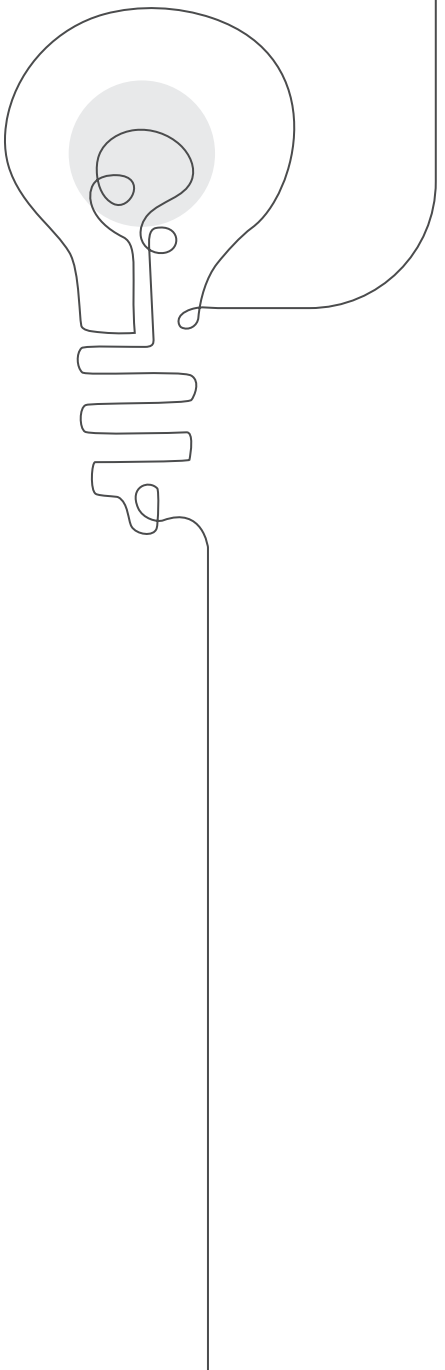
Amplify Science



K–5 unit alignment

Next Generation Science Standards

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Kindergarten

Amplify Science unit name and summary	NGSS performance expectations addressed
Pushes and Pulls **Designing a Pinball Machine** Students play the roles of pinball machine engineers as they explore the effects of pushes and pulls on the motion of an object. They conduct tests in their own prototypes (models) of a pinball machine, contributing to the design of a class pinball machine.	K-PS2-1: Motion and Stability: Forces and Interactions K-PS2-2: Motion and Stability: Forces and Interactions K-2-ETS1-1: Engineering and Design K-2-ETS1-2: Engineering and Design K-2-ETS1-3: Engineering and Design
Sunlight and Weather **Solving Playground Problems** In their roles as weather scientists, students look into why one fictional schoolyard is too cold in the morning, while another, which is nearby, is too hot in the afternoon. They use physical models and firsthand investigation to figure out the impact of sunlight on Earth's surface.	K-PS3-1: Energy K-PS3-2: Energy K-ESS2-1: Earth's Systems K-ESS3-2: Earth and Human Activity K-2-ETS1-1: Engineering and Design K-2-ETS1-2: Engineering and Design
Needs of Plants and Animals **Milkweed and Monarchs** Students take on the roles of scientists in order to figure out why there are no monarch caterpillars in the garden since the vegetables were planted. In so doing, they investigate how plants and animals get what they need to live and grow, and make a new plan for the community garden that provides for the needs of the monarch caterpillars in addition to vegetables for humans.	K-LS1-1: From Molecules to Organisms: Structures and Processes K-ESS2-2: Earth's Systems K-ESS3-1: Earth and Human Activity K-ESS3-3: Earth and Human Activity K-2-ETS1-1: Engineering and Design K-2-ETS1-2: Engineering and Design

Grade 1

Amplify Science unit name and summary	NGSS performance expectations addressed
Light and Sound **Puppet Theater Engineers** In their roles as light and sound engineers, students investigate cause and effect relationships to learn about the nature of light and sound. They apply what they learn to design shadow scenery and sound effects for a puppet show.	1-PS4-1: Waves and their Applications in Technologies for Information Transfer 1-PS4-2: Waves and their Applications in Technologies for Information Transfer 1-PS4-3: Waves and their Applications in Technologies for Information Transfer 1-PS4-4: Waves and their Applications in Technologies for Information Transfer K-2-ETS1-1: Engineering and Design K-2-ETS1-2: Engineering and Design K-2-ETS1-3: Engineering and Design
Spinning Earth **Investigating Patterns in the Sky** As emerging space scientists, students figure out how to explain why it is never the same time of day for a grandmother who lives in Asia as it is for her grandson in the United States when she calls him. Students record, organize, and analyze observations of the sun and other sky objects as they look for patterns and make sense of the cycle of daytime and nighttime.	1-ESS1-1: Earth's Place in the Universe 1-ESS1-2: Earth's Place in the Universe
Animal and Plant Defenses **Spikes, Shells, and Camouflage** Students play the roles of marine scientists. In their roles, students apply their understanding about plant and animal defense structures to explain to concerned visitors to an aquarium how a sea turtle at the aquarium can be released and will be able to defend herself and her offspring from predators in the ocean.	1-LS1-1: From Molecules to Organisms: Structures and Processes 1-LS1-2: From Molecules to Organisms: Structures and Processes 1-LS3-1: Heredity: Inheritance and Variation of Traits K-2-ETS1-1: Engineering and Design K-2-ETS1-2: Engineering and Design

Grade 2

Amplify Science unit name and summary	NGSS performance expectations addressed
Properties of Materials **Designing Glue** As glue engineers, students use engineering design practices to create a glue for use at their school. They conduct tests that yield quantifiable results, graph their data, analyze and interpret results, and then use that evidence to iteratively design a series of glue mixtures, each one better than the one before.	2-PS1-1: Matter and Its Interactions 2-PS1-2: Matter and Its Interactions 2-PS1-3: Matter and Its Interactions 2-PS1-4: Matter and its Interactions K-2-ETS1-1: Engineering and Design K-2-ETS1-2: Engineering and Design K-2-ETS1-3: Engineering and Design
Changing Landforms **The Disappearing Cliff** Students play the roles of Earth scientists as they attempt to figure out what caused a rock cliff to change shape over time. They use models to investigate the erosion of rock and the formation of sand.	2-ESS1-1: Earth's Place in the Universe 2-ESS2-1: Earth's Systems 2-ESS2-2: Earth's Systems 2-ESS2-3: Earth's Systems K-2-ETS1-1: Engineering and Design
Plant and Animal Relationships **Investigating Systems in a Bengali Forest** In their roles as plant scientists working at the Bengal Tiger Reserve, students work to figure out why there are no new Chalta trees growing in this part of the forest. Students investigate what the Chalta tree needs to survive, and collect and analyze qualitative and quantitative data to solve the mystery.	2-LS2-1: Ecosystems: Interactions, Energy, and Dynamics 2-LS2-2: Ecosystems: Interactions, Energy, and Dynamics 2-LS4-1: Biological Evolution: Unity and Diversity 2-ESS2-2: Earth's Systems

Grade 3

Amplify Science unit name and summary	NGSS performance expectations addressed
Balancing Forces **Investigating Floating Trains** In their roles as consulting scientists, students are challenged to figure out how a floating train works in order to explain it to the citizens of the fictional city of Faraday. They apply ideas about non-touching forces as well as balanced and unbalanced forces.	3-PS2-1: Motion and Stability: Forces and Interactions 3-PS2-2: Motion and Stability: Forces and Interactions 3-PS2-3: Motion and Stability: Forces and Interactions 3-PS2-4: Motion and Stability: Forces and Interactions 3-5-ETS1-1: Engineering and Design 3-5-ETS1-2: Engineering and Design
Weather and Climate **Establishing an Orangutan Colony** As weather scientists for a nature conservation group, students determine which of four fictional islands will be the best location for an orangutan reserve. They analyze and interpret weather data in order to compare and construct arguments about the weather patterns for a particular location in the world over a given span of time.	3-ESS2-1: Earth's Systems 3-ESS2-2: Earth's Systems 3-ESS3-1: Earth and Human Activity 3-LS4-3: Biological Evolution: Unity and Diversity 3-5-ETS1-1: Engineering and Design 3-5-ETS1-2: Engineering and Design 3-5-ETS1-3: Engineering and Design
Environments and Survival **Snail Trait Biomimicry** As engineers that specialize in biomimicry, designing structures that are modeled on organisms in the natural world, students investigate the adaptive traits of the Grove Snail population, and use what they learn to design a protective shell to transport endangered sea turtle eggs.	3-LS4-1: Biological Evolution: Unity and Diversity 3-LS4-2: Biological Evolution: Unity and Diversity 3-LS4-4: Biological Evolution: Unity and Diversity 3-LS4-3: Biological Evolution: Unity and Diversity 3-5-ETS1-1: Engineering and Design 3-5-ETS1-2: Engineering and Design 3-5-ETS1-3: Engineering and Design
Inheritance and Traits **Variation in Wolves** Students play the roles of wildlife biologists working in Greystone National Park, as they study two wolf packs and are challenged to figure out why an adoptive wolf in one of the packs has the traits it does. Students investigate variation between and within different species, inherited and acquired traits, and conclude the unit by writing an explanation of the origin of the adoptive wolf's traits for the visitors in Greystone National Park.	3-LS1-1: From Molecules to Organisms: Structures and Processes 3-LS2-1: Ecosystems: Interactions, Energy, and Dynamics 3-LS3-1: Heredity: Inheritance and Variation of Traits 3-LS3-2: Heredity: Inheritance and Variation of Traits

Grade 4

Amplify Science unit name and summary	NGSS performance expectations addressed
Energy Conversions **Blackout in Ergstown** Students play the roles of systems engineers for Ergstown, a fictional town that experiences frequent blackouts. They explore reasons why an electrical system can fail, choose new energy sources and energy converters for the town, and use evidence to explain why their choices will make the town's electrical system more reliable.	4-PS3-1: Energy 4-PS3-2: Energy 4-PS3-3: Energy 4-PS3-4: Energy 4-ESS3-1: Earth and Human Activity 4-ESS3-2: Earth and Human Activity 3-5-ETS1-1: Engineering and Design 3-5-ETS1-2: Engineering and Design 3-5-ETS1-3: Engineering and Design
Waves, Energy, and Information **Investigating How Dolphins Communicate** In their roles as marine scientists, students work to figure out how mother dolphins communicate with their calves. They investigate how sound travels and learn about how to look for and to create patterns of communication.	4-PS3-2 Energy 4-PS3-3: Energy 4-PS4-1: Waves and their Applications in Technologies for Information 4-PS4-3: Waves and their Applications in Technologies for Information 4-ESS3-2: Earth and Human Activity 4-LS1-2: From Molecules to Organisms: Structures and Processes 3-5-ETS1-2: Engineering and Design 3-5-ETS1-3: Engineering and Design
Earth's Features **Mystery in Desert Rocks Canyon** Playing the roles of geologists, students help the National Park Service explain what a particular boney-looking rock is, how it formed, and how it came to be in its current location at the bottom of Desert Rocks National Park. Then they explain to park visitors how the canyon where they're doing their research was formed.	4-ESS1-1: Earth's Place in the Universe 4-ESS2-1: Earth's Systems 4-ESS2-2: Earth's Systems 4-ESS3-2: Earth's Systems
Vision and Light **Investigating Animal Eyes** As wildlife biologists, students work to figure out why a local population of geckos has decreased since the construction of a new stadium. Students consider the bright lights of the stadium and use a computer simulation to investigate the relationship of light and vision, specifically the sensitivity of different animals' eyes to light, and make a recommendation for mitigating the situation.	4-PS4-2: Waves and their Applications in Technologies for Information 4-LS1-1: From Molecules to Organisms: Structures and Processes 4-LS1-2: From Molecules to Organisms: Structures and Processes

Grade 5

Amplify Science unit name and summary	NGSS performance expectations addressed
Modeling Matter **The Chemistry of Food** As food scientists working in a lab for a large food production company, students take on two work assignments, one related to food safety and one related to creation of a new food product. In so doing, they figure out that the properties of materials are related to the properties of the nanoparticles that make up those materials.	5-PS1-1: Matter and Its Interactions 5-PS1-2: Matter and Its Interactions 5-PS1-3: Matter and Its Interactions 5-PS1-4: Matter and Its Interactions 3-5-ETS1-2: Engineering and Design
Patterns of Earth and Sky **Analyzing Stars on Ancient Artifacts** In their roles as astronomers, students investigate an artifact found on an archeological dig that seems to show patterns in the daytime and nighttime sky. Using a computer simulation of stars, physical models, and a reference text, students figure out how the position of stars around the Earth, and the spin and orbit of the Earth, cause us to see daily and yearly patterns of stars.	5-PS2-1: Motion and Stability: Forces and Interactions 5-ESS1-1: Earth's Place in the Universe 5-ESS1-2: Earth's Place in the Universe
The Earth System **Investigating Water Shortages** As water resource engineers, students figure out what caused a water shortage on the east side of a fictional island, East Ferris, and work to design a solution to the problem. Applying their knowledge of water distribution and analyzing the flow of water between the hydrosphere, atmosphere, and geosphere, students communicate the nature of the problem and possible solutions to the people of East Ferris.	5-ESS2-1: Earth's Systems 5-ESS2-2: Earth's Systems 5-ESS3-1: Earth and Human Activity 5-PS1-1: Matter and Its Interactions 5-PS1-2: Matter and Its Interactions 5-PS1-3: Matter and Its Interactions 5-PS1-4: Matter and Its Interactions 5-LS2-1: Ecosystems: Interactions, Energy, and Dynamics 3-5-ETS1-1: Engineering and Design 3-5-ETS1-2: Engineering and Design 3-5-ETS1-3: Engineering and Design
Grade 5: Ecosystem Restoration **Matter and Energy in a Rainforest** Students engage as ecologists as they figure out why the plants and animals in a failing Costa Rican rainforest ecosystem aren't growing and thriving. Growing a terrarium, using physical models, and investigating how matter and energy flow with a computer model, students solve the mystery and create a plan for rainforest restoration.	5-LS1-1: From Molecules to Organisms: Structures and Processes 5-LS2-1: Ecosystems : Interactions, Energy, and Dynamics 5-ESS3-1: Earth and Human Activity 5-PS1-1: Matter and Its Interactions 5-PS1-4: Matter and Its Interactions 5-PS3-1: Energy 3-5-ETS1-1: Engineering and Design 3-5-ETS1-2: Engineering and Design

For more information on Amplify Science, visit **amplify.com/science**.

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