

Somers Point School District

Curriculum

Science

Grade 3

July 2010

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Somers Point Schools

Mission and Beliefs

Mission

Empower each student to make responsible choices, meet challenges, achieve personal success, and to contribute to a global society as they apply the New Jersey Core Curriculum Standards to become autonomous, lifelong learners who are literate, problem solvers across all disciplines.

Beliefs

Beliefs: We believe that our empowered learners:

- Participate in educational programs that are designed to meet the needs of learners while providing challenging activities in the context of real life situations.
- Are aware of community issues and take part in activities to better their community.
- Acquire basic skills in obtaining information, thinking critically, solving problems and communicating effectively.
- Develop intellectual curiosity and the ability to access information as needed
- Become reflective learners that have an understanding of their own strengths and weaknesses.
- Develop the aptitudes and skills to adjust to a changing world and an unpredictable future.
- Are lifetime learners who value and accept learning as a continuing and dynamic process affecting all aspects of life.

PROGRAM PHILOSOPHY, GOALS, AND BELIEFS

Philosophy

An effective science curriculum...

- Reflects the belief that all students can and must learn enough science to assume their role as concerned citizens equipped with necessary information and decision-making skills;
- Reflects a nature of knowledge, pedagogy, and nature of human development linked to empirical research;
- Recognizes that an inquiry-based method is used to study sound science content;
- Encourages teachers to view that the study of science should be interesting and relevant to students' lives, emphasize student understanding through inquiry and be connected with other school subjects especially math.

Unifying Concepts and Processes

An effective science curriculum incorporates the following while addressing the content areas...

1. Systems, order and organizations
2. Evidence, models and explanation
3. Changes, constancy and measurement
4. Evolution and equilibrium
5. Form and function
6. Abilities to do and understanding of scientific inquiry
7. Technology
8. Social perspective

Educational Goals & Beliefs

- Inquiry is an effective method to actively involve students.
- All students share a natural curiosity about the world around them.
- Curriculum provides real world connections.
- Effective instruction integrates concepts within science and other content areas.
- Assessment is ongoing, diagnostic, and aligned with instruction.
- Students can improve their community and the world through problem-solving.
- The broad goal of a science program should be to foster understanding, interest, and appreciation of the world in which we live.

New Jersey State Department of Education Core Curriculum Content Standards

Science Education in the 21st Century

"Today more than ever before, science holds the key to our survival as a planet and our security and prosperity as a nation" (Obama, 2008).

Scientific literacy assumes an increasingly important role in the context of globalization. The rapid pace of technological advances, access to an unprecedented wealth of information, and the pervasive impact of science and technology on day-to-day living require a depth of understanding that can be enhanced through quality science education. In the 21st century, science education focuses on the practices of science that lead to a greater understanding of the growing body of scientific knowledge that is required of citizens in an ever-changing world.

Mission: *Scientifically literate students possess the knowledge and understanding of scientific concepts and processes required for personal decision-making, participation in civic and cultural affairs, and economic productivity.*

Vision: A quality science education fosters a population that:

- Experiences the richness and excitement of knowing about the natural world and understanding how it functions.
- Uses appropriate scientific processes and principles in making personal decisions.
- Engages intelligently in public discourse and debate about matters of scientific and technological concern.
- Applies scientific knowledge and skills to increase economic productivity.

Then 2009 NJ science standards can be accessed at: <http://www.njcccs.org/ContentAreaTabularView.aspx?code=5&Desc=Science>

In addition, the New Jersey Standards Clarification Project provides materials that convey an understanding of the priorities in the NJ CCCS and how to capture those priorities in designing local curriculum and assessments, as well as in managing local instruction across content areas.

To access the NJ Standards Clarification Project: <http://www.state.nj.us/education/aps/njscp/>

Assessment Note:

All 4th & 8th grade students take the state end of year assessment the NJ ASK or the Alternative Proficiency Assessment when applicable.

3rd Grade Science
Scope and Sequence

Unit I
Structure of Life
Unit II
Chemical Tests
Unit III
Physics of sound
Unit IV
Sun, Moon and Stars

Science Practices – Standard 5.1

The New Jersey Core Curriculum (2009) includes Science Practices (standard 5.1). This standard embodies the idea of “knowledge in use” and includes understanding scientific explanations, generating scientific evidence, reflecting on scientific knowledge, and participating productively in science. Science practices are integrated into the Cumulative Progress Indicators within each science domain in recognition that science content and processes are inextricably linked; science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge.

5.1 Science Practices: All students will understand that science is both a body of knowledge and an evidence-based, model-building enterprise that continually extends, refines, and revises knowledge. The four Science Practices strands encompass the knowledge and reasoning skills that students must acquire to be proficient in science.

A. Understand Scientific Explanations : Students understand core concepts and principles of science and use measurement and observation tools to assist in categorizing, representing, and interpreting the natural and designed world.

B. Generate Scientific Evidence Through Active Investigations : Students master the conceptual, mathematical, physical, and computational tools that need to be applied when constructing and evaluating claims.

C. Reflect on Scientific Knowledge : Scientific knowledge builds on itself over time.

D. Participate Productively in Science : The growth of scientific knowledge involves critique and communication, which are social practices that are governed by a core set of values and norms.

The Somers Point School District curriculum weaves these standards into each science unit of study. Through our hands-on, inquiry based approach to science content, students cover each area of standard 5.1 listed above.

Suggested blocks of Instruction	Grade Level/Subject: Grade 3/ Science	Big Idea: The natural world is defined by organisms and life processes which conform to principles regarding conservation and transformation of matter and can be applied to improving human health and well being.	
		Topic: Structure of Life	
		Goal 1: The student will be able to understand the structure, characteristics and basic needs of organism and will investigate the diversity of life.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions / Enduring Understandings	Learning Activities including technology integration, interdisciplinary activities, and differentiation methods / Materials / Assessment
40 mins. A day for 8 weeks	<p>5.3.4.A.1 Living Organisms:</p> <ul style="list-style-type: none"> Interact with and cause changes in their environment. Exchange materials (such as gases, nutrients, water, and waste) with the environment. Reproduce. Grow and develop in a predictable manner <p>5.3.4.A.2 Essential functions required for the well-being of an organism are carried out by specialized structures in plants and animals.</p> <p>5.3.4.B.1 Almost all energy (food) and matter can be traced to the Sun.</p> <p>5.3.4.C.1 Organisms can only survive in environments in which their needs are met. Within ecosystems, organisms interact with and are dependent on their physical and living environment.</p> <p>5.3.4.C.2 Some changes in ecosystems occur slowly, while others occur rapidly. Changes can affect life forms, including humans.</p> <p>5.3.4D1 Plants and animals have life cycles (they begin life, develop into adults, reproduce,</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> How is matter transformed, and energy transferred/transformed in living systems? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> All organisms transfer matter and convert energy from one form to another. Both matter and energy are necessary to build and maintain structures within the organism. 	<p>Learning Activities</p> <p>Investigation 4, parts 1& 4 Investigation 3, part 1&2 Investigation 2 part 3 Investigation 1 part 3, Investigation 3, part 1 Math Extension, Investigation 4 parts 1& 3 Investigation 5, parts 1& 4 Investigation 2 part 2 Science stories The Food Web</p> <p>Materials:</p> <p>See materials sheet Investigation 1 p.28; investigation 2 p.14, 18; investigation 3 p.8,16; investigation 4 p.8, 20, 25; investigation 5 p.8,25; Science stories The Food Web</p> <p>Assessment:</p> <p>Teacher Observation, Assessment charts, End of Module Assessment, Portfolio assessment, benchmarks</p>

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		Topic: Structure of Life	
		Goal 1: The student will be able to understand the structure, characteristics and basic needs of organism and will investigate the diversity of life.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions / Enduring Understandings	Learning Activities including technology integration, interdisciplinary activities, and differentiation methods / Materials / Assessment
	and eventually die). The characteristics of each stage of life vary by species. 5.3.4.E.1 Individuals of the same species may differ in their characteristics, and sometimes these differences give individuals an advantage in surviving and reproducing in different environments. 5.3.4.E.2 In any ecosystem, some populations of organisms thrive and grow, some decline, and others do not survive at all. 5.4.4.B.1 Fossils provide evidence about the plants and animals that lived long ago, including whether they lived on the land or in the sea as well as ways species changed over time.		

Suggested blocks of Instruction	Grade Level/Subject: Third/Science	Big Idea: Materials exist throughout our physical world. The structures of materials influence their physical properties, chemical reactivity and use.	
		Topic: Chemical Tests	
		Goal 2: The student will be able to gain an understanding of the structure and behavior of matter.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions / Enduring Understandings	Learning Activities including technology integration, interdisciplinary activities, and differentiation methods / Materials / Assessment
40 mins. A day for 8 weeks	<p>5.2.4.A.1 Some objects are composed of a single substance; others are composed of more than one substance.</p> <p>5.2.4A3 Objects and substances have properties, such as weight and volume, that can be measured using appropriate tools. Unknown substances can sometimes be identified by their properties.</p> <p>5.2.4.B.1 Many substances can be changed from one state to another by heating or cooling.</p> <p>5.2.4.E.3 Magnets can repel or attract other magnets, but they attract all matter made of iron. Magnets can make some things move forward without being touched.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> • How do properties of materials determine their use? • What determines the type and extent of a chemical reaction? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> • The structures of materials determine their properties. • There are several ways in which elements and compounds react to form new substances and each reaction involves the flow of energy. 	<p>Learning Activities</p> <p>Chemical Tests TG App-(pp159-160) Chemical Tests TG L01 p3-12 Chemical Tests TG L 02 p. 13-22 Chemical Tests TG L 03 p. 23-29 Chemical Tests TG L 04 p. 35-44; exts p.39 Chemical Tests TG L 05 p. 45-56; exts p.50 Chemical Tests TG L 06 p.57-68 Exts p61 Chemical Tests TG L 07 p. 69-78; Exts p.72-73 Chemical Tests TG L 08 p.79-84;Exts p 82 Chemical Tests TG L 09 p.85-92 Chemical Tests TG L10 p. 93-100; Exts, p 97 Chemical Tests TG L 11 p. 101-106; Exts 103-104 Chemical Tests TG L 12 p. 107-114 Chemical Tests TG L 13 p.115-124 Chemical Tests TG L 14 p.125-134 Chemical Tests TG L 15 p. 135-148;Exts 140-141 Chemical Tests TG L 16 p. 149-154; Exts. 152-153 Chemical Tests TG L 17 p155-158</p> <p>www. sciencenetlinks.com/lessons Magnets 1: Magnetic Pick-ups</p> <p>Materials: See Materials List TG p. 5-7</p> <p>Assessment: Teacher Observation, pre and post book assessments, student self assessment, lab sheets, record sheets, rubrics, lab sheets</p>

Suggested blocks of Instruction	Grade Level/Subject: 3rd Grade/Science	Big Idea: The flow of energy drives processes of change in all biological, chemical, physical and geological systems. The conservation of energy is a law that can be used to analyze and build understandings of diverse physical and biological systems.	
		Topic: Physics of Sound	
		Goal 3: The student will be able to understand natural laws as they apply to motion, forces, and energy transformation.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions / Enduring Understandings	Learning Activities including technology integration, interdisciplinary activities, and differentiation methods / Materials / Assessment
40 mins. A day for 8 weeks	<p>5.2.4.A.2 Each state of matter has unique properties (e.g., gases can be compressed, while solids and liquids cannot, the shape of a solid is independent of its container; liquids and gases take the shape of their containers).</p> <p>5.2.4.C.1 Heat (thermal energy), electricity, light, and sound are forms of energy.</p> <p>5.2.4.C.3 Energy can be transferred from one place to another. Heat energy is transferred from warmer things to colder things.</p> <p>5.2.4.E.4 Earth pulls down on all objects with a force called gravity. Weight is a measure of how strongly an object is pulled down toward the ground by gravity. With a few exceptions, objects fall to the ground no matter where they are on Earth.</p> <p>5.3.4.B.1 Almost all energy (food) and matter can be traced to the Sun.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> • How would the universe be different if one or more of the laws of motion were suspended? • How do we know that things have energy? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> • The same basic rules govern the motion of all bodies, from planets and stars to birds and billiard balls. • Energy takes many forms. • These forms can be grouped into types of energy that are associated with the motion of mass (kinetic energy), and types of energy associated with the position of mass and with energy fields (potential energy). 	<p>Learning Activities</p> <p>Investigation 2 parts 1-3 Investigation 4 parts1- 2 Investigation 1 Parts 1 part 3; investigation2 parts 1-3 FOSS Science stories Highs and Lows; Making Waves Investigation 3 parts 1&2; Seeing the World Through Sound; Listen to This; Your Source and Receiver; Highs and Lows; Scoping Out Sound; Moving Along; Bouncing Back FOSS Science stories: Sound Off Foss Science Stories p.22-25</p> <p>Materials:</p> <p>See Materials list Investigation1 p8, 16, 21 Investigation 2: p.8, 13, 20; Investigation 3: p.8, 15, ; Investigation 4: p.6, 16 Foss Science Stories: Highs and Lows; Making Waves, Seeing the World Through Sound; Listen to This; Your Source and Receiver; Highs and Lows; Scoping Out Sound; Moving Along; Bouncing Back, Sound Off Foss Science Stories p.22-25</p> <p>Assessment:</p> <p>Teacher Observation, Assessment charts, End of Module Assessment, Portfolio assessment, benchmarks</p>

Suggested blocks of Instruction	Grade Level/Subject: Third/Science	Big Idea: Our Solar System is part of the Milky Way Galaxy, which, in turn, is one of many galaxies in the known Universe. While the composition of planets vary considerably, their components and the applicable laws of science are universal.	
		Topic: Sun, Moon and Stars	
		Goal 4: The student will be able to gain an understanding of the origin, evolution and structure of the universe.	
	Objectives / Cluster Concepts / Cumulative Progress Indicators (CPI's) The student will be able to:	Essential Questions / Enduring Understandings	Learning Activities including technology integration, interdisciplinary activities, and differentiation methods / Materials / Assessment
40 mins. A day for 8 weeks	<p>5.2.4.E.1 Motion can be described as a change in position over a period of time.</p> <p>5.4.4.A.1 Objects in the sky have patterns of movement. The sun and Moon appear to move across the sky on a daily basis. The shadows of an object on Earth change over the course of a day, indicating the changing position of the Sun during the day.</p> <p>5.4.4.A.2 The observable shape of the Moon changes from day to day in a cycle that lasts 29.5 days.</p> <p>5.4.4.A.3 Earth is approximately spherical in shape. Objects fall towards the center of the Earth because of the pull of the force of gravity.</p> <p>5.4.4.A.4 Earth is the third planet from the Sun in our solar system, which includes seven other planets.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> • What predictable, observable patterns occur as a result of the interaction between the Earth, Moon, and Sun? • What causes these patterns? • How are planets and other objects in the Solar System similar and different to Earth? • What implication does this have for the existence and sustaining of life? • What characteristics does our Sun share with other stars? • Is there order to the Universe? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> • Observable, predictable patterns of movement in the Sun, Earth, Moon system occur because of gravitational interaction and energy from the Sun. • Physical characteristics of planets depend on their distance from the Sun and their size. • The Sun is a star. • The universe is made up of galaxies, each of which is composed of solar systems, having the same elements and governed by the same laws. 	<p>Learning Activities</p> <ul style="list-style-type: none"> • Read Alouds • Inquiry based lessons • Investigations • Teacher Discussion <p>Materials: See materials list Sun, Moon, & Stars Module</p> <p>Assessment: Teacher Observation, Assessment charts, End of Module Assessment, Portfolio assessment, benchmarks</p>

3rd Grade Science

COURSE BENCHMARKS

The student will be able to...

Unit I

Identify similarities and differences among seeds.
Identify the roles an animal serves in a food chain
Tell the difference between the needs of plants and animals
Identify different stages in the lives of various organisms
Set up a simple experiment using good science safety practices.

Unit II

Sort materials based on characteristics that can be seen using magnification
Combine two or more materials and show that the new material may have different properties than the original materials
Observe the stages of water and realize water can change form due to heating or cooling.
Show that not all materials respond in the same way.
Use tables and graphs to represent and interpret data.

Unit III

Identify sources of heat and demonstrate that heat can be transferred
Show that differences in sound can be produced by varying the way objects vibrate.
Recognize that some forces can act at a distance.
Identify the evidence used in an explanation

Unit IV

Raise questions about the world around them
Keep records of experiments
Develop strategies and skills for information gathering and problem solving
Hear, read, write, and talk about scientists and inventors.
Identify patterns through observation
Observe patterns that result from the Earth's position relative to the Sun
Describe the phases of the Moon
Describe Earth as one of several planets that orbit the sun
Observe that Stars are not all the same in brightness, size and color
Observe and record short-term and long-term changes in the night sky