CoAlt Science 2023 Performance Level Descriptors
Grade 11 Science
Based on the 2020 Colorado Academic Standards with Extended Evidence Outcomes for High School Science

Emerging
Students performing at this level demonstrate an initial understanding of concepts and skills represented by the Extended Evidence Outcomes (EEOs) of the Colorado Academic Standards (CAS). They will need extensive academic supports to engage successfully in further studies in the content area.

Approaching Target
Students performing at this level demonstrate a limited understanding of concepts and skills represented by the EEOs of the CAS. They will likely need moderate academic supports to engage successfully in further studies in the content area.

At Target
Students performing at this level demonstrate a foundational understanding of concepts and skills represented by the EEOs of the CAS. They are academically prepared to engage in further studies in the content area with appropriate supports.

Advanced
Students performing at this level demonstrate a solid understanding of the concepts and skills represented by the EEOs of the CAS. They are academically well prepared to engage in further studies in the content area with appropriate supports.

Color Legend for Three-Dimensional Alignment

Colorado Essential Skills and Science and Engineering Practice

Grade Level Expectation

Cross Cutting Concept

Note: Minor editorial changes made in January 2023 post SBE Adoption, December 14, 2022

Physical Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
PG 1.	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding structure, properties, and interactions of matter.**			
GLE 1.1, 1.2, 1.3	Identify a property of a metal or a nonmetal. (HS.1.1.a)	Use parts of the periodic table to identify properties of metals or nonmetals. **OR** Identify metals or nonmetals based on properties of groups. (HS.1.1.a)	Use parts of the periodic table to identify properties of groups of elements. (HS.1.1.a)	Use parts of the periodic table to identify properties of groups and families and uses of commonly found elements. (HS.1.1.a)
		Identify that the structure of a substance affects the properties of the substance. (HS.1.1.b)	Evaluate an investigation of how the structure of a substance affects the properties of the substance. **OR** Identify how the structures of different substances affect the properties of the substances. (HS.1.1.b)	Plan an investigation of how the structures of different substances affect the properties of the substances. (HS.1.1.b)
	Identify that temperature changes occur during a chemical reaction. (HS.1.1.c)	Develop a model to illustrate changes in temperature in a chemical reaction. **OR** Identify chemical reactions based on changes in temperature that show evidence of energy transfer. (HS.1.1.c)	Develop a model to illustrate how changes in temperature show evidence of energy transfer in a chemical reaction. (HS.1.1.c)	Develop a model to illustrate how changes in temperature show evidence of the directionality of energy transfer in a chemical reaction. (HS.1.1.c)
	Identify an atom or a molecule based on a pattern. (HS.1.2.a)	Identify a model of a chemical reaction. (HS.1.2.a)	Identify a model that represents that atoms are rearranged in a chemical reaction. (HS.1.2.a)	Develop a model to represent simple chemical reactions that have the same pattern of atom rearrangement. (HS.1.2.a)

Physical Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
	Identify that temperature changes can affect a chemical reaction. (HS.1.2.b)	Identify how a chemical reaction is affected by an energy transfer. (HS.1.2.b)	Develop a model to illustrate how a chemical reaction is affected by changes in temperature. (HS.1.2.b)	Develop a model to illustrate how changes in temperature show evidence of changes in rate of energy transfer in a chemical reaction. (HS.1.2.b)
	Identify that temperature changes can affect a chemical reaction. (HS.1.2.c)	Use evidence to describe that a change in temperature affects the energy supplied to or released by a reaction. **OR** Use patterns in evidence to describe the effects of changing the temperature of the two reacting substances on the rate at which a reaction occurs or on the outcomes of the reaction. (HS.1.2.c)	Use evidence to describe that a change in concentration of a reacting substance affects the number of atoms or molecules supplied to or produced by the reaction. (HS.1.2.c)	
	Identify that the outcome of a chemical reaction is a product. (HS.1.2.d)		Describe an investigation in which an increased amount of product from a chemical reaction occurs. **OR** Identify how changes in experimental conditions can increase the amount of product from a chemical reaction. (HS.1.2.d)	Use an investigation to explain or predict the relationship between changes in experimental conditions and an increased amount of product from a chemical reaction. (HS.1.2.d)
	Identify that individual atoms have mass. (HS.1.2.e)	Identify that the mass or size of an individual atom stays the same during a chemical reaction. (HS.1.2.e)	Identify that the total mass or total number of atoms stays the same during a chemical reaction. (HS.1.2.e)	Use a mathematical representation to show that the total mass or total number of atoms stays the same during a chemical reaction. (HS.1.2.e)
	Identify that a nucleus is a part of an atom. (HS.1.3.a)	Identify that nuclei are made of particles. **OR** Identify a model illustrating nuclear fission or nuclear fusion. (HS.1.3.a)	Describe that energy is released as a result of nuclear fission or nuclear fusion. (HS.1.3.a)	Use a model to illustrate the energy released and the composition of nuclei for nuclear fission or nuclear fusion. (HS.1.3.a)

Physical Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
PG 2.	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding interactions between objects and within systems of objects.**			
GLE 1.4, 1.5		Identify that mass affects force. (HS.1.4.a)	Use data from an investigation to identify how mass affects force. **OR** Describe the relationship between mass and force. (HS.1.4.a)	Use data from an investigation to identify evidence of the relationship between mass, force, and acceleration. (HS.1.4.a)
		Identify that mass or speed affects momentum. (HS.1.4.b)	Describe the relationship between mass, speed, and momentum for an object. **OR** Use data from an investigation to identify an example of conservation of momentum. (HS.1.4.b)	Use data from an investigation to identify the relationship between the mass and speed of two colliding objects demonstrating conservation of momentum. (HS.1.4.b)
		Identify that an object experiences force during a collision. (HS.1.4.c)	Identify the relationship between the force of a collision and the effects on the objects colliding. (HS.1.4.c)	Compare and evaluate designs that minimize the effect of the force on an object during a collision. (HS.1.4.c)
		Identify that mass or charge affects force. (HS.1.5.a) **OR** Identify Earth as the object that pulls other objects down. (HS.1.5.a)	Describe the relationship between mass, charge, and force. **OR** Use data from an investigation or a simulation to identify an object affected by forces because of mass and charge. (HS.1.5.a)	Use data from an investigation or a simulation to predict the relationship between two objects of different masses (Newton's Law of Gravitation) and two charged objects (Coulomb's Law). (HS.1.5.a)

Physical Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
		Identify that an electric current can produce a magnetic force. (HS.1.5.b)	Identify the relationship between an electric current and a magnetic field. **OR** Use data from an investigation to show that an electric current can produce a magnetic field. (HS.1.5.b)	Plan an investigation demonstrating how changing an electric current changes a magnetic field. (HS.1.5.b)
		Identify a property of a material commonly used in industry. (HS.1.5.c)	Gather evidence about the properties of materials commonly used in industry. (HS.1.5.c)	Gather evidence about the properties or molecular-level structure of materials commonly used in industry. (HS.1.5.c)
PG. 3	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding of how energy is transferred and conserved.**			
GLE 1.6, 1.7, 1.8, 1.9		Identify a transfer of energy. (HS.1.6.a)	Describe the changes in energy and the impact on the components of a system. (HS.1.6.a)	Use data from an investigation to determine the relationship between changes in energy and the impact on the components of a system. (HS.1.6.a)
		Identify that a moving object has kinetic energy. (HS.1.6.b)	Use a model to identify kinetic energy or thermal energy. **OR** Identify the conversion of kinetic energy to thermal energy. (HS.1.6.b)	Develop a model to illustrate the conversion of kinetic energy to thermal energy. (HS.1.6.b)
		Identify that a device requires input of energy in order to output energy. (HS.1.6.c)	Design or identify features of a device that affect the input and output of energy. (HS.1.6.c)	Design or identify features of a device showing the transformations of energy that occur. (HS.1.6.c)
	Identify that the quantity of energy in an object can change. (HS.1.7.a)	Describe the change in energy of one component of a system when the energy of another component changes. (HS.1.7.a)	Use an equation to show the change in energy of one component of a system when the energy of another component changes. (HS.1.7.a)	Create an equation to show the change in energy of one component of a system when the energy of another component changes. (HS.1.7.a)

Physical Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
	Identify that while energy can be transferred, it cannot be created or destroyed. (HS.1.7.b)	Use data to show evidence of thermal energy transfer from hotter matter to colder matter. **OR** Identify that thermal energy transfers from hotter matter to colder matter when two liquids at different initial temperatures are mixed. (HS.1.7.b)	Use data from an investigation to show that uniform thermal energy distribution is the ultimate result when two liquids at different initial temperatures are mixed. (HS.1.7.b)	Plan an investigation to produce data to show evidence that uniform thermal energy distribution is the ultimate result when two liquids at different initial temperatures are mixed. (HS.1.7.b)
		Identify the motion of an object as caused by an electric or magnetic force. (HS.1.8.a)	Describe the cause and effect relationship between the change in energy of objects and the forces produced by electric or magnetic fields. **OR** Develop or use a model to show that forces can be produced by electric or magnetic fields. (HS.1.8.a)	Develop or use a model to show the cause and effect relationship between the change in energy of objects and the forces produced by electric or magnetic fields. (HS.1.8.a)
		Identify energy as kinetic energy or as potential energy. (HS.1.9.a)	Describe the conversion of one form of energy into another form of energy. (HS.1.9.a)	Design or identify a device that converts one form of energy into another form of energy. (HS.1.9.a)
	Identify that an object with more thermal energy feels warmer than the same object with less thermal energy. (HS.1.9.b)	Describe the transfer of thermal energy between two objects. (HS.1.9.b)	Use data from an investigation to describe the transfer of thermal energy between two objects. (HS.1.9.b)	Plan an investigation to explore the transfer of thermal energy between two objects. (HS.1.9.b)
PG 4.	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding of how waves are used to transfer energy and information.**			
GLE 1.10, 1.11, 1.12		Identify the height of a wave with intensity or the width of wave with frequency or wavelength. (HS.1.10.a)	Identify a medium that changes the frequency, wavelength, or speed of a wave in a specified way. (HS.1.10.a)	Identify a mathematical representation that shows that the frequency, wavelength, and speed of waves can vary when traveling through various media. (HS.1.10.a)

Physical Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
		Identify an example of digital information. (HS.1.10.b)	Identify the advantages and disadvantages of using and storing digital information. **OR** Ask questions about the natures of digital and analog information. (HS.1.10.b)	Ask questions to examine the advantages and disadvantages of using and storing digital information. (HS.1.10.b)
		Identify the two models of light as the wave and particle models. (HS.1.11.a)	Use evidence to compare the wave model and the particle model of electromagnetic radiation. (HS.1.11.a)	Use evidence to compare the wave model and the particle model of electromagnetic radiation and determine which is more useful in given situations. (HS.1.11.a)
	Identify that electromagnetic radiation can affect humans. (HS.1.11.b)	Identify a way to protect humans from electromagnetic radiation. (HS.1.11.b)	Describe the effects of electromagnetic radiation on humans. (HS.1.11.b)	Evaluate information about the effects of electromagnetic radiation on humans. (HS.1.11.b)
	Identify waves as a carrier of energy. (HS.1.11.c)	Identify that a technological device uses waves as a carrier of energy to perform its function. (HS.1.11.c)	Evaluate information about how a technological device uses wave energy to perform its function. (HS.1.11.c)	
	Identify waves as a carrier of information. (HS.1.12.a)	Identify that a technological device uses waves to transmit and capture information. (HS.1.12.a) **OR** Create or use a model to show how technological devices use waves that carry information. (HS.1.12.a)	Create or use a model to show how technological devices use waves to transmit and capture information. (HS.1.12.a)	

Life Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
PG 5	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how individual organisms are configured and how these structures function to support life, growth, behavior, and reproduction.**			
GLE 2.1, 2.2, 2.3	Identify DNA as the molecule that carries the instructions for proteins. (HS.2.1.a)	Identify that the structure of DNA determines the structure of proteins. (HS.2.1.a)	Identify, based on evidence, how the structure of DNA determines the structure of proteins. (HS.2.1.a)	Identify, based on evidence, how the structure of DNA determines the structure of proteins and how the DNA molecule helps different cells carry out essential life functions. (HS.2.1.a)
	Identify an organ as an organ. (HS.2.1.b)	Identify the function of an organ system. (HS.2.1.b)	Develop a model to illustrate the function of an organ system. (HS.2.1.b)	Develop a model to illustrate the function of an organ system and identify common symptoms that show when a body system is not functioning properly. (HS.2.1.b)
	Identify a mechanism a body uses that affects the whole organism. (HS.2.1.c)	Identify a mechanism a body uses to stay in balance during an environmental change. (HS.2.1.c)	Use data from an investigation to identify a mechanism a body uses to stay in balance during environmental changes. (HS.2.1.c)	Use data from an investigation to identify different mechanisms a body uses to stay in balance during environmental changes. (HS.2.1.c)
	Identify cell division as what allows an organism to grow. (HS.2.2.a)	Identify a model of cell division. (HS.2.2.a)	Use a model to show how cells divide and multiply to allow organisms to grow. (HS.2.2.a)	Develop a model to show how cells divide and multiply to allow organisms to grow. (HS.2.2.a)
	Identify light as necessary for plant survival. (HS.2.3.a)	Identify light as the energy input for photosynthesis. (HS.2.3.a)	Identify sugar (or food) as the energy output by photosynthesis. **OR** Use a model to illustrate that sugar (or food) contains energy. (HS.2.3.a)	Use a model to Illustrate the process of photosynthesis transforming light into energy for plants. (HS.2.3.a)

Life Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
		Identify that organisms use the simple elements from matter obtained from the environment for growth and metabolism. **OR** Identify that simple elements make up sugar molecules. (HS.2.3.b)	Explain how organisms use the simple elements that make up sugar molecules to combine with other elements to make up proteins. (HS.2.3.b)	Explain how organisms use the simple elements that make up sugar molecules to combine with other elements to make up proteins necessary for growth and metabolism. (HS.2.3.b)
	Identify that plants and animals need energy from food. (HS.2.3.c)	Use a model to illustrate that food contains energy. (HS.2.3.c)	Identify that plants and animals use food and oxygen to provide energy to cells. (HS.2.3.c)	Use a model to illustrate how food and oxygen break down providing energy to cells to sustain life's processes. (HS.2.3.c)
PG 6	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how living systems interact with the biotic and abiotic environment.**			
GLE 2.4, 2.5, 2.6, 2.7	Identify that the resources in an environment affect the organisms living there. (HS.2.4.a)	Use a graphical representation to identify how the quantity of resources in an environment affects the organisms living there. (HS.2.4.a)	Use a graphical representation to show how the quantity of resources in an environment affects the organisms living there. (HS.2.4.a)	
	Identify that the conditions in an environment affect an animal population. (HS.2.4.b)	Identify a change in the number of individuals in an animal population when conditions in their environment change. (HS.2.4.b)	Use mathematical representations to identify changes in the number of individuals in an animal population when conditions in their environment change. (HS.2.4.b)	Use mathematical representations to identify changes in the number of individuals with different characteristics of an animal population when conditions in their environment change. (HS.2.4.b)
		Identify organisms that use oxygen or that do not use oxygen. (HS.2.5.a)	Describe the use of oxygen by an aerobic or anaerobic organism. (HS.2.5.a)	Compare and contrast the use of oxygen and stored energy in aerobic and anaerobic environments. (HS.2.5.a)

Life Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
		Identify which part of an energy pyramid or a food web represents the most or the least energy. (HS.2.5.b)	Use a graphical representation to describe the changes in the amount of matter or energy as it travels through an energy pyramid or a food web. (HS.2.5.b)	Use a graphical representation to explain the changes in the amount of matter or energy as it travels through an energy pyramid or a food web. (HS.2.5.b)
	Identify carbon dioxide as a carrier of carbon. (HS.2.5.c)	Identify whether carbon is absorbed or released by a component of an ecosystem. (HS.2.5.c)	Use a model to describe how carbon is cycled through an ecosystem. (HS.2.5.c)	Develop a model to illustrate how carbon is cycled through an ecosystem. (HS.2.5.c)
	Identify a change to a population that occurs because of an extreme event. (HS.2.6.a)	Describe how a change to a population occurs because of an extreme event. (HS.2.6.a)	Use evidence to compare the number of individuals in a population in relatively stable conditions to the population after extreme events. (HS.2.6.a)	Use evidence to compare the number of individuals with different characteristics in a population in relatively stable conditions to the population after extreme events. (HS.2.6.a)
		Identify a solution by which people can reduce the impacts of human activity. (HS.2.6.b)	Compare solutions by which people can reduce the impacts of human activity to help protect Earth's environment and biodiversity. (HS.2.6.b)	Develop a solution by which people can reduce the impacts of human activity to help protect Earth's environment and biodiversity. (HS.2.6.b)
		Identify a group behavior. (HS.2.7.a)	Identify whether a group behavior benefits or harms a species. (HS.2.7.a)	Use evidence to explain how a group behavior benefits or harms a species. (HS.2.7.a)
PG 7	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how genetic and environmental factors influence variation of organisms across generations.**			
GLE 2.8	Identify that offspring traits resemble parent traits. (HS.2.8.a)	Identify genes as a carrier of traits from parents to offspring. (HS.2.8.a)	Describe that DNA and chromosomes influence traits passed from parents to offspring. (HS.2.8.a)	Ask questions about how DNA and chromosomes influence traits passed from parents to offspring. (HS.2.8.a)

Life Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
PG 8	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how natural selection drives biological evolution accounting for the unity and diversity of organisms.**			
GLE 2.9, 2.10, 2.11, 2.12, 2.13	Identify a trait that varies within a population. (HS.2.9.a)	Identify genes as the cause of the variation of a trait within a population. (HS.2.9.a)	Use data to identify the distribution (number) of a trait within a population. (HS.2.9.a)	
		Identify genes as a cause of traits. (HS.2.9.b)	Identify that different genes in parents cause differences in offspring traits or that changes in genes can cause different traits. (HS.2.9.b)	Use evidence to describe factors that cause genetic variations. **OR** Identify changes in genes over time as a cause of adaptation to changes in the environment. (HS.2.9.b)
		Identify similarities and differences in anatomical structures or genes as evidence that organisms are more closely or more distantly related. (HS.2.10.a)	Identify two organisms that share an anatomical structure as having a common ancestor. (HS.2.10.a)	Use evidence of similar anatomical structures to explain common ancestry or that similar genes are a cause of the similarities. (HS.2.10.a)
		Identify evidence that organisms that are better able to survive in the environment are better able to reproduce and increase in number. (HS.2.11.a)	Identify genetic variation and limited resources as causes of differential survival. (HS.2.11.a)	Identify evidence that the process of evolution primarily results from four factors: (1) the potential for a species to increase in number, (2) the heritable genetic variation of individuals in a species due to mutation and sexual reproduction, (3) competition for limited resources, and (4) the proliferation of those organisms that are better able to survive and reproduce in the environment. (HS.2.11.a)

Life Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
		Use mathematical representations to identify that an organism with an advantageous heritable trait increases in number. **OR** Identify that organisms with advantageous heritable traits tend to increase in number. (HS.2.11.b)	Use mathematical representations to represent how organisms with advantageous heritable traits tend to increase in number. (HS.2.11.b)	Use mathematical representations to represent how organisms with advantageous heritable traits tend to increase in proportion to organisms lacking this trait. (HS.2.11.b)
		Identify that changes in or differences in environment can lead to differences in two populations of organisms. (HS.2.12.a)	Use evidence to identify a factor in the environment that has led to or will lead to differences in two populations of organisms. (HS.2.12.a)	Use evidence to explain how changes in the environment over time lead to adaptations of organisms. (HS.2.12.a)
		Identify a change in the environment that can result in an increase or a decrease in the number of a species. (HS.2.12.b)	Use evidence to identify a species that is likely to increase in number or is likely to go extinct as a result of changes in the environment. **OR** Use evidence to identify a change in the environment that results in the increase in number of a species or the extinction of a species. (HS.2.12.b)	Identify or interpret evidence that shows that changes in the environment result in: (1) increases in the number of some species, (2) the emergence of new species, (3) the extinction of other species. (HS.2.12.b)
	Identify a proposal that will protect a threatened or endangered species. (HS.2.13.a)	Identify how a proposal that will protect a threatened or endangered species leads to an increase in its number. (HS.2.13.a)	Use mathematical representations to identify a proposal that will protect a threatened or endangered species. (HS.2.13.a)	Use mathematical representations to explain how protecting a threatened or endangered species leads to an increase in its number. (HS.2.13.a)

Earth and Space Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
PG 9	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding the universe and Earth's place in it.**			
GLE. 3.1, 3.2, 3.3	Identify that the energy from the Sun that reaches Earth is primarily in the form of electromagnetic or wave radiation (light). (HS.3.1.a)	Use a model to identify how radiative energy from the Sun reaches Earth. (HS.3.1.a)	Use a model to identify that the Sun has a life cycle during which its radiative energy output changes. **OR** Develop a model to illustrate how radiative energy from the Sun's core reaches Earth. (HS.3.1.a)	Develop a model to explain that the Sun has a life cycle during which its radiative energy output changes. (HS.3.1.a)
		Identify the universe as a space containing galaxies, which are collections of stars. (HS.3.1.b)	Identify the expansion of the universe as an explanation of the motions of galaxies. (HS.3.1.b)	Demonstrate that the universe is expanding using light spectra evidence of the motions of galaxies and the proportional composition of visible matter in the universe. (HS.3.1.b)
		Identify that stars produce elements. (HS.3.1.c)	Describe a step in a star life cycle that results from or results in the production of elements. (HS.3.1.c)	Explain ideas about the way stars, over their life cycle, produce elements. (HS.3.1.c)
	Identify that orbiting objects follow roughly circular paths. (HS.3.2.a)		Use a qualitative scale or proportional relationship to describe an orbiting object in the solar system. (HS.3.2.a)	Develop a table representing quantitative patterns of orbiting objects in the solar system. (HS.3.2.a)
	Identify crystallization (freezing) of rock as a process that makes new rock or melting of rock as a process that recycles (destroys) old rock. (HS.3.3.a)	Use evidence of plate movements to identify the ages of crystal rock. (HS.3.3.a)	Use evidence to identify that newer rock is generally found on the ocean floor near plate boundaries and that older rock is generally found on continents away from plate boundaries. (HS.3.3.a)	Evaluate evidence of past and current movements of plate boundaries to explain the ages of crystal rock. (HS.3.3.a)

Earth and Space Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
		Identify rocks as the evidence that scientists use to determine the age of Earth. (HS.3.3.b)	Use evidence to compare the age of Earth to other solar system objects. **OR** Identify changes that occurred during the early history of Earth. (HS.3.3.b)	Describe how scientists use evidence from solar system objects to reconstruct the changes that occurred during the early history of Earth. (HS.3.3.b)
PG. 10	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how and why Earth is constantly changing.**			
GLE. 3.4, 3.5, 3.6, 3.7, 3.8		Identify an internal Earth process or external process that results in continental and ocean-floor features. (HS.3.4.a)	Use a model to describe how an internal Earth process or external process results in continental and ocean-floor features. (HS.3.4.a)	Create a model to demonstrate the relationship between Earth's internal and external processes and the changes that occur on Earth's surface resulting in continental and ocean-floor features. (HS.3.4.a)
		Identify an aspect of Earth's surface that could affect another aspect of Earth's surface. (HS.3.4.b)	Examine the connections between Earth systems to explain how a change, over short- or long-time scales, in one aspect of Earth's surface affects another aspect of Earth's surface. (HS.3.4.b)	Using a graph or table, examine the connections between Earth systems to compare the changes, over short- and long-time scales, in one aspect of Earth's surface to another aspect of Earth's surface. (HS.3.4.b)
		Identify the cycling motion of mantle as convection. (HS.3.4.c)	Use a model to identify how new rock is formed or how old rock melts. (HS.3.4.c)	Develop or use a model to show how the movement of tectonic plates is part of the cycles of convection in Earth's mantle. (HS.3.4.c)
		Identify a cause of a change in Earth's climate. (HS.3.4.d)	Use a timeline to describe a change in Earth's climate. (HS.3.4.d)	Use a timeline to illustrate the causes of changes in Earth's climate. (HS.3.4.d)
	Identify a similar feature of Earth's surface and the ocean floor. (HS.3.5.a)	Use a model to describe the similarities of the features of Earth's surface and the ocean floor. (HS.3.5.a)	Identify a force that created similar features of Earth's surface and the ocean floor. (HS.3.5.a)	Develop a model to illustrate the similarities of the features of Earth's surface and the ocean floor and the forces that created them. (HS.3.5.a)

Earth and Space Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
		Identify heat from Earth's interior as a cause of changes in Earth's crust. (HS.3.5.b)	Use a model to illustrate the composition of Earth's layers. **OR** Describe the cycling of matter in Earth's layers. (HS.3.5.b)	Use a model to illustrate the composition of Earth's layers and the cycling of matter. (HS.3.5.b)
	Identify stream transportation, erosion, and frost wedging as effects of water. (HS.3.6.a)	Identify the movement of water as a cause of stream transportation or erosion. (HS.3.6.a)	Identify how a property of water is connected to stream transportation, erosion, or frost wedging. **OR** Use the results of an investigation to identify stream transportation, erosion, or frost wedging as the cause of a change on Earth's surface. (HS.3.6.a)	Use the results of an investigation to identify how water's properties are connected to stream transportation, erosion, and frost wedging. (HS.3.6.a)
		Identify an aspect of Earth's surface that could affect another aspect of Earth's surface. (HS.3.7.a)	Examine the connections between Earth systems to identify how a change to one aspect of Earth's surface influenced natural factors to another aspect of Earth's surface. (HS.3.7.a)	Using a graph or table, examine the connections between Earth systems to predict how the changes to one aspect of Earth's surface influenced natural factors to another aspect of Earth's surface. (HS.3.7.a)

Earth and Space Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
	Identify that sunlight energy influences Earth systems. (HS.3.7.b)	Identify that Earth's rotation, orbit, and tilt affect the amount of sunlight energy that reaches Earth systems. **OR** Identify that different amounts of sunlight energy reach Earth systems to create different climates. (HS.3.7.b)	Use a model of Earth's rotation, orbit, and tilt to describe how different amounts of sunlight energy reach Earth systems to create different climates. (HS.3.7.b)	Use a model of Earth's rotation, orbit, and tilt to describe how different amounts of sunlight energy, going in and out of Earth systems, affects surface temperature, precipitation patterns, sea levels and biosphere distribution and how changes based on these factors create different climates. (HS.3.7.b)
	Identify that living things (biosphere) and air (atmosphere) contain carbon. (HS.3.7.c)	Describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. (HS.3.7.c)	Use a qualitative carbon cycle model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. (HS.3.7.c)	Develop a qualitative carbon cycle model to predict changes to the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere. (HS.3.7.c)
	Identify that living organisms can change Earth's surface, atmosphere, and hydrosphere. (HS.3.8.a)	Identify a change to Earth's surface, atmosphere, and hydrosphere that influences changes in living organisms. **OR** Identify a change in living organisms that influences a change to Earth's surface, atmosphere, and hydrosphere. (HS.3.8.a)	Use a timeline to identify a change to Earth's surface, atmosphere, and hydrosphere that influences changes in living organisms. **OR** Use a timeline to identify a change in living organisms that influences a change to Earth's surface, atmosphere, and hydrosphere. (HS.3.8.a)	Use evidence to create a timeline comparing the changes to Earth's surface, atmosphere, and hydrosphere to changes in living organisms. (HS.3.8.a)

Earth and Space Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
PG. 11	**Students can use the full range of science and engineering practices to make sense of natural phenomena and solve problems that require understanding how human activities and Earth's surface processes interact.**			
GLE 3.9, 3.10, 3.11	Identify a limited natural resource. (HS.3.9.a)	Use evidence to identify that the availability of natural resources varies. (HS.3.9.a)	Use evidence to identify why a natural resource is limited. **OR** Identify how the availability of natural resources affects the development of human society and the costs, risks, and benefits of human resource use. (HS.3.9.a)	Use evidence to identify how the availability of natural resources affects the development of human society and the costs, risks, and benefits of human resource use. (HS.3.9.a)
	Identify an example of conserving, recycling, and reusing energy and mineral resources. (HS.3.9.b)	Identify a solution for conserving, recycling, and reusing a particular energy or mineral resource. (HS.3.9.b)	Identify why a solution for conserving, recycling, and reusing energy and mineral resources is cost-effective. **OR** Use evidence to compare the success of different solutions for conserving, recycling, and reusing energy and mineral resources. (HS.3.9.b)	Use evidence to compare the cost-effectiveness of different solutions for conserving, recycling, and reusing energy and mineral resources. (HS.3.9.b)
	Identify a natural hazard. (HS.3.10.a)	Use evidence to compare the severity of natural hazards. (HS.3.10.a)	Identify how the occurrence of natural hazards affects the course of human history at local, regional, and global scales. (HS.3.10.a)	Use evidence to identify how the occurrence of natural hazards affects the course of human history at local, regional, and global scales. (HS.3.10.a)
	Identify a need for management of natural resources, the sustainability of human populations, and biodiversity. (HS.3.11.a)	Identify a relationship between the management of natural resources, the sustainability of human populations, and biodiversity. (HS.3.11.a)	Use a mathematical representation to illustrate the relationships between the management of natural resources, the sustainability of human populations, and biodiversity. (HS.3.11.a)	Create a mathematical representation to illustrate the relationships between the management of natural resources, the sustainability of human populations, and biodiversity. (HS.3.11.a)

Earth and Space Science				
	Emerging	**Approaching Target**	**At Target**	**Advanced**
	Identify an example of reducing the impact of human activities on natural systems by conserving, recycling, and reusing. (HS.3.11.b)	Identify how a solution reduces the impact of human activities on natural systems by conserving, recycling, and reusing. (HS.3.11.b)	Evaluate a solution to reduce the impact of human activities on natural systems by conserving, recycling, and reusing. (HS.3.11.b)	