# SPRING GROVE AREA SCHOOL DISTRICT

## PLANNED COURSE OVERVIEW

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| **Course Title:** General Science | **Length of Course:** 30 cycles |
| **Grade Level(s):** 7 | **Periods Per Cycle:** 6 |
| **Units of Credit:** N/A | **Length of Period:** 47 minutes |
| **Classification:** Required | **Total Instructional Time:** 141 hours |

## Course Description

The 7th grade General Science course will be presented in a spiral format, building upon content in previous grades. The 7th grade General Science course will cover a variety of science topics including Earth and Space, Life/Biology, Geology, Ecology, and Physical Science.

## Instructional Strategies, Learning Practices, Activities, and Experiences

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| Anchor Charts | Graphic Organizers | Projects (Oral and Written) |
| Anticipatory Sets | Guided Practice | Remediation |
| Assessments (Quizzes, Unit, Teacher-Created) | Higher-Level Questioning | Research Projects |
| Bell Ringers/Warm-ups | Homework | Re-teaching |
| Class Discussions | Internet Links and Interactive Activities | Review (Games, Study Guides) |
| Closure | Interaction Sequence | Simulations |
| Concept Maps | Journals | Standardized Test Preparation |
| Cooperative Learning | Lab Experiments and Write-ups | Teacher Demonstrations |
| Critical Thinking | Map Creation and Interpretation | Teacher Observations |
| Cross Curricular Connections | Manipulatives | Technology Integration |
| Directed Reading Worksheets | Notes (Templates, Teacher or Student Generated) | Videos/DVDs |
| Entrance and Exit Passes | Partners (Think-Pair-Share) | Visual Aids (Charts, Diagrams, Models, etc.) |
| Essays | Posted and Numbered Objectives | Vocabulary (Cards, Strategies, and Lists) |
| Flexible Groups | Practice Exercises | Wait Time and Wait Time Extended |
| Graph Creation and Interpretation | Presentations | |

## Assessments

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| Assessments (Quizzes, Unit, Teacher-Created) | Evaluation (Summative and Formative) | Presentations |
| Bell Ringers | Higher-Level Questioning | State Standardized Assessments |
| Closure | Homework Review | Projects |
| CDT | Interaction Sequence | Rubrics |
| Entrance and Exit Passes | Lab Experiments and Write-ups | Teacher Observations |

## Materials/Resources

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| Anchor Charts | Literature | Study Guides |
| Graphic Organizers | Manipulatives | Technology Integration |
| Internet Resources | Note Packets | Videos/DVDs |
| Journals | PowerPoints | Vocabulary (Cards, Strategies, and Lists) |
| Laboratory Equipment and Supplies | Resource Books | |

**Adopted:** 8/21/88
**Revised:** 6/17/98; 11/15/01; 8/20/07; 5/19/14

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***PLANNED COURSE: General Science*** ***LEVEL: Grade 7***

**Science and Technology and Engineering Education**

| **How Things Get Moved** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students will understand that forces acting on an object change the way it moves, and that movement is the product of force. Students will:<br><br>• Identify balanced and unbalanced forces.<br>• Identify forces acting on an object.<br>• Anticipate the outcome of forces acting on an object.<br>• Analyze mechanical advantage. | 3.2.7.B1. Describe how unbalanced forces acting on an object change its **velocity**. Analyze how observations of displacement, **velocity**, and acceleration provide necessary and sufficient evidence for the existence of forces.<br><br>3.2.7.B2. - Describe how energy can be changed from one form to another (transformed) as it moves through a **system** or transferred from one system to another system.<br><br>3.2.7.B3. - Differentiate among **convection**, **conduction,** and **radiation**. Explain why heat energy consists of the random motion and vibrations of the particles of matter.<br><br>3.2.7.B4. - Explain how electrical current is produced by the flow of electrons. Explain and demonstrate how electric current produces magnetic forces and how moving magnets produce electric current.<br><br>3.2.7.B5. - Demonstrate that visible light is a mixture of many different colors. Explain the construct of the electromagnetic spectrum. Describe how sound and light energy are transmitted by waves.<br><br>3.2.7.B6. – ENERGY - Demonstrate that heat is often produced as energy is transformed through a **system**.<br>ENERGY - Demonstrate how the transfer of heat energy causes temperature changes.<br><br>3.2.7.B7. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection. |

| **Keys to the Past** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students connect Earth processes with the formation of fossils, fossilized remains with prehistoric plants and animals, and fossil succession (change in life over time) with geologic time. Students will:<br><br>• Investigate the formation of molds and casts of marine organisms and the fossilized remains in the La Brea Tar Pits.<br>• Explain how fossilized remains and traces of organisms show evidence of prehistoric plants and animals.<br>• Apply the concepts of fossil succession and geologic time through the use of index fossils to determine relative ages of fossiliferous rock units.<br>• Create hypothetical fossils and rock units to explain relative age-dating of rock units through the use of fossils. | 4.1.7.A. - Describe the relationships between **biotic** and **abiotic** components of an **ecosystem**.<br>• Compare and contrast different **biomes** and their characteristics.<br>• Describe **symbiotic** and **predator/ prey** relationships.<br><br>4.2.7.C. - Use appropriate tools and techniques to analyze a freshwater **environment**.<br>• Interpret physical, chemical, and biological data as a means of assessing the **environmental** quality of a freshwater **environment**.<br><br>3.1.4.C3 - CONSTANCY AND CHANGE - Compare fossils to one another and to currently living organisms according to their anatomical similarities and differences.<br><br>3.1.7.A1 – Describe the similarities and differences of physical characteristics in diverse organisms.<br><br>3.1.7.A2 – Describe how organisms obtain and use energy throughout their lives.<br><br>3.1.7.A3 – Explain why the life cycles of different organisms have varied lengths.<br><br>3.1.7.A4 - Explain how cells arise from pre-existing cells.<br><br>3.1.7.A5. - Explain how the cell is the basic structural and functional unit of living things.<br><br>3.1.7.A6. - Identify the levels of organization from cell to organism.<br><br>3.1.7.A7. - Compare life processes (e.g. growth, **digestion**) at the organism level with life processes at the cellular level.<br><br>3.1.7.A8. MODELS Apply the appropriate **models** to show interactions among **organisms** in an environment. |

| **Keys to the Past (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.1.7.A9. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.<br><br>3.1.7.C1. - Describe how **natural selection** is an underlying factor in a population's ability to adapt to changes.<br><br>3.1.7.C2. - Explain why the **extinction** of a **species** may occur when the environment changes. Explain that **mutations** can alter a gene and are the original source of new variations in a population.<br><br>3.1.7.C3. CONSTANCY AND CHANGE Identify evidence drawn from **geology**, fossils, and comparative anatomy that provides the basis for the **theory of evolution**. |

| **Keys to the Past (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.1.7.C4. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.<br><br>3.3.7.A1. - Define basic features of the **rock cycle.** Describe the layers of the earth. Differentiate among the mechanisms by which heat is transferred through the Earth's **system**.<br><br>3.3.7.A2. - Explain land use in relation to soil type and **topography**.<br><br>3.3.7.A3. - Explain and give examples of how physical evidence, such as fossils and surface features of glaciation support theories that the Earth has evolved over **geologic time.** Compare geologic processes over time.<br><br>3.3.7.A4. - Differentiate among Earth's water **systems**. Describe the motions of tides and identify their causes. |

| **Keys to the Past (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.3.7.A5. - Describe basic elements of **meteorology**. Explain the relationship between the energy provided by the sun and the temperature differences among water, land and **atmosphere.**<br><br>3.3.7.A6. - MODELS/SCALES Locate significant geologic structures using various mapping representations.<br>CONSTANCY/ CHANGE<br>Describe changes in atmospheric conditions associated with various weather patterns.<br>CONSTANCY/ CHANGE<br>SCALE<br>Describe geologic time as it relates to earth processes.<br><br>3.3.7.A7 -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.<br><br>3.4.7.A1. - Explain how **technology** is closely linked to creativity, which has resulted in **innovation** and invention.<br><br>3.4.7.A2. - Explain how different **technologies** involve different sets of processes.<br><br>3.4.7.A3. - Explain how knowledge gained from other fields of study has a direct effect on the development of technological products and **systems**. |

| **Keys to the Past (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.4.7.B1. - Explain how the use of **technology** can have consequences that affect humans in many ways.<br><br>3.4.7.B2. - Explain how decisions to develop and use **technologies** may be influenced by environmental and economic concerns.<br><br>3.4.7.B3. - Describe how **invention** and **innovation** lead to changes in society and the creation of new needs and wants.<br><br>3.4.7.B4. - Explain how many **inventions** and **innovations** have evolved by using deliberate and methodical processes of tests and refinements.<br><br>3.4.7.C1. - Describe how **design**, as a creative planning process, leads to useful products and **systems**.<br><br>3.4.7.C2. - Explain how modeling, testing, evaluating, and modifying are used to transform ideas into practical solutions.<br><br>3.4.7.C3. - Describe how troubleshooting as a problem-solving method may identify the cause of a malfunction in a technological **system**.<br><br>3.4.7.D1. - Identify and collect information about everyday problems that can be solved by **technology** and generate ideas and requirements for solving a problem.<br><br>3.4.7.D2. - Select and safely use appropriate tools, products and **systems** for specific tasks.<br><br>3.4.7.D3. - Use data collected to analyze and interpret trends in order to identify the positive or negative effects of a **technology**. |

| **Keys to the Past (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.4.7.E1. - Investigate recent advancements in medical technologies and their impact on quality of life.<br><br>3.4.7.E2. - Examine specialized equipment and practices used to improve the production of food, fiber, fuel, and other useful products and in the care of animals.<br><br>3.4.7.E3. - Examine the efficiency of energy use in our environment.<br><br>3.4.7.E4. - Illustrate how information can be acquired and sent through a variety of technological sources, including print and electronic media.<br><br>3.4.7.E5. - Explain how processes, such as receiving, holding, storing, loading, moving, unloading, delivering, evaluating, marketing, managing and communicating are necessary for the entire **system** to operate efficiently.<br><br>3.4.7.E6. - Examine the processes involved in extracting (e.g., harvesting, drilling, mining) raw materials from the earth for use in manufacturing processes.<br><br>3.4.7.E7. - Examine subsystems found in the construction of a building. |

| **The Fig Tree Wasp** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students learn about the symbiotic relationship between fig trees and fig tree wasps. Students will:<br><br>• Describe the life stages and reproduction of fig trees.<br>• Describe the life stages and reproduction of fig tree wasps.<br>• Compare various types of symbiotic relationships.<br>• Explain the scientific evidence for the co-evolution of fig trees and fig tree wasps. | 4.1.7.A. - Describe the relationships between **biotic** and **abiotic** components of an **ecosystem**.<br>• Compare and contrast different **biomes** and their characteristics.<br>• Describe **symbiotic** and **predator/ prey** relationships.<br><br>4.1.7.C. - Explain the flow of energy within an **ecosystem**.<br>• Compare and contrast the flow of energy between **organisms** in different **habitats**.<br>• Explain the concept of **trophic** levels. |

| **Reproduction** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students will learn how organisms make new cells from existing cells. They will compare and contrast sexual and asexual reproduction. They will learn how the processes of mitosis and meiosis fit into the life cycles of different organisms. Students will:<br><br>• Speculate as to why people historically supported the idea of spontaneous generation.<br>• Observe daphnia under microscopes and apply concepts of biological organization and reproduction to the organism.<br>• Summarize the life cycles of humans and daphnia.<br>• Draw the stages of mitosis and meiosis.<br>• Classify and calculate the relative amount of time a cell spends in each stage of mitosis.<br>• Compare and contrast the types of cells produced by mitosis and meiosis and how the two processes fit into organisms' life cycles. | 3.1.7.B1. - Explain how **genetic** instructions influence inherited traits. Identify **Mendelian patterns of inheritance.**<br><br>3.1.7.B2. - Compare **sexual reproduction** with **asexual reproduction**.<br><br>3.1.7.B4. - Describe how selective breeding and **biotechnology** can alter the **genetic** composition of **organisms**. |

| **Lentic and Lotic Ecosystems** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students will learn about lentic and lotic ecosystems. Students will identify abiotic and biotic characteristics of each. Students will examine interactions between organisms in wetlands. The last lesson focuses on pollution in wetlands. Students will:<br><br>• Identify biotic and abiotic factors in lentic and lotic ecosystems.<br>• Explain interactions among organisms in Pennsylvania's lentic and lotic ecosystems.<br>• Investigate how wetlands can buffer pollution.<br>• Describe the impact of human activities on lentic and lotic ecosystems. | 4.1.7.A. - Describe the relationships between **biotic** and **abiotic** components of an **ecosystem**.<br>• Compare and contrast different **biomes** and their characteristics.<br>• Describe **symbiotic** and **predator/ prey** relationships.<br><br>4.1.7.C. - Explain the flow of energy within an **ecosystem**.<br>• Compare and contrast the flow of energy between **organisms** in different **habitats**.<br>• Explain the concept of **trophic** levels.<br><br>4.1.7.E. - Identify factors that contribute to change in natural and human-made systems.<br>• Explain the processes of primary and secondary **succession** in a given **ecosystem**.<br><br>4.3.7.A. - Explain how products are derived from **natural resources**.<br>• Describe the process of converting raw materials to **consumer** goods.<br>• Differentiate between **renewable** and **nonrenewable resources**.<br><br>4.4.7.A. - Describe how agricultural practices, the **environment,** and the availability of **natural resources** are related.<br><br>4.5.7.A. - Describe how the development of civilization affects the use of **natural resources**.<br>• Compare and contrast how people use **natural resources** in sustainable and non-sustainable ways throughout the world.<br><br>4.5.7.C. - Explain how human actions affect the health of the **environment**.<br>• Identify residential and industrial sources of pollution and their effects on **environmental** health.<br><br>4.5.7.D. Describe the wastes derived from using **resources,** how the waste is managed, and the potential impact on the **environment**.<br><br>4.5.7.E. Describe how length and degree of exposure to pollutants may affect human health.<br>• Identify diseases/ conditions that have been associated with exposure to pollutants. |

| **Experiments** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students will learn the components of a scientific experiment, how to accurately design and perform an experiment, and how to analyze results taken from the experiment. Students will:<br><br>• Form a hypothesis.<br>• Identify controls and variables in experiments.<br>• Make observations.<br>• Create a graph.<br>• Analyze data.<br>• Draw conclusions.<br>• Identify bias and flaws in the experiment. | 4.2.7.C. - Use appropriate tools and techniques to analyze a freshwater **environment**.<br>• Interpret physical, chemical, and biological data as a means of assessing the **environmental** quality of a freshwater **environment**.<br><br>3.1.7.A9. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.<br><br>3.4.7.D1. - Identify and collect information about everyday problems that can be solved by **technology** and generate ideas and requirements for solving a problem.<br><br>3.4.7.D2. - Select and safely use appropriate tools, products and **systems** for specific tasks. |

| **Ecology** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students will be introduced to the various biomes, understand the interdependency of ecosystems, and investigate how natural and human-made disasters affect ecosystems. Students will:<br><br>• Define ecology.<br>• Identify biotic and abiotic characteristics of various biomes.<br>• Analyze the role of competition between animals, as well as among plants, in an ecosystem.<br>• Distinguish between the types of symbiosis (i.e., commensalism, mutualism, and parasitism).<br>• Explain that symbiotic relationships are examples of the intricate web of interdependence within which all plants and animals live.<br>• Recognize how humans can impact natural ecosystems.<br>• Investigate and describe the effects of oil spills on marine ecosystems. | 4.1.7.A. - Describe the relationships between **biotic** and **abiotic** components of an **ecosystem**.<br>• Compare and contrast different **biomes** and their characteristics.<br>• Describe **symbiotic** and **predator/ prey** relationships.<br><br>4.1.7.E. - Identify factors that contribute to change in natural and human-made systems.<br>• Explain the processes of primary and secondary **succession** in a given **ecosystem**.<br><br>4.2.7.C. - Use appropriate tools and techniques to analyze a freshwater **environment**.<br>• Interpret physical, chemical, and biological data as a means of assessing the **environmental** quality of a freshwater **environment**.<br><br>4.5.7.D. Describe the wastes derived from using **resources,** how the waste is managed, and the potential impact on the **environment**. |

| **Obtaining Energy** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students will examine how living things use specialized structures to obtain energy. They will learn about the processes of photosynthesis and cell respiration. They will investigate the respiratory systems of several animals. Students will:<br><br>• Investigate the structures of a leaf that are used for photosynthesis.<br>• Describe some of the levels of organization in a plant.<br>• Compare the specialized respiratory structures in animals.<br>• Explain the flow of energy in the processes of photosynthesis and cell respiration. | 4.1.7.C. - Explain the flow of energy within an **ecosystem**.<br>• Compare and contrast the flow of energy between **organisms** in different **habitats**.<br>• Explain the concept of **trophic** levels.<br><br>3.1.7 B5. - PATTERNS Compare and contrast observable patterns in the physical characteristics across **families**, **strains** and **species**.<br><br>3.1.7.B6. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.<br><br>3.1.6.A2 – Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers. |

| **Fossil Fuels** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students investigate the formation, extraction, and usage of fossil fuels. Students will:<br><br>• Analyze fossil fuel and paleogeographic maps.<br>• Connect fossil-fuel forming processes to Pennsylvania geologic history.<br>• Analyze and interpret graphs representing energy production and usage in the United States.<br>• Explain how energy from fossil fuels is used in the United States.<br>• Explore fossil fuel extraction methods.<br>• Link possible environmental impacts to fossil fuel extraction methods. | 4.4.6.A. - Explain how different plants and animals in the United States have specific growing requirements related to climate and soil conditions.<br><br>4.4.6.B. - Analyze how soil types and geographic regions have impacted **agriculture** in Pennsylvania.<br>3.1.6.A1 – Describe the similarities and differences of major physical characteristics in plants, animals, fungi, protists, and bacteria.<br><br>3.1.6.A2 – Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers.<br><br>3.1.6.A4 - Recognize that all organisms are composed of cells and that many organisms are **unicellular** and must carry out all life functions in one cell.<br><br>3.1.6.A5. - Describe basic structures that plants and animals have that contribute to their ability to make or find food and reproduce.<br><br>3.1.6.A6. - Identify examples of **unicellular** and **multicellular organisms**.<br><br>3.1.6.A8. – SCALE Explain why the details of most cells are visible only through a microscope. |

| **Fossil Fuels (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.1.6.A9. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.<br><br>3.1.6.C1. – Differentiate between instinctive and learned animal behaviors that relate to survival.<br><br>3.1.6.C4. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection. |

**Environment and Ecology**

| **Fossil Fuels (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.2.6.B1. - Explain how changes in motion require a force.<br><br>3.2.6.B2. - Describe energy as a property of objects associated with heat, light, electricity, magnetism, mechanical motion, and sound. Differentiate between potential and kinetic energy.<br><br>3.2.6.B3. - Give examples of how heat moves in predictable ways, normally flowing from warmer objects to cooler ones until they reach the same temperature. Explain the effect of heat on particle motion by describing what happens to particles during a phase change.<br><br>3.2.6.B4. - Describe how electric current produces magnetic forces and how moving magnets produce electric current. Derive Ohm's Law through investigation of voltage, current, and resistance.<br><br>3.2.6.B6. – ENERGY Demonstrate that heat moves in predictable ways from warmer objects to cooler ones. SCALE Investigate that materials may be composed of parts too small to be seen without magnification.<br><br>3.2.6.B7. –<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection. |

| **Fossil Fuels (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.3.6.A1. - Recognize and interpret various mapping representations of Earth's common features.<br><br>3.3.6.A2. - Examine how soil fertility, composition, resistance to erosion, and texture are affected by many factors.<br><br>3.3.6.A4. - Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere.<br><br>3.3.6.A5. - Describe the composition and layers of the **atmosphere.**<br>Explain the effects of oceans on climate.<br>Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.<br><br>3.3.6.A6. - MODELS/SCALES Describe the scales involved in characterizing Earth and its atmosphere.<br>MODELS/SCALES Create models of Earth's common physical features.<br><br>3.3.6.A7. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection. |

| **Fossil Fuels (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.4.6.D1. - Apply a design process to solve problems beyond the laboratory classroom.<br><br>3.4.6.D2. - Use computers appropriately to access and organize and apply information.<br><br>3.4.6.D3. - Design and use instruments to evaluate data. |

| **Multicellular Organisms** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students learn about the appearance of multicellular organisms during the Cambrian period and what environmental conditions stimulated their appearance. Students will:<br><br>• Identify and differentiate characteristics of multicellular organisms.<br>• Examine fossil evidence from the Cambrian period.<br>• Compare and contrast how organisms respond to changes in the environment. | 4.5.6.D - Identify reasons why organisms become threatened, endangered, and extinct.<br><br>4.4.6.A. - Explain how different plants and animals in the United States have specific growing requirements related to climate and soil conditions.<br><br>3.1.6.A1 – Describe the similarities and differences of major physical characteristics in plants, animals, fungi, protists, and bacteria.<br><br>3.1.6.A2 – Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers.<br><br>3.1.6.A4 - Recognize that all organisms are composed of cells and that many organisms are **unicellular** and must carry out all life functions in one cell.<br><br>3.1.6.A5. - Describe basic structures that plants and animals have that contribute to their ability to make or find food and reproduce.<br><br>3.1.6.A6. - Identify examples of **unicellular** and **multicellular organisms**.<br><br>3.1.6.A8. – SCALE Explain why the details of most cells are visible only through a microscope. |

| **Multicellular Organisms (Continued)** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| | 3.1.6.A9. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection.<br><br>3.1.6.C1. – Differentiate between instinctive and learned animal behaviors that relate to survival.<br><br>3.1.6.C4. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection. |

| **Forces: On Earth and Beyond** | |
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| **CONTENT/KEY CONCEPTS** | **OBJECTIVES/STANDARDS** |
| In this unit, students will explore some of the forces that surround us and have created the world in which we live. Students will identify ways that we use force to describe objects as well as methods to make inferences about our planet and solar system. Students will:<br><br>• Identify the similarities and differences between mass and weight.<br>• Calculate weight on other planets.<br>• Describe and demonstrate the law of inertia.<br>• Understand the relationship between planetary orbits and inertia. | 3.2.5.B1. - Explain how mass of an object resists change to motion.<br><br>3.2.5.B2. - Examine how energy can be transferred from one form to another.<br><br>3.2.5.B3. - Demonstrate how heat energy is usually a byproduct of an energy transformation.<br><br>3.2.5.B4. - Demonstrate how electrical circuits provide a means of transferring electrical energy when heat, light, sound, and chemical changes are produced. Demonstrate how electromagnets can be made and used.<br><br>3.2.5.B5. - Compare the characteristics of sound as it is transmitted through different materials. Relate the rate of vibration to the pitch of the sound.<br><br>3.2.5.B7. -<br>• Understand how theories are developed.<br>• Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions.<br>• Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations.<br>• Describe relationships using inference and prediction.<br>• Use appropriate tools and technologies to gather, analyze, and interpret data and understand that it enhances accuracy and allows scientists to analyze and quantify results of investigations.<br>• Develop descriptions, explanations, and models using evidence and understand that these emphasize evidence, have logically consistent arguments, and are based on scientific principles, models, and theories.<br>• Analyze alternative explanations and understanding that science advances through legitimate skepticism.<br>• Use mathematics in all aspects of scientific inquiry.<br>• Understand that scientific investigations may result in new ideas for study, new methods, or procedures for an investigation or new technologies to improve data collection. |