SPRING GROVE AREA SCHOOL DISTRICT

PLANNED COURSE OVERVIEW

Course Title: Science	**Length of Course:** 30 cycles
Grade Level(s): 4	**Periods Per Cycle:** 3
Units of Credit: N/A	**Length of Period:** 30 minutes
Classification: Required	**Total Instructional Time:** 45 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

- FOSS (Full Option Science System)
- Guest Speakers
- Internet
- Leveled Readers
- Resource Books
- SAS (Standards Aligned System)
- Supplemental Readings
- Videos / DVDs

Adopted: 1/27/88
Revised: 9/3/91; 12/8/97; 11/15/01; 8/20/07; 5/19/14

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PLANNED COURSE: Science LEVEL: Grade 4

Science and Technology and Engineering Education

3.1 Biological Sciences **3.1A. Organisms and Cells**	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Common Characteristics of Life	3.1.4.A1. – Classify Plants and animals according to the physical characteristics that they share.
Energy Flow	3.1.4.A2. – Describe the different resources that plants and animals need to live.
Life Cycles	3.1.4.A3. – Identify differences in the life cycles of plants and animals.
Form and Function	3.1.4.A5. - Describe common functions living things share to help them function in a specific environment.
Unifying Themes	3.1.4.A8. – MODELS Construct and interpret **models** and diagrams of various animal and plant **life cycles**.
Science as Inquiry	3.1.4.A9. – • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms, and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

3.1.B. Genetics	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Heredity	3.1.4.B1. - Describe features that are observable in both parents and their offspring.
Reproduction	3.1.4.B2. - Recognize that reproduction is necessary for the continuation of life.
Unifying Themes	3.1.4 B5. - PATTERNS Identify observable patterns in the physical characteristics of plants or groups of animals.
Science as Inquiry	3.1.4.B6. – • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms, and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

3.1.C. Evolution	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Natural Selection	3.1.4.C1. - Identify different characteristics of plants and animals that help some populations survive and reproduce in greater numbers. Describe how environmental changes can cause **extinction** in plants and animals.
Adaptation	3.1.4.C2. - Describe plant and animal adaptations that are important to survival.
Unifying Themes	3.1.4.C3. - CONSTANCY AND CHANGE Compare fossils to one another and to currently living organisms according to their anatomical similarities and differences.
Science as Inquiry	3.1.4.C4. – • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms, and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

3.2. Physical Sciences: Chemistry and Physics **3.2.A. Chemistry**	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Properties of Matter	3.2.4.A1. - Identify and classify objects based on their observable and measurable physical properties. Compare and contrast solids, liquids, and gases based on their properties.
Structure of Matter	3.2.4.A2. - Demonstrate that materials are composed of parts that are too small to be seen without magnification.
Matter and Energy	3.2.4.A3. - Demonstrate the conservation of **mass** during physical changes such as melting or freezing.
Reactions	3.2.4.A4. - Recognize that combining two or more substances may make new materials with different properties.
Unifying Themes	3.2.4.A5. - MODELS Use models to demonstrate the physical change as water goes from liquid to ice and from liquid to vapor.
Science as Inquiry	3.2.4.A. - • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms, and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

3.2.B. Physics	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Force and Motion of Particles and Rigid Bodies	3.2.4.B1. - Explain how an object's change in motion can be observed and measured.
Energy Storage and Transformations: Conservation Laws	3.2.4.B2. - Identify types of energy and their ability to be stored and changed from one form to another.
Heat/Heat Transfer	3.2.4.B3. - Understand that objects that emit light often emit heat.
Electrical and Magnetic Energy	3.2.4.B4. - Apply knowledge of basic electrical circuits to the design and construction of simple direct **current** circuits. Compare and contrast series and parallel circuits. Demonstrate that magnets have poles that repel and attract each other.
Nature of Waves (Sound and Light Energy)	3.2.4.B5. - Demonstrate how vibrating objects make sound and sound can make things vibrate. Demonstrate how light can be reflected, refracted, or absorbed by an object.
Unifying Themes	3.2.4.B6. – ENERGY Give examples of how energy can be transformed from one form to another.

3.2.B. Physics	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Science as Inquiry	3.2.4.B7. - • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms, and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

3.4. Technology and Engineering Education **3.4.A. The Scope of Technology**	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Characteristics of Technology	3.4.4.A1. - Understand that tools, materials, and skills are used to make things and carry out tasks.
Core Concepts of Technology	3.4.4.A2. - Understand that systems have parts and components that work together.
Technology Connections	3.4.4.A3. - Describe how various relationships exist between **technology** and other fields.

3.4.B. Technology and Society	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Effects of Technology	3.4.4.B1. - Describe how **technology** affects humans in various ways.
Technology and Environment	3.4.4.B2. - Explain how the use of **technology** affects the environment in good and bad ways.
Society and Development of Technology	3.4.4.B3. - Explain why new **technologies** are developed and old ones are improved in terms of needs and wants.
Technology and History	3.4.4.B4. - Describe how the history of civilization is linked closely to technological development.

3.4.C. Technology and Engineering Design	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Design Attributes	3.4.4.C1. - Understand that there is no perfect **design**.
Engineering Design	3.4.4.C2. - Describe the **engineering design process**: Define a problem. Generate ideas. Select a solution and test it. Make the item. Evaluate the item. Communicate the solution with others. Present the results.
Research and Development, Invention and Innovation, Experimentation/Problem Solving and Troubleshooting	3.4.4.C3. - Explain how asking questions and making observations help a person understand how things work and can be repaired.

3.4.D. Abilities for a Technological World	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Applying the Design Process	3.4.4.D1. - Investigate how things are made and how they can be improved.
Using and Maintaining Technological Systems	3.4.4.D2. - Recognize and use everyday symbols (e.g. icons, simple electrical symbols measurement) to communicate key ideas. Identify and use simple hand tools (e.g., hammer, scale) correctly and safely.
Assessing Impact of Products and Systems	3.4.4.D3. - Investigate and assess the influence of a specific **technology** or **system** on the individual, family, community, and environment.

3.4.E. The Designed World	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Medical Technologies	3.4.4.E1. - Identify tools and devices that have been designed to provide information about a healthy lifestyle.
Agricultural and Related Biotechnologies	3.4.4.E2. - Identify the **technologies** in agriculture that make it possible for food to be available year round.
Energy and Power Technologies	3.4.4.E3. - Identify types of energy and the importance of energy conservation.
Information and Communication Technologies	3.4.4.E4. - Explain how information and communication systems allow information to be transferred from human to human.
Transportation Technologies	3.4.4.E5. - Recognize that a transportation **system** has many parts that work together to help people travel and to move goods from place to place.
Manufacturing Technologies	3.4.4.E6. - Identify key aspects of manufacturing processes (designing products, gathering resources and using tools to separate, form and combine materials in order to produce products).
Construction Technologies	3.4.4.E7. - Understand that structures rest on foundations and that some structures are temporary, while others are permanent.

Environment and Ecology

4.1. Ecology	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
The Environment	4.1.4.A. - Explain how living things are dependent upon other living and nonliving things for survival. • Explain what happens to an **organism** when its food supply, access to water, shelter or space (**niche / habitat**) is changed. • Identify similarities and differences between living **organisms,** ranging from single-celled to multi-cellular **organisms** through the use of microscopes, video, and other media.
Materials Cycles	4.1.4.B. - Identify how **matter** cycles through an **ecosystem**. • Trace how death, growth, and decay cycle **matter** through an **ecosystem**.
Energy Flow	4.1.4.C. - Explain how most life on earth gets its energy from the sun.
Biodiversity	4.5.4.D. - Explain how specific adaptations can help **organisms** survive in their **environment**.
Succession	4.1.4.E. - Explain that **ecosystems** change over time due to natural and/ or human influences.

4.1. Ecology	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Science as Inquiry	4.1.4.F. – • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced and review and ask questions about the work of other scientists.

4.2. Watersheds and Wetlands	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Watersheds	4.2.4.A. - Describe the physical characteristics of a **watershed**. • Identify and explain what determines the boundaries of a **watershed**. • Identify water systems and their components as either **lotic** or **lentic**.
Wetlands	4.2.4.B. - Describe the characteristics of different types of **wetlands**.
Aquatic Ecosystems	4.2.4.C. - Explain how freshwater **organisms** are adapted to their **environment**. • Explain the life cycles of **organisms** in a freshwater **environment**.
Science as Inquiry	4.2.4.D. - • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced and review and ask questions about the work of other scientists.

4.3. Natural Resources	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Use of Natural Resources	4.3.4.A. - Identify ways humans depend on **natural resources** for survival. • Identify resources used to provide humans with energy, food, employment, housing and water.
Availability of Natural Resources	4.3.4.B. - Identify the geographic origins of various **natural resources**.
Science as Inquiry	4.3.4.C. – • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced and review and ask questions about the work of other scientists.

4.4. Agriculture and Society	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Food and Fiber System	4.4.4.A. - Describe the journey of local/global agricultural commodities from production to consumption.
Importance of Agriculture	4.4.4.B. Describe how humans rely on the **food and fiber system**. • Identify Pennsylvania's important agricultural products.
Applying Sciences to Agriculture	4.4.4 C. - Use scientific inquiry to investigate the composition of various soils.
Technology Influences on Agriculture	4.4.4.D. - Identify how **technology** affects the development of civilizations through agricultural production.
Science as Inquiry	4.4.4.E. – • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced and review and ask questions about the work of other scientists.

4.5. Humans and the Environment	
CONTENT/KEY CONCEPTS	**OBJECTIVES/STANDARDS**
Sustainability	4.5.4.A. - Identify how people use **natural resources** in **sustainable** and non-sustainable ways.
Integrated Pest Management	4.5.4.B. - Determine the circumstances that cause humans to identify an **organism** as a **pest**.
Pollution	4.5.4.C. Describe how human activities affect the **environment**.
Waste Management	4.5.4.D. - Describe a **waste stream**. • Identify sources of waste derived from the use of **natural resources**. • Identify those items that can be **recycle**d and those that cannot. • Describe how everyday activities may affect the **environment**.
Human Health Issues	4.5.4.E. - Identify different ways human health can be affected by pollution.
Science as Inquiry	4.5.4.F. – • Distinguish between scientific fact and opinion. • Ask questions about objects, organisms and events. • Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known. • Plan and conduct a simple investigation and understand that different questions require different kinds of investigations. • Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information. • Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge. • Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced and review and ask questions about the work of other scientists.