

Chapter 13

Instructional Resources to Support the Next Generation Science Standards for California Public Schools



2016 Science Framework

FOR CALIFORNIA PUBLIC SCHOOLS
Kindergarten Through Grade Twelve



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To view the remaining sections of the 2016 California Science Framework on the CDE website, go to:
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Items in this document that relate to crosscutting concepts are highlighted in green and followed by the abbreviation CCC in brackets, **[CCC]**, with a number corresponding to the concept. The same items that correspond to the science and engineering practices are highlighted in blue and followed by the abbreviation SEP in brackets, **[SEP]**, with a number corresponding to the practice.

The Web links in this document have been replaced with links that redirect the reader to a California Department of Education (CDE) Web page containing the actual Web addresses and short descriptions. Here the reader can access the Web page referenced in the text. This approach allows CDE to ensure the links remain current.

CHAPTER 13

Instructional Resources to Support the Next Generation Science Standards for California Public Schools, Kindergarten Through Grade 12

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Introduction

While standards describe what students are expected to know and be able to do, they do not define curriculum and how teachers should teach. This *Science Framework* provides guidance on how instruction will look inside a classroom, how to use assessment strategies to promote student learning, how technology can be integrated for engagement and learning, and how to support all students to reach their learning goals. Another important tool to help teachers instruct and all students to learn is the development and careful selection of high-quality instructional resources to support the implementation of the Next Generation Science Standards for California Public Schools, Kindergarten Through Grade Twelve (CA NGSS). Instructional resources are broadly defined to include textbooks, kit-based resources, technology-based resources, other educational resources, and texts.

Throughout this document the term “alignment” shall be interpreted as a reflection of the vision, intent, and philosophy of the guiding documents, including the National Research Council’s *A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas (NCR Framework)*, the CA NGSS, and the *Science Framework for California Public Schools: Kindergarten Through Grade Twelve (CA Science Framework)*. Alignment is not a superficial matching of topics covered to those mentioned in the CA NGSS. The concept of three-dimensional learning is defined and explained in chapter 1, overview of the *CA Science Framework*, and is a critical element of the vision.

This chapter provides guidance for the selection of instructional resources, including the evaluation criteria for the state adoption of instructional resources for kindergarten through grade eight. In addition, this chapter offers guidance for local educational agencies (LEAs) on the adoption of instructional resources for students in grades nine through twelve, as well as guidance on the social content review process, supplemental instructional resources, and accessible instructional resources.

State Adoption of Instructional Resources

The State Board of Education (SBE) adopts instructional resources for use by students in kindergarten through grade eight. School districts, charter schools, and county offices of education are not required to purchase state-adopted instructional resources pursuant to *California Education Code (EC)* Section 60210(a). However, if an LEA chooses to use resources that are not adopted by the SBE, it has the responsibility to adopt resources that best meet the needs of its students and to conduct its own evaluation of instructional resources. As part of the evaluation process conducted by the LEA, the review committee must include a majority of classroom teachers from that content area or grade level [(*EC* Section 60210(c))]. Those identified as classroom teachers should have a current classroom teaching assignment and not be a teacher placed on special assignment in an administrative role.

For grades nine through twelve, the review and local board adoption of instructional resources for use by students is the sole responsibility of LEAs, recognizing that not all standards may be taught in a particular course, and a combination of materials may be used to ensure that all students gain the skills and knowledge to achieve all grade-level performance expectations.

It should be noted, however, that the selection of instructional resources at any grade level is an important process that is guided by both local and state policies and procedures. As part of the process for selecting instructional resources, *EC* Section 60002 requires the LEA to promote the involvement of parents and other members of the community in the selection of instructional resources, in addition to the substantial teacher involvement. The LEA must also conduct a social content review to ensure the locally selected instructional resources are in compliance with those legal requirements.

The primary resource to be used when selecting instructional resources is found in the next section, the Criteria for Evaluating Instructional Resources for Kindergarten Through Grade Eight (Criteria). The Criteria include comprehensive descriptions of elements required for effective instructional programs that are aligned to the CA NGSS and will be the basis for the next adoption of science instructional resources.

Criteria for Evaluating Instructional Resources for Kindergarten Through Grade Eight

The adoption of new science instructional resources will be guided by the criteria described below. To be adopted, resources must meet Category 1, Alignment with CA NGSS Three-Dimensional Learning, in full. Resources will be evaluated holistically for strengths in the other categories of Program Organization, Assessment, Access and Equity, and

Instructional Planning and Support. This means that while a program may not meet every criterion listed in those categories, they must on balance meet the intent stated in the introductory paragraph of each category to be eligible for state adoption. Programs that do not meet Category 1 in full and do not show strengths in each one of the other four categories will not be adopted. These criteria are designed to be a guide to publishers in developing their instructional resources and to local educational agencies when selecting instructional resources for their students. To assist in the evaluation of instructional resources, publishers will use SBE-approved standards map and evaluation criteria map templates, developed and supplied by the California Department of Education (CDE), to provide evidence that the program provides students a path to meet the appropriate grade-level performance expectations of the CA NGSS by the end of the year.

It is the intent of the SBE that these criteria be seen as neutral on the format of instructional resources. Print-based, kit-based, digital, interactive online, and other types of programs may all be submitted for adoption as long as they are aligned to the evaluation criteria. Any gross inaccuracies or deliberate falsification revealed during the review process may result in disqualification; any found during the adoption cycle may subject the program to removal from the list of state-adopted instructional resources. Gross inaccuracies and deliberate falsifications are defined as those requiring changes in instructional content. All authors listed in the instructional program are held responsible for the content. Beyond the title and publishing company's name, the only name to appear on a cover and title page shall be the actual author or authors.

Criteria for Evaluating Instructional Resources for Kindergarten Through Grade Eight

The criteria for the evaluation of science instructional resources for kindergarten through grade eight are organized into five categories:

- 1. Alignment with CA NGSS Three-Dimensional Learning:** Instructional resources include content as specified in the CA NGSS. Programs must include a well-defined sequence of instructional opportunities that provides a path for all students to become proficient in all grade-level performance expectations to be eligible for adoption.
- 2. Program Organization:** Instructional resources support instruction and learning of the CA NGSS and include such features as the organization, coherence, and design of the program; chapter, unit, and lesson overviews; and glossaries.
- 3. Assessment:** Instructional resources include multiple models of both formative

and summative assessment tasks for measuring what students know and are able to do and provide guidance for teachers on how to use scoring rubrics and interpret assessment results to guide instruction.

- 4. Access and Equity:** Instructional resources should include suggestions for teachers on how to differentiate instruction to meet the needs of all students. In particular, instructional resources should provide guidance to support students with special needs, including standard English learners, English learners, long-term English learners, students living in poverty, foster youth, girls and young women, advanced learners, students with disabilities, gifted learners, students below grade level in reading comprehension or mathematics skills and knowledge, and students below grade level in science skills and knowledge.
- 5. Instructional Planning and Support:** Information and resources suggest coherent guidelines for teachers to follow when planning three-dimensional instruction and are designed to help teachers provide effective standards-based instruction.

Resources that fail to meet the criteria in Category 1: Science Content/Alignment with the Standards, will not be considered suitable for adoption. All criteria statements in Category 1 must be met for a program to be adopted. The criteria for Category 1 must be met in the core resources or via the primary means of instruction, rather than in ancillary components. In addition, programs must have strengths in each of categories 2 through 5 to be suitable for adoption. Extraneous resources should be minimal and clearly purposeful.

Category 1: Alignment with the CA NGSS Three-Dimensional Learning

All programs must include the following features:

1. Instructional Resources, as defined in *EC* Section 60010(h), must align to the CA NGSS, adopted by the SBE in September 2013 for kindergarten through grade five and resources for grades six through eight must be aligned either to the Integrated Learning Progression Courses for Middle Grades Six through Eight adopted in November 2013 found in chapter 5 of the *CA Science Framework* or, alternatively, the Discipline-Specific Courses for Grades Six through Eight found in chapter 6 of the *CA Science Framework*. Alignment shall be determined by assessing a full year's program, not unit by unit. When developing Discipline-Specific courses, the publisher should consider which disciplinary core ideas, if any, from the other science domains would need to be introduced in specific grade-level courses in order to facilitate students' full understanding of each performance expectation by the end of the year. For this reason, some units of the Discipline-Specific Course model contain

supplemental Disciplinary Core Ideas (DCIs) from other domains.

2. Instructional resources engage students in using text, discourse, and experiential learning to develop mastery of the three integrated dimensions of the CA NGSS: the Science and Engineering Practices (SEPs), Crosscutting Concepts (CCCs), and DCIs.
3. Instructional resources reflect the full content of the *CA Science Framework* allowing teachers to engage students in using each of the SEPs in multiple contexts and to use and apply the CCCs to connect ideas across science topics.
4. Instructional resources progressively build students' abilities to meet all grade-level Performance Expectations (PEs) through a three-dimensional instructional sequence.
5. Teacher resources support instructional opportunities and assessments that engage students in three-dimensional learning.
6. Instructional resources shall use proper grammar and spelling (*EC* Section 60045).
7. Use of primary sources, such as scientific research, case studies, and photographs, are integrated into the three-dimensional learning, as grade-level appropriate.
8. Instructional resources introduce real-world phenomena and systems that students can investigate, model, and explain using the targeted DCIs and CCCs.
9. Instructional resources focus on the application of science to be learned (e.g., medicine, engineering, environmental science) using authentic and meaningful real-world applications and scenarios that are specific to California when appropriate.
10. The science curriculum is enriched with opportunities for students to access informational texts, literature, simulations and other media related to science and engineering and it presents diverse examples of notable scientists and engineers.
11. Resources include examples of people and groups who used their context, learning, and intelligence to make important contributions to society through science and technology from different demographic groups: Native Americans; African Americans; Mexican Americans and other Latino groups; Asian Americans; Pacific Islanders; European Americans; lesbian, gay, bisexual, and transgender Americans; persons with disabilities; women; and members of other ethnic and cultural groups. Resources emphasize the importance of science education to all members of our society in a way that is culturally and socially authentic [*EC* Sections 51051, 60040(b), and 60044(a)].
12. Student assignments make linkages and are consistent with the grade-level appropriate expectations in the California Common Core State Standards for English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects

(CA CCSS for ELA/Literacy), the California English Language Development Standards: Kindergarten through Grade 12 (CA ELD Standards), and California Common Core State Standards: Mathematics (CA CCSSM) and are consistent with the guidance in the *CA Science Framework*.

13. The materials provide support for students to develop grade-level appropriate academic language and discipline-specific vocabulary through their use in context in classroom discourse around science phenomena (science talk), and through well-written and grade-level appropriate text resources.
14. Teacher resources provide guidance to support all students, including English language learners and non-standard English speakers, to develop their science-related language and reading abilities, and to coordinate the multiple elements (text, diagrams, graphs and charts, etc.) that occur in science textual materials.
15. Instructional resources, where appropriate, examine humanity’s place in ecological systems and the necessity for the protection of the environment (*EC* Section 60041). Resources include instructional content based upon the Environmental Principles and Concepts developed by the California Environmental Protection Agency and adopted by the SBE (Public Resources Code Section 71301) in context and aligned to the CA NGSS, as exemplified in Appendix 2.
16. Instructional resources include explanations about human organ and tissue donation, as age and grade-level appropriate, aligned to the relevant standards and related science research (*EC* Section 33542).
17. Instructional resources, as age and grade-level appropriate, discuss trends and research in science, including medical research, neuroscience and neurological diseases (such as Amyotrophic Lateral Sclerosis, or Lou Gehrig’s disease) and inform students about career pathways in science.
18. Instructional resources support students to address the applications of science in the development of technologies and in fields such as agriculture, medicine, engineering, and environmental protection. Resources support students to reflect on the interconnections between science, engineering and technology, and to discuss ethical and regulatory issues that can arise when new science and technology allow new capabilities.
19. Instructional resources engage students in the SEPs. Teacher resources will include discussion of expendable and permanent equipment and materials necessary to conduct activities, guidance on obtaining those materials inexpensively, recycling or

disposing of materials, and explicit instructions for organizing and safely conducting instruction, labs and activities. (Aligned to the *Science Safety Handbook for California Public Schools*, California Department of Education [CDE] 2014).

20. Instructional resources include opportunities for reflection on the nature and history of science and on their science learning as indicated in the *CA Science Framework*.

Category 2: Program Organization

Sequential organization and a coherent instructional design of the science program provide structure for what students should learn each year and allow teachers to facilitate exposure to the content efficiently and effectively, incorporating the three dimensions of the CA NGSS. Instructional resources must have strengths in these areas to be considered for adoption:

1. Sequential organization of the material provides structure concerning what students should learn each year and allows teachers to convey the science content incorporating the three-dimensional learning expressed in the CA NGSS.
2. Instructional resources support teacher questioning strategies as a tool to assess students' knowledge and skills, promote student-to-student discourse, and guide student learning.
3. Instructional resources explicitly state which knowledge and skills learned in prior grades or units are applied and extended to accommodate new knowledge and skills.
4. Teacher resources provide support to engage students in three-dimensional learning and suggest research-based strategies to elicit student thinking and support student discourse.
5. The instructional resources are grade-level specific and provide instructional content for 180 days of instruction for at least one daily class period, including an estimate of the necessary instructional time.
6. The content is well organized and presented in a manner consistent with providing all students an opportunity to achieve the essential knowledge and skills described in the CA NGSS and the *CA Science Framework*.
7. Resources include explanations to teachers regarding how the SEPs, DCIs, and CCCs work together to support students in making sense of phenomena and/or to design solutions to problems and build toward the PEs of the CA NGSS. Teacher resources support understanding of how PEs are developed within units and across units throughout a year.
8. Topics selected for in-depth study are developed through their role in explaining

- selected phenomena, chosen to support students in building the knowledge and abilities needed to achieve proficiency in a bundle of PEs.
9. Resources encourage the meaningful use of technologies such as video clips or computer simulations to investigate phenomena that cannot be directly experienced in the classroom; effective measuring tools (computer linked thermometer or range-finder, digital scales, etc.); and spreadsheets and other software to record, display, and analyze data, etc. In these contexts, the materials support teachers as they introduce students to computational thinking and provide guidance to teachers on how science instruction may be improved by the effective use of library media centers and information literacy skills.
 10. Resources suggest appropriate engineering design tasks in varied contexts as a path to understanding and applying the science ideas being learned. Where appropriate, resources suggest computational tools and software to support the design process and allow students to model or simulate their designed products.
 11. Teacher resources include references to where related supplemental open educational resources may be found.
 12. Ancillary and support resources are an integral part of the instructional program and are clearly aligned with the CA NGSS.
 13. Course descriptions are aligned to a specific progression of courses across each grade band so that students completing the course sequence can meet all grade band CA NGSS PEs. The progression builds ideas in a planned sequence, so that each unit builds progressively on prior learning. The logic of the progression is described and explained in teacher resources.
 14. Suggested student tasks, including end-of-chapter or culminating problems and exercises, are three-dimensional in nature and build in complexity throughout the year and across years.

Category 3: Assessment

The program provides teachers with assistance in using both formative and summative assessment tasks for planning and modifying instruction, and for measuring the effectiveness of instruction through progress monitoring. Instructional resources must have strengths in these areas to be considered suitable for adoption:

1. Assessments in the instructional resources reflect the three-dimensional nature of the CA NGSS and the *CA Science Framework*. Assessment tools measure what students

know and are able to do, as defined by the PEs in the CA NGSS. Assessments stress performance tasks rather than rote memorization.

2. Entry-level assessments for each unit are provided to help teachers elicit students' prior knowledge and preconceptions and gauge their facility for using the SEPs and CCCs. Information is provided to teachers to help them use the results of those assessments to guide instruction and to determine modifications for specific students or groups of students.
3. Teacher materials provide support to engage students in tasks that afford both learning and formative assessment opportunities at the same time and provide guidance to teachers on how to embed formative assessment activities in the broader learning activity.
4. Brief formative assessment tools and practices at key stages in the unit of instruction are designed to elicit current understandings and preconceptions and to provide evidence of students' progress toward mastering the three-dimensional learning called for in the CA NGSS and the *CA Science Framework*. In addition to providing formative assessment tools, instructional materials must also provide teachers with strategies of how to address preconceptions during instruction. These strategies are to be differentiated for different age levels.
5. Assessments should yield information teachers can use in planning and modifying instruction to help all students meet or exceed the standards.
6. Teacher resources supply a differentiated path for diverse students to build toward the PEs of the CA NGSS. In particular, formative assessment tasks are designed to support teachers in collecting and analyzing data about student conceptual understanding.
7. Summative assessments designed to provide valid, reliable and fair measures of students' progress and attainment of three-dimensional learning after a period of instruction (for example at the end of a chapter, unit, or course) should involve multi-component tasks including, but not limited to: hands-on or simulation-based performance tasks, open-ended constructed response problems, and scoring of portfolios of student work collected over the course of instruction. Selected-response items, if used, should require analysis and reasoning to answer them, rather than simply memorized responses.
8. Students' progress toward meeting the three-dimensions of the CA NGSS is assessed through both writing and performance tasks. Student written responses are consistent

with the grade-level writing and mathematics requirements in the *CA CCSS for ELA/Literacy and the CA CCSSM*.

9. Resources include student work expectations and analytical rubrics for scoring performance tasks and, where possible, examples of student work at each scoring level. Resources include an explanation of the use of rubrics by teachers and students to evaluate the progress of students' models, projects, writing, and progression toward understanding.
10. Assessment tools include multiple measures of student performance as addressed in the assessment chapter in the *CA Science Framework*, including, but not limited to, engineering design and lab practical tasks; performance-based tasks; open-ended, short answer and essay responses; lab reports; research projects; computational simulations; and oral presentations.
11. Assessment tools include guidance on measuring students' ability to apply information literacy skills when obtaining and evaluating information about science topics.

Category 4: Access and Equity

The goal of science programs in California is to ensure universal and equitable access to high-quality curriculum and instruction for all students (all standards, all students) so they can meet or exceed the PEs as described in the CA NGSS. To reach the goals of access and equity, instructional resources must provide teachers with the necessary content and pedagogical tools to teach all students the CA NGSS. In particular, the instructional resources provide support for differentiated instruction for students with special needs, including standard English learners, English learners, long-term English learners, students living in poverty, foster youth, girls and young women, advanced learners, gifted learners, students with disabilities and students below grade level in science skills, three-dimensional learning, literacy skills or mathematics skills. Resources should incorporate recognized principles, concepts, and research-based strategies to meet the needs of students and provide equal access to learning, which could include Universal Design for Learning, Response to Intervention and Instruction, and Multi-tiered System of Supports, as outlined in chapter 10 on access and equity, in the *CA Science Framework*. Instructional resources must have strengths in these areas to be considered for adoption:

1. The instructional resources should reflect the goals of access and equity outlined in chapter 10 of the *CA Science Framework*.
2. At every grade level, suggested lessons and teacher resources will include research-based strategies to address the needs of English learners consistent with the CA ELD

Standards.

3. Instructional resources incorporate instructional strategies to address the needs of students with disabilities in lessons, assessments, and teacher resources, as appropriate, at every grade level.
4. Teacher resources supply a differentiated path for all students. In particular, instructional resources should provide guidance to support students with special needs, including standard English learners, English learners, long term English learners, students living in poverty, foster youth, girls and young women, advanced learners, students with disabilities and students below grade level in science skills, three-dimensional learning, literacy skills, or mathematics skills.

Category 5: Instructional Planning and Support

The resources present explicit guidance to help teachers plan instruction. The resources should be designed to help teachers provide instruction that ensures opportunities for all students to learn the essential skills and knowledge specified in the CA NGSS. The resources must have strengths in these areas of instructional planning and teacher support to be considered suitable for adoption:

1. Program resources include a curriculum guide for the academic instructional year for teachers to follow when planning for 180 days of instruction.
2. The teacher resources provide an estimated instructional time for each activity, lesson, chapter, and unit which allows for student engagement in the SEPs and engineering design projects.
3. The teacher resources provide guidance in daily lessons and units of instruction with appropriate opportunities for checking for understanding and adjusting lessons, if necessary, to ensure three-dimensional learning.
4. Program resources address the articulation of three-dimensional learning by identifying the knowledge and skills learned in prior grades and prior grade-level units, and address how to connect and build on these learnings to help students develop increasingly sophisticated ideas.
5. Teacher resources provide background knowledge about the SEPS, DCIs, and CCCs and discuss the desired level of SEPs in which students will engage, including how the three dimensions are integrated into units and lessons.
6. All suggested student tasks, including classroom activities, end-of chapter tasks, suggested out-of-school activities, and assessment tasks are supported with guidance

- for the teacher on how to implement and, where appropriate, grade the task. Assessment keys and rubrics are provided.
7. Teacher and student resources have correlating page numbers in print resources or corresponding references in electronic resources.
 8. Teacher resources include a planning guide describing the relationships between the components of the program and how to use all the components to meet all of the CA NGSS.
 9. Instructional objectives for three-dimensional learning are explicitly stated and clearly identifiable in the teacher resources. Teacher resources include guidance on explaining these objectives to parents.
 10. While learning goals may be explicitly stated in the teacher materials, student resources will provide experiences that clearly build to the development of those learning goals without explicitly stating those goals prior to the instruction. In most cases, prior to instruction, introduce a phenomenon or guiding question or the end result of the lesson series.
 11. Lessons include instructional strategies aligned to the CA NGSS, the *CA Science Framework* and based on current and confirmed research (e.g., teacher facilitated student-led conversations, as well as hands-on activities and laboratories). Resources are clearly connected to and support the goals of the CA CCSSM and CCSS for ELA/Literacy.
 12. Instructional resources should include a list of consumable and non-consumable equipment and materials required for each lesson and address safety issues included in the *Science Safety Handbook for California Public Schools* (CDE 2014).
 13. Terms from the CA NGSS and *CA Science Framework* are used appropriately and accurately in the instructions.
 14. Electronic learning resources, including technology-based assessments, support instruction that is connected explicitly to the CA NGSS, have a well-designed user interface, provide technical support, and include suggestions for appropriate and differentiated use.
 15. The teacher resources provide background information about important events, diverse people, places, ideas, and scientific principles appearing in, but not limited to the CA NGSS and *CA Science Framework*.
 16. Teacher resources discuss and identify preconceptions typical at a grade span (such as inaccurate explanations based on everyday experiences or vernacular conflicts

between the everyday use of a term and the meaning of the term in a scientific context) and provide guidance to help students build more accurate understandings of the scientific concept or process.

17. Suggested homework, if included, extends and reinforces classroom instruction. Homework should also provide opportunities to support student learning through shared experiences with family. Opportunities may include projects, journaling, reflection, or interviews with parents around a concept or activity such as family history used in genetics, decomposition in gardening, or chemistry in cooking.
18. The program should include resources that teachers can use to inform families about the CA NGSS and student progress.
19. Resources provide teachers with instructions on how outside resources (e.g., guest speakers; museum visits; electronic field trips, informal science education providers including state parks, nature parks, science centers, local organizations, school gardens or schoolyard open spaces, local parks, etc.) can be incorporated into a three-dimensional learning, standards-based science program.
20. Using guidance from the Model School Library Standards for California Public Schools, resources provide information for teachers on the effective use of library and media resources that best complement the standards.
21. The teacher resources provide guidance and support for engaging students in collaborative conversations using grade level appropriate academic vocabulary for scientific discourse

Guidance for Selecting Instructional Resources for Grades Nine through Twelve

While the *Criteria for Evaluating Instructional Resources for Kindergarten Through Grade Eight* (above) is intended to guide publishers, it also serves as guidance for selection of instructional resources for students in grades nine through twelve. The five categories in the criteria are an appropriate lens through which to view instructional resources a district or school is considering purchasing. In addition, a tool that could be helpful to local educational agencies considering resources for grades nine through twelve is the evaluation rubric developed through the Educators Evaluating Quality Instructional Products (EQuIP) initiative facilitated by Achieve. This multi-state effort culminated with the publication of the EQuIP Rubric for Lessons & Units: Science, as well as rubrics for evaluating resources for alignment to the Common Core State Standards for Mathematics and ELA/Literacy. The

Educators Evaluating Quality Instructional Products (EQuIP) Rubric for Lessons & Units: Science is available online at <https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link1>.

Instructional resources should include a list of consumable and non-consumable equipment and materials required for each lesson and address safety issues included in the *Science Safety Handbook for California Public Schools* (CDE 2014).

Selecting Quality Instructional Resources and Tools and Equipment for Science

The process of selecting instructional resources at the district or school level usually begins with the appointment of a committee of educators, including teachers and curriculum specialists, who determine what instructional resources are needed, develop evaluation criteria and rubrics for reviewing resources, and establish a review process that involves teachers and content area experts on review committees. After the review committee has developed a list of instructional resources being considered for adoption, the next step is to pilot the instructional resources. An effective piloting process helps determine if the resources provide teachers with the needed resources to implement a CA NGSS-based instructional program. One resource of information on piloting is the SBE Policy document, “Guidelines for Piloting Textbooks and Instructional Resources,” which is available online at <https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link2>.

Selection of instructional resources at the local level is a time-consuming but very important process. Poor instructional resources that are not fully aligned with the CA NGSS and CA CCSS for ELA/Literacy and Mathematics waste precious instructional time. High-quality instructional resources support effective instruction and student learning. As part of the process for selecting instructional resources, *EC* Section 60002 requires the LEA promote substantial teacher involvement, in addition to the involvement of parents and other members of the community, in the selection of instructional resources.

Having selected instructional resources or while developing a curriculum plan, districts and schools will need to ensure that every classroom has access to the necessary equipment and expendable materials and provides the necessary work-space and infrastructure (e.g. access to a sink, or power outlets) to teach the curriculum as designed. A system for maintaining equipment and renewing expendable materials is essential to support effective science teaching. Equipment for science, including needed computers and software, must be sufficient to provide access for the number of students in the classroom. Budgeting for science equipment, materials and renewables must be considered as an element in district plans.

Social Content Review

In addition to the review of instructional resources for educationally appropriate content, all materials used in California classrooms must be reviewed to ensure that instructional resources reflect California's multicultural society, avoid stereotyping, and contribute to a positive learning environment. Instructional resources used in California public schools must comply with the state laws and regulations for social content. Instructional resources must meet *EC* sections 60040-60045 as well as the SBE guidelines in the *Standards for Evaluating Instructional Resources for Social Content (2013 Edition)*, <https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link3>

Instructional resources that are adopted by the SBE meet the social content requirements as they are reviewed concurrently with the SBE-adopted criteria for that specific subject area adoption. The CDE conducts ad hoc social content reviews of a range of instructional resources and maintains an online, searchable list of the resources that meet the social content requirements. The list of approved instructional resources is on the CDE Social Content Review Web page at <https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link4>.

If a school or district is not purchasing state-adopted instructional resources or resources from the list of approved instructional resources maintained by CDE, the LEA must complete its own social content review. Information about the review process can be found on the CDE Social Content Review Web page at <https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link5>

Supplemental Instructional Resources

The SBE traditionally adopts only basic instructional resources programs,¹ but has adopted supplemental instructional resources on occasion. LEAs adopt supplemental resources for local use more frequently. Supplemental instructional resources are defined in California *EC* Section 60010(l). Supplemental instructional resources are generally designed to serve a specific purpose such as providing more complete coverage of a topic or subject, meeting the instructional needs of groups of students, and providing current, relevant technology to support interactive learning. One tool that could be helpful to local educational agencies considering supplemental resources is the evaluation rubric developed through the EQuIP initiative facilitated by Achieve. This multi-state effort culminated with the publication of the EQuIP Rubric for Lessons & Units: Science, as well as rubrics for

1. Programs that are designed for use by students and their teachers as a principal learning resource and that meet in organization and content the basic requirements of a full course of study (generally, one school year in length).

evaluating resources for alignment to the Common Core State Standards for Mathematics and ELA/Literacy. The EQuIP Rubric for Lessons & Units: Science is available online at <https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link6>. All supplemental resources must also meet the social content requirements described above.

Open-source Electronic Resources (OERs)

Open-source Electronic Resources (OERs) are free instructional resources and resources available online for teachers, students, and parents. OERs include a range of offerings, from full courses to quizzes, classroom activities, and games. Students may create OERs to fulfill an assignment. Teachers may work together to develop curriculum, lesson plans, or projects and assignments and make them available for others as an OER. A comprehensive school library program may include information regarding OERs and also professional development, provided by a credentialed teacher librarian, about the effective use of supplemental resources in the classroom. OERs offer the promise of more engaging, relevant instructional content, variety, and up-to-the-minute information. They should, however, be subject to the same type of evaluation as other instructional resources used in the schools and reviewed to determine if they are aligned with the content that students are expected to learn and are at an appropriate level for the intended students. The EQuIP Rubric noted in the Supplemental Instructional Resources section above could be a valuable tool in this evaluation. In addition, OERs need to be reviewed with the Social Content Standards in mind to ensure that students are not inadvertently exposed to name brands, corporate logos, or resources that demean or stereotype. OER Web sites that may provide access to resources supporting instruction and learning of the CA NGSS and for use in the classroom and for professional learning include:

- OER Commons (<https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link7>)
- The Learning Registry (<https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link8>)
- My Digital Chalkboard (<https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link9>)

Accessible Instructional Resources

The CDE Clearinghouse for Specialized Media & Translations (CSMT) provides instructional resources in accessible and meaningful formats to students with disabilities, including students with hearing or vision impairments, severe orthopedic impairments, or other print disabilities. The CSMT produces accessible versions of textbooks, workbooks, literature books, and assessment books. Specialized instructional resources include braille, large print, audio recordings, digital talking books, electronic files, and American Sign Language video-books. The distribution of various specialized media to public schools provides general education curricula to students with disabilities. Information about accessible instructional resources and other instructional resources, including what is available and how to order them, can be found on the CDE CSMT Media Ordering Web page at <https://www.cde.ca.gov/ci/sc/cf/ch13.asp#link10>

References

California Department of Education. 2014. *Science Safety Handbook for California Public Schools, 2014 Edition*. Sacramento: California Department of Education

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