



Environmental Literacy for All California Students

A CSTA Position Statement

Introduction

When asked, most California teachers struggle to provide a precise definition of environmental literacy in the same way that teachers may struggle with precisely defining Science, Technology, Engineering, and Math (STEM) education. It helps to consider environmental literacy as an educational outcome, the product of carefully constructed environmental education experiences and pathways whose ultimate goal is to support the development of 21st-century skills. Environmental issues are especially motivating for students and are often authentically complex, demanding interdisciplinary thinking and the first-hand experience of doing science. These are particularly useful characteristics when organizing ambitious three-dimensional California Next Generation Science Standards (CA NGSS) teaching and learning. Once you have witnessed young learners testifying to environmental decision makers, restoring wetlands, or persisting for months on difficult chemistry questions, it becomes clear that every California child deserves deep experiences with environmental science. Environmental learning has the capacity to close achievement gaps, enhance traditional academic learning, and ease time pressures on classroom teachers (G. Lieberman) (Yager) (Lieberman and Hoody).

Position Statement

CSTA believes that achieving environmental literacy for all students in California is a high priority, deserving a central role in curriculum, instruction, and assessment. The CA NGSS support this position with significant environmental and Earth science topics across all grade bands. Environmental literacy is prominent in the [2016 Science Framework for California Public Schools](#) (*Science Framework*) where investigating natural systems permeate example instructional vignettes and sequences. The phenomena-based instructional design as described in the *Science Framework* makes environmental literacy a logical partner. The *Science Framework* further identifies California's Environmental Principles and Concepts, adopted by the State Board of Education in 2004, as "an important piece of the curricular expectations for all California Students" (California Department of Education p. 14). CSTA supports educators in the creation of environmental learning pathways, weaving formal and informal learning experiences together in meaningful ways that will bring environmental learning to every child in California.



A Succinct Definition of Environmental Literacy

Environmental literacy is an understanding of how natural environments influence individual organisms, including humans, and how organisms, especially humans, in turn, influence the planet's natural systems.

Background

Being literate, in the broadest sense, means to have knowledge or competence to act in the targeted field, whether writing, quantifying, or investigating 21st-century environmental issues (Roadmap). CSTA believes that environmental literacy is the outcome of an intentional learning program coupled with the direct experience of making sense of environmental issues. Students are able to explore and gain an understanding of the [Earth and Human Activity Disciplinary Core Ideas](#) (California Department of Education p. 49) within the CA NGSS by using the Science and Engineering Practices and refining thinking with the Crosscutting Concepts. Other vital perspectives on environmental literacy have been offered by the [North American Association of Environmental Education](#) and the [California Environmental Literacy Initiative](#) (CAELI). CSTA shares with these organizations a goal of ensuring that every child gains access to high-quality environmental learning pathways.

CSTA believes teaching with an emphasis on local environmental issues enables students and their communities to be “sustainable,” providing students the necessary tools to be conscious consumers, informed members of society, and knowledgeable advocates for natural resources and systems. This learning can be empowering and particularly relevant to students personally experiencing the environmental injustice of air, water, and soil pollution.

CSTA believes that an environmentally literate person:

- Habitually recognizes and acts on the knowledge of how natural and human systems are woven together to produce ecosystem services upon which humans and the natural environment are both dependent.
- Makes decisions informed by environmental science (including traditional ecological knowledge from diverse cultures) and habitually acts to sustain the natural environment for future generations.
- Recognizes that access to high-quality, culturally relevant environmental learning opportunities for every student is a social justice issue and that barriers to environmental learning must be removed via thoughtful collective action and integration into the TK-16 educational system.



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- Understands and is motivated to act using the ideals, principles, and practices of civic engagement to participate in resolving issues.
- Understands that what people do as individuals and groups can make a difference.

Implications for Classroom Instruction

Teachers are frequently asked to shoulder another task, burden, or program, often with distracting consequences for their ability to provide high-quality learning experiences. The truth is that environmental learning is not just one more thing; it is a pathway to providing integrative three-dimensional learning that will when done thoughtfully, have the potential to actually ease time demands on teachers. The 2016 California Science Framework describes three essential elements of *CA NGSS* instruction, including that instruction should be: “*relevant to local communities and student interests. Content and practices build on students’ existing experience to learn about and solve real-world societal and environmental problems*” (p.8).

Transitioning to the use of environmental issues as a context for learning increases interest in STEM by traditionally underrepresented students, supporting the idea that environmental learning is an equity strategy.

Strong support for using the environment as a context for learning may be seen in the three instructional strategies endorsed by Chapter 11 of the 2016 California Science Framework. Each strategy is linked to environmental issues explicitly by the authors of the framework, reflecting their intention to ensure that every child has access to environmental learning:

- **Problem Based Learning:** The example utilizes a critical environmental issue as an anchor phenomenon. “In PBL, the problem is introduced at the beginning as the motivation for an entire unit. For example, a high school unit might begin by introducing the problems caused by climate change. During the unit, students will develop solutions that minimize the release of carbon dioxide into the atmosphere from burning fossil fuel. Along the way, they will develop scientific concepts of energy (physics), natural resources (Earth and space science), and fuel (chemistry) to support their development of engineering solutions (which might include energy conservation techniques and alternative energy sources)” (p. 1454).
- **The BSCS 5E Instructional Model:** Environmental issues permeate the framework as may be seen in the vignettes, especially with respect to the phenomena used to launch the 5E instructional sequences. From the framework: “Many of the phenomena selected illustrate California’s



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Environmental Principles and Concepts (EP&Cs), which are an essential part of the CA NGSS" (p.777).

- Outdoor Learning: "Outdoor and environmental learning experiences are powerful tools for implementing key instructional shifts required by the CA NGSS. There is wide-ranging evidence to support the value of using natural environments, local communities, and other outdoor settings as a real-world context for science learning that engages student interest as they investigate places around them (Lieberman and Hoody 1998; Lieberman 2013; American Institutes for Research 2005; Lozar 2000). Students should have rich opportunities to observe and investigate the multitude of natural and human social systems found throughout California" (p.1455).

Environmental issues lend themselves to cross-disciplinary integrative learning and science teachers are central to the effort to bring environmental literacy to every California child. California's Department of Education (CDE) considers environmental literacy the "bridge across subject areas" that will allow the "pedagogical convergence" of Mathematics, English Language Arts, Next Generation Science Standards, History-Social Science, Health and Career Technical Education to produce the 21st-century skills so sought after by employers (Glen Price Group).

At the heart of this broader integrative effort is three-dimensional science learning (NGSS) that emerges from the facilitation of rich environmental learning experiences. These are not two distinct efforts; instead, CSTA joins the Association for Supervision and Curriculum Development (ASCD) in believing that K-12 "schools should provide environmental education." Such rich learning opportunities empower students to investigate and explain phenomena in their world, strengthening both environmental and scientific literacy of these youth who are the parents, community members, and leaders of tomorrow.

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