Expedition: Learn! Lesson Catalog

Science | Grades 6–8

PHYSICAL SCIENCE

Structure and Properties of Matter

Lesson	Lesson Objectives
The Structure of Matter	• Students describe atoms and molecules. • Students contrast simple and complex molecules. • Students describe extended structures. • Students analyze molecular models. • Students define domain-specific vocabulary related to the structure of matter.
The Structure of Atoms	• Students describe the structure of an atom. • Students explain that atoms make up all matter and are the smallest unit of an element. • Students model the structure of an atom. • Students define domain-specific vocabulary related to the structure of atoms.
Elements and Compounds	• Students describe elements. • Students differentiate elements and compounds. • Students recognize the information available in the periodic table. • Students relate compounds and molecules. • Students define domain-specific vocabulary related to elements and compounds.
Synthetic Materials	• Students identify common synthetic materials. • Students explain how synthetic materials are produced. • Students relate synthetic materials to the natural resources used in their production. • Students identify positive and negative impacts of the use of synthetic materials. • Students define domain-specific vocabulary related to synthetic materials.
Thermal Energy and States of Matter	• Students explain how addition or removal of thermal energy affects particle motion. • Students relate temperature change to addition or removal of thermal energy. • Students describe solids, liquids, and gases. • Students predict changes in state when thermal energy is added or removed. • Students define domain-specific vocabulary related to thermal energy and states of matter.

How Heat Affects Matter	• Students explain how heat affects the movement of particles of matter. • Students describe thermal expansion and thermal contraction. • Students model thermal expansion and thermal contraction. • Students define domain-specific vocabulary related to thermal expansion and thermal contraction.
Substances and Mixtures	• Students distinguish pure substances and mixtures. • Students identify examples of pure substances and mixtures. • Students explain the difference between heterogeneous and homogeneous mixtures. • Students describe several methods that can be used to separate mixtures. • Students define domain-specific vocabulary related to substances and mixtures.
Chemical Symbols and Formulas	• Students recognize that chemical symbols represent elements and chemical formulas represent compounds. • Students apply information from the periodic table. • Students interpret a chemical formula using information from the periodic table. • Students define domain-specific vocabulary related to chemical symbols and formulas.
Comparing Properties of Matter	• Students identify physical properties. • Students compare and contrast properties that are dependent on the amount of matter to those that are independent of the amount of matter. • Students classify substances based on physical properties. • Students define domain-specific vocabulary related to properties of matter.
Density	• Students explain how to measure mass and volume. • Students calculate density using measurements of mass and volume. • Students compare densities to identify different types of matter. • Students define domain-specific vocabulary related to density.
Classifying Conductors and Insulators	• Students identify conductivity as a property of matter. • Students describe the characteristics of insulators and conductors. • Students classify materials as conductors or insulators, using evidence. • Students define domain-specific vocabulary related to conductors and insulators.
Classifying Elements	• Students explain that chemical elements can be identified and described based on their physical properties. • Students classify elements based on information from the periodic table. • Students predict the properties of elements based on information in the periodic table. • Students define domain-specific vocabulary related to elements.

The Properties of Water	• Students describe the properties of water. • Students relate properties of water to observable phenomena. • Students explain the importance of water's properties to living and non-living things. • Students define domain-specific vocabulary related to properties of water.
Factors that Affect Dissolving	• Students describe the process of dissolving. • Students describe how temperature, surface area, and agitation affect the rate of dissolution. • Students model the effect of temperature, surface area, and agitation on dissolving. • Students define domain-specific vocabulary related to factors that affect the rate of dissolution.
Acids, Bases, and Salts	• Students describe acids, bases, and salts. • Students compare and contrast the properties of acids, bases, and salts. • Students define domain-specific vocabulary related to acids, bases, and salts.

Chemical Reactions

Lesson	Lesson Objectives
Chemical Changes Affect Properties	• Students explain that atoms are rearranged during chemical reactions. • Students contrast properties of reactants and products of chemical reactions. • Students analyze chemical reactions to support an argument that matter is conserved. • Students define domain-specific vocabulary related to chemical changes and properties.
Chemical Reactions	• Students describe the characteristics of a chemical reaction. • Students identify examples of chemical reactions. • Students analyze models of chemical reactions. • Students analyze chemical reactions to support an argument that matter is conserved. • Students define domain-specific vocabulary related to chemical reactions.
Conservation of Matter in Chemical Reactions	• Students describe chemical reactions. • Students analyze chemical equations to support an argument that matter is conserved. • Students recognize that matter is conserved even if a reaction appears to lose mass. • Students define domain-specific vocabulary related to chemical reactions and conservation of matter.

Chemical Reactions and Energy	• Students explain that chemical reactions absorb or release energy. • Students relate energy changes during a reaction to bond strength of the reactants and products. • Students identify examples of endothermic and exothermic reactions. • Students apply information about endothermic and exothermic reactions to design a device. • Students define domain-specific vocabulary related to endothermic and exothermic reactions.

Forces and Interactions

Lesson	Lesson Objectives
Forces and Motion	• Students relate forces and motion. • Students apply Newton's first law of motion. • Students apply Newton's second law of motion. • Students define domain-specific vocabulary related to forces and motion.
Newton's First Law	• Students explain how motion is described. • Students relate forces and motion. • Students analyze the forces acting on an object to determine net force. • Students restate Newton's first law of motion. • Students apply their understanding of Newton's first law of motion. • Students define domain-specific vocabulary related to Newton's first law of motion.
Newton's Third Law	• Students explain Newton's third law of motion. • Students describe action and reaction forces. • Students identify examples of action and reaction forces. • Students apply information about Newton's third law of motion. • Students define domain-specific vocabulary related to Newton's third law of motion.
Graphing and Describing Motion	• Students describe the motion of an object using its direction and speed. • Students calculate speed. • Students analyze graphs to describe an object's motion. • Students define domain-specific vocabulary related to motion.
Comparing Simple Machines	• Students describe the six types of simple machines. • Students explain how the efficiency of simple machines is calculated. • Students investigate the efficiency of simple machines. • Students define domain-specific vocabulary related to simple machines.

Electric and Magnetic Forces	• Students describe electric and magnetic forces. • Students explain electric and magnetic forces. • Students identify examples of electric and magnetic force interactions used in technology and devices. • Students identify factors that affect the strength of electric and magnetic forces. • Students define domain-specific vocabulary related to electric and magnetic forces.
Gravitational Interactions	• Students describe gravity. • Students apply information about gravitational interactions to explain everyday observations. • Students identify factors that affect the strength of gravitational forces. • Students describe the role of gravity in the solar system. • Students define domain-specific vocabulary related to gravitational interactions.
Fields and Forces	• Students distinguish contact and non-contact forces. • Students identify examples of non-contact forces. • Students relate fields and non-contact forces. • Students identify examples of fields affecting motion. • Students apply information about fields to explain phenomena. • Students define domain-specific vocabulary related to fields and forces.
Energy	
Lesson	**Lesson Objectives**
Kinetic Energy	• Students describe kinetic energy. • Students distinguish kinetic and potential energy. • Students relate changes in potential and kinetic energy changes to conservation of energy. • Students identify factors that affect an object's kinetic energy. • Students analyze data and graphs showing an object's kinetic energy, mass, and speed. • Students define domain-specific vocabulary related to kinetic energy.
Potential Energy	• Students describe potential energy. • Students relate potential energy to position. • Students describe the transformation between potential and kinetic energy. • Students identify examples of fields affecting motion. • Students model how the distance between interacting objects affects potential energy. • Students define domain-specific vocabulary related to potential energy.

Changes in Kinetic Energy	• Students relate kinetic energy to motion. • Students describe energy changes. • Students support a claim that energy transfer is related to changes in kinetic energy. • Students define domain-specific vocabulary related to changes in kinetic energy.
Thermal Energy Transfer	• Students describe processes that transfer thermal energy. • Students apply information to maximize or minimize thermal energy transfer. • Students interpret information about insulators and conductors. • Students define domain-specific vocabulary related to thermal energy transfer.
Energy and Temperature Change	• Students identify factors that affect temperature change when energy is transferred to or from matter. • Students relate temperature to particle motion. • Students plan an investigation to test factors that affect temperature change. • Students define domain-specific vocabulary related to energy and temperature change.
Electrical Circuits	• Students identify components of electrical circuits. • Students differentiate series and parallel circuits. • Students analyze circuit diagrams. • Students define domain-specific vocabulary related to electrical circuits.
Energy Transfer in Mechanical Systems	• Students define the term *mechanical energy*. • Students explain how energy can be transferred between mechanical systems. • Students investigate energy transfer in mechanical systems. • Students define domain-specific vocabulary related to mechanical systems.
Conservation of Energy	• Students restate the law of conservation of energy. • Students describe energy transfer and energy transformation. • Students apply information about conservation of energy to roller coasters, electrical circuits, and food webs. • Students define domain-specific vocabulary related to conservation of energy.

Waves and Electromagnetic Radiation

Lesson	Lesson Objectives
Introduction to Wave Properties	• Students describe longitudinal and transverse waves. • Students relate amplitude and wave energy. • Students relate wavelength and frequency to characteristics of sounds and light. • Students define domain-specific vocabulary related to waves and their properties.

The Speed of Waves in Different Materials	• Students explain that waves move at different speeds in different materials. • Students analyze data about wave speeds in different materials. • Students explain everyday examples of differences in wave speed in different materials. • Students define domain-specific vocabulary related to waves and wave speed.
Light	• Students explain that light is a form of energy that travels in waves. • Students describe amplitude, wavelength, and frequency. • Students analyze how reflection, refraction, absorption, and transmission affect the path of light. • Students define domain-specific vocabulary related to light.
The Electromagnetic Spectrum	• Students describe the electromagnetic spectrum. • Students compare and contrast the characteristics of different regions of the electromagnetic spectrum. • Students describe uses and hazards associated with different types of electromagnetic waves. • Students define domain-specific vocabulary related to the electromagnetic spectrum.
Digital and Analog Signals	• Students describe digital and analog signals. • Students distinguish the characteristics and reliability of digital and analog signals. • Students explain how and why digital signals are used to communicate information over a distance. • Students define domain-specific vocabulary related to digital and analog signals.

LIFE SCIENCE

Structure, Function, and Information Processing

Lesson	Lesson Objectives
Cells	• Students explain that living things are made of cells, which are the basic unit of structure and function in living things. • Students contrast unicellular and multicellular organisms. • Students distinguish living and non-living things based on cellular composition. • Students define domain-specific vocabulary related to cells.
Parts of a Cell	• Students identify the parts of plant and animal cells. • Students describe the functions of various parts of plant and animal cells. • Students compare and contrast the structures found in plant cells and in animal cells. • Students infer the functions of various cells based on their structures. • Students define domain-specific vocabulary related to cell parts.

Osmosis and Diffusion	• Students describe osmosis and diffusion. • Students explain the importance of cellular transport. • Students relate osmosis and diffusion to life processes. • Students define domain-specific vocabulary related to cellular transport.
Organization of the Human Body	• Students describe the hierarchical organization of the human body. • Students analyze the relationship between cells, tissues, organs, and organ systems. • Students describe interactions within and among organ systems. • Students identify the main structures and functions of the human digestive system. • Students define domain-specific vocabulary related to the organization of the human body.
Sensing Information	• Students identify sensory receptors, sense organs, and the type of information these structures gather. • Students analyze the structure of the human nervous system. • Students recognize the relationship between stimuli and behavioral responses. • Students recognize that information gathered by stimuli can be used to form memories. • Students define domain-specific vocabulary related to sensing information.
The Human Muscular System	• Students identify the main structures and functions of the human muscular system. • Students analyze the organization of human body systems and subsystems. • Students support an argument that human body systems interact. • Students define domain-specific vocabulary related to the human muscular system.
The Human Respiratory System	• Students identify the main structures and functions of the human respiratory system. • Students analyze the organization of human body systems and subsystems. • Students support an argument that human body systems interact. • Students define domain-specific vocabulary related to the human respiratory system.
The Human Circulatory System	• Students identify the main structures and functions of the human circulatory system. • Students analyze the organization of human body systems and subsystems. • Students support an argument that human body systems interact. • Students define domain-specific vocabulary related to the human circulatory system.
The Human Excretory System	• Students identify the main structures and functions of the human excretory system. • Students analyze the organization of human body systems and subsystems. • Students support an argument that human body systems interact. • Students define domain-specific vocabulary related to the human excretory system.

The Human Nervous System	• Students identify the main structures and functions of the human nervous system. • Students analyze the organization of human body systems and subsystems. • Students support an argument that human body systems interact. • Students define domain-specific vocabulary related to the human nervous system.
The Human Immune System	• Students identify the main structures and functions of the human immune system. • Students analyze the organization of human body systems and subsystems. • Students support an argument that human body systems interact. • Students define domain-specific vocabulary related to the human immune system.
Body Structure and Symmetry	• Students identify similarities of all animals. • Students describe various types of symmetry found in organisms. • Students describe the body plans of various organisms. • Students identify key features of body plans that are used to classify organisms. • Students define domain-specific vocabulary related to body structure and symmetry.
Homeostasis	• Students explain the importance of homeostasis in living systems. • Students identify external factors that affect homeostasis. • Students describe the causes and effects of disruptions to homeostasis. • Students define domain-specific vocabulary related to homeostasis.
Cell Division for Growth and Repair	• Students explain the functions of cell division in multicellular organisms. • Students explain the function of cell division in unicellular organisms. • Students define domain-specific vocabulary related to cell division.
Meiosis	• Students explain that meiosis transfers genetic information to the next generation. • Students describe the role of meiosis in sexual reproduction. • Students summarize the steps of meiosis. • Students compare sexual and asexual reproduction. • Students define domain-specific vocabulary related to meiosis.
Comparing Vascular and Non-vascular Plants	• Students describe characteristics of vascular and non-vascular plants. • Students explain how the structures of vascular and non-vascular plants are used to obtain and transport nutrients and water. • Students compare and contrast vascular and non-vascular plants. • Students define domain-specific vocabulary related to vascular and non-vascular plants.

Using Characteristics to Classify Organisms	• Students define the term *taxonomy*. • Students describe the three domains of life. • Students explain how similar characteristics are used in the Linnaean system of classification. • Students define domain-specific vocabulary related to the classification of organisms.
Comparing Organisms	• Students describe basic characteristics of organisms • Students compare characteristics of organisms. • Students define domain-specific vocabulary related to characteristics of organisms.

Matter and Energy in Organisms and Ecosystems

Lesson	Lesson Objectives
Photosynthesis	• Students summarize the process of photosynthesis. • Students identify reactants and products of photosynthesis. • Students compare and contrast photosynthesis and cellular respiration. • Students analyze the role of photosynthesis in the movement of matter and energy. • Students define domain-specific vocabulary related to photosynthesis.
Cellular Respiration	• Students identify steps in the process of cellular respiration. • Students identify inputs and outputs of cellular respiration. • Students model the process of cellular respiration. • Students synthesize information about photosynthesis and cellular respiration. • Students define domain-specific vocabulary related to cellular respiration.
Materials in Food Are Used for Growth	• Students describe different types of molecules found in food. • Students explain how living things use food. • Students explain how materials in food are rearranged to form materials needed by the body. • Students define domain-specific vocabulary related to materials in food that are used for growth.
Resources in Ecosystems	• Students define the term *limiting factor*. • Students relate limiting factors to competition. • Students analyze the impacts of limiting factors. • Students describe disruptions and their impacts on resources in ecosystems. • Students define domain-specific vocabulary related to resources in ecosystems.
Cycles of Matter: Carbon	• Students explain that matter cycles on Earth. • Students recognize that energy is required for matter to cycle. • Students describe carbon and some everyday materials that contain carbon. • Students describe processes in the carbon cycle. • Students analyze a model of the carbon cycle. • Students define domain-specific vocabulary related to the carbon cycle.

Matter and Energy in Food Webs	• Students classify organisms as producers, consumers, or decomposers. • Students analyze food chains and food webs. • Students explain that matter and energy are conserved in ecosystems. • Students define domain-specific vocabulary related to food webs.
Energy Pyramids	• Students describe the flow of energy in an ecosystem. • Students diagram the flow of energy in trophic levels. • Students analyze the decrease in available energy in successive trophic levels. • Students define domain-specific vocabulary related to energy pyramids.
Ecosystems: Impacts of Change	• Students describe ecosystems and their components. • Students explain how living things interact with their environments. • Students describe changes in ecosystems. • Students construct an argument that changes in ecosystems affect populations. • Students define domain-specific vocabulary related to changes in ecosystems.
Primary and Secondary Succession	• Students describe primary succession. • Students describe secondary succession. • Students analyze how succession affects populations and species diversity. • Students define domain-specific vocabulary related to ecological succession.
Responding to Changes in Ecosystems	• Students describe daily, seasonal, and long-term changes in ecosystems. • Students analyze and explain how organisms respond to changes in ecosystems. • Students define-domain specific vocabulary related to organisms' responses to changes in ecosystems.

Interdependent Relationships in Ecosystems

Lesson	Lesson Objectives
Interactions in Ecosystems	• Students identify interactions in ecosystems, including mutualism and competition. • Students describe mutualism and competition. • Students predict patterns of interactions among organisms across multiple ecosystems. • Students define domain-specific vocabulary related to interactions in ecosystems.
Predators and Prey	• Students describe interactions in ecosystems, including predation. • Students identify predatory interactions in ecosystems using food chains and food webs. • Students predict patterns of interactions among organisms across multiple ecosystems. • Students define domain-specific vocabulary related to predation.

Viruses, Bacteria, Fungi, and Parasites	• Students describe how various infectious agents spread disease. • Students compare and contrast viruses, bacteria, fungi, and parasites. • Students define domain-specific vocabulary related to infectious agents.
Epidemics and Pandemics	• Students define disease. • Students contrast epidemics and pandemics. • Students analyze data to explain the difference between epidemics and pandemics. • Students define domain-specific vocabulary related to epidemics and pandemics.
Biodiversity	• Students define the term *biodiversity*. • Students describe the relationship between biodiversity, ecosystem stability, and ecosystem services. • Students identify examples of ecosystem services. • Students evaluate solutions for maintaining biodiversity. • Students define domain-specific vocabulary related to biodiversity.
Organization of Ecosystems	• Students describe ecosystems and their components. • Students describe the levels of organization in ecosystems. • Students analyze the hierarchy of organization in ecosystems. • Students explain the usefulness of organizing information about ecosystems. • Students define domain-specific vocabulary related to ecosystems and how they are organized.

Growth, Development, and Reproduction of Organisms

Lesson	Lesson Objectives
Plant Reproduction	• Students describe plant structures related to reproduction. • Students support an explanation that plant structures affect the probability of successful reproduction in plants. • Students define domain-specific vocabulary related to plant reproduction.
Animal Behaviors Affect Reproduction	• Students describe animal behaviors related to reproduction. • Students support an explanation that animal behaviors affect the probability of successful reproduction. • Students define domain-specific vocabulary related to animal reproduction.
Growth of Organisms	• Students identify factors that affect growth of organisms. • Students explain how specific factors affect the growth of organisms. • Students define domain-specific vocabulary related to growth of organisms.
Genes, Chromosomes, and Traits	• Students describe the relationships between DNA, genes, chromosomes, and traits. • Students explain that genes are related to proteins, which determine inherited traits. • Students use evidence to support a claim that genes determine inherited traits. • Students define domain-specific vocabulary related to genes, chromosomes, and inherited traits.

Mutations	• Students describe mutations and their causes. • Students explain that mutations may result in harmful, beneficial, or neutral effects on the organism. • Students define domain-specific vocabulary related to mutations.
Reproduction	• Students compare and contrast sexual and asexual reproduction. • Students predict the effect of sexual and asexual reproduction on variation in a population. • Students define domain-specific vocabulary related to reproduction.
Humans Influence the Inheritance of Traits	• Students describe processes by which humans influence the inheritance of traits. • Students synthesize information about methods of influencing the inheritance of traits. • Students define domain-specific vocabulary related to ways that humans influence the inheritance of traits.
Punnett Squares	• Students compare and contrast genotype and phenotype. • Students predict genotype and phenotype probabilities using a Punnett square. • Students analyze transmission of traits using a pedigree. • Students define domain-specific vocabulary related to Punnett squares and pedigrees.

Natural Selection and Adaptation

Lesson	Lesson Objectives
Patterns in the Fossil Record	• Students describe fossil formation. • Students analyze the fossil record to identify patterns. • Students define domain-specific vocabulary related to patterns in the fossil record.
Extinctions	• Students define the term *extinction*. • Students interpret information about background extinction rates. • Students describe mass extinction events. • Students analyze the fossil record to identify patterns related to extinction. • Students define domain-specific vocabulary related to extinctions.
Inferring Evolutionary Relationships	• Students define the term *evolution*. • Students explain that evolution changes populations. • Students apply information about homologous, analogous, and vestigial structures. • Students infer evolutionary relationships between organisms. • Students define domain-specific vocabulary related to evolutionary relationships.

Patterns in Development	• Students analyze diagrams of embryological development of different organisms. • Students infer evolutionary relationships based on patterns in development. • Students define domain-specific vocabulary related to patterns in development.
Natural Selection	• Students identify examples of variation among living things. • Students describe the process of natural selection and its impact on populations. • Students explain how genetic variations can affect an individual's probability of surviving and reproducing. • Students describe how natural selection affects populations after an environmental change. • Students define domain-specific vocabulary related to natural selection.
Understanding Adaptation	• Students explain how natural selection changes populations over time. • Students apply mathematical representations to explain increases and decreases in traits in a population over time. • Students define domain-specific vocabulary related to adaptation.

EARTH SCIENCE

Space Systems

Lesson	Lesson Objectives
Lunar Phases	• Students describe the lunar phases. • Students analyze a model of the Earth-Moon-Sun system to explain lunar phases. • Students define domain-specific vocabulary related to lunar phases.
Seasons	• Students describe the seasons. • Students analyze a model of the Earth-Moon-Sun system to explain seasons. • Students define domain-specific vocabulary related to seasons.
Eclipses	• Students describe solar and lunar eclipses. • Students analyze a model of the Earth-Moon-Sun system to explain eclipses. • Students define domain-specific vocabulary related to eclipses.
What Causes Tides?	• Students relate tides to the gravitational pull of the Sun and Moon. • Students describe spring tide and neap tide. • Students analyze graphs to predict patterns in tides. • Students define domain-specific vocabulary related to tides.
Motion in Space	• Students explain the role of gravity in the formation of the solar system. • Students describe the role of gravity in the motion of solar system objects. • Students analyze how gravity affects motion in the galaxy. • Students define domain-specific vocabulary related to gravity and motion in space.

Characteristics of the Sun	• Students describe the properties and characteristics of the Sun. • Students analyze and interpret data about surface features of the Sun. • Students interpret measurements and observations related to scale properties of objects in the solar system. • Students define domain-specific vocabulary related to the Sun.
The Solar System	• Students describe properties of objects in the solar system. • Students explain the role of gravity in the motion of objects in the solar system. • Students differentiate solar system objects. • Students define domain-specific vocabulary related to the solar system.
Understanding the Solar System	• Students describe the current understanding of the solar system. • Students explain how knowledge about the solar system has changed over time. • Students identify the role of technology in understanding the solar system. • Students define domain-specific vocabulary related to the solar system.
Galaxies	• Students describe galaxies. • Students describe the formation of galaxies. • Students model the relationship between Earth, the solar system, the Milky Way galaxy, and the universe. • Students define domain-specific vocabulary related to galaxies.
The Universe	• Students describe the universe. • Students describe evidence related to the formation of the universe. • Students recognize the enormous distances between objects in space. • Students define domain-specific vocabulary related to the universe.
History of Earth	
Lesson	**Lesson Objectives**
The Geologic Time Scale	• Students describe rocks layers and the information we can obtain from rock layers. • Students analyze models of rock layers. • Students explain the purpose of the geologic time scale. • Students analyze the geologic time scale. • Students define domain-specific vocabulary related to the geologic time scale.
Weathering and Other Changes in Earth's Surface	• Students compare and contrast weathering, erosion, and deposition. • Students describe how weathering changes Earth's surface. • Students describe how erosion and deposition change Earth's surface. • Students define domain-specific vocabulary related to the changes to Earth's surface.

Volcanoes	• Students describe how volcanoes form. • Students identify the effects of volcanoes on Earth's surface. • Students relate volcanoes to the movement of Earth's plates. • Students define domain-specific vocabulary related to volcanoes.
Plate Movements	• Students describe Earth's plates and their motion. • Students analyze the evidence used to support continental drift. • Students explain how plate movement affects Earth's surface. • Students define domain-specific vocabulary related to the movement of Earth's plates.
Plate Boundaries	• Students describe Earth's plates and their motion. • Students identify three types of plate boundaries. • Students identify features of Earth's surface associated with convergent, divergent, and transform plate boundaries. • Students define domain-specific vocabulary related to plate boundaries.
Earth's Layers	• Students identify Earth's layers. • Students describe the properties of Earth's layers. • Students analyze the movement of earthquake waves to determine the composition of Earth's layers. • Students define domain-specific vocabulary related to Earth's layers.
Earth's Systems	
Lesson	**Lesson Objectives**
The Rock Cycle	• Students identify different rock types. • Students explain how different types of rock form. • Students analyze a model showing how Earth's rocks and minerals form and change. • Students define domain-specific vocabulary related to the rock cycle.
The Water Cycle	• Students identify processes in the water cycle. • Students analyze a model showing how Earth's water cycles. • Students define domain-specific vocabulary related to the water cycle.
Natural Resources	• Students describe natural resources. • Students differentiate renewable and non-renewable resources. • Students relate past processes to today's distribution of resources. • Students interpret graphs to gather information about the distribution of Earth's resources. • Students define domain-specific vocabulary related to natural resources.
Soil Formation and Its Properties	• Students describe factors that affect soil properties. • Students describe properties of soil horizons. • Students explain how soil forms. • Students analyze diagrams of soil horizons. • Students define domain-specific vocabulary related to soil.

Minerals and Their Properties	• Students describe mineral formation. • Students describe properties of minerals. • Students identify minerals based on their properties. • Students classify minerals based on their properties. • Students define domain-specific vocabulary related to minerals.

Weather and Climate

Lesson	Lesson Objectives
Earth's Atmosphere	• Students explain the composition of Earth's atmosphere. • Students identify properties of the layers of Earth's atmosphere. • Students analyze the cycling of matter that occurs in Earth's atmosphere. • Students define domain-specific vocabulary related to Earth's atmosphere.
Air Masses and Weather	• Students describe the characteristics of air masses. • Students relate the motion and interaction of air masses to weather. • Students identify the effects of different types of fronts on weather. • Students define domain-specific vocabulary related to air masses and weather.
Introduction to Climate	• Students describe how unequal heating and Earth's rotation cause circulation of Earth's air and water. • Students identify factors that influence climate. • Students relate air and water currents to climate. • Students define domain-specific vocabulary related to climate.
Biomes	• Students describe characteristics of major biomes. • Students analyze maps and graphs related to biomes. • Students relate characteristics of biomes to the living things found there. • Students define domain-specific vocabulary related to biomes.
Climate Change	• Students identify factors that contribute to climate change. • Students explain how global temperatures have changed over the last century. • Students analyze graphs and diagrams related to climate change. • Students collect information to predict the effects of climate change. • Students define domain-specific vocabulary related to climate change.
What Are Greenhouse Gases?	• Students describe greenhouse gases. • Students explain the role of greenhouse gases in Earth's climate. • Students analyze trends in greenhouse gas emissions. • Students define domain-specific vocabulary related to greenhouse gases.

Human Impacts

Lesson	Lesson Objectives
Introduction to Natural Hazards	• Students analyze data on natural hazards. • Students predict future events based on data about natural hazards. • Students explain how technologies are developed to mitigate the effects of natural hazards. • Students define domain-specific vocabulary related to natural hazards.
Monitoring and Minimizing Human Impact	• Students describe human impacts on Earth systems. • Students identify methods and technologies used to monitor and minimize human impacts. • Students analyze information about human impacts on Earth systems. • Students apply their understanding of the design process to propose solutions to problems caused by human activities. • Students define domain-specific vocabulary related to human impacts.
Human Impacts on Earth Systems	• Students describe human resource consumption. • Students analyze data about human population size and per-capita consumption of resources. • Students identify effects of obtaining and using resources. • Students define domain-specific vocabulary related to human impacts on Earth systems.
Watersheds	• Students define the term watershed. • Students describe the importance of watersheds. • Students analyze beneficial and harmful effects of human activity on watersheds. • Students define domain-specific vocabulary related to watersheds.

ENGINEERING DESIGN

Engineering Design

Lesson	Lesson Objectives
Engineering and the Design Process	• Students identify criteria and constraints of a design problem. • Students evaluate design solutions. • Students analyze data to identify the best characteristics of design solutions. • Students model a design solution.