Environmental Instruction Catalyzes Standards-Based Science Teaching
How Environmental Literacy Aids Implementation of the NGSS

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) in grades K–8. These NGSS 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. The S. D. Bechtel, Jr. Foundation commissions WestEd’s STEM Evaluation Unit independently of the K–12 Alliance to evaluate the Initiative in the eight public school districts. This document summarizes the content and findings of the ninth evaluation report in the Initiative series, published in September 2019. Access the complete series and learn more at K12alliance.org.

Incorporating Environmental Literacy into Science Instruction

Environmental literacy can be a catalyst for Next Generation Science Standards (NGSS) teaching, and this report describes how the California K–8 NGSS Early Implementers Initiative has provided professional learning about environmental literacy to prompt and support this synergy. Intended for school and district administrators, leaders of science professional learning, and state policymakers, this report also outlines how the California Science Framework and the Human Impacts standards of the NGSS clearly call for such synergy. It draws on surveys, interviews, and observations of environmental literacy–focused lessons.

The report describes how Initiative teachers are addressing environmental literacy in science, in four ways:

- Addressing environmental literacy during lesson studies (known in the Initiative as Teaching Learning Collaboratives) for planning and teaching NGSS lessons
- Incorporating environmental literacy instruction outside of the classroom
- Partnering with local organizations to support environmental literacy
- Encouraging environmental literacy in their schools and districts

To help readers better understand the evaluation’s findings, the report shares quotes from the Initiative’s participants, including the following example illustrating how one teacher is incorporating environmental literacy into science instruction in the ways listed above.

We discovered that we didn’t have a recycling program. So, we created a program for the entire school. The students were so proud of themselves. They wrote to the PTA asking for $1,000 for recycling bins. We brought in the custodians to get their seal of approval and did public service announcements for the school that described the human impact on the local community without recycling. (Kindergarten teacher)

The report includes two vignettes: one of middle school teachers using an environmental scenario as the phenomenon for NGSS instruction during a Teaching Learning Collaborative, and the other of a science educator and third grade students getting outside of the classroom to explore the local natural environment during a field trip.
Effects of the Initiative’s Professional Learning About Environmental Literacy

Initiative leaders have taken steps to encourage teachers to incorporate environmental literacy into their science instruction by frequently pointing out and illustrating that environmental scenarios can serve as particularly effective phenomena and by modeling how to build instruction around environmental phenomena. Summer Institutes and Teaching Learning Collaboratives sometimes included this synergy of environmental literacy and science.

The Initiative’s participants first needed to understand environmental literacy before they could substantially integrate it into their science instruction. Annual surveys of participants in both 2017–18 and 2018–19 indicated that the majority of the Initiative’s most highly involved participants reported that they understood how to address environmental literacy in a science unit at least “fairly well.” In addition, many of the Initiative’s Core Administrators (nearly half) “thoroughly” understood how to address environmental literacy.

When asked in the spring 2019 survey how often they addressed environmental literacy in their classrooms during the 2018–19 school year, there were substantial differences among teachers based on their role in the Initiative. For teachers who were the most central to the Initiative, for example, 29 percent of Core Teacher Leaders responded that they addressed environmental literacy “weekly” or “2–5 times per week” compared to 13 percent of Teacher Leaders and only 9 percent of expansion teachers (i.e., teachers not substantially involved in the Institute’s professional learning).

Challenges to Incorporating Environmental Literacy in Science Instruction

There are two challenges related to incorporating environmental literacy into science instruction. First, there is a perception that environmental literacy is readily integrated with life or earth science, but less so with physical science. For example, a grade K–5 teacher remarked, “I don’t think of environmental ed as integrated into anything other than the earth and life sciences.”

Second, it can be difficult to reconcile school calendars and schedules with the timing of environmental phenomena occurring around us.

Recommendations for Administrators

The report lists brief recommendations for administrators supporting the implementation of environmental literacy:

- Acknowledge that environmental literacy is new to many teachers. In order to teach about it, teachers first need professional learning experiences to gain familiarity with environmental literacy.
- Present environmental literacy as a key connection to the NGSS. How environmental literacy can catalyze NGSS implementation needs to be showcased explicitly.
- Encourage teachers to seek out professional learning opportunities outside of their school or district and take advantage of other opportunities available regionally in which experts are leading this charge.
- Support the incorporation of environmental literacy into the NGSS by making it a priority throughout the school and district. In addition to teachers, administrators themselves need to gain an understanding of the shifts required, empowering them to prompt, lead, and support their school site and district in implementing these changes.

Appendices

The report contains evaluation interview questions, an additional vignette of an outdoor-themed Summer Institute, and a complete list of the Environmental Principles and Concepts.