

Haverhill Public Schools  
**PreK-5 Science Curriculum Map**

**Focus Science Topics**

<b>Term</b>	<b>Kindergarten</b>	<b>Grade 1</b>	<b>Grade 2</b>	<b>Grade 3</b>	<b>Grade 4</b>	<b>Grade 5</b>
<b>Term 1</b>	<ul style="list-style-type: none"> <li>• Establish classroom routines</li> <li>• Begin introductory lessons</li> </ul>	<ul style="list-style-type: none"> <li>• Establish classroom routines</li> <li>• Begin introductory lessons</li> </ul>	<ul style="list-style-type: none"> <li>• Weather</li> <li>• The Sun as a Source of Light and Heat</li> </ul>	<ul style="list-style-type: none"> <li>• Simple Machines</li> <li>• The Earth in the Solar System</li> </ul>	<ul style="list-style-type: none"> <li>• Weather</li> <li>• The Water Cycle</li> </ul>	<ul style="list-style-type: none"> <li>• Rocks and Their Properties</li> <li>• Soil</li> <li>• Earth's History</li> </ul>
<b>Term 2</b>	<ul style="list-style-type: none"> <li>• Periodic Phenomena (Patterns, Seasons, Day and Night)</li> </ul>	<ul style="list-style-type: none"> <li>• Earth's Materials</li> </ul>	<ul style="list-style-type: none"> <li>• Characteristics of Living Things</li> </ul>	<ul style="list-style-type: none"> <li>• Characteristics of Animals</li> <li>• Animal Adaptations</li> </ul>	<ul style="list-style-type: none"> <li>• Electrical Energy</li> <li>• Magnetic Energy</li> <li>• Compound Machines</li> </ul>	<ul style="list-style-type: none"> <li>• Energy and Living Things (Food Chains)</li> <li>• Sound Energy</li> <li>• Light Energy</li> <li>• Forms of Energy</li> </ul>
<b>Term 3</b>	<ul style="list-style-type: none"> <li>• Heredity (How Plants and Animals Resemble Their Parents)</li> </ul>	<ul style="list-style-type: none"> <li>• Living Things and Their Environment</li> </ul>	<ul style="list-style-type: none"> <li>• Evolution and Biodiversity (Fossils)</li> </ul>	<ul style="list-style-type: none"> <li>• Animal Life Cycles</li> <li>• States of Matter</li> </ul>	<ul style="list-style-type: none"> <li>• Characteristics of Plants</li> <li>• Plant Structures and Functions</li> </ul>	<ul style="list-style-type: none"> <li>• Review in preparation for MCAS</li> </ul>
<b>Term 4</b>	<ul style="list-style-type: none"> <li>• Observable Properties of Objects</li> </ul>	<ul style="list-style-type: none"> <li>• Position and Motion of Objects</li> </ul>	<ul style="list-style-type: none"> <li>• States of Matter</li> </ul>	<ul style="list-style-type: none"> <li>• Properties of Objects and Materials</li> </ul>	<ul style="list-style-type: none"> <li>• Plant Adaptations</li> <li>• Plant Life Cycles</li> </ul>	<ul style="list-style-type: none"> <li>• Review in preparation for MCAS</li> </ul>

**\* Scientific inquiry, experimentation, and the engineering design process are integrated into each Science unit.**

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**TE Topics**

**I = Introduce**

Introduce means exposure to the learning standard and content vocabulary through read alouds, videos, interactive websites, discussions and/or any experiential opportunities. Students will *recognize and identify* content specific vocabulary. Student demonstrates knowledge of the learning standard through informal discussions and teacher observations.

**F = Focus**

Focus means in-depth instruction which should end in the student being able to *use and apply* content specific vocabulary and concepts and independently demonstrate their knowledge of the learning standard through interim assessments, projects, group discussions, and/or written/oral responses.

**R=Review**

Review of instruction should include activities that allow students to *activate prior knowledge* of content specific vocabulary and concepts. Teachers should evaluate students' recall to see if more review is needed before moving onto other content. Their recall should demonstrate the same level of understanding that occurs at the *focus level*.

**Earth and Space Science PreK - 2**

Topic	Learning Standard	K	1	2	3	4	5	Technology/Engineering
Earth's Materials	Recognize that water, rocks, soil and living organisms are found on the earth's surface.	I	F	R				Identify characteristics shared by naturally occurring rocks and manmade concrete. (T/E 1.1)
	Understand that air is a mixture of gases that is all around us and that wind is moving air.	I	F	R				Design a kite and identify which materials would be used for its construction. Classify them as natural or manmade materials. Build the kite and fly it outside. (T/E 1.1, 1.2)
Weather	Describe the weather changes from day to day and over the seasons.	I	I	F				Design and build a tool that could be used to show wind direction (wind sock). (T/E 1.3)
The Sun as a Source of Light and Heat	Recognize that the sun supplies and light to the earth and is necessary for life.		I	F				Design a shade for the window to keep the room cool in the summer or to keep the sun out for television viewing. (T/E 1.1, 1.3)

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TE Topics

Topic	Learning Standard	K	1	2	3	4	5	Technology/Engineering
<b>Periodic Phenomena</b>	Identify some events around us that have repeating patterns, including the seasons of the year, day and night.	<b>F</b>	<b>R</b>					Use a thermometer to record the temperature from morning to noon over several weeks and discuss any patterns that emerge. (T/E 2.1)

**Earth and Space Science 3- 5**

Topic	Learning Standard	K	1	2	3	4	5	Technology/Engineering
<b>Rocks and Their Properties</b>	Give a simple explanation of what a mineral is and some examples, e.g., quartz, mica.					<b>I</b>	<b>F</b>	Design a flowchart to demonstrate how silica from sand is used to make glass. (T/E 2.2)
	Identify the physical properties of minerals (hardness, color, luster, cleavage, and streak), and explain how minerals can be tested for these different physical properties.					<b>I</b>	<b>F</b>	Use simple tools to test for hardness, e.g., Moh’s Scale of Hardness. (T/E 1.1)
	Identify the three categories of rocks (metamorphic, igneous, and sedimentary) based on how they are formed, and explain the natural and physical processes that create these rocks.				<b>I</b>	<b>I</b>	<b>F</b>	Discuss the use of rocks in construction based on their physical properties. Test the hardness of various types of rocks used in construction. (T/E 1.1)
<b>Soil</b>	Explain and give examples of the ways in which soil is formed (the weathering of rock by water and wind and from the decomposition of plant and animal remains					<b>I</b>	<b>F</b>	Design and construct a composting bin being sure to keep design considerations in mind, e.g., aeration, resistance to rot, etc. (T/E 1.2, 2.1-2.3)

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## TE Topics

**Earth and Space Science 3-5**

Topic	Learning Standard	K	1	2	3	4	5	
<b>Weather</b>	Explain how air temperature, moisture, wind speed and direction, and precipitation make up the weather in a particular place and time.			I		F	R	<p>Using measuring tools or graph paper, sketch a scale drawing of the front view of an object used to measure weather. (T/E 2.3)</p> <p>Design and construct a variety of simple instruments that could be used to measure weather. Discuss how their design suits their purpose. (T/E 2.1-2.4)</p> <p>Explain how tools of technology such as a hammer, screwdriver, pliers, tape measure, screws, nails, and other mechanical fasteners can be used to make or build weather instruments. (T/E 1.1)</p>
	Distinguish among the various forms of precipitation (rain, snow, sleet, and hail), making connections to the weather in a particular place and time.			I		F	R	Construct various weather station instruments (e.g., wind gauge, barometer, anemometer), record data from them, and make conclusions. (T/E 1.1, 1.2, 2.1, 2.2, 2.3)
	Describe how global patterns such as the jet stream and water currents influence local weather in measurable terms such as temperature, wind direction and speed, and precipitation.					I/F	R	To make a model of the jet stream, fill a jar halfway with warm water. Sprinkle some pepper into the water to represent nutrients on the ocean floor. Put a colored ice cube into the jar. Students should draw and describe their observations. (T/E 2.2)

**TE Topics**

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<b>Weather (cont.)</b>	Differentiate between weather and climate.			<b>I</b>		<b>F</b>	<b>R</b>	Discuss tools used to measure everyday weather compared with tools used in determining climate. (T/E 1.2) Use a thermometer and barometer to compare conditions indoors and outdoors. (T/E 2.4)
<b>The Water Cycle</b>	Describe how water on earth cycles in different forms and in different locations, including underground and in the atmosphere.			<b>I</b>		<b>F</b>	<b>R</b>	Design and build a terrarium to demonstrate the water cycle. (T/E 1.2, 2.1-2.3)
	Give examples of how the cycling of water, both in and out of the atmosphere, has an effect on climate.			<b>I</b>		<b>F</b>	<b>R</b>	

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## TE Topics

**Earth and Space Science 3-5**

Topic	Learning Standard	K	1	2	3	4	5	
<b>Earth's History</b>	Give examples of how the surface of the earth changes due to slow processes such as erosion and weathering, and rapid processes such as landslides, volcanic eruptions, and earthquakes.						<b>I</b>	<b>F</b> Identify one manmade attribute that slows the erosion process (e.g., hay bales at a construction site, silt fence protecting sand dunes) and one attribute that accelerates it (e.g., paving a parking lot, cutting trees). Relate these to natural systems. (T/E 2.1, 2.4)
<b>The Earth in the Solar System</b>	Recognize that the earth is part of a system called the "solar system" that includes the sun (a star), planets, and many moons. The earth is the third planet from the sun in our solar system.			<b>I</b>	<b>F</b>	<b>R</b>		
	Recognize that the earth revolves around (orbits) the sun in a year's time and that the earth rotates on its axis once approximately every 24 hours. Make connections between the rotation of the earth and day/night, and the apparent movement of the sun, moon, and stars across the sky.			<b>I</b>	<b>F</b>	<b>R</b>		Design and build a sundial and use it to determine the time of day. Explore how accurate it is over time. Determine the conditions under which the sundial does and does not work. (T/E 1.1, 1.2, 2.3)
	Describe the changes that occur in the observable shape of the moon over the course of a month.			<b>I</b>	<b>F</b>	<b>R</b>		Design and create a calendar that illustrates the phases of the moon. (T/E 2.2, 2.3)

**Life Science PreK-2**

Topic	Learning Standard	K	1	2	3	4	5	
<b>Characteristics of Living Things</b>	Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water.	I	I	F				Design and construct a habitat for a living organism that meets its needs for food, air and water. (T/E 1.2, 1.2, 2.3)
	Differentiate between living and nonliving things. Group both living and nonliving things according to the characteristics that they share.	I	I	F				
	Recognize that plants and animals have life cycles, and that life cycles vary for different living things	I	I	F				Design and build a habitat for a living organism that can be modified to meet the changing needs of the organism during its life cycle. (T/E 1.1, 1.2)
<b>Heredity</b>	Describe ways in which many plants and animals closely resemble their parents in observed appearance.	I/F		R				
<b>Evolution and Biodiversity</b>	Recognize that fossils provide us with information about living things that inhabited the earth years ago.	I	I	F				Make a fossil print of plant leaves using clay or putty. (T/E 1.1, 1.2)
<b>Living Things and Their Environment</b>	Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell, and taste.	I	F	R				Design and build an ant farm. Observe how ants use their senses and how they communicate to each other the location of a food source. (T/E 1.1, 1.2, 1.3)
	Recognize changes in appearance that animals and plants go through as the seasons change.	I	F	R				Visit a maple syrup manufacturing facility. Discuss the sap-to-maple syrup process and the seasonal life cycle of a tree. (T/E 1.1, 1.2)

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## TE Topics

Topic	Learning Standard	K	1	2	3	4	5	
<b>Living Things and Their Environment (cont.)</b>	Identify the ways in which an organism's habitat provides for its basic needs (plants require air, water, nutrients, and light; animals require food, water, air, and shelter).	I	F	R				Using simple tools and materials, have students draw pictures of their houses and an animal's habitat. Discuss differences and similarities. (T/E 1.3)

## Life Science 3-5

Topic	Learning Standard	Pre-K	K	1	2	3	4	5	
<b>Characteristics of Plants and Animals</b>	Classify plants and animals according to the physical characteristics that they share					I/F animal	I/F plant	R	Create a simple chart to classify plants and animals that are common to the school's geographical area. (T/E 2.2)
<b>Plant Structures and Functions</b>	Identify the structures in plants (leaves, roots, flowers, stem, bark, wood) that are responsible for food production, support, water transport, reproduction, growth, and protection.						I/F	R	Collect plants. Make a detailed drawing of a plant. Identify and label its major structures, i.e., leaves, flowers, stems, roots, seeds. Describe the function of each structure. (T/E 2.2, 2.3)
	Recognize that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death					I/F animal	I/F plant	R	Design and construct a habitat for a small animal (e.g., insect, butterfly, frog) that has adequate space, and contains the necessities for survival. The habitat should allow for observation of the animal as it goes through the stages of its life cycle. (T/E 1.1, 1.2, 2.1-2.3)



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Topic	Learning Standard	Pre-K	K	1	2	3	4	5	
<b>Plant Structures and Functions (cont.)</b>	Describe the major stages that characterize the life cycle of the frog and butterfly as they go through metamorphosis.					I/F		R	•
	Differentiate between observed characteristics of plants and animals that are fully inherited (e.g., color of flower, shape of leaves, color of eyes, number of appendages) and characteristics that are affected by the climate or environment (e.g., browning of leaves due to too much sun, language spoken).					I/F animal	I/F plant	R	•

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Life Science 3-5

Topic	Learning Standard	K	1	2	3	4	5	
<b>Adaptations of Living Things</b>	Give examples of how <b>inherited characteristics</b> may change over time as adaptations to changes in the environment that enable organisms to survive, e.g., shape of beak or feet, placement of eyes on head, length of neck, shape of teeth, plant features, color.				I/F animal	I/F plant	R	Discuss how engineers design things by using their knowledge of the way that animals move, e.g., birds and wings influence airplane design, tails and fins of aquatic animals influence boat design. (T/E 2.4)
	Give examples of how changes in the environment (drought, cold) have caused some plants and animals to die or move to new locations (migration).				I/F animal	I/F plant	R	
	Describe how organisms meet some of their needs in an environment by using behaviors (patterns of activities) in response to information (stimuli) received from the environment. Recognize that some animal behaviors are instinctive (e.g., turtles burying their eggs), and others are learned (e.g., humans building fires for warmth, chimpanzees learning how to use tools).				I/F		R	
	Recognize plant behaviors, such as the way seedlings' stems grow toward light and their roots grow downward in response to gravity. Recognize that many plants and animals can survive harsh environments because of seasonal behaviors, e.g., in winter, some trees shed leaves, some animals hibernate, and other animals migrate.					I/F	R	

## Life Science 3-5

Topic	Learning Standard	Pre-K	K	1	2	3	4	5	
<b>Adaptations of Living Things (cont.)</b>	Give examples of how organisms can cause changes in their environment to ensure survival. Explain how some of these changes may affect the ecosystem.					I/F animal	I/F plant	R	Brainstorm and sketch things in the home that are designed to help humans survive, e.g., heater for warmth, stove to cook. (T/E 2.1, 2.2)
<b>Energy and Living Things</b>	Describe how energy derived from the sun is used by plants to produce sugars (photosynthesis) and is transferred within a food chain from producers (plants) to consumers to decomposers.					I	I	F	Design and build a compost bin. Use a thermometer to measure the temperature rise during composting. Discuss where heat (energy) comes from (decomposers metabolize energy stored by producers and consumers). (T/E 1.2)

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## TE Topics

## Physical Science Pre-K - 2

Topic	Learning Standard	K	1	2	3	4	5	
<b>Observable Properties of Objects</b>	Sort objects by observable properties such as size, shape, color, weight, and texture.	I/F	R	R				Predict from looking at the shape of a simple tool or object what things it might be used for, e.g., pliers, letter opener, paperweight. (T/E 1.2, 2.1)
<b>States of Matter</b>	Identify objects and materials as solid, liquid, or gas. Recognize that solids have a definite shape and that liquids and gases take the shape of their container.		I	F				Ask students to bring in different types of containers from home. Discuss and demonstrate whether the containers are appropriate to hold solids and liquids, e.g., an unwaxed cardboard box will absorb water and eventually disintegrate while a glass bottle will not. (T/E 1.1, 1.2)
<b>Position and Motion of Objects</b>	Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow.	I	F	R				Using construction paper and glue, design a three-dimensional object that will roll in a straight line and a three-dimensional object that will roll around in a circle. (T/E 1.3, 2.1)
	Demonstrate that the way to change the motion of an object is to apply a force (give it a push or a pull). The greater the force, the greater the change in the motion of the object.	I	F	R				
	Recognize that under some conditions, objects can be balanced.	I	F	R				<ul style="list-style-type: none"> <li>Design a lever, putting unequal weights on the ends of the balance board. Observe. Now find ways to restore the balance by moving the fulcrum, keeping each weight in the same place. Discuss what happens. (T/E 2.1)</li> </ul>

## Physical Science 3-5

Topic	Learning Standard	K	1	2	3	4	5	
<b>Properties of Objects and Materials</b>	Differentiate between properties of objects (e.g., size, shape, weigh, mass) and properties of materials (e.g., color, texture, hardness)				I/F		R	Observe several common objects, discuss the different materials that they are made of, and the reasons that those specific materials may have been used. (T/E 1.1) Given a variety of objects made of different materials, ask questions and make predictions about their hardness, flexibility, and strength. Test to see if your predictions were correct. (T/E 1.1)
<b>States of Matter</b>	Compare and contrast solids, liquids, and gases based on the basic properties of each of these states of matter.				I/F		R	Design one container for each of the states of matter, taking into account what material properties are important, e.g., size, shape, flexibility. (T/E 1.1, 2.3)
	Describe how water can be changed from one state to another by adding or taking away heat.				I/F		R	Using given insulating materials, try to keep an ice cube from melting. (T/E 1.1)
<b>Forms of Energy</b>	Identify the basic forms of energy (light, sound, heat, electrical, and magnetic). Recognize that energy is the ability to cause motion or create change.						I/F	Design and construct a candle wheel that demonstrates how heat can cause a propeller to spin (a very popular craft toy). (T/E 1.1, 1.2, 2.2, 2.3)
	Give examples of how energy can be transferred from one form to another.						I/F	Design and build a simple roller coaster for a marble or toy car to demonstrate how energy changes from one form to another. (T/E 2.2, 2.3)

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## TE Topics

## Physical Science 3-5

Topic	Learning Standard	K	1	2	3	4	5	
<b>Electrical Energy</b>	Recognize that electricity in circuits requires a complete loop through which an electrical current can pass, and that electricity can produce light, heat, and sound.					I/F	R	Using graphic symbols, draw and label a simple electric circuit. (T/E 2.2) Using batteries, bulbs, and wires, build a series circuit. (T/E 1.2, 2.2) Design and build a simple game using simple circuits. (T/E 1.2, 2.2)
	Identify and classify objects and materials that conduct electricity and objects and materials that are insulators of electricity.					I/F	R	Select from a variety of materials (e.g., cloth, cardboard, Styrofoam, plastic, etc.) to design and construct a simple device (prototype) that could be used as an insulator. Do a simple test of its effectiveness. (T/E 1.1, 1.2, 2.2, 2.3)
	Explain how electromagnets can be made, and give examples of how they can be used.					I/F	R	Design and construct a simple game or toy (prototype) that works because of electromagnets. (T/E 1.1, 1.2, 2.2, 2.3) Make an electromagnet with a six-volt battery, insulated wire, and a large nail. (T/E 1.2, 2.1, 2.2, 2.3)
<b>Magnetic Energy</b>	Recognize that magnets have poles that repel and attract each other.					I/F	R	Design and build a magnetic device to sort steel from aluminum materials for recycling. (T/E 1.1)

## Physical Science 3-5

Topic	Learning Standard	Pre-K	K	1	2	3	4	5	
<b>Magnetic Energy (cont.)</b>	Identify and classify objects and materials that a magnet will attract and objects and materials that a magnet will not attract.						I/F	R	Design and construct a device that utilizes magnets to lift a metal weight at least six inches off the ground. (T/E 1.1, 1.3, 2.3)
<b>Sound Energy</b>	Recognize that sound is produced by vibrating objects and requires a medium through which to travel. Relate the rate of vibration to the pitch of the sound.					I	I	F	Design and construct a telephone (prototype) using a variety of materials, e.g., paper cups, string, tin cans, and wire. Determine which prototype works best. Discuss possible reasons. (T/E 1.1, 1.2, 2.2, 2.3)
<b>Light Energy</b>	Recognize that light travels in a straight line until it strikes an object or travels from one medium to another, and that light can be reflected, refracted, and absorbed.					I	I	F	Design and build a prototype to inhibit solar heating of a car, e.g., windshield reflector, window tinting. (T/E 1.2, 2.1, 2.3) Design and build a pinhole camera. Test the effects of light on light sensitive paper. (T/E 1.2, 2.3) Design and build a periscope from cardboard and mirrors. (T/E 1.1, 1.2, 2.3)

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**TE Topics**

**Technology and Engineering**

Topic	Learning Standard	Pre-K	K	1	2	3	4	5	
<b>Simple Machines</b>	Six Simple Machines Compound Machines					I/F simple	I/F com- pound	<b>R</b>	Identify and explain the difference between simple and complex machines e.g., hand can opener that includes multiple gears, wheel, wedge, gear and lever.