SPRING GROVE AREA SCHOOL DISTRICT

PLANNED COURSE OVERVIEW

Course Title: Science	**Length of Course:** 15 cycles
Grade Level(s): 5	**Periods Per Cycle:** 6
Units of Credit: N/A	**Length of Period:** 50 minutes
Classification: Required	**Total Instructional Time:** 75 hours

Course Description

This course provides students with a foundation of skills in Life, Earth, and Physical Science.

Instructional Strategies, Learning Practices, Activities, and Experiences

- Anchor Charts
- Anticipatory Sets
- Bell Ringers
- Class Discussions
- Closure
- Critical Thinking
- Graphic Organizers
- Guided Reading
- Higher Level Questioning
- Homework
- Interaction Sequence
- Internet Research
- Journals
- Paper and Pencil Activities
- Posted Objectives
- Practice Exercises
- Presentations
- PSSA Released Materials
- Question-Answer Relationships
- Quizzes
- Reports and Speeches
- Research
- Small Group Interventions
- Teacher Demonstrations
- Teacher-Made Tests
- Technology Integration
- Videos/DVDs
- Wait-Time
- Wait-Time Extended

Assessments

- Homework
- Oral Projects
- Presentations
- Projects
- Reports
- Teacher Observations
- Teacher-Made Tests and Quizzes
- PSSA Practice Materials
- PSSA Item Samples

Materials/Resources

- Guest Speakers
- Internet
- Supplemental Readings
- Videos / DVDs
- Leveled Readers
- Resource Books
- SAS (Standards Aligned System)
- Textbooks:
  - *Astronomy* (Prentice Hall)
  - *Weather and Climate* (Prentice Hall)
  - *Inside Earth* (Prentice Hall)

Adopted: 1/27/88
Revised: 5/17/89; 9/3/91; 11/18/98; 11/15/01; 8/20/07; 5/19/14

Science and Technology and Engineering Education

Who's on Top of Pennsylvania's Food Chain?	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Differentiate between inherited and acquired traits (e.g. scars, injuries). Explain how inherited traits help organisms survive and reproduce in different environments. Explain how certain behaviors help organisms survive and reproduce in different environments. Describe the roles of producers, consumers, and decomposers within a local ecosystem. Describe the relationships between organisms in different food webs. Describe how energy exists in many forms (e.g., electrical, mechanical, chemical, heat, light, sound) and can be transformed within a system. Describe how heat energy is usually a byproduct of an energy transformation.	4.1.5.A. - Describe the roles of **producers**, **consumers,** and **decomposers** within a local **ecosystem**. 4.1.5.C. - Describe different **food webs** including a **food web** containing humans**.** 4.4.5.A. - Explain why animal production is dependent upon plant production. 3.1.5.A2. – Describe how life on earth depends on energy from the sun. 3.1.5.A3. – Compare and contrast the similarities and differences in life cycles of different organisms. 3.1.5.A5. - Explain the concept of a cell as the basic unit of life. Compare and contrast plant and animal cells. 3.1.5.A9. - • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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.

Who's on Top of Pennsylvania's Food Chain? (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.1.5.B1. - Differentiate between inherited and acquired characteristics of plants and animals. 3.1.5.B6. - • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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. 3.1.5.C1. - Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment. 3.1.5.C2. - Give examples of how inherited characteristics (e.g., shape of beak, length of neck, location of eyes, shape of teeth) may change over time as adaptations to changes in the environment that enable organisms to survive.

Who's on Top of Pennsylvania's Food Chain? (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.1.5.C4. - • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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. 3.2.5.B1. - Explain how mass of an object resists change to motion. 3.2.5.B2. - Examine how energy can be transferred from one form to another. 3.2.5.B3. - Demonstrate how heat energy is usually a byproduct of an energy transformation. 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. 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.

Who's on Top of Pennsylvania's Food Chain? (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.2.5.B7. - • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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. 3.4.5.E1. - Identify how technological advances have made it possible to create new devices and to repair or replace certain parts of the human body. 3.4.5.E2. - Understand that there are many different tools necessary to maintain an ecosystem, whether natural or man-made. 3.4.5.E3. - Explain how tools, machines, products, and systems use energy in order to do work. 3.4.5.E4. - Describe how the use of symbols, measurements, and drawings promotes clear communication by providing a common language to express ideas. 3.4.5.E5. - Examine reasons why a transportation system may lose efficiency or fail (e.g., one part is missing or malfunctioning or if a subsystem is not working). 3.4.5.E6. - Examine how manufacturing technologies have become an integral part of the engineered world. 3.4.5.E7. - Describe the importance of guidelines when planning a community.

Our Solar System	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Explain how technology extends and enhances human abilities for specific purposes (e.g., use hand lens to examine crystals in evaporation dishes; use graduated cylinders to measure the amount of water used in a controlled plant experiment). Make predictions based on patterns in natural systems (e.g., phases of the Moon, time [day, month, and year], weather, seasons). Describe how models are used to better understand the relationships in natural systems (e.g., water cycle, Sun-Earth- Moon system, ecosystems, observe and draw a diagram to show the effects of flowing water in a watershed). Describe the patterns of Earth's rotation and revolution in relation to the Sun and Moon (i.e., solar eclipse, phases of the Moon, and time). Compare the general characteristics of the inner planets of our solar system (i.e., size, orbital path, surface characteristics, and moons).	3.1.5.A2. – Describe how life on earth depends on energy from the sun. 3.1.5.A3. – Compare and contrast the similarities and differences in life cycles of different organisms. 3.1.5.A5. - Explain the concept of a cell as the basic unit of life. Compare and contrast plant and animal cells. 3.1.5.A9. - • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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. 3.3.5.B1. - Provide evidence that the earth revolves around (orbits) the sun in a year's time and that the earth rotates on its axis once approximately every 24 hours.

Our Solar System (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.3.5.B3. – • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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. 3.4.5.A1. - Explain how people use tools and techniques to help them do things. 3.4.5.A2. - Understand that a **subsystem** is a **system** that operates as part of a larger **system**. 3.4.5.A3. - Describe how **technologies** are often combined. 3.4.5.C1. - Explain how the **design** process is a purposeful method of planning practical solutions to problems. 3.4.5.C2. - Describe how design, as a dynamic process of steps, can be performed in different sequences and repeated. 3.4.5.C3. - Identify how **invention** and **innovation** are creative ways to turn ideas into real things.

Science and Technology and Engineering Education

Igneous, Sedimentary, and Metamorphic Rocks	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Describe how scientists use models to explore relationships and make predictions about natural systems (e.g., weather conditions, the solar system). Describe how characteristic physical properties of matter can be used to distinguish one substance from another (e.g., boiling point, freezing/melting points). Identify the three basic rock types and describe their formation (i.e., igneous [granite, basalt, obsidian, and pumice]; sedimentary [limestone, sandstone, shale, and coal]; and metamorphic [slate, quartzite, marble, and gneiss]).	4.4.6.B. - Analyze how soil types and geographic regions have impacted **agriculture** in Pennsylvania. 3.1.6.A1 – Describe the similarities and differences of major physical characteristics in plants, animals, fungi, protists, and bacteria. 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. 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. 3.1.6.A5. - Describe basic structures that plants and animals have that contribute to their ability to make or find food and reproduce. 3.1.6.A6. - Identify examples of **unicellular** and **multicellular organisms**. 3.1.6.A8. – SCALE Explain why the details of most cells are visible only through a microscope.

Igneous, Sedimentary, and Metamorphic Rocks (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.1.6.A9. - • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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. 3.2.6.A1. - Distinguish the differences in properties of solids, liquids, and gases. Differentiate between volume and mass. Investigate that equal volumes of different substances usually have different masses. 3.2.6.A2. - Compare and contrast pure substances with mixtures. 3.2.6.A3. - Explain and give examples of how **mass** is conserved in a closed **system.** 3.2.6.A4. - Differentiate between physical changes and chemical changes. 3.2.6.A5. - CONSTANCY AND CHANGE Identify characteristic properties of matter that can be used to separate one substance from the other.

Igneous, Sedimentary, and Metamorphic Rocks (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.2.6.A6. – • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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. 3.3.6.A1. - Recognize and interpret various mapping representations of Earth's common features. 3.3.6.A2. - Examine how soil fertility, composition, resistance to erosion, and texture are affected by many factors. 3.3.6.A4. - Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere. 3.3.6.A5. - Describe the composition and layers of the **atmosphere.** Explain the effects of oceans on climate. 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.

Igneous, Sedimentary, and Metamorphic Rocks (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.3.6.A6. - MODELS/SCALES Describe the scales involved in characterizing Earth and its atmosphere. MODELS/SCALES Create models of Earth's common physical features. 3.3.6.A7. - • Understand how theories are developed. • Identify questions that can be answered through scientific investigations and evaluate the appropriateness of questions. • Design and conduct a scientific investigation and understand that current scientific knowledge guides scientific investigations. • Describe relationships using inference and prediction. • 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. • 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. • Analyze alternative explanations and understanding that science advances through legitimate skepticism. • Use mathematics in all aspects of scientific inquiry. • 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. 3.4.6.C1. - Recognize that requirements for a **design** include such factors as the desired elements and features of a product or **system** or the limits that are placed on the design. 3.4.6.C2. - Show how models are used to communicate and test design ideas and processes. 3.4.6.C3. - Explain why some technological problems are best solved through experimentation.