Information About the NGSS for Parents and Guardians of Fifth 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. Many 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 twelfth grade so that students can build their understanding over time, and see the connections between different ideas and across disciplines. To figure out these core ideas, students engage in the same practices that real scientists and engineers do. For example, students develop and use models, analyze data, and make evidence-based arguments. They also learn to make sense of core ideas using crosscutting concepts, such as systems or cause and effect, which are useful ways of thinking about and making connections across different areas of science and engineering. The NGSS website provides additional information and resources for families.

The NGSS call for these three dimensions—core ideas, practices, and crosscutting concepts—to work together in science classes. For example, students could plan and conduct investigations (a science practice) to identify changing patterns (a crosscutting concept) in the stars seen in the sky as Earth rotates and orbits around the sun (a core science idea). In each Amplify Science unit, students figure out a real-world problem by assuming the role of a scientist or engineer. Students engage in the three dimensions of the NGSS as they build their understanding of concepts and skills, which they can use in their lives.
Three-Dimensional Learning in the Amplify Science Fifth-Grade Course

The Amplify Science Grade 5 Course includes four units that support students in meeting the NGSS. The following unit summaries demonstrate how students engage in three-dimensional learning to answer and solve real-world questions and problems.

Patterns of Earth and Sky: Analyzing Stars on Ancient Artifacts. Students take on the role of astronomers, helping a team of archaeologists explain the illustrations on a recently discovered, thousand-year-old artifact with a missing piece. Students use mathematical thinking to make sense of patterns in the sky, which they figure out by using physical and digital models and obtaining information from science books. They plan and conduct investigations to figure out how the spin and orbit of our planet are the cause of the daily and yearly patterns of stars we see in the sky.

Modeling Matter: The Chemistry of Food. In the role of food scientists, students work to identify a potentially hazardous food dye in a food coloring mixture, then to create a good-tasting and visually appealing salad dressing. They engage in hands-on investigations and use physical and digital models to gather evidence about mixtures at the observable scale and at the scale of molecules. They develop visual models and write explanations about mixtures, including whether they are likely to change or remain stable.

The Earth System: Investigating Water Shortages. In the role of water resource engineers, students ask questions and investigate what makes East Ferris, a city on one side of the fictional Ferris Island, prone to water shortages while a city on the other side is not. Students develop and use system models that help them figure out how water cycles through parts of the Earth system at the nanoscale and at the observable scale. They apply their understanding of condensation and evaporation to design freshwater collection systems as a possible solution for East Ferris’ water shortage problem.

Ecosystem Restoration: Matter and Energy in a Rain Forest. Students take on the role of ecologists to figure out why a reforested section of the Costa Rican rain forest ecosystem is failing—the jaguars, sloths, and cecropia trees in the area are not growing and thriving. Students use a digital model and terrariums as models to figure out the ways that animals and plants in an ecosystem get the matter and energy they need to grow. They analyze data about the ecosystem, and use evidence to make scientific arguments about what is causing the problem and to design restoration plans to address it.