

Middle School Information and Resource Guide



The formative years of middle school are vital for fostering a new generation of scientists and engineers as well as for academically preparing middle school students with the skills to be successful in high school, college, careers and citizenship. A rigorous and challenging middle school science education is particularly important because teachers will work to prepare their students for a Science, Technology, Engineering, and Mathematics (STEM) job market that is growing three-times the rate of non-STEM jobs (Langdon et al., 2011). The Next Generation Science Standards (NGSS), California's new science standards, require students to apply skills learned in a real-world context in order to understand their application to future careers. Through NGSS, students are exposed to the diverse and exciting STEM careers that exist in their future.

What is NGSS?

The NGSS reflects the vision for all students to learn science in a relevant and meaningful way by integrating 3-dimensions. The 3-dimensions of NGSS support teachers in the design and utilization of curriculum that will engage students in learning by focusing on science and engineering practices, crosscutting concepts, and disciplinary core ideas of science that transforms instruction and improves science education to prepare students for college and future careers.

"All (NGSS) Standards, All Students" promises that all students will be engaged in rigorous K-12 science education.

A Framework for K-12 Science Education

What are the 3-dimensions of NGSS?

- **Science and Engineering Practices** for middle school students are the application of principles, skills, and tools that scientists and engineers use in the real-World.
- **Crosscutting Concepts** are the connections between the different disciplines that communicate science and engineering.
- **Disciplinary Core Ideas** focus on developing the depth of science content knowledge in a coherent and thoughtful way using scientific and engineering practices as the vehicle for strengthening the mastery of science learning over time.

Why do we need new standards?

Middle school students are facing a changing economy that necessitates the application of STEM skills. STEM jobs require critical thinking, strong communication skills, ability to work with people and collaborate, and creativity to solve real-world problems. NGSS uses performance expectations to reflect the integration of the 3-dimensions in order for students to demonstrate how much they understand and can apply science and engineering. Instructional shifts by teachers prepare students to be successful in achieving these NGSS performance expectations and will open the door for all learners — fulfilling the promise of a more diverse STEM workforce.

What does a middle school NGSS classroom look like?

Students will experience science through inquiry, development of models, creation of solutions to problems, and collection of authentic data. These experiences are the applications of the scientific and engineering practices that students will build upon during high school and in future STEM-related fields. Students will apply and communicate crosscutting concepts throughout middle school by supporting scientific claims with evidence and by engaging in scientific discourse. The application of the practices and crosscutting concepts will be taught in an integrated or domain-specific model. Local districts and schools will select one of the pathway models that best meet the needs of the students. Regardless of the pathway implemented, the integrated and domain-specific models achieve a deeper understanding of science for students.



When will NGSS be fully implemented and assessed?

The California State Board of Education adopted NGSS in September 2013 and they are now the new science standards for the state. There is a 3-phase rollout planned to implement the NGSS. Schools will begin with the "Awareness Phase" of implementation to develop teachers' understanding of the instructional shifts and changes in standards. In the "Transition Phase" of NGSS implementation, schools and districts will determine which additional resources and professional learning opportunities are needed to support movement into the "Implementation Phase." In this final phase, teachers will strategically integrate the 3-dimensions and fully align their curriculum, instruction, and assessments as a result of continuous support and on-going professional learning. In the future, schools and districts will administer new science assessments that reflect the performance expectations of NGSS.

NGSS prepares a new generation of scientists and engineers from diverse backgrounds for a STEM economy.



Implementation Plan Guidelines

Awareness Phase	Transition Phase	Implementation Phase
<ul style="list-style-type: none"> • Introduction of NGSS • Initial planning of systems implementation • Establishment of collaboration 	<ul style="list-style-type: none"> • Building foundational resources • Implementing needs assessments • Establishing new professional learning opportunities • Expanding collaboration between all stakeholders 	<ul style="list-style-type: none"> • Expanding new professional learning support • Fully aligning curriculum, instruction, and assessments • Effectively integrating all elements across the field

How can I support student success and facilitate NGSS implementation?

- Participate in meetings that seek input to prioritize the district and school's Local Control and Accountability Plan (LCAP). LCAP is the document that will support the successful implementation of NGSS at the local level.
- Be an advocate for NGSS by attending school and community STEM events.
- Form a strong partnership with districts, schools, and teachers by volunteering to be a speaker and provide resources for implementing the scientific and engineering practices.
- Share NGSS information and resources with stakeholders to increase awareness by attending public and community meetings.

Web Resources

- California Department of Education Professional Learning Resources: <http://www.cde.ca.gov/>
- Next Generation Science Standards: For States, By States: <http://www.nextgenscience.org/>
- California Science Teachers Association Resources: <http://www.cascience.org/>
- National Science Teachers Association Resources: <http://www.nsta.org/>
- Achieve: <http://www.achieve.org/>