

Options EHS Biology A 2020		Scope and Sequence
Unit	Lesson	Objectives
Ecology		
The Cycles of Matter		<p>Describe how water, carbon, nitrogen, and phosphorus are cycled through ecosystems.</p> <p>Demonstrate the importance of water, carbon, nitrogen, and phosphorus in ecosystems.</p> <p>Science Practice: Compare the economic, human, and environmental losses to the benefits of a specific scientific example.</p>
Organizational Hierarchy		<p>Describe the hierarchy of organisms, populations, communities, ecosystems, and biomes.</p> <p>Describe how organisms, populations, communities, ecosystems, and biomes are related.</p> <p>Science Practice: Examine the economic, societal, and environmental impacts of a real-world example.</p>
Relationships Among Organisms		<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>
Energy Flow in Ecosystems		<p>Distinguish between producers, consumers, and decomposers.</p> <p>Illustrate the flow of energy through an ecosystem.</p> <p>Explain the energy flow in a food web.</p> <p>Science Practice: Locate data on a table and relate that data to a corresponding graph.</p>
Succession and Extinction		<p>Identify and explain the stages of succession in an ecosystem.</p>

Unit Lesson**Objectives**

Identify factors that may disturb ecosystem stability.

Assess the importance of biodiversity in an ecosystem.

Science Practice: Locate data on a table and relate that data to a corresponding graph.

Populations and the
Environment

Determine biotic and abiotic factors within an ecosystem.

Demonstrate how an organism's habitat determines its niche.

Compare and contrast positive and negative interactions between organisms and their environment.

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

Human Impact on the
Environment

Relate the greenhouse effect to global warming and explain its impact on the environment.

Analyze how human populations affect resources.

Give examples of human activities that have been beneficial and detrimental to the environment.

Science Practice: Give examples of science contributions impacting sustainability.

Unit Test

The Building Blocks of Life

Characteristics of Life

Describe the characteristics of living organisms.

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

Compare and contrast living and nonliving objects.

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

Elements of Living Organisms

Unit Lesson**Objectives**

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).

Macromolecules

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

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

Science Practice: Examine careers in science fields.

Catalysts

Relate changes in energy to the rate of a chemical reaction.

Explain how catalysts affect the energy of a chemical reaction.

Describe the “lock and key” mechanism of enzymes in chemical reactions.

Science Practice: Create a laboratory experiment to answer a specific question.

Lab: Identifying Nutrients

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

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

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

Unit Test

Cell Biology

The Function of Organelles

Identify the organelles of a cell.

Describe the functions of each organelle.

Unit Lesson**Objectives**

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

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.

ATP

Identify ATP as a source of energy for living organisms.

Describe the role of ATP in plant processes.

Describe the role of ATP in living organisms other than plants.

Science Practice: Evaluate data to formulate a conclusion.

The Process of Photosynthesis

Summarize the process of photosynthesis.

Write the chemical equation for photosynthesis.

Explain the importance of photosynthesis to living organisms.

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

Cellular Respiration

Describe how cellular respiration converts glucose to energy in the form of ATP.

Compare and contrast aerobic and anaerobic cellular respiration.

Explain the importance of cellular respiration to living organisms.

Science Practice: Organize data using specific grouping methods.

Unit Test

Cellular Processes

Unit Lesson**Objectives**

Cell Theory

Examine the role of microscopes in discovering cells.

Compare and contrast the functions of different types of microscopes.

Describe the components of cell theory.

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

Prokaryotic and Eukaryotic Cells

Describe the basic structure of a cell.

Compare and contrast prokaryotic and eukaryotic cells.

Explain the endosymbiotic theory.

Science Practice: Evaluate past research from investigations similar in design and purpose.

Cell Homeostasis

Explain how cells maintain homeostasis.

Differentiate between diffusion, osmosis, passive transport, and active transport.

Describe the importance of homeostasis to living organisms.

Science Practice: Generate procedures to utilize charts, graphs, and tables to show data.

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

Illustrate the steps of meiosis.

Describe the roles of crossing over and independent assortment in meiosis.

Unit Lesson**Objectives**

Explain the importance of meiosis to living organisms.

Science Practice: Examine how a scientist's creativity can lead to scientific discovery.

Asexual and Sexual
Reproduction

Relate the processes of mitosis and meiosis to reproduction.

Differentiate between mitosis and meiosis.

Compare and contrast sexual and asexual reproduction.

Science Practice: Outline how to formulate scientific questions using reproduction as a model.

Unit Test

Molecular Genetics

Genetic Code

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

Describe the relationship between DNA, genes, and chromosomes.

Describe the role of DNA replication in transmitting genetic information.

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

DNA and RNA Structure

Analyze the similarities and differences between DNA and RNA.

Explain how the base pairing in DNA and RNA was discovered.

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

Chromosomes

Illustrate the structure of a chromosome and its relationship to DNA.

Create and label a diagram of homologous chromosome pairs with heterozygous alleles.

Explain how a karyotype can be used to identify genetic defects.

Unit Lesson**Objectives**

Science Practice: Apply the components of a scientific report.

Unit Test

Heredity

Introduction to Genetics

Explain the importance of Gregor Mendel to the field of genetics.

Describe the role of nucleic acids in transmitting genetic information.

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

Probability of Inheritance

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

Use Punnett squares to create monohybrid and dihybrid crosses.

Determine genotype and phenotype probabilities from Punnett squares.

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

Laws of Inheritance

Describe how the principle of dominance applies to genes.

Summarize the law of segregation.

Apply the law of independent assortment.

Science Practice: Differentiate scientific hypotheses, theories, and laws.

Unit Test

Cumulative Exam

Cumulative Exam Review

Cumulative Exam