HAWAII ALTERNATE ASSESSMENT FOR SCIENCE – NEXT GENERATION SCIENCE STANDARDS (NGSS)

PERFORMANCE LEVEL DESCRIPTORS

Essence Statement: The Essence Statement describes the core ideas within a Performance Expectation (PE) distilled down to a level appropriate for the students participating in the Alternate Assessment. In some instances, this distillation of the PE into an Essence Statement was not possible, and those PEs will not be included in the assessment.

Exceeds: A student who is exceeds demonstrates a level of understanding that includes the ability to "bring together" the Disciplinary Core Ideas (DCI) and/or Science and Engineering Practices (SEP) and/or Cross-Cutting Concepts (CCC) associated with a PE.

Meets: A student who meets demonstrates an understanding of the DCI and/or SEP and/or CCC within a PE at the level described in the Essence Statement.

Approaches: A student who is approaches demonstrates some understanding of the content of the PE, but that understanding is incomplete and does not yet meet the expectations found in the Essence Statement. This student's understanding is partial but emerging.

Well Below: A student who is well below demonstrates a level of understanding that is at a very preliminary level. This student's understanding is nonexistent or incomplete, and he or she has difficulty meeting the expectations of a student who approaches expectations.

Note: Performance Expectations (PEs) where Essence Statements and Performance Level Descriptor fields are in gray will not be assessed.

Abbreviations Used: **NGSS**: Next Generation Science Standards, **PE**: NGSS Performance Expectation, **SEP**: NGSS Science and Engineering Practice, **CCC**: NGSS Cross Cutting Concept

Selected HSA-Alt Range Performance Level Descriptors include a new symbol, which denotes standards that may be associated with the workplace, and, therefore, address needs identified in the Workforce Innovation and Opportunity Act (WIOA). The Workforce Innovation and Opportunity Act (WIOA) "seeks to increase the employment, career advancement, and economic self-sufficiency of people with disabilities through collaborative federal, state, and local partnerships" (Thurlow, Nye-Lengerman, and Lazarus, 2019). The *Workforce Innovation and Opportunity Act Appendix* within this document lists the identified standard, essence statement, and "Meets" Performance Level Descriptor for that standard, as well as the associated skills that students would demonstrate when engaged in postsecondary education and competitive integrated employment.

ELEMENTARY (Administered in Grade 5)

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
Physical Science: PS 1 Matter and Interactions ❖ A. Structure and Properties of Matter ❖ B. Chemical Reactions ❖ C. Nuclear Processes						
5-PS1-1 Develop a model to describe that matter is made of particles too small to be seen.	**SEP: Developing and Using Models** Use models to describe phenomena. **DCI: Structure and Properties of Matter** Matter of any type can be subdivided into particles that are too small to see, but even then, the matter still exists and can be detected by other means. A model showing that gases are made from matter particles that are too small to see and are moving freely around in space can explain many observations, including the inflation and shape of a balloon and the effects of air on larger particles or objects. **CCC: Scale, Proportion, and Quantity** Natural objects exist from the very small to the immensely large.	Matter of any type can be broken down into particles that are too small to see, but still exists and can be detected by other means.	Identify examples of matter including solids, liquids and gases.	Recognize that if a pure substance (e.g., a cube of sugar, pieces of salt) is broken up into small pieces, each piece is still a piece of that substance.	Demonstrate an understanding that when a substance is dissolved the pieces are still present but are too small to see (e.g., sugar dissolved in water are still present thus the water is sweet).	Identify models that prove matter is present even though it is too small to be seen (e.g., trapping gas in a balloon, tissue moving when you blow on it, evaporation of liquids).
5-PS1-2 Measure and graph quantities to provide evidence that regardless of the type of change that occurs when melting, cooling, or mixing substances, the total weight of matter is conserved.	**SEP: Using Mathematics and Computational Thinking** Measure and graph quantities such as weight to address scientific and engineering questions and problems. **DCI: Structure and Properties of Matter** The amount (weight) of matter is conserved when it changes form, even in transitions in which it seems to vanish. **DCI: Chemical Reactions** No matter what reaction or change in properties occurs, the total weight of the substances does not change. **CCC: Scale, Proportion, and Quantity** Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume.	Mass (weight) stays the same when materials change (when melted, cooled, mixed, or react to form new materials). Note: NGSS does not distinguish between mass and weight at this grade level.	Recognize that matter (solids or liquids) has mass (weight)	Recognize that matter (solids or liquids) has the same mass (weight) after a change (example--whole apple vs cut up pieces of apple) showing that matter is conserved	Identify that matter has the same weight after melting, cooling. Recommend leaving as was due to SEP: Identify weight data that shows the total weight of matter before and after heating, cooling, or mixing materials.	Recognizing that weight is conserved, determine a missing piece of data, when a change occurs. (Given all the weights except one).

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
5-PS1-3 Make observations and measurements to identify materials based on their properties.	**SEP: Planning and Carrying Out Investigations** Make observations and measurements to produce data as the basis for an explanation of a phenomenon. **DCI: Structure and Properties of Matter** Measurements of a variety of properties can be used to identify materials. **CCC: Scale, Proportion, and Quantity** Standard units are used to measure and describe physical quantities such as weight, time, temperature, and volume	Different substances have different properties (e.g., color, hardness, reflectivity, melting point, boiling point, response to magnetic forces, conductivity, solubility).	Identify a property of a material (e.g., color, hardness, flexibility, texture, luster).	Determine which materials possess a specified property (e.g., color, hardness).	Differentiate substances that have different physical/chemical properties.	Make observations and identify a material based on its properties (e.g., color, hardness, solubility).
5-PS1-4 Conduct an investigation to determine whether the mixing of two or more substances results in new substances.	**SEP: Planning and Carrying Out Investigations** Conduct an investigation in which variables are controlled to produce data, which serve as the evidence. **DCI: Chemical Reactions** When two or more different substances are mixed, a new substance with different properties may be formed. **CCC: Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.	Recognize changes that indicate that a chemical reaction has occurred.	Identify one or more properties of a substance. (See 5-PS1-1, 1-2, and 1-3 as well as temperature and volume.)	Identify the properties of two substances that are to be mixed.	Use observations to determine if the mixing of two or more substances results in a chemical change. (Signs include color change, production of a different smell, change of temperature, formation of a gas [bubbles], formation of a solid.)	Use observations to identify whether the material formed by mixing two substances has the same or different properties as either of the substances that were mixed.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Physical Science: PS 2 Motion and Stability: Forces and Interactions ❖ A. Forces and Motion ❖ B. Types of Interactions ❖ C. Stability and Instability in Physical Systems						
3-PS2-1 Plan and conduct an investigation to provide evidence of the effects of balanced and unbalanced forces on the motion of an object.	**SEP: Planning and Carrying Out Investigations** Plan and conduct an investigation in which variables are controlled to produce data, which serve as the evidence. **DCI: Forces and Motion** Each force acts on one particular object and has both strength and a direction. **DCI: Types of Interactions** Objects in contact exert forces on each other. **CCC: Cause and Effect** Cause and effect relationships are routinely identified.	Forces can cause an object to move, and changes in forces can change that motion (e.g., students pushing on a wooden crate).	Identify if an object will move if a given force is applied.	Recognize a force as being a push or a pull.	Identify unbalanced forces as the cause of an object's movement.	Predict how an object's motion would change if the forces acting on it change.
3-PS2-2 Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	**SEP: Planning and Carrying Out Investigations** Make observations to produce data as evidence for an explanation of a phenomenon. **DCI: Forces and Motion** The patterns of an object's motion can be observed and measured; when the motion exhibits a regular pattern, future motion can be predicted. **CCC: Patterns** Patterns of change can be used to make predictions.	Patterns of motion can be used to predict future motion (e.g., a child on a see saw [up/ down] or swing [back/ forth]).	Identify when an object is moving. (See 3-PS2-1.)	Identify motion that is following a pattern.	Use data (presented pictorially) related to the motion of an object whose motion is following a pattern to predict future motion.	Use data (presented in tabular information) related to the motion of an object whose motion is following a pattern to predict future motion.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
3-PS2-3 Ask questions to determine cause and effect relationships of electrical or magnetic interactions between two objects not in contact with each other.	**SEP: Asking Questions and Defining Problems** Ask questions that can be investigated based on patterns such as cause and effect relationships. **DCI: Types of Interactions** Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between magnets, on their orientation relative to each other. **CCC: Cause and Effect** Cause and effect relationships can be identified, tested, and used to explain change.	Some forces, such as electrical and magnetic forces, do not require objects to be in contact to interact.	Identify which objects would be affected by magnetic forces (ex. iron clip, paper wrapper, plastic cup, wooden pencil).	Recognize that magnets can pull some objects towards them AND can push some objects away (when magnets have similar poles "facing each other") without touching them.	Describe how magnets interact with metal objects when they are not in contact with each other.	Identify a question(s) (cause and effect) that could be asked and answered about the interaction of a magnet and a variety of items, given illustrations of metal objects mixed with non-metal objects (e.g., rice and paper clips).
3-PS2-4 Define a simple design problem that can be solved by applying scientific ideas about magnets.	**SEP: Asking Questions and Defining Problems** Define a simple problem that can be solved through the development of a new or improved object or tool. **DCI: Types of Interactions** Electric and magnetic forces between a pair of objects do not require that the objects be in contact. The sizes of the forces in each situation depend on the properties of the objects and their distances apart and, for forces between magnets, on their orientation relative to each other. **CCC: Science, Engineering, and Technology Are Interdependent** Scientific discoveries about the natural world can often lead to new and improved technologies.	DCI addressed in 3-PS2-3.				

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
5-PS2-1 Support an argument that the gravitational force exerted by Earth on objects is directed down.	**SEP: Engaging in Argument from Evidence** Support an argument with evidence, data, or a model. **DCI: Types of Interactions** The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center. **CCC: Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.	Gravity causes objects to fall toward Earth.	Identify that objects fall downward.	Identify that gravity is a force that affects all objects.	Use observations to determine that objects regardless of their weight fall toward the Earth due to Earth's gravitational force.	Determine if an observation supports the claim that objects fall downward toward the Earth.
Physical Science: PS 3 Energy ❖ **A. Definitions of Energy** ❖ **B. Conservation of Energy and Energy Transfer** ❖ **C. Relationship Between Energy and Forces** ❖ **D. Energy and Chemical Processes in Everyday Life**						
4PS3-1 Use evidence to construct an explanation relating the speed of an object to the energy of that object.	**SEP: Constructing Explanations and Designing Solutions** Use evidence (e.g., measurements, observations, patterns) to construct an explanation. **DCI: Definition of Energy** The faster a given object is moving, the more energy it possesses. **CCC: Energy and Matter** Energy can be transferred in various ways and between objects.	The faster a given object is moving, the more energy it has and the greater the impact will be if it strikes another object. (A "given object" is important here. It is not about comparing the energy of different objects, although two identical objects at different speeds can be compared.)	Identify that an object can move at different speeds (faster, slower).	Identify the conditions under which an object can move (e.g., the object requires energy to move [kinetic energy/push or pull]).	Recognize that if two identical objects are moving at different speeds, then the one moving faster has more energy.	Use data (information in tables, observations, or patterns) to identify the instance where energy is greatest or least if similar objects are moving at different speeds.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
4-PS3-2 Make observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electrical currents.	**SEP: Planning and Carrying Out Investigations** Make observations to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution. **DCI: Definitions of Energy** Energy can be moved from place to place by moving objects or through sound, light, or electric currents. **DCI: Conservation of Energy and Energy Transfer** Energy can be transferred from place to place and also be transformed from one form to another. **CCC: Energy and Matter** Energy can be transferred in various ways and between objects.	Energy can be moved from place to place by moving objects or through sound, light, or electricity.	Recognize motion, sound, light, or electricity as forms of energy	Identify the type of energy present in different circumstances (e.g., motion, sound, light, or electricity).	Identify examples of energy moving from place to place (e.g., electrical energy in a circuit, light or sound across a room, a moving object going from one place to another).	Given a scenario where energy moves and is changed into a different form, identify the transformation.(e.g., A restaurant uses lamps to keep the food warm. The lamp is plugged into an electrical socket. How does the energy from the socket transform to keep the food warm?)
4-PS3-3 Ask questions and predict outcomes about the changes in energy that occur when objects collide.	**SEP: Asking Questions and Defining Problems** Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships. **DCI: Definitions of Energy** See 4-PS3-2. **DCI: Conservation of Energy and Energy Transfer** See 4-PS3-2. **DCI: Relationship Between Energy and Forces** When objects collide, the contact forces transfer energy so as to change the objects' motions. **CCC: Energy and Matter** Energy can be transferred in various ways and between objects.	When a moving object collides with another object, energy is transferred and the motion changes.	Identify that a collision occurs when two objects hit each other. Identify that a collision of a moving object with a stationary object can cause the stationary object to move.	Recognize that objects move due to the energy that they possess. Identify that the energy in a moving object can be transferred to another object that it collides with.	Predict the motion of a stationary object as energy is transferred when another object collides with it. .	Identify that the harder/ stronger the push, the farther and faster an object will move. Predict the direction an object will move after a collision.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
4-PS3-4 Apply scientific ideas to design, task, and refine a device that converts energy from one form to another.	**SEP: Constructing Explanations and Designing Solutions** Apply scientific ideas to solve design problems. **DCI: Conservation of Energy and Energy Transfer** Energy can also be transferred from place to place by electric currents, which can then be used locally to produce motion, sound, heat, or light. **DCI: Energy in Chemical Processes and Everyday Life** The expression "produce energy" typically refers to the conversion of stored energy into a desired form for practical use. **CCC: Energy and Matter** Energy can be transferred in various ways and between objects.	Energy can be transferred from place to place and converted from one form to another for a variety of uses.	Identify a source of energy. (e.g. battery, moving car).	Identify what form of energy is produced by a device (source) (e.g. sound, light, heat, motion, electricity).	Identify a missing component in a device that changes energy from one form to another (e.g. circuit, a battery lighting a light, a bell ringing).	Use components to "build" a device that changes energy from one form to another (e.g., a simple circuit to light a bulb).
5-PS3-1 Use models to describe that energy in animals' food (used for body repair, growth, and motion and to maintain body warmth) was once energy from the sun.	**SEP: Developing and Using Models** Use models to describe phenomena. **DCI: Energy: Energy in Chemical Processes and Everyday Life** The energy released from food was once energy from the sun that was captured by plants in the chemical process that forms plant matter. **DCI: Organization for Matter and Energy Flow in Organisms** Food provides animals with the materials they need for body repair and growth and the energy they need to maintain body warmth and for motion. **CCC: Energy and Matter** Energy can be transferred in various ways and between objects.	Since all food can eventually be traced back to plants, energy that animals use for body repair, growth, motion, and warmth is energy that once came from the sun.	Identify that Identify animals need food to survive.	Identify the source of an animal's energy as its food. (Complete a two-step food chain.)	Trace the source of the materials an animal needs for body maintenance, growth, and motion to the sun.	Given all the components of a food chain, put them in order starting with the sun and ending with an animal. Recognize the effects of removing the sun from a given energy flow model. (The models should be limited to 3 or 4 components including the sun and the animal.)

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Physical Science: PS 4 Waves and Their Applications in Technologies ❖ A. Wave Properties ❖ B. Electromagnetic Radiation ❖ C. Information Technologies and Instrumentation						
4-PS4-1 Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.	**SEP: Developing and Using Models** Develop a model using an analogy, example, or abstract representation to describe a scientific principle. **DCI: Wave Properties** Waves have regular patterns of motion. They can be made in water by disturbing the surface. When waves move across the water, the water goes up and down in place; there is no net motion in the direction of the wave except when the water meets a beach. Waves of the same type can differ in amplitude and wavelength. **CCC: Patterns** Similarities and differences in patterns can be used to sort, classify, and analyze simple rates of change for natural phenomena.	Waves can differ in amplitude (height) and wavelength (spacing between waves), but they follow a regular pattern of motion.	Identify that waves are created when an object falls into water.	Identify that the size of an object that falls into water can make waves bigger or smaller.	Compare the pattern of two waves with different amplitude or wavelength.	Predict an object's motion based on the pattern of the wave.
4-PS4-2 Develop a model to describe that light reflecting from objects and entering the eyes allows objects to be seen.	**SEP: Developing and Using Models** Develop a model to describe phenomena. **DCI: Electromagnetic Radiation** An object can be seen when light reflected from its surface enters the eyes. **CCC: Cause and Effect** Cause and effect relationships are routinely identified.	Light reflecting from objects and entering the eyes allows the object to be seen.	Identify the sources of light.	Identify that light is needed to see objects.	Identify a model that shows the reflection of light following a path between a light source, the object, and the eye.	Complete the components of a model (diagram) that shows the path of the reflection of light.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information.	**SEP: Constructing Explanations and Designing Solutions** Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. **DCI: Information Technologies and Instrumentation** Digitized information can be transmitted over long distances without significant degradation. High-tech devices can receive and decode information—convert it from digitized form to voice—and vice versa. **DCI: Optimizing the Design Solution** Different solutions need to be tested in order to determine which of them best solves the problem. **CCC: Patterns** Similarities and differences in patterns can be used to sort and classify designed products.	This Performance Expectation will not be assessed at the elementary level.				
Life Science: LS 1 From Molecules to Organisms: Structures and Processes ❖ A. Structure and Function ❖ B. Growth and Development of Organisms ❖ C. Organization for Matter and Energy Flow in Organisms ❖ D. Information Processing						
3-LS1-1 Develop models to describe that organisms have unique and diverse life cycles, but all have in common birth, growth, reproduction, and death.	**SEP: Developing and Using Models** Develop models to describe phenomena. **DCI: Growth and Development of Organisms** Reproduction is essential to the continued existence of organisms. Plants and animals have unique and diverse life cycles. **CCC: Patterns** Patterns of change can be used to make predictions.	All living things have a life cycle that includes birth, growth, reproduction, and death.	Identify that organisms are born and grow.	Identify the components of an organism's life cycle.	Given the stages of the life cycle of an organism, put them in order (e.g., develop a model).	Make a prediction about what would happen to a species if it didn't reproduce.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
4-LS1-1 Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	**SEP: Engaging in Argument from Evidence** Construct an argument with evidence, data, and/or a model. **DCI: Structure and Function** Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. **CCC: Systems and System Models** A system can be described in terms of its components and their interactions.	Structures of organisms have different functions to support survival.	Identify plant and animal structures.	Distinguish between internal and external structures.	Identify the functions (survival, growth, behavior, and/or reproduction) of various plant and animal structures. (Structures could include thorns, stems, roots, colored petals, heart, stomach, lung, brain, skeleton, and skin.)	Identify the plant or animal structure that best meets the plant's or animal's needs in a given scenario. (e.g., ducks have webbed feet while pigeons have “claws”).
4-LS1-2 Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.	**SEP: Developing and Using Models** Use a model to test interactions concerning the functioning of a natural system. **DCI: Information Processing** Different senses are specialized for particular kinds of information, which may be then processed by the animal’s brain. Animals are able to use their perceptions and memories to guide their actions. **CCC: Systems and System Models** A system can be described in terms of its components and their interactions.	Animals receive information through their senses, process the information, and respond.	Identify the senses animals use to receive stimuli.	Identify environmental stimuli to which animals respond.	Identify animal structures that enable them to detect, process, and react to information from their surroundings.	Identify how an animal responds to information from its surroundings.
5-LS1-1 Support an argument that plants get the materials they need for growth chiefly from air and water.	**SEP: Engaging in Argument from Evidence** Support an argument with evidence, data, or a model. **DCI: Organization for Matter and Energy Flow in Organisms** Plants acquire their material for growth chiefly from air and water. **CCC: Energy and Matter** Matter is transported into, out of, and within systems.	Water and air are essential for plant growth.	Identify a plant as a living organism	Identify either air or water as a plant need.	Identify air and water as the chief sources of growth materials for plants. Soil is much less important.	Use data to explain that plants get the materials they need for growth from air and water (i.e. the effect of various amounts of water on plant growth)

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Life Science: LS 2 Ecosystems: Interactions, Energy, and Dynamics ❖ A. Interdependent Relationships in Ecosystems ❖ B. Cycles of Matter and Energy Transfer in Ecosystems ❖ C. Ecosystem Dynamics, Functioning, and Resilience ❖ D. Social Interactions and Group Behavior						
3-LS2-1 Construct an argument that some animals form groups that help members survive.	**SEP: Engaging in Argument from Evidence** Develop models to describe phenomena. **DCI: Social Interactions and Group Behavior** Being part of a group helps animals obtain food, defend themselves, and cope with changes. **CCC: Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.	Some animals form groups to help them survive.	Identify predator and prey animals or groups of animals.	Identify an animal groups' behavior (herding, hunting in packs, raising and protecting young, etc.).	Determine how the group behavior helps the animals survive. (Benefits might include obtaining food and protection.)	Use evidence to determine a predator or prey groups' behaviors and how they help the animals.
5-LS2-1 Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment.	**SEP: Developing and Using Models** Develop a model to describe phenomena. **DCI: Interdependent Relationships in Ecosystems** The food of almost any kind of animal can be traced back to plants. Organisms are related in food webs in which some animals eat plants for food and other animals eat the animals that eat plants. Some organisms, such as fungi and bacteria, break down dead organisms. Organisms can survive only in environments in which their particular needs are met. A healthy ecosystem is one in which multiple species of different types are each able to meet their needs in a relatively stable web of life. Newly introduced species can damage the balance of an ecosystem. **DCI: Cycles of Matter and Energy Transfer in Ecosystems** Matter cycles between the air and soil and among plants, animals, and microbes as these organisms live and die. **CCC: Systems and Systems Models** A system can be described in terms of its components and their interactions.	Producers, consumers, and decomposers have roles in the movement of matter in a food web.	Identify plants and animals as producers or consumers.	Identify the components of a food web (producer, consumer, and decomposer).	Identify the role of producers, consumers, and decomposers.	Use a model to show how matter flows through an ecosystem. Given a food chain, identify the flow of energy between organisms.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Life Science: LS 3 Heredity, Inheritance and Variation of Traits ❖ A. Inheritance of Traits ❖ B. Variation of Traits						
3-LS3-1 Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.	**SEP: Analyzing and Interpreting Data** Analyze and interpret data to make sense of phenomena using logical reasoning. **DCI: Inheritance of Traits** Many characteristics of organisms are inherited from their parents. **DCI: Variation of Traits** Different organisms vary in how they look and function because they have different inherited information. **CCC: Patterns** Similarities and differences in patterns can be used to sort and classify natural phenomena.	Many of the traits of organisms are similar to those of their parents (e.g. size, color).	Identify a trait of a plant or animal.	Identify one similarity between parents and their offspring.	Identify similarities and differences between parents and their offspring.	Given data (including pictures) identify similarities and differences between parents and offspring (e.g., parent dogs and a litter of puppies).
3-LS3-2 Use evidence to support the explanation that traits can be influenced by the environment.	**SEP: Constructing Explanations and Designing Solutions** Use evidence (e.g., observations, patterns) to support an explanation. **DCI: Inheritance of Traits** Some characteristics result from individuals' interactions with the environment, such as diet and learning. Many characteristics involve both inheritance and environment. **DCI: Variation of Traits** The environment also affects the traits that an organism develops. **CCC: Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.	Some characteristics of organisms result from environmental factors (e.g. lack of food or water).	Identify the needs of a plant or animal.	Distinguish between a plant with sufficient light and water and one where one of these is lacking OR an animal that is properly fed and getting sufficient exercise and one that is not.	Identify traits of a plant or animal that can be altered by its environment.	Determine environmental factors that affect traits of organisms of the same type (e.g., amount of food; amount of water; in the case of plants, amount of fertilizer).

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Life Science: LS 4 Biological Evolution: Unity and Diversity ❖ A. Evidence of Common Ancestry ❖ B. Natural Selection ❖ C. Adaptation ❖ D. Biodiversity and Humans						
3-LS4-1 Analyze and Interpret data from fossils to provide evidence of the organisms and environments in which they lived long ago.	**SEP: Analyzing and Interpreting Data** Analyze and interpret data to make sense of phenomena. **DCI: Evidence of Common Ancestry and Diversity** Some plants and animals that once lived on Earth are no longer found anywhere. Fossils provide evidence about the types of organisms that lived long ago and also about their environments. **CCC: Scale, Proportion, and Quantity** Some observable phenomena exist for a very short time and others for a very long period.	Fossils provide information about plants and animals that once lived and the environment in which they once lived.	Identify a fossil.	Identify whether the fossil was an animal or a plant.	Identify the environment (land or water, forest or desert) in which a fossil animal or plant lived.	Identify the fossil trait that supports the environment in which the animal or plant lived. (This may include illustrations)
3-LS4-2 Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.	**SEP: Constructing Explanations and Designing Solutions** Use evidence (e.g., observations, patterns) to support an explanation. **DCI: Natural Selection** Sometimes the differences in characteristics between individuals of the same species provide advantages in surviving, finding mates, and reproducing. **CCC: Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.	Sometimes differences in the characteristics between individuals of the same species provide advantages.	Identify a characteristic of an individual plant or animal.	Identify the differences in the characteristics of individuals within a species.	Determine which variation of the characteristic is most helpful to the animals.	Classify variations as likely to be an advantage or disadvantage to an animal or plant's survival.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
3-LS4-3 Construct an argument with evidence that in a particular habitat, some organisms can survive well, some survive less well, and some cannot survive at all.	**SEP: Engaging in Argument from Evidence** Construct an argument with evidence. **DCI: Adaptation** For any particular environment, some kinds of organisms survive well, some survive less well, and some cannot survive at all. **CCC: Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.	Sometimes the differences in characteristics between individuals of the same species provide advantages in a particular habitat.	Identify an organism in a habitat.	Identify the features of a habitat, including the organisms living it organisms.	Determine the characteristics an organism needs to survive in a particular habitat.	Interpret data to provide evidence that some organisms of a species can survive well in a habitat because their needs are met, and some organisms of that species cannot survive because their needs are not met.
3-LS4-4 Make a claim about the merit of a solution to a problem caused when the environment changes and the types of plants and animals that live there may change.	**SEP: Engaging in Argument from Evidence** Make a claim about the merit of a solution to a problem by citing relevant evidence. **DCI: Ecosystem Dynamics, Functioning, and Resilience** When an environment changes, some organisms die, others move to new locations, yet others move into the environment, and some die. **DCI: Biodiversity and Humans** Populations live in a variety of habitats, and changes in those habitats affect the organisms living there. **CCC: Systems and System Models** A system can be described in terms of its components and their interactions.	When an environment changes, the organisms in the environment are impacted, some positively and others negatively.	Identify how the environment changed after a natural or manmade event.	Identify an organism(s) that will be affected by a change in an environment.	Determine if a change in the environment is likely to have a positive or negative impact on a particular organism.	Given a simple data table, determine if a solution to the environmental change was effective (i.e. Did replanting trees lead to more birds being present?)

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Earth Space Science ESS 1 Earth's Place in the Universe ❖ A. The Universe and Its Stars ❖ B. Earth and the Solar System ❖ C. The History of Planet Earth						
4-ESS1-1 Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.	**SEP: Constructing Explanations and Designing Solutions** Identify the evidence that supports particular points in an explanation. **DCI: The History of Planet Earth** Patterns of rock formations reveal changes over time due to Earth forces, such as earthquakes. The presence and location of fossil types indicate the order in which rock layers were formed. **CCC: Patterns** Patterns can be used as evidence to support an explanation.	Patterns of rock formations and locations of fossils in rock layers reveal changes over time.	Identify that there are different rock layers in Earth and that fossils can be found in some rock layers.	Identify that the lower rock layers are the oldest rock layers.	Determine the environment of a given rock layer based on fossil evidence.	Determine a change that occurred in an environment based on the patterns/evidence found in the rock layers.
5-ESS1-1 Support an argument that differences in the apparent brightness of the sun compared to other stars is due to their relative distances from Earth.	**SEP: Engaging in Argument from Evidence** Support an argument with evidence, data, or a model. **DCI: The Universe and Its Stars** The sun is a star that appears larger and brighter than other stars because it is closer. Stars range greatly in their distance from Earth. **CCC: Patterns; Scale, Proportion, and Quantity** Natural objects exist, from the very small to the immensely large.	The universe has many stars. Some are brighter than the sun but appear less bright because of their distance from Earth.	Identify the sun as a star.	Demonstrate an understanding of the fact that a luminous object close to a person appears much brighter and larger than a similar object that is very far away from a person (e.g., nearby streetlights appear bigger and brighter than distant streetlights).	Use data to show that the closer a star is to Earth, the brighter the star appears.	Use data to determine which of two equally bright stars is closest to Earth based upon their apparent brightness.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
5-ESS1-2 Represent data in graphical displays to reveal patterns of daily changes in the length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	**SEP: Analyzing and Interpreting Data** Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. **DCI: Earth and the Solar System** The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about its axis, cause observable patterns. These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year. **CCC: Patterns; Scale, Proportion, and Quantity** Similarities and differences in patterns can be used to sort, classify, communicate, and analyze simple rates of change for natural phenomena.	Phases of the moon, shadows, and day and night follow a regular pattern.	Identify a shadow, the moon and the sun.	Identify that the size of a shadow changes, that the appearance of the moon changes, and that there are changes in the day and night patterns.	Use data to identify patterns in the size of shadows, in the phases of the moon, and in lengths of day and night.	Use data to identify patterns in the size of shadows including the relationship between the shadow and the position of the sun. Use data to identify a future phase of the moon.
Earth Space Science ESS 2 Earth Systems ❖ A. Earth Materials and Systems ❖ B. Plate Tectonics and Large-Scale System Interactions ❖ C. The Roles of Water in Earth's Surface Processes ❖ D. Weather and Climate ❖ E. Biogeology						
3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	**SEP: Analyzing and Interpreting Data** Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. **DCI: Earth Systems: Weather and Climate** Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. **CCC: Patterns** Patterns of change can be used to make predictions.	Use data to identify weather patterns	Identify weather (sunny, windy, rainy, etc.)	Identify common weather factors such as temperature, precipitation sky cover (clear, partly cloudy, very cloudy)	Use a simple graphical display or data table (limited to 3 or 4 data points) to identify a factor such as the time of the year when it rained the most or when it was hottest.	Recognize that weather predictions can be made based upon patterns but that they are not always accurate.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
3-ESS2-2 Obtain and combine information to describe climates in different regions of the world.	**SEP: Obtaining, Evaluating, and Communicating Information** Obtain and combine information from books and other reliable media to explain phenomena. **DCI: Earth Systems: Weather and Climate** Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. **CCC: Patterns** Patterns of change can be used to make predictions.	Describe typical weather conditions expected during a particular season in different parts of the world	Given illustrations, identify winter, spring, summer or fall based on "typical" conditions in many parts of the world (in temperate climates such as much of the mainland US).	Identify the temperature, precipitation, and other weather conditions as components of climate.	Describe the climate of a region of the world using weather data (Can include. using data to predict the weather of a region of the world at a given time of year given the climate.)	Identify differences between the climates found in two regions of the world (i.e. Hawaii and the Artic or California
4-ESS2-1 Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.	**SEP: Planning and Carrying Out Investigations; Analyzing and Interpreting Data** Make observations and/or measurements to produce data as evidence for an explanation. **DCI: Earth Materials and Systems** Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. **DCI: Biogeology** Living things affect the physical characteristics of their regions. **CCC: Patterns; Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.	Erosion and weathering reshape the landscape over time.	Identify erosion and/or weathering. (For this group of students, differentiating between weathering and erosion is probably not important.)	Identify a source of erosion and weathering that can cause changes to the landscape.	Identify examples of changes to the landscape caused by erosion and/or weathering.	Given a scenario, predict the effects of weathering and erosion on a landscape.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
4-ESS2-2 Analyze and interpret data from maps to describe patterns of Earth's features.	**SEP: Analyzing and Interpreting Data** Analyze and interpret data to make sense of phenomena using logical reasoning. **DCI: Plate Tectonics and Large-Scale System Interactions** The locations of mountain ranges, deep ocean trenches, ocean floor structures, earthquakes, and volcanoes occur in patterns. Most earthquakes and volcanoes occur along the boundaries between continents and oceans. Major mountain chains form inside continents or near their edges. Maps can help locate the different features of the Earth. **CCC: Patterns; Cause and Effect** Patterns can be used as evidence to support an explanation.	Interpret data from maps of plate boundaries, mountain ranges, volcanoes, and earthquakes to identify patterns.	Identify a volcano, an earthquake, or a mountain range.	Identify the locations of volcanos, earthquake sites, and mountain ranges given a map.	Use a map key to identify the pattern of earthquakes, mountain ranges, or volcanos relative to plate boundaries.	Predict a likely site of a future earthquake given a map showing plate boundaries.
5-ESS2-1 Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	**SEP: Developing and Using Models** Develop a model using an example to describe a scientific principle. **DCI: Earth Materials and Systems** Earth's major systems are the geosphere, the hydrosphere, the atmosphere, and the biosphere. These systems interact in multiple ways to affect Earth's surface materials and processes. The ocean supports a variety of ecosystems and organisms, shapes landforms, influences climate. **CCC: Systems and System Models** A system can be described in terms of its components and their interactions.	Earth's systems (geosphere, biosphere, hydrosphere, and atmosphere) interact in multiple ways.	Given a visual, identify the system.	Given a visual, identify the two systems interacting with one another.	Given a model, identify the result of the interaction of the two Earth systems.	Develop a model showing the interaction of two Earth systems.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
5-ESS2-2 Describe and graph the amounts of salt water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.	**SEP: Using Mathematics and Computational Thinking** Describe and graph quantities such as area and volume to address scientific questions. **DCI: The Roles of Water in Earth's Surface Processes** Nearly all of Earth's available water is in the ocean. Most fresh water is in glaciers or underground; only a tiny fraction is in streams, lakes, wetlands, and the atmosphere. **CCC: Scale, Proportion, and Quantity; Systems and System Models** Standard units are used to measure and describe physical quantities such as weight and volume.	The majority of the water found on Earth is salt water. Fresh water is limited.	Identify a body of water.	Identify where fresh water and salt water are found.	Use data to show that the ocean contains most of Earth's water.	Use data to determine the amount of salt water and fresh water on Earth.
Earth Space Science ESS 3 Earth and Human Activity A. Natural Resources B. Natural Hazards C. Human Impacts on Earth Systems D. Global Climate Change						
3-ESS3-1 Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.	**SEP: Engaging in Argument from Evidence** Make a claim about the merit of a solution to a problem by citing relevant evidence. **DCI: Natural Hazards** A variety of natural hazards results from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. **CCC: Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.	Humans can take steps to reduce the impacts of natural weather-related hazards.	Identify a weather hazard (e.g. heavy rain, high winds, high surf)	Identify an impact of a weather hazard. e.g. heavy rain, high winds, high surf)	Identify ways to help reduce the impact of a weather hazard.	Using data, determine if a solution to reduce the impact of a weather hazard will help animals and plants remain safe.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
4-ESS3-1 Obtain and combine information to describe that energy and fuels are derived from natural resources and that their uses affect the environment.	**SEP: Obtaining, Evaluating, and Communicating Information** Obtain and combine information from books and other reliable media to explain phenomena. **DCI: Natural Resources** Energy and fuels that humans use come from natural sources, and their use affects the environment in multiple ways. Some resources are renewable, and others are not. **CCC: Cause and Effect** Cause and effect relationships are routinely identified and used to explain change.	The use of renewable and nonrenewable sources for energy and fuel affect the environment.	Identify an energy source that is used by people.	Determine whether an energy source is renewable or non-renewable.	Identify an effect that the use of a given energy source would have on the environment.	Use evidence to determine how the use of a particular energy source might impact the environment.
4-ESS3-2 Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.	**SEP: Constructing Explanations and Designing Solutions** Generate and compare multiple solutions to a problem based on how well they meet the criteria and constraints of the design solution. **DCI: Natural Resources; Natural Hazards** A variety of hazards result from natural processes (e.g., earthquakes, tsunamis, volcanic eruptions). Humans cannot eliminate the hazards but can take steps to reduce their impacts. **DCI: Designing Solutions to Engineering Problems** Testing a solution involves investigating how well it performs under a range of likely conditions. **CCC: Cause and Effect** Cause and effect relationships are routinely identified, tested, and used to explain change.	Humans can take steps to reduce the impact of natural hazards.	Identify a natural hazard.	Identify the potential impact of a natural hazard (e.g., flooding after heavy rain or high surf).	Given a natural hazard, choose the design that would lessen the impact of the hazard (e.g., a raised house in an area prone to flooding).	Given two design solutions, explain why one of them will be more effective in reducing the impacts of a natural hazard.

HSA Alternate Science – NGSS Elementary

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	**SEP: Obtaining, Evaluating, and Communicating Information** Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem. **DCI: Human Impacts on Earth Systems** Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. **CCC: Systems and System Models** A system can be described in terms of its components and their interactions.	Human activity can affect the environment, but steps can be taken to protect it.	Determine a source of pollution (e.g. litter, car exhaust).	Identify an effect of pollution on air quality or water quality.	Identify actions humans can take to protect the environment.	Determine a way to clean up the environment.

MIDDLE SCHOOL (Administered in Grade 8)

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Physical Science: PS 1 Matter and interactions ❖ A. Structure and Properties of Matter ❖ B. Chemical Reactions ❖ C. Nuclear Processes						
MS-PS1-1 Develop models to describe the atomic composition of simple molecules and extended structures.	**SEP: Developing and Using Models** Develop a model to predict and/or describe phenomena. **DCI: Structure and Properties of Matter** Substances are made from different types of atoms, which combine with one another in various ways. Atoms form molecules that range in size from two to thousands of atoms. **CCC: Scale, Proportion, and Quantity** Models can be used to study systems that are very large or very small.	Matter is made of very small pieces called atoms, and atoms join together to create molecules.	Recognize that all things (matter) can be broken up into smaller and smaller pieces until they eventually become too small to see, but even then, they still exist.	Identify that the smallest parts of all molecules are atoms.	Classify molecules by make up: one type of atom (nitrogen or iron) or multiple types of atoms (water) and simple (e.g., carbon dioxide, water, salt) or complex (e.g., sugar, plastics, or nylon).	Use models (e.g., pictures, 3D ball, stick structures) to explain that atoms can combine to form molecules, including those made up of the same type of atom (e.g., iron, oxygen) and those made up of different types of atoms (e.g., water, ammonia, sodium chloride).
MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	**SEP: Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences. **DCI: Structure and Properties of Matter** Each pure substance has characteristic physical and chemical properties. **DCI: Chemical Reactions** In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. **CCC: Patterns** Macroscopic patterns are related to the nature of microscopic and atomic-level structure.	Some substances, when mixed, interact to form new substances with new properties.	Identify the physical and/or chemical properties of a substance.	Observe and identify examples of changes in substances.	Use data to support a claim that properties have changed, and a new substance has been formed.	Recognize that chemical changes involve changes in the molecules (atoms are rearranged), leading to a new substance with properties that are different from the properties of the original substances.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-PS1-3 Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.	**SEP: Obtaining, Evaluating, and Communicating Information** Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported by evidence. **DCI: Structure and Properties of Matter** Each pure substance has characteristic physical and chemical properties. **DCI: Chemical Reaction** In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. **CCC: Structure and Function** Structures can be designed to serve particular functions by taking into account properties of different materials and how materials can be shaped and used.	Natural resources can be used to make materials useful to society. (Also see MS-PS1-2).	Identify common natural resources.	Identify examples of materials that are made from natural resources (e.g., iron ore into steel, wood into furniture).	Identify the natural resources used to make a synthetic product (e.g., petroleum into plastics, aluminum into cans).	Using information from a short reading describing a synthetic material made from natural resources and its impact on society (e.g., use of plastics).
MS-PS1-4 Develop a model that predicts and describes changes in particle motion, temperature, and state of a pure substance when thermal energy is added or removed.	**SEP: Developing and Using Models** Develop a model to predict and/or describe phenomena. **DCI: Structure and Properties of Matter** Gases and liquids are made of molecules that are moving about relative to each other. In a liquid, the molecules are constantly in contact with each other, while in a gas, they are widely spaced except when they happen to collide. In a solid, atoms are closely spaced and do not change relative locations. Changes of state can occur with variations in temperature. **DCI: Definitions of Energy** The temperature of a system is proportional to the average internal kinetic energy and potential energy per atom or molecule. **CCC: Patterns; Cause and Effect** Cause and effect relationships may be used to predict phenomena.	Matter exists in various states, including solid, liquid, and gas. The molecules behave differently in each state. The state of matter of a material can change when heat is added or removed.	Identify matter as a solid, liquid, or gas.	Use a model to identify that the particles that make up an object move fast or slow depends on the temperature of the object.	Recognize that a source of heat or of cooling can change the state of common materials (ex. ice melts, water freezes, etc.) and the motion of the molecules change when a change of state occurs.	Predict the change in particle motion and state of matter that will occur when heat is introduced or removed (i.e., use common occurrences including things such as chocolate getting softer).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
MS-PS1-5 Develop and use a model to describe how the total number of atoms does not change in a chemical reaction, and, thus, mass is conserved.	**SEP: Developing and Using Models** Develop a model to describe unobservable mechanisms. **DCI: Chemical Reactions** In a chemical process, the atoms that make up the original substances are regrouped into different molecules, and these new substances have different properties from those of the reactants. The total number of each type of atom is conserved, and, thus, the mass does not change. **CC: Energy and Matter** Matter is conserved because atoms are conserved in physical and chemical processes.	*The DCI in this PE is covered in MS-PS1-2 and MS-PS1-3.*				
MS-PS1-6 Undertake a design project to construct, test, and modify a device that either releases or absorbs thermal energy by chemical processes.	**SEP: Constructing Explanations and Designing Solutions** Undertake a design project, engaging in the design cycle, to construct and/or implement a solution that meets specific design criteria and constraints. **DCI: Chemical Reactions** Some chemical reactions release energy; others store energy. **ETS1.B: Developing Possible Solutions** *(Secondary)* **ETS1.C: Optimizing the Design Solution** *(Secondary)* **CCC: Energy and Matter** The transfer of energy can be tracked as energy flows through a designed or natural system.	Some chemical reactions release heat; others absorb heat.	Recognize that chemical reactions create new substances. (Also see MS-PS1-2.)	Recognize that, sometimes, chemical reactions cause temperature changes within the substance.	Use presented evidence to determine if a reaction has released or absorbed thermal energy.	Use data to determine if a proposed solution would solve a problem (i.e., use common objects, like chemical reactions that produce temperature changes in heat packs; chemical reactions that are used in ice packs). (Data can be numbers or graphs)

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Physical Science: PS 2 Motion and Stability: Forces and Interactions ❖ A. Forces and Motion ❖ B. Types of Interactions ❖ C. Stability and Instability in Physical Systems						
MS-PS2-1 Apply Newton's Third Law to design a solution to a problem involving the motion of two colliding objects.	**SEP: Constructing and Designing Solutions** Apply scientific ideas or principles to design an object, tool, process, or system. **DCI: Forces and Motion** For any pair of interacting objects, the force exerted by the first object on the second object is equal in strength to the force that the second object exerts on the first, but in the opposite direction. **CCC: Systems and System Models** Models can be used to represent systems and their interactions—such as inputs, processes and outputs—and energy and matter flows within systems.	When objects collide, they exert force on each other, which will affect their motion (e.g., collisions between toy cars or between a toy car and a stationary object).	Recognize that force can cause motion. (Also see 3-PS2-1)	Relate the speed of a moving object to the impact of a collision with a stationary object (e.g., toy cars hitting a wall).	Use models to predict how the motion of objects with different speeds will be affected when the objects collide.	Conduct an investigation (simulation or simple data sets provided) to determine how the changing speed of objects affects the motion of the objects when they collide.
MS-PS2-2 Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	**SEP: Planning and Carrying Out Investigations** Plan an investigation individually and collaboratively, and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. **DCI: Forces and Motion** The motion of an object is determined by the sum of the forces acting on it. The greater the mass of the object, the greater the force needed to achieve the same change in motion. **CCC: Stability and Change** Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and forces at different scales.	Unbalanced forces cause a change in motion. The amount of change depends upon the size of the force and mass of the object. (Also see MS-PS3-1)	Identify that an object changed position due to an outside factor (e.g., a bowling ball hits a pin, and the pin moves).	Identify that a force (push/pull) is needed to change an object's motion.	Predict how the motion of an object will change when acted on by forces of different sizes or when objects have different masses.	Use data from an investigation where two objects with different masses are acted on by a series of forces to reach conclusions.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-PS2-3 Ask questions about data to determine the factors that affect the strength of electrical and magnetic forces.	**SEP: Asking Questions and Defining Problems** Ask questions that can be investigated within the scope of the classroom and outdoor environment with available resources, and, when appropriate, frame a hypothesis based on observations and scientific principles. **DCI: Types of Interactions** Electric and magnetic (electromagnetic) forces can be attractive or repulsive, and their sizes depend on the magnitudes of the charges, currents, or magnetic strengths involved, and on the distances between the interacting objects. **CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	Some forces, such as magnetic forces, act at a distance (push/pull) without physical contact with an object.	Identify a magnet as something that exerts an attractive force on some materials.	Sort objects based on whether they are attracted by a magnet.	Use data to make statements about the effect of distance on the interactions between magnets.	Identify a question that could be answered by a scientific investigation involving one or more magnets.
MS-PS2-4 Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	**SEP: Engaging in Argument from Evidence** Construct and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. **DCI: Types of Interactions** Gravitational forces are always attractive. There is a gravitational force between any two masses, but it is very small except when one or both of the objects have a large mass (e.g., Earth and the sun). **CCC: Systems and System Models** Models can be used to represent systems and their interactions—such as inputs and processes.	Gravitational force exists between any two objects. The size of the force depends upon the mass of the object.	Recognize that objects fall to the ground when dropped.	Use models to illustrate the effect of Earth's gravity on the motion of an object (ex. a ball thrown into the air falls toward Earth due to the gravitational force of Earth being larger).	Use models to demonstrate the effects of Earth's gravitational force (e.g., a ball thrown into the air falls toward Earth due to the gravitational force of Earth being larger).	Analyze and interpret data to describe and predict the effects of gravitational force of two objects with large mass (e.g., Earth and the sun).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
MS-PS2-5 Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other, even though the objects are not in contact.	**SEP: Planning and Carrying Out Investigations** Conduct an investigation and evaluate the experimental design to produce data to serve as the basis for evidence that can meet the goals of the investigation. **DCI: Types of Interactions** Forces that act at a distance (e.g., electric, magnetic, and gravitational) can be explained by fields that extend through space and can be mapped by their effect on a test object (e.g., a charged object or a ball, respectively). **CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	The behavior of magnets varies with changes in orientation, distance, and the strength of the magnet. (Gravitational forces are largely addressed in MS-PS2-4.)	Identify the "poles" of a bar magnet.	Recognize that like poles repel each other and unlike poles attract.	Relate the orientation of magnets and the distance between them to the behavior of the magnets.	Use data from an experiment, to explain the effect of changing the orientation of two magnets or changing the distance between two magnets.
Physical Science: PS 3 Energy ❖ A. Definitions of Energy ❖ B. Conservation of Energy and Energy Transfer ❖ C. Relationship Between Energy and Forces ❖ D. Energy and Chemical Processes in Everyday Life						
MS-PS3-1 Construct and interpret graphical displays of data to describe the relationships of kinetic energy to the mass of an object and to the speed of an object.	**SEP: Analyzing and Interpreting Data** Construct and interpret graphical displays of data to identify linear and nonlinear relationships. **DCI: Definitions of Energy** Kinetic energy is proportional to the mass of the moving object and grows with the square of its speed. **CCC: Scale, Proportion, and Quantity** Proportional relationships among different types of quantities provide information about the magnitude of properties and processes.	Kinetic energy (motion energy) is proportional to the mass of the object. Kinetic energy increases as speed increases.	Identify mass and speed of an object.	Use mass data to identify the object with the greatest mass or use speed data to determine which object moves the fastest.	Using mass or speed data to determine the object with the greatest kinetic energy.	Uses graphical data to identify that kinetic energy changes as mass or speed increases (e.g., two objects with different masses moving at the same speed or two objects with the same mass moving at different speeds, or a single object whose speed changes).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-PS3-2 Develop a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.	**SEP: Developing and Using Models** Develop a model to describe unobservable mechanisms. **DCI: Definitions of Energy** A system of objects may also contain stored (potential) energy, depending on the objects' relative positions. **DCI: Relationship Between Energy and Forces** When two objects interact, each one exerts a force on the other that can cause energy to be transferred to or from the object. **CCC: Systems and System Models** Models can be used to represent systems and their interactions—such as inputs, processes, and outputs—and energy and matter flows within systems.	The DCI is covered in MS-ESS1-2.				
MS-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer.	**SEP: Constructing Explanations and Designing Solutions** Apply scientific ideas or principles to design, construct, and test a design of an object, tool, process, or system. **DCI: Definitions of Energy** Temperature is a measure of the average kinetic energy of particles of matter. The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter present. **DCI: Conservation of Energy and Energy Transfer** Energy is spontaneously transferred out of hotter regions or objects and into colder ones. **CCC: Energy and Matter** The transfer of energy can be tracked as energy flows through a system.	Heat can be transferred from one object to another. Humans have invented devices to "manage" this transfer.	Identify objects that are hot and cold.	Identify "things" used to keep something hot or cold.	Realize that heat can be transferred (e.g., if ice is added to a cup of water or if water in a pot is heated on a stove).	Use data to identify the "tool" that is most efficient at keeping something hot or cold (e.g., different types of coolers or thermos bottles).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	**SEP: Planning and Carrying Out Investigations** Plan an investigation and in the design: identify independent and dependent variables and controls, what tools are needed to do the gathering, how measurements will be recorded, and how many data are needed to support a claim. **DCI: Definitions of Energy** Temperature is a measure of the average kinetic energy of particles of matter. **DCI: Conservation of Energy and Energy Transfer** The amount of energy transfer needed to change the temperature of a matter sample by a given amount depends on the nature of the matter, the size of the sample, and the environment. **CCC: Scale, Proportion, and Quantity** Proportional relationships among different types of quantities provide information about the magnitude of properties and processes.	Temperature can be used to measure the amount of heat transferred. (Also see MS-PS3-3.) (Temperature is the measure of the average kinetic energy of matter)	Identify sources of heat.	Use temperature data to determine when an object has changed in temperature due to the application of heat.	Use temperature data to determine the temperature changes of objects of the same material but different masses when heat is applied for a certain period of time.	Draw conclusions using data from an experiment involving adding two cold objects (e.g., ice) of different masses to separate pails of hot water and recording the temperature change of the water over time.
MS-PS3-5 Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	**SEP: Engaging in Argument from Evidence** Construct, use, and present oral and written arguments supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. **DCI: Conservation of Energy and Energy Transfer** When the motion energy of an object changes, there is inevitably some other change in energy at the same time. **CCC: Energy and Matter** Energy can take different forms (e.g., energy in fields, thermal energy, kinetic energy).	When the motion energy of an object changes, the object may gain or lose energy. (Motion energy refers to kinetic energy)	Recognize that the motion energy of an object can change.	Identify the motion energy transfer in presented examples (e.g., a ball that was moving begins to slow down, so this means that energy was transferred from the object).	Predict what will happen to the motion energy between two similar objects when one collides with the other (e.g., a ball rolling down a hill collides with a ball that is at rest at the bottom of the hill).	Use data from an experiment to determine the reasoning behind motion energy being transferred to or from an object (e.g., when two balls collide, one begins to move due to motion energy being transferred to it).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Physical Science: PS 4 Waves and Their Applications in Technologies ❖ A. Wave Properties ❖ B. Electromagnetic Radiation ❖ C. Information Technologies and Instrumentation						
MS-PS4-1 Use mathematical representations to describe a simple model for waves that includes how the amplitude of a wave is related to the energy in a wave.	**SEP: Using Mathematics and Computational Thinking** Use mathematical representations to describe and/or support scientific conclusions and design solutions. **DCI: Wave Properties** A simple wave has a repeating pattern with a specific wavelength, frequency, and amplitude. **CCC: Patterns** Graphs and charts can be used to identify patterns in data.	Mechanical waves (water, sound, waves in a rope at the gym) have a repeating pattern, including amplitude, which reflects the energy of the wave. (Note: tsunamis should not be used as examples)	Give/identify examples of waves.	Identify a property of a wave (e.g., frequency, amplitude, wavelength).	Compare wave diagrams to identify differences in wavelength and amplitude.	Use data to show that greater water wave height (i.e., amplitude) results in a greater force and more impact if it strikes shore or another object.
MS-PS4-2 Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	**SEP: Developing and Using Models** Develop and use a model to describe phenomena. **DCI: Wave Properties** A sound wave needs a medium through which it is transmitted. **DCI: Electromagnetic Radiation** When light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object's material. The path that light travels can be traced as straight lines, except at surfaces between different transparent materials (e.g., air and water, air and glass) where the light path bends. **CCC: Structure and Function** Structures can be designed to serve particular functions by taking into account properties of different materials and how materials can be shaped and used.	Light waves can be reflected, refracted (transmitted), or absorbed by different materials.	Recognize that light travels through some objects and not others.	Use observations to identify transparent materials.	Use models to recognize that light can be reflected, absorbed, or transmitted (light passes through the object).	Use models to describe how light behaves when striking transparent, translucent, and opaque materials. (Transparent can be a regular glass window. Translucent can be a plastic milk jug, and opaque can be a door.)

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
MS-PS4-3 Integrate qualitative scientific and technical information to support the claim that digitized signals are a more reliable way to encode and transmit information than analog signals.	**SEP: Obtaining, Evaluating, and Communicating Information** Integrate qualitative scientific and technical information in written text with that contained in media and visual displays to clarify claims and findings. **DCI: Information Technologies and Instrumentation** Digitized signals (sent as wave pulses) are a more reliable way to encode and transmit information. **CCC: Structure and Function** Structures can be designed to serve particular functions.	Technological advances have improved our ability to communicate information.	Identify different means of communicating information.	Identify examples of digital technologies used to communicate information (i.e. digital scales or thermometer, "smart phones", audio recordings).	Identify a benefit of a digital technology used to communicate information.	Given a short reading or scenario, evaluate advantages or disadvantages of various means of communication.
Life Science: LS 1 From Molecules to Organisms: Structures and Processes ❖ A. Structure and Function ❖ B. Growth and Development of Organisms ❖ C. Organization for Matter and Energy Flow in Organisms ❖ D. Information Processing						
MS-LS1-1 Conduct an investigation to provide evidence that living things are made of cells: either one cell or many different numbers and types of cells.	**SEP: Planning and Carrying Out Investigations** Conduct an investigation to produce data to serve as the basis for evidence that meet the goals of an investigation. **DCI: Structure and Function** All living things are made up of cells, which are the smallest units that can be said to be alive. An organism may consist of one single cell (unicellular) or many different numbers and types of cells (multicellular). **CCC: Scale, Proportion, and Quantity** Phenomena that can be observed at one scale may not be observable at another scale.	All living things are made up of cells, which are the smallest units that can be said to be alive.	Identify living and nonliving things.	Recognize that the cell is the smallest living unit.	Recognize that all living things are made up of one or more cells.	Recognize that many organisms have many different types of cells (e.g., skin cells, blood cells, muscle cells, brain cells).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-LS1-2 Develop and use a model to describe the function of a cell as a whole and ways the parts of cells contribute to the function.	**SEP: Developing and Using Models** Develop and use a model to describe phenomena. **DCI: Structure and Function** Within cells, special structures are responsible for particular functions, and the cell membrane forms the boundary that controls what enters and leaves the cell. **CCC: Structure and Function** Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the relationships among their parts.	Cells are made up of parts that work together. Cells have different parts with various functions.	Identify cells as the basic component of all living things.	Identify parts of a plant cell and/or animal cell (e.g., nucleus, chloroplast, mitochondria, cell membrane, cell wall).	Identify the function of one or more of the following cell parts: nucleus, chloroplast, mitochondria, cell membrane, and cell wall.	Use a model, to describe how the functions of the parts of a plant or animal cell contribute to the cell as a whole. (The model can be a scenario like a school or a factory, etc.)
MS-LS1-3 Use argument supported by evidence for how the body is a system of interacting sub-systems composed of groups of cells.	**SEP: Engaging in Argument from Evidence** Use an oral and written argument supported by evidence to support or refute an explanation or a model for a phenomenon. **DCI: Structure and Function** In multicellular organisms, the body is a system of multiple interacting subsystems. These subsystems are groups of cells that work together to form tissues and organs that are specialized for particular body functions. **CCC: Systems and System Models** Systems may interact with other systems; they may have sub-systems and be a part of larger complex systems.	The body is a group of systems that work together to carry out body functions. Within the systems groups of cells form tissues and organs.	Identify a major organ in the body (e.g., brain, heart, lungs).	Recognize that organs have specialized functions (e.g., heart pumps blood).	Recognize that groups of cells create tissues. Tissues come together to create organs, and multiple organs create organ systems.	Use a model to demonstrate how organs are connected in major organ systems (e.g., circulatory, excretory, digestive, respiratory, muscular, or nervous systems).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-LS1-4 Use argument based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively.	**SEP: Engaging in Argument from Evidence** Use an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon. **DCI: Structure and Function; Growth and Development of Organisms** Animals engage in characteristic behaviors that increase the odds of reproduction. Plants reproduce in a variety of ways, sometimes depending on animal behavior and specialized features for reproduction. **CCC: Cause and Effect** Phenomena may have more than one cause, and some cause and effect relationships in systems can be described only by using probability.	Animals exhibit behaviors and plants have characteristics that contribute to successful reproduction. (Human reproduction is not an appropriate topic)	Identify animal behaviors that contribute to their survival.	Match plant structural adaptations to survival needs.	Use observations to match structural adaptations and/or behaviors to survival needs of plants and animals in an environment.	Read a short passage on animal behaviors that affect plant reproduction and identify the behavior that assists plants.
MS-LS1-5 Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	**SEP: Constructing Explanations and Designing Solutions** Construct a scientific explanation based on evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do in the future. **DCI: Growth and Development of Organisms** Genetic factors as well as local conditions affect the growth of the adult plant. **CCC: Cause and Effect** Phenomena may have more than one cause, and some cause and effect relationships in systems can be described only using probability.	An organism's growth is affected by environmental factors.	Identify characteristics of an organism's habitat/environment.	Identify environmental factors that can influence an organism's growth.	Use data to identify environmental factors that lead to optimum organism growth (e.g., number of trees for camouflage, nest building).	Use data to explain an increase or decrease in organism growth in a specific environment.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-LS1-6 Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.	**SEP: Constructing Explanations and Designing Solutions** Construct a scientific explanation based on evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do in the future. **DCI: Organization for Matter and Energy Flow in Organisms** Plants, algae (including phytoplankton), and many microorganisms use the energy from light to make sugars (food) from carbon dioxide from the atmosphere and water through the process of photosynthesis, which also releases oxygen. These sugars can be used immediately or stored for growth or later use. **DCI: Energy in Chemical Processes and Everyday Life** The chemical reaction by which plants produce complex food molecules (sugars) requires an energy input (i.e., from sunlight) to occur. In this reaction, carbon dioxide and water combine to form carbon-based organic molecules and release oxygen. **CCC: Energy and Matter** Within a natural system, the transfer of energy drives the motion and/or cycling of matter.	Plants take in matter (in the form of carbon dioxide and water), and use energy from the sun to produce food, and release oxygen into the environment through photosynthesis.	Recognize that plants need light and water to live.	Recognize that light energy (sunlight), water, and carbon dioxide are necessary for plants to make food.	Recognize that in photosynthesis, light energy (sunlight) is used to combine carbon dioxide and water to produce oxygen, that is released, and food molecules which can be used or stored by the plant.	Use a model to describe that the processes of photosynthesis and respiration are necessary for plant survival.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-LS1-7 Develop a model to describe how food is rearranged through chemical reactions, forming new molecules that support growth and/or release energy as this matter moves through an organism.	**SEP: Developing and Using Models** Develop a model to describe unobservable mechanisms. **DCI: Organization for Matter and Energy Flow in Organisms** Within individual organisms, food moves through a series of chemical reactions in which it is broken down and rearranged to form new molecules, to support growth, or to release energy. **DCI: Energy in Chemical Processes and Everyday Life** Cellular respiration in plants and animals involves chemical reactions with oxygen that release stored energy. In these processes, complex molecules containing carbon react with oxygen to produce carbon dioxide and other materials. **CCC: Energy and Matter** Matter is conserved because atoms are conserved in physical and chemical processes.	Food moves through different processes to form new molecules that support growth and release energy. (Photosynthesis is in MS-LS1-6.)	Recognize that organisms eat to survive.	Recognize that food must be broken down by chewing and digesting so that the nutrients can be absorbed by the organism.	Recognize that food molecules are broken down and put back together during digestion to be useful to the organism (e.g. support growth and/or release energy).	Use diet data to develop a possible explanation behind two organisms of the same species being different sizes.
MS-LS1-8 Gather and synthesize information that sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.	**SEP: Obtaining, Evaluating, and Communicating Information** Gather, read, and synthesize information from multiple appropriate sources. Assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. **DCI: Information Processing** Each sense receptor responds to different inputs, transmitting them as signals that travel along nerve cells to the brain. The signals are then processed in the brain, resulting in immediate behaviors or memories. **CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems.	Sensory organs respond to inputs and send signals to the brain; and the body responds and/or remembers.	Identify the five senses.	Identify the inputs each of the senses responds to.	Describe that information received by the senses is transmitted to the brain and leads to a memory and/or an immediate response.	Given a scenario that describes a response to a stimuli, explain the process behind the response.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
Life Science: LS 2 Ecosystems: Interactions, Energy, and Dynamics ❖ A. Interdependent Relationships in Ecosystems ❖ B. Cycles of Matter and Energy Transfer in Ecosystems ❖ C. Ecosystem Dynamics, Functioning, and Resilience ❖ D. Social Interactions and Group Behavior						
MS-LS2-1 Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.	**SEP: Analyzing ad Interpreting Data** Analyze and interpret data to provide evidence for phenomena. **DCI: Interdependent Relationships in Ecosystems** Organisms are dependent on their environmental interactions with other living things and with nonliving factors. In any ecosystem, organisms with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction. Growth of organisms and population increases are limited by access to resources. **CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	Organisms are dependent on interactions in their environment, including other living things and the physical environment.	Identify an organism or environmental factor (e.g., plant or rainfall).	Identify factors in an ecosystem, that can impact an organism or a population of organisms. (ex. presence of a predator or lack of rainfall)	Identify if a population increases or decreases as a result of a change in the ecosystem.	Describe how the availability of resources in a habitat changes when a population changes (e.g., more food, increased competition).
MS-LS2-2 Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.	**SEP: Constructing Explanations and Designing Solutions** Construct an explanation that includes qualitative or quantitative relationships between variables that predict phenomena. **DCI: Interdependent Relationships in Ecosystems** Predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions may become so interdependent that each organism requires the other for survival. Although the species involved in these interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared. **CCC: Patterns** Patterns can be used to identify cause and effect relationships.	There are a variety of interactions in an ecosystem that may be predatory, competitive, or mutually beneficial.	Identify an example of an organism interacting with its environment. (Ex.: eating other organisms, drinking water, eating plants, using plants for shelter (nests, beaver dams, etc.), using the sun's warmth, etc.)	Identify an interaction between two organisms within an ecosystem.	Describe interactions among organisms across multiple ecosystems (e.g., how a predatory, land-based animal interacts with prey in water ecosystems).	Describe patterns of interactions, including those which are predatory, competitive, and mutually beneficial.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-LS2-3 Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.	**SEP: Developing and Using Models** Develop a model to describe phenomena. **DCI: Cycle of Matter and Energy Transfer in Ecosystems** Food webs are models that demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem. The atoms that make up the organisms in an ecosystem are cycled repeatedly between the living and nonliving parts of the ecosystem. **CCC: Energy and Matter** The transfer of energy can be tracked as energy flows through a natural system.	Food webs are models that demonstrate how matter and energy is transferred between living things (producers, consumers, decomposers) and nonliving parts of an ecosystem.	Identify parts of a food web (producer, consumer, decomposer).	Complete a food web given a set of common organisms.	Complete a food web showing the flow of energy between living organisms and nonliving parts of an ecosystem.	Develop a model to describe the cycling and flow of energy in living organisms and nonliving parts of an ecosystem.
MS-LS2-4 Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	**SEP: Engaging in Argument from Evidence** Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. **DCI: Ecosystem Dynamics, Functioning, and Resilience** Ecosystems are dynamic in nature; their characteristics can vary over time. Disruptions to any physical or biological component of an ecosystem can lead to shifts in all its populations. **CCC: Stability and Change** Small changes in one part of a system might cause large changes in another part.	Ecosystems can change over time. Changes to any physical or biological component of an ecosystem can lead to shifts in all its populations.	Identify an ecosystem.	Identify the biological and physical components of an ecosystem.	Use data to determine the effect on a population when a resource is limited due to environmental conditions.	Predict what would happen to the populations in an ecosystem when a new species is introduced, a predator is removed, or there is a physical change in the environment.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-LS2-5 Evaluate competing design solutions for maintaining biodiversity and ecosystem services.	**SEP: Engaging in Argument from Evidence** Evaluate competing design solutions based on jointly developed and agreed-upon design criteria. **DCI: Ecosystem Dynamics, Functioning, and Resilience** Biodiversity describes the variety of species found in Earth's terrestrial and oceanic ecosystems. The completeness or integrity of an ecosystem's biodiversity is often used as a measure of its health. **DCI: Biodiversity and Humans** Changes in biodiversity can influence humans' resources, such as food, energy, and medicines, as well as ecosystem services that humans rely on—for example, water purification and recycling. *(Secondary)* **DCI: Developing Possible Solutions** There are systematic processes for evaluating solutions with respect to how well they meet the criteria and constraints of a problem. *(Secondary)* **CCC: Stability and Change** Small changes in one part of a system might cause large changes in another part.	DCIs are addressed in MS-LS2-4.			

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Life Science: LS 3 Heredity, Inheritance and Variation of Traits ❖ A. Inheritance of Traits ❖ B. Variation of Traits						
MS-LS3-1 Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of an organism.	**SEP: Developing and Using Models** Develop and use a model to describe phenomena. **DCI: Inheritance of Traits** Genes are located in the chromosomes of cells, with each chromosome pair containing two variants of each of many distinct genes. Each distinct gene chiefly controls the production of specific proteins, which in turn affects the traits of the individual. Changes to genes can result in changes to proteins, which can affect the structures and functions of the organism and, thereby, change traits. **DCI: Variation of Traits** In addition to variations that arise from sexual reproduction, genetic information can be altered because of mutations. Though rare, mutations may result in changes to the structure and function of proteins. Some changes are beneficial, others harmful, and some neutral to the organism. **CCC: Structure and Function** Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the composition and relationships among their parts; thus, complex systems can be analyzed to determine how they function.	Structural changes to genes lead to mutations that may be helpful or harmful.	Identify a gene and the location of a gene.	Recognize that genes create proteins that the body needs.	Recognize that changes to gene structures cause changes to the proteins that they create and may lead to the development of new traits that may be helpful or harmful.	Given a scenario, recognize that any variation in the structure and function of an organism is the result of a genetic mutation.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
MS-LS3-2 Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.	**SEP: Developing and Using Models** Develop and use a model to describe phenomena. **DCI: Growth and Development of Organisms** Organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring. *(Secondary)* **DCI: Inheritance of Traits** Variations of inherited traits between parent and offspring arise from genetic differences that result from the subset of chromosomes (and therefore, genes) inherited. **DCI: Variation of Traits** In sexually reproducing organisms, each parent contributes half of the genes acquired (at random) by the offspring. Individuals have two of each chromosome and, hence, two alleles of each gene, one acquired from each parent. These versions may be identical or may differ from each other. **CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural systems.	All organisms reproduce, either sexually and/or asexually. Asexual reproduction occurs from a single organism. Sexual reproduction leads to offspring that inherit traits from both their parents.	Identify that all living organisms reproduce.	Take the first sentence about traits out. Differentiate between asexual and sexual reproduction. (Human reproduction should not be included as an example here.)	Use a model to describe why asexual reproduction differs from sexual reproduction.	Use data to show why sexual reproduction leads to trait variation among offspring.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Life Science: LS 4 Biological Evolution: Unity and Diversity ❖ A. Evidence of Common Ancestry ❖ B. Natural Selection ❖ C. Adaptation ❖ D. Biodiversity and Humans						
MS-LS4-1 Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.	**SEP: Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences in findings. **DCI: Evidence of Common Ancestry and Diversity** The collection of fossils and their placement in chronological order (e.g., through the location of the sedimentary layers in which they are found or through radioactive dating) is known as the fossil record. It documents the existence, diversity, extinction, and change of many life forms throughout the history of life on Earth. **CCC: Patterns** Graphs, charts, and images can be used to identify patterns in data.	Fossils and their placement in rock layers provide information about the age of fossils and how living things have changed over time.	Identify a fossil.	Identify the relative age of fossils based upon their location in rock layers.	Match a fossil to a similar organism found on Earth today or identify that organism as extinct.	Use patterns in fossil data or pictorial information to explain how an organism changed over time.
MS-LS4-2 Apply scientific ideas to construct an explanation for the anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.	**SEP: Constructing Explanations and Designing Solutions** Apply scientific ideas to construct an explanation for real-world phenomena, examples, or events. **DCI: Evidence of Common Ancestry and Diversity** Anatomical similarities and differences between various organisms living today, and between them and organisms in the fossil record, enable the reconstruction of evolutionary history and the inference of lines of evolutionary descent. **CCC: Patterns** Patterns can be used to identify cause and effect relationships.	There are anatomical similarities and differences between past and present day organisms. These enable the inference of lines of evolutionary descent (Also see MS-LS4-1)	Identify a fossil.	Match an anatomical structure of a living organism to a similar fossil.	Compare fossils with present-day organisms with similar characteristics.	Compare and contrast similarities and differences among related modern organisms and with those in the fossil record (e.g., ancient birds, an eagle, and a pigeon).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-LS4-3 Analyze displays of pictorial data to compare patterns of similarities in embryological development across multiple species to identify relationships not evident in the fully formed anatomy.	**SEP: Analyzing and Interpreting Data** Analyze displays of data to identify linear and nonlinear relationships. **DCI: Evidence of Common Ancestry and Diversity** Comparison of the embryological development of different species also reveals similarities that show relationships not evident in the fully formed anatomy. **CCC: Patterns** Graphs, charts, and images can be used to identify patterns in data.	This Performance Expectation will not be assessed at the middle school level.				
MS-LS4-4 Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.	**SEP: Constructing Explanations and Designing Solutions** Construct an explanation that includes qualitative or quantitative relationships between variables that describe phenomena. **DCI: Natural Selection** Natural selection leads to the predominance of certain traits in a population and the suppression of others. **CCC: Cause and Effect** Phenomena may have more than one cause, and some cause and effect relationships in systems can be described only using probability.	Natural selection favors organisms that have traits that increase the likelihood of survival and reproduction in a specific environment. (Also see MS-LS3-2 and other PEs)	Identify a trait.	Identify a trait that helps individuals survive and reproduce in a specific environment (e.g., speed, strength, size).	Explain that some traits help individuals in a population to survive and reproduce in a specific environment (ex. ability of a cactus to survive a drought better than a fern).	Explain changes in the population size, given data showing a variation of traits within a population in a specific environment (the population size should change based on the trait).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-LS4-5 Gather and synthesize information about technologies that have changed the way humans influence the inheritance of desired traits in organisms.	**SEP: Obtaining, Evaluating, and Communicating Information** Gather, read, and synthesize information from multiple appropriate sources and assess the credibility, accuracy, and possible bias of each publication and methods used, and describe how they are supported or not supported by evidence. **DCI: Natural Selection** In *artificial* selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring. **CCC: Cause and Effect** Phenomena may have more than one cause, and some cause and effect relationships in systems can be described only using probability.	Humans have the ability to influence the traits that organisms have through selective breeding.	Identify that traits are passed from parent to offspring from the organism's parent.	Identify the undesired and desired traits of an organism (e.g., size, taste, color).	Recognize selective breeding to be a process that allows the desirable traits to be chosen.	Given a small passage, determine how a desired trait was acquired.
MS-LS4-6 Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.	**SEP: Using Mathematics and Computational Thinking** Use mathematical representations to support scientific conclusions and design solutions. **DCI: Adaptation** Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes. **CCC: Cause and Effect** Phenomena may have more than one cause, and some cause and effect relationships in systems can be described only using probability.	Natural selection may lead to increases and decreases of specific traits in populations.	Identify the traits of an animal or plant.	Identify the differences in traits among members of the same animal or plant species (e.g., black, white, and gray mice).	Given a description of an environment, determine if a trait will increase or decrease in a specific population over time.	Given data, predict future population size based upon the survival of organisms with favorable traits (e.g., faster predators or camouflaged prey).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Earth Space Science ESS 1 Earth's Place in the Universe ❖ A. The Universe and Its Stars ❖ B. Earth and the Solar System ❖ C. The History of Planet Earth						
MS-ESS1-1 Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.	**SEP: Developing and Using Models** Develop and use a model to describe phenomena. **DCI: The Universe and Its Stars** Patterns of the apparent motion of the sun, the moon, and stars in the sky can be observed, described, predicted, and explained with models. **DCI: Earth and the Solar System** This model of the solar system can explain eclipses of the sun and the moon. Earth's spin axis is fixed in direction over the short term but tilted relative to its orbit around the sun. The seasons are a result of that tilt and are caused by the differential intensity of sunlight on different areas of Earth across the year. **CCC: Patterns** Patterns can be used to identify cause-and-effect relationships.	Models of the Earth-sun-moon system can describe patterns of day and night, seasons, and lunar phases.	Identify the sun, Earth, and moon in a model.	Identify day, night, and the four seasons using a model or diagram.	Use a model to identify Earth's seasons and relate them to Earth's tilt and revolution around the sun.	Use a model of the sun-moon system to explain day and night, seasons, and/or phases of the moon.
MS-ESS1-2 Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.	**SEP: Developing and Using Models** Develop and use a model to describe phenomena. **DCI: The Universe and Its Stars** Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe. **DCI: Earth and the Solar System** The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. The solar system appears to have formed from a disk of dust and gas, drawn together by gravity. **CCC: Systems and System Models** Models can be used to represent systems and their interactions.	The solar system consists of the sun, planets, and their moons. Gravity is the attractive force between objects in the system.	Identify gravity as the force that pulls objects together (e.g., dropped objects fall toward the ground).	Identify that the solar system consists of the sun, planets, and moons.	Describe the motions of all objects in the solar system that occur due to the gravitational force of the sun.	Describe that, in addition to the gravitational force of the sun, each individual planet also has gravitational force (e.g., the motions of moons around the planets and the role of gravity in these motions).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-ESS1-3 Analyze and interpret data to determine scale properties of objects in the solar system.	**SEP: Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences in findings. **DCI: Earth and the Solar System** The solar system consists of the sun and a collection of objects, including planets, their moons, and asteroids that are held in orbit around the sun by its gravitational pull on them. **CCC: Scale, Proportion, and Quantity** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	The solar system consists of the sun, planets, and their moons. The properties of these objects can be observed at various scales.	Recognize that Earth is part of the solar system.	Locate the sun, Earth, and Earth's moon in a diagram of the solar system.	Use data to order the planets based on their size or distance from the sun.	Compare and contrast the scale properties of objects in the solar system including scale drawings.
MS-ESS1-4 Construct a scientific explanation based on evidence from rock strata for how the geologic timescale is used to organize Earth's 4.6-billion-year-old history.	**SEP: Constructing Explanations and Designing Solutions** Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do in the future. **DCI: The History of Planet Earth** The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale. **CCC: Scale, Proportion, and Quantity** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	Rock layers and fossils provide a way to organize Earth's history.	Recognize rock layers and fossils.	Identify the youngest and oldest rock layers based upon their position in a column.	Identify the relative age of fossils based on their location in a column of rock layers.	Use data to estimate the age of a fossil in a rock layer.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	**SEP / DCI / CCC**		**Well Below**	**Approaches**	**Meets**	**Exceeds**
Earth Space Science ESS 2 Earth Systems ❖ A. Earth Materials and Systems ❖ B. Plate Tectonics and Large-Scale System Interactions ❖ C. The Roles of Water in Earth's Surface Processes ❖ D. Weather and Climate ❖ E. Biogeology						
MS-ESS2-1 Develop a model to describe the cycling of Earth's materials and the flow of energy that drives this process.	**SEP: Developing and Using Models** Develop and use a model to describe phenomena. **DCI: Earth's Materials and Systems** All Earth processes are the result of energy flowing and matter cycling within and among the planet's systems. This energy is derived from the sun and Earth's hot interior. The energy that flows and matter that cycles produce chemical and physical changes in Earth's materials and living organisms. **CCC: Stability and Change** Explanations of stability and change in natural or designed systems can be constructed by examining the changes over time and processes at different scales, including the atomic scale.	Earth materials cycle through processes such as the rock cycle and water cycle.	Identify Earth materials (e.g., water, rocks, minerals, soils).	Identify the rock cycle and different type of rocks (sedimentary, igneous, metamorphic). Identify stages in the water cycle.	Describe how heat from Earth's core powers the rock cycle. Describe how heat from the sun powers the water cycle.	Use models to describe the importance of the heat from Earth's core or the sun's energy to drive Earth processes.
MS-ESS2-2 Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying times and spatial scales.	**SEP: Constructing Explanations and Designing Solutions** Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe nature operate today as they did in the past and will continue to do in the future. **DCI: Earth's Materials and Systems** The planet's systems interact over scales that range from microscopic to global in size, and they operate over fractions of a second to billions of years. These interactions have shaped Earth's history and will determine its future. **DCI: The Roles of Water in Earth's Surface Processes** Water's movements—both on the land and underground—cause weathering and erosion, which change the land's surface features and create underground formations. **CCC: Scale, Proportion, and Quantity** Time, space, and energy phenomena can be observed at various scales using models to study systems that are too large or too small.	Fast and slow processes (geoscience processes) shape and reshape the surface of the Earth.	Identify that the Earth's surface features change over time.	Classify processes as slow or fast (e.g., erosion and weathering, landslides and earthquakes).	Recognize that surface processes such as erosion, movement, weathering, and the deposition of sediment can modify surface features, such as mountains, or create new features, such as canyons.	Given a scenario, describe which process (weathering, erosion, deposition) contributed to the change of Earth's surface.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-ESS2-3 Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of past plate motions.	**SEP: Analyzing and Interpreting Data** Analyze and interpret data to provide evidence for phenomena. **DCI: The History of the Planet Earth** Tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches. *(Secondary)* **DCI: Plate Tectonics and Large-Scale System Interactions** Maps of ancient land and water patterns, based on investigations of rocks and fossils, make clear how Earth's plates have moved great distances, collided, and spread apart. **CCC: Patterns** Patterns in rates of change and other numerical relationships can provide information about natural systems.	Maps of ancient land and water patterns, as well as investigations of rocks and fossils, show that the surface of the Earth consists of plates, which have moved, collided, and spread apart.	Identify that the Earth is divided into plates.	Identify plate movement.	Recognize how continent shapes fit together as evidence of plate motions.	Use fossil evidence to describe how continental and sea floor structures have changed over time.
MS-ESS2-4 Develop a model to describe the cycling of water though Earth's systems driven by energy from the sun and the force of gravity.	**SEP: Developing and Using Models** Develop a model to describe unobservable mechanisms. **DCI: The Roles of Water in Earth's Surface Processes** Water continually cycles among land, ocean, and atmosphere via transpiration, evaporation, condensation and crystallization, and precipitation, as well as downhill flows on land. Global movements of water and its changes in form are propelled by sunlight and gravity. **CCC: Energy and Matter** Within a natural or designed system, the transfer of energy drives the motion and/or cycling of matter.	Driven by the force of gravity and energy from the sun, water continually cycles through Earth's systems: among land, ocean, and atmosphere.	Identify bodies of water on the earth.	Identify the parts of the water cycle.	Use a model of the water cycle to explain the role of the sun in the water cycle.	Use a model of the water cycle to explain the cycling of water through the Earth's systems.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-ESS2-5 Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.	**SEP: Planning and Carrying Out Investigations** Collect data to produce data to serve as the basis for evidence to answer scientific questions or test design solutions under a range of conditions. **DCI: The Roles of Water in Earth's Surface Processes** The complex patterns of the changes and the movement of water in the atmosphere, determined by winds, landforms, and ocean temperatures and currents, are major determinants of local weather patterns. **DCI: Weather and Climate** Because these patterns are so complex, weather can be predicted only probabilistically. **CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	The movement of air masses causes changes in weather, including temperature, precipitation, and wind.	Identify a weather condition.	Use objects and pictures to identify local weather conditions and patterns.	Use observational data to identify and describe weather conditions to predict local weather patterns.	Describe how the movement of air masses causes changes in weather, including temperature, precipitation, and wind.
MS-ESS2-6 Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.	**SEP: Developing and Using Models** Develop and use a model to describe phenomena. **DCI: The Roles of Water in Earth's Surface Processes** Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. **DCI: Weather and Climate** Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude, and local and regional geography, all of which can affect oceanic and atmospheric flow patterns. The ocean exerts a major influence on weather and climate by absorbing energy from the sun, releasing it over time, and globally redistributing it through ocean currents. **CCC: Systems and System Models** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	Climates vary and are influenced by interactions involving sunlight, the ocean, the atmosphere, and landforms.	Identify a feature of a climate.	Match a climate to an area or region.	Describe how climate is determined in an area based on location, shape of land, and distance from water.	Use models to explain how climate is determined in an area (e.g., latitude, elevation, shape of land, distance from water, global wind patterns).

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Earth Space Science ESS 3 Earth and Human Activity A. Natural Resources B. Natural Hazards C. Human Impacts on Earth Systems D. Global Climate Change						
MS-ESS3-1 Construct a scientific explanation based on evidence for how the uneven distributions of Earth's minerals, energy, and groundwater resources are the result of past and current geoscience processes.	**SEP: Constructing Explanations and Designing Solutions** Construct a scientific explanation based on valid and reliable evidence obtained from sources (including the students' own experiments) and the assumption that theories and laws that describe the natural world operate today as they did in the past and will continue to do in the future. **DCI: Natural Resources** Humans depend on Earth's land, oceans, atmosphere, and biosphere for many different resources. Minerals, fresh water, and biosphere resources are limited, and many are not renewable or replaceable over human lifetimes. These resources are distributed unevenly around the planet as a result of past geologic processes. **CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	Humans depend on a variety of natural resources for survival. These come from various parts of the world, and many are not renewable.	Identify a natural resource.	Identify the locations of natural resources used in daily life (e.g., water, food, metals, fuel for vehicles).	Use data to explain why specific resources are limited.	Describe how the use of nonrenewable resources changes how much of the resources remain for future use.
MS-ESS3-2 Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.	**SEP: Analyzing and Interpreting Data** Analyze and interpret data to determine similarities and differences in findings. **DCI: Natural Hazards** Mapping the history of natural hazards in a region, combined with an understanding of related geologic forces, can help forecast the locations and likelihoods of future events. **CCC: Patterns** Graphs, charts, and images can be used to identify patterns in data.	Natural hazards include volcanic eruptions, earthquakes, tsunamis, severe weather, hurricanes, tornados, landslides, floods, and forest fires. Data from these events can be used to prevent the effects of future events.	Identify examples of a natural hazard.	Identify locally relevant natural hazards.	Classify natural hazards as predictable or not yet predictable.	Associate a technology/ safety measure with a given natural hazard to mitigate the effect.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-ESS3-3 Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.	**SEP: Constructing Explanations and Designing Solutions** Apply scientific principles to design an object, tool, process, or system. **DCI: Earth and Human Activity; Human Impacts on Earth Systems** Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. Typically, as human populations and consumption of natural resources increase, so do the negative impacts on Earth, unless the activities and technologies involved are engineered otherwise. **CCC: Cause and Effect** Relationships can be classified as causal or correlational, and correlation does not necessarily imply causation.	Human activities can alter the environment in positive and negative ways.	Identify the needs of organisms in a specific environment.	Identify human actions that can alter the environment.	Match human activities with their effect on the Earth.	Given a scenario, determine a way to solve an environmental problem caused by human activity.
MS-ESS3-4 Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.	**SEP: Engaging in Argument from Evidence** Construct an oral and written argument supported by empirical evidence and scientific reasoning to support or refute an explanation or a model for a phenomenon or a solution to a problem. **DCI: Human Impacts on Earth Systems** Typically, as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth, unless the activities and technologies involved are engineered otherwise. **CCC: Cause and Effect** Cause and effect relationships may be used to predict phenomena in natural or designed systems.	Human populations and the resources they use impact Earth systems.	Recognize resources that humans need to survive.	Describe ways in which human activity uses natural resources.	Use evidence to link an environmental change to human population increase.	Predict the effect of human population increase on an environment.

HSA Alternate Science – NGSS Middle School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
MS-ESS3-5 Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.	**SEP: Asking Questions and Defining Problems** Ask questions to identify and clarify evidence of an argument. **DCI: Global Climate Change** Human activities, such as the release of greenhouse gases from burning fossil fuels, are major factors in the current rise in Earth's mean surface temperature (global warming). Reducing the level of climate change and reducing human vulnerability to whatever climate changes do occur depend on the understanding of climate science, engineering capabilities, and other kinds of knowledge, such as understanding of human behavior, and on applying that knowledge wisely in decisions and activities. **DCI: Stability and Change** Stability might be disturbed either by sudden events or gradual changes that accumulate over time.	Human activities are major factors that have led to a rise in global temperatures over the past century.	Identify human activities that have an impact on the environment.	Match human activities to possible factors causing gradual temperature changes.	Identify a question that could be answered using data that depicts rising temperatures over the last 100 years.	Identify ways in which rising temperatures could have an impact on the environment.

HIGH SCHOOL (Aligned with the Biology End-of-Course Exam and Administered in Grade 11)

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Life Science: LS 1 From Molecules to Organisms: Structures and Processes ❖ A. Structure and Function ❖ B. Growth and Development of Organisms ❖ C. Organization for Matter and Energy Flow in Organisms ❖ D. Information Processing						
HS-LS1-1 Construct an explanation based on evidence for how the structure of DNA determines the structure of proteins, which carry out the essential functions of life through systems of specialized cells.	**SEP: Constructing Explanations and Designing Solutions** Construct an explanation based on valid and reliable evidence. **DCI: Structure and Function** Systems of specialized cells within organisms help them perform essential functions. All cells contain genetic information in the form of DNA molecules. **CCC: Structure and Function** Investigating or designing new systems or structures requires a detailed examination of the properties of different materials, the structures of different components, and connections of components to reveal its function and/or solve a problem.	Living things are made up of a variety of types of cells that have different functions. In some organisms, the function of a cell is determined by its DNA, which is found in the cell's nucleus.	Identify that living things are made up of cells.	Identify the nucleus as the control center of a cell for determining the function of a cell. Recognize that DNA is found in the nucleus of the cell.	Identify that the DNA in a cell's nucleus is the genetic code that creates proteins that determine a cell's function.	Identify that body tissues are systems of specialized cells with similar functions (e.g., skin cells, muscle cells, brain cells) that use specific DNA structures.
HS-LS1-2 (W) Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms.	**SEP: Developing and Using Models** Use a model to illustrate the relationships between systems or between components of a system. **DCI: Structure and Function** Multicellular organisms have a hierarchical structural organization in which any one system is made up of numerous parts and is itself a component of the next level. **CCC: Systems and System Models** Models (e.g., physical, computer) can be used to simulate systems.	Living organisms have systems that work together to maintain life. These systems, and the organs that make them up, carry out specific functions.	Identify a body system.	Identify major organ(s) in a body system and its function.	Identify the function of a body system, its major organ(s), and another system with which it interacts to maintain life.	Explain how two body systems work together to maintain life.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS1-3 (W) Plan and conduct investigations to provide evidence that feedback mechanisms maintain homeostasis.	**SEP: Planning and Carrying Out Investigations** Plan and conduct an investigation individually and collaboratively to produce data to serve as the basis for evidence, and in the design: decide on types, how much, and accuracy of data needed to produce reliable measurements and consider limitations on the precision of the data (e.g., number of trials, cost, risk, time), and refine the design accordingly. **DCI: Structure and Function** Feedback mechanisms maintain a living system's internal conditions within certain limits, allowing it to remain alive and functional. **CCC: Stability and Change** Feedback (negative or positive) can stabilize or destabilize a system.	Organisms respond to stimuli to maintain homeostasis.	Identify stimuli that lead to reactions in a living system (e.g., temperature, amount of light present, sounds, smells).	Identify ways the body reacts to stimuli to maintain homeostasis (e.g., sweating when hot, increasing heart rate and breathing during exercise, pupils reacting to light).	Produce and use data (graphical or in a table) to identify changes in body systems during exercise or other activities. (Graphs should show the body's response and a return to homeostasis.)	Identify the correct sequence of steps necessary in an investigation to show how an organism reacts to stimuli (e.g., eye reacting to light, heart or lungs reacting to exercise).
HS-LS1-4 Use a model to illustrate the role of cellular division (mitosis) and differentiation in producing and maintaining complex organisms.	**SEP: Developing and Using Models** Use a model to illustrate the relationships between systems or between components of a system. **DCI: Growth and Development of Organisms** In organisms, individual cells grow and then divide via a process called mitosis, thus allowing the organism to grow. The organism begins as a single cell (fertilized egg) that divides successively to produce many cells. Cellular division and differentiation produce and maintain a complex organism. **CCC: Systems and System Models** Models (e.g., physical, computer models) can be used to simulate systems.	Cell division and differentiation, which occurs through a process called mitosis, enables growth and the replacement of dead or damaged cells.	Identify that cells divide.	Identify a model of the cellular division process.	Use a model to illustrate how cellular division contributes to the growth and development of the organism.	Explain how cellular division contributes to the growth and development of the organism.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS1-5 (W) Use a model to illustrate how photosynthesis transforms light energy into stored chemical energy.	**SEP: Developing and Using Models** The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide and water into sugars plus released oxygen. **DCI: Organization for Matter and Energy Flow in Organisms** The process of photosynthesis converts light energy to stored chemical energy by converting carbon dioxide and water into sugars plus released oxygen. **CCC: Energy and Matter** Changes of energy and matter in a system can be described in terms of energy and matter flowing into, out of, and within that system.	Plants produce their food through a process called photosynthesis. Photosynthesis uses light energy to convert carbon dioxide and water into sugars and releases oxygen.	Identify that plants make their own food with energy from the sun.	Recognize the purpose of photosynthesis.	Identify what a plant uses (e.g., sunlight, water) and what a plant produces (e.g., food, oxygen) during photosynthesis (e.g. fill in the missing part of the model).	Use a model (using words, pictures, etc.) to explain the overall process of photosynthesis.
HS-LS1-6 Construct and revise an explanation based on evidence for how carbon, hydrogen, and oxygen from sugar molecules may combine with other elements to form amino acids and/or other large carbon-based molecules.	**SEP: Constructing Explanations and Designing Solutions** Construct an explanation based on valid and reliable evidence. **DCI: Organization for Matter and Energy Flow in Organisms** Sugar molecules contain carbon, hydrogen, and oxygen: their hydrocarbon backbones are used to make amino acids and other carbon-based molecules that can be assembled into larger molecules (such as proteins or DNA), used, for example, to form new cells. As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. **CCC: Energy and Matter** Changes of energy and matter in a system can be described in terms of energy and matter flows into, out of, and within that system.	Sugar molecules contain carbon, hydrogen, and oxygen. Explain how they are used to make amino acids and other carbon-based molecules.	Recognize that plants and animals rely on sugar molecules to create other molecules necessary for survival.	Identify sugars as molecules containing carbon, hydrogen, and oxygen.	Confirm or revise a description of the process of creating other molecules from sugar molecules.	Explain how the elements that make up sugar molecules can be used to form other molecules (e.g. amino acids, DNA, proteins).

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS1-7 Use a model to illustrate that cellular respiration is a chemical process that results in the bonds of food molecules and oxygen molecules being broken and the bonds in new compounds being formed, resulting in a net transfer of energy.	**SEP: Developing and Using Models** Use a model based on evidence to illustrate the relationships between systems or between components of a system. **DCI: Organization for Matter and Energy Flow in Organisms** As matter and energy flow through different organizational levels of living systems, chemical elements are recombined in different ways to form different products. Because of these chemical reactions, energy is transferred from one system of interacting molecules to another. Cellular respiration is a chemical process in which the bonds of food molecules and oxygen molecules are broken, and new compounds are formed that can transport energy to muscles. Cellular respiration also releases the energy needed to maintain body temperature despite ongoing energy. **CCC: Energy and Matter** Energy cannot be created or destroyed; it only moves between one place and another place, between objects and/or fields, or between systems.	Cellular respiration involves the transfer of energy from consumed food to the organism.	Identify the reasons why organisms need food and air. (N.B.: exclude plants here, photosynthesis is addressed in HS LS1-5)	Identify the molecules that are involved in cellular respiration.	Use a model of cellular respiration to illustrate the input and output of the process.	Given a scenario, describe how food and oxygen molecules are used in the process of cellular respiration.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Life Science: LS 2 Ecosystems: Interactions, Energy, and Dynamics ❖ A. Interdependent Relationships in Ecosystems ❖ B. Cycles of Matter and Energy Transfer in Ecosystems ❖ C. Ecosystem Dynamics, Functioning, and Resilience ❖ D. Social Interactions and Group Behavior						
HS-LS2-1 Use mathematical and/or computational representations to support explanations of factors that affect carrying capacity of ecosystems at different scales.	**SEP: Using Mathematics and Computational Thinking** Use mathematical and/or computational representations of phenomena or design solutions to support explanations. **DCI: Interdependent Relationships in Ecosystems** Ecosystems have carrying capacities, which limit the numbers of organisms and populations they can support. These limits result from such factors as the availability of living and nonliving resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance (number of individuals) of species in any given ecosystem. **CCC: Scale, Proportion and Quantity; Stability and Change** The significance of a phenomenon is dependent on the scale, proportion, and quantity at which it occurs.	Ecosystems have carrying capacities that are determined by factors that limit the numbers of organisms and populations they can support. Dynamic equilibrium exists in organisms, populations, and ecosystems.	Identify the organisms that interact in a specific ecosystem.	Identify the factor(s) that could affect the equilibrium in an ecosystem (e.g., population increases or decreases, immigration/ emigration, invasive species).	Use data to determine if the food supply present in an ecosystem can sustain a specified increase in the populations eating that particular food.	Use data (including graphical representations) to describe a change in the population of an organism or a change in the resources found in a specific ecosystem.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS2-2 (W) Use mathematical representations to support and revise explanations based on evidence about factors affecting biodiversity and populations in ecosystems of different scales.	**SEP: Using Mathematics and Computational Thinking** Use mathematical representations of phenomena or design solutions to support and revise explanations. **DCI: Interdependent Relationships in Ecosystems** Ecosystems have carrying capacities, limit the numbers of organisms and populations they can support. These limits result from such factors as the availability of resources and from such challenges such as predation, competition, and disease. Organisms would have the capacity to produce populations of great size were it not for the fact that environments and resources are finite. This fundamental tension affects the abundance of species in any given ecosystem. Interactions within an ecosystem can keep its numbers and types of organisms relatively constant under stable conditions. If a modest disturbance to an ecosystem occurs, it may return more or less to its original status. Extreme fluctuations in conditions can challenge the functioning of ecosystems. **DCI: Ecosystem Dynamics, Functioning, and Resilience** A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. **CCC: Scale, Proportion and Quantity** Using the concept of orders of magnitude allows one to understand how a model at one scale relates to a model at another scale.	Dynamic equilibrium exists in organisms, populations, and ecosystems. Interactions within a stable ecosystem keeps the numbers and types of organisms relatively constant. *(cont. next page)* If a modest disturbance to an ecosystem occurs, it normally returns to its original status. Extreme changes can challenge the functioning of an ecosystem.	Identify the needs of a common plant or animal.	Recognize the interdependence of two or more organisms in an ecosystem.	Use data to explain the patterns and/or trends between population size and the availability of resources.	Use a graphical representation to describe change(s) over time in the population size of an organism as another environmental factor changes.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS2-3 Construct and revise an explanation based on evidence for the cycling of matter and flow of energy in aerobic and anaerobic conditions.	**SEP: Constructing Explanations and Designing Solutions** Construct an explanation based on valid and reliable evidence. **DCI: Cycles of Matter and Energy Transfer in Ecosystems** Photosynthesis and cellular respiration (including anaerobic processes) provide most of the energy for life processes **CCC: Energy and Matter** Energy drives the cycling of matter within and between systems	DCI and CCC are covered through HS-LS2.4, where SEP is more appropriate. Aerobic and anaerobic are unnecessary complications for this group of students.				
HS-LS2-4 Use mathematical representations to support claims for the cycling of matter and flow of energy among organisms in an ecosystem.	**SEP: Using Mathematics and Computational Thinking** Use mathematical representations of phenomena or design solutions to support claims. **DCI: Cycles of Matter and Energy Transfer in Ecosystems** Plants are in the lowest level of the food web. At each link upward in a food web, only a small fraction of the matter consumed at the lower level is transferred upward. Therefore, there are generally fewer organisms at higher levels of a food web. The matter (chemical elements) passes through food webs and into and out of the atmosphere and soil. At each link in an ecosystem, matter and energy are conserved. **CCC: Energy and Matter** Energy cannot be created or destroyed; it only moves between one place and another place.	Matter and energy flow through a food web (ecosystem) with only a small fraction transferred from one level to another.	Identify that matter and energy flow through a food chain.	Identify the types of matter and energy that flow through a food web.	Diagram the movement of matter and energy through a food web (ecosystem).	Given an example of a food web, explain why there are more producers than consumers in an ecosystem.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS2-5 Develop a model to illustrate the role of photosynthesis and cellular respiration in the cycling of carbon among the biosphere, atmosphere, hydrosphere, and geosphere	**SEP: Developing and Using Models** Develop a model based on evidence to illustrate the relationships between systems or components of a system. **DCI: Cycles of Matter and Energy Transfer in Ecosystems; Energy in Chemical Processes** Photosynthesis and cellular respiration are important components of the carbon cycle. The main way that solar energy is captured and stored on Earth is through the process of photosynthesis. **CCC: Systems and System Models** Models (e.g., physical, mathematical, computer) can be used to simulate systems and interactions—including energy, matter and information flows—within and between systems.	Photosynthesis and cellular respiration result in the movement of matter and energy.	Identify what a plant needs to make its own food.	Recognize the purpose/importance of photosynthesis and respiration to plants.	Identify that the outputs of photosynthesis are the inputs of respiration, and the outputs of respiration are the inputs of photosynthesis.	Describe the link between photosynthesis and cellular respiration in the carbon cycle.
HS-LS2-6 (W) Evaluate claims evidence and reasoning that the complex interactions in ecosystems maintain relatively consistent numbers and types of organisms in stable conditions; but changing conditions may result in a new ecosystem.	**SEP: Engaging in Argument from Evidence** Evaluate the claims, evidence, and reasoning behind currently accepted explanations or solutions to determine the merits of arguments. **DCI: Ecosystem Dynamics, Functioning, and Resilience** A complex set of interactions within an ecosystem can keep its numbers and types of organisms relatively constant over long periods of time under stable conditions. If a modest biological or physical disturbance to an ecosystem occurs, it may return to its more or less original status (i.e., the ecosystem is resilient), as opposed to becoming a very different ecosystem. Extreme fluctuations in conditions or the size of any population, however, can challenge the functioning of ecosystems in terms of resources and habitat availability. **CCC: Stability and Change** Science deals with constructing explanations of how things change and how they remain stable.	Changes in the environment including physical or biological factors can lead to temporary or permanent changes to an ecosystem.	Identify a nonliving factor in an ecosystem.	Identify how a nonliving factor affects and changes a population (e.g., sunlight, water, soil).	Identify and/or classify natural and human-initiated changes in the physical environment that could affect a population.	Describe how a change can affect the physical and biological environment, and in turn, affect the populations in an ecosystem.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS2-7 Ⓦ Design, evaluate, and refine a solution for reducing the impact of human activities on the environment and biodiversity.	**SEP: Constructing Explanations and Designing Solutions** Design and refine a solution to a real-world problem based on scientific knowledge, student-generated sources of evidence, and tradeoff considerations. **DCI: Ecosystem Dynamics Functioning and Resilience; Biodiversity and Humans; Developing Possible Solutions** Changes induced by human activity in the environment—including habitat destruction, pollution, introduction of invasive species, overexploitation, and climate change—can disrupt an ecosystem and threaten the survival of some species. Humans depend on the living world for the resources and other benefits provided by biodiversity. **CCC: Stability and Change** Much of science deals with constructing explanations of how things change and how they remain stable.	Human activity can change the environment. Some changes are harmful, but humankind can also take steps to preserve and restore the environment.	Identify human activities that can be harmful to the Earth.	Identify human activities that can be harmful to the Earth and match the human activity with its effect on the Earth.	Identify human activities that can have a negative effect on the Earth and then identify a solution that reduces its impact on the environment.	Describe a solution to reduce the impact of human activities on the environment.
HS-LS2-8 Ⓦ Evaluate evidence for the role of group behavior on individuals' and species' chances to survive and reproduce.	**SEP: Engaging in Argument from Evidence** Evaluate the evidence behind currently accepted explanations to determine the merits of arguments. **DCI: Social Interactions and Group Behavior** Group behavior has evolved because membership can increase the chances of survival for individuals and their genetic relatives. **CCC: Cause and Effect** Evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.	Group behavior has evolved because it can increase the chances of survival.	Identify potential threats to a population of animals.	Identify a group behavior that helps an animal species survive.	Given a group behavior, describe how that behavior helps individuals and species to survive and reproduce.	Use data (pictorial, graphical, or tabular) to illustrate the positive impact of group behavior on an animal's species.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Life Science: LS 3 Heredity, Inheritance and Variation of Traits ❖ A. Inheritance of Traits ❖ B. Variation of Traits						
HS-LS3-1 (W) Ask questions to clarify relationships about the role of DNA and chromosomes in coding the instructions for characteristic traits passed from parents to offspring.	**SEP: Asking Questions and Defining Problems** Ask questions that arise from examining models or a theory to clarify relationships. **DCI: Structure and Function; Inheritance of Trait** All cells contain genetic information in the form of DNA molecules. The instructions for forming species' characteristics are carried in DNA. **CCC: Cause and Effect** Evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.	DNA contains genetic information that is passed from parent (cell or organism) to offspring. The instructions for forming species' traits (characteristics) are carried in DNA.	Identify the traits (characteristics) of an organism.	Identify chromosomes, which are made up of DNA, as a set of instructions (code) that determine traits (characteristics).	Describe how traits (characteristics) are passed from one generation to the next through DNA.	Describe how changes in DNA can result in changed traits in the offspring.
HS-LS3-2 (W) Make and defend a claim based on evidence that inheritable genetic variations may result from (1) new genetic combinations through meiosis, (2) viable errors occurring during replication, and/or (3) mutations caused by environmental factors.	**SEP: Engaging in Argument from Evidence** Make and defend a claim based on evidence about the natural world that reflects scientific knowledge and student-generated evidence. **DCI: Variation of Traits** In sexual reproduction, chromosomes can sometimes swap sections during the process of meiosis (cell division), thereby creating new genetic combinations and, thus, more genetic variation. Environmental factors also affect expression of traits, and hence affect the probability of occurrences of traits in a population. **CCC: Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.	Sexual reproduction involves chromosomes from two individuals of the same species and the process of meiosis, which leads to new combinations and variation of traits. Genetic variations may also result from replication errors or mutations.	Identify that traits are determined by genetic information that is kept in the chromosome.	Identify a reason why two siblings can have different characteristics even though they have the same parents.	Identify the causes of genetic variation.	Given a scenario, explain why reproduction may or may not result in offspring with different traits.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS3-3 Apply concepts of statistics and probability to explain the variation and distribution of expressed traits in a population.	**SEP: Analyzing and Interpreting Data; Engaging in Argument from Evidence** Apply concepts of statistics and probability to scientific and engineering questions and problems, using digital tools when feasible. **DCI: Variation of Traits** Environmental factors also affect expression of traits and, hence, affect the probability of occurrences of traits in a population. Thus, the variation and distribution of traits observed depends on both genetic and environmental factors. **CCC: Scale, Proportion, and Quantity** Algebraic thinking is used to examine scientific data and predict the effect of a change in one variable on another (e.g., linear growth vs. exponential growth).	Covered through HS-LS3-2, where the SEP is more appropriate.				
Life Science: LS 4 Biological Evolution: Unity and Diversity ❖ A. Evidence of Common Ancestry ❖ B. Natural Selection ❖ C. Adaptation ❖ D. Biodiversity and Humans						
HS-LS4-1 (W) Communicate scientific information that common ancestry and biological evolution are supported by multiple lines of empirical evidence.	**SEP: Obtaining, Evaluating, and Communicating Information** Communicate scientific information (e.g., about phenomena and/or the process of development and the design and performance of a proposed process or system) in multiple formats (including orally, graphically, textually, and mathematically). **DCI: Evidence of Common Ancestry and Diversity** Genetic information, like the fossil record, provides evidence of evolution. DNA sequences vary among species. Lines of descent can be inferred by comparing the DNA sequences of different organisms. **CCC: Patterns** Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.	Multiple sources of evidence indicate that many organisms found on Earth are related and can be traced back to common ancestors that lived very long ago.	Identify two present-day species of organisms that have similar anatomical structures (e.g., pigeons and myna birds, cows and horses).	Identify a fossil organism and a present-day organism that have the similar anatomical structures.	Identify multiple ways to determine the ancestry of an organism (e.g., fossils, DNA sequence).	Using descriptions and pictures, determine the evolved development pattern from a fossil to a present-day organism

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS4-2 Construct an explanation based on 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.	**SEP: Constructing Explanations and Designing Solutions** Construct an explanation based on valid and reliable evidence. **DCI: Natural Selection; Adaptation** Natural selection occurs only if (1) there is both variation in the genetic information between organisms in a population and (2) there is trait variation that leads to differences in performance among individuals. Evolution is a consequence of the interaction of four factors: (1) the potential for a species to increase in number, (2) the genetic variation of individuals in a species, (3) competition for an environment's limited supply of the resources, and (4) the ensuing proliferation of those organisms that are better able to survive and reproduce in that environment. **CCC: Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.	Evolution explains the change due to natural selection across successive generations in a biological population.	Identify evolution as a process that results in species developing beneficial characteristics.	Recognize that evolution results in species developing new characteristics that increase the chances of survival.	Determine which factor (e.g., an inherited genetic variation, limited resources, organisms that were more fit to survive in an environment) resulted in a specific adaptation within a species.	Given a scenario (e.g., limited resources), describe an adaptation that a specific species may develop and pass on to future generations.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS4-3 (W) Apply concepts of statistics and probability to support explanations that organisms with an advantageous heritable trait tend to increase in proportion to organisms lacking this trait.	**SEP: Analyzing and Interpreting Data** Apply concepts of statistics and probability (including determining function fits to data, slope, intercept, and correlation coefficient for linear fits) to scientific and engineering questions and problems, using digital tools when feasible. **DCI: Natural Selection; Adaptation** The traits that positively affect survival are more likely to be reproduced and, thus, are more common in the population. Natural selection leads to a population dominated by organisms that are anatomically, behaviorally, and physiologically well suited to survive in a specific environment. Adaptation also means that the distribution of traits in a population can change when conditions change. **CCC: Patterns** Different patterns may be observed at each of the scales at which a system is studied and can provide evidence for causality in explanations of phenomena.	Organisms with traits that increase an organism's chances of survival are more likely to be reproduced and, thus, become more common in the population.	Identify that some organisms survive better in certain environments.	Identify an advantageous inheritable trait.	Given a scenario of similar organisms with different traits, explain why an organism will likely survive based on the given environment (e.g., birds with different-shaped beaks trying to eat insects).	Use data (pictorial, graphical, or tabular) to explain why there is an increase of individual organisms exhibiting an advantageous trait over time.
HS-LS4-4 (W) Construct an explanation based on evidence for how natural selection leads to adaptation of populations.	**SEP: Constructing Explanations and Designing Solutions** Construct an explanation based on valid and reliable evidence. **DCI: Adaptation** Natural selection leads to adaptation in a population of organisms, well suited to survive in a specific environment. That is, the differential survival and reproduction of organisms in a population that have an advantageous heritable trait leads to an increase in the proportion of individuals in future generations that have the trait and to a decrease in the proportion of individuals that do not. **CCC: Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.	Natural selection is a process whereby beneficial traits result in a higher survival rate and more offspring leading to adaptations in a population.	Identify a trait.	Identify a trait that would give an organism a better chance of survival in a specific environment.	Explain why organisms with beneficial traits are more likely to survive and reproduce.	Describe how over time, populations become better adapted in a specific environment.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
HS-LS4-5 (W) Evaluate the evidence supporting claims that changes in environmental conditions may result in (1) increases in the number of individuals of some species, (2) the emergence of new species over time, and (3) the extinction of other species.	**SEP: Engaging in Argument from Evidence** Evaluate the evidence behind currently accepted explanations or solutions to determine the merits of arguments. **DCI: Adaptation** Changes in the physical environment have contributed to the expansion of some species, the emergence of new distinct species as populations diverge under different conditions, and the decline—and sometimes the extinction—of some species. Species become extinct because they can no longer survive and reproduce in their altered environment. **CCC: Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.	Changes in an ecosystem determines the survival of some organisms over others, and could result in the emergence of new species.	Identify the survival needs of the organisms present in a specific environment.	Identify a gradual change in a specific environment (e.g., deforestation, fishing, fertilizer application, drought, or flood).	Identify a gradual change in the environment that may result in changes in the population of organisms or the emergence of a new species.	Predict what will happen to specific species over time based on an environmental change.
HS-LS4-6 (W) Create or revise a simulation to test a solution to mitigate adverse impacts of human activity on biodiversity.	**SEP: Using Mathematics and Computational Thinking** Create or revise a simulation of a phenomenon, designed device, process, or system. **DCI: Adaptation; Biodiversity and Humans** Changes in the physical environment have contributed to the expansion of some species, the emergence of new species as populations diverge, and the decline and sometimes the extinction of some species. **DCI: Biodiversity and Humans** Humans depend on the living world for the resources and other benefits provided by biodiversity. But human activity is also having adverse impacts on biodiversity through overpopulation, overexploitation, habitat destruction, pollution, introduction of invasive species, and climate change. **CCC: Cause and Effect** Empirical evidence is required to differentiate between cause and correlation and make claims about specific causes and effects.	Humans propose solutions to correct changes in the physical environment. Some of these solutions work and some do not work. Some of the solutions may favor some species but harm others, sometimes leading to extinction.	Identify a human activity that negatively impacts another species.	Identify other species that have been significantly impacted by human activity (i.e., endangered or extinct species).	Use data (pictorial, graphical, or tabular) to determine the effectiveness of a strategy to protect a species.	Use data (pictorial, graphical, or tabular) to determine alternative ways for humans to continue an activity without negatively affecting another species.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Earth Space Science ESS 2 Earth Systems ❖ A. Earth Materials and Systems ❖ B. Plate Tectonics and Large-Scale System Interactions ❖ C. The Roles of Water in Earth's Surface Processes ❖ D. Weather and Climate ❖ E. Biogeology						
HS-ESS2-6 Ⓦ Develop a quantitative model to describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	**SEP: Developing and Using Models** Develop a model based on evidence to illustrate the relationships between systems or between components of a system. **DCI: Weather and Climate** Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. Changes in the atmosphere due to human activity have increased carbon dioxide concentrations and thus affect climate. **CCC: Energy and Matter** The total amount of energy and matter in closed systems is conserved.	Describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	Identify a cycle as a series of events that are regularly repeated in the same order.	Identify a cycle that involves carbon.	Describe the cycling of carbon using a model.	Use data to describe changes in the amount of carbon in the atmosphere due to human activities.
HS-ESS2-7 Ⓦ Construct an argument based on evidence about the simultaneous coevolution of Earth's systems and life on Earth.	**SEP: Engaging in Argument from Evidence** Construct an oral and written argument or counter-arguments based on data and evidence. **DCI: Weather and Climate** Gradual atmospheric changes were due to plants and other organisms that captured carbon dioxide and released oxygen. **DCI: Biogeology** The many dynamic and delicate feedbacks between the biosphere and other Earth systems cause a continual coevolution of Earth's surface and the life that exists on it. **CCC: Stability and Change** Much of science deals with constructing explanations of how things change and how they remain stable.	The biosphere and other Earth systems are linked. Changes in one system lead to changes in others and some changes result in the evolution of new life forms.	Identify that gradual and rapid changes to the Earth and organisms occurred over time.	Recognize that gradual and rapid changes on land or in the water can lead to changes among living things.	Identify examples of how living things change the characteristics of the environment in their specific region.	Identify examples of how living things change the characteristics of the environment in their specific region and the results of those changes.

HSA Alternate Science – NGSS High School

Next Generation Science Standards		Essence Statements	Performance-Level Descriptors			
PE	SEP / DCI / CCC		Well Below	Approaches	Meets	Exceeds
Earth Space Science ESS 3 Earth and Human Activity A. Natural Resources B. Natural Hazards C. Human Impacts on Earth Systems D. Global Climate Change						
HS-ESS3-3 (W) Create a computational simulation to illustrate the relationships among management of natural resources, the sustainability of human populations, and biodiversity.	**SEP: Using Mathematics and Computational Thinking** Create a computational model or simulation of a phenomenon, designed device, process, or system. **DCI: Human Impacts on Earth Systems** The sustainability of human societies and the biodiversity that supports them requires responsible management of natural resources. **CCC: Stability and Change** Change and rates of change can be quantified and modeled over very short or very long periods of time. Some system changes are irreversible.	The sustainability of human societies and living resources we use and need requires responsible management of natural resources.	Identify a natural resource.	Identify ways in which humans use living and natural resources.	Identify steps that can be taken to sustain human populations and living resources.	Use data to illustrate how the management of natural resources promotes the sustainability of human populations and biodiversity.

WORKFORCE INNOVATION AND OPPORTUNITY ACT APPENDIX

The Workforce Innovation and Opportunity Act and the HSA-Alt Range Performance Level Descriptors

Selected HSA-Alt Range Performance Level Descriptors include a new (w) symbol, which denotes standards that may be associated with the workplace, and, therefore, address needs identified in the Workforce Innovation and Opportunity Act (WIOA). The Workforce Innovation and Opportunity Act (WIOA) "seeks to increase the employment, career advancement, and economic self-sufficiency of people with disabilities through collaborative federal, state, and local partnerships" (Thurlow, Nye-Lengerman, and Lazarus, 2019).

Hawaii Department of Education Test Development Specialists and nine community stakeholders convened as a workgroup on April 16, 2019 and May 7, 2019 to discuss content standards that could be associated with employment. Stakeholders included special education advocates, state and local support agency staff, higher education/community leaders with expertise in disability study, adult education, and/or transition services, and organizations that employ and/or support people with disabilities. Stakeholders examined the English Language Arts (ELA), Math, and Science general education standards and the essence statements that distill these standards into achievable performance targets for students who take Hawaii's alternate assessment, the Hawaii State Assessment-Alternate (HSA-Alt). The HSA-Alt Range Performance Level Descriptors served as the single document for committee review. This document contains the general education reference standards, Common Core for ELA and Math and the Next Generation Science Standards for Science, the essence statement for each general education standard, and the four tiers of associated performance that students who take the HSA-Alt would exhibit at each level of achievement: Well-Below, Approaches, Meets, and Exceeds. While it is important to note that all Common Core standards for ELA and Math and NGSS standards for Science have college and career readiness in mind, the workgroup believed that only a subset of these standards would be considered acutely applicable to employment for students with significant cognitive disabilities. For each identified work related standard in this subset, the workgroup developed parallel task exemplars of how the target skill or concept for the applicable standard might be demonstrated in the workplace.

The following document is intended to help guide the development of future items for Hawaii's alternate assessment; it may also prove to be a useful guide to Hawaii's teachers as they plan and design instruction for their students with significant cognitive disabilities.

Science Work-Related NGSS

Range Performance Level Descriptors

Standard	Essence Statement	Meets Range Performance Level Descriptor	Related Workforce Skills/ Civic Responsibility/ Well-being
HS-LS1-2	Living organisms have systems that work together to maintain life. These systems, and the organs that make them up, carry out specific functions.	Identify the function of a body system, its major organ(s), and another system with which it interacts to maintain life.	Understand the relationship between body organs and body organ systems to maintain health.
HS-LS1-3	Organisms respond to stimuli to maintain homeostasis.	Produce and use data (graphical or in a table) to identify changes in body systems during exercise or other activities. (Graphs should show the body's response and a return to homeostasis.)	Understand some basic mechanisms to maintain body homeostasis; for example, sweating to cool the body, heart rate increasing during exercise to match increased muscular output, increased demand for glucose, oxygen, and by-product waste removal. Some workforce examples would be recognizing that environmental stressors can raise heart rate and being able to identify a stimulus that increases heart rate and taking measures to reduce stress by avoiding stimuli or by using coping mechanisms when stimuli arises. Understanding homeostasis might also assist an employee in understanding the impact that room temperature could have on an individual's comfort and knowing what to do when customer has an issue with the temperature of the environment.
HS-LS1-5	Plants produce their food through a process called photosynthesis. Photosynthesis uses light energy to convert carbon dioxide and water into sugars and releases oxygen.	Identify what a plant uses (e.g., sunlight, water) and what a plant produces (e.g., food, oxygen) during photosynthesis (e.g. fill in the missing part of the model).	Understand that plant growth is tied to light energy is essential when working with plants in an agricultural employment setting.
HS-LS2-2	Dynamic equilibrium exists in organisms, populations, and ecosystems. Interactions within a stable ecosystem keeps the numbers and types of organisms relatively constant. If a modest disturbance to an ecosystem occurs, it normally returns to its original status. Extreme changes can challenge the functioning of an ecosystem.	Use data to explain the patterns and/or trends between population size and the availability of resources.	Understand the balance between the number of animals that an area of land can support and the negative effects of overgrazing on the environment. Relate population growth to the availability of food and resources, including space.

Standard	Essence Statement	Meets Range Performance Level Descriptor	Related Workforce Skills/ Civic Responsibility/ Well-being
HS-LS2-6	Changes in the environment including physical or biological factors can lead to temporary or permanent changes to an ecosystem.	Identify and/or classify natural and human-initiated changes in the physical environment that could affect a population.	Understand the difference between human-initiated and natural changes in the physical environment. For example, humans could start a fire in a dry environment by carelessly disposing of a cigarette butt on the ground, yet fires can also have natural causes such as lightning strikes or volcanic eruptions with lava flows.
HS-LS2-7	Human activity can change the environment. Some changes are harmful, but humankind can also take steps to preserve and restore the environment.	Identify human activities that can have a negative effect on the Earth and then identify a solution that reduces its impact on the environment.	Understand the negative and positive impacts of individual and group activities on the environment. Examples of negative and positive activities include: polluting vs. cleaning up or litter collection; clearing forests vs. planting trees; use of packaging material, paper products, and plastics vs. recycling and reuse; hunting and fishing vs. species propagation and controlled harvests; chemical pest control vs. natural pest control; etc.
HS-LS2-8	Group behavior has evolved because it can increase the chances of survival.	Given a group behavior, describe how that behavior helps individuals and species to survive and reproduce.	Understand that fish swim in schools in order to increase their chance of survival.
HS-LS3-1	DNA contains genetic information that is passed from parent (cell or organism) to offspring. The instructions for forming species' traits (characteristics) are carried in DNA.	Describe how traits (characteristics) are passed from one generation to the next through DNA.	Understand the basis for genetic related disorders such as Down's Syndrome.
HS-LS3-2	Sexual reproduction involves chromosomes from two individuals of the same species and the process of meiosis, which leads to new combinations and variation of traits. Genetic variations may also result from replication errors or mutations.	Identify the causes of genetic variation.	Understand why offspring may look different from each other such as why two kittens in the same litter may have different markings or coloration.
HS-LS4-1	Multiple sources of evidence indicate that many organisms found on Earth are related and can be traced back to common ancestors that lived very long ago.	Identify multiple ways to determine the ancestry of an organism (e.g., fossils, DNA sequence).	Understand that fossils can be used to connect organisms living today with organisms that lived long ago.

Standard	Essence Statement	Meets Range Performance Level Descriptor	Related Workforce Skills/ Civic Responsibility/ Well-being
HS-LS4-3	Organisms with traits that increase an organism's chances of survival are more likely to be reproduced and, thus, become more common in the population.	Given a scenario of similar organisms with different traits, explain why an organism will likely survive based on the given environment (e.g., birds with different-shaped beaks trying to eat insects).	Identify that some organisms survive better in certain environments. Understand that specific traits may increase the likelihood that an organism with those traits will survive.
HS-LS4-4	Natural selection is a process whereby beneficial traits result in a higher survival rate and more offspring leading to adaptations in a population.	Explain why organisms with beneficial traits are more likely to survive and reproduce.	Understand that survival increases the chances of reproducing and that reproducing is an essential component of beneficial traits being passed on.
HS-LS4-5	Changes in an ecosystem determines the survival of some organisms over others, and could result in the emergence of new species.	Identify a gradual change in the environment that may result in changes in the population of organisms or the emergence of a new species.	Identify a gradual change in the environment that may result in changes in the population of organisms or the emergence of a new species.
HS-LS4-6	Humans propose solutions to correct changes in the physical environment. Some of these solutions work and some do not work. Some of the solutions may favor some species but harm others, sometimes leading to extinction.	Use data (pictorial, graphical, or tabular) to determine the effectiveness of a strategy to protect a species.	Understand that strategies to correct previous damage to the environment are not always successful; some strategies are effective, others may not be. Be able to look at a pictorial representation of data before and after a strategy has been implemented to determine if a problem has been mitigated, aggravated, or remains unchanged.
HS-ESS2-6	Describe the cycling of carbon among the hydrosphere, atmosphere, geosphere, and biosphere.	Describe the cycling of carbon using a model.	Identify a cycle as a series of events that are regularly repeated in the same order.
HS-ESS2-7	The biosphere and other Earth systems are linked. Changes in one system lead to changes in others and some changes result in the evolution of new life forms.	Identify examples of how living things change the characteristics of the environment in their specific region.	Recognize that gradual and rapid changes on land or in the water can lead to changes among living things. For example, the recent volcanic activity on the Big Island resulted in some very rapid changes to the landscape that impacted the living things in those regions.

Standard	Essence Statement	Meets Range Performance Level Descriptor	Related Workforce Skills/ Civic Responsibility/ Well-being
HS-ESS3-3	The sustainability of human societies and living resources we use and need requires responsible management of natural resources.	Identify steps that can be taken to sustain human populations and living resources.	Identify natural resources and ways in which humans use living and natural resources. Understand that humans are dependent on sustaining living and natural resources. Be able to use data and pictorial representations of data to assess whether management of resources is effective and determine the impact of management on human populations and biodiversity.

ACKNOWLEDGEMENT

The Hawaii Department of Education would like to acknowledge the contribution of the following WIOA/HSA-Alt Range Performance Level Descriptors Committee:

Kevin Bardsley-Marcial, BAYADA Community Liaison and Project Manager

Rhonda Black, University of Hawaii, Faculty member, Expert in Transition Services

Martha Guinan, Special Education Advisory, Chair

Kristin Hirata, Hawaii Department of Education, Educational Specialist for Adult and Community Education

Chin Lee, University of Hawaii Center on Disability Studies, Faculty member

Beverly Reidy, Leadership in Disabilities and Achievement of Hawaii, Education and Training Manager

Susan Rocco, Special Parent Information Network, Coordinator and Special Education Advisory, Staff member

Shelli Souza-Motta, Goodwill, Program Coordinator

Susan Wood, Hiliopa'a Family to Family Information Center, Project Coordinator