Global STEM Alliance
The New York Academy of Sciences

STEM

EDUCATION FRAMEWORK

Global STEM Alliance
The New York Academy of Sciences

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Introduction

The Global STEM Alliance (GSA) STEM Education Framework aims to identify best practices in science, technology, engineering, and mathematics (STEM) education. It reflects current education research and draws on innovative and effective practices employed around the world.

The framework details 26 features of quality STEM education in 3 essential areas:

- **Core Competencies:** To what extent are students provided with opportunities to develop 21st-century skills needed to thrive in the modern workplace?
- **Instructional Design:** To what extent do the materials and/or program design reflect research-based pedagogy and a cohesive system of learning objectives, supports, and assessment resources?
- **Implementation:** To what extent are necessary supports or services available to facilitate distribution and ensure effective implementation?

This framework is intended to be used by anyone engaged in STEM education—curriculum developers, content providers, teachers, students, parents, school leaders, policymakers, and philanthropists—to help guide the development and evaluation of high-quality instructional programs and materials. It was developed by the New York Academy of Sciences in collaboration with SRI International and an advisory board of STEM education experts. For details about the development process and research supporting the framework, see *STEM Education Framework Research Foundations*.

Part A: Core Competencies

Part A has two sections: *Essential Skills* are competencies that, in addition to content knowledge, students must develop to thrive in the modern workplace; *Supporting Attributes* are competencies that facilitate the development of and enhance these essential skills. To be Exemplary in these areas, materials must include explicit guidance for instruction and assessment of a given competency, including rubrics or instructions for interpreting assessment outcomes.

A.1 Essential Skills

A.1.1 Critical Thinking

Exemplary	Developing	Basic	Undeveloped
Students have opportunities to evaluate multiple sources of information, evidence, and primary material; select appropriate material to support arguments; critique the work of others; and differentiate evidence from inference and opinion. Activities include the use of scientific procedures to test students' hypotheses. Students are supported and have opportunities to apply one or more perspectives to reason about problems, experimental procedures, and phenomena (e.g., computational, systems, or design thinking) when developing arguments, critiques, or hypotheses. Supports are provided to facilitate teacher and student discussion and reasoning when evaluating sources and critiquing each other's work.	Students have opportunities to evaluate sources of information, evidence, and primary materials; critique the work of others; and use evidence to build an argument, but not as integral components of instructional activities. Students have opportunities to make predictions based on given information (if X, then Y) and form conclusions or generalizations about phenomena. Students are supported and have opportunities to apply one or more perspectives to reason about problems and phenomena (e.g., computational, systems, or design thinking).	Students have limited opportunities to review primary materials or sources that allow them to evaluate and integrate new knowledge. Students have opportunities to make predictions based on given information (if X, then Y), but are not asked to generalize or test hypotheses.	Students do not have opportunities to evaluate information or evidence presented; information is imparted from a unitary perspective. Materials to do not include or reference outside resources. Students are not asked to make predictions, test hypotheses, or build arguments.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

A.1.2 Problem Solving

Exemplary	Developing	Basic	Undeveloped
Students have opportunities to develop their ability to generate solutions to a range of STEM-based problems and scenarios, including organizing ideas, defining goals and milestones, and executing plans. Materials support the use and evaluation of a range of approaches to problem solving, including the scientific method and design thinking. Students are supported and have opportunities to apply one or more solutions to a range of STEM-based problems and scenarios. Supports are provided to facilitate teacher and student reasoning about challenges that occur during problem solving, with an emphasis on strategy, creativity, collaboration, and persistence.	Students have opportunities to develop their ability to generate solutions to a range of STEM-based problems and scenarios, including organizing ideas, defining goals and milestones, and executing plans. Materials support the use and evaluation of a range of approaches to problem solving, including the scientific method and design thinking.	Students have opportunities to develop their ability to generate a single solution to a range of STEM-based problems and scenarios, including organizing ideas, defining goals and milestones, and executing plans.	Students are led through activities step by step. Teachers may model problem-solving skills, but students do not engage with these skills, and therefore do not have opportunities to develop them.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.1.3 Creativity

Exemplary	Developing	Basic	Undeveloped
Students have multiple opportunities to approach problems from many different perspectives, including their own. Novel approaches or solutions are explicitly valued. Activities promote exploration of varied approaches to a task, allowing students to devise their own path. Teacher and/or student supports are included to facilitate synthesis of activity outcomes and reflection upon the value of novel and innovative approaches and solutions. Materials encourage students to develop work products (e.g., explanations, representations, presentations) that express their perspectives or approaches to activities.	Students have opportunities to approach problems from different perspectives and are encouraged to generate and adopt novel, innovative approaches. Teacher and/or student supports are included to facilitate synthesis of activity outcomes and reflection on the value of novel and innovative approaches and solutions. Materials encourage students to develop work products (e.g., explanations, representations, presentations) that express their perspectives or approaches to activities.	Activities do not explicitly present opportunities for students to approach problems from different perspectives; however, materials encourage students to develop work products (e.g., explan-ations, representations, presentations) that express their perspectives or approaches.	Students do not have opportunities to approach problems from different perspectives.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.1.4 Communication

Exemplary	Developing	Basic	Undeveloped
Students have frequent and varied opportunities to practice and demonstrate their ability to communicate clearly, accurately, and/or persuasively about STEM topics to multiple audiences, both formal and informal. Students frequently use multi-modal methods, such as drawings, images, visual representations, and models, to convey ideas. Communication is integral to instructional activities and goals. Supports are provided to facilitate teacher and student discussion and reasoning about forms and purposes of communication in STEM, as well as evaluation of their own and others' communication skills.	Students have periodic opportunities to practice and demonstrate their ability to communicate clearly, accurately, and/or persuasively about STEM topics. Activities do not require students to address multiple audiences or use multi-modal methods to convey ideas. Communication is a component of some instructional activities.	Students have occasional opportunities to practice and demonstrate their ability to communicate clearly, accurately, and/or persuasively about STEM topics. Activities do not require students to address multiple audiences or use multi-modal methods to convey ideas. Communication is a component of select instructional activities (e.g., capstone activities only).	Students do not have opportunities to practice or demonstrate their ability to communicate clearly, accurately, and/or persuasively about STEM topics.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.1.5 Collaboration

Exemplary	Developing	Basic	Undeveloped
Students have frequent opportunities to engage in group work. Teacher and/or student supports are included to help students work together to plan, organize, and execute activities. Activities are structured to support co-construction of knowledge and work products (e.g., students are assigned roles within groups so that each student can contribute).	Students have periodic opportunities to engage in group work. Teacher and/or student supports are included to help students work together to plan, organize, and execute activities. Activities do not explicitly support co-construction of knowledge or work products (e.g., roles are not defined for students; most subtasks can be completed independently).	Students have occasional opportunities to engage in group work; however, supports to help students work together to plan, organize, and execute activities are not provided. Activities do not explicitly support co-construction of knowledge or work products (e.g., roles are not defined for students; most subtasks can be completed independently).	Students do not have opportunities to engage in group work.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.1.6 Data Literacy

Exemplary	Developing	Basic	Undeveloped
Activities require students to engage with qualitative and quantitative data as part of analytical tasks such as problem solving, investigation, and design. Materials provide teacher and student guidance for data-related activities, including technical support for use of necessary tools or technology. Materials support student reasoning about data generation, analysis, representation, and interpretation, as well as appropriate and ethical uses of data and data methods in various contexts.	Activities require students to engage with qualitative and quantitative data as part of analytical tasks such as problem solving, investigation, and design. Materials provide teacher and student guidance for data-related activities, including technical support for use of necessary tools or technology.	Activities provide opportunities for students to engage with qualitative and/or quantitative data.	Activities do not provide opportunities for students to engage with qualitative or quantitative data.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.1.7 Digital Literacy & Computer Science

Exemplary	Developing	Basic	Undeveloped
Computer science concepts are integrated into STEM content when appropriate (e.g., as part of problem solving, critical thinking, and logic-based reasoning). When technology tools are used, appropriate teacher and student supports are provided to equip students with the digital literacy skills needed to use the tools.	Computer science concepts are presented, but are not integrated into STEM content. When technology tools are used, appropriate teacher and student supports are provided to equip students with the digital literacy skills needed to use the tools.	When technology tools are used, appropriate teacher and student supports are provided to equip students with the digital literacy skills needed to use the tools.	Digital literacy and computer science concepts are not introduced.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.2 Supporting Attributes

A.2.1 STEM Mindset

Exemplary	Developing	Basic	Undeveloped
Students are encouraged to approach problems with an open mind, consider a range of solutions, seek innovation, and express their ideas in a variety of modes. Students are encouraged to investigate questions objectively by generating and testing hypotheses, and by collecting and analyzing evidence to support claims. Activities are designed to promote students' curiosity and flexibility across situations by providing many types of projects and problem scenarios. Supports are provided to facilitate teacher and student discussion and reasoning about STEM epistemologies (e.g., empiricism, design thinking, mathematical proof) and productive STEM dispositions (e.g., curiosity, objectivity, flexibility).	Students are encouraged to approach problems with an open mind, consider a range of solutions, seek innovation, and express their ideas in a variety of modes. Students are encouraged to investigate questions objectively by generating and testing hypotheses, and by collecting and analyzing evidence to support claims. Activities are not explicitly designed to promote curiosity and flexibility.	Students have opportunities to investigate questions objectively by generating and testing hypotheses, and by collecting and analyzing evidence to support claims. Activities are not designed to promote open-minded exploration, innovation, curiosity, and flexibility.	Activities are not designed to promote objectivity, open-minded exploration, innovation, curiosity, and flexibility.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.2.2 Agency & Persistence

Exemplary	Developing	Basic	Undeveloped
Activities are designed to allow adequate time for student-directed exploration of problem-solving approaches, setbacks, and adoption of new approaches as obstacles are encountered. Failure is treated as an opportunity to learn and troubleshoot. Failure to find a complete or satisfactory solution to a problem does not adversely affect students' grades or standing. Supports are included to assist teachers in facilitating student-driven exploration and providing feedback to students when they experience failure or frustration.	Activities are designed to allow adequate time for student-directed exploration of problem-solving approaches, setbacks, and adoption of new approaches as obstacles are encountered. Failure is treated as an opportunity to learn and troubleshoot. Failure to find a complete or satisfactory solution to a problem does not adversely affect students' grades or standing.	Minimal time is allotted for student-directed exploration of problem-solving approaches. Failure is treated as an opportunity to learn and troubleshoot. Failure to find a complete or satisfactory solution to a problem does not adversely affect students' grades or standing.	The value of student setbacks is not explicitly addressed or supported.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.2.3 Social & Cultural Awareness

Exemplary	Developing	Basic	Undeveloped
Materials introduce multiple cultural perspectives and address the value of social and cultural awareness, sensitivity, and empathy in STEM professional work and in society, especially as related to global citizenship and global STEM challenges. Materials link directly to the social studies curriculum as appropriate. Supports are provided to help teachers facilitate class discussions about empathy and sensitivity, and identify opportunities to raise issues of social and cultural awareness beyond those in the materials (e.g., selecting a diverse group of STEM experts to interact with students).	Materials introduce multiple cultural perspectives and address the value of social and cultural awareness, sensitivity, and empathy in STEM professional work and in society, especially as related to global citizenship and global STEM challenges. Materials link directly to the social studies curriculum as appropriate.	Materials introduce multiple cultural perspectives and address the value of social and cultural awareness, sensitivity, and empathy in STEM professional work and in society, especially as related to global citizenship and global STEM challenges.	Materials do not introduce multiple cultural perspectives or address the value of social and cultural awareness, sensitivity, and empathy in STEM professional work and society. Materials may express negative attitudes toward other cultures and/or social groups.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.2.4 Leadership

Exemplary	Developing	Basic	Undeveloped
Students have opportunities to take leadership roles and practice leadership skills. Skills such as taking initiative, building consensus, and communicating effectively in groups are practiced and evaluated. Materials include guidance for teachers to organize groups, assign leadership roles, offer students feedback about their leadership skills, and facilitate discussions about leadership.	Students have opportunities to take leadership roles and practice leadership skills. Skills such as taking initiative, building consensus, and communicating effectively in groups are practiced and evaluated.	Students have opportunities to take leadership roles and practice leadership skills.	Leadership roles and skills are not explicitly addressed, and students have few or no opportunities to take leadership roles or practice leadership skills.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

A.2.5 Ethics

Exemplary	Developing	Basic	Undeveloped
Materials introduce students to the notion of ethics as part of STEM professional work and its application. Materials prompt students to consider ethics in their approach to their work, and by recognizing diverse perspectives and viewpoints. Supports are provided to help teachers facilitate discussions about ethics in students' work and in STEM professional work.	Materials introduce students to the notion of ethics as part of STEM professional work and its application. Materials prompt students to consider ethics in their approach to their work, and by recognizing diverse perspectives and viewpoints.	Materials introduce students to the notion of ethics as part of STEM professional work and its application.	Ethics are not addressed in materials or activities.

Is this a stated learning outcome? _____ Yes _____ No **Rating:** E / D / B / U

Notes:

Part B: Instructional Design

B.1 Research-based Pedagogy

Exemplary	Developing	Basic	Undeveloped
Materials are well aligned to current research, and alignment is clearly documented. Comprehensive materials, tools, and/or guidance are provided to support identified pedagogical strategies.	Materials leverage known research-based strategies. Though strategies are not explicitly aligned, they are identifiable in the design of activities. Sufficient materials, tools, and/or guidance are provided to support identified pedagogical strategies.	Materials minimally leverage research-based strategies. Though strategies are not explicitly aligned, they are identifiable in the design of activities.	Materials do not obviously leverage research-based strategies.

Rating: E / D / B / U

Notes:

B.2 STEM Content Integration

Exemplary	Developing	Basic	Undeveloped
To the extent possible and strategic, STEM content is presented in an integrated, multidisciplinary approach in which students have multiple opportunities to apply STEM skills and knowledge in the context of STEM activities, problems, and/or practices (e.g., modeling, argumentation). Alignment of STEM content to relevant policy initiatives (e.g., local or national economic development efforts and workforce needs) and instructional frameworks (e.g., grade-level standards) is clear and documented.	At some opportunities, STEM content is presented in an integrated, multidisciplinary approach. Alignment of STEM content to relevant policy initiatives (e.g., local or national economic development efforts and workforce needs) and instructional frameworks (e.g., grade-level standards) is apparent but not documented.	Primary STEM content is related to other disciplines, but is not presented in an integrated, multidisciplinary approach. STEM content is partially aligned to relevant policy initiatives (e.g., local or national economic development efforts and workforce needs) and instructional frameworks (e.g., grade-level standards).	STEM content is not presented in an integrated, multidisciplinary approach. STEM content is not well aligned to relevant policy initiatives (e.g., local or national economic development efforts and workforce needs) or instructional frameworks (e.g., grade-level standards).

Rating: E / D / B / U

Notes:

B.3 Real-world Application

Exemplary	Developing	Basic	Undeveloped
Content is embedded in scenarios that relate to problems or challenges students are likely to encounter outside of school at some time in their lives. Relationships between instructional content and real-world application are made explicit to students. Supports for the identification and use of scenarios related to challenges or activities of local or regional STEM industries are provided to teachers.	Content is embedded in scenarios that relate to problems or challenges students are likely to encounter outside of school at some time in their lives. Relationships between instructional content and real-world application are made explicit to students.	Content is related to real-world scenarios; however, scenarios may not relate to students' experiences, and no rationale for their selection is provided.	Content is not embedded in or related to real-world scenarios.

Rating: E / D / B / U

Notes:

B.4 Project- or Problem-based Learning

Exemplary	Developing	Basic	Undeveloped
Projects or problem-based activities vary in length and complexity, and are used throughout the curriculum. Students have multiple opportunities to work collaboratively to identify a problem, identify and implement one or more solutions, and present their work to various stakeholders. Supports are provided for teachers to help students identify problem contexts that impact their school or community.	Projects or problem-based activities occur regularly throughout the curriculum (e.g., as recurring capstone activities, or as long-term activities coordinated with other instructional activities). Project or problem contexts may be predetermined, but students have opportunities to identify solutions or strategies.	Projects or problem-based activities are presented as special opportunities for students (i.e., not part of typical instruction). Project or problem contexts and solution strategies are predeter-mined.	Projects or problem-based activities are not provided.

Rating: E / D / B / U

Notes:

B.5 Scaffolding

Exemplary	Developing	Basic	Undeveloped
Materials provide clear guidance for teachers, or embedded student supports, to scaffold instruction and move students progressively toward deeper understanding and greater independence in the learning process. A variety of instructional techniques are presented to support teachers in scaffolding students of varying abilities and backgrounds. There are clear milestones to reach, multiple techniques for achieving the same milestone, and strategies to remove scaffolding as milestones are achieved.	Materials include embedded student supports and/or guidance for teachers to scaffold instruction. Instructional techniques are presented, but they do not include strategies to support students of varying abilities or backgrounds.	Materials include minimal student supports and/or guidance for teachers to scaffold instruction (e.g., only one approach may be suggested). The concept of scaffolding may be inferred, but explicit approaches are not presented.	Materials do not include embedded student supports or guidance for teachers to scaffold instruction.

Rating: E / D / B / U

Notes:

B.6 Assessment

Exemplary	Developing	Basic	Undeveloped
Materials and opportunities for formative and summative assessments are provided. Assessments align to learning objectives, and include a variety of formats as appropriate. Assessments include necessary scoring materials, guidance about using outcomes to make data-driven decisions, and pedagogical strategies to address conceptual challenges identified by assessments.	Materials and opportunities for formative and summative assessments are provided. Assessments align to learning objectives, and include a variety of formats as appropriate. Strategies for interpreting assessment results are limited to scoring rubrics.	Materials and opportunities for formative and/or summative assessments are provided, but are limited in scope and/or format. Assessments align to learning objectives. Strategies for interpreting assessment results are limited to scoring rubrics.	Assessment materials are not provided or do not align to learning objectives.

Rating: E / D / B / U

Notes:

B.7 Cultural Sensitivity & Relevance

Exemplary	Developing	Basic	Undeveloped
Content is situated within a range of diverse historical, cultural, and political contexts, referencing social studies standards as appropriate. The role of historical, cultural, and political context in current and past STEM work is discussed. Activities, teacher materials, and supports consistently value multiple cultural perspectives. Teacher supports include guidance to lead student discussions and activities to acknowledge and value the backgrounds, cultures, and experiences of others.	The role of historical, cultural, and political context in current and past STEM work is discussed. Activities, teacher materials, and supports consistently value multiple cultural perspectives. Teacher supports include guidance to lead student discussions and activities to acknowledge and value the backgrounds, cultures, and experiences of others.	The role of historical, cultural, and political context in current and past STEM work is discussed. Activities, teacher materials, and supports consistently value multiple cultural perspectives.	Materials do not situate content in diverse historical, cultural, or political contexts. Support for recognizing and valuing diverse perspectives and experiences is not provided.

Rating: E / D / B / U

Notes:

B.8 Technology Integration

Exemplary	Developing	Basic	Undeveloped
Students use technology as a tool throughout the curriculum. Technology is used to support student learning, enable a broad range of activities, and enhance collaboration. Activities take advantage of how students use technology outside of school, and encourage teachers and students to use technology in novel ways. Teacher and student supports include guidance and training in the use and benefits of technologies.	Students use technology as a tool throughout the curriculum. Technology is used to support student learning, enable a broad range of activities, and enhance collaboration. Teacher and student supports include guidance and training in the use and benefits of technologies.	Technology is used to support student learning and/or collaboration.	Technology is rarely or never used, and does not enhance the curriculum.

Rating: E / D / B / U

Notes:

Part C: Implementation

C.1 Accessibility

Exemplary	Developing	Basic	Undeveloped
Activities are designed to engage learners with diverse backgrounds, abilities, and experiences. All materials and supports adhere to Universal Design for Learning principles to meet students' and teachers' diverse needs. Teacher supports present a variety of strategies to address students' diverse needs, including use of multiple means of representation, expression, and engagement.	Activities are designed to engage learners with diverse backgrounds, abilities, and experiences. Teacher supports present a variety of strategies to address students' diverse needs, including use of multiple means of representation, expression, and engagement.	Activities are designed to engage learners with diverse backgrounds, abilities, and experiences.	There is no evidence that accessibility issues have been considered in the design of materials.

Rating: E / D / B / U

Notes:

C.2 Alignment to Local Contexts

Exemplary	Developing	Basic	Undeveloped
All materials are designed to be adapted by stakeholders to align to their instructional context (e.g., local or national education policies, assessment goals, and accountability frameworks). Supports for this adaptation are provided (e.g., content is aligned to an instructional framework that is relevant across regions or a set of frameworks that represent a range of approaches internationally). All materials are designed to be adapted by stakeholders to align to their socio-cultural context. Supports for this adaptation are provided (e.g., problem-based scenarios include a range of industry or agricultural contexts that may be selected based on local economies).	Some materials are designed to be adapted by stakeholders to align to their instructional and/or socio-cultural context. Supports for this adaptation are provided.	Materials include examples of adaptations to local instructional and/or socio-cultural contexts, but no supports are provided to stakeholders to facilitate adaptation.	Materials are not designed to be adapted by stakeholders to align to local contexts.

Rating: E / D / B / U

Notes:

C.3 Professional Development & Learning Supports

Exemplary	Developing	Basic	Undeveloped
Supports are provided for both teachers and school leaders, including substantial opportunities to prepare prior to implementation; ongoing, individualized support for planning and reflection; and coaching, mentoring, or collaboration throughout implementation. Professional development interactively engages teachers with lesson content, pedagogy, and sample student discussions and/or student work via opportunities to observe or rehearse future lessons.	Professional development resources address both content and pedagogy. Professional development primarily occurs prior to implementation. During implementation, teachers have occasional access to professional learning communities in their region or online.	Professional development resources address both content and pedagogy. Professional development primarily occurs prior to implementation.	No professional development resources are provided.

Rating: E / D / B / U

Notes:

C.4 Evidence of Effectiveness

Exemplary	Developing	Basic	Undeveloped
Evidence of effectiveness, gathered via rigorous evaluation methods, is made available and accessible to all stakeholders. Supports are available for ongoing data collection and analysis to measure impact and support data-driven decision making.	Evidence of effectiveness in the form of a research study is available.	Positive user reviews are available.	No evidence of effectiveness is available.

Rating: E / D / B / U

Notes:

C.5 Access to Materials & Practitioner Support

Exemplary	Developing	Basic	Undeveloped
There are no significant barriers to stakeholders' engagement with materials as designed. Any localization of materials needed is easy and not cost-prohibitive. Access to user support is not restricted by time of day or stakeholders' location, language, budget, or technology expertise. Limitations on stakeholders' access to technology (e.g., slow Internet speeds) are addressed to the extent possible (e.g., option to download materials as small, individual files). Any technology requirements are well documented and easily accessible.	Although access to materials and support may be constrained (e.g, by time, language, location, or format), resources are sufficient for all stakeholders to participate as intended. Limitations on stakeholders' access to technology (e.g., slow Internet speeds) are addressed to the extent possible (e.g., option to download materials as small, individual files). Any technology requirements are well documented and accessible.	Access to materials and supports may be intermittent or otherwise insufficient for all stakeholders to participate as intended. Technology requirements may not be well documented.	Access to necessary materials and/or supports is significantly constrained.

Rating: E / D / B / U

Notes:

C.6 Scalability

Exemplary	Developing	Basic	Undeveloped
All materials and supports are delivered online, locally, or through a flexible distribution channel. There is a proven mechanism to scale professional development and learning supports (e.g., train-the-trainer model). Content is reviewed and updated regularly to ensure that examples and real-world applications remain relevant.	All materials and supports are delivered online, locally, or through a flexible distribution channel. Content is reviewed and updated regularly to ensure that examples and real-world applications remain relevant.	Scalability is limited by one or more of the following: format of materials; distribution channel; training or professional development mechanisms; dated or static content.	Scalability is significantly constrained by one or more of the following: format of materials; distribution channel; training or professional development mechanisms; dated or static content.

Rating: E / D / B / U

Notes:

Advisory Board

We are grateful to our esteemed advisory board members for generously sharing their time, expertise, and wisdom.

Jennifer Childress: Director, Instructional Support, Science, Achieve, Inc.

Katie Culp: Chief Learning Officer, New York Hall of Science

Angela DeBarger: Program Officer, Lucas Education Research

John Easton: Distinguished Senior Fellow, Spencer Foundation

Patrick Griffin: Chair of Education and Director, Assessment Research Centre, University of Melbourne

Kathy Hurley: Senior Fellow, P21: Partnership for 21st Century Learning

Mitja Jermol: Head of the Center for Knowledge Transfer in Information Technologies, Jozef Stefan Institute

Krissanapong Kirtikara: Chairman, Council of Rajamangala University of Technology Lanna, Thailand

Jari Lavonen: Professor, Physics and Chemistry Education, and Head of the Department of Teacher Education, University of Helsinki

Jia Liu: Dean, School of Psychology, Beijing Normal University

Po-Shen Lo: Associate Professor of Mathematics, Carnegie Mellon University

Chee-Kit Looi: Professor, Office of Education Research Learning Sciences and Technologies, National Institute of Education, Singapore

Megan Pacheco: Chief Learning Officer, New Tech Network

Gabrielle Rappolt-Schlichtmann: Executive Director and Chief Scientist, EdTogether, Inc.

Linda Rosen: Chief Executive Officer, Change the Equation

Linda Shear: Director of International Studies, Center for Technology in Learning, SRI International

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