



Northern York County School District

Curriculum Overview

Course: 4th Grade Science

Grade Level: 4

Development/Revision Date: January 2025

Length of Time: 90 Days

Course Description:

Students will explore essential concepts in Life Science, Physical Science, and Earth Science through hands-on activities and real-world applications. They will examine how plants and animals have internal and external structures that support survival, growth, and reproduction, and use models to understand how animals process and respond to information through their senses. Students will also investigate forces and energy, exploring how motion relates to energy, how energy is transferred through sound, light, and heat, and design devices that convert energy from one form to another.

In Earth science, students will study the changes in landscapes over time, the effects of weathering and erosion, and analyze data to identify patterns in Earth's features. They will also learn how natural resources provide energy and explore ways to reduce the environmental impacts of their use. Throughout the course, students will engage in critical thinking, problem-solving, and collaborative activities, fostering their curiosity and understanding of the natural world.

Course Objectives:

Life Science

- Understand how the structures of plants and animals help them survive and grow.
- Describe how animals use their senses to gather and respond to information.

Physical Science

- Explain the relationship between an object's speed and its energy.
- Observe how energy moves through sound, light, heat, and electricity.
- Predict what happens to energy when objects collide.
- Design and test devices that change energy from one form to another.
- Understand wave patterns and how light helps us see.

Earth and Space Science

- Use evidence from rocks and fossils to explain how landscapes change over time.
- Measure the effects of weathering and erosion.
- Analyze maps to understand Earth's features.
- Describe how natural resources are used and their environmental impact.
- Find ways to reduce the impact of natural processes on humans.

Related Standards:

Pennsylvania STEELS State Standards

Life Science

- **3.1.4.A** Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

- **3.1.4.B** Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

Physical Science

- **3.2.4.A** Use evidence to construct an explanation relating the speed of an object to the energy of that object.
- **3.2.4.B** Make and communicate observations to provide evidence that energy can be transferred from place to place by sound, light, heat, and electric currents.
- **3.2.4.C** Ask questions and predict outcomes about the changes in energy that occur when objects collide.
- **3.2.4.D** Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.
- **3.2.4.E** Develop a model of waves to describe patterns in terms of amplitude and wavelength and that waves can cause objects to move.
- **3.2.4.F** Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.
- **3.2.4.G** Generate and compare multiple solutions that use patterns to transfer information.

Earth and Space Science

- **3.3.4.A** Identify evidence from patterns in rock formations and fossils in rock layers to support an explanation for changes in a landscape over time.
- **3.3.4.B** Make observations and/or measurements to provide evidence of the effects of weathering or the rate of erosion by water, ice, wind, or vegetation.
- **3.3.4.C** Analyze and interpret data from maps to describe patterns of Earth's features.
- **3.3.4.D** Obtain and combine information to describe that energy and fuels are derived from natural resources and their uses affect the environment.
- **3.3.4.E** Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.

Units:

- Energy
- Soils, Rocks, and Landforms
- Environments: Senses and Survival

Concepts:

- **STRUCTURES AND PROCESSES** - Plants and animals have structures that support growth, survival, behavior, and reproduction, with animals using specialized sense receptors and brain processing to guide their actions based on perceptions and memories.
- **ENERGY** - Moving objects have energy that can transfer through collisions, sound, light, and electric currents, while energy conversions enable practical applications, and solutions to engineering problems are evaluated by criteria and resource constraints.
- **WAVES AND THEIR APPLICATIONS IN TECHNOLOGIES FOR INFORMATION TRANSFER** - Waves carry information, light allows us to see objects, and digitized data can travel long distances and be

Competencies:

- Describe a system by identifying its components and explaining their interactions.
- Explain how energy is transferred in various ways and between objects.
- Use similarities and differences in patterns to classify, sort, and analyze rates of change in natural phenomena.
- Identify and explain cause-and-effect relationships.
- Use similarities and differences in patterns to classify and organize designed products.
- Understand the importance of relevant scientific concepts and research findings in engineering.
- Recognize that science assumes consistent patterns in natural systems.

<p>decoded by devices, with solutions tested to find the best fit within set limits.</p> <ul style="list-style-type: none"> • EARTH'S PLACE IN THE UNIVERSE - Patterns in rock formations show changes over time from Earth forces like earthquakes, and fossils help reveal the order of rock layer formation. • EARTH'S SYSTEMS - Rain shapes land and affects local life, while natural forces break and move earth materials; mountains, trenches, and volcanoes often follow patterns along continents and oceans, visible on maps. • EARTH AND HUMAN ACTIVITY - Human energy sources impact the environment, some are renewable; natural hazards can't be stopped but their impacts can be reduced, with solutions tested for effectiveness in different conditions. 	<ul style="list-style-type: none"> • Use patterns as evidence to support scientific explanations. • Identify, test, and use cause-and-effect relationships to explain changes in systems. • Explain how changes in people's needs and wants over time influence the demand for new and improved technologies. • Understand that engineers develop or improve technologies to increase benefits, decrease risks, and meet societal demands.
<p>Learning Activities:</p> <ul style="list-style-type: none"> • 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 	<p>Performance Tasks:</p> <ul style="list-style-type: none"> • Formative lesson assessments such as student discussion, questioning, peer collaborative activities, reflections, FOSS notebook entries • Summative unit assessments and projects
<p>Other Assessment Measures:</p>	
<p>Textbook/Primary Resource: FOSS Next Generation.</p>	
<p>Supplemental Resource Materials: Discovery Ed, Nearpod, BrainPop, Mystery Science</p>	