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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.6.L.14.1	Describe and identify patterns in the hierarchical organization of organisms from atoms to molecules and cells to tissues to organs to organ systems to organisms.	This standard is addressed in the Microbiome and Metabolism units. In these units, students investigate the relative scales of a variety of organisms (including microorganisms) and cells. For example: In Microbiome: ● In Lesson 1.1, Activity 4, students explore the Scale Tool, which visually represents the relative scales of objects and organisms from macroscale to microscopic to molecular and atomic scales. ● In Lesson 1.2, Activity 5, students read about how cells are organized into tissues, tissues into organs, and organs into systems in the article “Cells: The Basic Unit of Life” (located in the Amplify Library) In Metabolism: ● In Lesson 3.3, Activity 5, students read “The Big Climb: A Story in Large and Small Scale,” an article about the hierarchical organization of organisms.
SC.6.L.14.2	Investigate and explain the components of the scientific theory of cells (cell theory): all organisms are	This standard is addressed in the Microbiome unit. For example: ● In Lesson 1.2, the Activity titled “Introducing Cells”, students analyze information from a video, How small is a cell?, which introduces the idea

	composed of cells (single-celled or multi-cellular), all cells come from pre-existing cells, and cells are the basic unit of life.	that all living things are made of cells. The teacher introduces the concept of cell theory. In that same lesson, in Activity 2, students analyze information about different cell types, including those that make up unicellular organisms and those that make up organs in the human body. ● In Lesson 2.1, Activity 3, students read the article “The Human Microbiome” to obtain information about unicellular and multicellular organisms. ● Students draw conclusions about a variety of single-celled organisms, for example, reading about single-celled bacteria in Lesson 2.6, Activity 3, as they investigate the human microbiome.
SC.6.L.14.3	Recognize and explore how cells of all organisms undergo similar processes to maintain homeostasis, including extracting energy from food, getting rid of waste, and reproducing.	This standard is addressed across multiple units in the Life Science Course. For example: I ● In Metabolism Lesson 2.1, the Activity titled “Playing Body System Model Video”, students are introduced to the concept of homeostasis and discuss how the villi and alveoli play a role in maintaining homeostasis. ● In Metabolism Lesson 1.3, Activity 2, students read an article “Molecules Cells Need” to construct an understanding of how cells use oxygen, amino acids, and glucose. ● Throughout Chapter 2 of the unit, Matter and Energy in Ecosystems, students investigate how both plants and animals undergo cellular respiration to get energy from food. For example, in Lesson 2.2, Activity 2, students observe cellular respiration in the Matter and Energy in Ecosystems Sim. ● In Lesson 1.2, Activity 5 of the unit Microbiome, students read about how cells make up all living things and undergo processes to take in food and get energy in the article “Cells: The Basic Unit of Life” (located in the Amplify Library) ● In Chapter 3 of the Traits and Reproduction unit, students focus on the process of sexual reproduction in spiders at the cellular level. In Lesson 3.3, Activity 5 (press 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.
SC.6.L.14.4	Compare and contrast the structure and function of major organelles of plant and animal cells, including cell	This standard is addressed across multiple units in the Life Science Course. For example: ● In Lesson 1.2, Activity 5 of the unit Microbiome, students read about the

	wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles.	organelles of plant and animal cells in the article “Cells: The Basic Unit of Life” (located in the Amplify Library). The article includes descriptions of the structure and function of the cell wall, cell membrane, nucleus, cytoplasm, chloroplasts, mitochondria, and vacuoles; and contrasts plant cells with animal cells. ● In Lesson 2.7, Activity 4 of the unit Microbiome, students read the article “Tree of Life: Classifying Organisms” which includes descriptions and images of the cell wall, cell membrane, nucleus, cytoplasm, and mitochondria; and includes a table comparing and contrasting the organelles of plant and animal cells. ● In the unit Matter and Energy in Ecosystems, students read about chloroplasts and mitochondria in the "Where Did Chloroplasts Come From?" (Lesson 1.4, Activity 4 - click NEXT to see part 2 of 2 of this activity) and "How Did We Get Mitochondria?" articles (Lesson 2.4, Activity 4). Also in this unit, students investigate photosynthesis, using the Matter and Energy in Ecosystems sim to watch what happens inside the chloroplast, in Lesson 2.2, Activity 2 (click NEXT to view all parts of the activity). ● In the Metabolism unit, students investigate the role of the mitochondria and cell membrane in cellular respiration; they read an article about cellular respiration (Lesson 3.2, Activity 3) and observe and analyze information from the Metabolism sim that models the process at the cellular level (Lesson 3.2, Activity 4). ● In the unit Traits and Reproduction, students learn about the cell nucleus and ribosomes. For example, in Lesson 2.2, Activity 2, students engage in a physical model of how chromosomes in the nucleus provide instructions for building protein molecules.
SC.6.L.14.5	Identify and investigate the general functions of the major systems of the human body (digestive, respiratory, circulatory, reproductive, excretory, immune, nervous, and musculoskeletal) and describe ways these systems interact with each other to maintain homeostasis.	This standard is addressed in the Metabolism unit. Investigations in the unit support students to learn and describe hoq starches and proteins are broken down into glucose and amino acids in the digestive system, while oxygen comes in through the respiratory system, and the circulatory system transports these molecules to the cells. For example: ● In Lesson 2.1, Activity 3, students engage in a classroom-sized model of the body to develop an understanding of how body systems work together to get necessary molecules to cells. Students are introduced to the three main body systems involved in metabolism: the digestive, respiratory, and circulatory systems. ● In Lesson 2.2, Activity 2, students read “Patient Stories,” which provides

		examples of patients diagnosed with various health conditions that affect the functions of major body systems. ● In Lesson 2.4, Activity 2, students use the Metabolism simulation to run tests on a healthy body and on a body with a health condition to investigate the effects of various conditions on body systems. ● In Lesson 2.6, Activity 5, students read about other systems of the human body (reproductive, excretory, immune, nervous, and musculoskeletal).
SC.6.L.14.6	Compare and contrast types of infectious agents that may infect the human body, including viruses, bacteria, fungi, and parasites.	This standard is addressed in the Microbiome unit. In Lesson 1.3, Activity 5 in this unit, students read an article titled “Germs Are Not All the Same,” which explores similarities and differences among parasites, fungi, bacteria, and viruses, infectious agents that can cause illness in humans.
SC.6.L.15.1	Analyze and describe how and why organisms are classified according to shared characteristics with emphasis on the Linnaean system combined with the concept of Domains.	This standard is addressed in the Microbiome unit. In Lesson 2.7, Activity 4 of this unit, students read an article titled “Tree of Life: Classifying Organisms,” which explains how and why scientists classify organisms into three domains (eukarya, bacteria, and archaea). It further explores the subdivision of the domain eukarya into kingdoms (plants, animals, fungi, and protists).
SC.6.N.1.1	Define a problem from the sixth-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 Metabolism Unit, students are investigating what medical condition (related to body system function) is causing a patient’s symptoms. ● In Lesson 2.4, Activity 2, students make predictions, then test their predictions by planning and conducting experiments using the Metabolism simulation. ● In Lesson 2.7, Activities 2 and 3, students analyze data from their simulation experiments as well as data from other sources, including reference articles about medical conditions; then write a scientific argument to explain and defend their conclusions about what condition is causing the symptoms.
SC.6.N.1.2	Explain why scientific investigations should be replicable.	This standard is addressed in multiple units. For example: ● In the Metabolism unit, Lesson 2.4, Activity 2, and Lesson 3.1, Activity 4, students gain experience with the value of conducting repeated trials in order to support accurate conclusions. ● In the Metabolism Engineering Internship, Lesson 6, Activity titled

		"Retesting the Optimized Recipe" students discuss variability and the importance of repeat testing.
SC.6.N.1.3	Explain the difference between an experiment and other types of scientific investigation, and explain the relative benefits and limitations of each.	This standard is addressed in multiple units, in which students engage in different types of investigations and discuss the evidence gathered. For example: ● In the Metabolism Unit, Lesson 2.4, Activity 2, students conduct controlled experiments using the Metabolism simulation. They then discuss the nature of experiments and the distinction between experiments and systematic observations (press NEXT to view part 4 of 4 of this activity). ● In the Microbiome unit, Lesson 1.3, Activity 3, students conduct a systematic observation of a bacteria culture.
SC.6.N.1.4	Discuss, compare, and negotiate methods used, results obtained, and explanations among groups of students conducting the same investigation.	In every Amplify Science student, there are frequent opportunities for student-to-student talk as students share results of investigations and discuss possible explanations. For example: ● In the Metabolism Unit, Lesson 3.2, Activity 2, each group of students conducts a systematic observation of a chemical reaction that releases energy. Their observations of the temperature change may vary depending on exactly how they mix the substances. The class discusses in order to make sense of observations and conclusions about energy release. ● In the Populations and Resources Unit, Lesson 3.2, Activity 3, students use the Populations and Resources simulation to investigate what happens when two populations compete for the same resource population. They share their methods used and results (click NEXT to view all parts of the activity).
SC.6.N.1.5	Recognize that science involves creativity, not just in designing experiments, but also in creating explanations that fit evidence.	Students are exposed to many different examples of scientists using creativity in their work. For example: ● In Metabolism, Lesson 2.3, Activity 5, students read an article, "Meet a Scientist Who Grows New Cells", which describes the creative processes used by a scientist who is designing processes to grow new tissues to replace body parts. Students also think creatively themselves as they plan investigations and create explanations. For example: ● In the Metabolism Unit, Lesson 1.2, Activity 4, students design their own

		experiments using the Metabolism Simulation, to test the results of different diets on body system outcomes. ● In the Metabolism Unit, Lesson 4.3, Activity 3, students use creativity to generate and describe explanations for surprising bicycle race results, based on several pieces of evidence.
SC.6.N.2.1	Distinguish science from other activities involving thought.	Amplify Science units provide students with a strong foundational understanding of how scientific knowledge is constructed and how this differs from everyday thinking processes. One illustration of this is the Argumentation Wall, which is introduced in Microbiome, Lesson 2.3, in the Activity titled “Introducing Argumentation”. The wall contains visual representations of the goals and structure of scientific arguments, and is added to and referred to across the year. When the Argumentation Wall is introduced, there is explicit discussion of the differences between scientific knowledge and other kinds of knowledge.
SC.6.N.2.2	Explain that scientific knowledge is durable because it is open to change as new evidence or interpretations are encountered.	Across multiple Amplify Science units, students encounter this concept both in their own work and in reading about scientists. For example: ● In Microbiome, Lesson 1.2, Activity 5 (click NEXT to see part 2 of 2 of this activity), students read an article “Cells: The Basic Unit of Life” that includes a description of how scientists’ knowledge about cells changed as technology improved and new evidence was available. ● In Microbiome, students refine their claims about the effects of a fecal transplant as they receive new evidence about their case study patient. These experiences are in Lesson 2.2, Activity 3; 2.3, Activity 3; 2.4, Activity 4; and 2.5, Activity 2. ● In Metabolism, Lesson 1.3, Activity 4 and 5, students receive and analyze new evidence about the patient they are diagnosing, and revise their initial claims based on the new evidence.
SC.6.N.2.3	Recognize that scientists who make contributions to scientific knowledge come from all kinds of backgrounds and possess varied talents, interests, and goals.	Across multiple Amplify Science units, students encounter profiles of scientists of a wide variety of ethnic and racial backgrounds, and of -different ages and genders. The profiles highlight a variety of goals, interests and manners of investigating. For example: ● In Traits and Reproduction, Lesson 1.2, in an activity titled “Playing Studying Spider Silk”, students watch a short documentary video about Cheryl Hayashi, a young Asian-American scientist investigating spider silk. The video highlights her work with live spiders, her measurements of spider silk properties, and the engineering implications of her research.

		● In Metabolism, Lesson 2.3, Activity 5, students read an article, “Meet a Scientist Who Grows New Cells”, which describes the work of Dr. Grace O'Connell, a woman of color who investigates ways to grow new tissues for medical purposes. ● In Natural Selection, Lesson 2.3, Activity 4, students read an article “Wallace and Darwin” about two European scientists from the 1800’s who first proposed the mechanism of natural selection.
SC.6.N.3.1	Recognize and explain that a scientific theory is a well-supported and widely accepted explanation of nature and is not simply a claim posed by an individual. Thus, the use of the term theory in science is very different than how it is used in everyday life.	This standard is addressed in the Natural Selection Unit. In Lesson 3.3, Activity 4, the class discusses the theory of evolution, including how the term theory is used differently in science and in everyday language.
SC.6.N.3.2	Recognize and explain that a scientific law is a description of a specific relationship under given conditions in the natural world. Thus, scientific laws are different from societal laws.	In the unit, Matter and Energy in Ecosystems, students have a number of experiences that support an understanding of the Laws of Conservation of Mass and Conservation of Energy, for example: ● After reading the article “Sunlight and Life”, about photosynthesis (Lesson 1.3, Activity 2), students discuss how the law of conservation of energy applies to photosynthesis (click NEXT to see part 2 of 3 of Activity 3 where this discussion takes place) ● After engaging in the Carbon Game (Lesson 3.2, Activity 3), students discuss how the law of conservation of mass applies to the Carbon Game, and also discuss what a scientific law is and how it is different from a societal law. (click NEXT to see part 2 of 3 of Activity 3 where this discussion takes place)
SC.6.N.3.3	Give several examples of scientific laws.	In the unit, Matter and Energy in Ecosystems, students have a number of experiences that support an understanding of the Laws of Conservation of Mass and Conservation of Energy, for example: ● After reading the article “Sunlight and Life”, about photosynthesis (Lesson 1.3, Activity 2), students discuss how the Law of Conservation of Energy applies to photosynthesis (click NEXT to see part 2 of 3 of Activity 3 where this discussion takes place) ● After engaging in the Carbon Game (Lesson 3.2, Activity 3),students discuss how the law of conservation of mass applies to the Carbon

		Game, (click NEXT to see part 2 of 3 of Activity 3 where this discussion takes place) Other exposures to scientific laws occur in Physical and Earth Science courses.
SC.6.N.3.4	Identify the role of models in the context of the sixth-grade science benchmarks.	Throughout the Amplify Science program, students experience the importance of a wide variety of models to scientific investigation and communication. For example, in the Metabolism Unit: ● In Lesson 1.2, Activity 2, the Metabolism simulation is introduced as a scientific model and students conduct initial observations and exploration of the sim. ● In Lesson 2.1, Activity 3, students investigate interactions between body systems using a kinesthetic classroom model. ● In Lesson 2.3, Activity 3, students use a digital Modeling Tool to create a visual model showing how a particular medical condition affects body systems and molecules in the body.
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	This standard is addressed in the Natural Selection unit. For example: ● In Lesson 2.4, Activity 4, students are challenged to cause extinction in

	of a species to adapt within a changing environment may contribute to the extinction of that species.	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" (found in the Amplify Library) 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	The unit Traits and Reproduction is focused on the problem of selective breeding of spiders for biomedical purposes. For example:

	engineering, artificial selection) on the individual, society and the environment.	● In Lesson 1.2 Activity 2, 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 Matter and Energy in Ecosystems unit, in which students investigate the relationships between producers, consumers, and decomposers in order to explain a failed biodome project. Examples of activities include: ● In Lesson 2.1, Activity 4, students read the article “A Feast for Decomposers” ● In Lesson 3.2, Activity 3, students engage in the Carbon Game, a model of interactions of biotic and abiotic parts (transfer of carbon and energy) of an ecosystem. ● In Lesson 3.4, Activity 2, students explain the cause and effect relationships between abiotic and biotic factors in an ecosystem to explain why burying dead matter in an ecosystem caused the plants and animals to get fewer energy storage molecules. ● In Lesson 2.5, , Activity 2, students read the articles “Getting Energy in a Coastal Prairie Ecosystem”, “Getting Energy Near a Deep-Sea Vent” , or “Getting Energy in a Cave Ecosystem” in order to evaluate claims about feeding relationships in those ecosystems. In addition, this standard is addressed in the Populations and Resources unit. For example: ● In Lesson 2.3, Activity 3, 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 Ant and the Acacia” which compares and contrasts these different types of relationships among organisms. 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. Students also read more about parasites in the Microbiome unit, in Lesson 1.3, Activity 5, in the article "Germs Are Not All the Same".
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 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.
SC.7.N.1.2	Differentiate replication (by others) from repetition (multiple trials).	This standard is addressed in the Traits and Reproduction and Natural Selection 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, a Teacher Support note 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.
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 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 life science course, students experience and discuss numerous methods used in life science to gather evidence in pursuit of scientific explanations. For example: ● 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 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.
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 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 Microbiome Unit, Lesson 1.3, Activity 5, students read about the scientific debate over whether viruses are alive in the article “Germs Are Not All the Same”. In addition, during Chapter Four of each Amplify Science unit, students engage in scientific argumentation around a question for which there is compelling evidence to support multiple competing claims, and in which students are supported to disagree productively. For example: ● In Traits and Reproduction, Chapter Four (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 Four, (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.
SC.7.N.2.1	Identify an instance from the history	This standard is addressed in the Microbiome Unit in Lesson 1.2, Activity 5.

	of science in which scientific knowledge has changed when new evidence or new interpretations are encountered.	Students read an article titled “Cells: The Basic Unit of Life” that includes description of how two different early scientists made discoveries that changed our understanding of cells.
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 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 the unit, Matter and Energy in Ecosystems, students have a number of experiences that support an understanding of the Laws of Conservation of Matter and Conservation of Energy, for example: ● The article “Sunlight and Life”, about photosynthesis (Lesson 1.3, Activity 2) ● The Carbon Game (Lesson 3.2, Activity 3; press NEXT to see part 2 of 2 of this activity). Other exposures to scientific laws occur in Physical Science courses, a domain in which scientific laws are more prevalent.
SC.7.N.3.2	Identify the benefits and limitations of the use of scientific models.	This standard is addressed in all Amplify Science units. For example: ● In the 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.
SC.8.L.18.1	Describe and investigate the process of photosynthesis, such as the roles	The unit Matter and Energy in Ecosystems is focused on this concept. For example:

	of light, carbon dioxide, water and chlorophyll production of food release of oxygen.	● In Lesson 1.3, Activity 2, students read the article, “Sunlight and Life”, which looks at the effects of varying levels of sunlight on photosynthesis in three very different ecosystems: the Arctic, coral reefs, and tropical rain forests. ● In Lesson 1.4, Activity 3, students gather evidence in the Matter and Energy in Ecosystems sim about how plants create energy storage molecules (i.e., glucose).
SC.8.L.18.2	Describe and investigate how cellular respiration breaks down food to provide energy and releases carbon dioxide.	This standard is addressed across multiple units in the Life Science Course. For example: ● In Lesson 2.2, Activity 2 of Matter and Energy in Ecosystems, students observe and analyze cellular respiration in a digital simulation. In that same lesson, students create a model of the process of cellular respiration in living things. ● In Lesson 3.2, Activity 4, of Metabolism, students make observations in a digital simulation of the conversion of glucose and oxygen into water and carbon dioxide and analyze their data to begin to construct an understanding of cellular respiration. ● In Lesson 3.3, Activity 2, of Metabolism, students read about the processes related to cellular growth and repair in the cells, deepening their understanding of the role of protein and amino acid molecules in the human body. In Activity 3 of that same lesson, students create a digital model of what is happening in a healthy cell, which incorporates their understanding of cellular respiration, growth, and repair. Finally, in Activity 4, students describe these processes as they construct an explanation about how a health condition affects a person’s ability to grow and repair cells. ● In Metabolism Engineering Internship, students draw on their understanding of cellular respiration, growth, and repair to design nutritional bars with various ingredients that serve populations with different needs (e.g., Lesson 2, the Activity titled “Research Ingredients and Metabolism”).
SC.8.L.18.3	Construct a scientific model of the carbon cycle to show how matter and energy are continuously transferred within and between organisms and their physical environment.	This standard is addressed in the Matter and Energy in Ecosystems unit. For example: ● In Lesson 1.5, Activity 3, students use the Matter and Energy in Ecosystems Simulation to investigate ways to affect the flow of matter in an ecosystem. ● In Lesson 2.1, Activity 2, students complete a digital Sorting Tool

		activity to show their ideas about which parts of an ecosystem give off carbon dioxide and which do not. ● In Lesson 3.1, Activity 3, students read the article “Carbon in the Global Ecosystem”, focused on the carbon cycle.
SC.8.L.18.4	Cite evidence that living systems follow the Laws of Conservation of Mass and Energy.	This standard is addressed in the Matter and Energy in Ecosystems unit. For example: ● In Lesson 1.3, Activity 3 (press NEXT to see part 2 of 2 of this activity) students discuss an article called “Sunlight and Life” and make an explicit connection between photosynthesis and the Law of Conservation of Energy. ● In Lesson 3.1, Activity 3, students read about how carbon moves through the Earth system. In the next lesson (Lesson 3.2, Activity 3), students play the Carbon Game, simulating the movement of carbon through a closed ecosystem. From these activities, students construct an understanding that the total amount of carbon in a closed ecosystem does not change, and therefore, if the amount of carbon changes in abiotic matter, it must also change in biotic matter. They then learn about the Law of Conservation of Mass and discuss how they saw evidence of this in the Carbon Game.
SC.8.N.1.1	Define a problem from the eighth-grade curriculum using appropriate reference materials to support scientific understanding, plan and carry out scientific investigations of various types, such as systematic observations or experiments, identify variables, collect and organize data, interpret data in charts, tables, and 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 Matter and Energy in Ecosystems unit, students are investigating why the closed ecosystem in a biodome collapsed. ● In Lesson 1.2, Activity 2, students use reference materials, the “Biodome Files”, to prepare for their investigations. ● In Lesson 1.6, Activity 2, students analyze graphical data about biotic and abiotic factors in order to make an explanation. ● In Lesson 3.3, Activity 2, students make a prediction about what happened to missing carbon in the biodome, and use the Matter and Energy simulation to make observations and gather evidence to test their prediction. ● In Lesson 4.3, Activity 4, students write a scientific argument in which they defend their conclusions about how carbon moves in an ecosystem.
SC.8.N.1.2	Design and conduct a study using	This standard is addressed in multiple units. For example:

	repeated trials and replication.	● In the Metabolism unit, Lesson 2.4, Activity 2, and Lesson 3.1, Activity 4, students gain experience with the value of conducting repeated trials in order to support accurate conclusions. ● In the Metabolism Engineering Internship, Lesson 6, activity titled “Retesting the Optimized Recipe” students discuss variability and the importance of repeat testing, for the study they have designed. ● In Natural Selection, Lesson 1.4, Activity 4, a Teacher Support note 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.
SC.8.N.1.3	Use phrases such as "results support" or "fail to support" in science, understanding that science does not offer conclusive 'proof' of a knowledge claim.	In every unit in Amplify Science, students are supported in using the language of scientific argumentation. For example ● In the Microbiome unit, Lesson 2.3, in the Activity titled “Introducing Argumentation”, students are introduced to the Argumentation Wall. The wall contains visual representations of the goals and structure of scientific arguments, and is added to and referred to across the year. ● In every core unit, in Chapter 4, students participate in a Science Seminar in which they engage in oral and written argumentation. Students are provided with Argumentation Sentence Starters such as ‘the evidence that supports my claim is…’ (see Matter and Energy in Ecosystems, Lesson 4.2, Activity 2 for an example).
SC.8.N.1.4	Explain how hypotheses are valuable if they lead to further investigations, even if they turn out not to be supported by the data.	Across Amplify Science, students are exposed to the idea that scientists make claims based on evidence and revise those claims when needed, in the face of new evidence. Students experience this both in their own scientific investigations and in reading about professional scientists. For example: ● In Natural Selection, Lesson 1.2, Activity 4 (press NEXT to see part 2 of 2 of this Activity), students read an article, “Meet a Scientist Who Studies Natural Selection”, in which the scientist describes the value of ‘failed’ experiments. In Lesson 1.3, Activity 1, students reflect on the article and the teacher introduces the idea that even inaccurate ideas are valuable if they lead to further investigations. ● In Matter and Energy in Ecosystems, Lesson 1.6, Activity 4, students revise their models based on new evidence.
SC.8.N.1.5	Analyze the methods used to develop a scientific explanation as seen in	In every Amplify Science unit, students are exposed to scientists using different methods to develop scientific explanations, and also use different methods in

	different fields of science.	their own investigations. For example: ● Students conduct a **systematic observation** of a bacteria culture (using photographic images) in Microbiome, Lesson 1.3, Activity 3. ● Students conduct a **case study analysis** in Microbiome (the case study is introduced in Lesson 2.2, Activity 3, and continues through Chapter 2) ● Students conduct **controlled experiments** in Metabolism, Lesson 4.2, Activity 4, using the Metabolism simulation. ● Students read about how both **laboratory experiments and field research** can be valuable in Natural Selection, Lesson 1.2, Activity 4, in the article, “Meet a Scientist Who Studies Natural Selection” ● Students view a video about scientists conducting a **closed-system experiment** in Matter and Energy in Ecosystems, Lesson 1.2, the activity titled “Introducing Biosphere 2”
SC.8.N.1.6	Understand that scientific investigations involve the collection of relevant empirical evidence, the use of logical reasoning, and the application of imagination in devising hypotheses, predictions, explanations and models to make sense of the collected evidence.	Every unit in Amplify Science is structured around a driving question which students answer by gathering evidence, using reasoning to construct arguments, and making explanations and models. As one example, in the Matter and Energy in Ecosystems unit, students are investigating the question of why the closed-ecosystem biodome failed. ● Students collect evidence from multiple sources, including text (Lesson 1.4, Activity 2), secondhand quantitative data (Lesson 1.6, Activity 2); simulation data (Lesson 2.3, Activity 3). ● Students create and revise models and written explanations based on this evidence (Lesson 1.6, Activity 4; Lesson 2.3, Activity 5; Lesson 3.4, Activity 3 and 4). ● Students use a graphic organizer called the Reasoning Tool to organize their evidence (Lesson 4.3, Activity 3) and then write an argument (Lesson 4.3, Activity 4). ● In Lesson 3.4, the Activity titled “What’s New at Biosphere 2”,the class reflects on what they have done and how that demonstrates what is involved in scientific investigations.
SC.8.N.2.1	Distinguish between scientific and pseudoscientific ideas.	Students are supported in their understanding of the distinction between scientific and pseudoscientific ideas through a continual emphasis on the nature of scientific knowledge as constructed based on empirical evidence and revised through the collaboration of the scientific community. For example, in the Microbiome unit, Lesson 2.3, in the Activity titled “Introducing Argumentation”, students are introduced to the Argumentation Wall. The wall contains visual representations of the goals and structure of scientific arguments, and is added

		to and referred to across the year. The teacher introduces the term pseudoscience and explains how students will learn a lot in this course about how scientific ideas are supported, which will help them distinguish between scientific ideas and pseudoscientific ideas.
SC.8.N.2.2	Discuss what characterizes science and its methods.	Students are supported in their understanding of what characterizes science and its methods through a continual emphasis on the nature of scientific knowledge as constructed based on empirical evidence and revised through the collaboration of the scientific community. For example: ● In the Metabolism unit, Lesson 2.4, Activity 2 (press NEXT to see part 4 of 4 of this activity), students discuss different investigation methods in science. ● In the Microbiome unit, Lesson 2.3, in the Activity titled “Introducing Argumentation, students are introduced to the Argumentation Wall”. The wall contains visual representations of the goals and structure of scientific arguments, and is added to and referred to across the year.
SC.8.N.3.1	Select models useful in relating the results of their own investigations.	In every Amplify science unit, students both use a variety of models and create or select their own models to explain the results of their investigations. For example: ● In the Metabolism unit, Lesson 2.3, Activity 3, students create a model to show their explanation, based on their investigations, of how the body systems work in the body of an individual with a medical condition such as diabetes or pancreas injury. ● In the Matter and Energy in Ecosystems unit, Lesson 3.4, Activity 3, students create a model to show their explanation, based on their investigations, of how carbon moves through the different parts of the biodome ecosystem.
SC.8.N.3.2	Explain why theories may be modified but are rarely discarded.	Students understanding of this idea is supported by discussions of how claims in science, including theories, are constructed and modified. For example: ● In Microbiome, Lesson 1.2, Activity 5 (press NEXT to see part 2 of 2 of this activity), students read an article, “Cells: The Basic Unit of Life” that describes progress made at different points in the development of cell theory. See the Teacher Support tab, the note titled “Instructional Suggestion: Nature of Science: Discussing How Theories Change”. ● In Natural Selection, Lesson 3.3, Activity 4, the class discusses the theory of evolution, including how the term theory is used differently in science and in everyday language.

SC.8.N.4.1	Explain that science is one of the processes that can be used to inform decision making at the community, state, national, and international levels.	Students get experience with how science can be used in decision-making process in several units. For example: ● In Microbiome, Lesson 2.2, the activity titled “Play and Discuss Video Message”, students are introduced to a scenario in which science researchers must provide evidence to a lawmaker in order to decide whether a medical procedure is safe. ● In Metabolism, Lesson 4.1, Activity 2, students are introduced to a scenario in which science researchers must analyze evidence to support a decision about whether or not an athlete should be disqualified for blood doping.
SC.8.N.4.2	Explain how political, social, and economic concerns can affect science, and vice versa.	Students see how political, social, and economic concerns can affect science, and vice versa, across multiple units in the Life Science Course. For example: ● In Microbiome, Lesson 1.1, the activity titled “Introducing Life Science”, students view a video that introduces the idea that government funding decisions can affect scientific research. ● In Metabolism, students learn about how scientific research supports diagnosis of medical conditions (See Lesson 1.2, activity titled “Introducing Medical Student Role”, where the scenario is introduced, and Lesson 2.7, Activity 3, in which students write the argument that supports their diagnosis). ● In Traits and Reproduction, students are introduced to context in which scientific research on spider genetics supports the development of medical technology (see Lesson 1.2, Activity 2, where the scenario is introduced). ● In Matter and Energy in Ecosystems, in Chapter 4, students investigate a problem related to how deforestation, while providing space for farmland, also potentially increases carbon dioxide in the atmosphere. (See Lesson 4.1, Activity 2, for the introduction to the problem).
LAFS.6.SL.1.2	Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.	This standard is addressed across multiple units in the Life Science Course. For example: ● In Lesson 1.5, Activity 2 of Matter and Energy in Ecosystems, students are introduced to a digital modeling tool in which they diagrammatically show their thinking about where energy storage molecules (glucose) can be found in an ecosystem, then discuss, explain and interpret their models with a partner. Following this, in Activity 3, students use a simulation to explore factors that affect the number of energy storage molecules producers are able to make, interpret graphs, and discuss

		their thinking and the evidence they gathered. ● In Lesson 2.3, Activity 2, of Traits and Reproduction, students explore and discuss data derived from a simulation activity where they investigate gene copies in spiders. In Activity 3, they re-read an article about hemophilia, collecting more evidence about heterozygous and homozygous genes copies, then summarize what they have learned from both Activities (simulation and article) during a class discussion.
LAFS.6.SL.1.3	Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.	This standard is addressed across multiple units in the Life Science 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 Metabolism, students discuss claims about blood doping, cellular respiration and high altitude training and use evidence to determine whether there is more convincing evidence to support the claim that an athlete blood-doped, or that he trained at high altitude -- or if another claim might explain this athlete's performance. ● In Lesson 4.2, Activity 3, of Matter and Energy in Ecosystems, students discuss claims about why deforestation causes an increase of carbon dioxide in the air. Students determine if there is more convincing evidence to support the claim that deforestation means less photosynthesis so there is less carbon dioxide in the air, or that deforestation means there is more cellular respiration from other organisms, so there is an increase of carbon dioxide in the air.
LAFS.6.SL.1.1a	Come to discussions prepared, having read or studied required material; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.	This standard is addressed across multiple units in the Life Science Course. Most units end with a curricular sequence called the Science Seminar Sequence, which asks students to apply what they have learned to a new context. Students are presented with competing claims and evidence, then prepare for a whole-class discussion of this evidence. The following offer examples of students coming prepared to discuss a specific, content-specific topic: ● In Lesson 4.3, Activity 3 of Metabolism, students discuss claims about blood doping, cellular respiration and high altitude training and use evidence that they have examined during the previous two lessons during the discussion.

		● In Lesson 4.2, Activity 3, of Matter and Energy in Ecosystems, students discuss claims about why deforestation causes an increase of carbon dioxide in the air. Students use evidence they have examined in the prior lesson to sustain the discussion. ● In Lesson 4.2, Activity 3, of Natural Selection, students discuss claims about why stickleback fish in a particular lake have less armor than other sticklebacks from a nearby body of water. Students use evidence they have examined in the prior lesson during the discussion.
LAFS.6.SL.1.1b	Follow rules for collegial discussions, set specific goals and deadlines, and define individual roles as needed.	This standard is addressed across all units in the Life Science Course. Following are some examples: ● In Natural Selection, Lesson 4.2, Activity 2, students discuss evidence they will use later in the lesson, and the teacher reviews the "Language of Argumentation" -- a set of sentence starters for students to use as a scaffold for holding a scientific discussion. In the Activity titled 'Introducing the Science Seminar' following Activity 2, the teacher reviews the roles students will take on during the Science Seminar -- a whole-class discourse routine that is repeated in almost every unit. During Activity 3, students use this information to participate in the Science Seminar. ● In Lesson 2.6, Activity 4 of the Microbiome unit, students discuss the relative strength of various pieces of evidence, using a tool called the Evidence Gradient. This tool helps students to share their thinking aloud in a collegial way, and provides them with a specific goal to accomplish during discussion -- to try to decide together where on the Gradient to place each piece of evidence. In addition, students are supported in this activity by the inclusion of a set of Argumentation Sentence Starters, which can be referenced in support of productive argumentation.
LAFS.6.SL.1.1c	Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.	This standard is addressed across all units in the Life Science Course. For example: ● In Lesson 3.3, Activity 3 of the Populations and Resources unit, students participate in a discourse routine called Write and Share in which each student in a group responds in writing to a different but related prompt. Next, they come together and share their responses, summarizing what they have learned from each unique response. ● In Lesson 2.4, Activity 2 of the Metabolism unit, students work together and use the Metabolism simulation to respond to questions about different conditions that a body might have that affect its ability to get

		either oxygen, glucose or protein to the cells. Students collect and discuss data in order to draw conclusions from the tests they run in the simulation.
LAFS.6.SL.1.1d	Review the key ideas expressed and demonstrate understanding of multiple perspectives through reflection and paraphrasing.	This standard is addressed across all units in the Life Science Course. For example: ● In Lesson 3.3, Activity 3 of the Populations and Resources unit, students participate in a discourse routine called Write and Share in which each student in a group responds in writing to a different but related prompt. Next, they come together and share their responses, reviewing the key ideas expressed by each group member and summarizing what they have learned from each unique response. ● In Lesson 2.5, Activity 3 of the Matter and Energy in Ecosystems unit, students participate in a discourse routine called Word Relationships in which students work in small groups and use important vocabulary from the unit to summarize key ideas. To participate group members must discuss their thinking and come to agreement, which requires them to demonstrate understanding of multiple perspectives through reflection and paraphrasing.
LAFS.6.SL.2.4	Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.	This standard is addressed across multiple units in the Life Science Course. Most units end with a curricular sequence called the Science Seminar Sequence. The science seminar itself provides students with opportunities to discuss and sequence ideas logically, use pertinent descriptions, facts and details to accentuate main ideas or themes and use appropriate eye contact, adequate volume and clear pronunciation so they can communicate with their peers. For example: ● In Lesson 4.3, Activity 3 of Metabolism, students discuss claims about blood doping, cellular respiration and high altitude training and hold a student-led discussion about these content-driven topics. ● In Lesson 4.2, Activity 3, of Natural Selection, students discuss claims about why stickleback fish in a particular lake have less armor than other sticklebacks from a nearby body of water. Students use evidence they have examined in the prior lesson, as well as content they have learned throughout the unit, to maintain this student-driven discussion. ● In Lesson 4.3, Activity 3 of the Populations and Resources unit, students discuss claims and evidence about what is causing a population of parrots to decrease. Students participate in a student-led discussion about this topic.

LAFS.6.SL.2.5	Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.	This standard is addressed in every unit of the Life Science Course. For example: ● In Lesson 4.3, Activity 4 in the Metabolism 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 2.4, Activity 2 of the Metabolism unit, students who have already been assigned a body condition to learn about (anemia, asthma, EPI or diabetes) are now responsible for teaching each other about their assigned condition. Students work in pairs with the Metabolism simulation, using provided questions as prompts to help them explain to their partner what is happening in the simulated body. . Students use several different displays the simulation has to offer during their presentation to a peer, including a 'working' body that shows molecules moving through it, a function that allows students to use pop-ups to show helpful, explanatory text, and tables that display data after each simulation run, to discuss information and draw conclusions and present their thinking to each other. ● In Lesson 2.2, Activity 3 of the Matter and Energy in Ecosystems unit, students use a digital Modeling Tool to create models explaining which organisms in an ecosystem give off carbon dioxide and how this happens. They then use their models to explain their thinking to a partner, in Activity 4.
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 Life Science Course. Students read articles multiple times, for different purposes, in order to gather textual evidence to support science ideas. For example: ● In Lesson 2.3, Activity 2 of the Metabolism unit, students re-read the same article they read (from a set) during the previous lesson. Each article is about a particular condition (diabetes, asthma, anemia or EPI) that can affect a person's energy level. Students re-read and gather specific information about their assigned condition that they will share with their peers. They also use this information as evidence to support a diagnosis they make later in the Chapter, about which of the four conditions they believe a patient they are studying has. ● 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.
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 Life Science Course. Students read articles multiple times and for every 'second read' students are asked questions to summarize the important ideas from the text. For example: ● In Lesson 2.3, Activity 2 of the Metabolism unit, students re-read the same article they read (from a set) during the previous lesson. Each article is about a particular condition (diabetes, asthma, anemia or EPI) that can affect a person's energy level. Students re-read so they can fully understand what is happening to the body with their assigned condition, as they prepare to share this information with a small group of their peers. ● In Lesson 3.2, Activity 2 of the Populations and Resources unit, students re-read a section of the article, "Competition for Food" 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 procedure when carrying out experiments, taking measurements, or performing technical tasks.	This standard is addressed in every unit of the Life Science Course. For example: ● In Lesson 3, Activity 4 of the Metabolism Engineering Internship unit, students use a digital data tool to test various recipes. In order to complete the tests, which include gathering and interpreting measurements and data, students must read and follow multistep procedures. ● 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. ● In Lesson 2.1, Activity 3 of the Metabolism unit, students independently enact a classroom model of the human body and what happens to it under various conditions. In order to do this, they must work together and follow a complicated set of procedures.

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 6-8 texts and topics.	This standard is addressed in every unit of the Life Science Course. For example: ● In Lesson 2.2, Activity 3 of the Microbiome unit, students examine two pie graphs representing the amounts and different kinds of bacteria in a patient's gut over time. Students examine these pie graphs for differences and make inferences about a patient's condition using this data. They then examine subsequent pie graphs in upcoming lessons; students must understand the meaning of the symbols and key terms associated with these graphs in order to comprehend the information on 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 4.1, Activity 3 of the Matter and Energy in Ecosystems unit, students read and annotate evidence cards. Each card contains text and graphs. Students must carefully read all available information on these cards in order to make meaning from them.
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 Life Science Course. For example: ● In the Metabolism 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 "Patient Stories" articles. ● In the Metabolism Engineering Internship unit in Lesson 1, during the activity titled, "Introducing the Futura Workspace and Dossier" for the Metabolism Engineering Internship unit, students learn what a dossier is (a term professionals use for a set of related documents) and learn that as engineering interns, they too will be examining and adding to a dossier. They read different portions of the dossier, and add their own reports to this document, throughout the unit. ● 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.
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 Life Science Course. For example: ● In Lesson 1.2, Activity 2, of the Matter and Energy in Ecosystems unit, students examine the "Biodome Files" -- a set of texts they will use throughout the unit to understand what happened to the (fictitious) ecosystem trapped inside a biodome. Students are encouraged in this lesson and throughout the unit to consider the authors' purposes in creating the texts that make up these files. ● In the Metabolism Engineering Internship unit, Lesson 1, in the Teacher-led activity titled "Introducing Project Phases and Roles", the teacher explains the various roles students (and the teacher) will take on during the Engineering Internship. In each lesson that follows, students repeatedly read texts from different participants in the internship and consider the role each participant plays and how this affects the ways they should read associated texts that are provided in the unit.
LAFS.68.RST.3.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	This standard is addressed in every unit of the Life Science Course, during standard reading lessons, as well as when students read evidence cards and participate in using a simulation that has textual elements such as symbols, graphs and standard text. For example: ● In Lesson 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 3.4, Activity 2 in the Metabolism unit, students read the article, "Blood Doping: Messing with Metabolism to Win Races." The article contains several diagrams that support a student's understanding of what blood doping is, and how the oxygen levels differ for an athlete who blood dopes and one who does not. In Lesson 3.5, Activity 4, students re-read the article and focus specifically on one of the diagrams during this read. In addition, students use the article in Activity

		5, to help them revise a model they previously made, showing what happens to an athlete who blood dopes. ● In Lesson 4.1, Activity 3 of the Matter and Energy in Ecosystems unit, students read and annotate a set of evidence cards. Each card has both text and a graph and students must incorporate an understanding of each element on the card to fully understand and interpret what the evidence is saying. ● 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 (click NEXT to see all three parts of this activity).
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 Life Science Course. For example: ● In Lesson 2.2, Activity 2 and the following Activity, “Teacher: Play and Discuss Video Message” in the Microbiome unit, students are introduced to a fictitious senate bill that a senator is proposing. The bill is set to cut funding for fecal transplant and microorganism research. Students are challenged to learn more about this line of research so that they can dispute claims this senator has made about the efficacy and validity of using fecal transplants to cure infections. Students spend the next 5 lessons reading about various studies and trying to understand what happens with the microorganisms in the human gut before and after a fecal transplant, and collect evidence to write letters to the senator explaining the value in this procedure. ● 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.
LAFS.68.RST.3.9	Compare and contrast the	This standard is addressed in every unit of the Life Science Course. For

	information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	example: ● 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. ● In Lesson 3.3, Activity 2 of the Metabolism unit, students read and annotate a short article called “Growth and Repair” which describes how the body’s cells grow and repair themselves. The teacher then projects the Metabolism simulation, and the class compares what they learned during reading to what they observe from the simulation. Finally, In Activity 3, students use the Metabolism Modeling Tool to model their understanding of growth and repair.
LAFS.68.RST.4.10	By the end of grade 8, read and comprehend science/technical texts in the grades 68 text complexity band independently and proficiently.	This standard is addressed in every unit of the Life Science Course. Every unit has at least 2 embedded articles in them, and students read each article at least two times for different purposes. For example: ● In Lesson 2.1, Activity 2 in the Traits and Reproduction unit, students read the article, “Hemophilia, Proteins and Genes.” In Lesson 2.3, during Activity 3, students re-read a section of the same article in order to focus on and learn more about homozygous and heterozygous genes.
LAFS.68.WHST.1.1	Write arguments focused on discipline-specific content. Introduce claim(s) about a topic or issue, acknowledge and distinguish the claim(s) from alternate or opposing claims, and organize the reasons and evidence logically. Support claim(s) with logical reasoning and relevant, accurate data and evidence that demonstrate an understanding of the	This standard is addressed in all units of the Life Science Course. For example: ● 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.

	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.	● In Lesson 4.3, Activity 4 in the Matter and Energy in Ecosystems unit, students write arguments to address the question "Why does deforestation lead to increased carbon dioxide in the air?" Students base their arguments on evidence about a specific site where deforestation occurred (the site is fictional but realistic). 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 formal style and objective tone. Provide a concluding statement or section that follows from and supports the information or explanation presented.	This standard is addressed in all units of the Life Science Course. For example: ● 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-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 8, during the activity titled, 'Introducing the Recipe Proposal" of the Metabolism Engineering Internship unit, students read a sample design proposal so that they can observe the tone and construction of the arguments they will be writing, and are introduced to the rubric that will be used to provide feedback about their proposals the rubric includes categories that describe the use of relevant, domain specific vocabulary that should be included. In Lesson 8 (see activity titled "Drafting the Design Overview"), students write draft proposals, which receive feedback about the content as well as overall writing and vocabulary use, and in Lesson 9 (see activity titled "Finalizing the Written Proposal") they revise their proposals based on this feedback. In addition, throughout the last 3 lessons of this unit, students are reminded to establish and maintain a formal style and objective tone in their proposal writing. ● 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.
LAFS.68.WHST.2.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	This standard is addressed in all units of the Life Science Course. For example: ● In Lessons 8 and 9 (see Lesson 8, activity titled "Drafting the Design Overview" and Lesson 9, activity titled "Finalizing the Written Proposal") of the Metabolism Engineering Internship unit, students are introduced to the task of developing an Engineering Proposal that explains which recipe is best for their (fictitious) company to create, based on criteria such as taste, cost and the amount of energy it will provide for those who eat the bars. 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. ● In Lesson 2.5, Activity 5 of the Microbiome unit, students write arguments for a press release intended to convince people that fecal transplants are helpful and should be funded. They organize their thinking prior to writing, by considering each piece of possible evidence they might use in a tool called the Reasoning Tool. Students are encouraged to consult the work they did with the Reasoning Tool to help them develop and organize their arguments, and are reminded about the style, task, purpose. In Lesson 2.7, Activities 2 and 3, students write the second half of this press release argument, and follow similar procedures as in Lesson 2.5. They are also provided with time to revise their original arguments from Lesson 2.5 as needed.
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 Life Science Course. Most units in the Life Science Course end with a 3-day Science Seminar Sequence. This sequence provides time for students to examine evidence about a novel scientific problem that requires them to use content from the rest of the unit. Students discuss their ideas about this problem in a discourse routine called the Science Seminar, then independently write final arguments based on the thinking they did during the sequence. For example: ● In Lesson 8, during the Activity titled, 'Introducing the Recipe Proposal" of the Metabolism 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 read a sample design proposal so that they can observe the tone and construction of the arguments they will be writing, and are introduced to the rubric that will be used to provide feedback about their proposals. In Lessons 8 and 9 (see Lesson 8, activity titled “Drafting the Design Overview” and and 9, activity titled “Finalizing the Written Proposal”) students write draft proposals, receive feedback, and revise their proposals based on this feedback. ● 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 Life Science Course. For example: ● In Lesson 4.3, Activity 4 in the Metabolism 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 2.4, Activity 2 in the Metabolism unit, students collect data about the condition they are studying (either asthma, anemia, EPI or diabetes) using the Metabolism simulation. As they work in small groups, students use this simulation-produced data to help them diagnose the condition of a fictitious patient, Elisa, in Lesson 2.7, activity 2. Finally, in Activity 3, students write arguments supporting a diagnosis for Elisa, and use data collected with the simulation along with consideration of information they gather from the Metabolism Digital Modeling Tool in Activity 2, to support their arguments. Each member of the group works together to make the diagnosis and shares

		in the ownership of the published diagnosis they create.
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 Life Science Course. For example: ● In the Natural Selection unit, students are challenged to find out why the rough-skinned newt is so poisonous. In Lessons 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 2.2 of the Microbiome unit, students are asked to research what fecal transplants are and how they work. Over the course of the next few lessons students read the results of several studies (see for example, Lesson 2.2, Activity 3) and use this information to write arguments about fecal transplants in Lesson 2.5 (see Activity 5) and Lesson 2.7 (see Activity 3). Students also choose a claim to support for the writing they do in Lesson 2.7. ● In Lessons 2.2, 2.3, and 2.4 of the Metabolism unit, students research different conditions (anemia, asthma, diabetes or EPI) that a patient might have and eventually diagnose the patient (see for example, Lesson 2.3, Activity 2). In Lesson 2.7 (see Activity 3) they write scientific arguments describing which condition they feel the patient has. Their arguments use evidence from a variety of sources that they investigated during the previous lessons.
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 Life Science Course. For example: ● In every unit, students can use the search function in the Amplify Library to search and find relevant content within articles. ● In Lesson 3.5, Activities 3, 4 and 5 in the Metabolism unit, students first model what an athlete's body would look like with regard to oxygen intake using the Metabolism Modeling Tool, then reread the article, "Blood Doping: Messing with Metabolism to find out more about this topic. They then use the Modeling Tool again to model an athlete's body who blood doped. Finally, in Activity 5, students use the Metabolism simulation to find out how to get the highest rate of cellular respiration possible with this tool. All of these activities provide evidence and background information to support students' evaluation of specific evidence they receive in Lesson 4.1 about one athlete who may or may

		not have blood doped, and support the argument writing students complete in Lesson 4.3. ● 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 Life Science 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 Life Science Course. For example: ● In Lesson 3.5, Activity 4 of the Metabolism unit, students conduct a second read of part of the article “Blood Doping: Messing with Metabolism to Win Races.” During this read, they collect evidence that allows them to compare the amount of oxygen in a normal and blood doped body, as well as the amount of oxygen absorbed by the cells for each body. In addition, students make predictions about what a blood-doped body needs, using the article to support their thinking, and, in the next Activity, use what they read to help reflect upon their learning and revise a model of the body that they’d made with the digital Modeling Tool before reading. ● In Lesson 3.2, Activity 2 of the Populations and Resources unit, students reread the article, “Jelly Population Explosion: How Competition Can Affect Population Size.” After reading, students respond in writing to a question that asks them to reflect upon and summarize several important ideas from the article. Next, in Activity 3, students use this thinking to support an understanding of an activity in the Populations and Resources simulation. ● In all Science Seminar Sequences, which occur in most units in the Life Science Course, students spend either 1-2 days reading, analyzing and participating in research using evidence cards and other sources. Then, at the end of the sequence, students use evidence derived from these sources to support writing final arguments for the unit.
LAFS.68.WHST.4.10	Write routinely over extended time frames (time for reflection and	This standard is addressed in all units of the Life Science Course. Students write in virtually every lesson, for a wide variety of purposes. Some examples

	revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.	are: ● In Lesson 4.3, Activity 4 of the Matter and Energy in Ecosystems 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 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. At the end of each Chapter, 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.
HE.6.C.1.8	Examine the likelihood of injury or illness if engaging in unhealthy/risky behaviors.	This standard is addressed across multiple units in the Life Science Course. For example: ● In Metabolism, students investigate blood doping and examine its effects on health (see Lesson 3.5, Activity 4). Also in this unit, students read about a biking accident and a pancreas injury that results (see Lesson 2.2, Activity 2). ● In Microbiome, students investigate the effect of antibiotics on the human microbiome and examine how antibiotics affected the microbiome of a specific patient, concluding that the antibiotics caused C. difficile infection (see Lesson 2.3, Activity 2 and 3). ● In Metabolism Engineering Internship, students read about the risks and needs associated with particular emergency safety responder roles and

		work to design a nutritional bar that meets those needs (see Day 3, Activity titled “Researching How to Design a FuturaBar”).
MAFS.6.EE.3.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.	This standard is addressed in the Matter and Energy in Ecosystems unit. For example: ● In Lesson 1.5, Activity 3 (click NEXT to see part 2 of 2 of this activity and see the Teacher Support tab, note titled “Instructional Suggestion: Going Further: Mathematical Thinking“), students make quantitative comparisons for the changes they make in the Matter and Energy in Ecosystems sim by calculating the total amount of glucose produced during the observed amount of time units before and after they make a change to the ecosystem. Students also write an equation for the amount of glucose produced as a function of time and use the function to calculate the total amount of glucose produced for any amount of time. ● In Lesson 2.3, Activities 1 and 2, students analyze a graph representing population size over time, using information from the graph to draw conclusions about the ecosystem they are investigating. In Activity 3 of that same lesson (see the Teacher Support tab), students investigate the effect of removing decomposers (independent variable) from an ecosystem on carbon dioxide and cellular respiration in the ecosystem (dependent variables). Students have another opportunity in this lesson to write an equation for the amount of glucose as a function of time.
MAFS.6.SP.2.4	Display numerical data in plots on a number line, including dot plots, histograms, and box plots.	This standard is addressed over many lessons in the Natural Selection unit. For example: ● In Lesson 1.3, students watch a video, Histograms (found in the Digital Resources), that introduces students to how histograms can represent the distribution of a trait in a population. Students compare box plots to histograms and create their own box plots (see Teacher Support tab, note titled “Instructional Suggestion: Going Further: Mathematical Thinking”) ● In Activity 4 of that same lesson (1.3), students use cubes to create a series of histograms representing populations with different amounts of variation in traits. ● In Lesson 2.2, Activity 2 (press NEXT to see part 2 of 3, and see the Teacher Support tab, note titled “Instructional Suggestion: Going Further: Mathematical Thinking”) students use data from the Sim to create box plots.

		● In Lessons 1.3, 1.4, 1.5, 2.1, 2.2, 2.6, and 3.2, students use the Natural Selection sim to analyze the variation and distribution of traits in a population over time using histograms. ● In Lesson 1.4, Activity 2 (see the Teacher Support tab), students collect data in the Sim and use a digital Data Tool to create a scatterplot of the temperature level of an environment and the average fur level of an animal population after many generations. ● In Lesson 2.1, Activity 3, students engage in an activity illustrating how reproduction in a population leads to the passing of traits from one generation to the next by creating a series of histograms to show the variation and distribution of traits in a population after multiple generations.
MAFS.6.SP.2.5	Summarize numerical data sets in relation to their context, such as by: Reporting the number of observations. Describing the nature of the attribute under investigation, including how it was measured and its units of measurement. Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	This standard is addressed across multiple units in the Life Science course. For example: ● In Lesson 2.2, Activity 3 of the Microbiome unit, students analyze data represented in pie charts to summarize the effects of changes to the human microbiome on a person's health. ● In Lesson 5 of the Metabolism Engineering Internship unit, in the activity titled "Analyzing Data," students use the data they collected from a digital simulation about the nutritional value of their nutrition bar recipes and determine which recipe best meets the metabolic needs of a population. Also in this activity (see the Teacher Support tab), students compare their recipes by calculating and using the average percent of growth and repair needs met, average percent energy needs meet after different amounts of time. ● In Lesson 1.4, Activity 2 of the Natural Selection unit (see the Teacher Support tab, the note titled Instructional Suggestion, Going Further: Mathematical Thinking), students collect data in the Sim and use a digital Data Tool to create a scatterplot of the temperature level of an environment and the average fur level of an animal population after many generations. Students use these data to describe the overall pattern of trait variance and distribution in a population. In Lesson 2.1, Activity 3, students create a series of histograms to represent the number of observations of particular traits in a population. ● In Lesson 4.1, Activity 3, the Traits and Reproduction unit, students interpret data on the levels of ACTN3 with different populations, identifying patterns in the data about presence of ACTN3 among elite athletes.

HE.7.C.1.3	Analyze how environmental factors affect personal health.	This standard is addressed across multiple units in the Life Science Course. For example: ● In Microbiome, students investigate the microbiome of the human body and how new microorganisms introduced to the microbiome can help or harm personal health (e.g., Lesson 2.5, Activity 2). Also in this unit, students investigate the effect of antibiotics on the human microbiome (Lesson 2.3, Activity 2 and 3). ● In Metabolism, students investigate and analyze the effects of limited oxygen in the environment on the process of cellular respiration (Lesson 3.1, Activity 4).
HE.7.C.1.7	Describe how heredity can affect personal health.	This standard is addressed in the Traits and Reproduction unit. In Lesson 2.1, Activity 2, and Lesson 2.3, Activity 3, students read and analyze the contents of an article. The article, “Hemophilia, Proteins, and Genes,” discusses how genes are instructions for proteins, which determine traits, and hemophilia is a genetic condition that affects personal health.
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 Matter and Energy in Ecosystems Unit, Lesson 2.3, Activity 4, 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), ● In all core units, students use modeling tools to create visual representations of their explanations, providing English learners with an opportunity to express their understanding visually in addition to in writing (see for example, Metabolism, Lesson 2.3, Activity 3) ● Students are provided with scaffolds for oral and written language use, such as sentence starters (see for example, Matter and Energy in Ecosystems, Lesson 4.3, Activity 4): ● Teachers are provided with suggestions for how to group students in order to support English learners (see for example, Microbiome, Lesson 1.1, in the Differentiation Brief, section titled, “Specific Differentiation Strategies for English Learners”, note titled “Strategically choose partners for ELs.” ● Teachers are encouraged to capitalize on English learners’ language knowledge, for example by pointing out Spanish-English cognates (see for example, Microbiome, 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 Metabolism Engineering Internship (see Lesson 1, the activity titled “Introducing Project Phases and Roles”), students assume their role as FuturaBar Engineers and work to make sense of the problem they are trying to solve. Students are actively considering, discussing, and reflecting on the problem context as they work to understand the larger problem of how to provide a nutritional remedy to people involved in a natural disaster. 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 to search for the best solution for the problem at hand. ● 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.
MAFS.K12.MP.2.1	Reason abstractly and quantitatively.	This standard is addressed across multiple units in the Life Science course. For example: ● In Lesson 4, the "Designing and Testing Recipes" Activity of the Metabolism Engineering Internship, students work to design a nutritional bar. As they do so, they move back-and-forth between manipulating symbols abstractly and attending to the meaning of those symbols while doing so. The Metabolism Engineering Internship asks students to engage in contextualizing and decontextualizing as they work iteratively between the FuturaBar nutritional value data and the need to create an affordable solution they can take to scale. Students are also making connections regarding the nutritional value provided by various ingredients and the resulting output of available energy. ● In Lesson 1.6, Activity 4 of the Matter and Energy in Ecosystems unit, students create a model (using a digital modeling tool) to reason about the relationship between quantities of carbon dioxide, glucose, and photosynthesis in an ecosystem using symbols. Also in this lesson (Activity 2), students analyze graphs to determine how the amounts of sunlight, water, and carbon dioxide has changed in an ecosystem over time. ● 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 discover when a system is unstable and when it is stable.
MAFS.K12.MP.3.1	Construct viable arguments and critique the reasoning of others.	This standard is addressed across multiple units in the Life Science course. For example: ● In Lesson 7 of the Metabolism Engineering Internship, in the activity titled Finalizing Recipes (see the Teacher Support tab), students calculate the percent increase or decrease in different recipes of

		nutritional bars for various factors (taste score, cost, average percent of growth and repair needs met, average percent of energy needs met after 15 minutes, and average percent of energy needs met after 60 minutes). This activity allows students to analyze how their design has changed and to use how much their design has improved to support their argument for their final designs. ● 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 1.6, Activity 3 of the Matter and Energy in Ecosystems unit, students evaluate a claim using graphical evidence that represents how the amounts of sunlight, water, and carbon dioxide has changed in an ecosystem over time.
MAFS.K12.MP.4.1	Model with mathematics.	This standard is addressed across multiple units in the Life Science course. For example: ● In Lesson 1.2, Activity 3 of the Microbiome unit, students created scaled diagrams of two microorganisms at 20,000 times their actual size. In Lesson 1.3, Activity 2, students investigate how the scale of molecules relates to the scale of cells and add the scale of molecules to their diagrams. ● 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 1.6, Activity 4 of the Matter and Energy in Ecosystems unit, students use a digital modeling tool to show decreasing carbon dioxide and decrease in energy storage molecules, using a symbol that represent a decreasing quantity. In Lesson 3.3, Activity 2, of that same unit, students use the digital Sim to analyze (using a graph) what happens to the quantity of carbon in an ecosystem when all decomposers die.
MAFS.K12.MP.5.1	Use appropriate tools strategically.	This standard is addressed across multiple units in the Life Science course. For example: ● In Lesson 4, the “Designing and Testing Recipes” Activity of the Metabolism Engineering Internship, students work to design a nutritional bar by gathering data from the Recipe Test sim about the percent of

		protein and carbohydrates in each recipe and the glycemic index and determine the best recipe. ● 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 3.3, Activity 2, of the Matter and Energy in Ecosystems unit, students use the digital Sim to strategically alter an ecosystem to observe the effects of those changes on the abiotic parts of that ecosystem. Students use a graph to analyze what happens to the quantity of carbon in an ecosystem when all decomposers die.
MAFS.K12.MP.6.1	Attend to precision.	This standard is addressed across multiple units in the Life Science course. For example: ● In Lesson 2.7, Activity 3 of Microbiome, students will have many opportunities to attend to precision as they use evidence from pie charts representing percentages of different microorganisms in a patient’s microbiome to explain why the fecal transplant cured the patient of the C. difficile infection. Attending to precision means that students aim to communicate precisely to others, both in the evidence they present and the corresponding reasoning that links this evidence to a claim. ● In Lesson 1.6, Activity 4 of the Matter and Energy in Ecosystems unit, students use a digital modeling tool to show decreasing in carbon dioxide and decrease in energy storage molecules, using a symbol that represent a decreasing quantity.
MAFS.K12.MP.7.1	Look for and make use of structure.	This standard is addressed across multiple units in the Life Science 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.
MAFS.K12.MP.8.1	Look for and express regularity in repeated reasoning.	This standard is addressed across multiple units in the Life Science course. For example:

		● In Lesson 1.5, Activity 3 (press NEXT to see part 2 of 3; see the Teacher Support tab, the note titled “Going Further: Mathematical Thinking”) of the Matter and Energy in Ecosystems unit, students make quantitative comparisons for the changes they make in the Matter and Energy in Ecosystems sim by calculating the total amount of glucose produced during the observed amount of time units before and after they make a change to the ecosystem. Students also write an equation for the amount of glucose produced as a function of time and use the function to calculate the total amount of glucose produced for any amount of time. ● In Lesson 2.4, Activity 2 of Metabolism, students use the Metabolism sim to examine the number of glucose, amino acid, and oxygen molecules absorbed by cells in a healthy body and body with a medical condition. After conducting multiple trials for each condition, students recognize patterns in number of molecules absorbed by cells in the body under different conditions. ● 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.