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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.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 physical evidence supports scientific theories that Earth has evolved over geologic time due to natural processes.	This standard is a focus of the Plate Motion and Rock Transformations units. 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. (Click NEXT to see part 3 of 3 of this activity and see the Teacher Support tab). ● 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.
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 the Rock Transformations unit. For example, in Lesson 3.4, Activity 4, students view a slide show and discuss ways that human actions impact weathering and water flow.

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.L.15.1	Recognize that fossil evidence is consistent with the scientific theory of evolution that living things evolved from earlier species.	This standard is addressed in the Natural Selection unit in Lesson 3.2, Activity 5 (click NEXT to see parts 2 and 3 of 4 in this activity). Students observe and compare detailed illustrations of fossils and of skeletons of related living organisms and they read “How You Are Like a Blue Whale”, an article that describes fossil evidence of evolution in mammals.
SC.7.L.15.2	Explore the scientific theory of evolution by recognizing and explaining ways in which genetic variation and environmental factors contribute to evolution by natural selection and diversity of organisms.	This standard is addressed in the Natural Selection unit. For example: ● In Lesson 1.3, Activity 2, students use the Natural Selection Simulation to explore variation in a population. ● In Lesson 2.2, Activity 2 students use the Natural Selection Simulation to investigate how adaptive traits affect survival and reproduction rates. ● In Lesson 2.2, Activity 3, students create a model and write an explanation for how the trait of beak strength could change in a bird population over time. ● In Lesson 3.2, Activity 3, students use the Natural Selection Simulation to investigate how the fur level trait in a population will change over time in a cold environment. ● In Lesson 3.3, Activity 4, students read an article describing the evolution through natural selection of tortoises in South America and the Galapagos Islands.
SC.7.L.15.3	Explore the scientific theory of evolution by relating how the inability of a species to adapt within a changing environment may contribute to the extinction of that species.	This standard is addressed in the Natural Selection unit. For example: ● In Lesson 2.4, Activity 4, students are challenged to cause extinction in the Natural Selection simulation, and the class discusses how environmental change can cause extinction when individuals with adaptive traits are not present in the population.

SC.7.L.16.1	Understand and explain that every organism requires a set of instructions that specifies its traits, that this hereditary information (DNA) contains genes located in the chromosomes of each cell, and that heredity is the passage of these instructions from one generation to another.	Chapter 2 and Chapter 3 of the unit Traits and Reproduction are focused on this concept. For example: ● In Lesson 2.1, Activity 2, students read the article, “Hemophilia, Proteins, and Genes” which describes the role of genes and chromosomes in producing proteins which determine traits. ● In Lesson 2.2, Activity 2, students engage in a physical model in which they play the roles of genes and ribosomes. ● In Lesson 2.2, Activity 4, and in Lesson 2.3, students watch the video “Mutations and New Traits” (see Digital Resources), which shows how new traits can be introduced into a population by a mutation that results in a trait, the genes for which can be passed down from parents to offspring. ● In Lesson 2.3, Activity 2, students use the Traits and Reproduction sim to observe that organisms always have two copies of a gene (one on each chromosome) for each feature. ● In Lesson 3.2, Activity 3, students use the Traits and Reproduction Simulation to investigate the process of inheritance.
SC.7.L.16.2	Determine the probabilities for genotype and phenotype combinations using Punnett Squares and pedigrees.	This standard is addressed in the Traits and Reproduction unit in lesson 3.3, Activity 4. Students learn to use Punnett squares to predict probabilities for genotypes and phenotypes for specific traits from given parents and compare these to results shown in pedigrees in the digital simulation.
SC.7.L.16.3	Compare and contrast the general processes of sexual reproduction requiring meiosis and asexual reproduction requiring mitosis.	This standard is addressed in the Traits and Reproduction unit. In Lesson 3.3, Activity 5, (click NEXT to see part 2 of 2 of this activity), students read an article titled “Sea Anemones: Two Ways to Reproduce,” which compares sexual and asexual reproduction at the cellular level. In addition, throughout Chapter 3, students investigate sexual reproduction of organisms and the gene combinations that result in offspring. For instance, in Lesson 3.3, Activity 5, students investigate the resulting combinations of genes and traits in offspring of a male and female spider after random fertilization.
SC.7.L.16.4	Recognize and explore the impact of biotechnology (cloning, genetic engineering, artificial selection) on the individual, society and the environment.	The unit Traits and Reproduction is focused on the problem of selective breeding of spiders for biomedical purposes. For example: ● In Lesson 1.2 Activity 3, students are introduced to the problem they will investigate: the need for a biomedical firm to breed spiders to produce silk that can be used for medical applications. ● In Lesson 3.6 Activity 4, students use the Traits and Reproduction Simulation to breed spiders with the trait for medium silk flexibility.

SC.7.L.17.1	Explain and illustrate the roles of and relationships among producers, consumers, and decomposers in the process of energy transfer in a food web.	This standard is addressed in the Populations and Resources unit. For example: ● In Lesson 2.3, Activity 4, students read an article, “Where Living Things Get Their Energy,” which describes the relationships between producers, consumers, and decomposers in ecosystems, and where each of those organism types gets its energy.
SC.7.L.17.2	Compare and contrast the relationships among organisms such as mutualism, predation, parasitism, competition, and commensalism.	The unit Populations and Resources is focused on this concept. For example: ● In Lesson 3.3, Activity 4, students read the article “The Ant and the Acacia”, which addresses mutualism and compares it to other relationships in ecosystems, such as predation and competition. Students discuss the article and contrast mutualism with parasitism and commensalism in Lesson 3.4, Activity 1. ● In Lesson 2.4, Activity 4, students conduct an investigation of predator-prey relationships using the Populations and Resources Simulation. ● In Lesson 3.1, Activity 2, students read the article “Jelly Population Explosion: How Competition Can Affect Population Size” ● In Lesson 3.4, Activity 3, students write an argument about the causes of changes to a population of moon jellies, which includes an analysis of predator-prey relations.
SC.7.L.17.3	Describe and investigate various limiting factors in the local ecosystem and their impact on native populations, including food, shelter, water, space, disease, parasitism, predation, and nesting sites.	This standard is addressed in the Populations and Resources unit. In Lesson 4.3, Activity 4, students read an article titled “Limiting Factors in Ecosystems,” which provides a variety of examples of when a factor is limiting and when it is not and the effects of these limiting factors on populations of organisms that live in the ecosystem.
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 Light Waves unit, students are investigating the cause of the increased rate of skin cancer in Australia. ● In Lesson 2.1, Activity 2, students conduct an experiment to gather evidence about how different types of light affect materials differently. ● In Lesson 2.2, Activity 2, students use reference materials—an article titled “Harvesting Sunlight”—to get more evidence about different wavelengths of light.

		● In Lesson 2.5, Activity 3, students analyze data about melanin levels in different populations and about global levels of UV light. ● In Lesson 2.5, Activity 4, students write an argument defending their conclusions about the causes of the increased rate of skin cancer in Australia. In the Populations and Resources unit, students are investigating what has caused a dramatic increase in the moon jelly population in an ecosystem. ● In Lesson 1.2, Activity 4, students gather evidence about organisms in the moon jellies' ecosystem from reference texts. ● In Lesson 2.3, Activity 2, students make predictions about what can change the rate of births for a population, then test their predictions by planning and conducting tests in the Populations and Resources simulation. In Lesson 2.4, Activity 2, they have a similar experience investigating the rate of deaths in a population. ● In Lesson 2.7, Activity 3 and Lesson 3.4, Activity 2, students analyze data about the moon jellies' ecosystem and engage in scientific argumentation. 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 in the Traits and Reproduction, Natural Selection and Plate Motion Engineering Internship units. ● In Traits and Reproduction Lesson 3.3, Activity 4, the class engages in

		repeated trials with the Traits and Reproduction simulation in order to get reliable data for questions about probability. Class discussion contrasts this to what would be necessary for replication of inheritance tests with live organisms. ● In Natural Selection, Lesson 1.4, Activity 4, the Teacher Support note "Technology Note: Repeating Trials" encourages the teacher to discuss both replication and repetition with students after a sim test in which different students are likely to find different results based on random variation. ● 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").
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 engage in different types of investigations and discuss the evidence gathered. For example: ● In Thermal Energy, Lesson 1.2, Activity 3, students conduct an experiment in which they compare effects in hot and cold water. ● In Light Waves, Lesson 1.2, Activity 3, students conduct an exploratory investigation in which they gather evidence that light carries energy. ● In the Populations and Resources Unit, Lesson 2.2, Activities 2 and 4, the class conducts a controlled experiment to test the input variable of different amount of sugar on the output variable of the amount of cellular respiration by the yeast. ● In the Natural Selection Unit, Lesson 2.2, Activity 2, students conduct systematic observations of reproduction by organisms with more-adaptive and less-adaptive traits in the Natural Selection simulation.
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, in which students engage in experiments. For example: ● In the Populations and Resources Unit, Lesson 2.2, Activity 2 (press NEXT to see part 2 of 2, in which test and outcome variables are discussed) and Activity 4, the class conducts a controlled experiment to test the input variable of different amount of sugar on the output variable of the amount of cellular respiration by the yeast. ● In the Natural Selection Unit, Lesson 1.5, Activity 2, students conduct a controlled experiment in the Natural Selection simulation testing the

		effect of the input variable of the presence/absence of predators on the outcome variable of prey color traits.
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.	Throughout the Comprehensive Science 2 Course, students experience and discuss numerous methods used in physical science to gather evidence in pursuit of scientific explanations. For example: ● In the Light Waves Unit, Lesson 1.2, in the activity titled “Interview with a Spectroscopist”, students watch a short documentary video about a scientist who conducts laboratory experiments using lasers. ● In Harnessing Human Energy unit, Lesson 1.4, Activity 3, students read an article, “Energy Inventions”, about scientists and engineers who design energy solutions. ● In the Populations and Resources Unit, in Lesson 1.2 in an activity titled “Introducing Studying Jelly Populations” students watch a short documentary video about a real scientist who uses sampling, laboratory experiments and ecosystem models to learn about jellies role in ecosystems. ● In the Populations and Resources Unit, Lesson 1.4 in an activity titled “Sampling a Jelly Population” students watch a video that teaches them about the importance of sampling in ecology and what makes evidence from sampling stronger or less strong. And in the same lesson in Activity 2, students evaluate sampling evidence. ● In the Traits and Reproduction Unit, Lesson 1.3, Activity 3, students create physical models of protein molecules and discuss the importance of models to investigating organic structures that are too small to be seen.
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 Light Waves unit, students are investigating the natural phenomenon of the high rate of skin cancer in Australia. ● In Lesson 1.2, Activity 3, students gather empirical evidence that light carries energy. ● In Lesson 1.4, Activity 3, students analyze observations of world sunlight levels and compare them to skin cancer rates. ● In Lesson 1.4, Activity 4, students write an explanation of the phenomenon based on this evidence and observations. In the Natural Selection Unit, students are investigating what has caused a

		population of newts to become so poisonous. ● In Lesson 1.5, Activity 2; Lesson 2.2, Activity 2 and Lesson 3.2, Activity 3, students generate and analyze evidence from the simulation in order to explain how traits in a population can change. ● In Lesson 2.4, Activities 3 and 5, students analyze data about the newt population and plan and write arguments supporting an explanation about why the newts became so poisonous. 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 Light Waves Unit, Lesson 3.2, Activity 4, students read an article “What Animals See” that includes discussion about the uncertainties scientists have about animal vision. (click NEXT to see part 2 of 2 of this activity.) ● In the Natural Selection Unit, Lesson 2.3, Activity 4, students read about how Charles Darwin and Alfred Russel Wallace each contributed evidence and thinking that led to the theory of evolution. ● 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. (click NEXT to see part 2 of 2 of this activity.)

		In addition, during Chapter 4 of each Amplify Science unit, students engage in scientific debate 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 Thermal Energy, Chapter 4 (e.g., Lesson 4.2, Activity 3) students engage in argumentation about the cause of a failed water pasteurization effort. ● In Traits and Reproduction, Chapter 4 (e.g., Lesson 4.2, Activity 3) students engage in argumentation about why a runner has a trait that no one else in her family has, with some evidence pointing toward environmental factors, some pointing toward a mutation, and some toward a novel combination of existing genes. ● In Populations and Resources, Chapter 4, (e.g., Lesson 4.3, Activity 3) students engage in argumentation about why a population of parrots has declined, with some evidence pointing toward a decrease in birth rate and some toward an increase in predation. ● In the Rock Transformations unit, Chapter 4 (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 4, (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 of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.	Students encounter this concept in the Plate Motion unit. In 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 Natural Selection, Plate Motion, and Rock Transformations units. This standard is addressed in the Natural Selection Unit. In Lesson 3.3, Activity 4, the class discusses the theory of evolution, including the extensive evidence that supports the theory. 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 plate tectonics and cell theory. In addition, 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 2, a classroom model of cycling of rock material.
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 Thermal Energy unit, students investigate thermal energy transfer using a variety of models, including a digital simulation (Lesson 1.3, Activity 2), a physical model (Lesson 2.4, Activity 3), and a visual model (Lesson 2.5, Activity 3 - press NEXT to see part 2 of 3 of this activity), recognizing differences between each model. ● In the Traits and Reproduction unit, students investigate proteins using a variety of models, including a digital simulation (Lesson 1.2, Activity 3), a 3D image of a protein (Lesson 1.3, Activity 2 - press NEXT to see part 2 of 3 of this activity), and a physical model of proteins (Lesson 1.3, Activity 3), recognizing differences between each model (e.g., the simulation shows a diagrammatic representation of proteins, while the 3D image shows a more realistic, three-dimensional shape of a protein). ● In the Traits and Reproduction unit, students investigate using a digital simulation, which allows students to add proteins to organisms’ cells. In Lesson 1.5, Activity 3, the class discusses the limitations of this model: The Sim includes this feature because it helps us investigate how different proteins relate to different traits. However, changing traits in this way would be a difficult feat to accomplish in the real world and would not occur exactly as the Sim shows. ● 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.7.P.10.1	Illustrate that the sun's energy	This standard is the focus of the Light Waves unit and is addressed in multiple

	arrives as radiation with a wide range of wavelengths, including infrared, visible, and ultraviolet, and that white light is made up of a spectrum of many different colors.	lessons. For example: ● In Lesson 2.2, Activity 2, Students read the article “Harvesting Sunlight”, about how the sun emits all types of light, including infrared, visible and ultraviolet, but plants can only use certain types of visible light for photosynthesis; then in Lesson 2.3, Activity 1, they analyze a diagram and write an explanation of the difference between light from the sun and light from a grow bulb, in terms of wavelengths and spectrum. ● In Lesson 2.4, Activity 1, students analyze a diagram showing the range of wavelengths emitted from the sun, considering which wavelengths are absorbed in the atmosphere. ● In Lesson 2.3, Activity 3, students use the Light Wave simulation to discover that different types of light have different wavelengths. ● In Lesson 2.4, Activity 2, students use the Light Wave simulation to collect, record and analyze data about the effects of different types of light on the genetic materials in cells. ● In Lesson 3.2, Activity 2, students read the article “What Eyes Can See”, which helps them make an explanation for why objects appear a certain color because they reflect or absorb different colors of light that make up white light.
SC.7.P.10.2	Observe and explain that light can be reflected, refracted, and/or absorbed.	This standard is addressed in the Light Waves unit: ● In Lesson 3.1 activity 2, students use a laser pointer and different objects to investigate what can happen to light as it travels. Students discover that light can be reflected, transmitted or absorbed depending on the object it hits. ● In Lesson 3.1 Activity 3, students use the Light Waves simulation to test how different types of light behave when they hit glass and aluminum foil. Students discover that light can be reflected, transmitted or absorbed depending on the type of light and the material it hits. ● In Lesson 3.6 activity 4, students read the article “Making Waves at Swim Practice”, about how waves travel different speeds depending on the material they are traveling through. Students learn that when waves change speed when traveling from one material to another the light wave refracts (bends).
SC.7.P.10.3	Recognize that light waves, sound waves, and other waves move at different speeds in different materials.	This standard is addressed in the Light Waves unit: ● In Lesson 3.6, Activity 4, students read the article “Making Waves at Swim Practice”, about how waves travel different speeds depending on the material they are traveling through. Students learn that sounds

		waves travel more quickly through solids and liquids than through gases like the air, but that light waves travel most quickly through empty space, more slowly through gas and even more slowly through liquids.
SC.7.P.11.1	Recognize that adding heat to or removing heat from a system may result in a temperature change and possibly a change of state.	This standard is addressed in the Thermal Energy unit. For example: ● In Lesson 2.3, Activity 2, students investigate why the molecules that make up objects change speed (why objects change temperature). Using the Thermal Energy simulation, students test what happens when a warm object and is placed near a cooler object. Students observe that energy (heat) transfers from warmer to cooler objects causing both objects to change temperature. When energy (heat) is transferred out the object gets cooler, when energy (heat) is transferred in the object gets warmer. ● In Lesson 2.3, Activity 3, students reread the article “How Air Conditioners Make Cities Hotter”, about how air conditioners make the inside of building cooler by transferring energy (heat) to the outdoors, making it hotter. Students learn that energy (heat) transfers from warmer objects to colder objects because faster-moving molecules that make up warmer objects collide with the slower-moving molecules that make up cooler objects, making the slower-moving molecules speed up. This causes the warmer object to cool down and the cooler object to warm up.
SC.7.P.11.2	Investigate and describe the transformation of energy from one form to another.	This standard is addressed in the Harnessing Human Energy unit. ● In Lesson 1.4, Activity 3, students engage in active reading of an article, “Energy Inventions”, an informational text about a series of innovative inventions that harness energy and transform it into a different type of energy that can be used to solve a real-world problem (such as the creation of the Little Sun Lamp, transforms solar energy into light energy for communities with limited resources). ● In Lesson 2.1, Activity 3, students investigate in a digital simulation to gather evidence about where objects get their energy from. From this investigation, students discover that objects do not create their own energy; rather, they get energy from other objects that have energy. ● In Lesson 3.1, Activity 3, students read an article, “Capturing Human Energy”, about innovative designs that transform human energy into other usable forms of energy. ● In Lesson 3.2, Activity 2, students engage in a hands-on activity during which they design an energy system that harnesses human kinetic

		energy and transforms it into another form of energy. Students create Energy Transfer Diagrams to describe how their systems work.
SC.7.P.11.3	Cite evidence to explain that energy cannot be created nor destroyed, only changed from one form to another.	This standard is addressed in the Harnessing Human Energy unit. ● In Lesson 2.1, Activity 3, students investigate in a digital simulation to gather evidence about where objects get their energy from. From this investigation, students discover that objects do not create their own energy; rather, they get energy from other objects that have energy. (press NEXT to see part 2 of 3 of this activity). Students make an explicit connection between their investigations and the law of conservation of energy. ● In Lesson 2.2, Activity 2, students revisit an article, “Energy Inventions”, with a focus on where the objects in the article get their energy from. After analyzing information presented in this article, students figure out that energy can change from one form to another.
SC.7.P.11.4	Observe and describe that heat flows in predictable ways, moving from warmer objects to cooler ones until they reach the same temperature.	This standard is addressed in the Thermal Energy unit: ● In Lesson 2.3, Activity 2, students investigate why the molecules that make up objects change speed (why objects change temperature). Using the Thermal Energy simulation, students test what happens when a warm object and is placed near a cooler object. Students learn that energy (heat) transfers from the warmer object to the cooler object. ● In Lesson 2.3, Activity 3, students reread the Article “How Air Conditioners Make Cities Hotter”, about how air conditioners make the inside of building cooler by transferring energy (heat) to the outdoors, making it hotter. Students learn that energy (heat) transfers from warmer objects to colder objects because faster-moving molecules that make up warmer objects collide with the slower-moving molecules that make up cooler objects, making the slower-moving molecules speed up. This transfer happens until the objects are the same temperature.
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 Comprehensive Science 2 Course. Students read articles multiple times, for different purposes, in order to gather textual evidence to support science ideas. For example: ● In Lesson 2.3, Activity 3 of the Thermal Energy unit, students re-read a section of the same article, “How Air Conditioners Make Cities Hotter” that they read during the previous lesson. The purpose of the re-reading they do in this lesson is to collect evidence from the article to support or refute two opposing claims about how molecules speed up when energy

		is introduced. Students then discuss the evidence they found and the claim that is supported (or refuted) based on evidence from the text. ● In Lesson 2.3, Activity 2 of the Natural Selection unit, students read the article, “The Deadly Dare.” As they read, they 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, working together to analyze the text, resolving any lingering questions and making more connections as they reconsider the text and their annotations together. ● 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 Comprehensive Science 2 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 Light Waves unit, students read the article “Harvesting Sunlight” and are introduced to the specific strategy of summarizing main ideas while reading. Students then read and apply this strategy, among others they have learned as part of the Active Reading approach. After reading, in Activity 3, students share their annotations (first with partners and with the whole class), including the summaries they made while reading. ● In Lesson 3.2, Activity 2 of the Populations and Resources unit, students re-read a section of the article, “Jelly Population Explosion” (the Competition for Food section) in order to better understand how competition in an ecosystem affects the populations described in the article. They highlight important information as they read, then respond to a question in which they summarize this key information.
LAFS.68.RST.1.3	Follow precisely a multistep	This standard is addressed in every unit of the Comprehensive Science 2

	procedure when carrying out experiments, taking measurements, or performing technical tasks.	Course. For example: ● In Lesson 3.2, Activity 2 of the Harnessing Human Energy unit, students work in small groups to design and create an energy system, using materials in the classroom. In order to do this, they must work together and follow a set of procedures, checking these procedures often throughout the activity to ensure that they have included all the required elements. ● In Lesson 2.4, Activity 2 of the Populations and Resources unit, students test a variety of scenarios focused on changes to an ecosystem, in the Populations and Resources simulation. Students must follow a multistep procedure and collect and record data in order to complete 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 Comprehensive Science 2 Course. For example: ● In Lesson 4.1, Activities 3 and 4 of the Thermal Energy unit, students read, annotate and analyze evidence cards. Each card contains text, symbols, graphs and/or data tables. Students must carefully read all available information on these cards in order to make meaning from them. ● In Lesson 3.1, Activity 3 of the Traits and Reproduction unit, students read the article, “Why Are Identical Twins Rare?” The article contains both traditional text as well as several diagrams that are essential for understanding the article. In order to analyze these diagrams, students will need to determine the meaning of the associated symbols and domain-specific vocabulary. ● 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 Comprehensive Science 2 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 3.1, Activity 2 of the Natural Selection unit, students are introduced to a set of articles, each of which describes how mutations have affected one species of organisms. Students choose one species to read about, and over the course of this lesson and the next as they discuss the information they learn from each article, students learn how this article set works to contribute to the whole and to an understanding of the topic of mutations in general. ● 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 Comprehensive Science 2 Course. For example: ● In Lesson 3.3, during the Activities titled introducing Quality of Evidence and Evaluating Ed-U-Swivel Evidence from the Harnessing Human Energy unit, students are asked to read and analyze a set of possible evidences, and sort it according to how reliable each source of evidence is. Each piece of evidence comes from a different source, and students evaluating the sources and make conclusions about the inherent biases of each before deciding which data they should rely upon to create arguments later in the lesson. ● 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 (several of whom are fake) 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 multiple units of the Comprehensive Science 2 Course. For example: ● In Lesson 3.1, Activity 3 of the Traits and Reproduction unit, students read the article, “Why Are Identical Twins Rare?” The article contains several diagrams that are crucial for understanding the content of the article, which focuses on sexual reproduction. In Lesson 3.2, Activity 2, students re-read a portion of the article and are specifically directed to pay attention to these important diagrams so they can more fully understand the content expressed in the article. ● In Lesson 2.2, Activity 2 of the Natural Selection unit, students read and follow directions, make observations in the Natural Selection simulation that include understanding symbols and text, read and interpret the associated histograms that are produced for each run of the simulation, and apply the data they collected through the simulation to a digital data tool in order to make sense of it.
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 Comprehensive Science 2 Course. For example: ● In Lesson 4.1, Activity 2 of the Thermal Energy unit, students are introduced to a problem that they need analyze: after a disaster on an island, a company provided the residents with pasteurization kits, yet some residents still got sick. Were the kits faulty, or was something else at fault? Over the course of this and the following lesson (Lesson 4.2) students read, analyze and discuss evidence cards and other related documents in order to determine what happened; they must decide which facts and which opinions use, refute or ignore in order to make a strong argument about what happened on the island. ● In Lesson 2.7, Activity 3 in the Populations and Resources unit, students read a set of evidence cards that contain evidence collected by different scientists about the size and distribution of zooplankton and leatherback sea turtles in a particular area. Each evidence card uses text to describe the study, and provides a graphic depicting how the data was collected. Students read, annotate and evaluate each card. They discuss with a partner which evidence is strongest and which is weakest, based on how each study was conducted and how the evidence was collected. They then discuss this evidence with the class. ● 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 3, discussing what they read with others in Activity 4, 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 Comprehensive Science 2 Course. For example: ● In Lesson 2.3, Activity 2 of the Light Waves unit, students re-read the article, "Harvesting Sunlight" to identify different kinds of light that affect plants. This information helps students to understand that there are different kinds of light, and that each kind of light can affect materials in different ways. Next, in Activity 3, students further develop this understanding by using the Light Waves simulation to create different kinds of light in the simulation and investigate their properties. ● In Lesson 3.2, Activity 2 of the Thermal Energy unit, students re-read a section of the article, "Thermal Energy is NOT Temperature," in order to review concepts about average kinetic energy and total kinetic energy. They then use this understanding to a hands-on modeling activity about the same concepts in Activity 3. ● In Lesson 2.1, Activity 2 of the Populations and Resources unit, students read an article from the article set, "Reproduction and Energy." Each article describes how energy is needed for reproduction to occur, and therefore, for a population to continue. In Lesson 2.2, Activity 3, students reread the article and focus on how each organism gets the energy it needs to reproduce, and conduct an experiment with yeast that shows how sugar is an energy source for this organism. In Lesson 2.3, Activity 2, students review what they have learned from the reading and from the yeast experiment, and apply this understanding to an activity about reproduction in the Populations and Resources simulation.
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	This standard is addressed in all units of the Comprehensive Science 2 Course. For example: ● In Lesson 4.3, Activity 4 in the Thermal Energy unit, students write arguments about whether the heating instructions for a pasteurization kit that was distributed to an island community after a disaster are actually

	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.	able to pasteurize water. Students base their arguments on evidence about how the device, which uses concepts of heat (energy) transfer works. This argumentation writing activity is constructed so that students' arguments can contain content from the entire unit. ● In Lesson 4.3, Activity 4 in the Traits and Reproduction unit, students write arguments about why Jackie, a fictitious student, is an elite long distance runner while others in her family do not have this trait. Students base their arguments on evidence about the genotypes for all family members in Jackie's family (this data is based on actual genotypes for long distance runners and non-runners) as well as evidence about each family member's athletic habits. 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 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	This standard is addressed in all units of the Comprehensive Science 2 Course. For example: ● In Lesson 4.3, Activity 2 in the Light Waves 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 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 Sentence Starters, which remind students ways to include transitions, clarify relationships among ideas, and maintain cohesion during their writing. ● In Lesson 4.3, Activity 2 of the Traits and Reproduction unit, students begin to prepare to write final arguments in the unit by first choosing a claim they want to support in writing. They then organize their thinking using a tool called the Reasoning Tool. 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 develop a topic with relevant, well-

	formal style and objective tone. Provide a concluding statement or section that follows from and supports the information or explanation presented.	chosen facts. In the instructions for writing their arguments, students are encouraged to directly use the information from each evidence card to support their argument writing in Activity 4. ● In Lesson 4.3, Activity 5 of the Populations and Resources unit students write an argument to conclude the science seminar sequence. Students are provided with supportive scaffolds such as the Scientific Argument Sentence Starters, which remind students ways to include transitions, clarify relationships among ideas, and maintain cohesion during their writing. In addition, this Activity provides students with a word bank of important words (concepts) from the unit and this reminder serves to encourage students to use these words in their writing. ● 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 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,	This standard is addressed in all units of the Comprehensive Science 2 Course. For example:

	organization, and style are appropriate to task, purpose, and audience.	● 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 Comprehensive Science 2 Course. Most units in the Comprehensive Science 2 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. ● Most units in the Comprehensive Science 2 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. In Lesson 4.3, Activity 2 of the Traits and Reproduction 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.
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 Comprehensive Science 2 Course. For example: ● In Lesson 4.3, Activity 4 in the Thermal Energy 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 2.3, Activity 2 in the Traits and Reproduction unit, students work with a partner to investigate spider traits in the Traits and Reproduction simulation. As they work, they write descriptions of what they are observing. After all students have completed the simulation investigation, the teacher asks pairs to share their simulation work, and the thinking they did through writing during this activity. ● In Lesson 9, across all the Activities in the lesson for the Plate Motion Engineering Internship unit, students create final, published reports describing the ideal tsunami warning system that they have been engineering in the unit. The report has several distinct sections and students work on each, while consulting a rubric that guides their work throughout. In addition, students have been working on and becoming familiar with the pieces of this report in all the previous lessons from the unit (see, for example, Lesson 8, the activity titled “Revising Design Decisions”).
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 exploration.	This standard is addressed in many units of the Comprehensive Science 2 Course. For example: ● In the Harnessing Human Energy unit, students are challenged to figure out how rescue workers who have to conduct rescues in areas that are far from an energy grid might have access to a sustainable supply of energy. They gather evidence about how this supply could be available over the course of many lessons; particularly, in Lesson 2.1, Activity 3 and Lesson 2.2, Activities 2 and 3, students conduct experiments using the Harnessing Human Energy simulation and gather evidence from an article and from energy source cards. In Lesson 2.3, Activity 3 they write explanations about how rescue workers can best meet their energy needs. ● In the Natural Selection unit, students are challenged to find out why the

		rough-skinned newt is so poisonous. In Lesson 1.6, Activity 3, Lesson 2.4, Activity 5, and Lesson 3.3, Activity 3, students write explanations and/or create visual models to answer the question “Why is the rough-skinned newt so poisonous?”, using evidence from many sources including texts, the Natural Selection simulation and the histograms found in the Natural Selection modeling tool. ● In Lesson 5, during the activity titled, Testing Warning System Designs in the Plate Motion Engineering Internship, 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 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.
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 Comprehensive Science 2 Course. For example: ● In every unit, students can use the search function in the Amplify Library to search and find relevant content within articles. ● In Lesson 3.3, during the Activities titled introducing Quality of Evidence and Evaluating Ed-U-Swivel Evidence from the Harnessing Human Energy unit, students are asked to read and analyze a set of possible evidences, 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 to create arguments later in the lesson. Students use the evidence that they determined is from more quality/less biased sources to prepare for (Activity 3) and write (Activity 4) an argument. ● In Lesson 4.1, Activity 3 of the Populations and Resources unit, students receive evidence cards. In this unit, students are asked to evaluate evidence according to the evidence criterion, “Samples that represent as much of the whole as possible provide stronger evidence.” In this Activity, students discuss and sort evidence according to this criterion, eventually discarding evidence that does not meet this standard. In the following lessons, students use the better, culled evidence to support their writing. Considering the quality of evidence according to authentic scientific criterion is an emphasis in many units for the Comprehensive Science 2 Course.

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 Comprehensive Science 2 Course. For example: ● In Lesson 2.3, Activity 3 of the Thermal Energy unit, students conduct a second read of part of the article “How Air Conditioners Make Cities Hotter.” During this read, they collect and record evidence that, along with evidence they gathered from a simulation investigation in Activity 2, allows them determine which claim, out of two provided claims, is most strongly supported by evidence. ● In Lesson 2.3, Activity 2 of the Light Waves unit, students reread the article, “Harvesting Sunlight.” After reading, students respond in writing to several questions that ask them to reflect upon and summarize important ideas from the article. Next, in Activity 3, students use this thinking to support an investigation they conduct in the Light Waves simulation. ● 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 all Science Seminar Sequences, which occur in most units in the Comprehensive Science 2 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 Comprehensive Science 2 Course. Students write in virtually every lesson, for a wide variety of purposes. Some examples are: ● In Lesson 3.6, Activity 3 of the Light Waves unit, students analyze evidence with support of the Reasoning Tool, then use this work to write short arguments in Activity 5, about why skin cancer rates are so high in Australia. ● In Lesson 2.4, Activity 2 of the Populations and Resources unit, students make predictions and write explanations about what factors would decrease the number of deaths that might occur in the ecosystem that is represented in the Populations and Resources simulation, then conduct an investigation to see if their predictions are correct. Afterwards, they again write and explain how they interpret the data they collected during the simulation activity. ● In Lesson 2.4, Activity 3 of the Populations and Resources 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 the Natural Selection unit, students are challenged to refute several misconceptions that are associated with the concept of natural selection. After learning specific aspects of the theory of natural selection, students respond in writing to a character, Sherman, who makes an erroneous claim about natural selection. The first 'Sherman Story' students respond to is in Lesson 1.6, Activity 1, and the next three are found in: Lesson 2.1, Activity 1, Lesson 2.3, Activity 1 and Lesson 3.3, Activity 1. ● 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.
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 discussions, track progress toward specific goals and deadlines, and define individual roles as needed.	This standard is addressed in all units of the Comprehensive Science 2 Course. An example of some (not all) instances from the Traits and Reproduction unit is: ● In Lesson 1.2, Activity 3, students activate prior knowledge about spiders and traits by discussing these concepts in partners then with the class. in Lesson 1.5, Activity 4, students participate in the discourse routine, Write and Share, in which they write about, then discuss in small groups, several pieces of evidence. In Lesson 2.4, Activity 3, students again participate in the small group discourse routine, Write and Share, discussing a different set of evidences. In Lesson 3.2, Activity 3, students engage in simulation activity and discuss with a partner during and after this activity, and in Activity 4 student pairs discuss several claims then discuss these with the entire class. In Lesson 4.1, Activity 4, students work together to sort and discuss evidence, and in Lesson 4.2, Activity 3, students participate in a whole-class discussion based on the evidence the examined in Lesson 4.1.

	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.	
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 Comprehensive Science 2 Course. ● In Lesson 2.4, Activity 4 of the Populations and Resources unit, students participate in the small group discourse routine, Write and Share. In this activity, each student evaluates information about a different part of an ecosystem. Afterwards, students in the group come together to share their conclusions about the information they examined, and work together through discussion to come to conclusions about what happened the organisms they examined in the ecosystem. ● In Lesson 4.1 Activities 3 and 4, of the Natural Selection unit, students receive evidence from a variety of sources. They read, discuss, evaluate each source. In Lesson 4.2 students revisit this evidence and discuss its usefulness in supporting or refuting claims during the whole-class Science Seminar discussion.
LAFS.7.SL.1.3	Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.	This standard is addressed across multiple units in the Comprehensive Science 2 Course. Most units end with a curricular sequence called the Science 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 3 of Populations and Resources, students, in a whole-class group format, discuss claims about why there has been a decrease in the size of the orange-bellied parrot population on an island off the coast of Australia, and use evidence and reasoning to decide with environmental factors is mostly likely to be responsible for this decrease. During the discussion, students evaluate which evidence is relevant and irrelevant to each claim and 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 Comprehensive Science 2 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. ● In Lesson 4.3, in the Activity titled 'Introducing the Science Seminar' from the Populations and Resources unit, the class reviews the important social attributes needed to participate effectively in scientific argumentation. In Activity 2 students discuss claims about which factor or factors best explain why a population of parrots is decreasing; during the whole-class discussion students use evidence that they have examined during the previous two lessons during the 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 Comprehensive Science 2 Course. For example: ● In Lesson 4.3, Activity 4 in the Thermal Energy 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 Natural Selection unit, student pairs participate in an activity in which they collect data from the Natural Selection simulation. During this activity student pairs are directed to discuss their observations and the data they collect and analyze

		associated histograms showing distribution of the trait of having fur and how this is associated with temperature. Students make predictions beforehand and then discuss, using visual displays of data, afterwards. In Activity 3 students make and discuss models to show what they learned during the simulation activity.
HE.7.C.1.3	Analyze how environmental factors affect personal health.	This standard is addressed across multiple units in the Comprehensive Science 2 Course. For example: ● In Light Waves, students are introduced to the problem in Australia: its population is at an exceptionally high risk of skin cancer. Throughout the unit, students investigate light waves to help them explain why the skin cancer rate in Australia is so high. In doing so, students analyze how environmental factors, such as sun exposure and UV radiation, affect personal health. For example, in Lesson 1.3, Activity 4, students use the Light Waves Simulation to observe that genetic material absorbs energy from light from the sun, and this energy can cause damage. ● In Thermal Energy, students investigate water quality and analyze its effects on personal health as they explain why a water pasteurization kit failed to make water safe for drinking. For example, in Lesson 4.1, Activity 3, students analyze a set of evidence cards that provide information about water that was treated with a pasteurization kit (which failed) and its effect on individuals who drank it.
HE.7.C.1.8	Classify infectious agents and their modes of transmission to the human body.	This standard is addressed across multiple units in the Comprehensive Science 2 Course, in the context of health issues around clean drinking water. For example: ● In the Thermal Energy unit, Chapter 4 focuses on a problem involving contaminated drinking water. In Lesson 4.1, Activity 2 (click NEXT to see part 2 of 3 of this activity), students learn about the health effects of untreated water that is contaminated with bacteria. ● In the Populations and Resources unit, Lesson 1.3, Activity 3, students read the article “How Ecosystems Clean Earth's Water” which also addresses the importance of ecosystem services in filtering harmful substances out of water. ● In the Natural Selection unit, Lesson 2.2, in the activity titled “Introducing Homework,” students reflect on how populations change over many generations, mostly in response to environmental changes, and connect their thinking to a microbiome example: when one part of the body system changes, such as an increase in the number of harmful gut

		bacteria, other body systems are affected. As a result, the other helpful bacteria in the intestines cannot survive, which makes people sick.
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 Thermal Energy unit. In Lesson 1.4, Activity 2, students discuss the concept of an average as they define temperature (a measure of the average speed of the molecules of a thing). In an extended activity (see the Teacher Support tab in part 1 of 4 of the activity, the note titled: INSTRUCTIONAL SUGGESTION: Going Further: Mathematical Thinking), students are introduced to and use measure of center and variability (median, mode, and range) to describe the same data set.
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 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	This standard is addressed in the Light Waves unit. In Lesson 1.2, Activity 2 (see the Teacher Support tab, note titled “INSTRUCTIONAL SUGGESTION Going Further: Mathematical Thinking), students are prompted to think more about the chances of a person in Australia and a person in the US getting skin cancer. Students are introduced to data about the likelihood of each scenario (e.g., 2 out of every 3 people) and are supported to determine the probability of each event and to compare the two.
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 Thermal Energy Unit, Lesson 2.1, Activity 3 and 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 Traits and Reproduction 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 the cause of a particular runner’s trait. ● In the Traits and Reproduction 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, Populations and Resources, Lesson 1.2, Activity 1 or Thermal Energy, Lesson 1.2, Activity 1 or Weather Patterns, Lesson 1.2, Activity 1), ● Teachers are encouraged to capitalize on English learners' language knowledge, for example by point out Spanish-English cognates (see for example, Harnessing Human Energy, Lesson 1.3 or 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 Populations and Resources (see Lesson 1.2, the activity titled "Introducing Studying Jelly Populations"), students assume their role as student ecologists to make sense of what may have caused a puzzling increase in the size of a moon jelly population in a fictional ecosystem. Students tackle this question one piece at a time, drawing on a range of data, including population sizes and birth and death rate in a particular region. ● In Harnessing Human Energy (see Lesson 1.1, the activity titled "Welcome to the Energy Research Lab"), students assume the role of student energy scientists. Students are actively considering, discussing, and reflecting as they work to understand the larger problem of finding a

		way for rescue workers to get energy to the batteries in their equipment during rescue missions. 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. ● 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.
MAFS.K12.MP.2.1	Reason abstractly and quantitatively.	This standard is addressed across multiple units in the Comprehensive Science 2 course. For example: ● In the Populations and Resources unit, Lesson 1.3, Activity 2, students use a model to reason through how the number of births and deaths in a population affects its size and discover when a system is unstable and when it is stable. ● In the Harnessing Human Energy unit, Lesson 1.3, Activity 2 (click NEXT to see part 3 of 3 of this activity, and in the Teacher Support tab see "Going Further: Mathematical Thinking"), students introduced to the mathematical models used to describe the kinetic and potential energy of objects falling in Earth's gravitational field and are asked to calculate the potential energy of student on a skateboard at the top of a hill and the kinetic energy of that same student once the skateboard has rolled to the bottom of the hill. Students decontextualize the problem as they work through the equations and contextualize as they analyze what these values mean in relation to the problem at hand. ● In Lesson 3.1, Activity 2 of Plate Motion, 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 Comprehensive Science 2 course. For example: ● In Lesson 1.5, Activities 3 and 4 of the Natural Selection unit, students predict how and why traits for increased levels of water storage can become more common in a plant population over time, use the Natural Selection sim to gather evidence, and explain what they observed based on the evidence they gathered. ● In Lesson 3.3, Activity 3 of Thermal Energy, students analyze evidence (e.g., temperature of water in two heating systems) and collect data by running a test in the Thermal Energy Sim. Students use this data to support a conclusion about which of two heating systems will warm a school more.
MAFS.K12.MP.4.1	Model with mathematics.	This standard is addressed across multiple units in the Comprehensive Science 2 course. For example: ● In Lesson 1.4, Activity 3 of the Natural Selection unit, students use the Natural Selection Modeling Tool to model their ideas about changes in the distribution of traits in populations using histograms. ● 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. 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 Comprehensive Science 2 course. For example: ● In Lesson 3.2, Activities 2 and 3 of Traits and Reproduction unit, students analyze diagrams in an article, "Why Are Identical Twins Rare?", and use the Sim and to determine each offspring gets half of its genes from mom and half from dad. ● In Lesson 2.1, Activity 2, students use the Thermal Energy sim to observe the kinetic energy of molecules for a specific purpose: to draw conclusions about what happens at a molecular scale when a material gets hotter. ● 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.
MAFS.K12.MP.6.1	Attend to precision.	This standard is addressed across multiple units in the Comprehensive Science 2 course. For example: ● In Lesson 2.4, Activity 2 of Thermal Energy, students use the Thermal Energy sim to collect and analyze data about two samples before and after contact in order to discover that energy transfers until all the molecules are moving at about the same speed. To do so, students must closely observe the molecules of the two samples to characterize their behavior, and accurately record and attend to the patterns in the temperature data they collect. ● 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.
MAFS.K12.MP.7.1	Look for and make use of structure.	This standard is addressed across multiple units in the Comprehensive Science 2 course. For example: ● In Lesson 3.2, Activity 3 of Traits and Reproduction unit, students use the Sim to determine a structure for how offspring get their genes, drawing conclusions that each offspring gets half of its genes from mom and half from dad. ● In Lesson 1.3, Activity 2, of the Populations and Resources unit, students use a model to reason through how the number of births and deaths in a population affects its size and draw conclusions about when a population size changes and when it stays the same. ● In the Thermal Energy unit, students use the Thermal Energy digital simulation to examine the behavior of molecules in various samples of material when thermal energy is added or taken away and analyze line graphs that result. For example, in Lesson 2.3, Activity 2, students use the sim to investigate what happens at the molecular level when two samples of material of different temperatures are combined. They

		analyze line graphs that show thermal energy over time and temperature over time, noticing the correlational pattern between molecular speed and thermal energy.
MAFS.K12.MP.8.1	Look for and express regularity in repeated reasoning.	This standard is addressed across multiple units in the Comprehensive Science 2 course. For example: ● In Lesson 2.1, Activity 3 of Natural Selection, students engage in an activity illustrating how reproduction in a population leads to the passing of traits from one generation, recognizing regularity in the factors that affect what traits are present in a population (reproduction, death by predation, death by old age). Students use this regularity to determine the number of organisms living in a population and the distribution of traits in that population after each new generation. ● In Lesson 2.4, Activity 2 of Thermal Energy, students investigate in the digital sim to explain why energy transfer between two materials stops. Students recognize that as the total energy of one sample in the system decreases, the total energy of the second sample increases, and that the total energy of the system is the same for starting and final; it remains constant. In an extended activity (see the teacher support tab), students construct an equation for the total energy of a system and use the equation to solve for unknowns.