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It's About TIME: A Rigorous New Process for Selecting Instructional Materials for Science

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NGSS EARLY IMPLEMENTERS

WestEd

NGSS Early Implementers Initiative: Bringing Science to Life as a Core Subject in K–8 Classrooms

A diverse group of eight California school districts and two charter management organizations is actively implementing the Next Generation Science Standards (NGSS). The progress, experiences, and lessons of the NGSS Early Implementers, as they are called, can inform others implementing the NGSS. The Early Implementers are supported by the K–12 Alliance at WestEd and work in partnership with the California Department of Education, the California State Board of Education, and Achieve. Funding for the Early Implementers Initiative (the Initiative) is provided by the S. D. Bechtel, Jr. Foundation, and the Hastings/Quillin Fund is supporting participation by the charter organizations.

The Initiative spans 2014 through 2020. It focuses on NGSS implementation in grades K–8 and incorporates the integrated course model (preferred by the California State Board of Education) for middle school.

Teachers are supported with strategies and tools, including an instructional framework that incorporates phenomena-based learning. This framework aligns with the three NGSS dimensions: disciplinary core ideas, crosscutting concepts, and science and engineering practices. Using science notebooks, questioning strategies, and other approaches, students conduct investigations, construct arguments, analyze text, practice descriptive skills, articulate ideas, and assess their own understanding.

Teachers engage in science lesson studies twice each year through a Teaching Learning Collaborative. In each district, the Initiative is guided by a Core Leadership Team composed of Teacher Leaders and administrators who participate in additional professional learning and coaching activities. Together, this core team and an extended group of Teacher Leaders are the means for scaling NGSS implementation throughout the district.

Learn more about this multiyear initiative and access evaluation findings as well as instructional resources at k12alliance.org/ca-ngss.php.

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The S. D. Bechtel, Jr. Foundation has commissioned WestEd's STEM Evaluation Unit to evaluate the NGSS Early Implementers Initiative in the eight participating public school districts. This independent evaluation is advised by a technical working group that includes representatives of the California Department of Education and the State Board of Education. Evaluators investigate three main aspects of the Initiative's NGSS implementation:

- districts' local implementation,
- implementation support provided by the K–12 Alliance, and
- the resulting science teaching and leadership growth of teachers and administrators, as well as student outcomes.

In addition to this current Report #11, evaluators previously released:

- *The Needle Is Moving in California K–8 Science: Integration with English Language Arts, Integration of the Sciences, and Returning Science as a K–8 Core Subject (Evaluation Report #1, October 2016)*
- *The Synergy of Science and English Language Arts: Means and Mutual Benefits of Integration (Evaluation Report #2, October 2017)*
- *Administrators Matter in NGSS Implementation: How School and District Leaders Are Making Science Happen (Evaluation Report #3, November 2017)*
- *Developing District Plans for NGSS Implementation: Preventing Detours and Finding Express Lanes on the Journey to Implement the New Science Standards (Evaluation Report #4, February 2018)*
- *Next Generation Science Standards in Practice: Tools and Processes Used by the California NGSS Early Implementers (May 2018)*
- *Making Middle School Science Whole: Transitioning to an Integrated Approach to Science Instruction (Evaluation Report #5, October 2018)*
- *Engaged and Learning Science: How Students Benefit from Next Generation Science Standards Teaching (Evaluation Report #6, November 2018)*

- *Investing in Science Teacher Leadership: Strategies and Impacts in the NGSS Early Implementers Initiative (Evaluation Report #7, February 2019)*
- *Collaborative Lesson Studies: Powerful Professional Learning for Implementing the Next Generation Science Standards (Evaluation Report #8, September 2019)*
- *Environmental Instruction Catalyzes Standards-Based Science Teaching: How Environmental Literacy Aids Implementation of the NGSS (Evaluation Report #9, September 2019)*
- *Administrators Matter In NGSS Implementation (2019): Updated Findings on How School and District Leaders are Making Science Happen. (Evaluation Report #10, October 2019)*

Executive Summary

California counties and school districts are implementing a critically needed change in how they evaluate science instructional materials before investing in local adoption. Past adoptions were often too superficial in nature, focusing on candidate materials' overall look and feel, use of graphical elements, and availability of ancillary materials while insufficiently attending to the substance of the materials for high-quality teaching and learning. In contrast, the *California NGSS Toolkit for Instructional Materials Evaluation* (hereafter referred to as TIME) process enables participants to use evidence-based measures to choose materials aligned to the Next Generation Science Standards (NGSS) that meet their district's needs.

This 11th report in the NGSS Early Implementers Initiative evaluation series is intended for school and district administrators, leaders of science professional learning, and state policymakers. It provides an overview of the full TIME process, including participants' perceptions, a detailed description of the statewide TIME trainings of 2018–19, and a vignette that illustrates a portion of the TIME process.

The 2018–19 Statewide TIME Rollout

When the California Department of Education released its approved list of 29 K–8 science instructional materials, district adoption committees were primed for using a toolkit such as TIME to help them select NGSS-aligned instructional materials to adopt. TIME trainings, which emphasized the labor-intensive Paper Screen step, occurred in three phases: (1) a *master class* to prepare 23 California science education leaders to lead large, regional TIME trainings; (2) two *regional trainings*, one in Northern California and one in Southern California, to which all county offices of education were invited to send a small team; and (3) dozens of *local trainings* facilitated by regional training participants.

All but nine of California's 58 counties sent participants to a regional training. Local trainings were held in 39 of the 49 participating counties (almost 80 percent) between January and October 2019.

Challenges to Implementing TIME

Participants detailed a variety of challenges associated with using the TIME toolkit as designed, most often citing the amount of time required. Although many local trainings closely followed the three-day training modeled in the master class and the regional trainings, evaluators also saw some modifications, including combining or rushing parts of the process. The report includes cautions from master class facilitators about which variations have the potential to reduce the integrity of a TIME training.

Recommendations

The report recommends that adoption committees:

- Identify the unique needs and priorities of their district that they hope instructional materials will help them address.
- Acknowledge the benefit of rigorously reviewing candidate instructional materials in all content areas.
- Consider taking advantage of TIME, an existing tool developed specifically to guide the review of NGSS-aligned instructional materials.
- Consider the TIME approach as a support for learning about the NGSS.
- Know that even after adopting NGSS instructional materials, teachers and administrators will continue to need professional learning.

Introduction

California counties and school districts are implementing a critically needed change in how they evaluate candidate science instructional materials for local adoption.

Historically, districts have expended relatively little effort in selecting instructional materials to adopt (BSCS Science Learning, 2020; Landes et al., 2004). Some localities have simply conducted "thumb tests" — flipping through a textbook's pages to see what they notice at a glance — or other sorts of cursory reviews. Other common selection processes involve using mostly superficial evaluation criteria, such as appraising the quantity, look, and feel of graphics and pictures or looking for the presence of various ancillary materials, such as handouts or assessment banks.

However, given the substantial cost of materials and their significant impact on teaching and learning, there is a need for a more rigorous process for inspecting candidate materials. This need is particularly pressing for science education in California, as teachers need high-quality materials that are aligned to the California Next Generation Science Standards (hereafter referred to as the NGSS), which require substantial shifts in teaching and learning practices from prior science standards.

> This process was very beneficial for our team. It was an opportunity to calibrate and have a shared vision for reviewing [science] instructional materials next year. I am mentally exhausted, but excited and motivated for this process!
>
> *—School district participant in a local training on the California Next Generation Science Standards Toolkit for Instructional Materials Evaluation*

Background

A more rigorous and intensive process has been developed to enable educators to deeply analyze candidate science resources and determine their suitability for the kinds of science learning called for by the NGSS. The NextGen Toolkit for Instructional Materials Evaluation (NextGen TIME)[1] is a suite of tools and processes for evaluating and selecting instructional materials aligned with the NGSS (NGSS Lead States, 2013). Based on the original work of the K–12 Alliance at WestEd and developed for national application by BSCS, Achieve, and the K–12 Alliance, NextGen TIME provides a detailed process for curriculum adoption committees to collaboratively analyze materials based on key criteria and scoring guidance. Furthermore, NextGen TIME provides educators with a transformative professional learning experience highly focused on the NGSS.

1 NextGen TIME is a new toolkit, but is rooted in processes developed over the last two decades. In the early 2000s, BSCS and the K–12 Alliance at WestEd collaborated to create a rigorous process and a guidebook for selecting science instructional materials (Landes et al., 2004).

The California NGSS Collaborative[2] customized the national NextGen TIME toolkit to align it with the state's version of the NGSS (Henriques et al., 2019), including the state's focus on environmental literacy (Nilsen et al., 2019). This report focuses only on California's version of the toolkit, CA NGSS TIME (hereafter referred to as TIME).

How TIME Connects to the Early Implementers Initiative

This report is included in the Early Implementers evaluation report series because most of the Early Implementer districts have implemented TIME to some extent, and evaluators have been able to collect additional data about TIME from these districts. Further, four of the K–12 Alliance Regional Directors — who have provided professional learning and support to the Early Implementer districts for the duration of the Early Implementers Initiative (the Initiative) — contributed to the development of the TIME toolkit and led the initial TIME "master class" training of trainers in November 2018. Attendees of the master class, including five Project Directors and four Core Teacher Leaders from the Early Implementer districts, went on to lead the TIME regional trainings for county office of education personnel in December 2018. In addition, two Regional Directors facilitated local TIME trainings, which took place in 2019 at county offices of education and school districts, including the Early Implementer districts.

Of the eight Early Implementer districts, five districts have used or plan to use TIME to evaluate candidate instructional materials for district adoption. The remaining three Early Implementer districts have varied reasons for not using the TIME approach. One large district is choosing not to adopt instructional materials because it would require an initial cost investment with ongoing subscription costs. Another district is content, for the time being, with the materials it developed over the course of the Initiative and is working to share them with all of its K–8 teachers. The third district had already chosen curriculum before the TIME trainings were offered.

About This Report

This report describes the TIME process and toolkit and how they have been shared with and received by science educators throughout the state of California. The report also describes how the TIME approach and review of instructional materials may be beneficial to districts in their NGSS implementation efforts.

Although this report describes a toolkit and process for selecting NGSS-aligned science instructional materials, it *does not* provide specific recommendations or suggestions for which instructional materials to select or adopt because through participating in the TIME process, district teams collect evidence and come to consensus on instructional materials that meet their unique needs, which can differ across districts.

2 Members of the California NGSS Collaborative include the California Department of Education, the California Science Project, the California Science Teachers Association, local county offices of education, theCalifornia County Superintendents Educational Services Association and its Curriculum Instruction Science Committee, and the K–12 Alliance at WestEd.

Data Sources

This report draws upon a variety of data sources from three phases of TIME trainings — the master class, regional trainings, and local trainings — as well as from interviews of Early Implementer leaders. Specifically, the data sources include:

- Extensive interviews with 20 facilitators and 26 attendees of TIME trainings
- Observations of the TIME master class, both the north and the south regional TIME trainings, and 15 local TIME sessions around the state
- Survey responses from 178 attendees of regional TIME trainings
- Survey responses from 41 facilitators and 425 attendees of local TIME trainings
- Interviews in early 2020 with eight Early Implementer Project Directors and three Early Implementer Regional Directors
- Focus group with three master class facilitators

Participants and phases of data collection are described in more detail in Appendix A.

Description of the TIME Process

Purpose of TIME

TIME is a comprehensive and rigorous process for evaluating how well instructional materials:

- Align to the NGSS, including whether they include phenomena/design problems, the three dimensions, the Environmental Principles and Concepts, and a logical sequence.
- Provide learning experiences corresponding to desired student learning outcomes and useful teacher supports and resources.
- Are consistent with district needs and priorities, which are determined in the first activity in the TIME process.

In addition, TIME was designed to be a powerful NGSS professional learning experience. For example, TIME teaches participants[3] to recognize the conceptual shifts required by the NGSS and provides hands-on practice locating specific evidence of NGSS features, including phenomena/design problems and the three dimensions, in instructional materials.

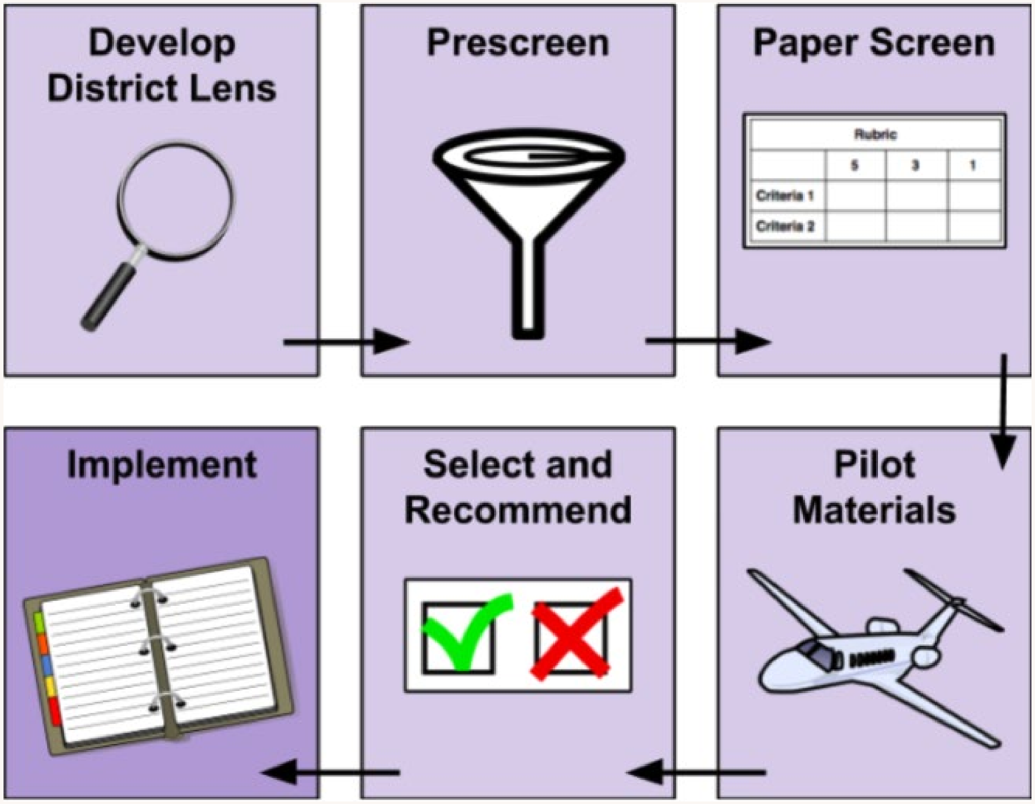
Although TIME was designed for evaluating science instructional materials, districts could use a process like TIME when selecting instructional materials in any content area.

How Is the Process Structured?

TIME is a comprehensive, six-step, evidence-based process (see Figure 1) for evaluating and adopting NGSS-aligned instructional materials that will fit a district's identified needs and priorities. The TIME toolkit offers a detailed procedure, with supporting tools (e.g., Score Sheets, Strengths and Limitations charts) that guide users through the six steps, which are summarized in this section.

3 The term *participants* refers to individuals participating in the TIME process, which is a collaborative group activity. Participants typically include county office of education professional learning providers and district-level adoption committee members.

Figure 1. The six steps of NGSS TIME



Source: Graphic from handout included in binder provided at TIME trainings.

Step 1: Develop District Lens

During this step, participants collaboratively identify their district's unique needs, resources, and instructional priorities. The district lens can be shaped by school demographics, as well as by school or district instructional priorities (e.g., a focus on technology integration). This step prepares the team to evaluate instructional materials based on the district's unique needs, which assists the adoption committee in selecting the best possible materials for their particular teacher and student populations. (Typical duration: 3–4 hours)[4]

Step 2: Prescreen

This step is designed to efficiently narrow down a relatively large number of available science instructional materials to just a few of the most promising options, which will undergo a more thorough and time-intensive review in the next step, the Paper Screen. During the Prescreen, participants examine multiple sets of instructional materials for alignment with the NGSS. An essential component of this step is a professional learning session that calibrates the team and models the Prescreen process to be used for instructional materials

4 Typical duration for each step comes from an informational two-page handout disseminated at the TIME trainings.

under consideration. (Typical duration: 16 hours, including 6–8 hours of training)

Step 3: Paper Screen

This is the most time-intensive and potentially most important step, which is why it was the focus of the TIME trainings delivered throughout California in 2019. Working with one set at a time of materials that "passed" the Prescreen, participants apply a series of rubrics to evaluate evidence of features of high-quality, NGSS-aligned science instructional materials.[5] They individually score the materials using several criteria in the rubrics and engage in consensus-building activities to cooperatively determine which materials merit advancing to the Pilot Materials step. As in step 2 (Prescreen), an essential component of the Paper Screen step is for the adoption committee to engage in a shared professional learning experience in order to calibrate themselves using a sample set of instructional materials not under consideration for adoption. (Typical duration: 24 hours of training, plus approximately 16 hours per set of materials under consideration)

The following rubrics are used to evaluate the materials during the Paper Screen step:

- Rubric 1 – Foundations: Do the instructional materials include the basics for NGSS alignment (i.e., phenomena/problems; the three dimensions; Environmental Principles and Concepts [EP&Cs], if applicable; and a logical sequence)?
- Rubric 2 – Student Work: How are students going to learn? For example, do students have opportunities to explain phenomena/problems or build a three-dimensional conceptual framework? Do the materials leverage students' prior knowledge and experiences, provide learning experiences that develop metacognition, and provide equitable learning experiences for all students?
- Rubric 3 – Monitoring Student Progress: How are students assessed? For example, are the assessments designed to monitor three-dimensional learning and EP&Cs? Will they capture student progress over time? Do the assessments include self- or peer-assessments and a variety of measures, support, and strategies for ensuring equitable access?
- Rubric 4 – Teacher Support: How do the instructional materials help teachers facilitate students' understanding of phenomena/problem solutions using the three dimensions? For example, do the teacher materials provide guidance for supporting coherence, effective teaching, students with diverse learning needs, and phenomena-driven and problem-driven three-dimensional learning? Do the materials provide support for teachers to monitor student progress?
- Rubric 5 – Program Evaluation: Is high quality consistent across a grade level or between grade level progressions? (Optional)[6]

Each rubric is composed of three to five criteria that are examined by participants one at a time. For summaries of the criteria in the rubrics, see Appendix B.

The vignette at the end of this section provides a more detailed description of the Paper Screen step.

5 Participants examine only a section of the materials rather than the full set. Further, it is recommended that, across the candidate instructional materials being evaluated, sections with similar content be chosen for the Paper Screen step to facilitate comparison of materials.

6 A group may choose to complete rubric 5 between the Paper Screen and Pilot Materials steps to see if high quality is consistent across a grade level (e.g., across modules, chapters, units) or between grade level progressions.

Step 4: Pilot Materials

This step allows teachers to use in the classroom the instructional materials chosen in the Paper Screen. The pilot-testing teachers collect additional evidence while using the instructional materials during their instruction. This allows a more thorough analysis of each set of instructional materials under review and allows for additional evidence from teachers and students to be used in step 5, Select and Recommend. (Typical duration: varies)

Step 5: Select and Recommend

This step provides a decision-making framework to support the adoption committee in coming to consensus about the instructional materials to be recommended for adoption. Evidence and data from steps 1–4 are used as support for decisions, as this district level participant stated in an interview:

> *My job is to present to [our school board] that we're recommending [instructional materials] because of what we found, based off of the evidence that it has all the components that we need for it to be the best program out there. (School district participant in a local TIME training)*

In some cases, districts have decided that none of the materials they reviewed were a fit:

> *And then after using the TIME process, we realized that the materials that were out there were not actually in line with those components that I mentioned earlier: phenomena driven, prior knowledge, access, and equity. And so [the adoption committee] decided not to adopt anything. (Early Implementer Project Director who co-facilitated TIME)*

(Typical duration: varies)

Step 6: Implement

In this final step, the toolkit provides resources for planning and monitoring ongoing instructional material implementation. It is important to note that Early Implementer district leaders have acknowledged that no instructional materials will be a perfect fit for any district. Consequently, many, such as the following Project Director, have stated that they intend to modify their district's adopted instructional materials or supplement them:

> *What we found [in the instructional materials we reviewed] were investigations that needed to be supplemented to make more of a hands-on experience in the classroom that could connect to the program and the phenomena that was driving the learning. We needed more to engage the students and keep them going in helping them to understand with the kinesthetic component of learning. (Early Implementer Project Director who co-facilitated TIME)*

(Typical duration: length of adoption)

It is important to emphasize that, as described above, training is required before engaging in steps 2 and 3, to calibrate the evaluation of criteria and to familiarize adoption committee members with the process of looking for evidence before beginning to deeply examine candidate instructional materials.

Vignette: Using the Paper Screen Step to Score Instructional Materials

This vignette is representative of a typical TIME Paper Screen experience. The aspects of the Paper Screen process described below were commonly observed by evaluators.

Three county office of education facilitators met with 30 participants from the same school district for a three-day TIME training on the Paper Screen process. The participants were divided into five chapter-specific groups to correspond to the five chapters of the instructional materials they would be reviewing.[7] Their first assignment was to get acquainted with their chapter and create a graphic representation of the storyline of their chapter on a poster. The posters were placed on the wall in sequence. A presenter from each chapter group walked everyone through their chapter so that the whole group understood, and could see by looking at the posters on the wall, the storyline of the entire set of instructional materials from start to finish.

Participants then used Rubric 1 from the toolkit to begin to further review their chapters. They examined the materials for evidence of the first important feature of high-quality NGSS instructional materials, phenomena/problems used to drive student learning. When evidence of this feature was found, a pink sticky note was placed in the appropriate location on the chapter storyline. Then each chapter group presented what they had found. Members of other chapter groups had a chance to ask clarifying questions to make sure they agreed that the colored sticky on the poster was in fact evidence that phenomena/problems were present. They repeated this process for the other criteria in Rubric 1 (i.e., presence of the three dimensions, EP&Cs, and a logical sequence).

When evidence of all of the rubric's criteria had been marked with colored stickies on the chapter posters, it was time to score the entire set of instructional materials. First, individuals recorded their own score (1, 3, or 5)[8] for each criterion in Rubric 1 in their notebooks. Then the whole group stood in a circle and shared their scores. A facilitator asked everyone, at the count of three, to show their score by holding up the appropriate number of fingers. The scores were close, but not unanimous. Most of the group had raised three fingers, but two people raised five. The facilitator recorded these scores on the rubric poster. Some participants explained the reasons for their scores. Occasionally, they scored based on an inference rather than evidence from the chapters. For example, one person noted that a phenomenon was present in multiple places in the unit. When asked to describe where he found evidence of the phenomenon, he was unable to document it in the text. He had inferred that a teacher would be able to use the question posed to students in the unit to identify a related phenomenon. Facilitators reminded the group that TIME requires that

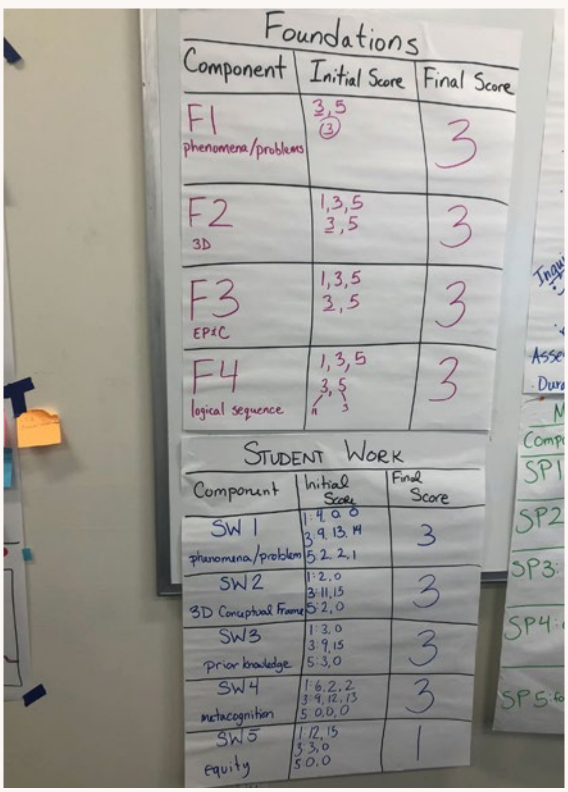
7 Participants used a set of instructional materials called Disruptions in Ecosystems for the Paper Screen process. Disruptions in Ecosystems was chosen for training purposes because it is recognized as being mostly aligned to the NGSS, and it is not one of the 29 sets of K–8 instructional materials approved by the California State Board of Education. The full list of approved materials is posted on the California Department of Education's (2018) website: https://www.cde.ca.gov/ci/sc/im/adoptedsciprograms2018.asp.

8 Participants used a scoring scale to indicate their assessment of the quality of each criterion. On this scale, 1 = low quality, 3 = medium quality, and 5 = high quality (see Appendix B for score descriptions across all five rubrics).

they focus on what is evident in the instructional materials, not how teachers might modify them. After this share, facilitators asked participants to score the criteria again. This time all raised three fingers. They took a break and repeated the process with the next criterion, the three dimensions of the NGSS.

After the set of instructional materials was assigned a consensus score for each criterion, the whole group discussed and assigned an overall score based on the entire rubric. Because the materials had earned a score of 3 on most of the criteria, the group easily decided that the overall Rubric 1 score should be 3 (see Figure 2).

Figure 2. Poster with recorded initial and final Rubric 1 scores



It had been a productive day, with a combination of sitting and moving about and plenty of animated discourse. Even participants who arrived with deep knowledge of the NGSS remarked that they were learning even more about the standards. They would start with Rubric 2 in the morning.

Over the next two days, the process was repeated with the three remaining rubrics. On the second day, the whole group completed Rubric 2 and began Rubric 3. They finished Rubrics 3 and 4 on the last day and unanimously determined that the instructional materials merited pilot testing.

This vignette illustrates how thoroughly instructional materials are examined by participants during the TIME Paper Screen step. It is important to note that the whole group focused carefully on one criterion at a time. The group members also documented the evidence of the criteria they found, and they engaged in consensus building for each criterion score.

In the event that a set of candidate instructional materials receives consistently low scores on Rubric 1 (which was not the case in the vignette above), it would not be reviewed further (i.e., participants would not use Rubrics 2–5 to continue to examine the materials). However, when instructional materials show promise for adoption based on Rubric 1 scores, participants continue to the other toolkit rubrics and complete the Paper Screen process. Occasionally, consensus is not reached after a couple of rounds of sharing scores, and facilitators may ask if those in the minority (i.e., those whose scores had the fewest tallies) can "live with" the final score from the majority; this usually only occurs at the criterion level.

Perceptions of the TIME Process

As described above, TIME is a rigorous, multistep, multiday process for reviewing and selecting instructional materials. TIME training attendees and facilitators noted several benefits of the TIME approach and described the effectiveness of the TIME experience. Participants also reported challenges to implementing TIME, and evaluators observed variations to implementing the Paper Screen model as intended.

Benefits of the TIME Approach

TIME training attendees and facilitators reported that they found value in the TIME approach for instructional materials adoption. They believe that TIME is useful in a variety of ways, first and foremost for evaluating the quality of instructional materials based on evidence and for providing professional learning about the NGSS.

Is Useful for Materials Adoption

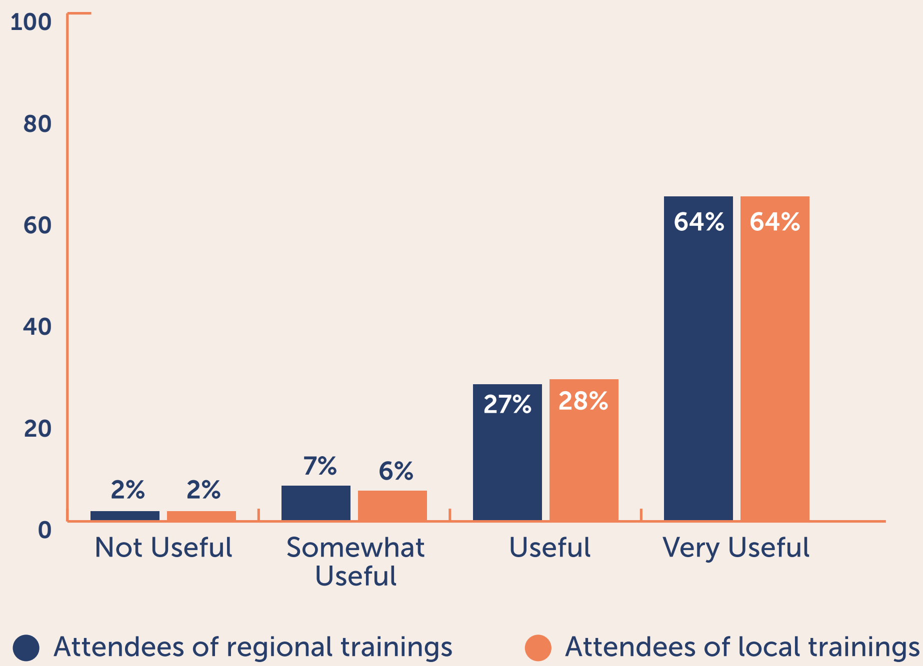
Participants reported that the TIME toolkit enabled them to conduct a thorough and objective review of instructional materials. Some interviewees described how the TIME process is a more rigorous approach to materials adoption compared with past approaches because it is evidence driven and not just based on opinion.

> *As far as looking at instructional materials, it goes back to being very intentional with what you're looking at and how you're assessing it and making sure that it's evidence based. Not just what you like, what you don't like, or what you think will work based on your own experience, but really looking at data to make sure that the kids are learning what they're supposed to. (School district participant in a local TIME training)*

Although TIME is designed for science materials adoption, survey respondents indicated that the TIME process was useful for adopting instructional materials in science *and* other subjects. When asked how useful they thought the TIME approach was for materials adoption in science, a large majority of regional training attendees (91 percent) thought that the approach was "very useful" (64 percent) or "useful" (27 percent) (see Figure 3). Similarly, 92 percent of local training attendees reported that it was "very useful" (64 percent) or "useful" (28 percent).

Figure 3. Participants' perceptions of the usefulness of the TIME approach for materials adoption in science

How useful do you think the TIME approach is for materials adoption in science?



Sources: CA NGSS TIME Survey for Regional Training Participants, administered by WestEd in 2019 (n = 174) and CA NGSS TIME Survey for Local Training Participants, administered by WestEd in 2019 (n = 381).

In addition, the majority of both regional and local training attendees reported that the TIME approach was "very useful" or "useful" for materials adoption in content areas other than science (88 percent and 83 percent, respectively).

Some training attendees expressed the view that the TIME process is worth the investment of staff time and effort in order to ensure they are satisfied with the instructional materials that they choose.

> *We have had teachers who have been doing the [TIME] process say that they would like to see something similar done with future [materials] adoptions and that if we had had this process for math, we wouldn't have selected the curriculum that we did. (School district facilitator in a local TIME training)*

> *Many of our districts did not go through a particularly robust process to choose instructional materials [for math]. And there is an immense amount of buyer's remorse that's being voiced publicly in our county right now. (County office of education participant in a regional TIME training)*

Helps With Understanding the NGSS

The TIME experience was perceived to be useful for learning about the NGSS in general and the three dimensions in particular. This perception was true for participants with strong as well as weak background knowledge of the standards. Some participants reported that TIME trainings can serve as valuable professional learning about the NGSS, and the knowledge gained can be applied in the classroom and when evaluating and selecting candidate instructional materials.

> *This training was very intense, but one of the best trainings I have attended. I feel very empowered to work with my district and use this tool to make the best selection for our science adoption. In addition, my knowledge and understanding of the NGSS has greatly improved because of this specific training. (School district participant in a local TIME training)*

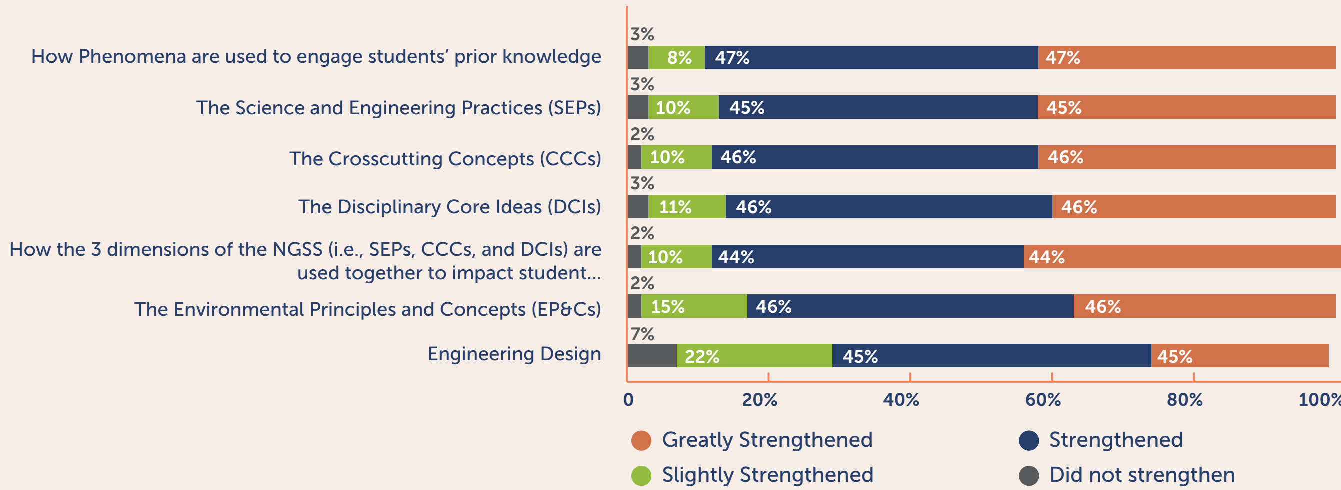
> *We had some teachers who are much deeper into the NGSS and have a greater understanding of the classroom application and things, and then we have some more novice teachers and administrators there. They all felt valued and comfortable. They all felt pushed. (School district participant in a local TIME training)*

> *The TIME training has been the quickest learning experience that I have observed for people new to the NGSS, and [it] pushed our NGSS experts to realize new understandings of the framework as well. The training may be designed to select instructional materials, but the process has helped build a core of NGSS ambassadors from across our district and primed us for implementation. (School district facilitator in a local TIME training)*

> *It really helped us dig into the standards and the three dimensions and how they work. We've been to trainings before about NGSS, but it kind of had just been an overview of how they're structured. And unless you're looking at [the NGSS] every single day and digging into them, you're not getting that depth of understanding. The whole process really gave us a deeper understanding of the NGSS and how they're supposed to function in the classroom. (School district participant in a local TIME training)*

The majority of survey respondents felt that their experience using TIME "greatly strengthened" or "strengthened" their ability to recognize evidence of NGSS aspects in science instructional materials (see Figure 4). This was true for all seven of the NGSS aspects listed in the survey, although the lowest percentage of respondents indicated that TIME "greatly strengthened" their ability to recognize evidence of engineering design.

Figure 4. Extent to which TIME strengthened participants' ability to recognize evidence of NGSS aspects in science instructional materials



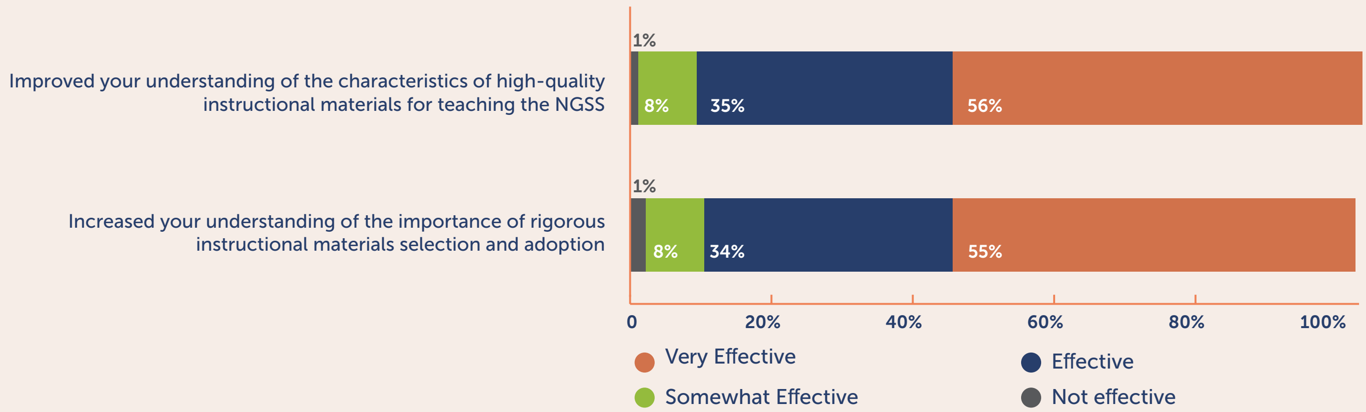
Source: CA NGSS TIME Survey for Local Training Participants, administered by WestEd in 2019 (n = 334).

Helps With Understanding Features of High-Quality Instructional Materials

A theme that emerged across data sources was that using TIME improved participants' understanding of characteristics of high-quality, NGSS-aligned instructional materials. Also, participants noted that using the TIME rubrics enabled them to recognize elements of what students should learn and provided a shared vocabulary for reviewing instructional materials.

Training participants answered questions about the effectiveness of the TIME experience in achieving two goals (see Figure 5). Views were generally positive, with more than half of participants reporting that the TIME experience was "very effective" in meeting each of these goals. Very few respondents (1 to 2 percent) reported that the TIME experience was "not effective" in achieving either of these goals.

Figure 5. Participants' perceptions of the effectiveness of the TIME experience in achieving two goals



Source: CA NGSS TIME Survey for Local Training Participants, administered by WestEd in 2019 (n = 334).

One Project Director described how teachers in their district have been encouraged to use newly adopted instructional materials in science lesson studies as a way to learn the new materials:

> *One of the options with lesson study this year is that teams get to, or can opt to, use the recommended material or pilot material. So they get to actually experience [the recommended material] before we push it out and drop it on their doorstep.*

Participants discussed other things they valued about the TIME toolkit, including the rubrics and how engaging in the collaborative TIME process led to a shared understanding of instructional priorities among district teams.

> *I love the tools. I love the rubrics. I think that, used correctly, they actually give you an amazing amount of insight into what students will be learning, and that's what we wanted. (School district participant in a local TIME training)*

> *TIME enhanced my ability to recognize critical aspects of quality instructional materials and gave our district a common language and experience for the process. (School district participant in a local TIME training)*

Overview of 2018–19 Statewide TIME Rollout

An effort to implement TIME statewide in California began in late 2018 and continued through the fall of 2019. With the NGSS being more widely implemented in districts than in previous years and a list of science instructional materials having just been approved by the California Department of Education (2018), it was an opportune time to promote the use of this toolkit for evaluating and selecting high-quality, NGSS-aligned instructional materials.

To help foster statewide implementation, TIME trainings occurred in three phases, which are described below. The primary purpose of all three training phases was to model step 3 of the TIME process, the Paper Screen. Although the Paper Screen is just one of six steps, it is the most time-intensive, the most comprehensive, and arguably the most important step.

Master Class

In November 2018, a TIME master class was held to prepare 23 California science education leaders to lead large, regional TIME trainings the following month. The five master class trainers included staff from BSCS, Achieve, and the K–12 Alliance. The 23 attendees included representatives from the California Science Project; the NGSS Early Implementer districts; the K–12 Alliance; institutions of higher education; and school districts, including five district Project Directors and four Core Teacher Leaders from Early Implementer districts. The group spent three days briefly learning about the six-step TIME toolkit, but focused on how to facilitate step 3, the Paper Screen. A set of *sample* instructional materials that was *not* on the California Department of Education list of 2018 approved Science Publishers and Programs[9] was used for training purposes.

Regional Trainings

In December 2018, these 23 leaders facilitated two regional TIME trainings, one in Northern California (Sacramento) and one in Southern California (Claremont). A small number of Early Implementer district leaders, who had learned the TIME process from previous Early Implementer professional learning, also facilitated these regional trainings. The regional trainings were open to any individuals responsible for supporting districts with the adoption of science materials.[10] Materials were provided to attendees so that they could return and conduct local TIME trainings with their constituents. Forty-nine county offices of education out of 58 counties in California had teams attend the regional trainings, totaling 216 attendees in all. Most teams had between three and ten members and included both county office and school district representatives.

Like the master class, the regional trainings each lasted three full days and focused on the Paper Screen, and the facilitators followed the master class model they had experienced in November.

9 See the full list at https://www.cde.ca.gov/ci/sc/im/adoptedsciprograms2018.asp.

10 The S. D. Bechtel Jr. Foundation supported the California NGSS Collaborative in the development and delivery of the TIME master class and the two regional trainings as well as WestEd's STEM Evaluation Unit in the evaluation of these events.

They had received binders containing instructions, a facilitator script, and PowerPoint slides from the master class, and they had been asked to follow these as closely as possible. Each participant of the regional trainings was also given these items, and it was impressed upon them that they, too, should closely follow the facilitator script and use the provided PowerPoint slides when they conducted TIME trainings themselves for their constituents.

Local Trainings

Throughout 2019, regional training attendees facilitated dozens of local TIME trainings. These facilitators, who were from county offices of education and school districts, both trained participants in the TIME process using sample instructional materials and guided participants to apply the TIME process to candidate instructional materials being considered for adoption.[11]

Of the 49 counties with team attendance at the December 2018 regional trainings, 39 hosted local trainings, as shown in Figure 6.

Figure 6. Map of California counties' participation in December 2018 regional TIME trainings

*Out of the 39 county teams that hosted local trainings, 36 of them were led by local training facilitators, and three of them were led by regional training facilitators — these three are indicated with asterisks in the map.

11 Local TIME trainings have two primary purposes: (1) to lead participants through using the TIME toolkit and learning how to use the rubrics and identify evidence to assess the quality of *sample* instructional materials (through a three-day training) and (2) to guide participants through the process (generally two to three days) of facilitating school district staff as they use TIME to review and select *candidate* instructional materials for potential adoption.

Challenges to Implementing TIME

County office and district personnel who attended the regional trainings and were charged with leading their own TIME trainings back home anticipated challenges associated with conducting TIME trainings. In interviews and surveys conducted soon after the regional trainings, finding time and meeting spaces for three full days was a tall order for many. Some said that it might be difficult to convince administrators of the value of such an investment. In addition, others were concerned about obtaining substitutes to enable teachers to participate in sessions held during the school year.

> *While I completely see the relevance and professional development that is built in, communicating this with district superintendents will be very important. I worry about the impact on students to pull teachers for this amount of time. So we will need to get creative about using the toolkit in chunks and possibly offering incentives for teachers to meet in the summer. (County office of education participant in a regional TIME training)*

> *I feel that three days in a row like that is just too much. It's a whirlwind, you come away shaking your head. There's just no way during school time that I think we can pull teachers out for three straight days .... I don't think it's the money. I mean, it's going to take a two- or three-day training, and to really be beneficial, you need teams from districts. So for some of our districts to be able to get five or six or seven subs, it's difficult. They just can't do it — they're in isolated areas. (County office of education participant in a regional TIME training)*

Other challenges mentioned by participants included associated monetary costs, such as printing materials and paying for substitutes. In addition, one Early Implementer Core Teacher Leader attendee discussed how prior knowledge of the NGSS is helpful to be able to effectively apply the TIME process:

> *My gosh, how are they going to evaluate materials when they don't really understand what the tool is asking them to look for? You can't find evidence [of aspects of NGSS in instructional materials] when you don't understand [the NGSS]. To me, it was sort of not a limitation of the presenters .... I just feel [the facilitators] were having to answer questions that went way beyond the tool. It was more like these people that were attending needed NGSS 101.*

Nonetheless, most TIME participants said that they saw value in following the three-day training model and that they intended to try to do so. And although that Core Teacher Leader strongly believed that NGSS expertise is required for evaluating instructional materials, she added that the experience was useful to them nonetheless: "I think it helped them. It sort of put a spotlight on what they didn't know."

Variations in the Paper Screen Process

During observations across the state, the evaluation team saw several variations in the way local training facilitators implemented the Paper Screen process. Master class facilitators were asked for their input on which variations they thought had the potential to reduce the value of a TIME training. Their response began with the assertion that, in general, districts should follow the Paper Screen process with fidelity. They also cautioned that certain variations can impact the integrity of the process and therefore the validity and reliability of the resulting information for making a recommendation to pilot test or adopt instructional materials.

Although some degree of variation is normal, the variations to the prescribed TIME process outlined in Table 1 should be avoided.

Table 1. Variations observed by evaluators that can impact the integrity of the TIME process

Variations observed by evaluators	Considerations
Sessions were shorter than three days	All three days are necessary to build understanding and to calibrate participants.
Not all rubrics were used	Participants cannot be fully trained and calibrated without using all four required rubrics. Each rubric measures unique and critical aspects of the instructional materials.
Rubrics were combined	There are purposeful redundancies built into the rubrics. Each rubric reviews the materials through a different, but coherent lens. Multiple passes through the materials also provide confirmation of the findings of the committee.
Rubrics were addressed out of order	The rubrics build on one another. The materials have to pass Rubric 1 before the next rubrics are considered. Rubric 4 is dependent on the other three rubrics.
Groups did not have access to all components of candidate instructional materials	All components of the instructional materials are required for complete and valid scoring.
Process was rushed	TIME takes time, so it's recommended to allocate sufficient time to allow for contingencies that may impact the timing of the process.
More than one grade/grade band or chapter were examined at same time	Review should be focused on one grade/grade band and one chapter at a time.

During interviews, evaluators also learned of variations that were used in other steps in the TIME process. For example, an interviewed participant noted that their district applied the Paper Screen and Pilot Materials steps of the TIME process concurrently, rather than using the Paper Screen to gather evidence about the presence of specific components indicating that the candidate material is appropriate to advance to the pilot step. By not conducting the Paper Screen first, it is possible that teachers used instructional materials in their classrooms that were poorly aligned to the NGSS and so were not suitable for the district's NGSS implementation efforts.

Recommendations

The evaluation team presents the following recommendations to guide adoption committees as they evaluate, select, and adopt science instructional materials to support districts' NGSS implementation:

- **Identify the unique needs and priorities of your district that you hope instructional materials will help you address.** Each district has particular needs that affect its instructional priorities. For example, a district's vision for instruction is often shaped by the resources it has, as well as by its teacher and student populations. It is important for adoption committees to evaluate instructional materials based on these unique needs in order to select the best materials possible.
- **Acknowledge the benefit of rigorously reviewing candidate instructional materials in all content areas.** Adoption represents a hefty financial investment and a commitment of 10 or more years to the adopted product. Districts should realize how critical it is to carefully analyze and vet candidate instructional materials before making such an investment. A thorough review could also reveal potential gaps in the materials and inconsistencies across grade levels.
- **Consider taking advantage of TIME, an existing tool developed specifically for review of NGSS-aligned instructional materials.** Even though many attendees pointed out that implementing the TIME process is demanding and challenging, they acknowledged the value of using the TIME process to choose appropriate instructional materials to match district needs and priorities. To participate in a TIME training yourself, please contact a member of the California NGSS Collaborative (the California Department of Education, the California Science Project, the California Science Teachers Association, the California County Superintendents Educational Services Association and its Curriculum Instruction Science Committee, local county offices of education, and the K–12 Alliance).
- **Consider the TIME approach as a support for learning about the NGSS.** Because the NGSS are so different from past science standards, teachers will need deep professional learning to understand how to teach them as intended. Going through the TIME process not only helps participants evaluate science instructional materials, but also helps teachers become more familiar with the standards themselves.
- **Know that even after adopting NGSS instructional materials, teachers and administrators will continue to need professional learning.** Once your district has adopted instructional materials, do not consider your district finished with NGSS implementation. High-quality instructional materials are a cornerstone to launching NGSS implementation efforts, but ongoing professional learning is needed to support teachers in how to best use those materials to support students' three-dimensional learning. Administrators need to learn what NGSS instruction should look like in order to support teachers in best using the materials.

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Appendix A. Data Collection

Data collected for this report came from three phases of TIME trainings. A small group of regional leaders were trained in the TIME process during the master class. These regional leaders, in turn, facilitated two regional trainings — one in Northern California and one in Southern California. The attendees of the regional trainings then returned to their districts and counties all over the state, where they conducted local trainings.

There were two time points of data collection related to the local trainings — data collected shortly after participants attended trainings and data collected months after these trainings. A couple of Early Implementer teachers participated in these TIME-specific interviews.

Table A1. Dates of data collection, number of participants, and sources of data

Phase of TIME trainings	Date(s)	Participants	Data collected
Master class	November 2018	23 regional leaders	Sign-in sheets Agenda Observation notes
Regional trainings in Northern and Southern California	December 2018 (two regional trainings) January–February 2019 (interviews)	206 attendees (178 completed the survey) Four facilitators and seven attendees interviewed	Sign-in sheets Agenda Observation notes Attendee survey responses Attendee and facilitator interviews

Phase of TIME trainings	Date(s)	Participants	Data collected
Local trainings in counties and school districts	January–October 2019 (surveys for local training participants and facilitators) April–October 2019 (observations) May–October 2019 (interviews)	41 facilitators and 425 attendees completed surveys 16 facilitators and 19 attendees interviewed	Observation notes Attendee and facilitator survey responses Attendee and facilitator interviews (Data collected shortly after trainings)
Local trainings in counties and school districts	December 2019–January 2020 (follow-up interviews with local training facilitators and attendees)	Seven facilitators and eight attendees interviewed	Observation notes Attendee and facilitator interviews (Data collected months after trainings)

In addition, data were collected from Early Implementer leaders, as shown in Table A2.

Table A2. Dates of data collection, number of participants, and sources of data related to Early Implementer leaders

Date(s)	Participants	Data collected
January 2020 (Master class facilitator focus group, Early Implementer Initiative Project Director interviews, and Regional Director interviews)	Three master class facilitators participated in a focus group Eight Project Directors interviewed Three Regional Directors interviewed	Master class facilitator focus group Project Director interviews Regional Director interviews

Appendix B. Paper Screen Rubrics

The following are Paper Screen rubrics that are used to determine an overall score for the instructional materials being evaluated. Each criterion within these rubrics has its own guidelines that are individually applied to the instructional materials and scored before participants decide on an overall score for the rubric. Scores range from 1 (Low Quality) to 5 (High Quality). If a set of instructional materials is given an overall score of 1 on Rubric 1, Foundations, the review process does not continue because the quality of the materials is not high enough to warrant further review. A set of materials earning a score of 3 or 5 on Rubric 1 undergoes scoring with the remaining required rubrics (i.e., Student Work, Monitoring Student Progress, and Teacher Support). The fifth rubric (Program Evaluation) is optional and may be applied before the Pilot Materials step.

Figure B1. CA NGSS TIME Paper Screen Rubric 1: Foundations

Section 3: Paper Screen Rubric 1 – **H7**

Designed for the NGSS: Foundations Rubric

Components and Indicators	High Quality 5	Medium Quality 3	Low Quality 1
F1. Presence of Phenomena/Problem. The materials include phenomena/problems that • have the ***potential*** to drive student learning. • have the ***potential*** to relate across the dimensions.	The materials include phenomena/problems that have strong *potential* to drive student learning toward the targeted learning goals.	The materials include phenomena/problems that have some *potential* to drive student learning toward the targeted learning goals.	The materials include phenomena/problems that have limited *potential* to drive student learning toward the targeted learning goals.
F2. Presence of Three Dimensions. The materials include the three dimensions, such that • the DCIs, SEPs, and CCCs are present and have the *potential* to support student learning. • when engineering design is a learning focus, it is integrated with the appropriate dimensions (i.e., engineering is not isolated).	The materials consistently provide opportunities for students to develop and use grade-appropriate elements of the three dimensions.	The materials occasionally provide opportunities for students to develop and use grade-appropriate elements of the three dimensions.	The materials rarely provide opportunities for students to use grade-appropriate elements of the three dimensions.
F3. Presence of Environmental Principles and Concepts (EP&Cs). The materials include (as applicable) • instructional content that incorporates the California EP&Cs. • opportunities for students to examine the interactions and interdependence of human societies and natural systems. • opportunities for students to develop and/or implement solutions to real-world environmental problems.	The materials consistently provide opportunities for students to examine and use elements of the EP&Cs.	The materials occasionally provide opportunities for students to examine and use elements of the EP&Cs.	The materials rarely provide opportunities for students to examine and use elements of the EP&Cs.
F4. Presence of Logical Sequence. Materials demonstrate appropriate sequencing of three dimensions when • they include a targeted set of DCIs, SEPs, and CCCs within a sequence; • the sequence is clear and logical across the DCIs; and • the SEPs and CCCs are potentially sufficient and appropriate for students to figure out the phenomena or problems. • phenomenon or problems are linked to each other.	The materials consistently exhibit a clear, logical, and appropriate sequence across the three dimensions.	The materials occasionally exhibit a clear, logical, and appropriate sequence across the three dimensions.	The materials rarely exhibit a clear, logical, and appropriate sequence across the three dimensions.

Source: Adapted from BSCS Science Learning, developed in collaboration with the K–12 Alliance at WestEd and Achieve, Inc.

Figure B2. CA NGSS TIME Paper Screen Rubric 2: Student Work

Section 3: Paper Screen Rubric 2 – **H14**

Designed for the NGSS: Student Work Rubric

Designed for CA NGSS: Student Work Rubric	High Quality 5	Medium Quality 3	Low Quality 1
SW1. Phenomena/Problems. Materials provide anchoring and investigative phenomena/problems that: • engage students as directly as possible in authentic and relevant experiences. • are matched to targeted learning goals. • can be figured out/solved using scientifically accurate understandings and abilities. • make connections beyond and to their daily lives including to their homes, neighborhoods, communities, local environment, and/or cultures.	Materials consistently offer quality phenomena/ problems sufficient to motivate and drive student learning.	Materials sometimes offer quality phenomena/ problems sufficient to motivate and drive student learning.	Materials rarely offer quality phenomena/ problems sufficient to motivate and drive student learning.
SW2. Three-dimensional Conceptual Framework. Materials include learning experiences that help students to build scientifically accurate understandings and abilities through opportunities for students to: • link prior knowledge to negotiated new understanding and abilities. • do work that approximates the nature of science. • use reasoning to connect grade-appropriate SEP, DCI, and CCC elements and EP&C's (when applicable). • ask and answer questions that link learning over time. • negotiate new understandings and abilities by comparing their ideas, their peers' ideas, and ideas encountered in the learning experience(s). • apply their understandings and abilities in a variety of ways.	Materials consistently include learning experiences that help students build from prior experiences to negotiate new understandings and abilities and apply their understandings in a variety of ways.	Materials sometimes include learning experiences that help students build from prior experiences to negotiate new understandings and abilities and apply their understandings in a variety of ways.	Materials rarely include learning experiences that help students build from prior experiences to negotiate new understandings and abilities and apply their understandings in a variety of ways.

Section 3: Paper Screen Rubric 2 – **H14**

Designed for CA NGSS: Student Work Rubric	High Quality 5	Medium Quality 3	Low Quality 1
SW3. Prior Knowledge. Materials leverage students' prior knowledge and experiences to motivate student learning in ways that: • make visible students' prior knowledge and experiences related to the anchoring and investigative phenomena/problems and relevant SEPs, DCIs, and CCCs and EP&Cs (when applicable). • revisit students' early ideas to see how they have changed (or not) as they figure out phenomena/solve problems. • make explicit links to new ideas and practices being developed by students.	Materials consistently leverage student prior knowledge and experiences to motivate their learning.	Materials sometimes leverage student prior knowledge and experiences to motivate their learning.	Materials rarely leverage student prior knowledge and experiences and when included, they do not relate to the phenomena or problems.
SW4. Metacognitive Abilities. Materials include learning experiences for students to: • set and monitor their learning in light of the targeted learning goals. • consider, over time, **what** and **how** they have learned across the three dimensions. • articulate how the three dimensions helped them figure out anchor and investigative phenomena/solve problems.	The materials provide students with regular, explicit opportunities to consider how their learning experiences changed their thinking.	The materials provide students with some opportunities to consider how their learning experiences changed their thinking.	The materials provide few opportunities for students to consider how their learning experiences changed their thinking.
SW5. Equitable Learning Opportunities: Materials ensure that ***all*** students, including those from non-dominant groups and with diverse learning needs, have access to the targeted learning goals and experiences, including: • appropriate reading, writing, listening, and/or speaking alternatives for students who are English language learners, have special needs, read below the grade level, or have high interest and have already met the intended learning goals. • culturally-relevant contexts and examples that support all students. • opportunities to cultivate interest and confidence as scientists and engineers for all students.	Most learning experiences in materials are designed such that students can engage meaningfully in a variety of ways, with multiple access points, and with supports for students.	Some learning experiences in materials are designed such that students can engage meaningfully in a variety of ways, with multiple access points, and with supports for students	Few learning experiences in materials are designed such that students can engage meaningfully in a variety of ways, with multiple access points, and with supports for students.

Source: Adapted from BSCS Science Learning, developed in collaboration with the K–12 Alliance at WestEd and Achieve, Inc.

Figure B3. CA NGSS TIME Paper Screen Rubric 3: Monitoring Student Progress

Section 3: Paper Screen Rubric 3 – **H19**

Designed for CA NGSS: Monitoring Student Progress Rubric

Designed for CA NGSS: Monitoring Student Progress Rubric	High Quality 5	Medium Quality 3	Low Quality 1
SP1. Monitoring Three-Dimensional Learning and EP&Cs If Applicable. Assessments are designed to • ensure that students use SEPs integrated with DCIs and CCCs to demonstrate their understanding of phenomena and/or design solutions to problems. • connect student learning experiences to the targeted learning goals. • elicit observable evidence of students' knowledge of and ability to use grade-level appropriate elements of the three-dimensions. • ensure that students use EP&Cs where applicable to demonstrate their understanding of environmental phenomenon/problem solution.	Assessments are consistently designed to connect to learning goals and prompt students to apply appropriate elements of the three dimensions and EP&Cs where applicable to demonstrate their understanding of the phenomenon/problem solution.	Assessments are sometimes designed to connect to learning goals and prompt students to apply elements of two or three dimensions and EP&Cs where applicable to demonstrate their understanding of the phenomenon/problem solution.	Assessments are either not connected to learning goals and/or they prompt students to apply elements of only one dimension to demonstrate their understanding of the phenomenon/problem solution. EP&Cs are not included, even where applicable.
SP2. Capturing Student Progress. The assessments within a unit: • include pre-, formative, summative, and self- or peer-assessment measures that assess three-dimensional learning; and • these different types of measures are connected to one another to demonstrate student progress over time.	There are multiple opportunities, using more than one type of measure, to demonstrate learning and these measures are strongly connected to show student progress both in and across the three dimensions.	There are multiple opportunities, using more than one type of measure, to demonstrate learning and these measures are connected to show student progress both in and across the three dimensions.	There is not an appropriate combination of measures for students to demonstrate progress both in and across the three dimensions.

Section 3: Paper Screen Rubric 3 – **H19**

Designed for CA NGSS: Monitoring Student Progress Rubric	High Quality 5	Medium Quality 3	Low Quality 1
SP3. Variety of Measures. Assessments are matched to targeted learning goals and elicit a full range of student thinking by • providing clear expectations (e.g., rubric) to students so they understand how they can demonstrate their knowledge. • using a variety of measures (e.g., performance tasks, discussion questions, constructed response questions, project- or problem-based tasks, portfolios, and justified multiple choice). • providing set(s) of tasks so that students can demonstrate their understanding of the same learning goals in multiple ways.	The assessments include a wide variety of formats with clear expectations that allow students to demonstrate their understanding of the learning goals in multiple ways.	The assessments include some variety of formats with clear expectations that allow students to demonstrate their understanding of the learning goals in multiple ways.	The assessments use just one format and/or the expectations for students to demonstrate their knowledge are absent or unclear.
SP4. Equitable Access. Assessments are designed to be • free from bias (e.g., gender, racial, socioeconomic status, cultural). • accessible to all students (e.g., reading level, accommodations).	Most assessments are free from bias and are accessible.	Some assessments are free from bias and are accessible.	Few assessments are free from bias and are accessible.
SP5. Use of Assessment. The materials provide self- or peer-assessments that allow students to reflect on and monitor their learning over time.	The materials miss few or no opportunities to encourage self- or peer-assessments that allow students to reflect on and monitor their progress.	The materials miss some opportunities to encourage self- or peer-assessments that allow students to reflect on and monitor their progress.	The materials miss all or most opportunities to encourage self- and peer-assessments that allow students to reflect on and monitor their progress.

Source: Adapted from BSCS Science Learning, developed in collaboration with the K–12 Alliance at WestEd and Achieve, Inc.

Figure B4. CA NGSS TIME Paper Screen Rubric 4: Teacher Support

Section 3: Paper Screen Rubric 4 – **H22**

Designed for CA NGSS: Teacher Support Rubric

Designed for CA NGSS: Teacher Support Rubric	High Quality 5	Medium Quality 3	Low Quality 1
TS1. Phenomena/Problems Driven Three-Dimensional Learning. Teacher materials provide • background information about the phenomena or problems included in the learning sequence and across sequences. • an explanation of the role of phenomena or problems in driving student learning. • rationale for why the unit phenomena or problems were selected for the targeted DCIs, SEPs, CCCs, and EP&Cs (when applicable). Evidence found in: F1, F2, SW1, SW2, SP1	Materials provide clear guidance to teachers on how students develop, use, and integrate the three dimensions and EP&Cs (where appropriate) to make sense of phenomena or design solutions to problems.	Materials provide some guidance to teachers about how students develop, use, and integrate the three dimensions and EP&Cs (where appropriate) to make sense of phenomena or design solutions to problems.	Materials provide little guidance to teachers about how students develop, use, and integrate the three dimensions and EP&Cs (where appropriate) to make sense of phenomena or design solutions to problems
TS2. Coherence. Teacher materials describe and provide a rationale for • the conceptual framework and sequence of ideas, practices, and learning experiences in the learning sequences and across sequences. • strategies for linking student experiences across lessons to ensure student sense-making and/or problem-solving focused on phenomena or problems is linked to learning across all three dimensions. • connections to other science domains, nature of science, engineering, technology, and applications of science, math, ELA, and EP&Cs (when applicable). Evidence found in: F2, F3, F4, SW2, SP2	Materials provide strong support for understanding unit coherence and helping students link experiences to learning across all three dimensions and to phenomena or problems.	Materials provide some support for understanding unit coherence and helping students link experiences to learning across all three dimensions and to phenomena or problems.	Materials provide little support for understanding unit coherence and helping students link experiences to learning across all three dimensions and to phenomena or problems.

Section 3: Paper Screen Rubric 4 – **H22**

Designed for CA NGSS: Teacher Support Rubric

Designed for CA NGSS: Teacher Support Rubric	High Quality 5	Medium Quality 3	Low Quality 1
TS1. Phenomena/Problems Driven Three-Dimensional Learning. Teacher materials provide • background information about the phenomena or problems included in the learning sequence and across sequences. • an explanation of the role of phenomena or problems in driving student learning. • rationale for why the unit phenomena or problems were selected for the targeted DCIs, SEPs, CCCs, and EP&Cs (when applicable). Evidence found in: F1, F2, SW1, SW2, SP1	Materials provide clear guidance to teachers on how students develop, use, and integrate the three dimensions and EP&Cs (where appropriate) to make sense of phenomena or design solutions to problems.	Materials provide some guidance to teachers about how students develop, use, and integrate the three dimensions and EP&Cs (where appropriate) to make sense of phenomena or design solutions to problems.	Materials provide little guidance to teachers about how students develop, use, and integrate the three dimensions and EP&Cs (where appropriate) to make sense of phenomena or design solutions to problems
TS2. Coherence. Teacher materials describe and provide a rationale for • the conceptual framework and sequence of ideas, practices, and learning experiences in the learning sequences and across sequences. • strategies for linking student experiences across lessons to ensure student sense-making and/or problem-solving focused on phenomena or problems is linked to learning across all three dimensions. • connections to other science domains, nature of science, engineering, technology, and applications of science, math, ELA, and EP&Cs (when applicable). Evidence found in: F2, F3, F4, SW2, SP2	Materials provide strong support for understanding unit coherence and helping students link experiences to learning across all three dimensions and to phenomena or problems.	Materials provide some support for understanding unit coherence and helping students link experiences to learning across all three dimensions and to phenomena or problems.	Materials provide little support for understanding unit coherence and helping students link experiences to learning across all three dimensions and to phenomena or problems.

Source: Adapted from BSCS Science Learning, developed in collaboration with the K–12 Alliance at WestEd and Achieve, Inc.

Figure B5. CA NGSS TIME Paper Screen Rubric 5: Program Evaluation

Section 3: Paper Screen Rubric 5 – **H28**

Designed for CA NGSS: Program Evaluation Rubric

Designed for CA NGSS: Program Evaluation Rubric	High Quality 5	Medium Quality 3	Low Quality 1
PE1. Progressions of Learning. Within a program, learning experiences are more likely to help students develop a greater sophistication of understanding of the elements of SEPs, CCCs, and DCIs, and EP&Cs (when applicable) when teacher materials: • make it clear how each of the three-dimensions builds logically and progressively over the course of the program and make clear how students ◦ engage in the science and engineering practices with increasing grade-level appropriate complexity over the course of the program. ◦ utilize the crosscutting concepts with increasing grade-level appropriate complexity over the course of the program. ◦ engage in grade level/band appropriate disciplinary core ideas. • teacher materials make clear how the performance expectations are addressed in the program. • provide a rationale for a logical sequence/treatment of Engineering, EP&Cs, and the Nature of Science (NoS).	Materials enact progressions of learning that have all or most of the quality characteristics	Materials enact progressions of learning that have some of the quality characteristics	Materials enact progressions of learning that have none or few of the quality characteristics
PE2. Unit-to-Unit Coherence. Units across a program demonstrate coherence when student materials: • are designed with an appropriate sequence and development of DCIs, CCCs, and SEPs to support students in demonstrating learning across a program as they figure out phenomena/problems. • make explicit connections from one unit to the next across the three-dimensions to connect prior learning, current learning, and future learning as they figure out phenomena/problems. • support students in making connections across units and disciplines by helping student negotiate more sophisticated understandings and abilities.	The materials consistently justify sequencing and demonstrate strong unit-to-unit coherence for developing competence in three-dimensions.	The materials occasionally justify sequencing and sometimes demonstrate strong unit-to-unit coherence for developing competence in three-dimensions.	The materials never justify sequencing and rarely demonstrate unit-to-unit coherence for developing competence in three-dimensions.

Section 3: Paper Screen Rubric 5 – **H28**

Designed for CA NGSS: Program Evaluation Rubric	High Quality 5	Medium Quality 3	Low Quality 1
PE3. Program Assessment System. Over the course of the program, teacher materials demonstrate a system of assessments that • coordinates the variety of ways student learning is monitored to provide information to students and teachers regarding student progress for all three-dimensions of the standards and toward proficiency at the identified grade-level/band performance expectations. • includes support for teachers and other leaders to make program-level decisions based on unit, interim, and/or year-long summative assessment data. • is driven by an assessment framework and provides a structured conceptual map of student learning along with details of how achievement of the outcomes can be measured.	The materials use a program-level assessment system that has all or most of the quality characteristics	The materials use a program-level assessment system that has some of the quality characteristics	The materials use a program-level assessment system that has few or none of the quality characteristics

Source: Adapted from BSCS Science Learning, developed in collaboration with the K–12 Alliance at WestEd and Achieve, Inc.

Glossary

Core Leadership Team (CLT) — Group of three to five administrators and five to eight teachers established at each district at the beginning of the Initiative. The CLT meets with their Project Director regularly during each school year to plan and lead all Early Implementers Initiative activities. They meet with their K–12 Alliance Regional Director for six Technical Assistance Days each school year.

Core Teacher Leader (CTL) — Teacher member of the Core Leadership Team. Provides professional learning to Teacher Leaders, other teachers, and/or administrators in their district or at projectwide events such as the Summer Institute.

Crosscutting Concepts (CCCs) — One of the three NGSS dimensions and a way of linking the different domains of science. CCCs include patterns; cause and effect; scale, proportion, and quantity; systems and system models; energy and matter; structure and function; and stability and change.

Dimensions of the NGSS — The NGSS includes three dimensions: Disciplinary Core Ideas (what scientists know), Crosscutting Concepts (how scientists make connections among the sciences), and Science and Engineering Practices (what scientists and engineers do and how scientific knowledge develops).

Disciplinary Core Ideas (DCIs) — One of the three NGSS dimensions. According to National Research Council's Framework for K–12 Science Education, disciplinary core ideas are the important concepts in each of four domains: physical sciences; life sciences; Earth and space sciences; and engineering, technology, and applications of science.

Environmental Principles and Concepts (EP&Cs) — Today, the most common schema for the field of environmental literacy in California is the Environmental Principles and Concepts. The five Principles of the EP&Cs are the following: People Depend on Natural Systems; People Influence Natural Systems; Natural Systems Change in Ways That People Benefit From and Can Influence; There Are No Permanent or Impermeable Boundaries That Prevent Matter From Flowing Between Systems; and Decisions Affecting Resources and Natural Systems Are Complex and Involve Many Factors. Each of the five Principles contains several Concepts.

K–8 NGSS Early Implementers Initiative — Six-year initiative (summer 2014 through spring 2020) supporting implementation of the NGSS by eight public school districts and two charter management organizations in California. Developed by the K–12 Alliance at WestEd in collaboration with the California State Board of Education, the California

Department of Education, and Achieve, the Early Implementers Initiative builds the capacity of participating local education agencies to fully implement the NGSS in grades K–8.

K–12 Alliance — A WestEd program of science education leaders and professional learning providers who plan and deliver all projectwide activities for the Early Implementers Initiative.

NGSS — A set of K–12 science content standards developed by states to improve science education for all students. They are composed of three dimensions based on the National Research Council's Framework for K–12 Science Education.

Phenomena — Phenomena are occurrences in the natural or built world that cause us to wonder and ask questions. There are two types of phenomena, anchoring and investigative.

Project Director — District person responsible for leading all Early Implementers Initiative activities for the district and representing the district at monthly Initiative-wide planning meetings with Regional Directors.

Science and Engineering Practices (SEPs) — One of the three NGSS dimensions, SEPs are the behaviors that scientists engage in as they investigate and build models and theories about the natural world and the key set of engineering practices that engineers use as they design and build models and systems. SEPs include asking questions (for science) and defining problems (for engineering); developing and using models; planning and carrying out investigations; analyzing and interpreting data; using mathematics and computational thinking; constructing explanations (for science) and designing solutions (for engineering); engaging in argument from evidence; and obtaining, evaluating, and communicating information.

Teacher Leader (TL) — One of 30 to 70 teachers in each district who joined the Early Implementers Initiative in year 2, one year after the CLTs joined. Teacher Leaders attend annual Summer Institutes and participate in two Teacher Learning Collaboratives each school year (one in the fall and one in the spring) and other district-level professional learning.

Teaching Learning Collaborative (TLC) — Lesson study activity in years 1 through 4 of the Early Implementers Initiative. Each TLC brings together three to four same-grade Early Implementers Initiative teachers from different schools within the district. Teachers plan and teach a lesson to two classrooms of students and debrief after each lesson is taught, during which they examine student work from the lesson. Each TL participates in two TLCs per year.

Toolkit for Instructional Materials Evaluation (TIME) — A suite of tools and processes for curriculum-based professional learning that is designed to help educators evaluate, select, and implement instructional materials aligned to the NGSS.

NGSS EARLY IMPLEMENTERS
WestEd

It's About TIME: A Rigorous New Process for Selecting Instructional Materials for Science

EVALUATION REPORT #11

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