



Course Description
Grades 6-8
National (NGSS)
2016-17



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Disciplinary Core Idea: PS1 Matter and its Interactions

Matter and Its Interactions

Description: Students will learn that pure substances have characteristic properties and can be elements or compounds; the Periodic Table is a chart that organizes elements based on their properties and atomic structures; during a chemical reaction, atoms that make up the original substances regroup into different molecules and form new substances with different properties; these reactions can be represented by chemical equations.

Unit 1	Elements and Compounds <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students learn about the difference between an element and a compound. They learn that elements are pure substances represented by symbols and their unique properties are related to their atomic structure. They understand the difference between a physical change and a chemical change and that a chemical change leads to the formation of new substances. They learn through examples that production of a gas, change in temperature, production of a precipitate, and color change are indications of a possible chemical change.
Interactivity/simulation	In this interactive section of the module, students classify a given substance as an element or a compound based on its symbol/chemical formula. They observe the substance undergoing a change and recognize it as a physical or a chemical change.
Glossary	Elements and Compounds
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Atomic structure, difference between an element and a compound, and difference between a physical change and a chemical change.
Activities	Elements and Compounds
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2 Journal 3



Unit 2	Metals and Nonmetals <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students observe and compare the physical properties of metals, nonmetals and metalloids, such as luster, ability to conduct heat and electricity, and malleability. They understand that elements can be classified as metal, nonmetals, and metalloids based on their physical properties. They learn to identify metals, nonmetals, and metalloids based on their position in the periodic table. They learn that density is unique to the element or substance and can be calculated using the formula $\text{density} = \text{mass}/\text{volume}$. When other properties are similar, density can be used to identify the substance.
Interactivity/simulation	In this interactive section of the module, students observe the physical properties of elements and classify them as metal, nonmetal, or metalloid. Then, given the mass and volume of the sample, they identify it by calculating its density and comparing the value with a density chart.
Glossary	Metals and Nonmetals
Quiz	The questions in the assessment section test the student's understanding of the following concepts: the physical properties of metals, nonmetals, and metalloids, exceptions to the above categories, how the elements are classified on the periodic table and the formula for density.
Activity	Calculating Density to Identify Substances
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 3	The Periodic Table <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students are presented with a basic understanding of the Periodic Table. They recognize that elements are organized in the Periodic Table based on their properties. They differentiate between physical and chemical properties of elements. They learn that elements in the Periodic Table have been classified into metals, nonmetals and metalloids based on these properties. They also learn and understand atomic structures of elements.
Interactivity/simulation	In this interactive section of the module, students identify the position of an element on the Periodic Table based on its atomic structure. The student also has to recognize whether an element is a metal, a nonmetal or a metalloid based on its properties.
Glossary	The Periodic Table
Quiz	The questions in the assessment section test the student's understanding of the following concepts: The position of elements on the Periodic Table, recognizing elements based on its atomic structure and its physical / chemical properties.
Activity	The Periodic Table
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 4	Structure of the Atom <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students are introduced to the structure of the atom. They learn about protons, neutrons, and electrons, their location in the atoms and their electrical charges. They learn about atomic number and mass number. They understand that the valence electrons determine how reactive an element is. Through examples, they learn that atoms can share or transfer electrons to form covalent bonds or ionic bonds with other atoms.
Interactivity/simulation	In the interactive section of the module, students observe the number of valence electrons in an atom. Then they observe the valence electrons in three other atoms and decide which among those is most likely to form a covalent bond with the given atom.
Glossary	Structure of the Atom
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Atomic number, net electrical charge on an atom, force between charged particles, mass number, electron cloud, valence electrons, stable and reactive elements, covalent and ionic bonding.
Activity	Protons and Electrons Structure of the Atom
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 5	Chemical Reactions and Equations <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students apply their knowledge of the periodic table, atoms and elements as they learn about chemical formulas. Students learn how to determine the types of elements in a chemical formula and the number of atoms of each element in the formula. They understand how different substances react chemically to form new substances in a chemical reaction. They recognize the characteristics that can help detect a chemical reaction, such as a change in color, a change in temperature, odor and/ or release of gas. Students differentiate between exothermic and endothermic reactions. They are introduced to the law of conservation of mass and apply it as they learn how to determine if a chemical equation with coefficients is balanced or not.
Interactivity/simulation	In this interactive section of the module, students use the law of conservation of mass to balance chemical equations. They add/remove atoms and molecules in the reactants as well as products to balance the equation.
Glossary	Chemical Reactions and Equations
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Chemical reactions, chemical formula, law of conservation of mass, balancing chemical reactions.
Activity	Chemical Reactions and the Law of Conservation of Mass, Part 1 (Experimental Investigation) Chemical Reactions and the Law of Conservation of Mass, Part 2 (Experimental Investigation) Chemical Reaction (Experimental Investigation) Is it a Chemical Reaction? (Descriptive Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Disciplinary Core Idea: PS2 Motion and Stability: Forces and Interactions

Forces, Motion, and Interactions

Description: Students will recognize the effects of force on motion and explain them using Newton's Laws of Motion; simple machines help to do work by changing the amount and direction of the force applied; work is done when a force on an object moves it through a distance.

Unit 1	Force and Motion <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students are presented with various examples that show the effects of force on an object. They are introduced to a few familiar forces such as friction and gravity and learn that forces acting on an object can be balanced or unbalanced. They differentiate between distance and displacement. They learn the relation between speed, distance, and time and understand how to represent it on a graph.
Interactivity/simulation	In this interactive section of the module, students recognize that weight is a force and figure out when forces are balanced and when they are unbalanced.
Glossary	Force and Motion
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Distance, displacement, average speed, balanced and unbalanced forces, magnitude and direction of forces, reading a time-displacement graph, effect of nature of surface on frictional forces.
Activity	Unbalanced Forces (Experimental Investigation) Representing Changes in Motion Graphically (STEM Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1



	Journal 2
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Unit 2	Force and Acceleration <i>(Suggested Grade Level: 8)</i>
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Instruction Module	In this module, students are presented with various examples that show the effects of force on an object. They are introduced to speed, velocity, acceleration and force. They learn about the Newton’s laws of motion. They recognize the relationship between force, mass and acceleration.
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Interactivity/simulation	<p>In this interactive section of the module, students “apply” different amounts of force on different masses. They observe the motion of the object and calculate acceleration in each case. They recognize the relationship between force, mass, and acceleration.</p> <p>In the simulation, students “use” air pumps to apply varying amounts of force and observe the effect on a constant mass. Then they use a constant force on varying masses and observe the effects. They record their observations and arrive at a conclusion.</p>
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Glossary	Force and Acceleration
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Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Distance, speed, balanced and unbalanced forces, mass, acceleration, velocity, magnitude and direction of forces, and Newton’s Laws of Motion.
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Activity	<p>Investigate and Describe Applications of Newton’s Law (Experimental Investigation)</p> <p>Speed, Velocity and Acceleration (Experimental Investigation and STEM)</p> <p>Investigating and Describing Applications of the Law of Action-Reaction (Descriptive Investigation)</p> <p>Balanced and Unbalanced Forces</p>
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Journal entries

Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.

Journal 1

Journal 2



Unit 3	Simple Machines <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students learn how the six simple machines (lever, pulley, inclined plane, wedge, screw, and wheel and axle) help to do work by changing the amount of force, the distance over which a force is exerted, and/or the direction in which a force is exerted. They learn about the different types of levers based on the position of the fulcrum, load and effort. They are introduced to the concept of mechanical advantage of a machine and understand how the mechanical advantage of a pulley system increases with the increase in the number of pulleys used.
Interactivity	In this interactive section of the module, students identify the input and output forces and calculate the MA (mechanical advantage) of inclined planes. They use the relation between the length and height of a ramp to its mechanical advantage to find the length of the ramp.
Glossary	Simple Machines
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Recognition and uses of simple machines, parts of a lever, identifying the type of lever, and calculation of mechanical advantage.
Activity	Using Pulleys to do Work (Comparative Investigation) Using an Inclined Plane to do Work
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 4	Force, Work, and Energy <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students learn that work is done when a force applied on an object moves the object in the direction of the force. They identify situations in which work is done against situations in which work is not done. They calculate the amount of work done and understand that work done on the machine (input energy) can never be greater than the work done by the machine (output energy). They learn that simple machines like the ramp and the pulley make work easier by changing the amount of force or the direction of the force but do not reduce the amount of work done.
Interactivity/simulation	In this interactive section of the module, students observe different situations and figure out if work is being done. They also calculate the amount of work being done using the values of the force applied and the distance moved.
Glossary	Force, Work, and Energy
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Force, work, simple machines, and energy.
Activity	The Energy Stored in Foods (Comparative Investigation) Work and Force 1 Work and Force 2 Calculating Work (Comparative Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2 Journal 3



Disciplinary Core Idea: PS3 Energy

Energy and Energy Transfer

Description: Students learn that kinetic energy is the energy of motion; objects may also contain stored (potential) energy, depending on their relative positions; energy can be transferred and transformed; energy is spontaneously transferred from regions or objects at higher temperatures to colder ones at lower temperatures.

Unit 1

Potential and Kinetic Energy *(Suggested Grade Level: 6)*

Instruction Module

In this module, students are presented with various examples that demonstrate potential and kinetic energy. They learn how factors such as mass, speed, position, and condition affect the potential and kinetic energy of an object. They differentiate between potential and kinetic energy and understand the law of conservation of energy.

Interactivity/simulation

In this interactive section of the module, students observe the movement of objects and identify the correct amounts of potential and kinetic energy at different positions of the objects.

In this simulation section, students change the height of the hills of a roller coaster and observe the effect on the movement of the roller coaster car. They record their observations and conclude that the ride is completed only when the successive hills are shorter than the previous ones. This helps them to understand the energy conversions that take place in a roller coaster ride.

Glossary

Potential and Kinetic Energy

Quiz

The questions in the assessment section test the student's understanding of the following concepts:
Potential energy, kinetic energy, factors affecting potential and kinetic energy, and energy transformations.

Activity

Potential and Kinetic Energy (Experimental Investigation)

Journal entries

Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.
Journal



Unit 2	Energy Transformations <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students are presented with various examples to show that energy can neither be created nor destroyed. It just changes form from one to another. They are introduced to different forms of energy such as mechanical, thermal, chemical, electrical, sound, nuclear, and light. They differentiate between the various types of energy and recognize the energy transformations that take place.
Interactivity/simulation	In this interactive section of the module, students are presented with various examples of energy transformations and they identify the correct sequence of energy transformations taking place.
Glossary	Energy Transformations
Quiz	The questions in the assessment section test the student's understanding and ability to recognize the energy transformations that occur in various situations such as motor vehicles, electrical appliances, photosynthesis, glow sticks, video games, greenhouses, and fossil fuel plants.
Activity	Energy Transformations - Project Energy Transformation – STEM
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 3	Heat Transfer <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students are presented with the three modes of heat transfer – conduction, convection, and radiation. They learn the difference between heat and temperature. They learn that heat moves from an object at a higher temperature to an object at a lower temperature until the temperatures of both objects are the same.
Interactivity/simulation	This module has two simulations. In one simulation, students set the temperatures of two materials and observe and infer that thermal energy moves from the warmer material to the cooler material. In the second simulation, students observe the time taken for heat to flow through different materials and, based on their observations, categorize the materials as thermal conductors and insulators.
Glossary	Heat Transfer
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Use of thermometers, heat transfer by conduction, convection, and radiation, and applications of these processes.
Activity	Safety First! Modeling Heat Transfer by Convection and Conduction (Descriptive Investigation) Heat Conduction
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Disciplinary Core Idea: PS4 Waves and their Applications in Technologies for Information Transfer

Light

Description: Students will learn that when light shines on an object, it is reflected, absorbed, or transmitted through the object, depending on the object’s material; the path of light can be traced as straight lines; light refracts when it passes from one transparent material into another.

Unit 1

Light
(Suggested Grade Level: 6)

Instruction Module

In this module, students are introduced to light and its characteristics. They learn that light travels in a straight line until it strikes an object or travels through one medium to another. They learn the differences between opaque, translucent, and transparent materials. They recognize that light can be reflected and refracted and learn about the construction and uses of lenses.

Interactivity

This module does not include an interactive section.

Glossary

Light

Quiz

The questions in the assessment section test students’ understanding of the following concepts: reflection, refraction, refraction through lenses and its uses, and transparent, translucent, and opaque objects. The additional questions test students’ ability to identify examples of refraction and reflection, and translucent objects.

Activities

- The Properties of Light
- Light Reflection and Different Surfaces (Descriptive Investigation)
- Why Rainbows Form
- Exploring the Properties of Light

Journal entries

- Journal #1
- Journal #2



Disciplinary Core Idea: LS1 From Molecules to Organisms: Structures and Processes

Structure, Growth, and Development of Organisms

Description: Students will learn that all living things are made of cells; cells have special structures that are responsible for particular functions; in multicellular organisms, groups of cells work together to form tissues, organs, and organ systems that are specialized for particular functions.

Unit 1

Cell: The Basic Unit of Life *(Suggested Grade Level: 6)*

Instruction Module

In this module, students are introduced to cells, the basic units of life. They learn that organisms can be unicellular or multicellular. The students learn that there are two different types of cells – Prokaryotic and Eukaryotic.

Interactivity

In this interactive section of the module, students identify the components of cells that are common to both kinds of cells and the components which are present either in eukaryotic cells or in prokaryotic cells.

Glossary

Cell: The Basic Unit of Life

Quiz

The questions in the assessment section test the student's understanding of the following concepts:
Similarities and differences between a prokaryotic and eukaryotic cell.

Journal entries

Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.

- Journal 1
- Journal 2



Unit 2	Plant vs. Animal Cell <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students are presented with the structure and functions of a eukaryotic cell. They learn about the various organelles in a cell and their functions. They differentiate between a plant cell and an animal cell. They also learn about the Cell Theory.
Interactivity/simulation	In the interactive section of the module, students “build” a plant cell and an animal cell by dragging and dropping the correct organelles to the appropriate cell.
Glossary	Plant vs. Animal Cell
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Eukaryotic and prokaryotic cells, differences between plant and animal cells, importance of the cell wall in plants and the cell theory.
Activity	Observing Paramecia (Descriptive Investigation) Comparing Plant and Animal Cells’ Organelles Light, Photosynthesis and the Production of Oxygen (Experimental Investigation) Describing Chloroplasts in Elodea Cells (Descriptive Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 3	Cells to Organisms <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students understand that all organisms are composed of billions of cells. Cells that work together to perform common functions is called a tissue. Different tissues that work together to perform a certain job, is called an organ. Different organs work together to form an organ system. When all the organ systems work together, they form an organism.
Interactivity/simulation	In the interactive section of the module, students will recognize the levels of structural organization in plants and animals and arrange the levels according to their complexity. They will also sort different plant and animal structures according to their appropriate organizational level.
Glossary	Cells to Organisms
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Complexity of organisms based on the specialization of cells, levels of organization including cells, tissues, organs, and organ systems and the functions of each of these.
Activity	Levels of Organization of Living Things
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 4	Human Body Systems <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students learn about the various organ systems in the human body including the respiratory system, the skeletal system, the muscular system, the digestive system, the excretory system, the integumentary system, the nervous system, the endocrine system, and the reproductive system. They recognize that the structures of these systems complement their functions. They learn that organ systems work together to keep the body alive and maintain its health.
Interactivity/simulation	In the interactive section of the module, students identify organs that are missing from an organ system and drag and drop the right organ to its right location in the organ system.
Glossary	Human Body Systems
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Organs and organ systems in the human body, the functions of organ systems, the effects that different organs have on other organ systems.
Activity	Human Body Systems
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 5	Stimulus and Response <i>(Suggested Grade Level: 7)</i>
Instruction Module	Students learn about the various stimuli in the environment. They understand that there are two types of stimuli, internal and external. An organism's reaction to a stimulus is called a response. The students also learn that an organism can respond through learned behavior or by instinct and that responses can be positive, negative, or ignored.
Interactivity/simulation	In the interactive section of the module, students observe how an organism responds to a stimulus and identify whether the stimulus is internal or external and also whether the response is learned or instinctive.
Glossary	Stimulus and Response
Quiz	The questions in the assessment section test the student's understanding of the following concepts: The different kinds of stimuli and responses, phototropism, homeostasis.
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Disciplinary Core Idea: LS2 Ecosystems: Interactions, Energy, and Dynamics

Interdependent Relationships in Ecosystems

Description: Students will learn that organisms are dependent on interactions with other living things and with nonliving factors; food webs and energy pyramids demonstrate how matter and energy is transferred between producers, consumers, and decomposers as the three groups interact within an ecosystem; disruptions to an ecosystem can lead to shifts in all its populations.

Unit 1	Ecosystems – Levels of Organization <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students are presented with examples that show how living and non-living things in an ecosystem interact with each other and are interdependent. They understand that changes in one of the components can affect the whole ecosystem. They also learn about the different levels of organization in an ecosystem – individuals, populations, communities, and ecosystems.
Interactivity/simulation	In this interactive section of the module, students observe changes in one component of an ecosystem and predict its possible effects on the rest of the ecosystem.
Glossary	Ecosystems – Levels of Organization
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: The difference between abiotic and biotic components of the ecosystem, interactions between the living and non-living components, and the levels of organization in an ecosystem.
Activity	Levels of Organization Evaporating Saltwater (Descriptive Investigation)



Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2
Unit 2	Photosynthesis and Energy Conversions <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module students understand that the food used by organisms for energy, provides the matter necessary for growth. They identify the necessary ingredients for photosynthesis and recognize the parts of the plant in which this process can take place. They learn how each of the ingredients reaches the leaf. They recognize plant adaptations that help to maximize photosynthesis.
Interactivity/simulation	In this simulation, students measure the rate of photosynthesis in underwater plants exposed to varying amounts of sunlight. They make a hypothesis, record their observations and arrive at conclusions after analyzing their data.
Glossary	Photosynthesis and Energy Conversions
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Recognizing the structures where photosynthesis can take place, ingredients required for photosynthesis, the reason for the green color of leaves, structure of leaves, and structure of roots that help in absorption of water.
Activity	Extracting Chlorophyll from Plant Leaves (Descriptive Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 3	Forces Affect Plant Growth <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students are presented with examples of forces that cause movement of muscles and blood in humans and those that affect plant growth. They learn about germination, geotropism, and turgor pressure.
Interactivity/simulation	In this interactive section of the module, students observe the direction of growth of roots and stems of plants and decide the direction of the force of gravity. They identify the parts of the plant that exhibit positive geotropism or negative geotropism.
Glossary	Forces Affect Plant Growth
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Forces that affect plant growth, germination, positive and negative geotropism, and turgor pressure.
Activity	Forces Affect Plant Growth and Movement (Descriptive Investigation) Plants and Phototropism (Comparative Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 4	Energy Flow through Ecosystems <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, the students are presented with the concept of energy flow from the Sun to organisms, ultimately forming food chains and food webs in an ecosystem. They are also introduced to the various trophic levels and the energy pyramid.
Interactivity/simulation	The interactivity of this module requires the student to make a viable food chain in order for energy to flow to the top predator and predict the amount of energy available at a particular trophic level.
Glossary	Energy Flow through Ecosystems
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Food chains, food webs, energy pyramids, biomass.
Activity	Flow of Energy in Ecosystems
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 5	Cycling of Matter <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students learn about the various ways in which nutrients such as carbon, nitrogen, phosphorus, oxygen and water are recycled between the environment and the organisms living in it. They also learn how composting helps to recycle nutrients in organic wastes. They recognize the role of decomposers in each of these cycles.
Interactivity/simulation	In the interactive section of this module, students “build” a compost pit choosing the correct materials for each layer in the compost pit.
Glossary	Cycling of Matter
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: The importance of various nutrient cycles, role of decomposers associated with each cycle, and methods of composting.
Activity	Mini Compost in a Bottle – STEM
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 6	Organic Compounds and the Living World <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students are introduced to organic compounds and recognize the four major organic compounds in our body. They recognize the physical and chemical changes that food undergoes during digestion to break down these organic compounds into forms that can be absorbed by the body.
Interactivity/simulation	In the interactive section of the module, students “conduct” tests using Benedict’s solution, Lugol’s solution, Biuret solution, and brown paper to identify the various organic compounds present in food items such as beans, dates, carrots, apples, and lobsters.
Glossary	Organic Compounds and the Living World
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Structures of organic compounds and the physical and chemical changes occurring at each stage of digestion. Food in the Body
Activity	Identifying Organic and Inorganic Compounds Science Safety Scenario
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2 Journal 3



Unit 7	Ecological Succession <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students are presented with examples to show that ecological succession or the gradual change of plant and animal life in an area, occurs in all types of ecosystems. They also differentiate between primary and secondary succession with the help of examples. They recognize the process of ecological succession in a garden that is untended.
Interactivity/simulation	In this interactive section of the module, students recognize the different stages of ecological succession in three different ecosystems.
Glossary	Ecological Succession
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Ecological succession in various ecosystems, the different stages of succession, primary and secondary successions.
Activity	Ecological Succession
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 8	Environmental Changes and Organisms <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module students are presented with various examples of organisms that adapt to short-term seasonal changes by going into a state of dormancy, such as hibernation or diapause or migrating in search of warmer weather or food. They also learn that some long term environmental changes lead to a change in traits over the generations (natural selection). Organisms also deal with long-term changes through removal migration.
Interactivity/simulation	In the simulation section, students recognize that the addax antelope changes color to adapt to seasonal changes. To investigate the relation between color and heat absorption, they place water filled jars of different colors under a heat lamp. They observe and record the temperature of the water after every 20 minutes and conclude that darker colors absorb more heat than lighter colors. They infer that the addax antelope changes color to adapt to seasonal temperature changes.
Glossary	Environmental Changes and Organisms
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Diapause, physical and behavioral adaptations, removal migration, interpreting data from a graph, human activities that lead to long-term changes, hibernation, and natural selection.
Activity	Environmental Changes and Organisms
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 9	Human Impacts on Ocean Ecosystems <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students are presented with various examples of how human activities can impact the ocean and its ecosystems in different ways. They are introduced to concepts such as runoff, water cycle, disruption in food webs, impact of oil spills on the environment, and destruction of coral ecosystems.
Interactivity/simulation	In this interactive section of the module, students observe various human activities that could affect ocean ecosystems. They recognize the modes by which the pollution finally ends up in the ocean.
Glossary	Human Impacts on Ocean Ecosystems
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Food webs, water cycle, pollution of oceans through various sources, especially runoff.
Activity	Human Impacts on Ocean Ecosystems (Research Project)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 10	Interrelationships between Organisms <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students learn about the different biotic and abiotic factors influencing an ecosystem. They understand the different relationships such as consumer/producer, predator/prey, and parasite/host that exist in a food web.
Interactivity/simulation	In the simulation section of the module, students observe the growth of two sets of red clover plants, one that is inoculated with Rhizobium bacteria and the other which is untreated. They measure the height and observe the leaves of both sets of plants at intervals of two weeks and record their observations. They arrive at a conclusion regarding the interrelationship between Rhizobium bacteria and red clover plants.
Glossary	Interrelationships between Organisms
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Ecosystem, biotic and abiotic factors, identifying consumer-producer, predator-prey, parasite-host relationships in a food web.
Activity	Interrelationships between Organisms Activity 1 Interrelationships between Organisms Activity 2 The Importance of a Plant's Leaves (Experimental Investigation) Interdependence in Living Systems Depending on and Competing for Resources (Descriptive Investigation) Elodea and Saltwater (Comparative Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Disciplinary Core Idea: LS3 Heredity: Inheritance and Variation of Traits

Inheritance and Variation of Traits

Description: Students will learn that organisms reproduce, either sexually or asexually, and transfer their genetic information to their offspring; genes are located in the chromosomes of cells; when organisms reproduce sexually, each parent contributes half of the genes acquired by the offspring.

Unit 1	Heredity and Genes <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students understand that organisms form more of their kind by a process called reproduction. They learn that there are different types of asexual reproduction like binary fission, budding, fragmentation, regeneration, spore formation and vegetative reproduction. They learn that sexual reproduction occurs by fusion of gametes. They recognize that conjugation is also a type of sexual reproduction. Students are presented with examples to explain the concept of hermaphrodites and parthenogenesis which are a deviation from normal sexual reproduction.
Interactivity/simulation	In the interactive section of the module, students differentiate between sexual and asexual reproduction, classify asexual reproduction as binary fission, budding, fragmentation, regeneration, spore formation and vegetative reproduction. They recognize the advantages and disadvantages of sexual and asexual reproduction.
Glossary	Heredity and Genes
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Different types of asexual reproduction, its occurrence in various organisms and sexual reproduction.
Activity	Heredity and Genes
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 2	Types of Reproduction <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students learn that heredity is the passing of traits from parents to offspring and traits such as color of hair, the petals of flowers, the fur of animals, and feathers of birds, are controlled by genes located on chromosomes inside the nucleus of cells. They learn that each gene is present in two copies in most plants and animals, one coming from each parent.
Interactivity/simulation	In the interactive section of the module, students place labeled boxes one inside the other in the correct order to represent the location of genes within a cell.
Glossary	Types of Reproduction
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Location of genes and chromosomes, number of chromosomes, heredity and acquisition of genes from both parents.
Activity	Types of Reproduction
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Disciplinary Core Idea: LS4 Biological Evolution: Unity and Diversity

Organisms: Unity and Diversity

Description: Students will recognize the importance of biodiversity in an ecosystem and learn that there are variations in structure and behavior within a species that enable the species to survive; natural selection leads to the predominance of certain traits in a population; adaptations help organisms to survive and reproduce; organism can be classified based on their similarities and differences.

Unit 1

Diversity of Life

(Suggested Grade Level: 7)

Instruction Module

In this module, students learn about the biotic and abiotic factors of an ecosystem. They learn about the various biomes such as deserts, temperate and tropical grasslands, tropical rainforests, temperate forests, taiga, and the tundra; factors such as temperature and water availability, and their influence on the organisms that live in these biomes. They also observe a backyard ecosystem and recognize the importance of biodiversity in an ecosystem.

Interactivity/simulation

In the interactive section of the module, students will identify and sort organisms that belong and do not belong to a biome.

Glossary

Diversity of Life

Quiz

The questions in the assessment section test the student's understanding of the following concepts:
Biodiversity, biotic and abiotic factors, adaptations, environmental conditions of different biomes.

Activity

Observing Biodiversity in a Schoolyard Microhabitat
(Descriptive Investigation)

Insect Diversity (Descriptive Investigation)

Journal entries

Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.

Journal 1
Journal 2



Unit 2	Variability and Survival <i>(Suggested Grade Level: 7)</i>
Instruction Module	<p>In this module, students understand that there are variations in structure and behavior within a species. These variations enable the species to survive. Students are introduced to the concept of natural selection. Adaptations such as migration, hibernation, and bioluminescence help organisms to survive and reproduce.</p>
Interactivity/Simulation	<p>In the interactive section of the module, students analyze and select the traits that might be most suitable for survival based on the environment provided.</p> <p>In the simulation, students “conduct” an investigation to determine if the mass of seeds (chestnut) affects the rate of germination. They group the seeds based on their mass and observe and compare the number of seeds that grow into plants in each group. Based on their observations they infer and conclude that seeds with a greater mass provide more food to the embryo and therefore help in germination.</p>
Glossary	Variability and Survival
Quiz	<p>The questions in the assessment section test the student’s understanding of the following concepts: Natural selection, adaptations, migration, reading data from a graph, variations in a species, comparison of migration and hibernation, bioluminescence.</p>
Journal entries	<p>Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.</p> <p>Journal</p>



Unit 3	Internal Structural Adaptations <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students are presented with various examples that show how organisms have structures that help them adapt to their environments. They learn that organisms can have structural, behavioral, and physiological adaptations. They recognize that structural adaptation can be external or internal. They recognize how internal structural adaptations like fish gills, bird's hollow bones, and xylem and phloem in plants help the organism survive in their environment.
Interactivity/simulation	In the interactive section of the module, students click on different parts of an organism and learn how that structure helps the organism to adapt to its environment. Then, they identify which of the adaptations is an internal structural adaptation.
Glossary	Internal Structural Adaptations
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Adaptations, structural, behavioral and physiological adaptations, and internal and external structural adaptations.
Activity	Internal Structural Adaptations of Plants (Experimental Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 4	Natural Selection and Selective Breeding <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students learn about genetic traits that change over time due to natural selection and selective breeding. They recognize that environmental conditions influence natural selection whereas humans influence selective breeding. They learn about hybridization and inbreeding as types of selective breeding through examples.
Interactivity/Simulation	In the simulation, students investigate and find out if the shape of the beaks of finches is an adaptation to the kind of food available. They use different kinds of pliers to represent beaks and observe the type of food particles that can be picked up by each.
Glossary	Natural Selection and Selective Breeding
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Natural selection, selective breeding, reading data from a graph regarding natural selection in a population, comparing hybridization and inbreeding.
Activity	Selective Breeding Geographic Speciation and Natural Selection
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2 Journal 3



Unit 5	Taxonomic Classification <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students are introduced to the system of classifying organisms. They understand the hierarchy of classification beginning from domains to kingdoms and moving to species. They learn about the characteristics of each kingdom.
Interactivity/simulation	In this interactive section of the module, students classify organisms into kingdoms based on their characteristics.
Glossary	Taxonomic Classification
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Classification of organisms based on their characteristics, recognizing characteristics based on their classification, the hierarchy of classification and the differences between closely related groups.
Activity	The Basic Characteristics of Kingdoms Investigating Reproductive Adaptations of Seed Plants, Part 1 Investigating Reproductive Adaptations of Seed Plants, Part 2 Growing and Observing Yeast
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 6	Using Dichotomous Keys <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students learn about traits and that organisms are classified based on traits. They are presented with various examples that show how scientists use a dichotomous key to classify organisms based on their unique traits.
Interactivity/simulation	In this interactive section of the module, students examine the leaves of different trees and use a dichotomous key to identify the trees by their common names.
Glossary	Using Dichotomous Keys
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Classification of organisms into groups, recognition of traits, use of a dichotomous key.
Activity	Dichotomous Keys (Comparative Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Disciplinary Core Idea: ESS1 Earth’s Place in the Universe

Earth’s Place in the Universe

Description: Students will learn that Earth is the only planet in our solar system that has conditions to support life as we know it; the relative movements of the Sun, Moon, and Earth cause patterns such as day-and-night, seasons, tides, and phases of the moon, that can be described and predicted using models; Earth and its solar system are part of the Milky Way galaxy, which is one of many galaxies in the universe; stars can be identified based on their size, temperature, color, and brightness, and are represented on the H-R Diagram; scientists study the different wavelengths of light from distance stars and other objects in space to gain information about composition of the objects; discoveries such as Cosmic Microwave Background Radiation and Hubble’s discovery that galaxies are moving away support the Big Bang Theory used to explain the origin of the Universe.

Unit 1	The Solar System <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students are introduced to the characteristics of the Sun and the nuclear reactions taking place. They also learn about the characteristics of the eight planets and other bodies in the solar system and the force of gravity that keeps them in orbit around the Sun. They learn about the geo-centric and helio-centric views and the developments that led to the landing on the moon as well as the construction of the international space station.
Interactivity	In this interactive section of the module, students identify the planets with the help of some clues and determine their correct location in the solar system.
Glossary	The Solar System
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Characteristics, composition, locations, and movements of the Sun, planets, meteors, asteroids, and comets, and historical contributions of various scientists.
Activity	The Solar System Celestial Bodies in the Solar System
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



	Journal 3
Unit 2	Life in Our Solar System <i>(Suggested Grade Level: 7)</i>
Instruction Module	<p>In this module, students recognize that Earth has unique characteristics that support life. They recognize that Earth’s atmosphere supplies oxygen to breathe, protects Earth from harmful radiation, and traps heat. Students understand that Earth receives the right amount of sunlight for photosynthesis and has the right temperatures due to its location in the solar system. They recognize that water can exist in all three forms on Earth and its gravitational force is just right to hold on to the water and the atmospheric gases.</p>
Interactivity/simulation	<p>In the interactive section of the module, students change the location of the Earth and predict how it would affect the amount of sunlight and temperature if Earth was closer to or further away from the Sun. Then, they change the mass of the Earth and predict its effect on the gravitational force.</p>
Glossary	Life in Our Solar System
Quiz	<p>The questions in the assessment section test the student’s understanding of the following concepts: Effect of mass on gravity, the role of ozone, the composition of Earth’s atmosphere and its similarity to a greenhouse, and comparing features of Earth and Mars from a data table and arriving at conclusions regarding possibility of life on Mars.</p>
Journal entries	<p>Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.</p> <p>Journal 1 Journal 2 Journal 3</p>



Unit 3	The Sun, Moon, and Earth <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students are presented with models that explain the phenomena of day and night (rotation) and seasons (revolution). They learn how the positions of the Sun, Moon, and Earth cause tides and the phases of the moon.
Interactivity/simulation	In this interactive section of the module, students identify the phase of the moon given only the relative position of Sun, Moon, and Earth. Then they have to select the positions on earth that have high and low tide for that phase of the moon.
Glossary	The Sun, Moon, and Earth
Quiz	The questions in the assessment section test the student's understanding of the following concepts: What causes day and night, the tilt of Earth's axis, seasons in both hemispheres, the phases of the moon, and the tides? Modeling What Causes Day and Night (Descriptive Investigation)
Activity	Modeling What Causes the Seasons - (Descriptive Investigation) Describing the Lunar Cycle
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 4	The Universe <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students recognize the characteristics of the universe. They learn to identify stars based on their size, temperature, color, and brightness. They understand stars at different stages in their life are represented on the H-R Diagram. Students understand what galaxies are and recognize that they are classified according to their shape.
Interactivity/simulation	In this interactive section of the module, students increase or decrease the temperature of a star based on its location on the H-R Diagram. Then, they classify the star based on its luminosity and temperature.
Glossary	The Universe
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Components of the universe, Hertzsprung-Russell diagram, life cycle of a star, luminosity and temperature of a star.
Activity	Plotting the Stars Modeling Distances Using Light Years: Part 1 (Descriptive Investigation) Modeling Distances Using Light Years: Part 2 (Descriptive Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 5	The Universe – Distances and Sizes <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module students are introduced to light years. They understand that the light emitted from distant stars and galaxies can take thousands or millions of years to reach an observer on Earth. They also learn how scientists study the different wavelengths of light from distance stars and other objects in space and use it to gain information about composition of the objects. They understand how scientists compare absorption spectrums of stars to emission spectrums of elements to understand the composition of the stars.
Interactivity/simulation	In the interactive section of the module, students compare the absorption spectrum of stars and compare it with the emission spectrum of elements to analyze which element is present in the star.
Glossary	The Universe – Distances and Sizes
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Light years, comparison of wavelengths of visible light and radio waves, absorption spectrums, comparison of absorption and emission spectrums.
Activity	Radio Astronomy Absorption and Emission Spectra Constructing a Model Hand-held Spectroscope (Descriptive Investigation) Modeling Sizes Using Light Years: Part 1 (Descriptive Investigation) Modeling Sizes Using Light Years: Part 2 (Descriptive Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 6	Origins of the Universe – Theories <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students are introduced to the Big Bang Theory and the evidences that support this theory. These include Hubble’s discovery that galaxies are moving away (red shifted), Arno Penzias and Robert Wilson’s discovery of the Cosmic Microwave Background Radiation, and the abundance of light elements such as hydrogen and helium in the universe.
Interactivity/simulation	In this interactive section of the module students observe “light waves” from an object in space and decide whether the object is stationary, moving away from, or moving towards the observer. They also recognize if the light is red shifted, blue shifted, or if there is no shift.
Glossary	Origins of the Universe – Theories
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Studying data from a graph representing Hubble’s law, wavelengths, red shift, blue shift, Doppler shift, cosmic microwave background radiation. Big Bang Theory.
Activity	Using Scientific Data as Evidence Theories that Attempt to Explain the Origin of the Universe (Research Project)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Disciplinary Core Idea: ESS2 Earth's Systems

Earth's Systems

Description: Students will learn that water continually cycles among land, ocean, and atmosphere; patterns of the movement of water in the atmosphere, winds, landforms, and ocean temperatures and currents determine the weather and climate of a place; Earth's surface is constantly being changed by wind and water, and by forces from within Earth; Earth; tectonic processes continually generate new ocean sea floor at ridges and destroy old sea floor at trenches, and cause earthquakes and volcanic eruptions.

Unit 1

Water Cycle *(Suggested Grade Level: 6)*

Instruction Module

In this module, students identify the significance of cycles and understand and recognize the various processes that govern the water cycle such as evaporation, condensation, precipitation and infiltration.

Interactivity

This module does not include an interactive/simulation section.

Glossary

Water Cycle

Quiz

The questions in the assessment and additional assessment section test students' understanding and ability to identifying the different processes of the water cycle.

Activities

The Water Cycle (Descriptive Investigation)

Journal entries

After viewing the Instruction Module, students apply their knowledge and understanding to respond to open-ended, higher order thinking questions.
Journal #1
Journal #2

Expository text passages/ activities

The Rainiest Place in the United States



Unit 2	Climate and Weather <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students understand the difference between climate and weather. They understand that interactions between the Sun, the land, and the oceans cause changes in weather patterns and climate. They understand how wind and ocean currents are caused. They learn to read weather maps and identify areas of high/ low pressure and warm and cold fronts. They also understand how oceans can bring about changes in weather systems like hurricanes and El Niño.
Interactivity/simulation	In this interactive section of the module, students recognize the types of weather associated with high/low pressure and warm/cold fronts.
Glossary	Climate and Weather
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Convection currents, high and low pressures, El Niño, hurricanes and cold and warm fronts.
Activity	<p>El Niño</p> <p>Using Weather Maps to Predict Weather</p> <p>How Accurate are Weather Reports? (Comparative Investigation)</p> <p>Constructing a Model of an Anemometer (Descriptive Investigation; STEM)</p> <p>Convection Currents</p> <p>Constructing a Model of a Psychrometer</p> <p>The Uneven Heating of the Earth's Surface</p>
Journal entries	<p>Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.</p> <p>Journal 1</p> <p>Journal 2</p>



Unit 3	Topographic Maps <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students are introduced to topographic maps. They learn about contour lines, contour intervals, index contour lines, scale, and legends on a topographic map. They also learn how satellite views help us to identify land and erosional features.
Interactivity/simulation	In this interactive section of the module, students identify the correct elevation of a location on a topographic map and predict the slope and land feature of that location.
Glossary	Topographic Maps
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Reading a topographic map, satellite images, uses of this in day to day life and in science.
Activity	Topographic Maps
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2



Unit 4	Catastrophic Events and Ecosystems <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students understand that an ecosystem comprises of biotic and abiotic factors. They learn about the positive and negative effects that catastrophes like floods, forest fires, hurricanes, tornadoes, and asteroid impacts, can have on different types of ecosystems.
Interactivity/simulation	In this interactivity, students predict the type of catastrophic event that has occurred in a region by examining the components of soil in that area.
Glossary	Catastrophic Events and Ecosystems
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Biotic and abiotic factors of an ecosystem, different types of ecosystems and the effects that various catastrophic events such as hurricanes, forest fires, floods, and asteroid impacts, have on these ecosystems.
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 5	Slow Changes in Eco regions <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students recognize the various forces that cause weathering, erosion, and deposition. They differentiate between mechanical and chemical weathering. They also learn about the landforms such as deltas, valleys, alluvial fans, canyons, and moraines that are created as a result of these processes.
Interactivity/simulation	In this simulation students understand the effect of acid rain on different types of rocks. They test how acid affects marble, limestone, quartz, and granite by submerging them in acid that has a pH level similar to that of acid rain. They measure and record how much mass, if any, the rocks lost after 24 hours. They analyze the data collected and arrive at a conclusion that some rocks weather more quickly than others due to their chemical composition.
Glossary	Slow Changes in Eco regions
Quiz	The questions in the assessment section test the student's understanding of the following concepts: mechanical weathering, chemical weathering, abrasion, erosion, deposition, land formations.
Activity	Drought and its Effect on Eco regions (Research Project)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 6	Changes on the Earth's Surface <i>(Suggested Grade Level: 5)</i>
Instruction Module	In this module, students understand how landforms such as deltas, canyons, and sand dunes are the result of changes to Earth's surface by wind, water, and ice. They recognize the processes of weathering, erosion, and deposition.
Interactivity	This module does not include an interactive section. It includes an experiment that demonstrates the effect of the steepness of a slope on erosion by water.
Glossary	Changes on the Earth's Surface
Quiz	The questions in the assessment and additional assessment section test students' understanding of the following concepts: weathering, erosion, and deposition as processes that continually change the surface of the Earth and the landforms formed by these processes.
Activities	A Changing Earth Observing Erosion and Deposition (Observational Investigation)
Journal entries	After viewing the Instruction Module, students apply their knowledge and understanding to respond to open-ended, higher order thinking questions. Journal #1 Journal #2
Expository text passages/ activities	Changes on Earth's Surface



Unit 7	Rock Cycle <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students are introduced to the three main types of rocks, igneous, sedimentary, and metamorphic rocks. They understand that they are formed through different earth processes. They also learn that rocks continuously change through the process of the rock cycle
Interactivity	In the interactive section of the module, students identify the process that formed a given rock sample and then “transform” it into another rock type by choosing the right process.
Glossary	Rock Cycle
Quiz	The questions in the assessment section test the student’s understanding of the following concepts: The three types of rocks and the processes that formed them, the correct sequence of changes in each of the processes, and the rock cycle.
Activity	Modeling the Rock Cycle (Descriptive Investigation)
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Unit 8	Plate Tectonics <i>(Suggested Grade Level: 6)</i>
Instruction Module	<p>In this module, students “build” a model of the Earth to understand that the Earth is made up of different layers which includes the inner core, outer core, mantle and crust. They understand that the top portion of the mantle and the crust is broken into pieces called tectonic plates. They learn about the Tectonic Plate Theory and how movement of these tectonic plates affects the Earth's surface causing geological events, such as the formation of ocean basins, earthquakes, volcanic eruptions, and mountain building.</p>
Interactivity/simulation	<p>In the interactive section of this module, students identify divergent, convergent, and transform boundaries based on their description and then identify the crustal features associated with each of them.</p> <p>In the simulation section, the students recognize that thickness of the lava affects its flow rate and the type of volcanic structure that is formed. They compare liquids of different thicknesses. They observe and record the time taken by each liquid to flow down a funnel. They conclude that thinner the liquid is, the faster it flows. They infer that thick lava leads to the formation of strato-volcanoes and thin lava forms shield volcanoes.</p>
Glossary	Plate Tectonics
Quiz	<p>The questions in the assessment section test the student’s understanding of the following concepts: Divergent, convergent, and transform boundaries, crustal features associated with each, evidences that support the Plate Tectonic theory, sea floor spreading, and the difference between folded mountains and fault block mountains.</p>
Activity	Modeling the Structural Layers of the Earth Major Tectonic Plates



Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal 1 Journal 2
Unit 9	Effects of Plate Tectonics <i>(Suggested Grade Level: 8)</i>
Instruction Module	In this module, students understand how Wegener's Continental Drift Theory, evidences of sea floor spreading, and the location of most earthquakes and volcanoes led to the theory of plate tectonics. They learn about the crustal features associated with divergent, convergent, and transform boundaries including volcanoes, folded mountains, fault block mountains, rift valleys, and mid-ocean ridges.
Interactivity/simulation	<p>In the interactive section of this module, students identify divergent, convergent, and transform boundaries based on their description and then identify the crustal features associated with each of them.</p> <p>In the simulation section, the students recognize that thickness of the lava affects its flow rate and the type of volcanic structure that is formed. They compare liquids of different thicknesses. They observe and record the time taken by each liquid to flow down a funnel. They conclude that thinner the liquid is, the faster it flows. They infer that thick lava leads to the formation of strato-volcanoes and thin lava forms shield volcanoes.</p>
Glossary	Effects of Plate Tectonics
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Divergent, convergent, and transform boundaries, crustal features associated with each, evidences that support the Plate Tectonic theory, sea floor spreading, and the difference between folded mountains and fault block mountains.



Crustal Features and Plate Tectonics

Activity

Evidence that Supports Plate Tectonics Theory

Effects of Plate Tectonics 3D Mind Mapping

Journal entries

Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.

Journal 1

Journal 2

Journal 3



Disciplinary Core Idea: ESS3 Earth and Human Activity

Natural Resources and Human Activity

Description: Students learn that humans depend on Earth's resources such as minerals, fresh water, and fossil fuels that are limited, and many are not renewable or replaceable over human lifetimes; human activities can impact these resources negatively, unless human understand the consequences of these negative impacts and apply the knowledge wisely in decisions and activities.

Unit 1

Classifying Minerals

(Suggested Grade Level: 6)

Instruction Module

In this module, students learn that minerals are the building blocks of rocks. They understand the different ways in which minerals form and the uses of minerals. They learn how to identify minerals using their physical properties, such as color, streak, luster, hardness, and cleavage.

Interactivity/simulation

In this simulation section of the module, students identify minerals by observing their physical properties such as color, streak, luster, hardness, and cleavage and comparing the results with a mineral identification chart.

Glossary

Classifying Minerals

Quiz

The questions in the assessment section test the student's understanding of the following concepts:
Relation of rocks and minerals, different ways in which minerals form, uses of minerals, physical properties of minerals such as color, streak, luster, hardness, and cleavage, and identification of minerals based on their physical properties

Activity

Testing for Physical Properties to Identify Minerals
(Experimental Investigation)



Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal
Unit 2	Energy Resources <i>(Suggested Grade Level: 6)</i>
Instruction Module	In this module, students are introduced to the various energy resources to produce electricity including fossil fuels, nuclear energy, biomass, hydropower, geothermal energy, wind and solar energy and the advantages and disadvantages of each of them. They classify the resources as renewable resources, non-renewable resources and inexhaustible resources.
Interactivity/simulation	In this interactive section of the module, students identify an energy resource based on the clues provided and then classify it as renewable, nonrenewable and inexhaustible.
Glossary	Energy Resources
Quiz	The questions in the assessment section test the student's understanding of the following concepts: The different types of energy resources and their classification into renewable, non-renewable and inexhaustible resources. The various power plants and their functioning. The importance of developing alternative sources of energy. Reading a power output graph and how we can develop energy resources in different areas.
Activities	Managing Energy in Your Home, School, and Community Energy Matters Comparing Solar Ovens (Comparative Investigation) Comparing Solar Ovens The Effect of Color on Heat Absorption in a Solar Collector (Experimental Investigation)



Journal entries

Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.

Journal 1



Unit 3	Watersheds <i>(Suggested Grade Level: 7)</i>
Instruction Module	In this module, students understand what a watershed is and recognize the importance of watersheds. They recognize that human activities can pollute surface water as well as groundwater. Increased erosion due to human activities also affects watershed. Students recognize the importance of protecting our watersheds.
Interactivity/simulation	In the simulation, students collect water samples from different regions in a watershed and conduct water quality tests to discover the source of nitrogen that is entering the ocean.
Glossary	Watersheds
Quiz	The questions in the assessment section test the student's understanding of the following concepts: Meaning of a water shed, role of gravity, boundaries of a watersheds, human activities that affect groundwater and surface water, ground water infiltration, runoff, the effects of erosion and sedimentation on watersheds.
Activity	Human Activity in Watersheds (Descriptive Investigation) pH Tolerance of Aquatic Organisms
Journal entries	Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge. Journal



Disciplinary Core Idea: Science and Engineering Practices

Science Practices

Description: Students will learn how to plan, design, and implement comparative, descriptive, and experimental investigations, ask well-defined questions, formulate testable hypotheses, collect, record, and analyze data, construct tables and graphs using technology to organize, examine, and evaluate data, communicate valid conclusions supported by the data, and predict trends.

Unit 1

Safety and Scientific Investigations

(Suggested Grade Level: 6,7,8)

Instruction Module

This module reinforces students' knowledge of safe practices and the use safety equipment such as eyewash, fire blankets, safety goggles, gloves, and aprons during laboratory and field investigations; they learn how to plan, design, and implement comparative, descriptive, and experimental investigations, ask well-defined questions, formulate testable hypotheses, collect, record, and analyze data, construct tables and graphs using technology to organize, examine, and evaluate data, communicate valid conclusions supported by the data, and predict trends.

Glossary

Safety and Scientific Investigations

Quiz

The questions in the assessment section test the student's understanding of the following concepts:
Similarities and differences between the three types of scientific investigations: Comparative, descriptive, and experimental; independent and dependent variables, and use of safety equipment such as eyewash, fire blankets, safety goggles, gloves, and aprons.

Activity

Move it! Move it! - Molecules in Motion
Lab Safety Symbols

Journal entries

Journal entries are open-ended questions and prompts that may be used to engage students prior to instruction, as pre- and post-assessments to measure learning, or as opportunities for students to reflect on what they have learned as they apply acquired knowledge.
Journal

