Subject: Science
Grade Level: 6-8
Course Title: M/J Earth/Space Science, Advanced
Course Code: (#2001020)
Submission Title: Amplify Science: Florida Edition – Earth/Space Science, Advanced
Bid ID: 3340
Publisher: Amplify Education, Inc.
Publisher ID: 13-4125483

Refer to the Getting Started Guide for instructions on how to manually navigate to a citation.

Benchmark Code	Benchmark	**LESSONS WHERE STANDARD/BENCHMARK IS DIRECTLY ADDRESSED IN MAJOR TOOL (MOST IN-DEPTH COVERAGE LISTED FIRST)** (Include the student edition and teacher edition with the page numbers of lesson, a link to lesson, or other identifier for easy lookup by reviewers.)
PUBLISHER'S NOTE AND INSTRUCTIONS: Teacher logins can see both the teacher and student material. Therefore, a citation of "Unit X, Lesson Y, Activity Z" is good for BOTH student material (lesson text, activity instructions) and teacher material.		
SC.6.E.6.1	Describe and give examples of ways in which Earth's surface is built up and torn down by physical and chemical weathering, erosion, and deposition.	This standard is addressed in the Rock Transformations and Weather Patterns units. For example: In Rock Transformations: ● In Lesson 2.1, Activity 2 students explore a digital simulation that models rock transformation processes, including weathering, erosion, and deposition. ● In Lesson 2.1, in the activity titled “Playing Understanding Weathering”, a video entitled Understanding Weathering illustrates how weathering can alter landscapes. ● In Lesson 2.2, Activities 2 and 3 and Lesson 2.3, Activity 3, students read “Devil’s Tower” an article that describes how this geologic feature formed, including descriptions of weathering, erosion, and deposition. ● In Lesson 2.4, Activity 3, students create diagrams that model how weathering and erosion, produce and move the sediment that can later form sedimentary rocks. In Weather Patterns: ● In Lesson 1.5, Activity 4, students view the video entitled Understanding Weathering and discuss how precipitation can alter the geosphere.

		In Lesson 2.5, Activity 4, students read the article “An Astronaut’s View of Florida” which describes how weathering, erosion, and deposition have shaped the Earth’s surface in Florida.
SC.6.E.6.2	Recognize that there are a variety of different landforms on Earth's surface such as coastlines, dunes, rivers, mountains, glaciers, deltas, and lakes and relate these landforms as they apply to Florida.	This standard is fully addressed in the Weather Patterns unit. In Lesson 2.5, Activity 4, students read the article “An Astronaut’s View of Florida” which describes how weathering, erosion, and deposition have shaped the Earth’s surface in Florida. Students also consider examples of specific landforms throughout the Rock Transformations, Plate Motion, and Plate Motion Engineering Internship units. For example: In the Rock Transformations unit: - In Lesson 3.4, Activity 2 students write an explanation of the formation of rocks in the Rocky Mountains and Great Plains, and in Lesson 3.4, Activity 3 they create diagrams modeling these explanations. - Throughout Lesson 2.6, students investigate Hawaiian coastlines. In the Plate Motion unit: - In Lesson 2.7, Activities 1 and 2, students investigate landforms such as valleys, coastlines, and mountains in Iceland. In the Plate Motion Engineering Internship unit: - In Lesson 3, the Activity titled “Researching Plate Boundaries”, students use evidence of landforms such as mountain ranges, volcanoes, and ocean trenches to identify different types of plate boundary.
SC.6.E.7.1	Differentiate among radiation, conduction, and convection, the three mechanisms by which heat is transferred through Earth's system.	This standard is addressed in the Weather Patterns unit. In Lesson 1.6, Activity 4, students read “Death Valley: Three Reasons Why It's So Hot”, an article which describes how radiation, conduction, and convection all contribute to Death Valley’s high temperatures.
SC.6.E.7.2	Investigate and apply how the cycling of water between the atmosphere and hydrosphere has an effect on weather patterns and climate.	This standard is addressed throughout the Weather Patterns unit. For example: - In Lesson 1.3, Activities 2 and 4, students conduct an experiment and make observations of condensation. - In Lesson 1.2, Activity 3 students investigate the role of evaporation in leading to precipitation. - Lesson 1.3, Activity 3 and Lesson 1.5, Activity 3, students investigate the role of condensation in producing clouds and precipitation. - In Lesson 1.3, Activity 5, students read “What Makes Water Move” about

		the role of gravity in the water cycle. ● In Lesson 2.2, Activities 2 and 3, and Lesson 2.3, Activity 2, students read and discuss “Disaster in California”, and article which describes the cycling of water between the atmosphere and hydrosphere in California during a period of extreme weather.
SC.6.E.7.3	Describe how global patterns such as the jet stream and ocean currents influence local weather in measurable terms such as temperature, air pressure, wind direction and speed, and humidity and precipitation.	This standard is addressed throughout the Ocean, Atmosphere, and Climate unit. For example: ● In Lesson 1.2, Activity 4, students read “Effects of ElNiño Around the World” an article describing effects on local weather from this disruption to global patterns. ● In Lesson 2.1, Activities 2 and 3, and in Lesson 2.2, Activity 2, students read “The Ocean in Motion”, an article which describes how ocean currents move warm and cold water around the globe, influencing regional climates. ● In Lesson 2.3, Activity 2, students conduct an experiment about the transfer of energy between air and water at different temperatures and discuss how this relates to cold and warm ocean currents’ effect on regional climates. ● In Lesson 2.3, Activity 3, students use a digital simulation to compare energy transfer and air temperatures at two locations at the same latitude, one near a cold ocean current and one near a warm ocean current. ● In Lesson 3.1, Activities 3 and 4, and Lesson 3.2, Activity 2, students read and discuss “The Gulf Stream: A Current That Helped Win a War” an article which describes how prevailing winds affect ocean currents (which in turn affect regional climates). ● In Lesson 3.3, Activity 3, students use a digital simulation to investigate the effect of changing prevailing winds on ocean currents and regional climates. ● In Lesson 3.4, Activities 4 and 6, students write an explanation of how the El Niño phenomenon causes changes in New Zealand’s weather, a question they have investigated over the course of Chapters 1, 2, and 3 of the unit.
SC.6.E.7.4	Differentiate and show interactions among the geosphere, hydrosphere, cryosphere, atmosphere, and biosphere.	This standard is addressed in several units. For example: ● In Geology on Mars, Lesson 1.1, Activity 4, students are introduced to Earth’s spheres, then they compare these spheres for the other rocky planets in our Solar System.

		• In Ocean, Atmosphere, and Climate, Lesson 3.4, Activity 5, students analyze a set of Earth Sphere Interaction Cards. Each card describes a scenario, and students discuss and identify which of Earth's spheres (geosphere, hydrosphere, cryosphere, atmosphere, and biosphere) are involved in the scenarios (one of which is the El Niño phenomenon). • In Weather Patterns, Lesson 1.5, Activity 4, students discuss ways that precipitation can affect various of Earth's spheres.
SC.6.E.7.5	Explain how energy provided by the sun influences global patterns of atmospheric movement and the temperature differences between air, water, and land.	This standard is addressed throughout the Ocean, Atmosphere, and Climate unit. For example: • In Lesson 1.3, students discover that energy from sunlight is first transferred to land or water on Earth's surface before being transferred to the air, through an experiment (Activities 2 and 4) and use of a digital simulation (Activity 3) • In Lesson 1.4, Activity 2, students examine maps showing solar energy and and average air temperature around the world to conclude that the closer a location is to the equator, the more energy from sunlight reaches it, and the warmer its air temperatures. • In Lesson 2.4, Activity 5 (click NEXT to see part 2 of 2 of this activity), students read "How the Ocean Keeps Climates Stable" an article which compares the climates of Seattle and Minneapolis and explains how the ocean works as a heat sink to moderate air temperatures. • In Lesson 3.2, Activity 4 (click NEXT to see part 2 of 2 of this activity), students read "What Causes Prevailing Winds?" an article that explains how temperature differences cause wind.
SC.6.E.7.6	Differentiate between weather and climate.	This standard is addressed in the Ocean, Atmosphere, and Climate unit in Lesson 1.2. Students view a short documentary video called "Chasing El Niño" about climate scientists, then in Activity 2 they discuss the definition of the term climate in relation to the term weather.
SC.6.E.7.7	Investigate how natural disasters have affected human life in Florida.	This standard is addressed in the Weather Patterns unit in Lesson 3.2, Activity 4. Each student reads a short description of one natural disaster in Florida's history.
SC.6.E.7.8	Describe ways human beings protect themselves from hazardous weather and sun exposure.	This standard is addressed in the Weather Patterns unit. For example: • In Lesson 3.2, Activity 4, after reading about natural disasters in Florida's history, and the class uses what they read to discuss possible ways of protecting against natural disasters. The class also discusses

		the danger of sun exposure and ways of protecting against it.
SC.6.E.7.9	Describe how the composition and structure of the atmosphere protects life and insulates the planet.	This standard is addressed in the Ocean, Atmosphere, and Climate unit in Lesson 1.4, Activity 4. Students read an article titled "Earth's Atmosphere: An Invisible Shield" which describes several ways that Earth's atmosphere protects life on Earth.
SC.7.E.6.1	Describe the layers of the solid Earth, including the lithosphere, the hot convecting mantle, and the dense metallic liquid and solid cores.	This standard is addressed through, multiple activities in the Plate Motion unit. For example: ● In Lesson 1.2, Activity 3 (press NEXT to see parts 2 through 6 of 6),, students read short descriptions and analyze cross-section diagrams of deep drilling sites to learn about the nature of the outer lithosphere. ● In Lesson 1.3, the activity titled "Revealing Earth's Outer Layer". students view a video that shows a computer model of the outer lithosphere. ● In Lesson 2.1, Activity 3, students use a physical model to understand the nature of the mantle. ● In Lesson 2.1, Activity 5, students read "How Do We Know What's Inside Earth?" which describes all the layers of the solid Earth.
SC.7.E.6.2	Identify the patterns within the rock cycle and relate them to surface events (weathering and erosion) and sub-surface events (plate tectonics and mountain building).	This standard is the focus of much of the Rock Transformations unit. For example: ● In Lesson 2.1, Activity 2, students use the simulation to explore weathering at the surface and melting to form magma below ground. ● In Lesson 3.1, Activities 2 and 3, students read and discuss the article "The Oldest Rock Formations on Earth" describing many ways rock and rock material can be transformed. ● In Lesson 3.2, Activity 3, students complete the challenges in the simulation that involve moving rock material and mountain building due to subduction, as well as weathering and erosion.
SC.7.E.6.3	Identify current methods for measuring the age of Earth and its parts, including the law of superposition and radioactive dating.	This standard is covered in the Plate Motion unit: ● In Lesson 3.2, Activity 5. Students read "Steno and the Shark" which describes how observations of fossil shark teeth provided evidence about the age of the Earth and its parts. ● In Lesson 3.3, Activity 2, the class debriefs the article and discusses both the law of superposition and radioactive dating.
SC.7.E.6.4	Explain and give examples of how	This standard is a focus of the Plate Motion, and Rock Transformations units and

	physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes.	is also touched upon in the Ocean, Atmosphere and Climate unit. For example: ● In the Plate Motion unit, Lesson 3.1, the Activity titled “Video: Plate Motion and GPS”, students watch “Plate Motion and GPS”, a short documentary video about measuring the rate of plate motion. In Activity 2 of this lesson, students use data from a map, and use the simulation to calculate the distance tectonic plates move over many millions of years. ● In the Rock Transformations unit, Lesson 3.1, Activities 2 and 3, students read and discuss the article “The Oldest Rock Formations on Earth” describing changes to rock formations over billions of years. ● In the Ocean, Atmosphere, and Climate unit, Lesson 4.1, Activity 2, students are introduced to a question about regional climates during the late Carboniferous period and evidence about differences in content arrangements, prevailing winds, and polar ice between that time and now.
SC.7.E.6.5	Explore the scientific theory of plate tectonics by describing how the movement of Earth's crustal plates causes both slow and rapid changes in Earth's surface, including volcanic eruptions, earthquakes, and mountain building.	This standard is a focus of the Plate Motion unit. For example: ● In Lesson 1.4, Activity 2, students run tests in the simulation to determine the relationship between earthquakes and plate motion. ● In Lesson 3.4, Activities 2, 3, and 4, students analyze evidence, and write explanations for how fossils from the same land-dwelling species came to be found in both South America and South Africa as plate motion separated those continents over many millions of years.
SC.7.E.6.6	Identify the impact that humans have had on Earth, such as deforestation, urbanization, desertification, erosion, air and water quality, changing the flow of water.	This standard is addressed in multiple units. For example: ● In the Rock Transformations unit, Lesson 3.4, Activity 4, students view a slide show and discuss ways that human actions impact weathering and water flow. ● Over the first two chapters of the Weather Patterns unit, students investigate how a new lake created by a human-made dam could affect local precipitation patterns. This question is introduced in a video in Lesson 1.2, the Activity titled “introducing the Mystery of Galetown Storms”.
SC.7.E.6.7	Recognize that heat flow and movement of material within Earth causes earthquakes and volcanic eruptions, and creates mountains and ocean basins.	This standard is addressed in the Plate Motion unit. For example: ● In Lesson 2.1, Activity 5, students read “How Do We Know What's Inside Earth?” which describes convection within the mantle. ● In Lesson 2.4, Activity 3, students gather evidence from the simulation about earthquakes, volcanoes, and landforms at different types of plate boundaries.

		In Lesson 3.4, Activities 2, 3, and 4, students analyze evidence, and write explanations for how fossils from the same land-dwelling species came to be found in both South America and South Africa as plate motion created an ocean basin those continents.
SC.7.N.1.1	Define a problem from the seventh-grade curriculum, use appropriate reference materials to support scientific understanding, plan and carry out scientific investigation of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and graphics, analyze information, make predictions, and defend conclusions.	Every unit in Amplify Science is structured around conducting investigations as well as gathering and analyzing evidence from other sources to draw and defend conclusions about scientific principles as well as specific phenomena. For example, in the Rock Transformations unit: - In Lesson 1.2, Activity 2 (press NEXT to see both parts 1 and 2 of 2), students define and discuss the problem they will investigate: what caused a rock formation in the Great Plains and one in the Rocky Mountains to have nearly identical composition. - In Lesson 1.2, Activity 3 ((press NEXT to see part 3 of 3), students make systematic observations of rock samples and record data in a table format. - In Lesson 2.1, Activity 2, students plan and conduct tests in the simulation to discover how sediment and magma can each be formed. - In Lesson 2.2, Activity 2, students gather evidence from reference materials about different ways rocks can form by reading the article “Devil’s Tower”. - In Lesson 3.4, Activities 2 students analyze evidence presented in graphical form (note: the copymaster for this activity can be viewed in the Digital Resources for the Lesson). In Activity 3 they create visual models, and in Activity 5 they defend their conclusions by writing scientific arguments about the Great Plains/Rocky Mountains question.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).	This standard is addressed across multiple units. For example: - In the Plate Motion Engineering Internship unit, Lessons 5 and 6, students carefully track the details of the tsunami warning systems they test so that tests of successful designs can be replicated (see for example, Lesson 5, the Activity titled “Testing Warning System Designs”). - In the Geology on Mars unit, Lesson 2.2, Activity 3, the class conducts the same investigation on two stream tables and discusses the importance of conducting this investigation twice and the degree of variation that occurs even when the same procedures are followed (also see the Teacher Support note titled “Pedagogical Goals: Using the Same Setup for the Stream Tables:).

SC.7.N.1.3	Distinguish between an experiment (which must involve the identification and control of variables) and other forms of scientific investigation and explain that not all scientific knowledge is derived from experimentation.	This standard is addressed in multiple units, in which students generate, use and discuss evidence generated from different types of investigation. For example: ● In the Geology on Mars unit, Lesson 2.1, Activities 3 and 4, students read and discuss "Investigating Landforms on Venus" an article focused on how a real scientist uses observations of a computer model to gather evidence about landforms on Venus. ● In the Geology on Mars unit, Lesson 2.3, Activity 2, the class conducts an experiment with two stream tables, and discusses the value of experimental evidence. ● In the Geology on Mars unit, Lesson 3.1, Activities 2 and 3, students evaluate evidence from an experiment with a physical model (water vs. wax flowing over a stream table) and from the observation of photographs of Earth surface features.
SC.7.N.1.4	Identify test variables (independent variables) and outcome variables (dependent variables) in an experiment.	This standard is addressed in multiple units when students conduct experiments, for example: ● In the Geology on Mars unit, Lesson 2.3, Activity 2, the class plans and conducts an experiment with two stream tables. They identify test and outcome variables. ● In the Weather Patterns unit, Lesson 3.1, Activity 3, students conduct experiments in the simulation with the test variable of wind and the outcome variables of air parcel final height and temperature, energy released, and amount of rain.
SC.7.N.1.5	Describe the methods used in the pursuit of a scientific explanation as seen in different fields of science such as biology, geology, and physics.	This standard is addressed in several units. For example, in the Geology on Mars unit: ● In Lesson 1.1 students watch the video "Meet a Planetary Geologist" and discuss the importance in this field of making inferences about other planets based on observations of Earth. ● In Lesson 2.2, the Activity titled "Reflecting on How Scientists Use Models", students discuss the ways geologists get evidence from models, based on an article they have read about a real geologist using a model and their own use of a physical model.
SC.7.N.1.6	Explain that empirical evidence is the cumulative body of observations of a natural phenomenon on which scientific explanations are based.	Every Amplify Science unit is structured around students generating empirical evidence and analyzing this evidence as well as other evidence in order to make explanations about scientific principles as well as specific phenomena. For example, in the Rock Transformations unit, students are investigating what caused a rock formation in the Great Plains and one in the Rocky Mountains to

		have nearly identical composition. ● In Lesson 2.1, Activity 2, students plan and conduct tests in the simulation to gather evidence about how sediment and magma can each be formed. ● In Lesson 2.2, Activity 2, students gather evidence about different ways rocks can form by reading the article “Devil’s Tower”. ● In Lesson 3.4, Activities 2, 3, and 5 students analyze evidence about plate motion in the regions, create visual models, and write scientific explanations about the Great Plains/Rocky Mountains question.
SC.7.N.1.7	Explain that scientific knowledge is the result of a great deal of debate and confirmation within the science community.	In several Amplify Science units, students read examples of debates and confirmation in the science community. For example: ● In the Plate Motion unit, Lesson 3.2, Activity 5. Students read “Steno and the Shark” which describes how observations of fossil shark teeth provided evidence about the age of the Earth and its parts. ● In the Plate Motion unit, Lesson 3.2, Activities 3 and 4 students read and discuss “A Continental Puzzle”, an article which describes how new evidence caused a large change in scientists’ understanding of how the Earth’s surface changes over long time periods. ● In the Geology on Mars unit, Lesson 3.4, Activity 4, students read the article “Canals on Mars” which describes debates between scientists about the origin of surface features on Mars (press NEXT to see part 2 of 2 of this activity). In addition, during Chapter Four of each Amplify Science unit, students engage in scientific argumentation around a question for which there is compelling evidence to support multiple competing claims, and in which students are supported to disagree productively. For example: ● In the Rock Transformations unit, Chapter Four (e.g., Lesson 4.3, Activity 2) students engage in argumentation about which types of rock formation is predominant on Venus, with some evidence pointing toward the formation of sedimentary rocks, and some toward the formation of igneous rocks. ● In the Plate Motion unit, Chapter Four, (e.g., Lesson 4.2, Activity 3) students engage in argumentation about what best explains the pattern of volcanic activity and earthquakes on the Jalisco Block, with some evidence pointing toward convergent plate motion, and some pointing toward divergent plate motion.
SC.7.N.2.1	Identify an instance from the history	Across multiple Amplify Science units, students encounter this concept both in

	of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.	their own work and in reading about scientists. For example: ● In the Ocean, Atmosphere, and Climate unit, Lesson 1.5, Activity 3, students analyze new evidence about the amount of energy from the sun and the sea surface temperature near Christchurch New Zealand in normal and El Niño years, that causes students to reject one claim and see the need for more evidence about another (press NEXT to see part 2 of 2 of this activity). ● In the Plate Motion unit, Lesson 3.2, Activities 3 and 4, students read and discuss “A Continental Puzzle”, an article which describes how new evidence caused a large change in scientists’ understanding of how the Earth’s surface changes over long time periods.
SC.7.N.3.1	Recognize and explain the difference between theories and laws and give several examples of scientific theories and the evidence that supports them.	This standard is addressed in the Plate Motion and Rock Transformations units. In Plate Motion Lesson 3.3, Activity 2, the class discusses the theory of plate tectonics, including how the term theory is used differently in science and in everyday language. They also discuss the difference between a theory and a law, and consider other theories that they may be familiar with, such as the theory of evolution and cell theory. In the Rock Transformations unit, students have a number of experiences that support an understanding of the Laws of Conservation of Matter, for example: ● Lesson 3.1, Activities 2 and 3, the article “The Oldest Rock Formations on Earth” describes the cycling of rock material ● Lesson 3.3, Activity 3, a classroom model of cycling of rock material. Other exposures to scientific laws occur in Physical Science courses, a domain in which scientific laws are more prevalent.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.	This standard is addressed in all Amplify Science units. For example, in the Plate Motion unit investigate plate motion using a variety of models, including a physical model using putty and a plastic cube (Lesson 2.1, Activity 3) a digital simulation (e.g., Lesson 2.4, Activity 3), and a physical model using towels (Lesson 2.3, Activity 3), and recognizing differences between each model.
SC.8.E.5.1	Recognize that there are enormous distances between objects in space and apply our knowledge of light and space travel to understand this distance.	This standard is addressed in several units. For example: ● In the Geology on Mars unit, Lesson 4.3, Activity 2, students are introduced to light years, then calculate the time it would take to travel by spacecraft to other stars. ● In the Earth, Moon, and Sun unit in Lesson 1.2, Activity 4, students read “The Solar System is Huge”, and article that describes objects in our solar system—how big they are, how far away they are, and what it

		would take for humans to visit them
SC.8.E.5.2	Recognize that the universe contains many billions of galaxies and that each galaxy contains many billions of stars.	This standard is addressed in the Geology on Mars unit, for example: ● In Lesson 4.2, Activity 2, students analyze an image of the night sky to estimate the number of stars in the Milky Way, and in Activity 3, they analyze the Hubble Deep Field Image to estimate the number of galaxies in the Universe. ● In Lesson 4.3, Activity 3, students critique a physical model of the Milky Way in which grains of salt represent stars.
SC.8.E.5.3	Distinguish the hierarchical relationships between planets and other astronomical bodies relative to solar system, galaxy, and universe, including distance, size, and composition.	This standard is addressed in the Geology on Mars unit, for example: ● In Lesson 1.1, Activity 2, students analyze data about objects in our Solar System. ● In Lesson 4.3, Activity 2, students are introduced to light years, then calculate the time it would take to travel by spacecraft to other stars. ● In Lesson 4.2, Activity 3, they observe the Hubble Deep Field Image and learn that galaxies are composed of billions of stars.
SC.8.E.5.4	Explore the Law of Universal Gravitation by explaining the role that gravity plays in the formation of planets, stars, and solar systems and in determining their motions.	This standard is addressed in the Earth, Moon, and Sun unit in Lesson 2.4, Activity 5. Students read the article "Gravity in the Solar System" which discusses how the force of gravity helped form the solar system and continues to hold the solar system together as objects travel in their orbits.
SC.8.E.5.5	Describe and classify specific physical properties of stars: apparent magnitude (brightness), temperature (color), size, and luminosity (absolute brightness).	This standard is addressed in the Geology on Mars unit, for example: ● In Lesson 4.1, Activity 3, students analyze a set of Star Cards and classify stars based on data about each star. ● In Lesson 4.6, Activity 2, students analyze data about several stars in order to create scientific arguments about the stars' exoplanets. (Note: the Star Cards are printed and included in the unit kit. They can also be viewed in the Resource: Print Materials: 8.5x11 document found with the unit overview. Stars include: Alpha Centauri A, 51-Pegasi, Nu2 Lupi, Rigel A, Zeta Pupis, TRAPPIST-1, Kepler 438, Barnard's Star, Aldebaran, Wolf 1061, EPIC 201367065. Data presented about each star includes color, temperature, diameter, luminosity, sunspots, solar ares, and prominences; distance from Earth; and known planets)
SC.8.E.5.6	Create models of solar properties including: rotation, structure of the	This standard is addressed in the Geology on Mars unit. For example: ● In Lesson 4.1, Activity 3, students analyze a set of Star Cards with data

	Sun, convection, sunspots, solar flares, and prominences.	about solar properties. They identify commonalities across the stars in order to create a mental model of the properties that all or most stars have in common. ● In Lesson 4.5, Activity 3, students create a physical model of stars with different temperature properties.
SC.8.E.5.7	Compare and contrast the properties of objects in the Solar System including the Sun, planets, and moons to those of Earth, such as gravitational force, distance from the Sun, speed, movement, temperature, and atmospheric conditions.	This standard is addressed in the Geology on Mars unit, Lesson 1.1, Activity 2. Students analyze data about objects in our Solar System using a set of Solar System cards (Note: the Solar System cards are printed and include in the unit kit. They can also be viewed in the Resource: Print Materials: 8.5x11 document found with the unit overview). The objects presented in the Solar System cards are: ● The sun ● Planets: Mercury, Venus, Earth, Mars, Jupiter, Saturn, Neptune, Uranus ● Pluto (a dwarf planet) ● Moons: Earth's Moon, Titan, Io, Europa ● Rosetta's comet ● 4 Vesta (an asteroid) Data about each object presented on the card includes diameter, composition, surface temperature, surface gravity, movement, atmosphere and distance from the sun.
SC.8.E.5.8	Compare various historical models of the Solar System, including geocentric and heliocentric.	This standard is addressed in the Earth, Moon, and Sun unit, Lesson 1.4, Activity 5. Students read "Cosmic Models" which describes how ideas about the Solar System have changed as people discovered new evidence.
SC.8.E.5.9	Explain the impact of objects in space on each other including: the Sun on the Earth including seasons and gravitational attraction the Moon on the Earth, including phases, tides, and eclipses, and the relative position of each body.	This standard is addressed throughout the Earth, Moon, and Sun unit. For example: ● In Lesson 2.2, Activity 2, students use a physical model to gather evidence about the cause of changing moon phases. ● In Lesson 3.3, Activity 2, students gather evidence about the cause of lunar eclipses from a digital simulation. ● In Lesson 2.6, Activity 4, students read "Tides and the Moon" about the cause of tides. ● In Lesson 3.1, Activity 5 (press NEXT to see part 2 of 2 of this activity), students read "The Endless Summer of the Arctic Tern" about the causes of seasons. ● In Lesson 2.4, Activity 5, students read the article "Gravity in the Solar System" which discusses how the force of gravity helped form the solar

		system and continues to hold the solar system together as objects travel in their orbits.
SC.8.E.5.10	Assess how technology is essential to science for such purposes as access to outer space and other remote locations, sample collection, measurement, data collection and storage, computation, and communication of information.	This standard is addressed across several units. For example: ● In the Geology on Mars unit, Lesson 3.4, students watch a documentary video called "Rover on Mars" which describes a scientist's investigations that rely on technology. ● In the Geology on Mars unit, Lesson 4.4, Activities 2 and 3, students read and discuss "Using Starlight to Investigate Exoplanets", which describes the use of technology to detect different types of light as evidence about stars and planets. ● In the Plate Motion unit, Lesson 3.1, students watch a documentary video called "Plate Motion and GPS" which describes the use GPS technology to study the movement of tectonic plates. ● In the Ocean, Atmosphere, and Climate unit, Lesson 1.2, students watch a documentary video called "Chasing El Niño" which describes technology for data collection, computer modeling, and communication.
SC.8.E.5.11	Identify and compare characteristics of the electromagnetic spectrum such as wavelength, frequency, use, and hazards and recognize its application to an understanding of planetary images and satellite photographs.	This standard is addressed in the Geology on Mars unit, Lesson 4.4, Activities 2 and 3. Students read and discuss "Using Starlight to Investigate Exoplanets", which describes how scientists detect different types of light as a way to gather evidence about stars and planets.
SC.8.E.5.12	Summarize the effects of space exploration on the economy and culture of Florida.	This standard is addressed in the Geology on Mars unit, Lesson 2.3, Activity 4, when students read "How Space Flight Has Shaped Florida".
SC.8.N.1.1	Define a problem from the eighth-grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and	Every unit in Amplify Science is structured around conducting investigations as well as gathering and analyzing evidence from other sources to draw and defend conclusions about scientific principles as well as specific phenomena. For example, in the Geology on Mars unit, students are investigating what created a particular channel on the surface of Mars. ● In Lesson 1.1, Activities 2 and 4, students use reference materials, the Solar System Cards and Rocky Planet Cards, to support their understanding of the context of their investigation. ● In Lesson 1.2, Activities 2 and 4, students make systematic observations

	graphics, analyze information, make predictions, and defend conclusions.	and comparisons of surface features on Mars and Earth. ● In Lesson 2.3, Activity 2, students plan, make predictions about, and conduct an experiment using a stream table to gather additional evidence. ● In Lesson 3.4, Activity 2, students write a scientific argument, based on several types of evidence, in which they defend their conclusions about the process that formed the channel.
SC.8.N.1.2	Design and conduct a study using repeated trials and replication.	This standard is addressed across multiple units. For example: ● In the Plate Motion Engineering Internship unit, Lessons 5 and 6, students carefully track the details of the tsunami warning systems they test so that tests of successful designs can be replicated. ● In the Geology on Mars unit, Lesson 2.2, Activity 3, the class conducts the same investigation on two stream tables and discusses the importance of conducting this investigation twice and the degree of variation that occurs even when the same procedures are followed.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.	In every unit in Amplify Science, students are supported in using the language of scientific argumentation. For example ● In the Geology on Mars unit, Lesson 1.3, in Activity 2, students are introduced to the Argumentation Wall". The wall contains visual representations of the goals and structure of scientific arguments, and is added to and referred to across the year. ● In every core unit, in Chapter 4, students participate in a Science Seminar in which they engage in oral and written argumentation. Students are provided with Argumentation Sentence Starters such as 'the evidence that supports my claim is…' (see Earth, Moon, and Sun, Lesson 4.2, Activity 2 for an example).
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.	Across Amplify Science, students are exposed to the idea that scientists make claims based on evidence and revise those claims when needed, in the face of new evidence. Students experience this both in their own scientific investigations and in reading about professional scientists. For example: ● In Earth, Moon, and Sun, Lesson 1.4, Activity 5, students read an article, "Cosmic Models" that describes several inaccurate hypotheses about the Solar System then led to further investigations. The teacher explicitly introduces the idea that these ideas were valuable even though they turned out to be inaccurate

		• In Weather Patterns, Lesson 3.3, Activity 2, students revise their models based on new evidence (the models were originally created in Lesson 1.6, Activity 4).
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in different fields of science.	In every Amplify Science unit, students are exposed to scientists using different methods to develop scientific explanations, and also use different methods in their own investigations. For example: • Students conduct **systematic observations** of a physical models in Earth, Moon, and Sun, Lesson 2.2, Activity 2, and of photographs in Geology on Mars Lesson 1.2, Activities 3 and 4. • Students conduct **controlled experiments** in Weather Patterns, Lesson 3.1, Activity 3, using the Weather Patterns simulation. • Students read and discuss "Listening to Earth" about how a scientist makes explanations about difficult to observe processes based on **measurements** in Plate Motion Lesson 2.2, Activities 2 and 3. • Students view a video about scientists **making computer models** based on a variety of **measurements** in Ocean, Atmosphere, and Climate, Lesson 1.2, the activity titled "Chasing El Niño".
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.	Every unit in Amplify Science is structured around a driving question which students answer by gathering evidence, using reasoning to construct arguments, and making explanations and models. For example, in the Geology on Mars unit, students are investigating what created a particular channel on the surface of Mars. • In Lesson 1.2, Activities 2 and 4, students make systematic observations and comparisons of surface features on Mars and Earth. • In Lesson 2.3, Activity 2, students plan, make predictions about, and conduct an experiment using a stream table to gather additional evidence. • In Lesson 3.3, Activity 2, students use a graphic organizer called the Reasoning Tool to organize their evidence • In Lesson 3.4, Activity 2, students write a scientific argument, based on several types of evidence, in which they defend their conclusions about the process that formed the channel. • In Lesson 3.4, Activity 3, the class reflects on what they have done and how that demonstrates what is involved in scientific investigations
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.	Students are supported in their understanding of the distinction between scientific and pseudoscientific ideas through a continual emphasis on the nature

		of scientific knowledge as constructed based on empirical evidence and revised through the collaboration of the scientific community. For example, in the Geology on Mars unit, Lesson 1.3, Activity 2, "Introducing Argumentation", students are introduced to the Argumentation Wall. The wall contains visual representations of the goals and structure of scientific arguments, and is added to and referred to across the year.
SC.8.N.2.2	Discuss what characterizes science and its methods.	Students are supported in their understanding of what characterizes science and its methods through a continual emphasis on the nature of scientific knowledge as constructed based on empirical evidence and revised through the collaboration of the scientific community. For example: ● In the Geology on Mars unit, Lesson 2.3, Activity 2, students discuss different investigation methods in science. ● In the Geology on Mars unit, Lesson 1.3, Activity 2, "Introducing Argumentation", students are introduced to the Argumentation Wall. The wall contains visual representations of the goals and structure of scientific arguments, and is added to and referred to across the year.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.	In every Amplify science unit, students both use a variety of models and create or select their own models to explain the results of their investigations. For example: ● In the Earth, Moon, and Sun unit, Lesson 3.3, Activity 4, students create a model to show their explanation, based on their investigations, of the cause of when and how lunar eclipses occur. ● In the Rock Transformations unit, Lesson 3.4, Activity 3 students create a model to show their explanation, based on their investigations, of the rock transformations that led to rocks of very similar composition occurring in the Rocky Mountains and Great Plains.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.	Students understanding of this idea is supported by discussions of how claims in science, including theories, are constructed and modified. For example: ● In Earth, Moon, and Sun, Lesson 1.4, Activity 5, students read an article, "Cosmic Models" that describes progress made at different points in the development of an accurate understanding of the Solar System. See the Teacher Support tab, the note titled "Instructional Suggestion: Nature of Science: Discussing How Theories Change". ● In Plate Motion, Lesson 3.3, Activity 2, the class discusses the theory of plate tectonics, including how the term theory is used differently in science and in everyday language.

SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.	Students get experience with how science can be used in decision-making process in several units. For example: ● In Weather Patterns, Lesson 1.2, students view a video "Big Storms in Galetown" that introduces a scenario in which scientists must advise local lawmakers about the possible causes of large storms, and whether they might be related to a new artificial lake. ● In Ocean, Atmosphere, and Climate, Lesson 1.2, Activity 2, students are introduced to a scenario in which scientists must advise the New Zealand Farm Council about the causes of periodic disruptions to regional weather patterns. ● In Plate Motion Engineering Internship, students are introduced to context in which scientific research on plate motion and tsunamis supports the development of warning systems to save lives (see Lesson 1, "Introducing Futura" where the scenario is introduced).
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.	Students see how political, social, and economic concerns can affect science, and vice versa, across multiple units in the Earth Science Course. For example: ● In Plate Motion Engineering Internship, students are introduced to context in which scientific research on plate motion and tsunamis supports the development of warning systems to save lives (see Lesson 1, "Introducing Futura" where the scenario is introduced). ● In Plate Motion Engineering Internship, Lesson 1, "Introducing Futura", students learn that economic and social concerns make limiting long-term costs and limiting false alarms important criteria in designing tsunami warning systems. ● In Weather Patterns, Lesson 1.2, students view a video "Big Storms in Galetown" that introduces a scenario in which scientific research will affect political decisions about a new artificial lake. ● In Ocean, Atmosphere, and Climate, Lesson 3.1, Activities 3 and 4, students read and discuss "The Gulf Stream, a Current that Helped Win a War" which describes how early scientific understanding of the Gulf Stream current helped the United States economically and politically.
SC.912.E.5.4	Explain the physical properties of the Sun and its dynamic nature and connect them to conditions and events on Earth.	This standard is addressed in the **Geology on Mars** unit: ● In Lesson 4.1, Activity 3, students examine cards with information about several stars, including the Sun, and discuss sunspots, solar flares, and prominences. ● In Additional Advanced Content lesson (found in Chapter 4), Activity 1, students read the article "The Star Next Door" that describes how these

		events affect conditions and events on Earth.
SC.912.E.6.1	Describe and differentiate the layers of Earth and the interactions among them.	This standard is addressed through multiple activities in the Plate Motion unit. For example: ● In Lesson 1.2, Activity 3, students read short descriptions and analyze cross-section diagrams of deep drilling sites to learn about the nature of the outer lithosphere. ● In Lesson 1.3, students view a video (see the Activity titled “Revealing Earth's Outer Layer”) that shows a computer model of the outer lithosphere. ● In Lesson 2.1, Activity 3, students use a physical model to understand the nature of the mantle. ● In Lesson 2.1, Activity 5, students read “How Do We Know What's Inside Earth?” which describes all the layers of the solid Earth. ● In Lesson 2.2, Activity 2, students read “Listening to Earth”, which describes the interaction between Earth’s layers that happen at convergent and divergent plate boundaries.
SC.912.E.6.2	Connect surface features to surface processes that are responsible for their formation.	This standard is addressed across several units. For example: ● In Rock Transformations, Lesson 2.1, Activity 2, students use the Rock Transformations simulation to observe how volcanoes and sedimentary rock layers form. ● In Rock Transformations, Lesson 2.1, students view a video “Understanding Weathering” that describes how weathering creates surface features. ● In Rock Transformations, Lesson 2.2, Activities 2 and 3, students read and discuss “Devil’s Tower” which describes how an unusual surface feature was formed. ● In Geology on Mars, Lesson 2.3, Activities 2 and 3, students gather evidence from models of how flowing water and flowing lava can create surface features. ● In Plate Motion, Lesson 2.2, Activity 2, students read “Listening to Earth”, which describes how ridges and trenches are formed at convergent and divergent plate boundaries.
SC.912.E.6.3	Analyze the scientific theory of plate tectonics and identify related major processes and features as a result of moving plates.	This standard is a focus of the Plate Motion unit. For example: ● In Lesson 1.4, Activity 2, students run tests in the simulation to determine the relationship between earthquakes and plate motion. ● In Plate Motion, Lesson 2.2, Activity 2, students read “Listening to

		Earth", which describes how ridges and trenches are formed at convergent and divergent plate boundaries. ● In Lesson 3.3, Activity 2, students revisit the article "A Continental Puzzle" which describes the hypotheses of Alfred Wegener which led to the modern day theory of plate tectonics. ● In Lesson 3.4, Activities 2, 3, and 5, students analyze evidence, and write explanations for how fossils from the same land-dwelling species came to be found in both South America and South Africa as plate motion separated those continents over many millions of years.
SC.912.E.7.3	Differentiate and describe the various interactions among Earth systems, including: atmosphere, hydrosphere, cryosphere, geosphere, and biosphere.	This standard is addressed in several units. For example: ● In Geology on Mars, Lesson 1.1, Activity 4, students are introduced to Earth's spheres, then they compare these spheres for the other rocky planets in our Solar System. ● In Ocean, Atmosphere, and Climate, Lesson 3.4, Activity 5, students discuss which of Earth's spheres are involved in the El Niño phenomenon as well as in a series of other scenarios. ● In Weather Patterns, Lesson 1.5, Activity 4, students discuss ways that precipitation can affect various of Earth's spheres.
SC.912.E.7.5	Predict future weather conditions based on present observations and conceptual models and recognize limitations and uncertainties of such predictions.	This standard is addressed in the Weather Patterns unit. For example: ● In Lesson 3.2, Activity 4 (click NEXT to see part 2 of 2 of this activity), students read the article "How We Predict the Weather", which includes a discussion of how scientists use observations and models, as well as the limitations and uncertainties of weather prediction. ● In Lesson 3.3, Activity 4 (click NEXT to see part 2 of 2 of this activity), students write a report in which they make a prediction about future weather conditions in the town of Galeston, using data and the models they have created to discuss whether Galeston will always have severe storms.
SC.912.E.7.6	Relate the formation of severe weather to the various physical factors.	This standard is a focus of chapters 2, 3, and 4 of the Weather Patterns unit. For example: ● In Lesson 2.2, Activities 2 and 3, students read "Disaster in California!" an article which describes the factors that caused extreme rainfall and flooding. ● In Lesson 2.3, Activity 3, students model a severe rainstorm by changing variables of intensity of solar energy and amount of surface water. ● In Lesson 3.3, students create models (Activity 2) and write explanations

		(Activity 4) showing the causes of severe weather in a fictional town. ● In Lesson 4.3, Activity 2, students engage in scientific argumentation about whether severe weather caused damage to a structure, using evidence related to physical factors that affect precipitation.
LAFS.68.RST.1.1	Cite specific textual evidence to support analysis of science and technical texts.	This standard is addressed in every unit of the Earth/Space Science course. Students read articles multiple times, for different purposes, in order to gather textual evidence to support science ideas. For example: ● In Lesson 2.2, Activity 2 of the Weather Patterns unit, students read the article, “Disaster in California!” Students are encouraged to actively read and analyze the text by making annotations, noting questions they have and connections they are making as they read. During Activity 3, students discuss their annotations with a partner, then with the whole class. The reading coupled with this text-based discussion helps students to better understand important content related to temperature and energy, the relationship between these and how far cloud might rise into the troposphere, and what this means for the size of a storm. ● In Lesson 2.3, Activity 2 of the Plate Motion unit, students re-read a section of the same article, “Listening to the Earth” that they read during the previous lesson. The purpose of the re-reading they do in this lesson is to solidify an understanding of how plates at different kinds of boundaries move, how plates and the mantle interact at each type of boundary, and what landforms are commonly found at each type of boundary. Students then use this information, collected from two different readings of the same article, to support the creation of physical models in Activity 3.
LAFS.68.RST.1.2	Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.	This standard is addressed in every unit of the Earth/Space Science course. Students read articles multiple times and apply the strategy of summarizing often. In addition, for every ‘second read’ students are asked questions that help them to summarize the important ideas from the text. For example: ● In Lesson 2.2, Activity 2 of the Geology on Mars unit, students re-read a section of the article, “Investigation Landforms on Venus” in order to better understand how earth scientists use evidence from landforms to describe the history of a rocky planet, and how models can provide evidence about surface formations and geologic activity on a planet that is too far away to directly study. Students highlight and note important information as they read, then respond to questions that help them to use evidence from the text to summarize what they learned from

		reading. In addition, students then participate in a whole class discussion where they use information from the text to orally summarize important information from the text.
LAFS.68.RST.1.3	Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks.	This standard is addressed in every unit of the Earth/Space Science course. For example: ● In Lesson 2.3, Activity 3 of the Ocean, Atmosphere and Climate unit, students use the Ocean, Atmosphere and Climate simulation to make observations and collect data about the air temperature in two different locations on Earth: one near a warm current and one near a cold current. Students must follow a multistep procedure in order to collect the necessary data for this activity.
LAFS.68.RST.2.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 68 texts and topics.	This standard is addressed in every unit of the Earth/Space Science course. For example: ● In Lesson 3.2, Activity 3 of the Weather Patterns unit, students read, annotate and analyze evidence cards. Each card contains text and various symbols along with either graphs, maps or tables containing data. Students must carefully read all available information in order to make meaning from these cards. ● In Lesson 2.2, Activity 2 of the Rock Transformations unit, students read the article, "Devils Tower" The article contains both traditional text as well a time-sequence diagram that is essential for understanding the content in the article. In order to analyze the diagram, students have to determine the meaning of the associated symbols and domain-specific vocabulary.
LAFS.68.RST.2.5	Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	This standard is addressed in multiple units of the Earth/Space Science course. For example: ● In the Plate Motion unit, Lesson 2.2, Activity 2 (see the Teacher Support tab, note titled "Instructional Suggestion: Literacy Note: Text Structure) students are introduced to the idea of different text structures and discuss the text structure that best applies to the "Listening to Earth" article. ● In Lesson 1, during the activity titled, "Introducing Futura" for the Plate Motion Engineering Internship unit, students learn what their role is (as geohazard engineering interns) and discuss that this role means for the unit; they are also introduced to other characters and roles that they will encounter in the unit (for example, project director and internship

		director -- the teacher). In Lesson 2 during the Reading about Earthquakes and Tsunamis activity, students are introduced to the engineering dossier that will guide many activities in their internship and learn what a dossier is (a term professionals use for a set of related documents). The teacher explains that students will be reading from and adding to the dossier throughout the unit. Over the next 8 lessons students read different portions of the dossier and are encouraged to consider the formal tone as well as the structure and organization of the text.
LAFS.68.RST.2.6	Analyze the authors purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	This standard is addressed in multiple units of the Earth/Space Science course. For example: ● In Lesson 2.2, during Activity 2 of the Geology on Mars unit, students re-read a portion of the Article “Investigating Landforms on Venus” which is about the work that one scientist does with models as part of his work studying Venus. Before reading the class discusses the scientist’s work and why and how he uses models as part of that work as well as why this article, written for this unit, is important for inclusion in the unit. As they read they continue to consider the purposes and usefulness of this work and connect this to other content in the unit; students spend time after reading considering these questions as well. ● In Lesson 1, in the Activity titled “Introducing Futura” for the Plate Motion Engineering Internship unit, the teacher explains the various roles students (and the teacher) will take on during the Engineering Internship. In each lesson that follows, students repeatedly read texts from different participants in the internship and consider the role each participant plays and how this affects the ways they should read associated texts that are provided in the unit.
LAFS.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	This standard is addressed in every unit of the Earth/Space Science course, during standard reading lessons, as well as when students read evidence cards and participate in using a simulation that has textual elements such as symbols, graphs and standard text. For example: ● In Lesson 2.3, Activity 2 of the Weather Patterns unit, students re-read a section of the article “Disaster in California!” focusing on understanding how energy, temperature and the height of a cloud reaches in the troposphere are related to how much rainfall a storm provides. In Activity 3, students apply this understanding to an activity in the Weather Patterns simulation, where they simulate different sizes of rainstorms

		and make observations and collect data about which of these factors affect the amount of rainfall in each storm they model. ● In Lesson 3.3, Activity 2 of the Earth, Moon and Sun unit, students gather evidence from the Earth, Moon and Sun simulation about the conditions for an eclipse to happen. While conducting each trial on the simulation students need to read and understand the diagrams that are used, and they also need to be able to read and understand the data that is provided for each run of the simulation. Next, in Activity 3, students re-read the article, “An Ancient Machine for Predicting Eclipses” and continue to gather evidence about eclipses. Both sources provide evidence for students to use as they create models of eclipses in Activity 3.
LAFS.68.RST.3.8	Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	This standard is addressed in multiple units of the Earth/Space Science course. For example: ● In Lesson 3.2, Activity 3 of the Plate Motion unit, students read the article “A Continental Puzzle” which focuses on Alfred Wegener, who first proposed the theory that continents on Earth’s surface had moved over long periods of time, and the evidence he used to come up with this theory. The article takes an historical perspective and presents facts, reasoning and speculation that people have put forth over the last 150 years since Wegener’s theory has become accepted. While reading in Activity 2, discussing what they read with others in Activity 3, and re-reading again in Lesson 3.3, Activity 2, students confront facts, reasoned judgment and speculation in order to understand what current thinking about this topic is today.
LAFS.68.RST.3.9	Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	This standard is addressed in every unit of the Earth/Space Science course. For example: ● In Lesson 3.3, Activity 2 of the Earth, Moon and Sun unit, students gather evidence from the Earth, Moon and Sun simulation about the conditions necessary for a lunar eclipse to happen. Next, in Activity 3, students re-read the article, “An Ancient Machine for Predicting Eclipses” and continue to gather evidence about eclipses, comparing and contrasting the evidence from each source. Both sources provide evidence for students to use as they create models of eclipses in Activity 3. ● In Lesson 1.5, Activity 2 of the Weather Patterns unit, students re-read a portion of the article “What are Clouds?” to better understand how

		clouds form and how energy plays a role in this. Next, in Activity 3, students use information from the reading to guide them as they use the Weather Patterns simulation to create clouds with varying amounts of rainfall and energy.
LAFS.68.WHST.1.1	Write arguments focused on discipline-specific content. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the topic or text, using credible sources. Use words, phrases, and clauses to create cohesion and clarify the relationships among claim(s), counterclaims, reasons, and evidence. Establish and maintain a formal style. Provide a concluding statement or section that follows from and supports the argument presented.	This standard is addressed in all units of the Earth/Space Science course. For example: ● In Lesson 4.3, Activity 4 in the Earth, Moon and Sun unit, students write arguments to address the question, “During a year, will there be a lunar eclipse of the moon of Kepler-47c?” Kepler-47c is an actual planet that orbits two stars. Students write arguments based on evidence that they examine in the previous two lessons, as well as content knowledge they have gained throughout the unit; the writing activity is constructed so that students’ arguments can contain content from the entire unit. ● During Lessons 4.1 (for example, Activity 3) and 4.2 (for example, Activity 3) of the Ocean, Atmosphere and Climate unit, students consider evidence and claims about whether the average air temperature in an area of South China during the Carboniferous period was the same, warmer or cooler than it is today. In order to analyze the evidence, students use the content knowledge they have gained throughout the unit about climate, temperature, ocean currents, energy and the atmosphere. In Lesson 4.3 students write arguments that address the question about air temperature during the Carboniferous period that they have been examining. This writing activity is constructed so that students’ arguments can contain content from the entire unit.
LAFS.68.WHST.1.2	Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes. Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories as appropriate to achieving purpose; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension. Develop the topic	This standard is addressed in all units of the Earth/Space Science course. For example: ● In Lesson 4.3, Activity 2 in the Plate Motion unit, students begin to prepare to write final arguments by first choosing a claim they want to support in writing. They then organize their thinking using a tool called the Reasoning Tool. Next, students further organize their thinking by examining what they have written on the Reasoning Tool and deciding which evidence to include in their writing. All of these activities prepare students to develop a topic with relevant, well-chosen facts. In the instructions for writing their arguments, students are encouraged to directly use the information from each evidence card to support their writing, as they write their arguments in Activity 4. In addition, students are provided with supportive scaffolds such as the Scientific Argument

	with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples. Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts. Use precise language and domain-specific vocabulary to inform about or explain the topic. Establish and maintain a formal style and objective tone. Provide a concluding statement or section that follows from and supports the information or explanation presented.	Sentence Starters, which remind students ways to include transitions, clarify relationships among ideas, and maintain cohesion during their writing. ● In Lesson 7, during the activity titled, 'Introducing the Proposal" of the Plate Motion Engineering Internship unit, students discuss the rubric that will use to design their proposals, so that they can observe and understand the tone and construction of the arguments they will be writing; the rubric also includes categories that describe the use of relevant, domain specific vocabulary that should be included. Next, students create draft outlines, which receive feedback about the content as well as overall writing and vocabulary use, and in Lesson 8 they revise their proposals based on this feedback. In addition, throughout Lessons 7, 8, and 9, students are reminded to establish and maintain a formal style and objective tone in their proposal writing.
LAFS.68.WHST.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	This standard is addressed in all units of the Earth/Space Science course. For example: ● In Lessons 7, 8, and 9 of the Plate Motion Engineering Internship unit, students are introduced to the task of developing an Engineering Proposal that offers the best tsunami warning system for Sri Lanka, based on criteria such as cost, what kinds of earthquakes are detected and whether or not sufficient warning is provided for people to react. Students develop, revise and organize their written proposals during this series of lessons, and consider the style (through examination of a rubric, and after receiving feedback about their proposals) as well as audience (see, for example, Lesson 8, the activity titled "Revising Design Decisions").
LAFS.68.WHST.2.5	With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.	This standard is addressed in all units of the Earth/Space Science course. Most units in the Earth/Space Science course end with a 3-day Science Seminar Sequence. This sequence provides time for students to examine evidence about a novel scientific problem that requires them to use content from the rest of the unit. Students discuss their ideas about this problem in a discourse routine called the Science Seminar, then independently write final arguments based on the thinking they did during the sequence. For example: ● In Lesson 7, during the Activity titled, 'Introducing the Proposal" of the Plate Motion Engineering Internship unit, students review their role as

		engineering interns and consider the audience to whom they will be addressing their proposals -- their project director. They are introduced to the rubric that will be used to provide feedback about their proposals and, through this, consider the component parts, tone, audience and specific vocabulary needed to write an effective proposal. Next, students write draft proposals, which receive feedback, and in the following two lessons, students revise their proposals based on this feedback. ● In Lesson 4.3, Activity 2 of the Earth, Moon and Sun unit, students begin to prepare to write their final arguments. They first choose a claim they want to support in their writing, then use a tool called the Reasoning Tool to consider, analyze, and organize their evidence. In Activity 3, students further organize their thinking by examining what they have done with the reasoning tool and deciding which evidence to include in their writing. All of these activities prepare students to write their arguments in Activity 4. In addition, as they write in Activity 4, students are provided with supportive scaffolds such as Scientific Argumentation Sentence Starters to support their use of appropriate language and tone.
LAFS.68.WHST.2.6	Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.	This standard is addressed in all units of the Advanced Earth/Space Science Course. For example: ● In Lesson 4.3, Activity 4 in the Earth, Moon, and Sun Unit (see the Teacher Support note titled Instructional Suggestion: Literacy Note: Additional Modalities for Sharing Arguments) students are presented with presentation options for their final argument, including publishing to a class webpage or blog. ● In Lesson 3.3, Activity 2 in the Weather Patterns unit, students create models to show what they think is happening to cause recent storms in the fictitious town of Galetown to be so severe, then discuss their models with a partner in Activity 3. Students then write and publish reports, explaining to the citizenry of Galetown why they have been suffering from more severe storms lately, and make predictions about whether or not these strong storms will continue.
LAFS.68.WHST.3.7	Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of	This standard is addressed in multiple units of the Earth/Space Science course. For example: ● In the Plate Motion Engineering Internship, Lesson 5, during the activity titled “Testing Warning System Designs”, students use the Futura Tsunami Alert tool to test different designs for creating a tsunami warning system. In the activity titled, Analyzing Designs, students first

	exploration.	discuss designs with the class and with a partner, then decide on designs to submit, providing written analysis regarding why they chose their final design over others. ● In Lesson 1.3, Activity 3 of the Ocean, Atmosphere and Currents unit, students conduct a short investigation using the Ocean, Atmosphere and Currents simulation to answer the question, “How does air get energy?” In Activity 4 they discuss the evidence they gathered from the simulation, then write about this topic, using evidence they’ve gathered from the simulation and elsewhere.
LAFS.68.WHST.3.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	This standard is addressed across the Earth/Space Science course. For example: ● In every unit, students can use the search function in the Amplify Library to search and find relevant content within articles. ● The Weather Patterns unit prioritizes the consideration of source as an important criterion students should learn about and use. Beginning in Lesson 3.2, Activity 2, students are asked to read and analyze a set of possible evidence and sort it according to how reliable each source of evidence is. Each piece of evidence comes from a different source, and students evaluate the sources and make conclusions about the inherent biases of each before deciding which data they should rely upon during the next activity. In Activity 4, students re-read a section of the article “Disaster in California!” that they read in a previous lesson, and reflect in writing on which sources from the article seem more reliable than others, based on their burgeoning understanding of more and less reliable sources. Finally, in Lesson 4.1, Activity 2, students again decide which sources are more and less reliable from a new set of evidence cards; they discard sources deemed unreliable then use the remaining evidence to write strong arguments in Lesson 4.3, Activity 3.
LAFS.68.WHST.3.9	Draw evidence from informational texts to support analysis reflection, and research.	This standard is addressed in all units of the Earth/Space Science course. For example: ● In Lesson 3.3, Activity 2 of the Plate Motion unit, students re-read the article “A Continental Puzzle.” then address several questions about the reading, drawing evidence from the text in their response. ● In Lesson 1.1, Activity 4 (press NEXT to see part 2 of 2 of this activity) of the Geology on Mars unit, students examine cards that provide information about the different parts of each system (atmosphere, hydrosphere, biosphere, geosphere) that makes up the rocky planets in

		our solar system (Mars, Earth, Venus, Mercury). Students draw information and evidence from these cards and record this information in writing, then share what they learn with their peers. ● In all Science Seminar Sequences, which occur in most units in the Advanced Earth/Space Science Course, students spend either 1-2 days reading, analyzing and participating in research using evidence cards and other sources. Then, at the end of the sequence, students use evidence derived from these sources to support writing final arguments for the unit.
LAFS.68.WHST.4.10	Write routinely over extended time frames (time for reflection and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	This standard is addressed in all units of the Earth/Space Science course. Students write in virtually every lesson, for a wide variety of purposes. Some examples are: ● In Lesson 4.3, Activity 4 of the Plate Motion unit, students write final arguments to culminate their Science Seminar experience. These arguments contain content from the entire unit and serve as a culminating experience for the unit. ● In Lesson 3.4, Activity 2 of the Rock Transformations unit, students participate in a writing and discourse routine called Write and Share. In the routine, students are broken into small groups, and each group member receives a different but related prompt. Students write independently for a few minutes then share their written responses and discuss. ● In Lesson 2.2, Activity 3 of the Geology on Mars unit, students record observations of a hands-on model of stream tables.
LAFS.7.SL.1.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others ideas and expressing their own clearly. Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion. Follow rules for collegial	This standard is addressed in all units of the Advanced Earth/Space Science Course. Students discuss their thinking in virtually every lesson, for a wide variety of purposes. Some examples, across one unit, are: In the Rock Transformations unit, students discuss every day, with small, medium and large groups. ● In Lesson 1.5, Activity 3, student discuss evidence about how rocks form, first in pairs then as a class. ● In Lesson 2.4, Activity 2, students participate in the small group discourse routine, Write and Share, where each student in a group receives a unique data source, write about it then share what they learned with their group so that all members can learn something new from the others. ● In Lesson 3.3, Activities 2 and 3, students play a rock transformations

	discussions, track progress toward specific goals and deadlines, and define individual roles as needed. Pose questions that elicit elaboration and respond to others questions and comments with relevant observations and ideas that bring the discussion back on topic as needed. Acknowledge new information expressed by others and, when warranted, modify their own views.	game and discuss each transformation as they work together. In Lesson 3.4, Activity 2, students again use the Write and Share discourse routine to share thinking about rock transformations and plate movement. ● In Lessons 4.1 and 4.2 student pairs discuss claims and evidence focused on understanding which rock transformations might be happening on Venus, and in Lesson 4.3 students participate in an whole-class discussion called the Science Seminar where they work together to discuss the claims and evidence about the rock transformations on Venus, and must use the specific evidence they evaluated, along with all the content from the unit to evaluate and eventually decide what they think is happening on Venus. The Science Seminar in particular provides students with many opportunities to pose questions that elicit elaboration from others, and respond to others' questions and comments with relevant ideas. It also provides students with a time to acknowledge information presented by others and to modify their own views as needed.
LAFS.7.SL.1.2	Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.	This standard is addressed in all units of the Advanced Earth/Space Science Course. ● In Lesson 3.4, Activity 2 of the Earth, Moon and Sun unit, students participate in the small group discourse routine, Write and Share. In this activity one student evaluates evidence offered from the Earth, Moon and Sun simulation, one student evaluates evidence from an article they all read in a previous lesson, and another evaluates evidence from a model. During the discussion, students share what they learned from each source, and discuss what kind of evidence each unique format has to offer. They use all three sources to summarize the main ideas gathered and to answer questions from the unit. ● In Lesson 4.1 Activity 3, of the Plate Motion unit, students receive evidence from a variety of sources about a rift that is occurring near several plate boundaries in Mexico. They discuss each source, evaluating them and making conclusions about the main ideas presented on each, then use this information to sort the cards according to which claim each card supports. In Lesson 4.2 they revisit this evidence and discuss it in the whole-class discourse routine, the Science Seminar.
LAFS.7.SL.1.3	Delineate a speaker's argument and specific claims, evaluating the	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. Most units end with a curricular sequence called the Science

	soundness of the reasoning and the relevance and sufficiency of the evidence.	Seminar Sequence. This 3-day series of lessons asks students to use content derived throughout the unit and apply it to understanding a new context. Students are presented with competing claims and evidence, then prepare for a whole-class discussion of this evidence. The following offer examples of students discussing claims and evidence and using reasoning: ● In Lesson 4.3, Activity 2 of Weather Patterns students, during a whole-class Science Seminar, discuss claims and supporting evidence about what kind of rainstorm (or rainstorms) destroyed a remote environmental center (e.g. one large storm or several medium ones). Students must use evidence and reasoning to explain and determine which scenario best explains what happened there. During the discussion, students evaluate which evidence is relevant and irrelevant to each claim and, as part of this discussion, evaluate the soundness of the reasoning that each participant offers.
LAFS.7.SL.2.4	Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. Most units end with a curricular sequence called the Science Seminar Sequence, which asks students to apply what they have learned to a new context. Students are presented with competing claims and evidence, then prepare for a whole-class discussion of this evidence. The following offer examples of students coming prepared to discuss a specific, content-specific topic: ● In Lesson 4.3, in the Activity titled 'Introducing the Science Seminar' from the Rock Transformations unit, the class reviews the important social attributes needed to participate effectively in scientific argumentation. In Activity 2 students discuss claims about what rock transformations may be occurring on the planet Venus. Students use evidence that they have analyzed and discussed during the previous two lessons in order to hold this whole class discussion.
LAFS.7.SL.2.5	Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.	This standard is addressed in all units of the Advanced Earth/Space Science Course. For example: ● In Lesson 4.3, Activity 4 in the Earth, Moon, and Sun Unit (see the Teacher Support note titled Instructional Suggestion: Literacy Note: Additional Modalities for Sharing Arguments) students are presented with presentation options for their final argument, including a multimedia presentation or video. ● In Lesson 4.3, Activity 2 of the Rock Transformations unit, students participate in a whole-class Science Seminar discussion. Much of the

		evidence under discussion comes from several diagrams and actual photos from Venus that students have analyzed in previous lessons and, throughout the discussion in the Science Seminar students reference and discuss these visuals. ● In Lesson 1.4, Activity 2 of Earth, Moon and Sun unit, student pairs participate in an activity where they collect data from the Earth Moon and Sun simulation. During this activity pairs are directed to discuss their observations and the data they collect, and to then apply this information to answer the Investigation Question, “Why is part of the moon dark?” Students refer to the simulation as they work together to discuss and answer the Investigation Question, and to continually clarify their understanding as they participate in the activity.
MAFS.6.EE.3.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation $d = 65t$ to represent the relationship between distance and time.	This standard is addressed throughout the Weather Patterns unit. For example: ● In Lesson 1.3, Activity 3 (see the Teacher Support tab), students use the unit’s Data Tool to graph weather data. This activity enables students to model mathematically the relationship between different variables, such as temperature change, energy released, amount of cloud formed, and amount of rain formed, and to see how one variable can affect another. Students then have the opportunity to determine the equation that relates temperature difference to one of the other variables: students draw a line of best fit for the data and use it to determine the slope and equation. ● In Lesson 2.1, Activity 2 (see the Teacher Support tab) of that same unit, students again use the Data Tool to analyze how starting air parcel temperature affects how high the parcel rises. Students graph the data they collect in the Weather Patterns simulation, determine a line of best fit, and write an equation relating the two variables.
MAFS.6.SP.2.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	This standard is addressed in the Ocean, Atmosphere, and Climate unit. In Lesson 1.4, Activity 2 (see the note titled “Instructional Suggestion: Going Further: Mathematical Thinking” in the Teacher Support tab), students complete a sim extension activity where they gather numerical data about temperature and latitude and display it in dot plots on a number line. Students use their dot plots to draw conclusions about temperatures at different latitudes.

MAFS.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by: Reporting the number of observations. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. For example: ● In Lesson 3.2, Activity 3 of Weather Patterns, students analyze data sets representing weather conditions (e.g., temperature, wind speed, rainfall) of storms around the world to identify patterns across all storms to conclude that wind led to an increased amount of rain in each storm. ● In Lesson 1.5, Activity 3 of Ocean, Atmosphere, and Climate, students analyze a series of bar graphs, identifying the features of the graph they are using to get information (title, axis labels, and data), the variables that the graph shows (air temperature, year), and the units of measurement (degrees, years). Students use the graphs to draw conclusions about a specific location (e.g., the air temperature is cooler in New Zealand during El Niño years).
MAFS.7.SP.2.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.	This standard is addressed in the Ocean, Atmosphere, and Climate unit. In Lesson 1.5, Activity 3, students analyze a series of bar graphs representing average air temperature and ocean surface temperature in two different times. Students use the graphs to draw conclusions about a specific location (e.g., the air temperature is cooler in New Zealand during El Niño years). In the same lesson, students discuss data sets that include a measure of variability (click NEXT to see part 2 of 2 of this activity and select the Teacher Support tab; scroll down to the note titled “Instructional Suggestion: Going Further: Mathematical Thinking”).
MAFS.7.SP.3.5	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around	This standard is addressed in the Ocean, Atmosphere, and Currents unit with a math extension in Lesson 1.2, in the activity titled “Chasing El Niño” (see the Teacher Support tab, the note titled Instructional Suggestion: Going Further: Mathematical Thinking).

	1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	
ELD.K12.ELL.SC.1	English language learners communicate information, ideas and concepts necessary for academic success in the content area of Science.	In every Amplify Science unit, students are supported in developing science vocabulary and scientific language structures in oral discourse and in writing. For example: ● In the Weather Patterns Unit, Lesson 1.6, Activity 2, students use a Word Relationships routine to consider how key vocabulary words relate to one another and to practice forming sentences with these key words. ● In the Earth, Moon, and Sun unit, Lesson 4.2, Activity 2, students' use Argumentation Sentence Starters to support their use of scientific language as they discuss claims and evidence about whether lunar eclipses are likely in a binary star system. ● In the Plate Motion Unit, Lesson 4.3, Activities 2 and 3, students use a Reasoning Tool graphic organizer as they learn to connect evidence to claims in a written scientific argument.
ELD.K12.ELL.SI.1	English language learners communicate for social and instructional purposes within the school setting.	Student-to-student talk and writing-to-learn are important aspects of the pedagogical approach throughout Amplify Science, and Amplify Science uses a set of research-based principles for supporting English language learners in their oral and written participation: ● Access and build on students' background knowledge. ● Capitalize on students' knowledge of language. ● Provide additional scaffolds for language. ● Provide explicit instruction about the language of science. ● Offer multiple entry points into science content. ● Provide multiple means of expressing science content knowledge. These principles are built into each unit. For example: ● In all units, students have opportunity to express background knowledge orally or in writing (see for example, Weather Patterns, Lesson 1.2, Activity 1), ● In all core units, students use modeling tools to create visual representations of their explanations, providing English learners with an opportunity to express their understanding visually in addition to in writing (see for example, Earth, Moon, and Sun, Lesson 2.4, Activity 4) ● Students are provided with scaffolds for oral and written language use, such as sentence starters (see for example, Geology on Mars, Lesson 4.6, Activity 3):

		- Teachers are provided with suggestions for how to group students in order to support English learners (see for example, Ocean, Atmosphere, and Climate, Lesson 1.5, in the Differentiation Brief, section titled, “Specific Differentiation Strategies for English Learners”, note titled “Strategic Groupings”. - Teachers are encouraged to capitalize on English learners’ language knowledge, for example by point out Spanish-English cognates (see for example, Rock Transformations, Lesson 2.1, in the Differentiation Brief, section titled, “Specific Differentiation Strategies for English Learners”, note titled “Accessing cognates for Spanish-speaking students.”
MAFS.K12.MP.1.1	Make sense of problems and persevere in solving them.	Making sense of problems and persevering in solving them is a common characteristic of Amplify Science units. Each unit begins with a real-world problem that students address over the course of the unit, distilling patterns from data, synthesizing across a variety of evidence sources (e.g., text, tables, and graphs), and creating models to illustrate relationships between ideas. For example: - In Weather Patterns (see Lesson 1.2, the activity titled “Introducing the Mystery of Galetown Storms”), students assume the role of student forensic meteorologists as they investigate how water vapor, temperature, energy transfer, and wind influence local weather patterns in a fictional town. Using weather data, physical models, a digital simulation, and hands-on activities, and science texts, students investigate the mechanisms by which a warm weather rainstorm can be generated, through the lens of energy transfer. - In Plate Motion Engineering Internship (see Lesson 1, the activity titled “Introducing Futura”), students assume the role of geohazards engineering interns at Futura Engineering to design a tsunami warning system. They will use a digital model to simulate placing earthquake, deep water, and shallow water sensors at various places in the Indian Ocean region in order to maximize the response time people receive to get to safety, while operating within other design constraints. As they persevere in solving this problem, they strategically break it down into smaller parts, look for correspondences between and across quantitative data, and frequently use visual representations and models to investigate scientific ideas and test their designs. - In Geology on Mars (see Lesson 1.1, the activity titled “Introducing the Student Planetary Scientist Role”), students take on the role of student planetary geologists working to investigate the planet Mars, students

		search for evidence of past liquid water on the surface to determine habitability of Mars. Students explain this problem by answering smaller questions one at a time. Students compare a channel on Mars to analogous structures on Earth's surface and use physical models to gather evidence and evaluate whether it supports the claim that flowing liquid water formed the channel.
MAFS.K12.MP.2.1	Reason abstractly and quantitatively.	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. For example: ● In Lesson 1.6, Activity 1 of Weather Patterns, students analyze weather data (amount of rainfall, level of local surface water) from different storms. They decontextualize by observing patterns in the quantitative data about the different storms; they then contextualize the data by using it to support a claim about the cause of severe storms. ● In Lesson 3.1, Activity 2 of Plate Motion (press NEXT to see part 3 of 3), students gather data in the Plate Motion Sim (span of time and distance of plate travel). Students decontextualize the data by using it to calculate the rate of plate movement over a certain time period. Students then contextualize their results by considering what they mean in terms of plate motion, allowing students to conclude that Earth's plates travel at a rate too slow to be experienced by humans.
MAFS.K12.MP.3.1	Construct viable arguments and critique the reasoning of others.	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. For example: ● In Lesson 1.5, Activity 5 of Weather Patterns, students investigate the effect of more water vapor in the air on the amount of rainfall to help them evaluate a claim that a lake in the fictional town of Galetown caused more rain in that town. ● In Geology on Mars (see Lesson 3.3, Activity 2 for example), students evaluate evidence and generate arguments about whether flowing water caused a channel to form on Mars. In doing so, students reason inductively about data and make plausible arguments by taking into account the context from which the data arose.
MAFS.K12.MP.4.1	Model with mathematics.	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. For example: ● In Lesson 2.1, Activity 2 of Weather Patterns (see the Teacher Support tab), students use the Data Tool to mathematically model how the starting temperature of an air parcel affects how high the parcel rises.

		Students use temperature and height data from the sim to create a scatter plot and draw a best fit line for the data. Using the line, students are prompted to determine the slope and an equation for their line. ● In Lesson 3.1, Activity 2 of Plate Motion, students gather evidence in the Plate Motion Sim (a digital model) and use their data to calculate the rate of plate movement over millions of years (press NEXT to see Part 3 of 3). Through modeling plate motion and gathering data in the Sim, students conclude that Earth's plates travel at a rate too slow to be experienced by humans.
MAFS.K12.MP.5.1	Use appropriate tools strategically.	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. For example: ● In Lesson 3.1, the activity titled "Video: Plate Motion and GPS," of Plate Motion, students learn that GPS can be used to measure the rate and direction of plate movement. Then, in Activity 2, students gather evidence in the Plate Motion Sim (a digital model) and use their data to calculate the rate of plate movement over millions of years. Through modeling plate motion and gathering data in the Sim, students conclude that Earth's plates travel at a rate too slow to be experienced by humans. ● In Lesson 1.2, Activity 2 of Geology on Mars, students use an interactive digital tool, Google Mars, to explore the surface of Mars and identify landforms using elevation data that could be evidence that water once flowed on the planet.
MAFS.K12.MP.6.1	Attend to precision.	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. For example: ● In Lesson 3, the activity titled "Investigating Earthquakes with TsunamiAlert" of Plate Motion Engineering Internship, students use an ocean landform map and the TsunamiAlert Design Tool (a digital model) to identify the different types of plate boundaries found in the Indian Ocean. Students attend to precision as they annotate a map with likely earthquake and tsunami locations, which will ultimately inform their designs of tsunami warning systems. ● In Lesson 2.3, Activity 2 of Earth, Moon, and Sun, students make models of the moon at different times of month, attending to precision as they consider how much of the moon is visible from different locations.
MAFS.K12.MP.7.	Look for and make use of structure.	This standard is addressed across multiple units in the Advanced Earth/Space

1		Science Course. For example: ● In Lesson 1.4, Activity 2 of Ocean, Atmosphere, and Currents, students examine maps to identify patterns of energy transfer on Earth, concluding that there is more energy transferred to the parts of Earth that are closer to the equator and less energy transferred to parts further away from the equator. ● In Lesson 1.3, Activity 3 (see the Teacher Support tab in Part 1 of 3, the note titled "Going Further: Mathematical Thinking") of Weather Patterns, students use the unit's Data Tool to graph data points for weather data. Students then draw a line of best fit for the data and use it to describe the pattern in the data. ● In Lesson 2.3, Activity 3 of Earth, Moon, and Sun ((see the Teacher Support tab, the note titled "Going Further: Mathematical Thinking"), students use the equation for surface area ($SA = 4\pi r^2$) to determine the surface area of the moon. Students use the structure of this equation to determine the total surface area of the moon that is illuminated at different positions on Earth at a particular time.
MAFS.K12.MP.8.1	Look for and express regularity in repeated reasoning.	This standard is addressed across multiple units in the Advanced Earth/Space Science Course. For example: ● In Lesson 2.3, Activity 3 of Weather Patterns, students analyze and graph weather data to identify patterns and regularity in the relationship between the starting temperature of an air parcel, amount of rain, the height the parcel rises, and the amount of energy transferred out. Students discover relationships such as: as the starting air parcel temperature increases, the amount of rain also increases. ● In Chapter 1 of Ocean, Atmosphere, and Currents, students gather data from multiple evidence sources, including collecting temperature data from the unit's digital sim, to identify the repeated pattern that as solar energy decreases, air temperature increases (see Lesson 1.3, Activity 3 as an example).