Develop and enrich strategic partnerships;
- Build computational literacy; and
- Community use and implementation of the Federal STEM Education Strategic Plan.

In December 2018, The White House released the Federal STEM Education Strategic Plan, *Charting a Course for Success: America's Strategy for STEM Education* to provide a vision for a future where all Americans have access to

high-quality STEM education. This strategy was intended to serve as a “North Star” for the broader STEM community to help achieve its goals, pathways, and objectives.

The **GOALS** of the Federal STEM Education Strategic Plan:

- **Build Strong Foundations for STEM Literacy;**
- **Increase Diversity, Equity, and Inclusion in STEM; and**
- **Prepare the STEM Workforce for the Future.**

The Federal STEM Education Strategic Plan is built on four **PATHWAYS** representing a cross-cutting set of approaches, each with a specific set of objectives for achieving these goals:

- **Develop and Enrich Strategic Partnerships;**
- **Engage Students where Disciplines Converge;**
- **Build Computational Literacy; and**
- **Operate with Transparency and Accountability.**

These four pathways have the potential to catalyze and empower students, educators, employers, and communities to benefit learners at all levels and to harmonize the realization of a shared vision for American leadership in STEM literacy, innovation, and employment.

QUESTIONS FOR FEEDBACK

Provided below are categories from which the Government is seeking your input. Please respond to those questions within your (organization’s) area of expertise or need. In your response, please identify the category(s) and question number(s) to which you are responding.

FUTURE OPPORTUNITIES IN STEM EDUCATION

In response to the COVID-19 pandemic, education systems (including preK-12, postsecondary, adult, and informal) were required to make a sudden shift to remote or asynchronous teaching and learning, and this may continue in the near term. Please provide insights to the questions below based on current experiences. For each response below please indicate the education system (preK-12, postsecondary, adult, and informal) that covers your response and whether you are addressing school systems, schools, teachers/faculty/instructors, learners, other, or more than one category.

1. What COVID-19 related digital barriers (e.g., access to broadband or computers, digital learning platforms, online educational resources) have you found most prominent, impactful, or difficult to overcome? Are these barriers resolved fully, or partially? If resolved, how was that achieved? If not resolved, what barriers remain to resolving the challenge?
2. What new or existing educational programs, opportunities, or concepts would enhance remote (both synchronous and asynchronous) education? Please indicate which education system you are addressing and if the interventions are targeted toward schools, teachers/faculty/instructors (e.g., virtual field experiences for preservice teachers, flexibility in scheduling classes, virtual internships, micro credentialing), learners (e.g., pre-recorded sessions focused on enabling consistent instruction with individualized delivery options), or other areas.

3. What positive experiences using remote learning technologies have you had in recent months and how can they be enhanced or institutionalized to present new opportunities in STEM education? How has [or could] the Federal Government help support these innovative technologies?
4. What are the greatest challenges that have emerged related to inequities in STEM with the shift to online education and training? What solutions did you identify, and what gaps remain in your ability to deliver/receive equitable STEM education services? How did you measure your solution's success?
5. What areas of professional learning would be most beneficial to educators providing remote instruction (e.g., utilizing formative assessment, small group collaboration, facilitating meaningful discourse or inquiry, creating rigorous alternative assessments for those without access to technology/broadband)?
6. What data/information is the most important to collect about STEM education during the disruption of educational systems because of COVID-19? What data are you collecting currently related to the shift in education because of COVID-19?
7. What experience does your school system have with interoperable learning records or precision learning systems? If used, please share any barriers, solutions, or other information relevant to their effectiveness particularly related to digital barriers and the impact or effectiveness

related to distance education. How were these concepts used or modified in response to COVID?

8. What actions did your STEM Learning Ecosystem take to support learning in response to COVID-19? Were these actions helpful? What barriers prevented you from taking additional actions that may have been useful?

DEVELOP STEM EDUCATION DIGITAL RESOURCES

The Federal Government is seeking information on web-based STEM educational resources and opportunities for preK-12 teachers, post-secondary faculty, educational institutions, informal educators, parents, and students.

9. What type of web-based resources and opportunities would you hope to find on a STEM education website? Are there existing resource websites that could serve as a model for a Federal website? If so, please provide a link for reference. What aspects of this website should be utilized in a Federal website if such a site were developed?
10. Please describe your primary audience (e.g., I primarily work with 7th grade science students in a formal classroom setting) and how the STEM education resources you identified above would help you serve your audience.
11. How would you like to see resources categorized (e.g., subjects, topics, grade bands, Federal agency, other)? Do you have an example of another website that is categorized in this way? If so, please provide a link for reference.

INCREASE DIVERSITY, EQUITY, AND INCLUSION IN STEM

STEM education practices and policies at all levels should embody the values of inclusion and equity. All Americans deserve access to high-quality STEM education, regardless of geography, race, gender, ethnicity, socioeconomic status, veteran status, parental education attainment, disability status, learning challenges, and other social identities. For each response below, please indicate the education system or career experience for which you are responding.

12. What are the methods utilized by your organization to increase the recruitment, retention, inclusion, achievement, or advancement of individuals from groups that are underrepresented and underserved in STEM? For context, please briefly provide information on what groups your organization targets through these interventions? How are these interventions evaluated for success?

ENGAGE STUDENTS WHERE DISCIPLINES CONVERGE

Real world STEM problems require students to ask and answer questions across traditional disciplinary boundaries. This type of transdisciplinary learning, or convergence, is encouraged to produce STEM-literate talent capable of integrating knowledge to produce innovative solutions. Toward this objective, the Federal STEM Education Strategic Plan aims to (1) enable STEM educators through upskilling, resourcing, and providing a forum to share best practices; (2) support the dissemination of transdisciplinary education best practices and programs, and (3) expand support for STEM learners to study transdisciplinary problems.

13. How do you or your organization use transdisciplinary learning, integrated STEM, convergence, or engineering design (e.g., a community or global design/innovation challenge) in your experience? What topical areas in your curriculum do you teach to provide transdisciplinary learning opportunities? What approaches do you use to teach transdisciplinary learning? Why do you use this approach (e.g., more engaging for students, school/administration promotes transdisciplinary learning) and how does it benefit your students' learning?
14. How has your ability to teach transdisciplinary concepts to your students changed in recent months because of the shift to remote teaching and learning? What teaching modalities have you employed to deliver transdisciplinary instruction virtually?
15. What training have you/your organization received in any of these approaches for teaching STEM education: transdisciplinary, integrated, convergence, or engineering design, etc.? Please describe the training, if any (including university coursework or professional development), that helped you/your organization prepare to teach STEM using an integrated or transdisciplinary approach. Why was that specific training helpful, and if not, what could be done differently?
16. If you are an educator or school system and interested in using a more integrated or transdisciplinary approach to teaching STEM, what professional development would help you teach in this way? What specific delivery mechanism work well for you (e.g., online course, webinar, in-

person workshop)? What technology tools would be helpful for you when using a transdisciplinary approach?

17. If you are a student, what specific delivery mechanism works well for you (e.g., online course, webinar, in-person workshop)? What technology tools would be helpful for you to enhance your learning and engagement to deliver transdisciplinary education to your students?

DEVELOP AND ENRICH STRATEGIC PARTNERSHIPS

The Federal Government seeks perspectives to building STEM learning ecosystems through cross-sector strategic partnerships that promote work-based learning programs aimed at reskilling and upskilling. For the following questions, a STEM education partnership is a group of multi-sector partners united by a common vision of creating accessible, inclusive STEM learning opportunities that increase STEM literacy, expose learners to multiple STEM career pathways, and prepare Americans for jobs of the future.

18. What factors drive successful work-based learning programs? What elements encourage or discourage students, schools, or industries from participating? How can Federal agencies expand partnerships with the private and non-profit sectors and educational institutions to train the workforce needed for jobs of the future through work-based learning opportunities? If your organization provides work-based learning opportunities, how has the COVID-19 pandemic impacted your program? How has your organization made adjustments in response?

19. If you are currently engaged in a STEM learning ecosystem, what are the characteristics of success? What is the role of the private sector in a successful STEM learning ecosystem? What is your STEM ecosystem doing to support STEM education since the COVID-19 pandemic began?

BUILD COMPUTATIONAL LITERACY

The Federal Government seeks information on building computational literacy in STEM education. In the Federal Strategy for STEM Education, computational literacy includes digital literacy, cybersafety, cyberethics, cybersecurity, data science, data security, intellectual property (IP), computational thinking, artificial intelligence, quantum information science, and digital platforms for teaching and learning. Considering this definition, please answer the questions below:

20. What are the benefits when integrating computational literacy within a STEM curriculum and/or with related standards, guidance, or resources? Please describe any challenges when integrating aspects of computational literacy into your instructional delivery.
21. What components, key concepts, or topics should be included to integrate computational literacy into STEM education at all levels? Please explain what they are and why they merit special attention.
22. What are existing programs, content, curriculum, or education and training opportunities that inform successful examples of building computational literacy in STEM education? Identify both Federal and non-federally sponsored research and programs.

23. What technologies and resources do you currently use (e.g., apps, learning management systems, collaborative tools, STEM websites, websites linked to curriculum)? Are there others you would like to use, that you do not have access to both for in-person and remote teaching and learning?

COMMUNITY USE AND IMPLEMENTATION OF THE FEDERAL STEM EDUCATION STRATEGIC PLAN

The Federal Government seeks information on community utilization of the Federal STEM Education Strategic Plan.

24. Please describe how your organization has used the Federal STEM Education Strategic Plan. How does your work align with the goals and pathways identified in the Strategy (provided above)? What changes have you made to your program or activity in response to the Federal Strategy?

Thank you for taking the time to respond to this Request for Information.

We appreciate your input.

Dated: August 31, 2020.

Suzanne H. Plimpton,

Reports Clearance Officer,

National Science Foundation.

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