



# SPRING GROVE AREA SCHOOL DISTRICT



## PLANNED COURSE OVERVIEW

<b>Course Title:</b> General Science <b>Grade Level(s):</b> 7 <b>Units of Credit:</b> N/A <b>Classification:</b> Required	<b>Length of Course:</b> Full Year <b>Periods Per Cycle:</b> 6 <b>Length of Period:</b> 48 Minutes <b>Total Instructional Time:</b> 144 Hours
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### Course Description

The 7<sup>th</sup> grade General Science course is based off the PA STEELS Standards. As a general science class, the course is designed for students to learn science topics in the branch of Life Science and Ecology.

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

<b>Science and Engineering Practices</b> 1. Asking questions and defining problems 2. Developing and using models 3. Planning and carrying out investigations 4. Analyzing and interpreting data 5. Using mathematics and computational thinking 6. Constructing explanations and designing solutions 7. Engaging in arguments from evidence 8. Obtaining, evaluating, and communicating information	<b>Crosscutting Concepts</b> 1. Patterns 2. Cause and effect 3. Scale proportion and quantity 4. Systems and system models 5. Energy and matter: Flows, cycles, and conservation 6. Structure and function 7. Stability and change	<b>Instructional Strategies</b> Driving question boards Students conducting investigations and solving problems Data collection Reading from multiple sources for research and information Modeling Students writing of journals, reports, posters, and media presentations that explain and argue Students discussing open ended questions that focus on the strength of evidence used to generate claims
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### Assessments

Performance Assessments Journals Scientific Writing	Tests and Quizzes Lab Investigation Write Ups Projects	Rubrics Evaluation of Knowledge and Practices (Summative and Formative)
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### Materials/Resources

Internet Resources Laboratory Equipment and Supplies CK-12 Online Textbook	CK Science 7 Computer Simulations Science Models and Kits	Student Journals Resource Books
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**Adopted:** 8/21/88

**Revised:** 6/17/98; 11/15/01; 8/20/07; 5/19/14; 5/22/23

<https://springgroveareascho.sharepoint.com/sites/PrivateSGASD/Shared Documents/AASG/NEWCURR/SCIENCE/2023/Grade 7/7th Grade Science Planned Course Overview 2023.docx>

<b>Structure and Function</b>	
<b>CONTENT/KEY CONCEPTS</b>	<b>OBJECTIVES/STANDARDS</b>
<p>Cell Theory</p> <p>Instinctive and Learned Behaviors</p> <p>Levels of Organization</p> <p>Organelles</p> <p>Prokaryotic vs Eukaryotic Cells</p> <p>Response</p> <p>Specialized Cells</p> <p>Stimulus</p> <p>Unicellular vs Multicellular Organisms</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Compare and contrast living and nonliving things.</li> <li>2. Explain that all living things are made up of cells.</li> <li>3. Construct a model of a cell to identify cell organelles and demonstrate the relationship between structure and function.</li> <li>4. Order the levels of organization of life and identify examples at each level.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.A Conduct an investigation to provide evidence that living things are made of cells, either one cell or many different numbers and types of cells.</p> <p>3.1.6-8.B Develop and use a model to describe the function of a cell as a whole and the ways that parts of cells contribute to the function.</p> <p>3.1.6-8.C Use arguments supported by evidence for how the body is a system of interacting subsystems composed of groups of cells.</p>

<p><b>Growth and Development of Organisms</b></p>	
<p><b>CONTENT/KEY CONCEPTS</b></p>	<p><b>OBJECTIVES/STANDARDS</b></p>
<p>Adaptations</p> <p>Mating Behaviors</p> <p>Natural Selection</p> <p>Nature vs. Nurture</p> <p>Punnett Squares</p> <p>Selective Breeding</p> <p>Sexual and Asexual Reproduction</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain that animals engage in behaviors that increase the odds of reproduction.</li> <li>2. Explain how plants reproduce in a variety of ways based on their adaptations.</li> <li>3. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.D Use arguments based on empirical evidence and scientific reasoning to support an explanation for how characteristic animal behaviors and specialized plant structures affect the probability of successful reproduction of animals and plants, respectively.</p> <p>3.1.6-8.E Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.</p>

<b>Organization for Matter and Energy Flow in Organisms</b>	
<b>CONTENT/KEY CONCEPTS</b>	<b>OBJECTIVES/STANDARDS</b>
<p>Cellular Respiration</p> <p>Elements (C,H,O)</p> <p>Energy</p> <p>Photosynthesis</p> <p>Reactants and Products</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the flow of energy and trace movement of matter as molecules are broken apart and put back together.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.F Construct a scientific explanation based on evidence for the role of photosynthesis in the cycling of matter and flow of energy into and out of organisms.</p> <p>3.1.6-8.G Develop a model to describe how food is rearranged through chemical reactions forming new molecules that support growth and/or release energy as this matter moves through an organism.</p>

Information Processing	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>Adaptations</p> <p>Instinctive Behaviors</p> <p>Learned Behaviors</p> <p>Response</p> <p>Stimulus</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Explain how different inputs are interpreted by the brain to create a response or memory storage.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.H Gather and synthesize information about how sensory receptors respond to stimuli by sending messages to the brain for immediate behavior or storage as memories.</p>

<p><b>Interdependent Relationships in Ecosystems</b></p>	
<p><b>CONTENT/KEY CONCEPTS</b></p>	<p><b>OBJECTIVES/STANDARDS</b></p>
<p>Abiotic Factors</p>	<p><u>Objectives</u></p>
<p>Biotic Factors</p>	<p>Students will be able to:</p>
<p>Carrying Capacity</p>	<ol style="list-style-type: none"> <li>1. Predict how changes in availability of resources can impact ecosystems.</li> <li>2. Analyze data to illustrate a local environment.</li> </ol>
<p>Competition</p>	<p><u>Standards</u></p>
<p>Ecological Succession</p>	<p>3.1.6-8.I Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem.</p>
<p>Food Web</p>	<p>3.1.6-8.J Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems.</p>
<p>Forestry Management</p>	<p>3.1.6-8.L Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.</p>
<p>Limiting Factors</p>	<p>3.4.9-12.E Collect, analyze, and interpret environmental data to describe a local environment.</p>
<p>Water Management</p>	
<p>Wildlife Management</p>	

Cycles of Matter and Energy Transfer in Ecosystems	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>Abiotic and Biotic Factors</p> <p>Carrying Capacity</p> <p>Cellular Respiration</p> <p>Competition</p> <p>Elements (C,H,O)</p> <p>Energy</p> <p>Limiting Factors</p> <p>Natural Selection</p> <p>Reactants and Products</p> <p>Trophic Levels</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Construct a graphic organizer that tracks the flow of energy or matter through a natural system.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.K Develop a model to describe the cycling of matter and flow of energy among living and nonliving parts of an ecosystem.</p>

Ecosystem Dynamics, Functioning, and Resilience	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>Biodiversity</p> <p>Conservation- Regeneration- Restoration</p> <p>Gaining/Eliminating Prey/Predator</p> <p>Invasive Species</p> <p>Limiting Factors</p> <p>Natural Selection</p> <p>Scarcity of Food</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Evaluate the pros and cons of pest management control.</li> <li>2. To propose a plan for conserving, regenerating, and restoring a healthy environment.</li> </ol> <p><u>Standards</u></p> <p>3.4.9-12.F Evaluate and communicate the effect of integrated pest management practices on indoor and outdoor environments.</p> <p>3.4.9-12.H Design and evaluate solutions in which individuals and societies can promote stewardship in environmental quality and community well-being.</p>



<p><b>Inheritance and Variation of Traits</b></p>	
<p><b>CONTENT/KEY CONCEPTS</b></p>	<p><b>OBJECTIVES/STANDARDS</b></p>
<p>Acquired Traits</p> <p>Dominant Traits</p> <p>Heterozygous</p> <p>Homozygous</p> <p>Inherited Traits</p> <p>Meiosis/Mitosis</p> <p>Mutations</p> <p>Punnett Squares</p> <p>Recessive Traits</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Research and describe the reproduction of diverse living things.</li> <li>2. Construct a model that demonstrates the possible variations through inherited traits.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.M Develop and use a model to describe why structural changes to genes (mutations) located on chromosomes may affect proteins and may result in harmful, beneficial, or neutral effects to the structure and function of the organism.</p> <p>3.1.6-8.N Develop and use a model to describe why asexual reproduction results in offspring with identical genetic information and sexual reproduction results in offspring with genetic variation.</p>

Evidence of Common Ancestry and Diversity	
CONTENT/KEY CONCEPTS	OBJECTIVES/STANDARDS
<p>Biodiversity</p> <p>Casts</p> <p>Extinction</p> <p>Fossil Record</p> <p>Geological Dating</p> <p>Index Fossil</p> <p>Molds</p> <p>Trace Fossil</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Compare modern organisms with extinct organisms.</li> <li>2. Analyze qualitative and quantitative data to infer general patterns of relatedness between organisms.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.O Analyze and interpret data for patterns in the fossil record that document the existence, diversity, extinction, and change of life forms throughout the history of life on Earth under the assumption that natural laws operate today as in the past.</p> <p>3.1.6-8.P Apply scientific ideas to construct an explanation for anatomical similarities and differences among modern organisms and between modern and fossil organisms to infer evolutionary relationships.</p> <p>3.1.6-8.Q Analyze displays of pictorial data to compare patterns of similarities in anatomical structures across multiple species to identify relationships not evident in the fully formed anatomy.</p>

<b>Natural Selection/Adaptations</b>	
<b>CONTENT/KEY CONCEPTS</b>	<b>OBJECTIVES/STANDARDS</b>
<p>Behavioral Adaptations</p> <p>Biodiversity</p> <p>Genes</p> <p>Genetic Mutations</p> <p>Inherited Traits</p> <p>Natural Selection</p> <p>Physiological Adaptations</p> <p>Selective Breeding</p> <p>Structural Adaptations</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Use probability statements and proportional reasoning to construct an explanation of how populations have been influenced/modified by humans and environmental factors.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.R Gather and synthesize information about the technologies that have changed the way humans influence the inheritance of desired traits in organisms.</p> <p>3.1.6-8.S Construct an explanation based on evidence that describes how genetic variations of traits in a population increase some individuals' probability of surviving and reproducing in a specific environment.</p> <p>3.1.6-8.T Use mathematical representations to support explanations of how natural selection may lead to increases and decreases of specific traits in populations over time.</p>

<b>Biodiversity and Humans</b>	
<b>CONTENT/KEY CONCEPTS</b>	<b>OBJECTIVES/STANDARDS</b>
<p>Abiotic Factors</p> <p>Biotic Factors</p> <p>Biodiversity</p> <p>Invasive Species</p> <p>Limiting Factors</p> <p>Natural Selection</p> <p>Nutrient Cycling</p> <p>Recycling</p> <p>Soil Erosion</p> <p>Water Purification</p>	<p><u>Objectives</u></p> <p>Students will be able to:</p> <ol style="list-style-type: none"> <li>1. Evaluate different design solutions for maintaining the health and biodiversity of an ecosystem.</li> </ol> <p><u>Standards</u></p> <p>3.1.6-8.U Evaluate competing design solutions for maintaining biodiversity and ecosystem services.</p>