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 analyze data (a science practice) to identify patterns (a crosscutting concept) in traits among parents and offspring (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 Third-Grade Course

The Amplify Science Grade 3 Science Course includes four 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.

**Balancing Forces: Investigating Floating Trains.** Scientists and engineers have figured out a way to build a train that actually floats on air as it goes cruising down the track at high speeds. Students work to explain how this train works in order to reassure residents of a town that the train is safe. Students figure out ideas about magnetic force, gravity, and how forces can cause an object’s movement to change or stay stable. They communicate their ideas by making digital and physical models and by writing explanations.

**Inheritance and Traits: Variation in Wolves.** Students assume the role of wildlife biologists solving the mystery of how one wolf got some traits that are similar to and some that are quite different from those of the rest of its pack. Students conduct investigations and analyze data in order to figure out patterns in traits between parents and offspring. They ask questions and obtain information as they read science texts about traits, relatedness, inheritance, and the influence of the environment on traits.

**Environments and Survival: Snails, Robots, and Biomimicry.** Students play the role of biomimicry engineers studying a population of snails. They analyze data to figure out why some organisms are more likely to survive in their environment. They think about the systems made of organisms and the environment in which the organisms live to understand how the environment affects organisms’ likelihood of survival. Students apply what they learn about the structure and function of animals’ body parts to plan, make, and test designs that solve problems, such as a robot that can remove and grind up invasive plants.

**Weather and Climate: Establishing an Orangutan Reserve.** In the role of meteorologists, students investigate weather and climate patterns in order to make scientific arguments about where to establish an orangutan reserve. They use mathematical thinking to find patterns in weather data, and consider scale, proportion, and quantity as they learn to make reliable measurements of weather. They also define and work to solve an engineering problem related to natural hazards.