

Unit	Lesson	Lesson Objectives
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Introduction to Life**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.

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.

Lab: Identifying Nutrients

Describe nutrients found in common foods such as bread, meat, juice, oil, and milk.

Identify carbohydrates, lipids, and proteins found in food samples by conducting chemical tests.

Science Practice: Discuss how to apply safe practices during a lab and/or field investigation.

Cellular Structures and Functions**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.

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		Cellular Interactions with the Environment <ul style="list-style-type: none">Analyze the effects of osmosis on cells.Compare and contrast active and passive transport.Examine the process of diffusion.
		Cellular Energy and Reproduction
		Photosynthesis <ul style="list-style-type: none">Explain the steps in the process of photosynthesis.Identify the products and reactants of photosynthesis.
		Cellular Respiration <ul style="list-style-type: none">Explain the steps in the process of cellular respiration.Identify the products and reactants of cellular respiration.
		Cell Cycle <ul style="list-style-type: none">Distinguish the steps of mitosis.Identify the three stages of the cell cycle.
		Meiosis <ul style="list-style-type: none">Differentiate meiosis from mitosis.Explain why meiosis is necessary for sexual reproduction.Identify and describe the steps of meiosis.
		Asexual and Sexual Reproduction <ul style="list-style-type: none">Analyze the process of sexual reproduction.Compare and contrast asexual and sexual reproduction.Examine the different types of asexual reproduction.Identify the advantages and disadvantages of both asexual and sexual reproduction.
		DNA and Genetics
		Genetic Code <ul style="list-style-type: none">Analyze the contributions of different scientists to the discovery of the genetic code.Examine how cells make proteins.Identify the components and structure of DNA.Relate DNA, genes, and chromosomes.
		Lab: Building Proteins from RNA <ul style="list-style-type: none">Demonstrate how base pairing builds proteins from RNA.Describe the role of RNA in the creation of proteins.Science Practice: Conduct a laboratory experiment to answer a specific question.
		DNA Mutations <ul style="list-style-type: none">Analyze the effects of DNA mutations on the traits of an organism.Distinguish common types of DNA mutations.

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Introduction to Heredity

- Differentiate between genotype and phenotype.
- Distinguish dominant and recessive alleles.
- Examine the contributions made by Gregor Mendel to the field of genetics.
- Explain how traits are inherited.

Predicting Heredity

- Define probability and use it to explain the results of a genetic cross.
- Determine the probability of genotype combinations using a Punnett square.
- Identify the phenotype of an organism based on its genotype.

Lab: Heredity and Punnett Squares

- 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.

Inheritance Patterns

- Differentiate between codominance and incomplete dominance.
- Examine multiple alleles and polygenic inheritance, and give examples of each.

Human Inheritance

- Analyze the patterns of human inheritance.
- Examine how sex-linked traits are passed from parent to offspring.
- Identify causes of common genetic disorders.
- Use a pedigree to analyze the inheritance of traits.

Advances in Genetics

- 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.

Natural Selection and Evolution

The Theory of Evolution

- 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.

Natural Selection

- 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.

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Lab: Natural Selection

- Analyze data to determine phenotype changes through generations.
- Examine natural selection within a population.

The Fossil Record

- 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.

Evidence for Evolution

- Compare patterns of embryological development in different organisms.
- Determine how comparative anatomy supports the theory of evolution.

Evolutionary Relationships

- Analyze the relationships among organisms based on a variety of shared characteristics.
- Interpret evolutionary relationships among organisms on a cladogram.

Classification of Organisms**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.

Simple Organisms**Bacteria**

- Analyze the roles of helpful and harmful bacteria.
- Compare and contrast eubacteria and archaebacteria.
- Examine how bacteria reproduce.
- Identify the characteristics of bacterial cells.

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Protists

- 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.

Fungi

- Compare and contrast the various groups of fungi.
- Examine the characteristics common to all fungi.
- Identify the roles of fungi in nature.

Plants and Animals**Overview of Plants**

- 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.

Seed Plants

- Analyze the structures and functions of roots, stems, and leaves.
- Examine how new plants form from seeds.
- Identify the characteristics common to all seed plants.

Seedless Plants

- 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.

Gymnosperms

- Examine the life cycle of a gymnosperm.
- Identify examples of gymnosperms.
- Identify the characteristics of gymnosperms.

Angiosperms

- Differentiate the two types of angiosperms.
- Examine how angiosperms reproduce.
- Identify the characteristics of angiosperms.
- Identify the structure and function of flowers.

Lab: Flower Dissection

- Dissect and describe the parts of a flower.
- Relate the parts of a flower to their roles in reproduction.

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Plant Responses

- Describe the relationship between plant hormones and responses.
- Examine how some plants respond to seasonal changes.
- Explain how plants respond to external stimuli.

Overview of Animals

- Compare and contrast the characteristics of invertebrate and vertebrate animals.
- Examine the characteristics that are common to most animals.
- Identify the main functions that allow animals to meet their basic needs.

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.

The Human Body**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 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 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.

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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

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

Organisms in the Environment

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.

Interactions among Living Things

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

Lab: Owl Pellets

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

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.

Lab: Interdependence of Organisms

- Describe the interdependent relationship between two organisms.
- Science Practice: Formulate explanations by using logic and evidence.

Populations

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

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		<p>Cycles of Matter</p> <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. <p>Energy Flow in Ecosystems</p> <ul style="list-style-type: none"> 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. <p>Biomes</p> <ul style="list-style-type: none"> Characterize Earth's major terrestrial biomes. Identify adaptations that enable organisms to survive in distinct environments.
		<p>Changes in Ecosystems</p> <p>Succession</p> <ul style="list-style-type: none"> Compare primary and secondary succession. Contrast pioneer species and climax community. <p>Lab: Ecological Succession</p> <ul style="list-style-type: none"> Conduct a controlled experiment to test a hypothesis. Explore the process of ecological succession in a microhabitat. Recognize sampling methods commonly used in ecology. <p>Natural Environmental Change</p> <ul style="list-style-type: none"> 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. <p>Human Impact on the Environment</p> <ul style="list-style-type: none"> 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.