SPRING GROVE AREA SCHOOL DISTRICT

PLANNED COURSE OVERVIEW

Course Title: Science	**Length of Course:** 15 cycles
Grade Level(s): 6	**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
- Videos / DVDs
- Supplemental Readings
- Leveled Readers
- Resource Books
- SAS (Standards Aligned System)
- Videos / DVDs
- Textbooks:
  - *Motion, Forces and Energy* (Prentice Hall)
  - *Nature of Science and Technology* (Prentice Hall)
  - *Chemical Interactions* (Prentice Hall)

Adopted: 9/21/88
Revised: 8/15/90; 9/3/91; 11/18/98; 11/15/01; 8/20/07; 5/19/14

Science and Technology and Engineering Education

The Cell	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Describe ways technology extends and enhances human abilities for specific purposes (e.g., make observations of cells with a microscope and planets with a telescope). Describe a system as a group of related parts with specific roles that work together to achieve an observed result. Describe how cells carry out the many functions needed to sustain life. Identify examples of unicellular and multi-cellular organisms (i.e., plants, fungi, bacteria, protista, and animals). Explain how many organisms are unicellular and must carry out all life functions in one cell.	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. 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.

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

Multicellular Organisms	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
In this unit, students will learn about the appearance of multicellular organisms during the Cambrian period and what environmental conditions stimulated their appearance. Students will: • Identify and differentiate characteristics of multicellular organisms. • Examine fossil evidence from the Cambrian period. • Compare and contrast how organisms respond to changes in the environment.	4.5.6.D - Identify reasons why organisms become threatened, endangered, and extinct. 4.4.6.A - Explain how different plants and animals in the United States have specific growing requirements related to climate and soil conditions. 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**.

Matter	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Explain that matter is made of particles called atoms and that atoms are composed of even smaller particles (e.g., protons, neutrons, electrons). Describe how characteristic physical properties of matter can be used to distinguish one substance from another (e.g., boiling point, freezing/melting points). Explain that materials are characterized by having a specific amount of mass in each unit of volume (density).	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. 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. 3.2.7.A2 – Identify **atoms** as the basic building blocks of matter and that elements are composed of one type of atom.

Matter (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Identify characteristic properties of matter that are independent of mass and volume. Differentiate between volume and mass. Describe how water changes from one state to another. Identify differences between chemical and physical changes of matter.	3.2.5.A1. - Describe how water can be changed from one state to another by adding or taking away heat. 3.2.5.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. 3.3.5.A1. - Describe how landforms are the result of a combination of destructive forces such as erosion and constructive erosion, deposition of sediment, etc. 3.3.5.A2. - Describe the usefulness of Earth's physical resources as raw materials for the human made world. 3.3.5.A3. - Explain how geological processes observed today such as erosion, movement of lithospheric plates, and changes in the composition of the atmosphere are similar to those in the past. 3.3.5.A4. - Explain the basic components of the water cycle. 3.3.5.A5. – Differentiate between weather and climate. Explain how the cycling of water, both in and out of the atmosphere, has an effect on climate.

Matter (Continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.3.5.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.

Measurement	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Describe the appropriate use of instruments and scales to accurately measure time, mass, distance, volume, and temperature safely under a variety of conditions (e.g., use a thermometer to observe and compare the interaction of food coloring in water at different temperatures). 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.) Differentiate between volume and mass.	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. 3.2.5.A1. – Describe how water can be changed from one state to another by adding or taking away heat.

Measurement (continued)	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
	3.2.5.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. 3.4.5.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.