



Northern York County School District

Curriculum Overview

Course: 7 th Grade Life Science	
Grade Level: 7	
Development/Revision Date: January 2025	Length of Time: 180 Days
Course Description: <p>This course introduces students to the essential concepts of biology, focusing on the structure, function, and interactions of living organisms. The course begins by exploring the cellular foundation of life, investigating how single-celled and multicellular organisms operate and sustain life through their cellular functions. Students will use models to demonstrate how different cell structures contribute to overall organism function, as well as how genetic and environmental factors influence growth and reproduction.</p> <p>As the course progresses, students will delve into ecosystems, examining how organisms interact with each other and their environment. Topics such as resource availability, energy cycling, and ecosystem dynamics will be analyzed using data and scientific evidence. Additionally, students will explore the mechanisms of evolution, genetic variation, and natural selection, and learn how modern technologies impact biodiversity and inheritance. Through hands-on investigations, model-building, and data analysis, students will develop a deep understanding of the living world and its complexities.</p>	
Course Objectives: <ul style="list-style-type: none">• Investigate and model how cells form the basic building blocks of all living organisms and contribute to overall organism function.• Explain how the body is a system of interacting subsystems made up of cells, and how these systems work together for reproduction and survival.• Explain how genetic mutations, inheritance, and reproduction contribute to variations in organisms.• Analyze evidence from fossils and anatomical structures to understand the evolution and adaptation of species over time.• Use evidence and mathematical models to explain how natural selection and genetic variation affect species' survival.• Investigate how technological advances influence genetic inheritance and the maintenance of biodiversity.• Analyze how genetic and environmental factors influence the growth and development of organisms, including energy transformation.• Describe the process of photosynthesis and its role in the flow of energy and cycling of matter in ecosystems.• Model the interactions and energy flow between living and non-living parts of ecosystems and how these affect organisms and populations.	
Related Standards: <p>Pennsylvania STEELS Standards</p> <ul style="list-style-type: none">• 3.1.6-8.A Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells.	

- **3.1.6-8.B** Develop and use a model to describe the function of a cell as a whole and the ways that parts of cells contribute to the function.
- **3.1.6-8.C** Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.
- **3.1.6-8.D** Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively.
- **3.1.6-8.E** Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.
- **3.1.6-8.F** Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.
- **3.1.6-8.G** Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.
- **3.1.6-8.H** Gather and synthesize information about how sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.
- **3.1.6-8.I** Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.
- **3.1.6-8.J** Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.
- **3.1.6-8.K** Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.
- **3.1.6-8.L** Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.
- **3.1.6-8.M** Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.
- **3.1.6-8.N** Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.
- **3.1.6-8.O** Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.
- **3.1.6-8.P** Apply scientific ideas to construct an explanation for anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.
- **3.1.6-8.Q** Analyze displays of pictorial data to compare patterns of similarities in anatomical structures across multiple species to identify relationships not evident in the fully formed anatomy.
- **3.1.6-8.R** Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.
- **3.1.6-8.S** Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.
- **3.1.6-8.T** Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.
- **3.1.6-8.U** Evaluate competing design solutions for maintaining biodiversity and ecosystem services.

Units:

- Cells
- Genetics
- Ecosystems
- Adaptations

- Fossil Records

Competencies:

- Understand that phenomena observable at one scale may not be detectable at another, recognizing the importance of scale in scientific investigation.
- Explore how engineering advances fuel scientific discoveries across fields and drive the development of industries and engineered systems, illustrating the interconnectedness of science and technology.
- Visualize and model complex structures and systems, understanding that function is often determined by the relationship and composition of parts within a system.
- Examine how systems interact with each other, contain sub-systems, and integrate into larger complex systems, enhancing their understanding of hierarchical and interconnected systems.
- Cultivate habits such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas, essential for scientific inquiry and engineering design.
- Explore cause-and-effect relationships in natural systems, acknowledging that some relationships may require probabilistic descriptions rather than deterministic explanations.
- Analyze energy transfer within natural systems and understand that the cycling of matter is driven by this transfer of energy.
- Comprehend that matter is conserved in physical and chemical processes due to the conservation of atoms.
- Use cause-and-effect relationships to predict phenomena within natural and designed systems, recognizing patterns as a tool for identifying these relationships.
- Employ graphs, charts, and images to identify data patterns, leveraging these patterns to make sense of complex information and infer relationships.
- Differentiate between the descriptive nature of scientific knowledge and the prescriptive choices of society, recognizing the role of scientific understanding in informing, but not dictating, societal decisions.
- Assess how technology use is influenced by societal needs, values, scientific research, and regional factors such as climate and resources, acknowledging that technology adoption varies across time and place.
- Observe that objects and events in natural systems occur in consistent, measurable patterns, highlighting science's capacity to explain the natural world through observation.
- Investigate how small changes in one part of a system may lead to significant impacts on other parts, emphasizing the delicate balance and sensitivity within interconnected systems.

Concepts:

- **STRUCTURE, FUNCTION, AND INFORMATION PROCESSING** - All living things are made of cells, which can form tissues and organs that work together in systems, with sensory receptors sending signals to the brain for responses.
- **GROWTH, DEVELOPMENT, AND REPRODUCTION OF ORGANISMS** - Animals and plants have behaviors and traits that aid reproduction, with growth and traits influenced by genetics and environment, while natural variations and selective breeding impact offspring and society.
- **MATTER AND ENERGY IN ORGANISMS AND ECOSYSTEMS** - Plants, algae, and some microorganisms make food and oxygen

Learning Activities:

- Ask questions and define problems
- Plan and carry out investigations
- Engage in argument from evidence
- Develop and use models
- Analyze and interpret data
- Construct explanations and design solutions
- Obtain, evaluate, and communicate information
- Use math and computational thinking

using sunlight, while all organisms rely on food energy, interact for resources, and form ecosystems where energy and matter cycle, with any disruption affecting populations.

- **INTERDEPENDENT RELATIONSHIPS IN ECOSYSTEMS** - Ecosystems rely on predator-prey, competition, and mutual support among species, with biodiversity showing ecosystem health and affecting resources like food and water.
- **NATURAL SELECTION** - The fossil record shows how species have changed over time, revealing their evolutionary history, while natural selection favors traits that help survival and reproduction in changing environments.

Performance Tasks:

- Formative lesson assessments such as student discussion, questioning, peer collaborative activities, reflections
- Summative unit assessments and projects

Other Assessment Measures:

Textbook/Primary Resource:

Amplify Education, Inc. (2022). *Amplify Science: Life Science*. Amplify Education, Inc.

Supplemental Resource Materials: iXL, Brain Pop, EdPuzzle, Nearpod, Discovery Education, Flocabulary