



Course Description
Grades 6-8
National (NGSS)



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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

(Suggested Grade Level: 6)

Instruction Module

What are Elements?: In this Instruction Module, students learn that elements are the simplest form of matter and that about 117 elements have been discovered so far. They learn the names of some elements such as oxygen, hydrogen, nitrogen, and, carbon that make up the solid part of Earth, the ocean, the atmosphere, and living matter.

Identifying Elements: In this Instruction Module, students learn that an element can be identified by its properties. They learn that the atoms of each element have a unique structure that determines its properties. They also learn that each element is represented by a chemical symbol.

What are Compounds?: In this Instruction Module, students learn that two or more elements combine to form a compound and that the smallest unit of a compound is a molecule. They learn that compounds are represented by chemical formulas and can only be separated by chemical processes such as electrolysis.

Evidence of Chemical Changes: In this Instruction Module, students understand that a chemical change results in the formation of new substances. They learn that a change in color, a change in temperature, the release of a gas, and the formation of a precipitate are evidence of chemical changes.

Interactivity/Simulation

The Substance Detector: 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	<p>Properties of Metals: In this Instruction Module, students observe the properties of some metals and learn that metals have a shiny luster, are malleable and ductile, and are mostly good conductors of heat and electricity.</p> <p>Comparing Metals and Nonmetals: In this Instruction Module, students observe and compare some physical properties of metals and nonmetals including the ability to conduct heat and electricity, luster, malleability and ductility, and learn to tabulate the differences.</p> <p>Properties of Metalloids: In this Instruction Module, students observe the properties of metalloids and recognize that they have some properties of metals and some of nonmetals. They learn that metalloids occupy the space between the metals and nonmetals on the periodic table.</p> <p>Calculating Density: In this Instruction Module, students learn that the density of a substance is unique and can be used to identify a substance by using standard density charts. They learn that density can be calculated by dividing the mass of a substance by its volume. They understand that mass can be measured with a triple beam balance and the volume of an irregular shaped object can be measured using a graduated cylinder.</p>
Interactivity/Simulation	Test Your Metal: 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	The Periodic Table: In this Instruction Module, students learn that all known elements are represented on the periodic table based on their atomic numbers. They understand that elements in a group have common properties and that properties change across a period.
Interactivity/Simulation	Lost and Found: 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
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Unit 4	Structure of the Atom <i>(Suggested Grade Level: 8)</i>
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Instruction Module	<p>Atoms: In this Instruction 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.</p> <p>Valence Electrons and Reactivity: In this Instruction Module, students learn about electron shells and valence shells, and understand what is meant by a full electron shell. They learn that an element does not react easily with other elements when the valence shell of its atoms are full.</p> <p>Ionic and Covalent Bonds: In this Instruction Module, students learn that ionic bonds form when atoms lose or gain electrons resulting in the formation of positive and negative ions which attract each other. They learn that covalent bonds form when atoms of elements share their electrons.</p>
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Interactivity/Simulation	Form a Bond: In this Interactivity students will be able to infer which atoms would most likely form ionic bonds based on the number of electrons in their valence shell.
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Glossary	Structure of the Atom
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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.
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Activity	Protons and Electrons
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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
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Unit 5	Chemical Reactions and Equations <i>(Suggested Grade Level: 8)</i>
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Instruction Module	<p>Chemical Symbols and Formulas: In this Instruction Module, students are introduced to chemical symbols and formulas. They learn that a chemical formula conveys information about the number of atoms of each element that combine to make a molecule of the compound.</p> <p>Chemical Reactions and Equations: In this Instruction Module, students learn that chemical reactions result in the formation of new substances. They learn how to write chemical equations to represent chemical reactions. They understand that chemical equations need to be balanced so that the Law of Conservation of Mass holds true.</p>
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Interactivity/Simulation	<p>Balance the Chemical Equation: 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.</p>
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Glossary	Chemical Reactions and Equations
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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.
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	Chemical Reactions and the Law of Conservation of Mass, Part 1 (Experimental Investigation)
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Activity	Chemical Reactions and the Law of Conservation of Mass, Part 2 (Experimental Investigation)
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	Chemical Reaction Experimental Investigation
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	Is it a Chemical Reaction? (Descriptive Investigation)
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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</p>
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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	<p>Force and Motion <i>(Suggested Grade Level: 6)</i></p>
Instruction Module	<p>Effects of Force on Motion: In this Instruction Module, students learn the pushes and pulls are called forces. They observe examples and changes caused by friction and gravity, and recognize that unbalanced forces can move an object at rest and change the speed and direction of a moving object.</p> <p>Measuring Distance and Speed: In this Instruction Module, students observe and recognize that motion is relative. They learn to calculate the average speed of an object by dividing the total distance traveled by the total time taken to travel that distance and express it using the correct units of measurement. They also learn that the motion of an object can be depicted on a distance - time graph</p>
Interactivity/ Simulation	<p>The Mass-matcher! In this Interactivity, students observe the effects of a pair of forces on an object and decide if the forces are balanced or unbalanced.</p>
Glossary	Force and Motion



Quiz	<p>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.</p>
Activity	<p>Unbalanced Forces (Experimental Investigation) Representing Changes in Motion Graphically (STEM Investigation)</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. Journal 1 Journal 2</p>
Unit 2	<p>Force and Acceleration <i>(Suggested Grade Level: 8)</i></p>
Instruction Module	<p>Newton's First Law of Motion: In this Instruction Module, students learn to calculate average speed, and differentiate between speed and velocity. They observe examples and understand how Newton's First Law can explain the motion of objects. They learn about inertia and recognize the importance of wearing seat belts. Newton's Second Law of Motion: In this Instruction Module, students learn about Newton's Second Law of motion. They observe examples and recognize that acceleration depends on the amount of force applied and the mass of the object. Force is mathematically expressed as $\text{Force} = \text{Mass} \times \text{Acceleration}$. Newton's Third Law of Motion: In this Instruction Module, students learn about Newton's Third Law of motion. They observe examples and identify action-reaction force pairs. Bumper Cars and Newton's Laws: In this Instruction Module, students observe the motion of bumper cars and understand that their motion can be described using Newton's Laws of motion.</p>
Interactivity/Simulation	<p>Motor Speedway Rally: In this interactive section of the module, students "apply" different amounts of force on different masses. They observe the motion of the object</p>



	<p>and calculate acceleration in each case. They recognize the relationship between force, mass, and acceleration.</p> <p>Splat!: 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>
Glossary	Force and Acceleration
Quiz	<p>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.</p> <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>
Activity	
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</p>
Unit 3	<p>Simple Machines <i>(Suggested Grade Level: 6)</i></p>
Instruction Module	<p>Simple Machines and their Uses: In this Instruction Module, students learn about simple machines including inclined planes, wedges, screws, levers, pulleys, and wheel and axle. They understand how each of these simple machines changes the amount of force, the direction of force, or the distance through which the force is moved.</p> <p>Mechanical Advantage and Efficiency: In this Instruction Module, students observe a pulley system and recognize that it can multiply force. They learn that the mechanical advantage of a machine is the number of times the machine</p>



multiplies the effort and is calculated by dividing the output force by the input force. They also understand that the efficiency of a machine is the ratio of the output energy to the input energy expressed as a percentage, and is always less than 100%.

Interactivity/Simulation	What's the Mechanical Advantage?: 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>
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Instruction Module	<p>Work vs No Work: In this Instruction Module, students learn that work is done when a force moves an object through a distance in the direction of the force. They recognize that no work is done when force is applied but the object does not move in the direction of the force. They learn that the amount of work done is equal to the product of the force applied and the distance moved by the object in the direction of the force.</p> <p>Work, Energy, and Food: In this Instruction Module, students learn that the chemical energy obtained from food is stored in the muscles and other parts of our</p>
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body. They observe and recognize that this chemical energy is transferred and transformed into kinetic energy and potential energy when we do work, and some of it is transformed to heat or thermal energy.

Work and Simple Machines: In this Instruction Module, students learn that simple machines such as ramps, pulleys, and levers make work easier by changing the direction or amount of force and the distance moved, but the amount of work remains the same. They also learn that the input energy, or the work done on the machine, is always greater than the output energy, or the work done by the machine.

Interactivity/Simulation	Work It!: 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. The Energy Stored in Foods (Comparative Investigation)
Activity	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 Journal 1 Journal 2



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

Kinetic Energy: In this Instruction Module, students observe and learn that kinetic energy is the energy possessed by moving objects. They learn that the kinetic energy of an object depends on the mass and speed of the object.

Potential Energy: In this Instruction Module, students observe examples and learn that potential energy is the energy stored in objects because of their position or condition. They recognize that the potential energy of an object raised above the ground depends on its mass and the height to which it is raised.

Mechanical Energy Transformations: In this Instruction Module, students observe an oscillating pendulum and learn that mechanical energy continuously changes from potential to kinetic and back to potential energy. They learn the pendulum eventually stops oscillating because energy is lost as heat due to friction. Students apply this understanding to explain the energy transformations in roller coaster rides.

Interactivity/Simulation

Is it Potential or Kinetic?: 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.

Design the Ride: 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, analyze the data, and arrive at a conclusion. 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	<p>Energy Transformations: In this Instruction Module, students observe and recognize examples of energy transformations such as chemical energy in a flashlight battery changing to electrical energy and then to light energy, and kinetic energy changing to thermal energy. They learn about the Law of Conservation of Energy.</p> <p>Generating Electrical Energy: In this Instruction Module, students learn how electricity is generated by transforming other forms of energy including chemical energy, thermal energy, solar energy, nuclear energy, and potential energy. They learn how thermal, nuclear, and hydropower plants, and solar cells use various energy resources to produce electricity.</p> <p>Transformation of Chemical Energy: In this Instruction Module, students learn that chemical energy is the energy stored in the bonds that hold together the atoms and molecules of a substance. They observe examples of transformation of chemical energy to other forms of energy, such as transformations of chemical energy in food to kinetic and potential energy, in batteries to electrical and light energy, in fuels to thermal, kinetic, and electrical energy.</p>
Interactivity/Simulation	Identify My Change: 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

(Suggested Grade Level: 6)

Instruction Module

Temperature: In this Instruction Module, students learn that temperature is a measure of the average kinetic energy of the moving particles of matter. They recognize the need of tools such as a thermometers and learn about the three scales of measuring temperature.

What is Thermal Energy?: In this Instruction Module, students learn that thermal energy of a substance refers to the total kinetic energy of the moving particles of matter in the substance. They recognize that the thermal energy of two substances can be different even when their temperatures are the same.

Heat Transfer by Conduction: In this Instruction Module, students learn that heat is transferred from an object at a higher temperature to an object at a lower temperature until both objects are at the same temperature. They also learn that conduction is the process in which heat is transferred through a substance from one particle to another and mostly occurs in solids.

Heat Transfer by Convection: In this Instruction Module, students learn that convection is a process of heat transfer in which the particles of matter move from the hot end to



the cooler end, carrying the energy with them, and mostly occurs in liquids and gases. They learn that wind is a result of convection currents in the atmosphere, and earthquakes are a result of convection currents in Earth's mantle.

Heat Transfer by Radiation: In this Instruction Module, students learn that radiation is the process by which heat is transferred as electromagnetic waves and does not require a material medium. They learn that energy from the Sun is transferred to Earth by radiation.

Interactivity/Simulation	<p>Heat Transfer by Conduction: In this 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.</p> <p>Heat and Heat Transfer: In this simulation, students set the temperatures of two materials whose containers are in contact with each other, observe the changes in temperature of both after an interval of time, and arrive at a conclusion about the direction in which thermal energy moves.</p>
Glossary	Heat Transfer
Quiz	<p>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.</p> <p>Safety First!</p>
Activity	<p>Modeling Heat Transfer by Convection and Conduction (Descriptive Investigation)</p> <p>Heat Conduction</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</p>



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

Light and Matter: In this Instruction Module students learn about light as a form of energy, its sources, and how it travels. They observe various examples and identify transparent, translucent, and opaque materials.

Reflection and Refraction of Light: In this Instruction Module, students learn that light rays reflect off surfaces. They learn the difference between regular reflection and diffuse reflection. They also understand that light rays refract when they travel from one medium into another, and recognize instances of refraction.

Lenses and Their Uses: In this Instruction Modules, students learn how light rays refract when they travel through concave and convex lenses. They understand how a telescopes make distant objects appear closer by using a combination of lenses to magnify the image. They also understand the role of the lens in the human eye and a camera.

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

Cell: The Basic Unit of Life: In this Instruction Module, students learn that all living organisms are composed of cells and that the cell is the basic unit of life. They learn that organisms can be unicellular or multicellular. They understand that a single cell is capable of performing all life functions and that every cell has a cell membrane, cytoplasm and DNA.

Eukaryotic and Prokaryotic Cells: In this Instruction Module, students learn about the structures of a prokaryotic and eukaryotic cell. They also learn to compare and contrast a typical prokaryotic and eukaryotic cell.

Interactivity/Simulation

Sorting Cells: 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>
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Instruction Module

Plant vs. Animal Cell: In this Instruction Module, students will understand that plant and animal cells are both eukaryotic cells. They will learn about the structural components of both these types of cells and will learn to compare and contrast plant and animal cell structures.

Interactivity/Simulation

Cell! Cell! Organelle!: 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.

Observing Paramecia (Descriptive Investigation)

Comparing Plant and Animal Cells’ Organelles

Activity

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	<p>Structural Hierarchy - Cell to Organisms: In this Instruction Module, students learn that multicellular organisms can either be simple or complex based on whether or not they exhibit structural hierarchy. They learn that the structural hierarchy exhibited by complex multicellular organisms from the smallest to the largest unit is cells to tissues to organs to organ systems to organism.</p> <p>Plant and Animal Tissues: In this Instruction Module, students learn about the structure and functions of the three main types of plant tissues, namely dermal tissue, ground tissue and vascular tissue. They also learn about the structure and functions of the four main types of animal tissues, namely epithelial tissue, connective tissue, muscle tissue and nervous tissue.</p>
Interactivity/Simulation	<p>Levels of Structural Organisation: In this interactivity, 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.</p>
Glossary	Cells to Organisms
Quiz	<p>The questions in the assessment section test the student's understanding of the following concepts:</p> <p>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.</p>
Activity	Levels of Organization of Living Things
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</p>



Unit 4	Human Body Systems <i>(Suggested Grade Level: 7)</i>
Instruction Module	<p>Respiratory and Circulatory Systems: In this Instruction Module, students learn about the structural components of the respiratory and the circulatory systems. They understand that these systems are interconnected for the transport of gases in the human body. They understand how the respiratory system helps in the exchange of gases and the circulatory system helps in the transport of gases within the body.</p> <p>Skeletal and Muscular Systems: In this Instruction Module, students learn how bones and muscles work together to facilitate movement. They learn that muscles are of two main types, namely voluntary and involuntary muscles. They learn that the region where two or more bones meet is called a joint and learn about the different types of joints in the human body.</p> <p>Digestive and Excretory Systems: In this Instruction Module, students learn about the different components of the digestive system and how they aid in digestion. They also learn about the kidneys in the excretory system and how they work to eliminate wastes in the bloodstream.</p> <p>Integumentary System: In this Instruction Module, students learn that the integumentary system is made of the skin, hair and nails. They learn about the different structural components of the skin and the functions of these components.</p> <p>Nervous System: In this Instruction Module, students Learn about the components of the nervous system and their functions. They also understand how nerves carry electrical messages or impulses to and from the brain.</p> <p>Endocrine and Reproductive Systems: In this Instruction Module, students learn that the endocrine system is made of structures called glands that release hormones to regulate some important functions in the body. They learn about the functions of some important endocrine glands. They also learn about the structural components of the male and female reproductive systems and their functions.</p>
Interactivity/Simulation	Dr. Fix it: In this Interactivity, 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	Stimulus: In this Instruction Module, students learn to define and describe a stimulus. They learn that stimuli can either be internal or external stimuli. They understand the differences between the two. They also understand how stimuli help to restore homeostasis. Response: In this Instruction Module, students learn to define responses. They also learn to describe different kinds of responses such as positive, negative, ignored and fight or flight responses.
Interactivity/Simulation	Pair'em Up!: In this Interactivity, 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

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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 (Suggested Grade Level: 6)

Instruction Module

Components of an Ecosystem: In this Instruction Module, students learn that an ecosystem is composed of abiotic and biotic components. They understand that these components are constantly interacting with each other. They also understand the structural hierarchy within an ecosystem starting from an individual to population to community to finally an ecosystem.

Interactivity/Simulation

Ocean Ecosystem: In this Interactivity, 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	Photosynthesis: In this Instruction Module, students understand that green plants are capable of producing their own food through photosynthesis. They learn about the different structures of a leaf that aid photosynthesis. Plant Adaptations: In this Instruction Module, students learn all plants have adaptations that help them survive in their environments. Students learn about root and leaf adaptations of plants in the tropical rainforests, tundra and hot deserts.
Interactivity/Simulation	The Green Machine!: In this simulation, students investigate the effect of light on the rate of photosynthesis by varying the intensity of light that plants receive and measuring the amount of oxygen released.
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	Forces Affecting Plant Growth: In this Instruction Module, students learn that certain forces acting on plants affect their growth. They understand how forces affect seed germination, the direction of growth of different plant parts and the ability to remain stiff without wilting
Interactivity/Simulation	Gravity and Plants: 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

The Food Chain: In this Instruction Module, students learn that some organisms in an interconnected to each other based on who eats what and that this can be represented using a food chain. They learn that a food chain starts with a producer that is consumed by an herbivore, which in turn is consumed by a carnivore. They understand that herbivores and carnivores are both consumers and that in a food chain the flow of energy is unidirectional, always from the producers to the carnivores.

Ecosystems–Energy Flow: In this Instruction Module, students learn that energy flow in an ecosystem can be represented using food chains. They understand that food chains interconnect to form food webs that are more complex compared to food chains. They also learn that energy flow can be represented using an ecological pyramid with the producers at the base of the pyramid and the top carnivores at the apex.

Interactivity/Simulation

Build the Food Chain: In this Interactivity students create 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
(Suggested Grade Level: 7)



Instruction Module	<p>Cycling of Matter: In this Instruction Module, students learn to describe how nutrients such as carbon, hydrogen, nitrogen, oxygen and phosphorus are cycled in the environment through the carbon, nitrogen, phosphorus and water cycles.</p> <p>Decomposition: In this Instruction Module, students learn to describe the process of decomposition and to identify its importance in cycling nutrients in an ecosystem. They also learn to describe how decomposition can be employed to make compost.</p>
Interactivity/Simulation	<p>Garbage to Garden: In this Interactivity, students “build” a compost pit choosing the correct materials for each layer in the compost pit.</p>
Glossary	Cycling of Matter
Quiz	<p>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.</p>
Activity	Mini Compost in a Bottle – STEM
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 6	<p>Organic Compounds and the Living World <i>(Suggested Grade Level: 7)</i></p>
Instruction Module	<p>Organic Compounds in the Living World: In this Instruction Module, students learn that carbohydrates, proteins, lipids and nucleic acids are organic compounds. They learn about the structural similarities and differences of these compounds and how they are utilized in our bodies.</p> <p>Nutrients and Digestion: In this Instruction Module, students learn that carbohydrates, lipids and proteins are nutrients required by our bodies. They understand how these nutrients are broken down by the process of digestion and absorbed into the bloodstream.</p>



Interactivity/Simulation	Organic Kitchen: In this Interactivity, 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	Ecological Succession: In this Instruction Module, students learn that ecosystems are constantly changing. They learn to define ecological succession and to differentiate between primary and secondary ecological succession.
Interactivity/simulation	Fit Them Right!: In this Interactivity, 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
(Suggested Grade Level: 8)

Instruction Module

Adaptations to Seasonal Changes: In this Instruction Module, students learn that some environmental changes such as seasonal changes are short-term changes. They understand that plants and animals living in places with harsh winters have different physical and behavioral adaptations to cope with winter.
Migration: In this Instruction Module, students learn that organisms in an ecosystem migrate to cope with changing environmental conditions. They understand that seasonal migration is short-term migration and removal migration is a long-term, permanent migration.
Natural Selection: In this Instruction Module, students learn how long-term environmental changes affect organisms. They learn about the process of natural selection.

Interactivity/Simulation

Colors and Heat Absorption: In this simulation, students recognize that the addax antelope changes color in response to the seasons. Students investigate to determine how the change in coat color is an adaptation that aids the addax's survival.

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
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Unit 9	Human Impacts on Ocean Ecosystems (Suggested Grade Level: 8)
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Instruction Module	<p>Human Impact on Ocean Ecosystems: In this Instruction Module, students learn about the different ways in which oceans are important. They also learn about the negative impacts of human activities such as over-fishing and pollution on oceans and biodiversity. Finally they learn about different steps that human can take to preserve marine ecosystems.</p> <p>Marine Resources: In this Instruction Module, students learn that oceans provide us with many valuable resources such as food, transport, jobs, oil and natural gas.</p>
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Interactivity/simulation	<p>Trace the Waste! In this Interactivity, students observe various human activities that could affect ocean ecosystems. They recognize the modes by which the pollution finally ends up in the ocean.</p>
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Glossary	Human Impacts on Ocean Ecosystems
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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.
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Activity	Human Impacts on Ocean Ecosystems (Research Project)
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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
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Unit 10	Interrelationships between Organisms <i>(Suggested Grade Level: 8)</i>
Instruction Module	<p>Interrelationships between Organisms: In this Instruction Module, students learn that organisms in an ecosystem interact with one another. They understand that these interactions are of different types, namely producer/consumer, predator/prey, and host/parasite interactions.</p> <p>Abiotic Factors Influencing the Ecosystem: In this Instruction Module, students learn about the different abiotic factors in an ecosystem. They examine how these abiotic factors influence the biotic factors in the ecosystem.</p>
Interactivity/simulation	<p>Rhize 'n' Grow!: In this Simulation, 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.</p>
Glossary	Interrelationships between Organisms
Quiz	<p>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.</p>
Activity	<p>Interrelationships between Organisms Activity 1</p> <p>Interrelationships between Organisms Activity 2</p> <p>The Importance of a Plant's Leaves (Experimental Investigation)</p> <p>Interdependence in Living Systems</p> <p>Depending on and Competing for Resources (Descriptive Investigation)</p> <p>Elodea and Saltwater (Comparative Investigation)</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</p>



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 (Suggested Grade Level: 7)

Instruction Module

Genes and Heredity: In this Instruction Module students understand that genes are segments of DNA that code for a single trait. They learn that in eukaryotic cells, DNA is found in the nucleus in structures called chromosomes.

Interactivity/simulation

Packaging Fun: In this Interactivity, students place labeled boxes one inside the other in the correct order to represent the location of genes within a cell.

Glossary

Heredity and Genes

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

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 (Suggested Grade Level: 7)
Instruction Module	<p>Asexual Reproduction: In this Instruction Module, students learn that asexual reproduction involves only one parent and that the offspring produced are genetically identical to each other and to their parent. They will also learn to describe some methods of asexual reproduction such as fragmentation, budding, binary fission and vegetative propagation.</p> <p>Sexual Reproduction: In this Instruction Module, students learn that sexual reproduction requires two parents and that the offspring produced by sexual reproduction are genetically distinct from their parents and each other. They will also learn to describe some methods of sexual reproduction such as conjugation and fertilization.</p>
Interactivity/simulation	<p>Whose Parent is that Anyway?: In this Interactivity, 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.</p>
Glossary	Types of Reproduction
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	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 <i>(Suggested Grade Level: 7)</i>
Instruction Module	<p>Factors Affecting Ecosystems: In this Instruction Module, students learn that an ecosystem is made of abiotic and biotic components that are constantly interacting with one another. They understand how changes to any of these factors affect the ecosystem.</p> <p>Biomes and their Environments: In this Instruction Module, students learn to define a biome. They learn about the different types of biomes on Earth and to describe the characteristics of each of these biomes.</p>
Interactivity/simulation	Biomes and their Organisms: In this interactivity, 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	<p>Observing Biodiversity in a Schoolyard Microhabitat (Descriptive Investigation)</p> <p>Insect Diversity (Descriptive Investigation)</p>



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	Variations and Natural Selection: In this Instruction Module, students learn that favorable variations in a population develop into adaptations over time. They understand how natural selection acts on variations. Types of Adaptations: In this Instruction Module, students learn that adaptations are of three basic types, namely physical, behavioral and physiological. They learn to identify these adaptations in different organisms and understand the significance of these adaptations in helping the organisms survive.
Interactivity/Simulation	Survivor: In this Interactivity, students analyze and select the traits that might be most suitable for survival based on the environment provided. Mass Matters?: 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. They arrive at a conclusion based on their observations.
Glossary	Variability and Survival
Quiz	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.



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	Internal Structural Adaptations <i>(Suggested Grade Level: 7)</i>
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Instruction Module

Internal Structural Adaptations: In this Instruction Module, students understand that animals and plants have internal structural adaptations that increase their chances of survival in their environment. They understand the importance of some internal structural adaptations such as the hollow bones in some birds, gills in fish and xylem and phloem in plants.

Interactivity/Simulation

Name That Adaptation: 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	<p>Factors Influencing Natural Selection: In this Instruction Module, students understand that populations are constantly changing over time and this is due to the natural selection. They learn about different factors influencing natural selection such as variations within a population and environmental factors such as predators and the availability of food.</p> <p>Selective Breeding: In this Instruction Module, students learn that humans can create new species by selective breeding. They learn about common selective breeding such as inbreeding, hybridization that result in new breeds of animals and varieties of plants.</p>
Interactivity/Simulation	<p>Feed the Finch!: In this 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.</p>
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	<p>Taxonomic Classification: In this Instruction Module, students learn that taxonomic classification groups living organisms into smaller and smaller groups based on their similarities. They also understand the significance of using a standardized taxonomic classification system.</p> <p>Three Domain Classification: In this Instruction Module, students learn that all organisms are grouped into three domains - Archaea, Bacteria and Eukarya. They learn the main characteristics of organisms belonging to each domain. They also learn that organisms in Domain Eukarya are further divided into four kingdoms - Protista, Fungi, Plantae and Animalia and understand the salient features of organisms belonging to each of these kingdoms.</p>
Interactivity/Simulation	Sort the Lot! In this Interactivity, students classify organisms into kingdoms based on their characteristics.
Glossary	Taxonomic Classification
Quiz	<p>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.</p>
Activity	<p>The Basic Characteristics of Kingdoms</p> <p>Investigating Reproductive Adaptations of Seed Plants, Part 1</p> <p>Investigating Reproductive Adaptations of Seed Plants, Part 2</p> <p>Growing and Observing Yeast</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</p>



Unit 6	Using Dichotomous Keys <i>(Suggested Grade Level: 7)</i>
Instruction Module	Using Dichotomous Keys: In this Instruction Module, students learn what dichotomous keys are and what they are used for. They also learn to use dichotomous keys to identify plants and animals.
Interactivity/Simulation	Tricky Tree Key: In this interactivity, students will 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	<p>The Sun: In this Instruction Module, students learn how the process of fusion that occurs within the core of the Sun produces vast amounts of energy. They learn how this energy is transferred through the different layers of the Sun including the radiative zone, the convective zone, and the photosphere, from where it is released into space as heat and light.</p> <p>The Solar System: In this Instruction Module, students learn about the location, the movements, and some of the physical properties of the objects in our solar system such as the planets, the Galilean moons, the asteroid belt, meteors, and comets.</p> <p>History of Space Exploration: In this Instruction Module, students learn about the geocentric and heliocentric models of the solar system. They learn how inventions and development of equipment, such as telescopes and space transportation, have helped in space explorations.</p>
Interactivity/Simulation	The Spotlight: In this Interactivity, 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.



	The Solar System
Activity	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	Life in our Solar System: In this Instruction Module, students learn that Earth is the only object in our solar system that can support life. They recognize the characteristics of Earth such as its distance from the Sun, the presence of water, the composition of its atmosphere, and its mass that make it possible for life to exist. Living in Space: In this Instruction Module, students learn that conditions in space do not support life. They recognize the need for specially designed spacecrafts that can provide oxygen, water, and other conditions necessary for life, and thus allow astronauts to live and work in space.
Interactivity/Simulation	Will It Increase or Decrease?: 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.
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	<p>Earth's Rotation and Revolution: In this Instruction Module, students learn that Earth rotates on its tilted axis from west to east causing the day and night cycle and the apparent movement of the Sun across the sky. They also learn that Earth revolves around the Sun, and the tilt of its axis in relation to the Sun causes the changes in seasons.</p> <p>The Lunar Cycle: In this Instruction Module, students learn that the phases of the Moon are a result of the relative positions of the Sun, Moon, and Earth. They understand that only parts of the Moon's lit up surface are visible from Earth, resulting in the apparent waxing and waning of the Moon.</p> <p>Tides: In this Instruction Module, students learn that the Moon's gravitational pull on Earth's waters results in tides. They learn that every point on Earth experiences two high tides and two low tides during a day, and the combined effect of the gravitational pull of the Sun and the Moon result in spring tides and neap tides.</p>



Interactivity/Simulation	Phases and Tides: 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	Stars: Color and Luminosity: In this Instruction Module, students learn that the temperature of a star can be determined by its color. They learn that the temperature of blue colored stars are higher than that of red colored stars. They also learn that a star's luminosity depends on its distance from Earth, its size, and the amount of energy it emits. Stars and the H-R Diagram: In this Instruction Module, students learn about the different stages in the life cycle of stars such as the formation, the main sequence, red giants, supergiants, supernovae, white dwarfs, and black holes. They learn how stars are classified on the Hertsprung-Russel Diagram based on their temperature



and luminosity.

Galaxies: In this Instruction Module, students learn that galaxies are made of gas, dust, and stars. They learn about the characteristics of spiral, elliptical, and irregular galaxies and understand that galaxies are constantly changing or evolving. They recognize that our solar system is part of the Milky Way galaxy.

Interactivity/Simulation	Home for the Stars: In this Interactivity, 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.
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Glossary	The Universe
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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.
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Activity	Plotting the Stars
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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
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Unit 5	The Universe – Distances and Sizes <i>(Suggested Grade Level: 8)</i>
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Instruction Module	Distances in Light-Years: In this Instruction Module, students learn that a light year is the distance traveled by light in one year. They understand why a light year is a convenient unit to measure large distances and sizes in the universe. Using Light to Study the Universe: In this Instruction Module, students learn how scientists study the different wavelengths of light from distance stars and other objects in space and use it to gain information about the composition of the objects. They understand how scientists compare the absorption spectrums of stars to
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the emission spectrums of elements to understand the composition of stars.

Interactivity/Simulation	Star Light Star Bright: In this Interactivity, 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	<p>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.</p> <p>Radio Astronomy</p> <p>Absorption and Emission Spectra</p> <p>Constructing a Model Hand-held Spectroscope (Descriptive Investigation)</p>
Activity	<p>Modeling Sizes Using Light Years: Part 1 (Descriptive Investigation)</p> <p>Modeling Sizes Using Light Years: Part 2 (Descriptive Investigation)</p> <p>Modeling Distances Using Light Years: Part 1</p> <p>Modeling Distances Using Light Years: Part 2</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 6	Origins of the Universe – Theories (Suggested Grade Level: 8)
Instruction Module	Origin of the Universe – Theories: In this Instruction Module, students understand how observations such as Hubble's discovery of red shifted stars and galaxies leading to the theory of the expanding universe, the discovery of cosmic microwave background radiation, and the abundance of light elements in the universe led scientist to develop the Big Bang theory to explain the origin of the universe.
Interactivity/Simulation	Origin Of The Universe-Theories: In this Interactivity, 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

Water Cycle: In this Instruction Module, students are introduced to the water cycle. Students learn to identify and describe the different processes that are part of the water cycle such as evaporation, condensation, precipitation, infiltration, and transpiration.

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

(Suggested Grade Level: 8)

Instruction Module

Weather and Weather Maps: In this Instruction Module, students understand the difference between weather and climate. They learn about the role of the Sun in creating high pressure and low pressure regions, thus affecting the weather of a place. They also learn about the symbols on a weather map used to represent high and low pressures, and warm and cold fronts.



The Sun’s Influence on Atmosphere and Oceans: In this Instruction Module students learn that the energy from the Sun causes convection currents in the atmosphere. They also understand that unequal heating of the oceans and differences in salinity cause surface currents and deep ocean currents. They recognize how these ocean currents affect the climate and weather in all parts of the world.

Influence of Oceans on Weather and Climate: In this Instruction Module, students recognize the role of the oceans in the water cycle and in the creation of hurricanes. They understand the influence of ocean currents on the weather and climate of a place. They also learn what causes El Niño and how it affects the weather globally.

Interactivity/Simulation	Predict the Weather: 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	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	Topographic Maps <i>(Suggested Grade Level: 8)</i>
Instruction Module	Topographic Maps: In this Instruction Module students are introduced to topographic maps. They learn about contour lines, contour intervals, index contour lines, scale, and legends on a topographic map. Satellite Views of Land Features: In this Instruction Module students are introduced to satellite images of Earth and learn how these images help to identify land and erosional features. They understand how perspective views make it easier to see the relief of the landscape.
Interactivity/Simulation	Topographic Maps: 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	Catastrophic Events and Ecosystems: In this Instructional 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	Alex's Soil Lab: 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	Weathering: In this Instruction Module, students learn about the process of weathering and understand how mechanical weathering differs from chemical weathering. They learn about the agents of weathering including water, wind, ice, temperature changes, and organisms, and understand how weathering changes the surface of Earth. Erosion: In this Instruction Module, students will learn about the process of erosion and understand how wind, water, and ice act as agents of erosion. They learn how erosion changes the surface of Earth. Deposition: In this Instruction Module, students learn about the process of deposition and understand how



landforms such as deltas, alluvial fans, sand dunes, and moraines are a result of deposition by water, wind, and glaciers.

Interactivity/Simulation	Dissolve and Resolve: 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.
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>
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Instruction Module	<p>Erosion by Water: In this Instruction Module, students will learn about water erosion and the landforms created by such erosion. They will also understand how erosion by water can be measured quantitatively in the laboratory.</p> <p>Water as a Force: In this Instruction Module, students learn how water can change Earth's surface. They learn that water is a destructive force when it causes weathering and erosion and that it is a constructive force when it causes deposition.</p>
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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	Our Earth's Changing Surface

Unit 7	Rock Cycle <i>(Suggested Grade Level: 6)</i>
Instruction Module	Rocks: In this Instruction Module, students learn that rocks are of three basic types, namely igneous, sedimentary and metamorphic. They learn about the processes involved in the formation of these rocks. They also understand the rock cycle in which rocks can be converted from one form to another.
Interactivity/Simulation	Rock Transformer: In this Interactivity, 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.
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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
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Unit 8	Plate Tectonics <i>(Suggested Grade Level: 6)</i>
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Instruction Module

Layers of the Earth: In this Instruction Module, students learn that Earth is divided into the crust, mantle, and core.
Tectonic Plates: In this Instruction Module, students learn that Earth's crust is broken in pieces called tectonic plates that float atop the molten mantle and that the movements of these tectonic plates can alter Earth's surface and create earthquakes, ocean basins, volcanoes and mountains.

Interactivity/Simulation	Building Earth and Matching Plates: In this Interactivity, students recognize the different layers of the Earth and what it is made up of, by “building” a model Earth. They also recognize the different tectonic plates and their location on the world map.
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Glossary Plate Tectonics

Quiz	The questions in the assessment section test the student’s understanding of the following concepts: Movement of tectonic plates and the changes it brings about on Earth’s surface, the layers of the Earth, and the different Tectonic plates.
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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 (Suggested Grade Level: 8)

Instruction Module

Theory of Plate Tectonics: In this Instruction Module, students learn how the Continental Drift theory, the discovery of sea floor spreading, and observations that volcanoes and earthquakes occurred most frequently at specific areas around the world led scientists to develop the Theory of Plate Tectonics.

Effects of Plate Tectonics: In this Instruction Module, students learn that plate boundaries are classified as convergent, divergent, or transform boundaries based on their relative movement. They learn that divergent boundaries lead to the formation of crustal features such as mid-ocean ridges, rift valleys, and fault block mountains; convergent boundaries lead to the formation of features such as trenches, volcanoes, and folded mountains; transform boundaries result in strike-slip faults and cause earthquakes.

Interactivity/Simulation

Tectonic Trouble: In this Interactivity, students identify divergent, convergent, and transform boundaries based on their description and then identify the crustal features associated with each of them.

Flow of Lava: In this simulation, students investigate to find out if the 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. Based on the data, they arrive at a conclusion.

Glossary

Effects of 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> <p>Crustal Features and Plate Tectonics</p>
Activity	<p>Evidence that Supports Plate Tectonics Theory</p> <p>3D Mind Mapping</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>



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

Mineral Basics: In this Instruction Modules, students learn to define a mineral. They understand how some minerals such as diamonds and salt are formed. They also learn how minerals are used in our daily lives for various purposes.

Identifying Minerals: In this Instruction Module, students learn that minerals are inorganic, solid substances found in nature and that all rocks are made of minerals. They understand that different minerals are formed in different ways in different regions of Earth. They also learn to identify minerals based on their physical properties such as color and streak, luster, hardness and cleavage.

Interactivity/Simulation

Mystery Minerals: In this Simulation, 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
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Unit 2	Energy Resources <i>(Suggested Grade Level: 6)</i>
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Instruction Module	<p>Energy Resources: In this Instruction Module, students learn to distinguish between renewable and nonrenewable energy resources. They also learn to identify examples of renewable and non-renewable energy resources.</p> <p>Fossil Fuels: In this Instruction Module, students understand that coal, oil and natural gas are fossils used and that they can be used to produce electricity. They also understand the advantages and disadvantages of using fossil fuels.</p> <p>Nuclear Energy: In this Instruction Module, students understand how nuclear energy can be utilized to generate electricity. They also understand the advantages and disadvantages of using nuclear energy.</p> <p>Hydroelectricity: In this Instruction Module, students understand how hydropower, the energy stored in moving water, can be utilized to generate electricity. They also understand the advantages and disadvantages of using hydropower.</p> <p>Geothermal Energy: In this Instruction Module, students understand how geothermal energy or the energy stored in hot springs and geysers, can be utilized to generate electricity. They also understand the advantages and disadvantages of using geothermal energy.</p> <p>Biomass: In this Instruction Module, students understand how biomass can be utilized to generate electricity. They also understand the advantages and disadvantages of using biomass.</p> <p>Solar Energy: In this Instruction Module, students understand how solar energy can be utilized to generate electricity. They also understand the advantages and disadvantages of using solar energy.</p> <p>Wind Energy: In this Instruction Module, students understand how wind energy can be utilized to generate electricity. They also understand the advantages and disadvantages of using wind energy.</p>
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Interactivity/Simulation	Energize the Gadgets: In this Interactivity, students identify an energy resource based on the clues provided and then classify it as renewable and nonrenewable.
Glossary	Energy Resources
Quiz	<p>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.</p> <p>Managing Energy in Your Home, School, and Community</p> <p>Energy Matters</p>
Activities	<p>Comparing Solar Ovens (Comparative Investigation)</p> <p>The Effect of Color on Heat Absorption in a Solar Collector (Experimental Investigation)</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	Watersheds <i>(Suggested Grade Level: 7)</i>
Instruction Module	Watersheds: In this Instruction Module, students learn to define and describe a watershed. They understand the significance of watersheds and understand how watersheds are affected by natural and human activities.
Interactivity/Simulation	Nitrogen Levels in Water: 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

Safety and Scientific Investigation: In this Instruction Module, students learn how to plan and implement descriptive, comparative, and experimental investigations. They learn to ask well-defined questions, formulate testable hypotheses, collect, record, and analyze data, construct tables and graphs, communicate valid conclusions 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