Standards Crosswalk

Following is a crosswalk between the Missouri Learning Standards: Grade Level Expectations and the Dynamic Learning Maps (DLM) Essential Elements.

ABOUT THE MISSOURI LEARNING STANDARDS:

The State Board of Education approved the updated Missouri Learning Standards: Grade Level Expectations on April 19, 2016, based on the standards created by work groups of Missouri parents and educators. The revised standards were developed by Missourians for Missouri students. These expectations are challenging, yet attainable, for students in our state. The standards further define our high expectations for what children should know and be able to do in each course and grade level, helping ensure they graduate prepared for college, career and life.

ABOUT THE DYNAMIC LEARNING MAPS ESSENTIAL ELEMENTS:

The Dynamic Learning Maps Essential Elements for Science are specific statements of knowledge and skills linked to Missouri Learning Standards: Grade Level Expectations. The purpose of the DLM Essential Elements is to build a bridge from the content in the general education science framework to academic expectations for students with the most significant cognitive disabilities.

Elementary (Grades 3-5) Science

MISSOURI LEARNING STANDARDS: GRADE-LEVEL EXPECTATIONS		DLM ESSENTIAL ELEMENTS		DLM LINKAGE LEVELS
CODE	EXPECTATION	CODE	ESSENTIAL ELEMENTS	GRADE 3-5: ESSENTIAL ELEMENTS
Domain: Physical; Core Idea: Matter and Its Interactions; Topic: Structure and Properties				
5.PS1.2	Measure and graph quantities to provide evidence that, regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved. (Clarification Statement: Examples of reactions or changes could include phase changes, dissolving, and mixing that form new substances)	EE.5.PS1.2	Measure and compare weights of substances before and after heating, cooling, or mixing substances to show that weight of matter is conserved.	**Initial Level:** ● Recognize the change in state from liquid to solid or from solid to liquid of the same material. **Precursor Level:** ● Compare the weight of an object before and after it changes from a liquid to a solid and from a solid to a liquid. **Target Level:** ● Measure and compare weights of substances before and after heating, cooling, or mixing substances to show that weight of matter is conserved.
Domain: Physical; Core Idea: Matter and Its Interactions; Topic: Structure and Properties		**Domain: Physical; Core Idea: Matter and Its Interactions; Topic: Types of Interactions of Matter**		
5.PS1.3	Plan and conduct investigations to separate the components of a mixture/solution by their physical properties (i.e., sorting, filtration, magnets, screening).	EE.5.PS1.3	Make observations and measurements to identify materials based on their properties (e.g., weight, shape, texture, buoyancy, color, or magnetism).	**Initial Level:** ● Match materials with similar physical properties. **Precursor Level:** ● Classify materials by physical properties (e.g., weight, shape, texture, buoyancy, color, or magnetism). **Target Level:** ● Make observations and measurements to identify materials based on their properties (e.g., weight, shape, texture, buoyancy, color, or magnetism).

Domain: Physical; Core Idea: Motion and Stability: Forces and Interactions; Topic: Types of Interaction				
5.PS2.1	Support an argument that the gravitational force exerted by Earth on objects is directed toward the planet's center

(Clarification Statement: "Down" is a local description of the direction that points toward the center of the spherical Earth.) | **EE.5.PS2.1** | Demonstrate that the gravitational force exerted by Earth on objects is directed down. | **Initial Level:**
● Recognize the direction an object will go when dropped.
Precursor Level:
● Predict the direction an object will go when dropped.
Target Level:
● Demonstrate that the gravitational force exerted by Earth on objects is directed down. |
| **Domain: Physical; Core Idea: Energy; Topic: Energy in Chemical Process and Everyday Life** | | | | |
| 5.PS3.1 | Use models to describe that energy stored in food (used for body repair, growth, motion, and to maintain body warmth) was once energy from the sun

(Clarification Statement: Examples of models could include diagrams and flow charts). | **EE.5.PS3.1** | Create a model to describe that energy in animals' food was once energy from the Sun. | **Initial Level:**
● Identify simple models that show that plants need sunlight to grow.
Precursor Level:
● Use models to describe that plants capture energy from sunlight.
Target Level:
● Create a model to describe that energy in animals' food was once energy from the Sun. |
| **Domain: Life; Core Idea: From Molecules to Organisms: Structures and Processes; Topic: Organization for Matter and Energy Flow in Organisms** | | | | |
| 5.LS1.2 | Support an argument that plants get the materials (i.e., carbon dioxide, water, sunlight) they need for growth chiefly from air and water

(Clarification Statement: Emphasis is on the idea that plant matter comes mostly from air and water, not from the soil.
Clarification Statement: Do not assess photosynthesis.). | **EE.5.LS1.1** | Provide evidence that plants need air and water to grow. | **Initial Level:**
● Distinguish things that grow from things that don't grow.
Precursor Level:
● Provide evidence that plants grow.
Target Level:
● Provide evidence that plants need air and water to grow. |

Domain: Life; Core Idea: Ecosystems: Interactions, Energy, and Dynamics; Topic: Cycles of matter and Energy Transfer in Ecosystems		Domain: Life; Core Idea: Ecosystems: Interactions, Energy, and Dynamics; Topic: Interdependent Relationships in Ecosystems		
5.LS2.1	Develop a model to describe the movement of matter among plants, animals, decomposers, and the environment (Clarification Statement: Emphasis is on the idea that matter that is not food {air, water, decomposed materials in soil} is changed by plants into matter that is food.).	**EE.5.LS2.1**	Create a model that shows the movement of matter (e.g., plant, growth, eating, composting) through living things.	**Initial Level:** ● Identify common human foods. **Precursor Level:** ● Identify a model that shows the movement of matter from plants to animals (e.g. food chain/food web). **Target Level:** ● Create a model that shows the movement of matter (e.g., plant growth, eating, composting) through living things.
Domain: Earth and Space; Core Idea: Earth's Place in Universe; Topic: Earth and the Solar System				
5.ESS1.3	Represent data in graphical displays to reveal patterns of daily changes in length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky. (Clarification Statement: Examples of patterns could include the position and motion of Earth with respect to the sun and selected stars that are visible only in particular months.)	**EE.5.ESS1.2**	Represent and interpret data on a picture, line, or bar graph to show seasonal patterns in the length of daylight hours.	**Initial Level:** ● Order events in daily routine including sunrise and sunset. **Precursor Level:** ● Recognize patterns about length of daylight hours over time (e.g., week to week, month to month). **Target Level:** ● Represent and interpret data on a picture, line, or bar graph to show seasonal patterns in the length of daylight hours.

Domain: Earth and Space; Core Idea: Earth's Systems; Topic: Earth Materials and Systems				
5.ESS2.1	Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. (Clarification Statement: Examples could include the influence of the ocean on ecosystems, landform shapes, and climate; the influence of the atmosphere on landforms and ecosystems through weather and climate; and the influence of mountain ranges on winds and clouds in the atmosphere. The geosphere, hydrosphere, atmosphere, and biosphere are each a system.)	**EE.5.ESS2.1**	Develop a model showing how water (hydrosphere) affects the living things (biosphere) found in a region.	**Initial Level:** ● Anticipates routine (e.g., clothes to wear, activities to do) to follow when it is raining. **Precursor Level:** ● Recognize how water (hydrosphere) affects people in a region (e.g., floods, droughts, mudslide, tourism, and recreation). **Target Level:** ● Develop a model showing how water (hydrosphere) affects the living things (biosphere) found in a region.
Domain: Earth and Space; Core Idea: Core Idea: Earth and Human Activity; Topic: Human Impacts on Earth Systems				
5.ESS3.1	Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	**EE.5.ESS3.1**	Use information to describe how people can help protect the Earth's resources and how that affects the environment.	**Initial Level:** ● Identify one way to protect a resource of Earth (e.g., put paper in the recycling bin). **Precursor Level:** ● Compare two methods people can use to help protect the Earth's resources. **Target Level:** ● Use information to describe how people can help protect the Earth's resources and how that affects the environment.

Middle School (Grades 6-8) Science

MISSOURI LEARNING STANDARDS: GRADE-LEVEL EXPECTATIONS		DLM ESSENTIAL ELEMENTS		DLM LINKAGE LEVELS
CODE	EXPECTATION	CODE	ESSENTIAL ELEMENTS	GRADE 6-8: ESSENTIAL ELEMENTS
Domain: Physical; Core Idea: Matter and Its Interactions; Topic: Structure and Properties of Matter				
6-8.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. (Clarification Statement: Examples of reactions could include burning sugar or steel wool, fat reacting with sodium hydroxide, and mixing zinc with hydrogen chloride.)	EE.MS.PS1.2	Interpret and analyze data on the properties (e.g., color, texture, odor, and state of matter) of substances before and after chemical changes have occurred (e.g., burning sugar or burning steel wool, rust, effervescent tablets).	**Initial Level:** • Observe and identify examples of change (e.g., state of matter, color, temperature, and odor). **Precursor Level:** • Gather data on the properties (e.g., color, texture, odor, and state of matter) of substances before and after chemical changes have occurred (e.g., burning sugar or burning steel wool, rust, effervescent tablets). **Target Level:** • Interpret and analyze data on the properties (e.g., color, texture, odor, and state of matter) of substances before and after chemical changes have occurred (e.g., burning sugar or burning steel wool, rust, effervescent tablets).
Domain: Physical; Core Idea: Motion and Stability: Forces and Interactions; Topic: Forces and Motion				
6-8.PS2.2	Plan and conduct 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. (Clarification Statement: Emphasis is on balanced {Newton's First Law} and unbalanced forces in a system, qualitative comparisons of forces, mass and changes in motion {Newton's Second Law}, frame of reference, and specification of units.)	EE.MS.PS2.2	Investigate and predict the change in motion of objects based on the forces acting on those objects.	**Initial Level:** • Identify ways to change the movement of an object (e.g., faster, slower, stop). **Precursor Level:** • Investigate and identify ways to change the motion of an object (e.g., change an incline's slope to make an object go slower, faster, farther). **Target Level:** • Investigate and predict the change in motion of objects based on the forces acting on those objects.

Domain: Physical; Core Idea: Energy; Core Idea: Definitions of Energy		Domain: Physical; Core Idea: Energy; Topic: Conservation of Energy and Energy Transfer		
6-8.PS3.3	Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. (Clarification Statement: Examples of devices could include an insulated box, a solar cooker, and a Styrofoam cup.)	EE.MS.PS3.3	Test and refine a device (e.g., foam cup, insulated box, or thermos) to either minimize or maximize thermal energy transfer (e.g., keeping liquids hot or cold, preventing liquids from freezing, keeping hands warm in cold temperatures).	**Initial Level:** • Identify objects/materials used to minimize or maximize thermal energy transfer (e.g., gloves, vacuum flask, insulated hot pad holder or foam cup). **Precursor Level:** • Investigate objects/materials, and predict their ability to maximize or minimize thermal energy transfer. **Target Level:** • Test and refine a device (e.g., foam cup, insulated box, or thermos) to either minimize or maximize thermal energy transfer (e.g., keeping liquids hot or cold, preventing liquids from freezing, keeping hands warm in cold temperatures).
Domain: Life; Core Idea: From Molecules to Organisms: Structures and Processes; Topic: Structure and Function				
6-8.LS1.3	Develop an argument supported by evidence for how multicellular organisms are organized by varying levels of complexity; cells, tissue, organs, organ systems.	EE.MS.LS1.3	Make a claim about how a structure (e.g., organs and organ systems) and its related function supports survival of animals (circulatory, digestive, and respiratory systems).	**Initial Level:** • Recognize major organs of animals. **Precursor Level:** • Use a model to demonstrate how organs are connected in major organ systems. **Target Level:** • Make a claim about how a structure (e.g., organs and organ systems) and its related function supports survival of animals (circulatory, digestive, and respiratory systems).

Domain: Life; Core Idea: From Molecules to Organisms; Topic: Growth and Development of Organisms				
6-8.LS1.6	Construct a scientific explanation based on evidence for how environmental and genetic factors influenced	EE.MS.LS1.5	Interpret data to show that environmental resources (e.g., food, light, space, water) influence growth of organisms (e.g., drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates in different conditions, fish growing larger in large ponds than small ponds).	**Initial Level:** • Match organisms to their habitats. **Precursor Level:** • Identify factors that influence growth of organisms. **Target Level:** • Interpret data to show that environmental resources (e.g., food, light, space, water) influence growth of organisms (e.g., drought decreasing plant growth, fertilizer increasing plant growth, different varieties of plant seeds growing at different rates I n different conditions, fish growing larger in large ponds than small ponds).
Domain: Life; Core Idea: Ecosystems: Interactions, Energy and Dynamics; Topic: Interdependent Relationships in Ecosystems				
6-8.LS2.2	Construct an explanation that predicts the patterns of interactions among and between the biotic and abiotic factors in a given ecosystem. (Clarification Statement: Relationships may include competition, predation, and symbiosis.)	EE.MS.LS2.2	Use models of food chains/webs to identify producers and consumers in aquatic and terrestrial ecosystems.	**Initial Level:** • Identify food that animals eat. **Precursor Level:** • Classify animals based on what they eat (e.g., herbivore, omnivore, carnivore). **Target Level:** • Use models of food chains/webs to identify producers and consumers in aquatic and terrestrial ecosystems.

Domain: Earth and Space; Core Idea: Earth's Systems; Topic: Earth's Materials and Systems				
6-8.ESS2.2	Construct an explanation based on evidence for how geoscience processes have changed Earth's surface at varying time and spatial scales. (Clarification Statement: Emphasis is on how processes change Earth's surface a t time and spatial scales that can be large {such as slow plate motions or the uplift of large mountain ranges} or small {such as rapid landslides or microscopic geochemical reactions}, and how many geoscience processes {such as earthquakes, volcanoes, and meteor impacts} usually behave gradually but are punctuated by catastrophic events. Examples of geoscience processes include surface weathering and deposition by the movements of water, ice, and wind. Emphasis is on geoscience processes that shape local geographic features, where appropriate.)	**EE.MS.ESS2.2**	Explain how geoscience processes that occur daily (e.g., wind, rain, runoff) slowly change the surface of Earth, while catastrophic events (e.g., earthquakes, tornadoes, floods) can quickly change the surface of Earth.	**Initial Level:** • Identify differences in weather conditions from day to day. **Precursor Level:** • Identify geoscience processes (e.g., wind, rain, runoff) that have an impact on landforms (e.g., landslides, erosion such as gullies). **Target Level:** • Explain how geoscience processes that occur daily (e.g., wind, rain, runoff) slowly change the surface of Earth, while catastrophic events (e.g., earthquakes, tornadoes, floods) can quickly change the surface of Earth.

Domain: Earth and Space; Core Idea: Earth's Systems; Topic: The Role of Water in Earth's Surface Processes		Domain: Earth and Space; Core Idea: Earth's Systems; Topic: Weather and Climate		
6-8.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.

(Clarification Statement: Emphasis is on how patterns vary by latitude, altitude, and geographic land distribution. Emphasis of atmospheric circulation is on the sunlight-driven latitudinal banding, the Coriolis effect, and resulting prevailing winds; emphasis of ocean circulation is on the transfer of heat by the global ocean convection cycle, which is constrained by the Coriolis effect and the outlines of continents. Examples of models can be diagrams, maps and globes, or digital representations.) | EE.MS.ESS2.6 | Interpret basic weather information (e.g., radar, map) to make predictions about future conditions (e.g., precipitation, temperature, wind). | **Initial Level:**
• Interpret basic weather information (e.g., radar, map) to identify weather conditions.
Precursor Level:
• Interpret basic weather information (e.g., radar, map) to compare weather conditions (either over several days at the same location or different locations on the same day).
Target Level:
• Interpret basic weather information (e.g., radar, map) to make predictions about future conditions (e.g., precipitation, temperature, wind). |

Domain: Earth and Space; Core Idea: Earth and Human Activity; Topic: Natural Resources				
6-8.ESS3.1	Construct a scientific explanation based on evidence for how the uneven distribution of Earth's minerals, energy and groundwater resources are the result of past and current geoscience processes and human activity. (Clarification Statement: Emphasis is on how these resources are limited and typically non-renewable and how their distributions are significantly changing as a result of removal by humans. Examples of uneven distributions of resources as a result of past processes include but are not limited to petroleum {locations of the burial of organic marine sediments and subsequent geologic traps}, metal ores {locations of past volcanic and hydrothermal activity associated with subduction zones}, and soil {locations of active weathering and/or deposition of rock}.)	**EE.MS.ESS3.1**	Interpret, based on evidence, how the geoscience processes (e.g., weathering, erosion) create resources.	**Initial Level:** • Identify a natural resource (e.g., water, sand, wind). **Precursor Level:** • Identify the geoscience process that produces a natural resource (e.g., solar energy creating wind energy, rock cycle with ores and minerals). **Target Level:** • Interpret, based on evidence, how the geoscience processes (e.g., weathering, erosion) create resources.

Domain: Earth and Space; Core Idea: Earth and Human Activity; Topic: Human Impacts on Earth's Systems				
6-8.ESS3.4	Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment. (Clarification Statement: Examples of the design process include examining human environment impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage {such as the withdrawal of water from streams and aquifers or the construction of dams and levees}, land usage {such as urban development, agriculture, or the removal of wetlands}, and pollution {such as of the air, water or land}.)	EE.MS.ESS3.3	Develop a plan to monitor and minimize a human impact on the local environment (e.g., water, land, pollution).	**Initial Level:** • Recognize resources (e.g., food, water, shelter, air) in the local environment that are important for human life. **Precursor Level:** • Recognize ways in which humans impact the environment (e.g., agriculture, pollution, recycling, city growth). **Target Level:** • Develop a plan to monitor and minimize a human impact on the local environment (e.g., water, land, pollution).

High School (Grades 9-12) Science

MISSOURI LEARNING STANDARDS: GRADE-LEVEL EXPECTATIONS		DLM ESSENTIAL ELEMENTS		DLM LINKAGE LEVELS
CODE	EXPECTATION	CODE	ESSENTIAL ELEMENTS	GRADE 9-12: ESSENTIAL ELEMENTS
Domain: Physical; Core Idea: Matter and Its Interactions; Topic: Structure and Properties of Matter				
9-12.PS1.2	Construct and revise an explanation for the products of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties. (Clarification Statement: Examples of chemical reactions could include the reaction of sodium and chlorine, or of oxygen and hydrogen.)	EE.HS.PS1.2	Make a claim supported by evidence to explain patterns of chemical properties that occur in a substance during a common chemical reaction (e.g., baking soda and vinegar).	**Initial Level:** • Recognize that a change has occurred during a chemical reaction. **Precursor Level:** • Identify the changes that have occurred during a chemical reaction (e.g., metal-rust, paper-burn). **Target Level:** • Make a claim supported by evidence to explain patterns of chemical properties that occur in a substance during a common chemical reaction (e.g., baking soda and vinegar).
Domain: Physical; Core Idea: Motion and Stability: Forces and Interactions; Topic: Forces and Motion				
9-12.PS2.3	Apply scientific principles of motion and momentum to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. (Clarification Statement: Examples of evaluation and refinement could include determining the success of the device at protecting an object from damage and modifying the design to improve it. Examples of a device could include a football helmet or a parachute.)	EE.HS.PS2.3	Evaluate the effectiveness of safety devices and design a solution that could minimize the force of a collision.	**Initial Level:** • Identify safety equipment devices that minimize force of a collision (e.g., floor mats, helmets, or steel-toed boots). **Precursor Level:** • Use data to compare the effectiveness of safety devices to determine which best minimizes the force of a collision. **Target Level:** • Evaluate the effectiveness of safety devices and design a solution that could minimize the force of a collision.

Domain: Physical; Core Idea: Energy; Topic: Conservation of Energy and Energy Transfer				
9-12.PS3.4	Plan and conduct an investigation to provide evidence that the transfer of thermal energy when two components of different temperature are combined within a closed system results in a more uniform energy distribution among the components in the system (second law of thermodynamics). (Clarification Statement: Emphasis is on analyzing data from student investigations and using mathematical thinking to describe the energy changes both quantitatively and conceptually. Examples of investigation could include mixing liquids at different initial temperatures or adding objects at different temperatures to water.)	**EE.HS.PS3.4**	Investigate and predict the temperatures of two liquids before and after combining to show uniform energy distribution.	**Initial Level:** • Compare relative difference in temperature (warmth, coldness) of two liquids. **Precursor Level:** • Compare the temperature of two liquids of different temperatures before and after combining. **Target Level:** • Investigate and predict the temperature of two liquids before and after combining to show uniform energy distribution.
Domain: Life; Core Idea: From Molecules to Organisms: Structures and Processes; Topic: Structure and Function				
9-12.LS1.2	Develop and use a model to illustrate the hierarchical organization of interacting systems that provide specific functions within multicellular organisms. (Clarification Statement: Emphasis is on functions at the organism system level such as nutrient uptake, water delivery, and organism movement in response to stimuli.)	**EE.HS.LS1.2**	Use a model to illustrate the organization and interaction of major organs into systems (e.g., circulatory, respiratory, digestive, sensory) in the body to provide specific functions.	**Initial Level:** • Recognize that different organs have different functions. **Precursor Level:** • Identify which organs work for a specific function. **Target Level:** • Use a model to illustrate the organization and interaction of major organs into systems (e.g., circulatory, respiratory, digestive, sensory) in the body to provide specific functions.

Domain: Life; Core Idea: Ecosystems: Interactions, Energy, and Dynamics; Topic: Interdependent Relationships in Ecosystems				
9-12.LS2.1	Explain how various biotic and abiotic factors affect the carrying capacity and biodiversity of an ecosystem using mathematical and/or computational representations. (Clarification Statement: Examples of biotic factors could include relationships among individuals {e.g., feeding relationships, symbioses, competition} and disease. Examples of abiotic factors could include climate and weather conditions, natural disasters, and availability of resources. Genetic diversity includes within a population and species within an ecosystem. Examples of mathematical comparisons could include graphs, charts, histograms, and population changes gathered from simulations or historical data sets.)	EE.HS.LS2.2	Use a graphical representation to explain the dependence of an animal population on other organisms for food and their environment for shelter.	**Initial Level:** • Identify food and shelter needs for familiar wildlife. **Precursor Level:** • Recognize the relationship between population size and available resources for food and shelter from a graphical representation. **Target Level:** • Use a graphical representation to explain the dependence of an animal population on other organisms for food and their environment for shelter.

Domain: Life; Core Idea: Biological Evolution: Unity and Diversity; Topic: Adaptation				
9-12.LS4.6	Evaluate the evidence supporting claims that change 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. (Clarification Statement: Emphasis is on determining cause and effect relationships for how changes to the environment such as deforestation, fishing and application of fertilizers, droughts, flood and the rate of change of the environment affect distribution or disappearance of traits in species.)	**EE.HS.LS4.2**	Explain how the traits of particular species allow them to survive in their specific environment.	**Initial Level:** • Match particular species to their various environments. **Precursor Level:** • Identify factors in an environment that require special traits to survive. **Target Level:** • Explain how the traits of particular species allow them to survive in their specific environments.
Domain: Earth and Space; Core Idea: Earth's Place in the Universe; Topic: Earth and the Solar System				
9-12.KES1.4	Use Kepler's Law to predict the motion of orbiting objects in the solar system. (Clarification Statement: Emphasis is on Newtonian gravitational laws governing orbital motions, which apply to human-made satellites as well as planets and moons.)	**EE.HS.ESS1.4**	Use a model of Earth and the Sun to show how Earth's tilt and orbit around the sun cause changes in seasons.	**Initial Level:** • Identify characteristics of the seasons. **Precursor Level:** • Use a model of Earth and sun to show how Earth's positions in its orbit around the Sun correspond with the four seasons. **Target Level:** • Use a model of Earth and the Sun to show how Earth's tilt and orbit around the Sun cause changes in seasons.

Domain: Earth and Space; Core Idea: Earth and Human Activity; Topic: Natural Resources				
9-12.ESS3.2	Evaluate competing design solutions for developing, managing, and utilizing energy and mineral resources based on economic, social, and environmental cost-benefit ratios. (Clarification Statement: Emphasis is on the conservation, recycling, and reuse of resources {such as minerals and metals} where possible, and on minimizing impacts where it is not. Examples include developing practices for agricultural soil use, mining {for coal, tar sands, and oil shale}, and pumping {for petroleum and natural gas}. Science knowledge indicates what can happen in natural systems—not what should happen.)	EE.HS.ESS3.2	Construct an argument for a strategy to conserve, recycle or reuse resources.	**Initial Level:** • Recognize strategies to manage objects (e.g., dispose, repurpose, or recycle). **Precursor Level:** • Describe the factors that would favor one strategy to conserve, recycle, or reuse resources over another. **Target Level:** • Construct an argument for a strategy to conserve, recycle, or reuse resources.
Domain: Earth and Space; Core Idea: Earth and Human Activity; Topic: Human Impacts on Earth Systems				
9-12.ESS3.3	Create a computational simulation to illustrate relationships among management of natural resources, the sustainability of human populations, and biodiversity. (Clarification Statement: Examples of factors that affect the management of natural resources include costs of resource extraction and waste management, per-capita consumption, and the development of new technologies. Examples of factors that affect human sustainability include agricultural efficiency, levels of conservation, and urban planning.)	EE.HS.ESS3.3	Analyze data to determine the effects of a conservation strategy on the level of a natural resource.	**Initial Level:** • Gather data on the effects of a local (e.g., class or school-wide) conservation strategy. **Precursor Level:** • Organize data on the effects of conservation strategies (e.g., using less energy, using rechargeable batteries, recycling or repurposing materials). **Target Level:** • Analyze data to determine the effects of a conservation strategy on the level of a natural resource.