

NGSS in the Classroom: What Early Implementer Science Instruction Looks Like

EXECUTIVE SUMMARY

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 participating public school districts. This document summarizes the content and findings of the 13th evaluation report in the Initiative series, published in September 2020. Access the complete series and learn more at [K12alliance.org](https://www.k12alliance.org).

This 13th report in WestEd’s evaluation of the K–8 Early Implementers Initiative for the Next Generation Science Standards (NGSS) provides an extensive response to the following question: What does NGSS teaching look like in the classroom? The report also briefly describes specific ways that teachers have advanced in their NGSS teaching over the years of the Initiative and how the Initiative prepared them for such teaching.

The report draws most strongly from more than 50 classroom observations of, and interviews with, 24 teachers across six districts. It is also informed by multiple interviews with each district Project Director as well as results of an annual survey with high response rates from more than 500 K–8 science teachers.

NGSS in Action

The report examines how teachers regularly teach the NGSS core content in ways that address the following key features of NGSS teaching:

- **Equity:** Engaging all students
- **3D learning:** Blending all three dimensions of the NGSS (i.e., disciplinary core ideas, science and engineering practices, and crosscutting concepts)
- **Engineering and science phenomena:** Using real-world scientific phenomena and/or engineering problems to launch and drive instructional lessons and units
- **Student agency:** Having students do investigations in ways that give them the responsibility and opportunity for learning

The report first discusses Initiative teachers' experiences with instructional practices that promote equity and access. Then, through six vignettes of lessons observed by the evaluators, the report illustrates how teachers at both the elementary and middle grades addressed the three other NGSS features listed above. Each vignette is followed by commentary explaining how key features of the NGSS were incorporated into the lesson. We have tried to describe NGSS teaching in enough detail to help administrators and policymakers recognize when they are seeing NGSS-based instruction and when they aren't.

The first two vignettes of a couple of grade 8 science teachers in the same school both include student investigation of how light bends (refracts) when traveling through water. However, one teacher's instruction addresses NGSS features, such as using a real-world phenomenon to engage students (solving challenges in studying sharks), while the other uses more traditional science

instructional methods. Evidence of NGSS features in the two lessons are contrasted in detail.

The next four vignettes were selected to showcase each of the four noted NGSS features: 3D learning, phenomena-based instruction, engineering, and student agency.

Advances in NGSS Over Time

Survey and interview data indicated that sustained, multiyear professional learning was both needed and productive. That is, Initiative teacher leaders grew in their implementation of NGSS teaching over time as they participated in formal professional learning each year.

How the Initiative Prepared Teachers for NGSS Teaching

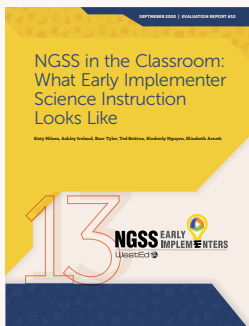
This section briefly describes the professional learning and support provided to teachers by the Initiative and then focuses on the evaluation's final spring 2020 survey in which teacher leaders were asked which specific activities and project participants had the most impact on their science instruction.

Teacher leaders noted that other teacher leaders in the Initiative, the district Project Director, and school administrators had notable impacts on empowering their NGSS teaching. They also noted that the following activities impacted their NGSS teaching: participating in professional learning communities, engaging in independent research/learning, and interacting informally with other teachers outside the Initiative (beyond the formal professional learning opportunities).

Recommendations for How Administrators Can Support NGSS Teaching

The report concludes with the following recommendations for how administrators can support teachers in implementing NGSS teaching:

- Understand that teachers need extensive professional learning about NGSS instruction.
- Know that the classroom may seem “messy” or “chaotic” during NGSS instruction.
- Keep in mind that NGSS instruction takes ample classroom time.
- Realize that you may not see all three dimensions of the NGSS in a single class period.
- Support and encourage teachers to incorporate engineering in their NGSS instruction.
- Provide teachers with professional learning on how to incorporate student agency and equity in their NGSS teaching.



Read the full report, access other evaluation reports and resources, and learn from NGSS Early Implementers at [K12alliance.org](https://www.k12alliance.org).