

Unit	Lesson	Lesson Objectives
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**Nature of Science****Scientific Knowledge**

- Define science and identify its limitations.
- Distinguish between science and pseudoscience.
- Examine the characteristics of scientific knowledge and describe their cumulative nature.

**Scientific Inquiry**

- Distinguish between variables and controls in a scientific investigation.
- Examine the process of scientific inquiry using the three types of scientific investigations, including the benefits and limitations of each.
- Identify questions that can be answered through scientific investigation.

**Hypotheses, Theories, and Laws**

- Analyze how hypotheses lead to new experimentation.
- Distinguish between hypotheses, theories, and laws.
- Explain that theories may change as new areas of science and technology develop.
- Identify examples of scientific theories and laws.

**Measurement**

- Identify basic units and prefixes used in the metric system.
- Measure length, mass, volume, and temperature.
- Perform metric system conversions.

**Analyzing Data**

- Analyze data to determine validity and reliability.
- Apply the concepts of mean, median, and mode to a data set.
- Examine charts and graphs to predict trends in the data.
- Use data to draw inferences and formulate conclusions.

**Living Things****Characteristics of Life**

- Identify the characteristics that are common to all living things.
- Identify what all living things need to survive.

**Building Blocks of Life**

- Differentiate between atoms, elements, molecules, and compounds.
- Distinguish organic compounds from inorganic compounds.
- Examine characteristics of carbohydrates, lipids, proteins, and nucleic acids.
- Identify the six common elements found in living organisms.

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**Introduction to Classification**

- Analyze how and why organisms are classified.
- Describe the modern system of classification.
- Examine how methods of classification have changed over time.

**Classification of Living Things**

- Characterize the domains of living organisms.
- Distinguish major animal and plant phyla.
- Identify the characteristics that differentiate one species from another.
- List the characteristics used to classify organisms into each kingdom.

**Dichotomous Keys**

- Examine and compare the physical characteristics of organisms.
- Identify objects based on their characteristics.
- Use a dichotomous key to identify organisms.

**Lab: Dichotomous Keys**

- Develop a dichotomous key to identify organisms.
- Practice grouping organisms based on similar traits.

**Cell Biology****Cell Theory**

- Analyze the contributions of different scientists to the development of the cell theory.
- Identify the three components of the cell theory.

**Cell Structure**

- Examine the functions of cell organelles.
- Identify the organelles of a cell.

**Animal and Plant Cells**

- Compare and contrast animal and plant cells.
- Differentiate prokaryotic and eukaryotic cells.
- Identify the levels of organization in animals and plants.

**Lab: Exploring Cells**

- Compare and contrast the structures of plant and animal cells.
- Distinguish between unicellular and multicellular organisms.
- Identify prokaryotic cells and eukaryotic cells.

**Photosynthesis**

- Explain the steps in the process of photosynthesis.
- Identify the products and reactants of photosynthesis.

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<b>Cellular Respiration</b>		
<p>Explain the steps in the process of cellular respiration.</p> <p>Identify the products and reactants of cellular respiration.</p>		
<b>Cell Cycle</b>		
<p>Distinguish the steps of mitosis.</p> <p>Identify the three stages of the cell cycle.</p>		
<b>Meiosis</b>		
<p>Differentiate meiosis from mitosis.</p> <p>Explain why meiosis is necessary for sexual reproduction.</p> <p>Identify and describe the steps of meiosis.</p>		
<b>Asexual and Sexual Reproduction</b>		
<p>Analyze the process of sexual reproduction.</p> <p>Compare and contrast asexual and sexual reproduction.</p> <p>Examine the different types of asexual reproduction.</p> <p>Identify the advantages and disadvantages of both asexual and sexual reproduction.</p>		
<b>Genetics</b>		
<b>Genetic Code</b>		
<p>Analyze the contributions of different scientists to the discovery of the genetic code.</p> <p>Examine how cells make proteins.</p> <p>Identify the components and structure of DNA.</p> <p>Relate DNA, genes, and chromosomes.</p>		
<b>DNA Mutations</b>		
<p>Analyze the effects of DNA mutations on the traits of an organism.</p> <p>Distinguish common types of DNA mutations.</p>		
<b>Introduction to Heredity</b>		
<p>Differentiate between genotype and phenotype.</p> <p>Distinguish dominant and recessive alleles.</p> <p>Examine the contributions made by Gregor Mendel to the field of genetics.</p> <p>Explain how traits are inherited.</p>		
<b>Predicting Heredity</b>		
<p>Define probability and use it to explain the results of a genetic cross.</p> <p>Determine the probability of genotype combinations using a Punnett square.</p> <p>Identify the phenotype of an organism based on its genotype.</p>		

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<b>Inheritance Patterns</b>		
Differentiate between codominance and incomplete dominance.		
Examine multiple alleles and polygenic inheritance, and give examples of each.		
<b>Lab: Heredity and Punnett Squares</b>		
Construct a Punnett square given the genotypes of the parents.		
Determine the possible genotypes of the offspring using a Punnett square.		
Relate the genotypes of the offspring to their phenotypes.		
<b>Advances in Genetics</b>		
Compare the processes of selective breeding, cloning, and genetic engineering.		
Describe the impact of genetic technologies on society and the environment.		
Examine the use of gene therapy to treat disease.		
<b>Evolution</b>		
<b>The Theory of Evolution</b>		
Analyze the historical development of the theory of evolution.		
Examine the evidence Darwin used to support his theory of evolution.		
Summarize Darwin's theory of evolution.		
<b>Natural Selection</b>		
Describe factors that contribute to the extinction of a species.		
Examine how natural selection leads to evolution.		
Identify the conditions required for natural selection.		
Identify ways in which genetic variation and environmental factors contribute to natural selection.		
<b>Lab: Natural Selection</b>		
Analyze data to determine phenotype changes through generations.		
Examine natural selection within a population.		
<b>The Fossil Record</b>		
Examine how the fossil record indicates a long history of changing life-forms.		
Explain how scientists determine the age of a fossil.		
Identify how a fossil forms.		
<b>Evidence for Evolution</b>		
Compare patterns of embryological development in different organisms.		
Determine how comparative anatomy supports the theory of evolution.		
<b>Evolutionary Relationships</b>		
Analyze the relationships among organisms based on a variety of shared characteristics.		
Interpret evolutionary relationships among organisms on a cladogram.		

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<b>Bacteria to Plants</b>		
<b>Bacteria</b>		
Analyze the roles of helpful and harmful bacteria.		
Compare and contrast eubacteria and archaeobacteria.		
Examine how bacteria reproduce.		
Identify the characteristics of bacterial cells.		
<b>Protists</b>		
Compare and contrast the characteristics of the three groups of protists.		
Examine the characteristics common to all protists.		
Examine why it is difficult to classify protists.		
Identify examples of the three groups of protists based on their characteristics.		
<b>Fungi</b>		
Compare and contrast the various groups of fungi.		
Examine the characteristics common to all fungi.		
Identify the roles of fungi in nature.		
<b>Overview of Plants</b>		
Compare the characteristics of nonvascular and vascular plants.		
Examine the characteristics common to all plants.		
Identify the things a plant needs to survive on land.		
<b>Seedless Plants</b>		
Compare and contrast the characteristics of nonvascular plants and seedless vascular plants.		
Examine the importance of seedless plants.		
Identify examples of nonvascular plants and seedless vascular plants based on their characteristics.		
<b>Gymnosperms</b>		
Examine the life cycle of a gymnosperm.		
Identify examples of gymnosperms.		
Identify the characteristics of gymnosperms.		
<b>Angiosperms</b>		
Differentiate the two types of angiosperms.		
Examine how angiosperms reproduce.		
Identify the characteristics of angiosperms.		
Identify the structure and function of flowers.		

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**Lab: Flower Dissection**

Dissect and describe the parts of a flower.

Relate the parts of a flower to their roles in reproduction.

**Animals****Sponges and Cnidarians**

Analyze the role of coral reefs.

Examine the basic functions performed by sponges and cnidarians.

Identify the characteristic structures of sponges and cnidarians.

**Worms**

Classify worms into three main groups.

Identify the characteristics of each group of worms.

**Mollusks and Echinoderms**

Differentiate between the four major groups of echinoderms.

Distinguish the three major groups of mollusks.

Examine the basic functions performed by mollusks and echinoderms.

Identify the characteristic structures of mollusks and echinoderms.

**Arthropods**

Distinguish the four major groups of arthropods.

Examine the basic functions performed by arthropods.

Identify the characteristic structures of arthropods.

**Fish**

Distinguish the three major groups of fish.

Examine the basic functions performed by fish.

Identify the characteristic structures of fish.

**Amphibians and Reptiles**

Differentiate between the three main groups of reptiles.

Distinguish the two main groups of amphibians.

Examine the basic functions performed by amphibians and reptiles.

Identify the characteristic structures of amphibians and reptiles.

**Birds and Mammals**

Distinguish the three main groups of mammals.

Examine the basic functions performed by birds and mammals.

Identify the characteristic structures of birds and mammals.

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### Animal Behavior

- Determine ways in which organisms respond to external stimuli.
- Differentiate between learned and inherited behaviors.
- Distinguish among the various patterns of behavior exhibited by animals.
- Relate responses in organisms to internal stimuli.

### Lab: Earthworm Behavior

- Examine how an earthworm responds to different external stimuli.
- Observe and measure the physical characteristics of an earthworm.

## Human Biology

### Body Organization and Homeostasis

- Analyze how organ systems function together to maintain homeostasis.
- Identify and order the levels of organization in the body.

### The Musculoskeletal and Integumentary Systems

- Compare and contrast the three types of muscle.
- Describe how bones and muscles work together to allow movement.
- Examine the major structures and functions of the integumentary system.
- Identify the major structures and functions of the musculoskeletal 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 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 Immune System

- Distinguish between passive and active immunity.
- Examine how the immune system protects the body from disease.
- Identify the major structures and functions of the immune system.

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### **The Nervous and Endocrine Systems**

- Analyze how negative feedback works in the endocrine system.
- Analyze how sensory receptors communicate with the brain in response to stimuli.
- Examine the major structures and functions of the endocrine system.
- Identify the major structures and functions of the nervous system.

### **The Reproductive System**

- Examine the structures and functions of the female reproductive system.
- Identify the structures and functions of the male reproductive system.

## **Ecology**

### **Living Things and the Environment**

- Differentiate between a habitat and a niche.
- Examine biotic and abiotic factors in the environment.
- Identify the levels of organization within an ecosystem.

### **Populations**

- Identify factors that affect population size.
- Identify limiting factors that affect a population in a given environment.

### **Interactions among Living Things**

- Differentiate competition, predation, and cooperation.
- Distinguish among the three types of symbiotic relationships.

### **Energy Flow in Ecosystems**

- Analyze the transfer of energy through the trophic levels in an energy pyramid.
- Examine the movement of energy through an ecosystem in food chains and food webs.
- Explain the roles of producers, consumers, and decomposers in an ecosystem.
- Identify producers, consumers, and decomposers in food chains and food webs.

### **Lab: Owl Pellets**

- Dissect an owl pellet and examine the contents.
- Identify an owl's prey based on the contents of an owl pellet.

### **Cycles of Matter**

- Analyze the importance of the nitrogen cycle.
- Examine how carbon cycles through an ecosystem.
- Identify the processes involved in the water cycle.

### **Biomes**

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



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**Environmental Changes****Succession**

- Compare primary and secondary succession.
- Contrast pioneer species and climax community.

**Lab: Ecological Succession**

- Conduct a controlled experiment to test a hypothesis.
- Explore the process of ecological succession in a microhabitat.
- Recognize sampling methods commonly used in ecology.

**Natural Environmental Change**

- 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.

**Human Impact on the Environment**

- Assess the impact of human-induced environmental changes on organisms, populations, and species.
- Identify examples of long-term human-induced environmental changes.
- Identify examples of short-term human-induced environmental changes.

**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.