

EXECUTIVE SUMMARY

Engaged and Learning Science

How Students Benefit from Next Generation Science Standards Teaching



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 Next Generation Science Standards 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 sixth evaluation report in the Initiative series, published in November 2018. Access the complete series and learn more at K12alliance.org.

New Engagement, New Impacts

Because the NGSS differ from past standards in substantive ways, NGSS instruction impacts students in substantive ways. In a dramatic departure from instruction that focuses predominantly on scientific information and facts, the NGSS move beyond textbooks to emphasize hands-on inquiry focused on real-world phenomena. The NGSS also promote deeper learning by engaging students in activities that scientists routinely do, including asking questions and defining problems, and planning and carrying out investigations. Notably, students, rather than teachers, are the primary actors in the NGSS science classroom.

This evaluation report describes the benefits that students are getting from their districts’ participation in the California K–8 NGSS Early Implementers Initiative. The findings are drawn from surveys of administrators, teachers, and students; interviews with select administrators and teachers; and classroom observations of 22 case study teachers. The report also presents an extended vignette of a grade 4 lesson to illustrate the student experiences and benefits that occur in NGSS instruction.

Findings

The report findings indicate that students are:

- › More excited about and engaged in science.
- › Experiencing more inclusive participation.
- › Showing evidence of higher-level learning.

These benefits extend across a diverse range of students, including those who are traditionally underserved, such as special education students, English learners, and those who are generally low-performing or less engaged.

During classroom observations, evaluators often directly observed high levels of student engagement and learning. Further, in surveys, strong majorities of the over 1,200 responding students taught collectively by over 40 instructors reported that:

- › Their teachers indeed were providing teaching that is informed by and aligned with the NGSS.
- › They had become “good at” carrying out most aspects of NGSS learning.

Data in this report were collected from the hundreds of Initiative Teacher Leaders (and their students) who have participated in substantial amounts of the Initiative's professional learning. Administrator data was obtained from principals of schools with one or more of these Teacher Leaders. Results could vary for other district teachers or administrators who have received less support and professional learning.

Student Benefits

In surveys, almost all teachers and administrators (99 and 95 percent, respectively) reported a positive change in the general quality of students' science learning. Additionally, over 90 percent of both teachers and principals also indicated that NGSS instruction is having a positive effect on the learning of traditionally low-performing students.

The report provides dozens of quotes to help readers understand the evaluation's findings and hear them from the vantage point of the Initiative's participants. Following are sample quotations that illustrate three areas of student benefits discussed in the report: (1) stronger engagement, (2) more inclusive engagement, and (3) higher-level learning.

I think it's just a whole different feeling for the kids now. Because of the way the class is set up, and the way it revolves a round phenomena. . . . I've talked to a lot of kids and they really like science now. (Middle school principal)

Parents will tell me, "Oh my gosh, my kid won't stop talking about this thing. What in the world are you guys doing in class!?" (Grade 5 teacher)

My school has the lowest socioeconomic status of the district. Our students crave hands-on, engaging activities. They don't tend to be kids with much prior knowledge and life experience with scientific phenomena. So, [NGSS activities] are important for them to be successful. (Elementary school principal)

I'd say [NGSS teaching] is positive for all, but we're reaching students that we might have not reached — giving them self-confidence and getting their interest and tying it in to their experiences. Special ed kids were very engaged. (Grade 8 teacher)

. . . More depth, more richness. They're getting science skills, not just facts. They're more engaged in content and models and putting it all together. . . . They're thinking about their thinking. Class discussions are better. (Grade 4 teacher)

Students' Views

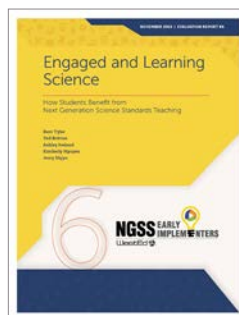
The report also discusses the results of whole class surveys administered to students in the K–2, 3–5, and 6–8 grade bands.

- Overall, a substantial majority of students reported frequently doing all of the 12 NGSS-aligned activities that they were asked about in the student survey.
- Additionally, at least half and as many as two-thirds of students reported that they were "good" or "very good" at each NGSS-aligned activity they were asked about.
- Even beginning in grades K–2, students had positive views about science. Students also reported speaking about their classroom science with parents and friends.

These results suggest that not only are the Initiative's Teacher Leaders providing NGSS learning activities, they are fostering student confidence and promoting stronger interest in science.

Recommendations for Administrator Support

The report concludes with 10 aspects of science teaching that administrators can promote and support among their teachers to enhance student engagement and learning. This concluding section also offers a few recommendations for administrators to develop the NGSS knowledge and expertise needed to provide such teacher support, including understanding the substantial instructional shifts required by NGSS, giving teachers freedom to fail as they try out these instructional shifts, and making time for teachers to collaborate on planning and teaching NGSS lessons.



Read the full report, access other evaluation reports and resources, and learn from NGSS Early Implementers at K12alliance.org.