

# Resources

## 2016 Science Framework

**FOR CALIFORNIA PUBLIC SCHOOLS  
Kindergarten Through Grade Twelve**



Adopted by the California State Board of Education  
November 2016

*Published by the California Department of Education  
Sacramento, 2018*

To view the remaining sections of the 2016 California Science Framework on the CDE website, go to:  
<https://www.cde.ca.gov/ci/sc/cf/cascienceframework2016.asp>

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.

## Resources

### Science

**California Academy of Sciences** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link1>)

The California Academy of Sciences Web site provides information, tutorials, and virtual learning modules. The Educator Center offers classroom resources broken down by grade level and content area.

**California Department of Education (CDE) Next Generation Science Standards Systems Implementation Plan** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link2>)

The Next Generation Science Standards (NGSS) Systems Implementation Plan, approved in December 2014, is a guide of possible strategies that can be interwoven to assist in the development of regional and local implementation plans to support updating curriculum and resources to support aligned to the Next Generation Science Standards for California Public Schools, Grades Kindergarten Through Grade Twelve (CA NGSS). In addition to the goals and strategies, the Plan includes Appendix A which is a list of resources that may be useful to support teachers, administrators, support providers, and other partners as they implement the NGSS.

**CDE Science** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link3>)

This Web page is an index to current Science curriculum frameworks and content standards, instructional materials and resources, and a collection of recommended literature for students in kindergarten through grade twelve.

**CDE Science Safety Handbook** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link4>)

This handbook includes information to help make kindergarten through grade twelve science environments safe.

**California Science Center** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link5>)

The California Science Center provides professional learning sessions designed to support the awareness, transition, and implementation of the NGSS into existing curriculum, including sessions on assessment, curriculum support and planning, resources, and strategies to integrate into other content areas. The center includes an innovative model for science learning by combining interactive exhibits with an on-site Science Center School and Amgen Center for Science Learning.

**National Science Digital Library** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link6>)

The National Science Digital Library provides online educational resources for teaching and learning, with emphasis on STEM disciplines. The NSDL collection includes metadata about web-based educational resources held on other sites by their providers.

**California Science Project** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link7>)

The California Science Project is a statewide network that provides professional development, resources, and research to support quality science education.

**California Science Teachers Association** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link8>) The California Science Teachers Association (CSTA) promotes high quality science education. Their Web site provides information on resources for both teachers and parents, as well as professional development opportunities.

**Exploratorium** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link9>)

The Exploratorium is a public learning laboratory in San Francisco. Its Web site offers a variety of science-teaching tools, including a digital library, podcasts, videos, online exhibits, and free apps and activities.

**K–12 Alliance** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link10>)

The K–12 Alliance is a WestEd program that provides professional development for K–12 educators in the areas of science and math.

**KQED QUEST** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link11>)

This Web site features science and engineering resources for educators and students broken down by topic and content area. It also features spotlights on people working in Science, Technology, Engineering, and Mathematics (STEM) careers.

**Lawrence Hall of Science** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link12>)

The Lawrence Hall of Science Web site offers curriculum and professional development to support teachers with NGSS implementation, as well as science apps and activities.

**Library of Congress for Science, Technology, and Business**  
(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link13>)

This Web site offers a collection content available online at the Library of Congress, arranged by broad categories. The Library's online content represents only a small percentage of its physical holdings.

**National Geographic News** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link14>)

The National Geographic News Web site provides a variety of articles on different science related topics.

**National Science Foundation News** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link15>)

This site provides articles covering new discoveries in various fields of science.

**National Science Teachers Association** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link16>) The National Science Teachers Association (NSTA) promotes excellence and innovation in science teaching and learning. They offer a range of online resources and publications for teachers of all grade levels.

**Next Generation Science Standards** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link17>)

The NGSS are K–12 science content standards. The NGSS were developed by states to improve science education for all students. The NGSS are based on the National Research Council's *A Framework for K–12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. This site includes links to the NGSS standards (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link18>), the three dimensions of science learning (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link19>), and tools and resources to support implementation (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link20>). The tools include NGSS Evidence Statements which provide educators with additional detail on what students should know and be able to do (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link21>).

**PubMed** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link22>)

PubMed is a free search engine of references and abstracts on life sciences and biomedical topics.

**Sally Ride Science** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link23>)

Sally Ride Science is a nonprofit providing professional development to help educators build students' STEM literacy.

**Science Daily** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link24>)

Science Daily is an American news Web site for topical science articles.

**SciGirls** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link25>)

SciGirls is a PBS Kids show that encourages tween girls' interest in STEM. Its Web site includes videos, games, and a searchable database of "citizen science" projects.

**Students Science** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link26>)

Students Science offers news and feature stories covering all field of science, technology, engineering, and math.

**Teaching Channel** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link27>)

The Teaching Channel is a video showcase of inspiring and effective teaching practices in schools to improve the outcomes of all students. The video library offers educators a wide range of subjects for grades K–12 and includes information on alignment with the Common Core State Standards (CCSS), NGSS, and ancillary materials for teachers to use in their own classrooms.

## Science – Environmental

**CDE A Blueprint for Environmental Literacy** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link28>) A *Blueprint for Environmental Literacy* is a plan to improve environmental education produced by the California State Superintendent of Public Instruction Tom Torlakson's Statewide Environmental Literacy Task Force.

### **California Coastal Commission** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link29>)

The California Coastal Commission is one of California's designated coastal management agencies. Its Web site offers resources for educators, including classroom activities and a lending library.

### **CalRecycle Education and the Environment Initiative**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link30>)

The California Education and the Environment Initiative (EEI) is a free environment-based curriculum for grades K–12. It supports the Next Generation Science Standards and also teaches select History-Social Science standards.

### **California State Parks** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link31>)

This is a link to a monthly e-newsletter about upcoming projects at local parks and literature about California State Parks.

### **CEEIN** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link32>)

The California Environmental Education Interagency Network (CEEIN) is a state government consortium of environmental educators representing departments, boards, and commissions of the CDE, California Environmental Protection Agency (Cal/EPA), The Resources Agency of California (RA), and the Department of Food and Agriculture (CDFA). CEEIN fosters broad understanding of the State's environmental and cultural resources while affirming that education is essential to the development of understanding and respect for the environment.

### **CREEC Network** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link33>)

The California Regional Environmental Education Community (CREEC) is a communication network that supports environmental literacy by providing teachers with access to environmental education resources. Its Web site features a searchable database of standards-based programs, online resources, and professional development opportunities.

### **Project WET** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link34>)

Project WET develops and delivers water education resources, including curriculum and activity guides.

### **Ten Strands** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link35>)

Ten Strands partners with state government, local education agencies, and providers of environmental education to bring environmental literacy to California's K–12 students through access to instructional materials, professional development opportunities, and outdoor education resources.

## English Learners

### **CDE English Language Development Standards**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link36>)

This Web page links to the California English Language Development (CA ELD) Standards adopted in November 2012 and the standards implementation plan and resources.

**CDE English Learners** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link37>)

This Web page provides a set of links to programs and information to improve the language proficiency of English learners and help them meet content standards adopted by the State Board of Education.

**CDE Integrating the CA ELD Standards into K–12 Mathematics and Science Teaching and Learning** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link38>)

This document is a supplementary resource to augment the California English Language Development (CA ELD) Standards and assist educators in implementing the CA ELD Standards in tandem with the California Common Core State Standards for Mathematics (CA CCSSM) and the CA NGSS.

**Colorín Colorado** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link39>)

A free Web-based service that provides information, activities, and advice for educators and Spanish-speaking families of English language learners.

**Council of Chief State School Officers (CCSSO) – State Collaboratives on Assessment and Student Standards (SCASS) – ELLs** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link40>)

The English language learner (ELL) SCASS constitutes the only national, sustained forum among state education agencies, researchers, and policy experts on issues of standards and assessment for English language learners. The ELL SCASS explores issues of policy implementation, particularly focusing on the connection of the standards and assessment system to state policies that affect instruction, curriculum, professional supports and leadership for ELLs. The ELL SCASS Web page is updated regularly with information about the organization's various foci and activities.

**Understanding Language** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link41>)

An initiative aimed to heighten educator awareness of the critical role that language plays in the CCSS and the NGSS that seeks to improve academic outcomes for English language learners (ELLs) by drawing attention to critical aspects of instructional practice and by advocating for necessary policy supports at the state and local levels. The initiative team, housed at Stanford University, has developed and presented papers, Massive Open Online Courses (MOOCS), and webinars addressing language and literacy issues, and sets of teaching resources that exemplify high-quality instruction for ELLs.

## Literacy in Content Areas

**Academic Language and Literacy** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link42>)

This site is focused on helping educators accelerate and deepen students' learning of academic language, literacy, and content understandings in all classrooms. The site provides information and tools to help teachers, schools, and parents to build language, literacy, thinking, and content in all students.



### **AchievetheCore.Org (Student Achievement Partners)**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link43>)

The achievethecore.org site provides free, high-quality resources compiled by Student Achievement Partners (writers of the CCSS) for educators implementing the CCSS, including professional learning modules, handouts, presentations, sample lessons, and lesson videos on the foundations of English language arts and literacy across subjects.

### **CDE Common Core State Standards Resources**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link44>)

This Web page offers information, links, and FAQs related to the California Common Core State Standards in English Language Arts and Literacy in History/Social Studies, Science, and Technical Subjects and Mathematics. In addition, all County Offices of Education have resources on their Web sites to support the implementation of the standards.

**The California Subject Matter Projects** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link45>) The California Subject Matter Projects (CSMP) professional development programs support teachers' use of standards and literacy strategies to foster achievement among all students, especially English learners and students with low literacy and content area knowledge. CSMP programs provide research-based, classroom-tested, and discipline-specific strategies to support student literacy.

### **Common Core en Español** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link46>)

As part of the State Standards Initiative Translation Project, the Spanish version of the CCSS are housed at the San Diego County Office of Education.

### **Google Scholar** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link47>)

This Web page provides a simple way to broadly search for scholarly literature.

### **Newsela** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link48>)

This Web site Newsela publishes high-interest news articles daily at five levels of complexity for grades 2–12 using Newsela's proprietary, rapid text-leveling process.

## **Access and Equity**

### **Children Now** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link49>)

Children Now is an umbrella organization which advocates for children in the areas of education, health, and overall well-being.

### **CDE Special Education** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link50>)

A Web page with links to information and resources to serve the unique needs of persons with disabilities so that each person will meet or exceed high standards of achievement in academic and nonacademic skills.



**Culturally Responsive Teaching** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link51>)

The Education Alliance, a department at Brown University, promotes educational change to provide all students equitable opportunities to succeed. They advocate for populations whose access to excellent education has been limited or denied and partner with schools, districts, and state departments of education to apply research findings in developing solutions to educational challenges. They focus on district and school improvement, with special attention to underperformance and issues of equity and diversity, and design and deliver expert services around planning, professional learning, and research and evaluation.

**Multi-Tiered System of Supports** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link52>)

A Multi-Tiered System of Supports (MTSS) describes how schools go about providing supports for each child to be successful and the processes and tools teachers use to make decisions. When compared to RtI, MTSS addresses a much broader variety of issues including: the identification of a student with specific learning disabilities under Individuals with Disabilities Education Act (IDEA), an individual student problem solving approach to interventions, and a standard protocol approach to interventions or possibly a school wide approach.

**Universal Design for Learning Center** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link53>)

The National UDL Center supports the effective implementation of Universal Design for Learning (UDL) by connecting stakeholders in the field and providing resources and information on relevant topics. UDL provides a blueprint for creating instructional goals, methods, materials, and assessments that work for everyone--not a single, one-size-fits-all solution but rather flexible approaches that can be customized and adjusted for individual needs.

**Universal Design for Learning Curriculum Toolkit**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link54>)

The Toolkit is an open-source Web application designed to support the creation of interactive, multimedia curricula according to the principles of UDL. The feature set includes a system of supports and scaffolds based explicitly on the UDL Guidelines that can be customized to any curricular context. Teachers can use the application to track students' progress; see and compare their responses, highlighting, and notes; and provide individual or group feedback.

**UCLA Center X** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link55>)

UCLA Center X is dedicated to dramatically changing schooling for underserved students. Center X provides a unique setting where researchers and practitioners collaborate to design and conduct programs that prepare and support K–12 teachers and administrators committed to social justice, instructional excellence, the integration of research and practice, and caring in urban schools. Together, these communities transform public schooling through inquiry and change, by asking questions and solving problems, fueled by passionate resolve and persistent effort.

### Instructional Resources

**American Printing House for the Blind** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link56>) The American Printing House for the Blind provides materials to help students with vision impairments access curriculum and daily living.

**CDE Clearinghouse for Specialized Media and Translations (CSMT)**  
(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link57>)

The CSMT (part of the Curriculum Frameworks and Instructional Resources Division) provides materials and information for students needing access to the core curriculum in various formats (e.g., braille, large print).

**CDE Instructional Materials Ordering and Distribution System (IMODS)**  
(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link58>)

Free instructional materials are provided for students with disabilities through the CDE CSMT in various formats such as Braille, large-print, audio, digital talking books, and electronic files.

**CDE Instructional Materials Price List** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link59>)

The CDE has a searchable list of all state-adopted instructional materials for kindergarten through grade eight. The list is updated with each new adoption of instructional materials, and publishers have the right to submit price increases for existing lists every two years.

**CDE Social Content Review** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link60>)

This Web page includes a searchable CDE database of supplemental instructional materials that have passed a social content review. Although these materials are not considered state-approved or state-adopted, they have met all of the requirements in the *Education Code* for social content.

**California Standards for the Teaching Profession, California Commission on Teacher Credentialing** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link61>)

This Web site provides information about credentialing requirements for California teachers. The 2009 California Standards for the Teaching Profession (CSTP) are posted at <https://www.cde.ca.gov/ci/sc/cf/res.asp#link62>

**Digital Chalkboard** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link63>)

The Digital Chalkboard allows educators to search for and follow colleagues who have had success in teaching specific California content standards or who work with similar types of students. Users share instructional practices through links, video, pictures, or documents, allowing other teachers to replicate similar innovations in their classrooms.

**National Federation of the Blind** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link64>)

The National Federation of the Blind provides information about teaching students who are blind.

**National Instructional Materials Access Center**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link65>)

The National Instructional Materials Access Center provides digital files in multiple formats including braille files and DAISY files which are accessible by students who are blind.

**The Partnership for 21st Century Skills** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link66>)

A national organization that advocates 21st century readiness skills for every student and provides tools and resources incorporating the 4Cs into education (critical thinking and problem solving, communication, collaboration, and creativity and innovation).

## School Libraries

**American Association of School Librarians (AASL)**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link67>)

The AASL provides advocacy resources for librarians and library users. One resource is an annual list of “The Best Web sites for Teaching and Learning” which honors internet sites that provide enhanced learning and curriculum for school librarians and their teacher collaborations. They also produce the “Best Apps for Teaching & Learning” which honors apps of exceptional value to inquiry based teaching and learning. AASL is a division of the American Library Association.

**CDE School Libraries** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link68>)

This CDE Web page provides information on California’s Model School Library Standards, including an alignment document with the CCSS for ELA, improving school libraries in California, and library funding.

## Courses of Study

**CDE Career Technical Education (CTE) Model Curriculum Standards**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link69>)

This Web page provides information about the CTE Model Curriculum Standards, adopted in January 2013, that are designed to prepare students to be both career- and college-ready.

**CDE Elementary School Resources** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link70>)

This Web page includes links to various resources about elementary education in California.

**CDE Gifted and Talented Education (GATE)** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link71>)

This Web page provides information about the purpose of the GATE program, requests for applications and application renewal dates, principal apportionment calculations, Advanced Placement, and International Baccalaureate programs.

**CDE State Minimum Course Requirements** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link72>)

This Web page lists state-level course requirements for high school graduation in California.

### **University of California Curriculum Integration (UCCI)**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link73>)

The UCCI program is dedicated to supporting California high schools as the work to ensure that more students are prepared for success in college and career. The UCCI program focuses on assisting high schools with the development of career technical education courses that also meet UC's criteria for fulfilling the "a-g" subject requirements for admission to UC and the California state universities. This Web page provides links to the UC-approved UCCI courses available for any high school in California to teach.

### **Statewide Accountability**

**Testing and Accountability Web Page** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link74>)

This Web page provides links to information about various elements of the statewide accountability system, including the California Assessment of Student Performance and Progress (CAASPP), the California English Language Development Test (CELDT), the English Language Proficiency Assessments for California (ELPAC), and the Smarter Balanced Assessment System.

**DataQuest** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link75>)

Dataquest is a resource for state, county, district, and school-level reports. It provides information on a variety of topics, including test scores, enrollment figures, and school staffing.

### **Health**

**California Department of Education** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link76>)

This CDE Web page provides information and resources to improve health, school environment, health education, and prevention.

**California Department of Public Health Resources (CDPH)**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link77>)

Health Information pages on the CDPH Web site provides a variety of topics such as diseases and conditions, family health, environmental health, and workplace health and safety. Topics include environmental health and healthy living.

**Centers for Disease Control and Prevention (CDC)**

(<https://www.cde.ca.gov/ci/sc/cf/res.asp#link78>)

The CDC Web pages offer information, resources, data and statistics, and instructional materials in such areas as adolescent health and human immunodeficiency virus/acquired immune deficiency syndrome (HIV/AIDS).

**Healthy Kids Resource Center** (<https://www.cde.ca.gov/ci/sc/cf/res.asp#link79>)

This site is a source of information on many health related topics, including curriculum and supplemental materials used for comprehensive sexual health education and HIV/AIDS presentation education.