

Unit	Lesson	Lesson Objectives
<b>History and Structure of the Earth</b>		
<b>The Expanding Universe</b>		
Describe the big bang theory.		
Describe what astronomers predict about the future of the universe.		
Explain how the solar system formed.		
<b>Planets</b>		
Identify characteristics shared by the inner planets.		
Identify characteristics shared by the outer planets.		
Identify each planet in the solar system.		
<b>Fossils</b>		
Differentiate types of fossils.		
Explain how fossils form.		
Explain how fossils show Earth's changes over time.		
<b>Relative Dating</b>		
Describe the law of superposition.		
Explain how fossils are used to date rocks.		
Explain how geologists determine the relative age of rocks.		
<b>Geologic Time</b>		
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.		
<b>Continental Drift</b>		
Describe evidence that supports continental drift.		
Explain continental drift.		
<b>Earth's Climate History</b>		
Explain how scientists study ancient climates.		
Identify factors that can cause long-term climate change.		
<b>Spheres of Earth</b>		
Distinguish the four major parts of the Earth system.		
Explain how Earth's four spheres interact.		
<b>Natural Environmental Change</b>		
Assess the impact of natural environmental changes on organisms, populations, and species.		
Identify examples of natural long-term environmental changes.		
Identify examples of natural short-term environmental changes.		

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## The Chemistry of Life and Cellular Structure

### Elements of Living Organisms

- Differentiate between elements and substances formed from elements.
- Identify the six most common elements found in living organisms.
- Illustrate the importance of the six most common elements to living organisms.
- Science Practice: Demonstrate how to read a Material Safety Data Sheet (MSDS).

### Carbohydrates

- Compare the structures of monosaccharides, disaccharides, and polysaccharides.
- Differentiate between the roles of monosaccharides, disaccharides, and polysaccharides in living organisms.
- Identify the role of carbohydrates in living organisms.
- Science Practice: Construct charts, graphs, and tables to organize data.

### Lipids

- Compare and contrast the structures of saturated and unsaturated lipids.
- Explain the roles of lipids within living organisms.
- Science Practice: Evaluate data to formulate a conclusion.

### Proteins and Nucleic Acids

- Explain the roles of proteins and nucleic acids in living organisms.
- Identify the components of proteins and nucleic acids and discuss how they were discovered.
- Recognize essential amino acids found in living organisms.
- Science Practice: Evaluate the impact of science and technology on society.

### Catalysts

- Describe the “lock and key” mechanism of enzymes in chemical reactions.
- Explain how catalysts affect the energy of a chemical reaction.
- Relate changes in energy to the rate of a chemical reaction.
- Science Practice: Create a laboratory experiment to answer a specific question.

### Prokaryotic and Eukaryotic Cells

- Compare and contrast prokaryotic and eukaryotic cells.
- Describe the basic structure of a cell.
- Explain the endosymbiotic theory.
- Science Practice: Evaluate past research from investigations similar in design and purpose.

### The Function of Organelles

- Describe the functions of each organelle.
- Identify the organelles of a cell.
- Science Practice: Construct charts, graphs, and tables to organize data.

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**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.

**Cell Homeostasis**

- Describe the importance of homeostasis to living organisms.
- Differentiate between diffusion, osmosis, passive transport, and active transport.
- Explain how cells maintain homeostasis.
- Science Practice: Generate procedures to utilize charts, graphs, and tables to show data.

**Lab: Diffusion Across a Semi-permeable Membrane**

- Describe the process of diffusion.
- Identify materials that are able to pass across a semipermeable membrane by diffusion.
- Science Practice: Apply the scientific method to given scenarios.

**Cellular Energy and Reproduction****Light Dependent Reactions in Photosynthesis**

- Outline the steps of the light-dependent reactions in photosynthesis.
- Science Practice: Distinguish between and give examples of observation and inference.

**Light Independent Reactions in Photosynthesis**

- Compare and contrast the light-dependent and the light-independent reactions of photosynthesis.
- Outline the steps of the light-independent reactions in photosynthesis.
- Science Practice: Apply the scientific method to given scenarios.

**Cellular Respiration**

- Compare and contrast aerobic and anaerobic cellular respiration.
- Describe how cellular respiration converts glucose to energy in the form of ATP.
- Explain the importance of cellular respiration to living organisms.
- Science Practice: Organize data using specific grouping methods.

**Mitosis**

- Describe the steps of mitosis.
- Explain the importance of mitosis to living organisms.
- Science Practice: Analyze how new technologies and experiments affect previous scientific explanations.

**Meiosis**

- Describe the roles of crossing over and independent assortment in meiosis.
- Explain the importance of meiosis to living organisms.
- Illustrate the steps of meiosis.
- Science Practice: Examine how a scientist's creativity can lead to scientific discovery.

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		<b>Cell Differentiation and Specialization</b> <ul style="list-style-type: none"><li>Describe specialized cells found within organisms.</li><li>Explain the role of differentiation in the creation of specialized cells.</li></ul>
		<b>DNA and Protein Synthesis</b>
		<b>Genetic Code</b> <ul style="list-style-type: none"><li>Describe the relationship between DNA, genes, and chromosomes.</li><li>Describe the role of DNA replication in transmitting genetic information.</li><li>Science Practice: Evaluate the impact of science and technology on society.</li><li>Summarize the experiments that led to the discovery of the genetic code.</li></ul>
		<b>DNA and RNA Structure</b> <ul style="list-style-type: none"><li>Analyze the similarities and differences between DNA and RNA.</li><li>Explain how the base pairing in DNA and RNA was discovered.</li><li>Science Practice: Give examples of how research affects science, society, and the environment.</li></ul>
		<b>Protein Synthesis</b> <ul style="list-style-type: none"><li>Describe the role of transcription in protein synthesis.</li><li>Describe the role of translation in protein synthesis.</li><li>Explain the functions of proteins within organisms.</li></ul>
		<b>Lab: Building Proteins from RNA</b> <ul style="list-style-type: none"><li>Demonstrate how base pairing builds proteins from RNA.</li><li>Describe the role of RNA in the creation of proteins.</li><li>Science Practice: Conduct a laboratory experiment to answer a specific question.</li></ul>
		<b>DNA Mutations</b> <ul style="list-style-type: none"><li>Analyze the effect of harmful environmental factors on DNA.</li><li>Describe common types of DNA mutations.</li><li>Explain the effects of DNA mutations on the characteristics of living organisms.</li><li>Science Practice: Discriminate scientific claims that are socially accepted but not scientifically based.</li></ul>
		<b>Genetics and Heredity</b>
		<b>Introduction to Genetics</b> <ul style="list-style-type: none"><li>Describe the role of nucleic acids in transmitting genetic information.</li><li>Explain the importance of Gregor Mendel to the field of genetics.</li><li>Science Practice: Give examples of how hypotheses lead to new experimental methods.</li></ul>
		<b>Laws of Inheritance</b> <ul style="list-style-type: none"><li>Apply the law of independent assortment.</li><li>Describe how the principle of dominance applies to genes.</li><li>Summarize the law of segregation.</li><li>Science Practice: Differentiate scientific hypotheses, theories, and laws.</li></ul>

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**Probability of Inheritance**

Determine genotype and phenotype probabilities from Punnett squares.

Predict possible allele combinations of offspring based on the genetics of the parent.

Use Punnett squares to create monohybrid and dihybrid crosses.

Science Practice: Explain how changing the variables, methods, and timing impacts scientific investigation.

**Lab: Mouse Genetics (One Trait)**

Demonstrate how dominant and recessive alleles are passed from parents to offspring.

Use the laws of inheritance to breed mice with desired genotypes for fur color.

Science Practice: Evaluate data to formulate a conclusion.

**Non-Mendelian Inheritance**

Analyze examples of polygenic traits.

Differentiate between incomplete dominance and codominance.

Explain how blood type is determined.

Science Practice: Assess how science and society impact each other.

**Sex-linked Inheritance**

Analyze a pedigree to determine sex-linked traits.

Summarize the process of sex-linked inheritance.

Science Practice: Give examples of how research affects science, society, and the environment.

**Lab: Mouse Genetics (Two Traits)**

Demonstrate how alleles are passed independently of one another.

Use the laws of inheritance to describe how two separate traits are inherited in an organism.

Science Practice: Evaluate data to formulate a conclusion.

**Natural Selection and Evolution****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.

**Factors Affecting Genetic Variation**

Describe genetic drift and gene flow as mechanisms of evolution.

Give examples of how environmental factors affect genetic variation and influence natural selection.

Science Practice: Predict trends and outcomes based on a given set of data.

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### Factors Affecting Biological Diversity

Examine how directional, disruptive, and stabilizing selection affect biological diversity.

Explain how new or varied species originate via natural selection.

Science Practice: Judge claims made by scientific explanations, data, or arguments.

### Biogeographic Isolation

Analyze how new species are formed by reproductive and geographic isolation.

Analyze the relationship between biogeographic isolation and the theory of evolution.

Explain the concept of biogeographic isolation.

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

### Biological Evidence and the Fossil Record

Assess the comparative anatomies among organisms.

Describe how the fossil record shows common ancestry between organisms.

Distinguish scientific evidence that supports the theory of evolution.

Science Practice: Explain the role of scientific argumentation in evaluating the validity of data, claims, hypotheses, and observations.

### Evolutionary Relationships

Analyze the relationships among organisms based on a variety of shared characteristics.

Explain how understanding evolutionary history impacts classification of organisms.

Interpret evolutionary relationships among organisms on a cladogram.

Science Practice: Describe various ways evidence can be interpreted or explained.

### Social Behavior

Describe examples of social behavior.

Examine social behavior and its benefits.

## The Human Body and Homeostasis

### Body Organization

Analyze how organ systems function together to maintain homeostasis.

Identify the levels of organization in the body.

### 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.

### Lab: Exercise and Homeostasis

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<b>The Endocrine and Exocrine Systems</b>		
<p>Describe the role of hormones in maintaining homeostasis.</p> <p>Explain the functions of the endocrine and exocrine systems.</p> <p>Illustrate the different structures of the endocrine and exocrine systems.</p> <p>Science Practice: Conduct research using a variety of sources.</p>		
<b>Organisms and the Environment</b>		
<b>Populations and the Environment</b>		
<p>Compare and contrast positive and negative interactions between organisms and their environment.</p> <p>Demonstrate how an organism's habitat determines its niche.</p> <p>Determine biotic and abiotic factors within an ecosystem.</p> <p>Science Practice: Distinguish between and give examples of observation and inference.</p>		
<b>The Cycles of Matter</b>		
<p>Demonstrate the importance of water, carbon, nitrogen, and phosphorus in ecosystems.</p> <p>Describe how water, carbon, nitrogen, and phosphorus are cycled through ecosystems.</p> <p>Science Practice: Compare the economic, human, and environmental losses to the benefits of a specific scientific example.</p>		
<b>Relationships Among Organisms</b>		
<p>Describe the five major types of interactions between organisms.</p> <p>Examine how symbiotic relationships can create dependency among species.</p> <p>Explain how invasive species affect the environment they occupy.</p> <p>Science Practice: Describe various ways evidence can be interpreted or explained.</p>		
<b>Lab: Interdependence of Organisms</b>		
<p>Describe the interdependent relationship between two organisms.</p> <p>Science Practice: Formulate explanations by using logic and evidence.</p>		
<b>Energy Flow in Ecosystems</b>		
<p>Analyze energy pyramids and biomass pyramids.</p> <p>Distinguish between producers, consumers, and decomposers.</p> <p>Explain the flow of energy through an ecosystem using food chains and food webs.</p>		
<b>Population Size and Structure</b>		
<p>Describe the limiting factors that affect a population in a given environment.</p> <p>Differentiate between density-dependent and density-independent factors.</p> <p>Explain how birth rate, death rate, immigration, and emigration affect population size.</p> <p>Science Practice: Evaluate the impact of science and technology on society.</p>		

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**Population Growth**

- Compare and contrast exponential and logistic growth models.
- Determine factors that influence a species' carrying capacity.
- Identify factors that affect population growth.
- Science Practice: Predict trends and outcomes based on a given set of data.

**Succession and Extinction**

- Assess the importance of biodiversity in an ecosystem.
- Identify and explain the stages of succession in an ecosystem.
- Identify factors that may disturb ecosystem stability.
- Science Practice: Locate data on a table and relate that data to a corresponding graph.

**Humans and the Environment****Human Impact on the Environment**

- Analyze how human populations affect resources.
- Give examples of human activities that have been beneficial and detrimental to the environment.
- Relate the greenhouse effect to global warming and explain its impact on the environment.
- Science Practice: Give examples of science contributions impacting sustainability.

**Biodiversity**

- Examine ways to protect biodiversity.
- Identify how biodiversity contributes to the sustainability of an ecosystem.
- Identify some factors that can threaten biodiversity.
- Identify the factors that affect biodiversity.

**Energy on Earth**

- Distinguish between renewable and nonrenewable resources.
- Identify advantages and disadvantages of various energy sources.
- Identify renewable and nonrenewable resources.

**Human Impact on Resources**

- Compare the costs and benefits of conservation policies.
- Identify the negative impacts that human activity has had on Earth's resources.
- Identify the positive impacts that human activity has had on Earth's resources.