

Somers Point School District

Curriculum

Science

Grade 2

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.

Science Grade 2
Scope and Sequence

New Plants

Diversity of Organisms in a Living System
Heredity

Changes

Physical Properties of Matter
Water

Balance & Motion

Motion

Air and Weather

Sound in our Atmosphere
Atmosphere and Weather
Studying our Earth
Space

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: 2nd Grade 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: New Plants	
		Goal 1: The student will be able to determine and describe the basic needs of humans and other organisms.	
	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
3-4 Weeks	<p>5.3.2.B.1 Describe the requirements for the care of plants and animals related to meeting their energy needs.</p> <p>5.3.2.B.3 Explain that most plants get water from soil through their roots and gather light through their leaves.</p> <p>5.3.2.C.3 Communicate ways that humans protect habitats and/or improve conditions for the growth of the plants and animals that live there, or ways that humans might harm habitats.</p> <p>5.3.2.D.1 Record the observable characteristics of plants and animals to determine the similarities and differences between parents and their offspring.</p> <p>5.3.2.D.2 Determine the characteristic changes that occur during the life cycle of plants and animals by examining a variety of species, and distinguish between growth and development.</p> <p>5.4.2.E.1 Describe the relationship between the sun and plant growth.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> • How is matter transformed, and energy transferred/transformed in living systems? • How are organisms of the same kind different from each other? • How does this help them reproduce and survive? <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. • Organisms are grouped in nature based upon similarities. 	<p>Learning Activities</p> <ul style="list-style-type: none"> • Read Alouds • Inquiry based lessons • Labs • Teacher Discussion <p>Materials:</p> <p>Investigation 1, Part 1-3 including Science Extension</p> <p>Investigation 2, Part 1</p> <p>Investigation 3, Part 1</p> <p>Investigation 4, Part 1</p> <p>Science Stories: <i>What Do Plants Need?</i></p> <p>Science Stories: <i>Plants Around the World</i></p> <p>Assessment:</p> <p>Teacher Observation</p> <p>Demonstration</p> <p>Discussion</p> <p>Lab Work Sheet</p>

Suggested blocks of Instruction	Grade Level/Subject: Grade 2 Science	Big Idea: Materials exist throughout our physical world. The structures of materials influence their physical properties, chemical reactivity and use.	
		Topic: Physical Properties of Matter	
		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
4-5 Weeks	<p>5.2.2.A.1 Sort and describe objects based on the materials of which they are made and their physical properties.</p> <p>5.2.2.A.2 Identify common objects as solids, liquids, or gasses.</p> <p>5.2.2.B.1 Generate accurate data and organize arguments to show that not all substances respond the same way when heated or cooled, using common materials, such as shortening or candle wax.</p> <p>5.4.2.G.1 Observe and discuss evaporation and condensation.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> How do properties of materials determine their use? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> The structures of materials determine their properties. 	<p>Learning Activities</p> <ul style="list-style-type: none"> Inquiry based lessons Labs Teacher Discussion Read aloud books <p>Materials:</p> <p>Changes TG: L01 (pp. 3 – 20) Changes TG: L06 (pp. 67-69) Changes TG: L11 (pp. 103-110) Changes TG: L13 (p. 123) Changes TG: L14 (p. 134)</p> <p>Assessment: Teacher Observation Demonstration Discussion Lab Work Sheet</p>

Suggested blocks of Instruction	Grade Level/Subject: Grade 2 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: Motion	
		Goal 3: The student will be able to differentiate the ways in which objects move and what causes their movements.	
	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
6-8 Weeks	<p>5.2.2.E.1 Investigate and model the various ways that inanimate objects can move.</p> <p>5.2.2.E.2 Predict an object's relative speed, path, or how far it will travel using various forces and surfaces.</p> <p>5.2.2.E.3 Distinguish a force that acts by direct contact with an object(e.g. by pushing or pulling) from a force that can act without direct contact (e.g. the attraction between a magnet and a steel paper clip).</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? <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. 	<p>Learning Activities</p> <ul style="list-style-type: none"> Inquiry based lessons Labs Teacher Discussion Read aloud books <p>Materials:</p> <p>Investigation 1, Parts 1-3 Investigation 2, Parts 1 & 2 Investigation 3, Parts 1-3 FOSS Science Story: <i>Push or Pull?</i> FOSS Science Story: <i>Things that Spin</i> FOSS Science Story: <i>Rolling, Rolling, Rolling</i></p> <p>Assessment:</p> <p>Teacher Observation Demonstration Discussion Lab Work Sheet</p>

Suggested blocks of Instruction	Grade Level/Subject: Grade 2 Science	Big Idea: Earth's dynamic systems are made up of the geosphere, hydrosphere, atmosphere and biosphere. Interactions among these spheres have resulted in ongoing changes to the system. Some of these changes can be measured on human time scale, but others occur so slowly, that they must be inferred from geological evidence.	
		Topic: Atmosphere and Weather	
		Goal 4: The student will be able to explain daily and seasonal weather changes, conditions and patterns to determine the effect that these conditions have on daily lives.	
	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
2-3 Weeks	<p>5.2.2.C.1 Compare, citing evidence, the heating of different colored objects placed in full sunlight.</p> <p>5.2.2.C.2 Apply a variety of strategies to collect evidence that validates the principle that if there is no light, objects cannot be seen.</p> <p>5.2.2.C.3 Present evidence that represents the relationship between a light source, solid object, and a resulting shadow.</p> <p>5.4.2.A.1 Determine a set of general rules describing when the sun and moon are visible based on actual sky observations.</p> <p>5.4.2.F.1 Observe and document daily weather conditions and discuss how the weather influences your activities for the day.</p> <p>5.4.4.F.1 Identify patterns in data collected from basic weather instruments.</p>	Essential Questions: <ul style="list-style-type: none"> How do changes in one part of an Earth system affect other parts of the system? Enduring Understandings: <ul style="list-style-type: none"> Earth's components form systems. These systems continually interact at different rates of time, affecting the Earth regionally and globally. 	Learning Activities <ul style="list-style-type: none"> Inquiry based lessons Labs Teacher Discussion Read aloud books <i>Sun and Moon Journal – Students create a sun and moon journal that documents the location and shape of the sun and moon in the sky every day for one lunar cycle. Students should visually depict the moon and sun in some way and then write about what they notice.</i> Materials: <ul style="list-style-type: none"> Investigation 2, Parts 1-4 Investigation 3, Parts 2 & 4 FOSS Science Story: <i>What's the Weather Today?</i> FOSS Science Story: <i>Understanding the Weather</i> FOSS Science Story: <i>Seasons</i> Assessment: Teacher Observation Demonstration of lab skills / Discussion Lab Work Sheet <i>Sun and Moon Journal</i>

**2nd Grade
Science**

COURSE BENCHMARKS

The student will be able to . . .

New Plants

Define the different characteristics of living and living things,
Compare the physical differences of plants and animals living in different parts of the world.
Analyze the basic needs of humans and other organisms.
Distinguish that humans and other organisms resemble their parents.

Changes

Select materials and objects that possess the same physical properties.
Utilize tools and complete an analysis of what was revealed by their use.
Analyze what occurs when water is changed from one form to another.

Balance & Motion

Explain the ways in which objects move.
Define how an object's position can be changed.
Express the ways in which sound can be created through vibrating objects.

Air and Weather

Enumerate the various weather conditions and explain each.
Define seasonal changes.
Describe earth's natural features within their environment.
Determine what causes day and night and explain the earth's movement that causes these changes.