

Information about the California NGSS for Parents and Guardians of 7th Graders

What are the Next Generation Science Standards?

The Next Generation Science Standards (NGSS) are a new set of science standards for kindergarten through high school. The NGSS were designed with the idea that students should have a science education that they can use in their lives. It should empower students to be able to make sense of the world around them. And it should give students the critical thinking, problem solving, and data analysis and interpretation skills they can use in any career, and that will help them make decisions that affect themselves, their families, and their communities. California and many other states have adopted the NGSS or very similar standards.

In order to accomplish this, the NGSS call for science learning in which students do not just memorize a set of science facts, but rather engage in figuring out how and why things happen. Core ideas in life science, Earth science, physical science, and engineering, are intentionally arranged from kindergarten through 12th grade so that students can build their understanding over time, and can see the connections between different ideas and across disciplines. To figure out these core ideas, while building the skills that will help them make sense of the world around them, students engage in the same practices that real scientists and engineers do. For example, students will develop and use models, analyze data, and make evidence-based arguments. They also learn to make sense of core ideas using crosscutting concepts that are useful ways of thinking about and making connections across different areas of science and engineering, for example thinking in terms of systems or cause and effect. The NGSS website provides additional information and resources for families.

The NGSS calls for these three dimensions—core ideas, practices, and crosscutting concepts—to work together in science classes. For example, students could develop and use models (a science practice) that show stability and change (a crosscutting concept) in populations of animals as affected by resource availability in an ecosystem (a core science idea). Each Amplify Science unit has students engage as scientists or engineers in making explanations or designing solutions as they figure out a real-world problem. Students will use the three dimensions of the NGSS together as they build their understanding of the concepts and skills they can use in their lives.

Three-dimensional learning in the Amplify Science Middle School 7th Grade Course

The Amplify Science Grade 7 Life Science Course includes nine units that support students in meeting the NGSS. The following unit summaries demonstrate how students engage in three-dimensional learning to solve real world questions and problems.

Microbiome: Students investigate the human microbiome at multiple scales—from molecules to bacteria to the human body. They construct scientific arguments about how a surprising treatment—fecal transplants—can cause a patient infected with harmful bacteria to recover.

Metabolism: Students diagnose a patient by figuring out how body systems work together to provide molecules to the body's cells. They obtain information from articles, system models, videos, and hands-on investigations about macroscale and microscale body processes.

Metabolism Engineering Internship: Students analyze data from tests to design a nutrition bar that meets the metabolic needs of rescue workers and patients in disaster areas. They consider how molecules in ingredients affect people at cellular and whole-body scales.

Populations and Resources: Students figure out why a population of jellies in an ecosystem is increasing dramatically. They plan and conduct investigations to figure out how stability and change in populations of animals is affected by resource availability.

Matter and Energy in Ecosystems: Students construct explanations for why a fictional biodome ecosystem collapsed. They figure out cause-and-effect relationships in ecosystems related to the cycling of carbon atoms during photosynthesis and cellular respiration.

Traits and Reproduction: Students write arguments about why the silk of closely related spiders can vary. From models and articles, they gather evidence about traits, the structure and function of protein molecules, gene combinations, and inheritance.

Natural Selection: Students investigate what caused a population of newts to become so poisonous. They use mathematical thinking to make sense of patterns in data showing how traits of populations are changed by natural selection.

Natural Selection Engineering Internship: Students use a digital model to test designs for a malaria treatment plan. They use their understanding of natural selection and patterns in populations to treat malaria while minimizing drug resistance, negative side effects, and cost.

Evolutionary History: Students create arguments based on evidence about which living animals a mystery fossil is most closely related to. They figure out how evolution results in some body structures staying stable and others changing over millions of years.