

Somers Point School District

Curriculum

Science

Grade 1

July 2010

Board Approved: September 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 One Scope and Sequence

Organisms

Organisms and their Diversity in Living Systems
Natural Systems/Human Impact

Solids & Liquids

Structure and Properties of Matter
Movement of Objects
Earth's Atmosphere and Weather

Pebbles Sand and Silt

Properties of Matter
How We Study the Earth
Natural Systems and Human Interactions

Batteries

Observing Batteries
Observing Circuits

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: 1st 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: Organisms and their Diversity in Living Systems	
		Goal 1: The student will be able to investigate the needs of living organisms; compare and contrast living and nonliving things; recognize that different plants and animals live in different parts of the world.	
	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
4-6 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>5.3.2.B.1 Describe the requirements for the care of plants and animals related to meeting their energy needs.</p> <p>5.3.2.B.2 Compare how different animals obtain food and water.</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>5.4.2.G.3 Identify and categorize the basic needs of living organisms as they relate to the environment.</p> <p>5.3.2.E.1 Describe similarities and differences in observable traits between parents and offspring.</p> <p>5.3.2.E.2 Describe how similar structures found in different organisms have similar functions and enable those organisms to survive in different environments.</p> <p>5.3.2.C.3 Communicate ways that humans protect habitats and/or improve conditions for the</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 • Classroom discussion to access prior knowledge • Make predictions and observations <p>Materials: STC Module - Organisms TG L 01 pp 3-10 TG L 12 pp 131</p> <p>Assessment: Pre- Unit Assessment Teacher Observation Post- Unit Assessments Student Presentations Student drawings Record sheet Lab reports</p>

Suggested blocks of Instruction	Grade Level/Subject: 1st 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: Organisms and their Diversity in Living Systems	
		Goal 1: The student will be able to investigate the needs of living organisms; compare and contrast living and nonliving things; recognize that different plants and animals live in different parts of the world.	
	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
	growth of the plants and animals that live there or ways that humans might harm habitats.		

Suggested blocks of Instruction	Grade Level/Subject: 1st Grade/Science	Big Idea: Organisms are linked to one another in an ecosystem by the flow of energy and the cycling of materials. Humans are an integral part of the natural system and human activities can alter the stability of ecosystems.	
		Topic: Natural Systems/Human Impact	
		Goal 2: The student will be able to associate organisms' basic needs with how they meet those needs	
	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 Less ons	<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 or ways that humans might harm habitats.</p> <p>5.4.2.G.3 Identify and categorize the basic needs of living organisms as they relate to their environment.</p> <p>5.2.2.E.1 Describe the relationship between the Sun and plant growth.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> • How can change in one part of an ecosystem affect change in other parts of the ecosystem? <p>Enduring Understandings:</p> <ul style="list-style-type: none"> • Organisms and their environments are interconnected. • Changes in one part of the system will affect other parts of the system. 	<p>Learning Activities</p> <ul style="list-style-type: none"> • Read alouds • Inquiry-based lessons • Labs • Classroom discussion to access prior knowledge • Make predictions and observations <p>Materials: STC Module - Organisms TG L12 p 131</p> <p>Assessment: Pre- Unit Assessment Teacher Observation Post- Unit Assessments Student Presentations Student drawings Record sheet Lab reports</p>

Suggested blocks of Instruction	Grade Level/Subject: 1st Grade/Science	Big Idea: Materials exist throughout our physical world. The structures of materials influence their physical properties, chemical reactivity and use.	
		Topic: Structure and Properties of Matter	
		Goal 3: The student will be able to sort materials according to their properties.	
	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
15 lessons	5.4.2.G.4 Identify the natural resources used in the process of making various manufactured products. 5.2.2.A.2 Identify common objects as solids, liquids, or gases.	Essential Questions: <ul style="list-style-type: none"> • How do properties of materials determine their use? Enduring Understandings: <ul style="list-style-type: none"> • The structures of materials determine their properties. 	Learning Activities <ul style="list-style-type: none"> • Read alouds • Inquiry-based lessons • Labs • Classroom discussion to access prior knowledge • Make predictions and observations Materials: STC Module - Organisms TG L12 p 131 Assessment: Pre- Unit Assessment Teacher Observation Post- Unit Assessments Student Presentations Student drawings Record sheet Lab reports

Suggested blocks of Instruction	Grade Level/Subject: 1st 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: Movement of Objects	
		Goal 4: The student will be able to distinguish among the different way objects can move and show that the position and motion of an object can be changed by pushing or pulling the object.	
	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
4-6 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 objects relative speed, path, or how far it will travel using various forces and services.</p> <p>5.2.2.E.3 Distinguish the 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"> Read alouds Inquiry-based lessons Labs Classroom discussion to access prior knowledge Make predictions and observations <p>Materials: STC Module – TG: L04 (pp29-40) TG: L04 (pp. 29-40)</p> <p>Assessment: Pre- Unit Assessment Teacher Observation Post- Unit Assessments Student Presentations Student drawings Record sheet Lab reports</p>

Suggested blocks of Instruction	Grade Level/Subject: 1st Grade/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: Earth's Atmosphere and Weather	
		Goal 5: The student will be able to gain an understanding of the structure, dynamics, and geophysical systems of the earth.	
	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
2-4 weeks	<p>5.4.2.G.1 Observe and discuss evaporation and condensation.</p> <p>5.4.2.G.2 Identify and use water conservation practices.</p> <p>5.4.2.C.1 Describe earth materials using appropriate terms such as hard, soft, dry, wet, heavy, and light.</p>	<p>Essential Questions:</p> <ul style="list-style-type: none"> How do changes in one part of an Earth system affect other parts of the system? <p>Enduring Understandings:</p> <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. 	<p>Learning Activities</p> <ul style="list-style-type: none"> Read alouds Inquiry-based lessons Labs Classroom discussion to access prior knowledge Make predictions and observations <p>Materials: STC Module – Solids and Liquids TG: L04.Exts (p34) TG: L10. Exts (p85)</p> <p>Assessment: Pre- Unit Assessment Teacher Observation Post- Unit Assessments Student Presentations Student drawings Record sheet Lab reports</p>

Suggested blocks of Instruction	Grade Level/Subject: 1st Grade/Science	Big Idea: Materials exist throughout our physical world. The structures of materials influence their physical properties, chemical reactivity and use	
		Topic: Properties of Matter	
		Goal 6: The student will be able to understand 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
2-4 weeks	<p>5.6.2.A.1 Sort objects according to the materials from which they are made or their physical properties, and give a rationale for sorting.</p> <p>5.6.2.A.2 Use magnifiers to observe materials, then draw and describe what more can be seen using the tools.</p> <p>5.1.2.C.1 Recognize that conducting science activities requires an awareness of potential hazards and the need for safe practices.</p> <p>5.3.A.2.3 Express quantities using appropriate number formats, such as : integers and fractions</p> <p>5.4.2.C.1 Describe earth materials using appropriate terms such as hard, soft, dry, wet, heavy, and light. **</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"> Read alouds Inquiry-based lessons Labs Classroom discussion to access prior knowledge Make predictions and observations <p>Materials: FOSS module – Pebbles Sand and Silt Investigation 1, Parts 3-4 Investigation 1, Parts 1-3</p> <p>Assessment: Pre- Unit Assessment Teacher Observation Post- Unit Assessments Student Presentations Student drawings Record sheet Lab reports</p>

Suggested blocks of Instruction	Grade Level/Subject: 1st Grade/Science	Big Idea: Organisms are linked to one another in an ecosystem by the flow of energy and the cycling of materials. Humans are an integral part of the natural system and human activities can alter the stability of ecosystems.	
		Topic: Natural Systems and Human Interactions	
		Goal 7: The student will be able to develop an understanding of the environment as a system of interdependent components affected by human activity and natural phenomena.	
	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
2-4 weeks	5.4.2.E.1 Describe the relationship between the sun and plant growth. 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 or ways that humans might harm habitats.	Essential Questions: <ul style="list-style-type: none"> • How can change in one part of an ecosystem affect change in other parts of the ecosystem? • How do humans impact the diversity and stability of ecosystems? Enduring Understandings: <ul style="list-style-type: none"> • Organisms and their environments are interconnected. • Changes in one part of the system will affect other parts of the system. • Humans can alter the living and non-living factors within an ecosystem, thereby creating changes to the overall system. 	Learning Activities <ul style="list-style-type: none"> • Read alouds • Inquiry-based lessons • Labs • Classroom discussion to access prior knowledge • Make predictions and observations Materials: FOSS module – Sand and Silt Investigation 1, Parts 2 Investigation 1, Part 8 Investigation 3, Part 2 Assessment: Pre- Unit Assessment Teacher Observation Post- Unit Assessments Student Presentations Student drawings Record sheet Lab reports

Suggested blocks of Instruction	Grade Level/Subject: 1st Grade/Science	Big Idea: Batteries supply energy to produce light , sound, or heat.	
		Topic: Observing Batteries	
		Goal 8: The student will be able to gain an understanding of the concept of energy conservation as they see energy transferred from one object to another.	
	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
1 week	5.2.2.D.1 Predict and confirm the brightness of a light, the volume of sound, or the amount of heat when given the number of batteries, or the size of batteries.	Essential Questions: <ul style="list-style-type: none"> How does the energy from the battery transfer to the light bulb. Enduring Understandings: <ul style="list-style-type: none"> Batteries produce energy. 	Learning Activities <ul style="list-style-type: none"> Read alouds Inquiry-based lessons Labs Classroom discussion to access prior knowledge Make predictions and observations Materials: Magic School Bus Batteries Book Circuit Board Assessment: Pre- Unit Assessment Teacher Observation Post- Unit Assessments Student Presentations Student drawings Record sheet Lab reports

First Grade Science
COURSE BENCHMARKS

The student will be able to ...

Organisms

Investigate the basic needs of humans and other organisms
Compare and contrast living and nonliving things
Recognize that different plants and animals live in different parts of the world
Raise questions about the world and seek answers through observation
Keep records of observations
Associate basic needs of an organism with their surroundings
Recognize when a science experiment is replicated similar results are expected
Create a plan to solve a problem

Solids and Liquids

Solve a problem through collaboration
Select tools to complete a task
Represent data in a graph
Distinguish the different ways an object can move
Show that position can change with a push/pull
Select appropriate measurement tools
Observe and describe rocks and soil
Identify the sources and uses of water
Recognize that water can evaporate and condense

Pebbles, Sand & Silt

Sort objects by materials and physical properties
Use magnifiers to observe then represent what is seen through drawing
Use Safety First!
Use numbers to express quantities
Record observations of the natural world
Identify how needs of humans are supplied by the environment
Describe how people make contributions to science

Batteries

Understanding of the concept of energy conservation as they see energy transferred from one object to another.