

# Sanborn Regional School District

SAU #17

Kingston and Newton New Hampshire

## Science Curriculum K-2

# Science Curriculum Broad Goals

## **K-12 Broad Goals for Science Education**

These goals will be attained as students acquire the knowledge and use the processes defined and explained in the six curriculum strands in this document.

- Students will demonstrate an understanding of the basic laws which govern and explain phenomena observed in the natural world.
- Students will demonstrate an understanding of, and be able to practice, the basic processes which scientists use to obtain and continually revise knowledge about the natural world.
- Students will use problem-solving strategies to investigate and understand the natural world.
- Students will recognize and understand the wide variety of similarities and differences that exist among objects and events in the natural world.
- Students will demonstrate an understanding of key concepts and principles central to the biological, physical, and earth sciences, while recognizing the interrelationship of all the sciences.
- Students will use oral and written communication, mathematical representation, and physical and conceptual models to describe and explain scientific concepts and ideas, and will be able to apply scientific knowledge.
- Students will know and employ safe practices and techniques in the laboratory, in field work or any other scientific investigation, and when using scientific or technological materials at home or work.
- Students will perceive that scientific knowledge is the result of the cumulative efforts of people, past and present, who have attempted to explain the world through an objective, peer-tested, rational approach to understanding natural phenomena and occurrences.
- Students will demonstrate an understanding of the impact of science and technology on society.
- Students will be able to use science and technology to creatively address issues in their personal and social lives and careers.
- Students will be able to apply rational, creative-thinking, and investigative skills and use scientific knowledge in their roles as citizens, workers, family members, and consumers in an increasingly technological society.
- Students will display a sense of curiosity and wonder about the natural world, and demonstrate an increasing awareness of the interdependence between all living things and the environment.

# Sanborn Regional School District Science Curriculum Document 2004-2005

## Grade Level Topic Assignments

<u>Primary</u>	<u>Elementary</u>	<u>Middle</u>	<u>High</u>
<p><b><u>Kindergarten</u></b></p>	<p><b><u>Grade Three</u></b></p> <ul style="list-style-type: none"> <li>• Water</li> <li>• Structures of Life</li> <li>• Physics of Sound</li> </ul>	<p><b><u>Grade Six</u></b></p> <ul style="list-style-type: none"> <li>• Mixtures and Solutions</li> <li>• Land Forms</li> <li>• Solar Energy</li> <li>• Matter</li> <li>• Sound and Light</li> <li>• Motions, Forces, and Energy</li> <li>• Electricity and Magnetism</li> </ul>	<p><b><u>Grade Nine</u></b></p> <ul style="list-style-type: none"> <li>• Physical Science</li> </ul>
<p><b><u>Grade One</u></b></p> <ul style="list-style-type: none"> <li>• New Plants</li> <li>• Balance and Motion</li> <li>• Pebbles, Sand, and Silt</li> </ul>	<p><b><u>Grade Four</u></b></p> <ul style="list-style-type: none"> <li>• Magnetism and Electricity</li> <li>• Human Body</li> <li>• Measurement</li> <li>• Earth Materials</li> </ul>	<p><b><u>Grade Seven</u></b></p> <ul style="list-style-type: none"> <li>• Life Science</li> </ul>	<p><b><u>Grade Ten</u></b></p> <ul style="list-style-type: none"> <li>• Biology</li> </ul>
<p><b><u>Grade Two</u></b></p> <ul style="list-style-type: none"> <li>• Insects</li> <li>• Air and Weather</li> <li>• Solids and Liquids</li> </ul>	<p><b><u>Grade Five</u></b></p> <ul style="list-style-type: none"> <li>• Levers and Pulleys</li> <li>• Environments</li> <li>• Variables</li> </ul>	<p><b><u>Grade Eight</u></b></p> <ul style="list-style-type: none"> <li>• Earth Science</li> <li>• Wind and Weather</li> <li>• Planetary Science</li> </ul>	<ul style="list-style-type: none"> <li>• <b><u>Grade Eleven/Twelve</u></b></li> <li>• Chemistry</li> <li>• Physics</li> <li>• Anatomy/Physiology</li> <li>• Microbiology/Biotechnology</li> <li>• Environmental</li> </ul>

# Sanborn Regional School District Science Curriculum Document 2004-2005

## Grade 1

### Grade-Level Expectations

#### New Plants

##### ***Science as Inquiry***

- Observe and describe objects in their environment in order to organize information and make comparisons (e.g., cats have fur, fish live in water, rocks are hard)
- Identify patterns in events
- Ask "How do we know?" and "Are we sure the same thing will happen the next time?"

##### ***Science, Technology, and Society***

- Seek out problems in need of solution and invent ways to solve those problems
- Describe ways that machines are used to manufacture items faster and in greater quantity than one person can do alone

##### ***Life Science***

- Distinguish between types of plants by using one or more attributes or characteristics (e.g., size, shape, kinds of leaves)
- Collect a variety of seeds and group them using a particular characteristic or attribute
- Observe and display understanding of the needs of plants and animals in the classroom by caring for them responsibly
- Name plants and animals whose appearance changes in different seasons and describes the differences
- Discuss features that help plants and animals survive in different environments or in the same environment during different seasons
- Investigate different habitats to identify some of the ways in which plants and animals which live there depend on each other
- Explore the various needs of living things (e.g., water, food, shelter)
- Identify the conditions necessary for the growth of green plants
- Carry out an experiment to determine the factors needed for seeds to germinate
- Identify real or representations (pictures, drawings) of living things found near their home and ask questions concerning their attributes and needs for survival

##### ***Unifying Themes and Concepts***

- Recognize that some changes are so slow that they are hard to observe (e.g., display monthly photographs of the class and teacher; record and graph monthly the height of each student and the teacher)
- Classify events or objects as changing quickly, slowly, or not at all

**Sanborn Regional School District Science Curriculum Document 2004-2005**  
**Grade 1**  
**Grade-Level Expectations**

**Balance and Motion**

***Science as Inquiry***

- Ask "How do we know?" and "Are we sure the same thing will happen the next time?"

***Science, Technology, and Society***

- Construct simple structures by following directions

***Physical Science***

- Construct a variety of different objects from a few types of small parts (e.g., paper clips, toothpicks, coffee stirrers, 3x5 cards, "Legos", "Tinkertoys")
- Suggest what is required to make things operate (e.g., yo-yos, pin-wheels, waterfalls, flashlights, windmills, bicycles)
- Observe and record the interactions of magnets with various objects
- Classify materials as interactive or not interactive with magnets
- Manipulate objects using a magnet (e.g., a game that requires steering an object through a maze without touching the object)
- Observe and describe the various directions in which objects can move (e.g., playground equipment)

***Unifying Themes and Concepts***

- Explore and identify the parts and materials that comprise simple objects and how they are connected (e.g., disassemble common household objects)
- Predict the effect of removing or exchanging parts of an object (e.g., a mechanical toy, a jigsaw puzzle)
- Discuss how parts when put together can do things that they could not do by themselves

# Sanborn Regional School District Science Curriculum Document 2004-2005

## Grade 1

### Grade-Level Expectations

#### Pebbles, Sand, and Silt

##### **Science as Inquiry**

- Observe and describe objects in their environment in order to organize information and make comparisons (e.g., cats have fur, fish live in water, rocks are hard)
- Manipulate an object to discover characteristics not apparent by observation alone
- Ask "How do we know?" and "Are we sure the same thing will happen the next time?"

##### **Science, Technology, and Society**

- Construct simple structures by following directions
- Seek out problems in need of solution and invent ways to solve those problems

##### **Earth and Space**

- Identify the important attributes of different landscapes (e.g., beaches, mountains, deserts)
- Describe a variety of natural and man-made changes in the earth's surface that they have observed (water level in streams and rivers, tidal changes, wind blown sand or soil, work of earth-moving machinery)
- Sort and categorize rocks, minerals and other earth materials using one or more characteristics
- Identify some naturally occurring materials that human beings use for various purposes (water, wood, coal, metals)

##### **Physical Science**

- Describe objects and events using all of their senses: touch (texture, hot/cold), taste (sour, sweet, salty, bitter), sound (pitch, loudness, tone), sight (float/sink, disappears/doesn't disappear in water), smell (smoky, fragrant, spicy, moldy)
- Describe objects in terms of the materials of which they are made (clay, cloth, paper) and their physical properties (color, size, shape, mass, texture, flexibility)

##### **Unifying Themes and Concepts**

- Explore and identify the parts and materials that comprise simple objects and how they are connected (e.g., disassemble common household objects)
- List several things that change through time or because of a change in the environment
- Recognize that some changes are so slow that they are hard to observe (e.g., display monthly photographs of the class and teacher; record and graph monthly the height of each student and the teacher)
- Classify events or objects as changing quickly, slowly, or not at all
- Identify ways in which models are the same or different from the real object (e.g., a plastic flower and a garden flower; a stuffed animal and a real animal; toy car and actual vehicle)
- Describe how a particular occurrence or event is like a different occurrence or event. Analogical thinking. (e.g., That person is as busy as a bee; that child is growing like a weed; she is as pretty as a picture)
- Observe and explore objects in nature and those that are man-made which have very different sizes, masses, ages, and speeds
- Explore simple scale models of very large and very small objects that can be made from simple familiar materials (e.g., clay, sand, paper, wood)
- Explore the use of various types of scales that are used in making observations (e.g., thermometers, rulers, color wheels, musical scales)

# Sanborn Regional School District Science Curriculum Document 2004-2005

## Grade 2

### Grade-Level Expectations

#### Insects

##### **Science as Inquiry**

- Identify patterns in events (e.g., sunrise and sunset, tidal schedules, movements of thrown or falling objects, stream flow and rainfall)
- Manipulate an object to discover characteristics not apparent by observation alone

##### **Life Science**

- Visit habitats and describe the organisms generally found in each habitat
- Observe and display understanding of the needs of plants and animals in the classroom by caring for them responsibly
- Name plants and animals whose appearance changes in different seasons and describe the differences
- Discuss features that help plants and animals survive in different environments or in the same environment during different seasons
- Investigate different habitats to identify some of the ways in which plants and animals which live there depend on each other
- Identify real or representations (pictures, drawings) of living things found near their home and ask questions concerning their attributes and needs for survival

##### **Unifying Themes and Concepts**

- List several things that change through time or because of a change in the environment
- Recognize that some changes are so slow that they are hard to observe (e.g., display monthly photographs of the class and teacher; record and graph monthly the height of each student and the teacher)
- Classify events or objects as changing quickly, slowly, or not at all
- Observe and explore objects in nature and those that are man-made which have very different sizes, masses, ages, and speeds
- Draw simple objects in actual size and compare the drawing to scale pictures

#### Solids and Liquids

##### **Science as Inquiry**

- Observe and describe objects in their environment in order to organize information and make comparisons (e.g., cats have fur, fish live in water, rocks are hard)
- Identify patterns in events (e.g., sunrise and sunset, tidal schedules, movements of thrown or falling objects, stream flow and rainfall)
- Manipulate an object to discover characteristics not apparent by observation alone

##### **Science, Technology, and Society**

- Seek out problems in need of solution and invent ways to solve those problems

##### **Physical Science**

- Describe objects and events using all of their senses: touch (texture, hot/cold), taste (sour, sweet, salty, bitter), sound (pitch, loudness, tone), sight (float/sink, disappears/doesn't disappear in water), smell (smoky, fragrant, spicy, moldy)
- Construct a variety of different objects from a few types of small parts (e.g., paper clips, toothpicks, coffee stirrers, 3x5 cards, "Legos", "Tinkertoys")
- Describe objects in terms of the materials of which they are made (clay, cloth, paper) and their physical properties (color, size, shape, mass, texture, flexibility)
- Describe characteristics of matter that are common to solids and liquids (have mass, take up space), and that distinguish them as different phases of matter

# Sanborn Regional School District Science Curriculum Document 2004-2005

## Grade 2

### Grade-Level Expectations

#### Air and Weather

##### **Science as Inquiry**

- Observe and describe objects in their environment in order to organize information and make comparisons (e.g., cats have fur, fish live in water, rocks are hard)
- Identify patterns in events (e.g., sunrise and sunset, tidal schedules, movements of thrown or falling objects, stream flow and rainfall)
- Manipulate an object to discover characteristics not apparent by observation alone

##### **Science, Technology, and Society**

- Explain the need for standard universal measurement units (e.g., initiated by measuring width of room using one's own feet and a meter stick)
- Measure net mass (e.g., subtracting mass of container holding some material whose mass is to be measured)
- Use rulers, thermometers, and balances to observe, measure, and construct objects
- Construct simple structures by following directions
- Seek out problems in need of solution and invent ways to solve those problems

##### **Life Science**

- Name plants and animals whose appearance changes in different seasons and describe the differences

##### **Earth and Space**

- Describe how the sky looks at different times (e.g., day and night, clear or cloudy)
- Describe the changes in the sky's appearance (e.g., the shape of the moon during the month, the location of the sun in the sky at different times of day)
- Keep daily records of temperature (hot, warm, cool, cold) and precipitation (some, none, lots) through a period of time and organize the information in a chart or graph

#### **Physical Science**

- Describe objects and events using all of their senses: touch (texture, hot/cold), taste (sour, sweet, salty, bitter), sound (pitch, loudness, tone), sight (float/sink, disappears/doesn't disappear in water), smell (smoky, fragrant, spicy, moldy)
- Suggest what is required to make things operate (e.g., yo-yos, pin-wheels, waterfalls, flashlights, windmills, bicycles)
- Observe how the sun warms the land, air, water, and other objects
- Identify natural and manufactured objects that produce heat

#### **Unifying Themes and Concepts**

- Explore and identify the parts and materials that comprise simple objects and how they are connected (e.g., disassemble common household objects)
- Discuss how parts when put together can do things that they could not do by themselves
- List several things that change through time or because of a change in the environment
- Identify ways in which models are the same or different from the real object (e.g., a plastic flower and a garden flower; a stuffed animal and a real animal; toy car and actual vehicle)
- Observe and explore objects in nature and those that are man-made which have very different sizes, masses, ages, and speeds
- Explore simple scale models of very large and very small objects that can be made from simple familiar materials (e.g., clay, sand, paper, wood)
- Explore the use of various types of scales that are used in making observations (e.g., thermometers, rulers, color wheels, musical scales)

# Sanborn Regional School District Science Curriculum

## Grade 1

Topics	Key Concepts	Essential Questions
<p><u>New Plants</u></p> <ul style="list-style-type: none"> <li><i>Students experience the diversity of life in the plant kingdom.</i></li> </ul>	<p><u>New Plants</u></p> <p>Change                      Life cycle                      Diversity of plant life                      Growth                      Living                      Plant parts (seed, stem, leaf, root, bulb)</p>	<ul style="list-style-type: none"> <li>What do we know about plants?</li> <li>How can we learn more about plants?</li> <li>How will we keep track of our new plants?</li> <li>What do brassica plants need to live and grow?</li> <li>What changes happen to brassica plants as they grow?</li> <li>What grows in a lawn?</li> <li>Do all plants grow back after cutting them back?</li> <li>How does a seed grow?</li> <li>How can we make a new plant from an old one?</li> <li>How do we keep our cuttings alive?</li> <li>Why do potatoes have eyes?</li> <li>What are bulbs?</li> <li>What other plant parts can grow new plants?</li> </ul>

# Sanborn Regional School District Science Curriculum

## Grade 1

Topics	Key Concepts	Essential Questions
<p><u>Pebbles, Sand, and Silt</u></p> <ul style="list-style-type: none"> <li><i>Students study the properties of rocks and soil.</i></li> </ul>	<p><u>Pebbles, Sand, and Silt</u></p> <p>Earth Materials mixture Natural resource Particles rocks soil</p>	<p>Pebbles, Sand, and Silt</p> <ul style="list-style-type: none"> <li>How are rocks different?</li> <li>What happens when rocks rub together?</li> <li>What happens when rocks are washed?</li> <li>How are some rocks the same?</li> <li>How many ways can rocks be sorted?</li> <li>What rocks can we find around us?</li> <li>How can rocks be sorted by size?</li> <li>How else can rocks be sorted by size?</li> <li>Is there an earth material smaller than sand?</li> <li>Is there an earth material smaller than silt?</li> <li>How do people use earth materials?</li> <li>What does sand do for sandpaper?</li> <li>How else can sand be used?</li> <li>What can be made by clay?</li> <li>How are bricks made?</li> <li>What's in dirt?</li> <li>Are all soils the same?</li> <li>How do soils differ?</li> </ul>

# Sanborn Regional School District Science Curriculum

## Grade 1

Topics	Key Concepts	Essential Questions
<p><u>Balance and Motion</u></p> <ul style="list-style-type: none"> <li><i>Students explore stable (balanced) and unstable systems using counter-weighting to change the center of the mass of the systems. They explore two classes of motion-spinning and rolling through trial and error, and later through systematic explorations.</i></li> </ul>	<p><u>Balance and Motion</u></p> <p>Axle Balance Balance point Disk Mobile Motion</p>	<ul style="list-style-type: none"> <li>How can a pencil be balanced on its point?</li> <li>How do the parts of a mobile stay in stable positions?</li> <li>How can spinning tops be changed?</li> <li>How can a spinning object be kept in motion?</li> <li>How can air start and object spinning?</li> <li>How can a wheel-and-axle system be changed?</li> <li>Can we predict the behavior of a rolling cup?</li> <li>What happens if weight is added to a rolling-cup system?</li> <li>How can we make a runway system that will keep a marble rolling?</li> </ul>

# Sanborn Regional School District Science Curriculum

## Grade 2

Topics	Key Concepts	Essential Questions
<p><u>Insects</u></p> <ul style="list-style-type: none"> <li><i>Students observe and compare insect structures and behaviors in different stages of the life-cycle of a variety of insects.</i></li> </ul>	<p><u>Insects</u></p> <p>Change Insect life Diversity Stage(adult, egg, larva, caterpillar, pupa, chrysalis, metamorphosis) Habitat</p>	<p>INSECTS</p> <ul style="list-style-type: none"> <li>• What do insects need? What are the structures and behavior of mealworms?</li> <li>• How do mealworms grow and change? What are the structures and behavior of mealworm larvae, pupae, and adults?</li> <li>• How do new mealworms begin?</li> <li>• What are waxworms? What do waxworms need?</li> <li>• How do waxworms grow and change? What are the structures and behaviors of waxworm larvae, pupae, and adults?</li> <li>• What is the life cycle of the waxworm?</li> <li>• How do insects begin their life? What do insect eggs look like?</li> <li>• What do milkweed bugs need? How do their needs compare to those of other insects?</li> <li>• What is the life cycle of the milkweed bug? Do all insects go through larval and pupal stages? How are all adult insects the same and different?</li> <li>• Do insects begin as eggs?</li> <li>• What do silkworms need to live?</li> <li>• What are the structures and behaviors of silkworm larvae? How do they compare to other insect larvae?</li> <li>• What are the structures of silkworm larvae? Do larvae have the same body parts as adult insects: head, thorax, and abdomen?</li> <li>• Why do silkworms spin silk? Do male and female silk moths look different? What is the life cycle of the silkworm?</li> <li>• What do insects need? What are the structures of the butterfly larva?</li> <li>• How do butterfly larvae change into butterflies? Are butterfly and moth pupae the same?</li> <li>• What is the life cycle of butterflies?</li> </ul>

# Sanborn Regional School District Science Curriculum

## Grade 2

Topics	Key Concepts	Essential Questions
<p><u>Air and Weather</u></p> <ul style="list-style-type: none"> <li><i>Students study the properties of air and find that it is matter that takes up space.</i></li> </ul>	<p><u>Air and Weather</u></p> <p>Air                      sun            Change                temperature            Gas                     weather            Lift                      wind            Pressure            Propulsion</p>	<p>AIR and WEATHER</p> <ul style="list-style-type: none"> <li>How does air interact with objects?</li> <li>How can I keep a paper towel dry underwater?</li> <li>How does air affect how a parachute floats to the ground?</li> <li>What happens when I push air into a smaller space?</li> <li>How can I use air to push water around a system?</li> <li>How can I use compressed air to propel a balloon rocket?</li> <li>How can we keep a record of daily weather conditions?</li> <li>How does a thermometer work to measure the temperature?</li> <li>Are all clouds the same? What kinds of weather do different clouds bring?</li> <li>How can we measure the amount of rain that falls?</li> <li>How can bubbles be used to find out about wind speed and direction?</li> <li>How do people describe the strength of the wind?</li> <li>How can we use pinwheels to observe wind speed?</li> <li>How can we use a wind vane to observe the direction of the wind?</li> <li>How can we use weather instruments to improve kite flying?</li> <li>How can we organize weather data collected for a month to look for change?</li> <li>How can we organize weather data taken over different seasons to look for change?</li> <li>What is in the night sky and how can we monitor and record our observations to look for change?</li> </ul>

# Sanborn Regional School District Science Curriculum

## Grade 2

Topics	Key Concepts	Essential Questions
<p><u>Solids and Liquids</u></p> <ul style="list-style-type: none"> <li><i>Students find that matter can exist in different states of matter-solid, liquid, gas.</i></li> </ul>	<p><u>Solids and Liquids</u></p> <p>Change layer viscous            Crystal liquid            Dissolve opaque            Evaporate property            Foam transparent</p>	<p>SOLIDS and LIQUIDS</p> <ul style="list-style-type: none"> <li>How can solids be described?</li> <li>In what ways are some solids the same?</li> <li>How can the properties of solids be used?</li> <li>How do liquids differ from each other?</li> <li>How do liquids flow when a bottle is tipped upside down? How does the same amount of liquid look in various shapes of containers? In what ways are all liquids the same?</li> <li>Are these materials solids or liquids?</li> <li>How can mixtures of solid particles be separated?</li> <li>How do particles of solids move in bottles?</li> <li>How do you know which screens to use for separating a mixture of solids?</li> <li>What happens when different solids are mixed with water? How can a mixture of water and solids be separated?</li> <li>What happens when water is mixed with different liquids?</li> <li>Is toothpaste a solid, a liquid, a mixture, or some other form of matter?</li> </ul>

**Sanborn Regional School District Math/Science Curriculum  
Measurement Benchmarks  
Grade Level Expectations 2-4**

<b>Measures</b>	<b>Grade 2</b>	<b>Grade 3</b>	<b>Grade 4</b>
<b>Length</b>	<p><b>Unit (accuracy):</b> Inch (to whole inch); Foot (to whole inch); Centimeter (to whole centimeter); Meter (to whole centimeter)</p> <p><b>Equivalencies:</b> 12 inches in 1 foot; 100 centimeters in 1 meter</p>	<p><b>Unit (accuracy):</b> Inch (to 1/2 inch); Foot (to whole inch); Centimeter (to whole centimeter); Meter (to whole centimeter)</p> <p><b>Equivalencies:</b> 12 inches in 1 foot; 100 centimeters in 1 meter</p>	<p><b>Unit (accuracy):</b> Inch (to 1/4 inch); Foot; Centimeter (to 0.5 centimeter); Meter (to 0.5 centimeter); Yard; Mile (use in scale questions); Kilometer (use in scale questions)</p> <p><b>Equivalencies:</b> 12 inches in 1 foot; 100 centimeters in 1 meter; 3 feet in 1 yard; 36 inches in 1 yard</p>
<b>Time</b>	<p><b>Unit (accuracy):</b> Hour (to 15 minute interval)</p> <p><b>Equivalencies:</b> 60 minutes in 1 hour</p>	<p><b>Unit (accuracy):</b> Hour (to 5 minute interval); Day; Year</p> <p><b>Equivalencies:</b> 24 hours in 1 day; 7 days in 1 week; 365 days in 1 year</p>	<p><b>Unit (accuracy):</b> Hour (to 5 minute interval); Day; Year</p> <p><b>Equivalencies:</b> 24 hours in 1 day; 7 days in 1 week; 365 days in 1 year; 60 seconds in 1 minute; 60 minutes in 1 hour</p>
<b>Temperature</b>	<p><b>Unit (accuracy):</b> Degree (to 1 degree)</p>	<p><b>Unit (accuracy):</b> C° and F° (to 1 degree)</p>	<p><b>Unit (accuracy):</b> C° and F° (to 1 degree)</p>
<b>Capacity</b>		<p><b>Units (accuracy):</b> Quart (to whole quart)</p>	<p><b>Unit (accuracy):</b> Quart (to whole quart)</p>
<b>Mass</b>		<p><b>Unit (accuracy):</b> Kilogram (to whole kilogram); Gram (to whole gram)</p>	<p><b>Unit (accuracy):</b> Kilogram (to whole kilogram); Gram (to whole gram)</p>
<b>Weight</b>		<p><b>Unit (accuracy):</b> Pound (to whole pound)</p>	<p><b>Unit (accuracy):</b> Pound (to whole pound)</p>