Institute of Education Sciences

Systematic Review Protocol For Science, Technology, Engineering, and Mathematics (STEM) Interventions	**WHAT WORKS CLEARINGHOUSE™** Version 4.1 (May 2022) NCEE U.S. DEPARTMENT OF EDUCATION

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This protocol guides the What Works Clearinghouse's (WWC) systematic reviews of evidence on interventions to improve the science, technology, engineering, and mathematics (STEM) knowledge and skills of students in preschool (PK) to grade 12 (or ages 3-21). To conduct the systematic review, use this protocol in conjunction with version 4.1 of the WWC Standards and Procedures Handbooks and the Study Review Protocol.

PURPOSE STATEMENT

This review focuses on educational interventions, particularly on improving STEM knowledge and skills of children and students in preschool through grade 12. STEM knowledge and skills are critical to students' academic achievement and setting them on a path to high school completion and readiness for college and careers.

The following research questions guide the systematic review:

- Which STEM interventions improve students' STEM knowledge and skills?
- Which interventions are effective at improving particular types of STEM knowledge and skills?
- Are some STEM interventions especially effective for specific groups of students?
- Are certain components of STEM interventions more effective than others at improving student knowledge and skills?

The following three processes are key to the WWC's systematic review process:

1. Identify research on STEM interventions.
2. Screen research for relevance to STEM and eligibility for WWC review.
3. Synthesize and disseminate evidence on STEM interventions.

The following sections describe each process in more detail.

LITERATURE SEARCH

As described in Section III: Identifying Relevant Literature and Appendix B: Principles for Searching for Studies to Review of the *WWC Procedures Handbook*, the WWC conducts literature searches in consultation with research librarians. In conducting literature searches under this protocol, the WWC identifies studies on STEM interventions that it has not yet reviewed. These searches are intended to identify studies that are relevant and useful to educators or other decision makers. To do this, the WWC identifies studies from the following sources:

- Federally funded research available in Education Resources Information Center (ERIC) or from other sources.
- Other research identified in ERIC using key terms.
- Research on specific interventions available in ERIC or other databases.

See Appendix A for additional details on identifying interventions for systematic review and on the search, screening, and prioritization processes.

SCREENING OF RESEARCH USING ELIGIBILITY CRITERIA

The *WWC Procedures Handbook* discusses the types of research the WWC reviews in [Section II: Developing the Review Protocol](), [Section III: Identifying Relevant Literature](), and [Section IV: Screening Studies.]() The WWC reviews studies using the [*Study Review Protocol*](), which guides the review in conjunction with the *WWC Standards Handbook* and the *WWC Procedures Handbook*. To be included in a systematic review under this protocol, a study must both meet the eligibility criteria in the [*Study Review Protocol*]() and the criteria listed below.

Eligible Interventions

The WWC will conduct a systematic review and synthesize evidence for STEM interventions that meet the following criteria:

- **Intervention type.** Interventions must be an educational product, practice, policy, or program designed primarily to improve students' STEM knowledge and skills. See the [*Study Review Protocol*]() for definitions of each type of intervention. A wide range of STEM interventions are eligible for review under this protocol, including:
  - STEM curricula, textbooks, "kits" or other sets of materials for exploring STEM knowledge and skills, and software programs or other educational technology that may be used in classrooms or by students at home.
  - STEM programs that (a) provide or supplement whole-school or whole-class STEM instruction; (b) focus on specific populations, such as students who are at risk of falling below their grade level, students identifying as female, English learners, or students with disabilities; or (c) support teachers in delivering STEM instruction.
  - STEM instructional practices and strategies intended to teach STEM knowledge and skills that involve specific actions school staff take as they interact with students or their families.
  - STEM school- or program-wide policies intended to improve STEM outcomes. A policy involves structural changes, such as changing STEM coursework requirements. Policies may be set by federal, state, or local governments or by districts and schools.
- **Setting.** Interventions must be provided in PK–12 educational programs, including remote instruction, center and home-based day care and child care settings, home schooling programs, after-school programs, or summer school. Interventions must have a connection to learning in a preschool, elementary, or secondary education program.
- **Delivery.** Interventions may be implemented schoolwide, at the classroom level, with small groups of students, or with individual students. See the [*Study Review Protocol*]() for definitions of each delivery method.
- **Replicability.** An intervention must be replicable (that is, it must be possible to reproduce the delivery of the intervention in another setting). To ensure that the intervention is replicable, the following characteristics of an intervention must be documented:
  - Intervention goals, including the targeted student knowledge and skills and teacher instructional practices.
  - The target population of the intervention.
  - The method of delivery, which is the unit of delivery of the intervention (for example, whole group versus individual).

- The frequency and duration of the intervention.
- Key intervention components, including activities and characteristics of activities, as well as the strategies used to improve the targeted student knowledge and skills or teacher instructional practices.
- Resources, including technology, facilities, personnel, and other materials, needed to implement the intervention.
- Qualifications of people delivering or administering the intervention.

The review will also document the resources and costs of implementing the interventions. An intervention may be excluded from a systematic review if little is known about the resources needed to implement the intervention with fidelity.

Eligible Populations

To be included in a systematic review under this protocol, studies must examine the effectiveness of an intervention administered to:

- **Students.** Students and other learners (ages 3-21) in PK-12 educational programs.
- **Staff.** Teachers, school leaders, other educators, or home- or school-based service providers.

STEM interventions might be designed to improve learning for all students, or designed specifically to meet the needs of students with disabilities, students identifying as female, English learners, or those with low prior achievement on STEM assessments. In addition, STEM interventions used with students in general science or mathematics courses might differ from those used with students in more specialized courses, such as biology or geometry. This protocol makes a distinction between interventions focused on general STEM content, typically offered in elementary and middle school grades, and interventions focused on specific STEM content, typically offered in middle and high school grades.

- Interventions that focus on general STEM content cover multiple topics broadly, such as a math course on arithmetic, number sense, and algebraic thinking.
- Interventions that focus on specific STEM content cover specific topics more in depth, such as a geometry course. STEM interventions that focus on specific content are typically for students in grades 9-12, but specific STEM content might also be relevant for students in grades 6-8, such as middle school students taking an Algebra I course.

Correspondingly, when a study is being reviewed as part of a systematic review of a STEM intervention under this protocol, the WWC will review findings reported for the following subpopulations of interest:

- **Preschoolers.** Preschoolers are 3- to 4-year-old students who have not yet entered kindergarten.
- **Students in general STEM courses.** General STEM instruction covers multiple topics and introduces a range of foundational, broadly applicable STEM practices. Regardless of the students' grade level, the WWC may review findings for students in general STEM courses separately from findings for students in specific STEM courses.
- **Students in specific STEM courses.** Specific STEM instruction focuses on a particular topic, such as biology or algebra. Regardless of the students' grade level, the WWC may review findings for students in specific STEM courses separately from findings for students in general STEM courses.
- **Students with low prior achievement on STEM assessments.** These are students who score below their age or grade level according to a standardized baseline measure in STEM.
- **Students identifying as female.** These are students whose gender identity is female.

- ***Students with disabilities.*** These are students who are eligible for special education and related services under the reauthorized Individuals with Disabilities Education Act of 2004 (IDEA 2004), most recently amended through Public Law 114-95, the Every Student Succeeds Act, in 2015. IDEA defines the term "child with disability" as a child with (i) with intellectual disabilities, hearing impairments (including deafness), speech or language impairments, visual impairments (including blindness), serious emotional disturbance (referred to as "emotional disturbance"), orthopedic impairments, autism, traumatic brain injury, other health impairments, or specific learning disabilities; and (ii) who, by reason thereof, needs special education and related services (U.S. Department of Education, n.d.). These students typically have an Individualized Education Program or a 504 Plan.
- ***English learners.*** English learners are students with a primary language other than English who have a limited range of listening, speaking, reading, or writing skills in English. English learners could be described using a variety of terms, including limited English proficient, English language learner, non-native English speaker, language minority, second language learner, or dual language learner.

Eligible Research

Studies included in a systematic review under this protocol must meet the eligibility criteria in the *WWC Procedures Handbook* and the *Study Review Protocol*, and the following additional criteria:

- ***Time frame.*** The study must have been released within the 15 years preceding the year of the review (for example, in 2007 or later for reviews occurring in 2022) to ensure that the intervention and its research base are timely. Research experts may advise a longer time frame for an intervention if necessary.
- ***Implementation of intervention components.*** Studies must describe the components of the intervention and how each was implemented with adequate detail so reviewers can accurately document the intervention.
- ***Intervention version.*** Studies must implement a version of the intervention that is similar to the version available from the developer or publisher at the time of the review. To be considered the same version as the available intervention, the intervention implemented in the study must share intervention components, goals, and methods of delivery, and be delivered with similar frequency and duration, with only minor differences.

Eligible Outcomes

STEM interventions may affect outcomes in multiple domains. Table 1 lists the outcome domains from the *Study Review Protocol* that systematic reviews under this protocol will include.

Table 1. Eligible outcome domains for systematic reviews of STEM interventions

Science	Mathematics	Other measures of knowledge or skills
• Earth/space sciences • Life sciences • Physical sciences • General science achievement	• Algebra • Calculus/precalculus • Data analysis, statistics, and probability • Geometry and measurement • Numbers and operations • General mathematics achievement	• Technology and engineering literacy • General academic achievement

Note: For each study, findings from all outcome domains from the *Study Review Protocol* will be reviewed and reported, but only findings from the outcome domains listed in Table 1 will be synthesized in reports under this protocol.

SYNTHESIS AND DISSEMINATION OF FINDINGS

Determining the number of reports. The WWC will present findings from its systematic review of a STEM intervention in one or more reports, referred to as "intervention reports." The WWC will determine the number and scope of the intervention reports once it identifies a set of eligible studies that meet WWC standards.

Reporting on findings for different subpopulations of interest. If findings for more than one subpopulation of interest are available, the WWC may produce multiple intervention reports (one for each subpopulation), or may combine findings from multiple populations into one intervention report. The WWC will determine whether to summarize findings in one or more reports based on the number of studies that meet WWC standards for each subpopulation of interest, and whether the implementation of the intervention differs across these subpopulations. When possible, findings will be summarized separately for (1) preschoolers, (2) students receiving instruction focusing on general STEM content, (3) students receiving instruction focusing on specific STEM content, (4) students with low prior achievement in STEM, (5) students identifying as female, (6) students with disabilities, and (7) English learners. For some interventions, however, it will not be possible to disaggregate intervention effects for multiple subpopulations of interest.

REFERENCES

U.S. Department of Education. (n.d.). *IDEA: Individuals with Disabilities Education Act*. https://sites.ed.gov/idea/.

APPENDIX A. PRIORITIZING RESEARCH FOR REVIEW AND SYNTHESIS

This appendix describes the processes for prioritizing studies for What Works Clearinghouse (WWC) review, and for selecting interventions for systematic reviews to inform "what works" in improving science, technology, engineering, and mathematics (STEM) knowledge and skills. The WWC prioritizes systematic reviews of evidence that are most likely to be relevant and useful to educators and other decision makers. The WWC also prioritizes for review studies that it has not already reviewed.

To select studies and interventions for WWC review, the WWC uses the five-step process outlined below. Studies are identified in Steps 1 and 2, scored in Step 3, and reviewed in Step 4 on a rolling basis. The WWC then identifies interventions for systematic reviews and disseminates the findings in Step 5.

Step 1: Identify studies for possible WWC review. The WWC identifies studies on STEM interventions. This step is intended to identify studies that are relevant and useful to educators or other decision makers through four literature search processes:

- Search the Education Resources Information Center (ERIC) for Institute of Education Sciences (IES)-funded research not yet reviewed by the WWC.
  - This search will be restricted to research funded by the U.S. Department of Education (ED), IES, using the *funded:y* search flag.
  - The review team will conduct this search so that all IES-funded research can be screened for possible review. Therefore, this search will not be limited by key terms related to STEM interventions specifically.
  - The review team will expand this search to include all ED-funded research when such an option becomes available in ERIC. ERIC does not currently encode whether research was conducted with funding from other ED grants. For this reason, the review team will supplement this search with the lists of ED-funded studies described below.
- Search ERIC using key terms for STEM research not yet reviewed by the WWC.
  - The review team will search ERIC using specific key terms to identify recent research on STEM interventions.
  - The WWC will use ERIC thesaurus terms and additional key search terms related to impact, study design, outcomes, and population and disability terms (if needed) to search key ERIC fields, including the title, abstract, and descriptors. Appendix B provides examples of the search terms that this review may use to focus the literature search. The ERIC database searches abstracts but does not search the full text of studies. Because abstracts are less likely to include the search terms than the full text, the WWC will identify studies that have terms from one or more of the categories in Appendix B, Table B.1 (such as impact and study design terms) to ensure that the search captures all relevant studies. To ensure the search focuses on STEM research, the WWC will require the study abstract to contain at least one of the terms from the outcomes or population categories listed in Table B.1. To address a high volume of identified research, the review may prioritize screening of studies that include terms from more than one of the categories listed in Table B.1.
- Search ERIC and other key databases for research on specific interventions, such as those identified by research experts in STEM, particularly from those who work closely with practitioners.
  - After identifying interventions for improving STEM knowledge and skills, the review team will search for the intervention names in ERIC and other databases listed in Appendix C. The team may also search additional websites that might be relevant to a particular intervention.

- For some interventions, the literature search may result in many studies unrelated to the intervention. For example, this often occurs when the intervention name includes commonly used terms. These searches may be limited by specific keywords listed in Appendix B.
- Search for lists of studies funded by a range of ED grants or other federal agencies.
  - ED grants including Effectiveness, Efficacy, Replication, and Scale-Up grants funded by ED centers such as the National Center for Education Research and the National Center for Special Education Research.
  - Additionally, the team will screen studies from other ED grants that have provided technical assistance for grantees to design evaluations to meet WWC standards. These include the Investing in Innovation (i3) program, the Education Innovation and Research (EIR) program, the Supporting Effective Educator Development (SEED) program, and First in the World.
  - Finally, the review team will aim to identify federally funded education research from outside of ED, such as from the National Institutes of Health and the National Science Foundation.

Step 2: Narrow the list of studies for possible WWC review. The review team determines whether the WWC has previously reviewed studies and screens them on the basis of eligibility criteria under the *Study Review Protocol*, such as whether the study examines the effects of an eligible intervention on an eligible outcome measure. The review team then screens the study for eligibility under this STEM protocol, such as whether the intervention in the study is intended to improve STEM knowledge and skills. To address a high volume of identified research, the WWC may prioritize screening recent studies or those for certain education levels, topic descriptors, or other characteristics.

Step 3: Score and select studies for WWC review. As eligible studies are identified in Step 2, the WWC assigns a prioritization score to each study on a rolling basis. The score helps to prioritize studies for WWC review and identify eligible research that is of high quality and interest to a wide range of WWC users and consumers. The WWC gives each eligible study a score based on a number of factors (Table A.1). The WWC then ranks the studies from highest to lowest according to their scores. The WWC begins reviewing studies with the highest prioritization scores on a rolling basis, while screening and scoring additional studies. For any studies that receive the same score, the study that was conducted more recently receives priority. The score of each study is calculated on a scale of 0 to 8 points (see Table A.1).

Table A.1. Study characteristics used to determine prioritization score for each study

Points	Study characteristic	Justification
+2	The study is a randomized controlled trial, regression discontinuity design, or single-case design and is therefore eligible to receive the highest study rating.	Stronger research designs provide more credible evidence and are more likely to meet standards. Quasi-experimental design studies are eligible for review but will not receive these points.
+1	The study relies on data from multiple sites, and the analytic sample for the study includes at least 350 individuals for group design and regression discontinuity design studies or 20 individuals for single-case design studies.	These studies provide evidence that is more likely to apply to different settings or populations of teachers or students.
+1	The study was funded by ED.	Research produced with support from ED is likely to be of great interest to a wide range of users and consumers.
+1	The study is already in ERIC with full text or with a direct link to the text in a journal or another publicly available source.	Research in ERIC is more accessible to educators and other decision makers.

Points	Study characteristic	Justification
+1	The intervention is widely used according to context experts or practitioner surveys.	Evidence on interventions in wide use is likely to be of interest to educators and other decision makers. For example, the RAND American Educator Panels are one source for this information.
+1	The WWC has not released an intervention report on the same intervention in the study.	The WWC prioritizes research that could contribute to new systematic reviews over research that might be included in an update to an existing systematic review.
+1	The WWC has previously reviewed at most one study of the same intervention that met WWC standards.	The WWC prioritizes reviewing studies of many different interventions. If an intervention is selected for systematic review in **Step 5**, the WWC will review all research on the intervention.

Step 4: Conduct WWC study reviews. The WWC reviews the studies with the highest prioritization scores from Step 3 on an ongoing basis using the *Study Review Protocol*.

Step 5: Disseminate findings and identify topics for intervention reports and other systematic review products. The WWC disseminates its findings and conducts systematic reviews of evidence through one or more of the following:

- **Single-study reviews.** The WWC will monitor recently reviewed studies and will disseminate relevant findings from single-study reviews through IES NewsFlashes and social media posts.

- **Intervention reports.** The WWC will monitor potential interventions for which to conduct systematic reviews:

  - In general, if only one study of an intervention meets WWC standards, or if the pooled sample size across all studies that meet WWC standards is fewer than 350 individuals for group design and regression discontinuity design studies or 20 individuals for single-case design studies, then the WWC will review those studies but will not prepare an intervention report.

  - When at least two studies of the same intervention meet WWC standards (version 2.1 or higher) and both are not already included in an existing WWC intervention report, the WWC will identify the intervention as a candidate for an intervention report. Once it has identified an intervention, the WWC may conduct a literature search to identify all research in ERIC and other databases specified in this protocol on the intervention (if one was not already conducted in **Step 1**). The WWC will then calculate a prioritization score for the intervention, which is a sum of the study-level prioritization scores calculated in **Step 3**, including any studies the WWC has previously reviewed that meet WWC standards and excluding any studies that do not meet WWC standards or that are already included in an intervention report.

  - IES reviews the prioritization scores and approves the production of intervention reports on a rolling basis.

  - When IES approves an intervention report, the WWC will review all eligible studies of the intervention not already reviewed by the WWC. The WWC will also use the *Study Review Protocol* to update reviews of any studies of the intervention previously reviewed under a different protocol. The WWC may also review additional supplementary findings, including findings for groups of students outlined in this protocol.

- **Other products.** The WWC may also develop evidence summaries across STEM interventions to inform educators and other decision makers about which components of interventions were most effective. These

summaries may include meta-analytic syntheses of findings across branded and nonbranded interventions. The WWC may highlight the strength of evidence by intervention component or across different student populations and outcome domains, as well as areas where the WWC has limited evidence, which may inform future literature searches.

APPENDIX B. SEARCH TERMS USED IN LITERATURE SEARCH

As described in Appendix A, the science, technology, engineering, and mathematics (STEM) review will use four literature search processes to identify research that practitioners and decision makers might find useful. This appendix lists example search terms for the literature searches.

Table B.1. Example search terms for the STEM review

Category	Search terms
Impact	achiev*, affect*, benefit*, decreas*, effect*, efficac*, evaluat*, gain, growth, impact*, improv*, increas*, progress, reduc*, success*
Study design	ABAB, alternating treatment*, assess*, assign*, causal, changing criteri*, comparison group*, control*, counterfactual, crossover design*, difference in differences, experiment*, matched, meta analy*, metaanaly*, multi element, multielement, multiple baseline, multiple probe*, post test*, posttest*, pre test*, pretest*, quasi experimental, quasiexperimental, random*, regression discontinuity, reversal design*, simultaneous treatment*, single case, single subject, treatment, withdrawal design*
Outcomes	algebra*, algorithm*, array*, atomsph*, biolog*, calcul*, chemic*, chemistr*, climat*, comput*, condition*, cyber*, design*, different*, digital*, dynam*, earth*, eco*, electr*, energ*, engineer*, environment*, equat*, estimat*, factor*, force*, fraction*, function*, geo*, geometr*, graph*, hypothes*, inequal*, integ*, internet*, iterat*, magnet*, material*, math*, matter*, measur*, mechan*, motion*, network*, number*, ocean*, physic*, planet*, polynom*, pre-calc*, pre calc*, probabilit*, quadratic*, recurs*, robot*, scien*, software*, solar*, space*, static*, statistic*, structur*, technol*, three-dimension*, 3d, 3-d, triang*, trigo*, vector*, weather*
Population	after school*, afterschool*, child*, childhood, early childhood, elementary grade*, elementary school*, grade school*, high school*, home school*, junior high, K-12, kindergart*, middle school*, pre-K*, PreK*, pre-school, preschool, primary school*, pupil*, student*, summer school*

Notes: The asterisk (*) ensures the search returns any word that begins with the specified letters.

APPENDIX C. DATABASES USED IN LITERATURE SEARCH

As described in Appendix A, the What Works Clearinghouse (WWC) will search the Education Resources Information Center (ERIC) and the following electronic databases and websites for research on science, technology, engineering, and mathematics (STEM) interventions. The WWC may also search additional websites that might be relevant to particular interventions.

Table C.1. Databases and websites for the STEM review

Category	Websites
Electronic databases	Academic Search Premier, E-Journals, EconLit, Education Research Complete (EBSCO), ERIC, ProQuest Dissertations & Theses, APA PsycInfo, SAGE Journals Online, Scopus, SocINDEX, WorldCat, ScienceDirect
Websites of federal agencies	Congressional Research Service (CRS), Government Accountability Office (GAO), Institute of Education Sciences (IES), National Center for Education Research (NCER), National Institute of Child Health and Human Development (NICHD), National Institute for Early Education Research (NIEER), National Science Foundation (NSF), U.S. Department of Education, U.S. Department of Health & Human Services
Websites of professional associations	American Association for the Advancement of Science (AAAS), American Association of Colleges of Teacher Education (AACTE), American Association of Physics Teachers (AAPT), American Association of School Administrators (AASA), American Educational Research Association (AERA), American Evaluation Association (AEA), American Federation of Teachers (AFT), American Society for Engineering Education (ASEE), Association for Public Policy Analysis and Management (APPAM), Association for Supervision and Curriculum Development (ASCD), Computer Science Teachers Association, Council of Chief State School Officers, International Society for Technology in Education, International Technology and Engineering Educators Association (ITEEA), National Association of Elementary School Principals, National Association of Secondary School Principals, National Association of State Boards of Education (NASBE), National Council of Teachers of Mathematics (NCTM), National Education Association (NEA), National Governors Association, National Science Teaching Association (NSTA), The School Superintendents Association, Society for Research on Educational Effectiveness (SREE)

Category	Websites
Websites of universities and other research organizations	Abt Associates, Achieve, Inc., Alliance for Excellent Education, Association for Supervision and Curriculum Development (ASCD), American Enterprise Institute, Best Evidence Encyclopedia (BEE), BSCS (formerly Biological Science Curriculum Study), Broad Foundation, The Brookings Institution, Carnegie Corporation of New York Center for Data-Driven Reform in Education (CDDRE) at Johns Hopkins University, Center for Research and Exploration in Space Science and Technology (CRESST II), Center for Research and Reform in Education (CRRE) at Johns Hopkins University, Center for Research in Educational Policy (CREP), Center for the Study of Instructional Improvement, Center on Education Policy, Center on Instruction, Cochrane Database of Systematic Reviews, Congressional Research Service, Consortium for Policy Research in Education (CPRE), Council of Chief State School Officers, Council of the Great City Schools (CGCS), Digital Promise, Editorial Projects in Education (EPE) Research Center, Education Development Center (EDC), Engineering is Elementary, Erikson Institute, University of Chicago, For Inspiration and Recognition of Science and Technology (FIRST), Grasping the Reality of Instructional Practice (GRIP) at the University of Michigan School of Education, Harvard Graduate School of Education, Heritage Foundation, Hoover Institution, JASON Learning, Johns Hopkins University School of Education, Link Engineering, Mathematical Association of America (MAA), Mathematica (formerly Mathematica Policy Research), Learning Mathematics for Teaching Project, MDRC, Mid-continent Research for Education and Learning, Millennium Mathematics Project, National Academies Press, The National Alliance of State Science and Mathematics Coalition (nassmc.org), National Association for the Education of Young Children, National Association for Research in Science Teaching (NARST), National Board for Professional Teaching Standards, National Center for Children in Poverty, National Center for Research on Early Childhood Education (NCRECE), National Center on Response to Intervention (RtI), National Center for Special Education Research, National Conference of State Legislatures (NCSL), National Council of Supervisors of Mathematics (NCSM), National Head Start Association, National Mathematics Advisory Panel, National Math and Science Initiative, National Science Digital Library (NSDL), National Science Resources Center (NSRC), National Science Teaching Association (NSTA), New America Foundation's Early Education Initiative, Next Generation Science Standards, Office of Early Learning, Pacific Resources for Education and Learning (PREL), PhysPort, Project Lead The Way (PLTW), Promising Practices Network, Public Education Network, Public Policy Research Institute at Texas A&M University, Science Education for Public Understanding Program (SEPUP), Smithsonian Science Education Center, Society for Research in Child Development, Southwest Educational Development Laboratory (SEDL), SRI International, STEM Education Coalition, TERC, UCLA Graduate School of Education and Information Studies Research Centers and Institutes, University of Chicago School Mathematics Project, Urban Institute, Westat, WestEd, Wisconsin Center for Education Research (WCER)