

Unit	Lesson	Lesson Objectives
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Life Science: Part 1**Characteristics of Life**

Compare and contrast living and nonliving objects.

Describe the characteristics of living organisms.

List the levels of organization within a living organism in hierarchical order.

Science Practice: Examine how two different scientists could use different experimental designs and have the same outcome.

Macromolecules

Compare the structures and functions of carbohydrates, lipids, proteins, and nucleic acids.

Identify the structures of the four macromolecules found in living organisms.

Science Practice: Examine careers in science fields.

Animal and Plant Cells

Compare and contrast the structures of animal and plant cells.

Differentiate between the cell membrane and the cell wall.

Science Practice: Construct charts, graphs, and tables to organize data.

Photosynthesis and Cellular Respiration

Compare and contrast the processes of photosynthesis and cellular respiration.

Illustrate and describe the energy conversions that occur during photosynthesis and respiration.

Science Practice: Evaluate data to formulate a conclusion.

Genetic Code

Describe the relationship between DNA, genes, and chromosomes.

Describe the role of DNA replication in transmitting genetic information.

Summarize the experiments that led to the discovery of the genetic code.

Science Practice: Evaluate the impact of science and technology on society.

Protein Synthesis

Explain the relationship between transcription and gene expression.

Explain the relationship between translation and gene expression.

Science Practice: Give examples of how hypotheses lead to new experimental methods.

DNA Mutations

Analyze the effect of harmful environmental factors on DNA.

Describe common types of DNA mutations.

Explain the effects of DNA mutations on the characteristics of living organisms.

Science Practice: Discriminate scientific claims that are socially accepted but not scientifically based.

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Asexual and Sexual Reproduction

- Compare and contrast sexual and asexual reproduction.
- Differentiate between mitosis and meiosis.
- Relate the processes of mitosis and meiosis to reproduction.
- Science Practice: Outline how to formulate scientific questions using reproduction as a model.

Laws of Inheritance

- Apply the law of independent assortment.
- Describe how the principle of dominance applies to genes.
- Summarize the law of segregation.
- Science Practice: Differentiate scientific hypotheses, theories, and laws.

Darwin's Theory

- Explain how natural selection acts as a mechanism of evolution.
- Summarize the main points of Darwin's theory.
- Summarize the major concepts of natural selection.
- Science Practice: Describe how scientific investigations lead to new scientific questions.

Lab: Natural Selection

- Identify natural selection as a mechanism for the evolution of a population.
- Science Practice: Decide whether specific questions can be answered using scientific investigation.

The Kingdoms

- Compare characteristics of taxonomic groups.
- Distinguish the six kingdoms of living organisms.
- Summarize the levels of biological classification.
- Science Practice: Organize data using specific grouping methods.

Diversity of Life

- Compare and contrast the physical characteristics of different animals.
- Compare and contrast the physical characteristics of different plants.
- Identify why the life cycles of different organisms vary.

Life Science: Part 2**Populations and the Environment**

- Compare and contrast positive and negative interactions between organisms and their environment.
- Demonstrate how an organism's habitat determines its niche.
- Determine biotic and abiotic factors within an ecosystem.
- Science Practice: Distinguish between and give examples of observation and inference.

Biomes

- Characterize Earth's major terrestrial biomes.
- Identify adaptations that enable organisms to survive in distinct environments.

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		<p>Aquatic Ecosystems</p> <ul style="list-style-type: none"> Characterize Earth's major aquatic ecosystems. Identify adaptations that enable organisms to survive in aquatic ecosystems. <p>The Cycles of Matter</p> <ul style="list-style-type: none"> Demonstrate the importance of water, carbon, nitrogen, and phosphorus in ecosystems. Describe how water, carbon, nitrogen, and phosphorus are cycled through ecosystems. Science Practice: Compare the economic, human, and environmental losses to the benefits of a specific scientific example. <p>Relationships Among Organisms</p> <ul style="list-style-type: none"> Describe the five major types of interactions between organisms. Examine how symbiotic relationships can create dependency among species. Explain how invasive species affect the environment they occupy. Science Practice: Describe various ways evidence can be interpreted or explained. <p>Lab: Interdependence of Organisms</p> <ul style="list-style-type: none"> Describe the interdependent relationship between two organisms. Science Practice: Formulate explanations by using logic and evidence. <p>Energy Flow in Ecosystems</p> <ul style="list-style-type: none"> Distinguish between producers, consumers, and decomposers. Explain the energy flow in a food web. Illustrate the flow of energy through an ecosystem. Science Practice: Locate data on a table and relate that data to a corresponding graph. <p>Body Organization</p> <ul style="list-style-type: none"> Analyze how organ systems function together to maintain homeostasis. Identify the levels of organization in the body. <p>The Nervous System</p> <ul style="list-style-type: none"> Differentiate the divisions of the peripheral nervous system. Explain how types of neurons interact to produce a response to a stimulus. Identify the structures and functions of the central nervous system. <p>The Human Skeleton</p> <ul style="list-style-type: none"> Describe the functions of the skeletal system. Differentiate between the axial and appendicular skeleton. Illustrate bone markings and joint types. Science Practice: Compare and contrast different scientific disciplines.

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Muscle Structure and Function

- Describe the physiological process of a muscle contraction.
- Differentiate skeletal, smooth, and cardiac muscles by structure and function.
- Illustrate the major structures and functions of the muscular system.
- Science Practice: Analyze how new technologies and experiments affect previous scientific explanations.

The Circulatory and Respiratory Systems

- Analyze the components of blood.
- Describe how breathing and gas exchange occur.
- Examine the major structures and functions of the respiratory system.
- Identify the major structures and functions of the circulatory system.

The Digestive and Excretory Systems

- Analyze how the kidneys work.
- Examine how food is physically and chemically broken down by the digestive system.
- Identify the major structures and functions of the digestive system.
- Identify the major structures and functions of the excretory system.

The Reproductive System

- Investigate the structures and functions of the female reproductive system.
- Investigate the structures and functions of the male reproductive system.
- Science Practice: Evaluate data to formulate a conclusion.

The Immune System

- Describe immune responses.
- Explain why an individual with a compromised immune system may not be able to fight infection.
- Identify the components that contribute to immune responses.
- Science Practice: Discriminate scientific claims that are socially accepted but not scientifically based.

Physical Science: Part 1**Introduction to Matter**

- Describe how to measure mass and volume.
- Differentiate between mass and weight.
- Explain what makes up matter.

States of Matter

- Describe the arrangement and motion of atoms in the different states of matter.
- Discriminate the characteristics of solids, liquids, and gases.

Changes of State

- Describe what happens during the different changes of state.
- Explain how energy is related to changes of state.

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		Physical Properties <ul style="list-style-type: none">Describe and give examples of physical properties of matter.Explain how and why matter is conserved during a physical change.Explain what happens during a physical change.Identify examples of physical changes.
		Chemical Properties <ul style="list-style-type: none">Describe and give examples of chemical properties of matter.Differentiate between physical and chemical changes.Explain what happens during a chemical change.Identify examples of chemical changes.
		Atoms <ul style="list-style-type: none">Describe the parts of an atom.Identify the masses, locations, and charges of protons, neutrons, and electrons.
		Elements <ul style="list-style-type: none">Describe what an isotope is and explain how isotopes of the same element are different.Examine the properties of an element.Explain how ions form.
		Chemical Bonding <ul style="list-style-type: none">Complete electron dot diagrams.Explain why atoms bond.Identify the three types of bonds.
		Compounds <ul style="list-style-type: none">Describe the defining characteristics of a compound.Determine the number of atoms of each element in a chemical formula.Explain how chemical formulas represent compounds.Use models to visualize the chemical structure of a compound.
		Introduction to Chemical Reactions <ul style="list-style-type: none">Describe the evidence that shows that a chemical reaction has occurred.Explain the difference between an endothermic and an exothermic reaction.Recognize that a chemical reaction is a chemical change.
		Balancing Chemical Equations <ul style="list-style-type: none">Demonstrate how to balance a chemical equation.Explain what it means for a chemical equation to be balanced.Relate balanced chemical equations to the law of conservation of mass.

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		Types of Chemical Reactions <ul style="list-style-type: none">Distinguish among the types of chemical reactions.Predict the product of each type of chemical reaction.
		Mixtures <ul style="list-style-type: none">Compare and contrast types of mixtures.Distinguish between substances and mixtures.Identify the properties of a mixture.
Physical Science: Part 2		
		Introduction to Motion <ul style="list-style-type: none">Describe the position of an object.Distinguish between distance and displacement.Explain how an object's motion is relative to a reference point or frame.
		Speed and Velocity <ul style="list-style-type: none">Differentiate between speed and velocity.Interpret graphs of distance versus time.Solve problems involving distance, time, speed, and/or velocity.
		Acceleration <ul style="list-style-type: none">Describe the concept of acceleration.Interpret graphs of velocity versus time.Solve problems involving velocity, time, and acceleration.
		Introduction to Forces <ul style="list-style-type: none">Describe the concept of force.Distinguish between balanced and unbalanced forces and their effect on motion.Explain how to determine the net force on an object.
		Newton's Laws of Motion <ul style="list-style-type: none">Describe Newton's first law of motion and how it relates to inertia.Explain Newton's third law of motion and how it relates to action and reaction forces.Identify applications of Newton's three laws of motion.Use Newton's second law of motion to calculate force, mass, and acceleration.
		Introduction to Energy <ul style="list-style-type: none">Define energy.Explain how energy and work are related.Identify and describe the different forms of energy.

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		Potential and Kinetic Energy <ul style="list-style-type: none">Calculate the kinetic energy in a system.Calculate the potential energy in a system.Distinguish between potential and kinetic energy.Explain how energy is transferred in a moving system.
		Temperature and Thermal Energy <ul style="list-style-type: none">Describe how temperature is measured.Convert temperature readings between different temperature scales.Describe how thermal energy relates to temperature.Explain how temperature relates to kinetic energy.
		Heat <ul style="list-style-type: none">Distinguish between heat and thermal energy.Explain why some substances change temperature more easily than others.Predict how thermal energy flows between objects at different temperatures.
		Introduction to Waves <ul style="list-style-type: none">Compare and contrast transverse waves and longitudinal waves.Define waves and explain how they carry energy.Distinguish between mechanical waves and electromagnetic waves.
		Properties of Waves <ul style="list-style-type: none">Calculate the speed of a transverse wave.Describe how a wave's amplitude is related to the energy the wave carries.Describe the relationship between the frequency and wavelength of a wave.Explain why waves travel at different speeds.Use mathematical representations to show relationships among the frequency, wavelength, and speed of waves traveling in various media.
		Wave Interactions <ul style="list-style-type: none">Describe how a wave's direction is changed by reflection, refraction, and diffraction.Differentiate between constructive and destructive interference.Explain what happens when waves interact.
		Properties of Light <ul style="list-style-type: none">Describe the wave and particle models of light.Explain what happens when light interacts with objects.Recognize what determines the color of an object.

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Electric Charge

- Analyze the factors that affect the strength of an electric force.
- Describe the electric field due to a charge.
- Determine how electric charges interact.
- Explain how electrons cause objects to become electrically charged.

Electric Current

- Describe resistance and how it affects current.
- Distinguish between conductors, superconductors, semiconductors, and insulators.
- Explain how an electric current is produced.
- Explain the relationship between voltage and an electric current.

Magnets and Magnetism

- Describe Earth's magnetic field.
- Describe the properties of magnets.
- Determine how magnetic poles interact with each other.
- Illustrate the magnetic field around a magnet.

Electromagnetism

- Describe the characteristics of solenoids and electromagnets.
- Explain how an electric current is produced by a magnet.
- Indicate how magnetism is produced by electric currents.

Earth Science**Stars**

- Explain how a star forms.
- Explain how stars are classified.
- Explain what happens as a star runs out of fuel.
- Identify the physical properties of stars.

The Sun

- Describe the structure, composition, and physical properties of the Sun.
- Discuss the different types of solar activity and explain how each activity affects Earth.
- Explain how the Sun generates energy.
- Science Practice: Describe units used by astronomers to measure the distance between the Sun and Earth.

The Solar System

- Compare the geocentric and heliocentric models of the solar system.
- Explain how Copernicus, Galileo, and Kepler contributed to the acceptance of the heliocentric model.
- Identify objects that make up the solar system.

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		Planets <ul style="list-style-type: none">Identify characteristics shared by the inner planets.Identify characteristics shared by the outer planets.Identify each planet in the solar system.
		Gravity and Motion <ul style="list-style-type: none">Explain how Earth and the moon stay in orbit.Identify factors that influence the force of gravity between objects.
		The Earth-Sun-Moon System <ul style="list-style-type: none">Describe solar and lunar eclipses.Explain how Earth moves in space.Explain what causes the phases of the moon.Explain what causes tides.
		Fossils <ul style="list-style-type: none">Differentiate types of fossils.Explain how fossils form.Explain how fossils show Earth's changes over time.
		Geologic Time <ul style="list-style-type: none">Distinguish the units of the geologic time scale.Explain how Earth has evolved over geologic time.Explain why the geologic time scale is used to show Earth's history.
		Spheres of Earth <ul style="list-style-type: none">Distinguish the four major parts of the Earth system.Explain how Earth's four spheres interact.
		Cycles of Matter <ul style="list-style-type: none">Analyze the importance of the nitrogen cycle.Examine how carbon cycles through an ecosystem.Identify the processes involved in the water cycle.
		Minerals <ul style="list-style-type: none">Describe the properties used to identify minerals.Explain how minerals are formed.Identify uses of minerals.
		Rocks and the Rock Cycle <ul style="list-style-type: none">Describe the properties used to identify rocks.Identify the three main groups of rocks.Identify the ways in which rocks change as they move through the rock cycle.

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		<p>Earth's Interior</p> <ul style="list-style-type: none"> Compare and contrast the three main layers of Earth. Explain how geologists learn about Earth's interior. <p>Plate Tectonics</p> <ul style="list-style-type: none"> Distinguish the three types of plate boundaries. Explain the theory of plate tectonics. Identify the major tectonic plates. Relate plate tectonics to the formation of landforms. <p>Forces in Earth's Crust</p> <ul style="list-style-type: none"> Explain how stress in the crust affects Earth's surface. Explain why faults form in particular areas. Identify land features that result from plate movement. <p>Weathering and Soil</p> <ul style="list-style-type: none"> Classify different types of soil. Describe the characteristics of soil. Distinguish between mechanical and chemical weathering. Explain how soil is formed. Identify factors that affect the rate of weathering. <p>Surface Water</p> <ul style="list-style-type: none"> Distinguish the three types of wetlands. Identify sources of fresh water. Identify the characteristics of ponds and lakes. Identify the components of a river system. <p>Groundwater</p> <ul style="list-style-type: none"> Differentiate major groundwater zones, including the saturated and unsaturated zones and the water table. Explain how groundwater is obtained. Explain how water moves underground. <p>Water and Wind Erosion</p> <ul style="list-style-type: none"> Describe the effects of wind erosion and deposition. Explain how glaciers and waves cause erosion and deposition. Identify causes of groundwater erosion. Identify features that are formed by water erosion and deposition. <p>Lab: Modeling Water Erosion</p> <ul style="list-style-type: none"> Identify factors that affect erosion and deposition by rivers. Model stream processes and observe stream behavior.

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		<p>Structure and Composition of the Atmosphere</p> <ul style="list-style-type: none"> Describe the composition of Earth’s atmosphere. Describe the importance of the atmosphere to living things. Distinguish the four main layers of the atmosphere. Explain how altitude affects air pressure and density. Identify properties of air, including pressure and density. <p>Atmospheric Moisture and Precipitation</p> <ul style="list-style-type: none"> Describe humidity and how it is measured. Distinguish the three main types of clouds. Explain how clouds form. Identify common types of precipitation. <p>Winds</p> <ul style="list-style-type: none"> Differentiate between local and global winds. Examine the processes that cause wind. Locate the major global wind belts. <p>Air Masses and Fronts</p> <ul style="list-style-type: none"> Differentiate the four main types of fronts. Explain how air masses move. Identify the major types of air masses. <p>Energy on Earth</p> <ul style="list-style-type: none"> Distinguish between renewable and nonrenewable resources. Identify advantages and disadvantages of various energy sources. Identify renewable and nonrenewable resources.
Scientific Process: Interpret and Apply		
		<p>Scientific Inquiry</p> <ul style="list-style-type: none"> Apply the scientific process to given scenarios. Science Practice: Describe how the scientific inquiry process uses the scientific method. <p>Analyzing Data and Drawing Conclusions</p> <ul style="list-style-type: none"> Analyze data to determine validity. Create charts and graphs to analyze trends in data. Formulate a conclusion based on observations, data, and inferences. Science Practice: Describe various ways evidence can be interpreted or explained.

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Scientific Process: Analyze**Formulating Scientific Questions**

Demonstrate how scientific questions are developed.

Identify questions that can be answered through scientific investigations.

Science Practice: Describe how scientific investigations lead to new scientific questions.

Designing Scientific Investigations

Demonstrate how scientific questions are turned into investigations.

Science Practice: Design and conduct a laboratory experiment to answer a specific question.

Evaluating Scientific Design

Evaluate possible limitations to current scientific design.

Explain how changing the variables, methods, and timing impacts scientific investigations.

Science Practice: Assess the possible impacts of different experimental design decisions.

Scientific Process: Evaluate and Generalize**Hypotheses, Theories, and Laws**

Examine the relationship between observations, hypotheses, theories, and laws.

Explain how hypotheses are formed and tested.

Explain how theories may change as new areas of science and technology develop.

Science Practice: Give examples of how hypotheses lead to new experimental methods.

Collecting and Organizing Data

Construct charts, graphs, and tables to organize data in a systematic way.

Gather data through qualitative and quantitative observations.

Identify tools and technology that should be used to gather accurate measurements.

Science Practice: Distinguish between and give examples of observation and inference.

Analyzing Evidence

Identify possible reasons for inconsistencies in scientific evidence.

Predict trends by analyzing and evaluating data.

Use evidence to critique scientific arguments.

Science Practice: Analyze how new technologies and experiments affect previous scientific explanations.

Assessing Claims and Evidence

Assess the reliability of a variety of sources of scientific information.

Evaluate the merit and accuracy of scientific claims based on supporting evidence.

Identify the claims made within a scientific text.

Science Practice: Critique scientific writing.