

Cambridge Public Schools Science Curriculum

Junior Kindergarten

Curriculum	Science Unit Description	Major Science Concepts	Related Massachusetts Science & Technology/Engineering Standards	Examples of Evidence of Student Learning
<i>Discovering Nature with Young Children</i>	<p>Life Science Through inquiry, young students build an understanding about what is living and nonliving. Students through exploration are introduced to the characteristics of living things, life cycles, habitats and diversity.</p>	<ul style="list-style-type: none"> • Classify of living and nonliving things. • Plants and animals have physical characteristics such as parts, shapes, colors, textures, and size. • Living things have basic needs including for most, water, food, light, air and space. • All living things go through a life cycle, consisting of birth, reproduction and death. • Plants and animals have their needs met in particular ways in particular places. 	<ul style="list-style-type: none"> • Recognize that animals (including humans) and plants are living things that grow, reproduce and need food, air and water. L.1. • Differentiate between living and nonliving things. Group both living and nonliving things according to the characteristics that they share L.2. • Describe ways in which many plant and animals closely resemble their parents in observed appearance. L.4. • Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell, and taste. L. 6 • Recognize changes in appearance that animals and plants go through as the seasons change. L.7 • 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). L.8. • Design and construct a habitat for a living organism that meets its needs for food, air, and water. T.E. 1.1. • 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 	<ul style="list-style-type: none"> • Students search for and find different plants and small animals in the neighborhood. • Students take nature walks both around their school and community discovering organisms and habitats. • Students help to plan and develop an indoor environment for a particular animal. • Students throughout the year return to different areas in the neighborhood looking for animals and insects. • Students deepen their awareness and understanding of small animals, insects and plants as they care for them in their classrooms. • Students grow plants from beans in the classroom and change containers to meet its changing needs through the plants life cycle.
<i>Exploring Water with Young Children.</i>	<p>Earth Science Through inquiry, students explore and develop ideas about the basic properties of water. Students learn that water flows, takes the shape of its container, sticks more or less strongly to other materials and that objects can sink or float in water.</p>	<ul style="list-style-type: none"> • Water moves in particular ways. • Water will flow, spill or splash. • Objects can sink, float, or stay suspended in water. • Air take up space and floats to the top of water. • Water takes the shape of its container 	<ul style="list-style-type: none"> • 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. P.2. • Recognize that water, rocks, soil, and living organisms are found on the earth’s surface. E.1. 	<ul style="list-style-type: none"> • Students ask and seek answers to questions about water. • Students discuss how they are able to get water into and out of the tube. • Through the use of tubes, funnels and small containers at the water table students predict where the water will flow. • Students create representations to illustrate what they learned at the water table. • Students extend the sink and float experiences by throwing leaves, sticks and rocks into a puddle outdoors.

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<i>Sand and Water</i>	<p>Physical Science Students explore the physical properties of water, sand and bubbles and how each moves. Classes may focus on phenomena such as sinking and floating, bubble making or measurement.</p>	<ul style="list-style-type: none"> • Sand and water have similarities and differences in their physical properties and behaviors. • Students can raise and investigate questions. 	<ul style="list-style-type: none"> • Sort objects by observable properties such as size, shape, color, weight, and texture. P.1. • Identify objects and materials as solid, liquid, or gas. P.2. • Recognize that solids have a definite shape and that liquids and gases take the shape of their container. P.2. 	<ul style="list-style-type: none"> • Students create a list of observations and questions raised as they explore sand or water. • Students record data in Science Journals.
<i>Myself and Others and The Senses</i>	<p>Life Science Students investigate similarities and differences between each other, especially with respect to their height, eyes, hair, skin, and hands. Students learn to use their senses as tools with which to observe and describe the world of objects around them.</p>	<ul style="list-style-type: none"> • Humans have similarities, differences and variation in physical characteristics. • Humans grow and develop over time. • Humans use senses (seeing, hearing, touching, tasting, smelling) to perceive the environment. 	<ul style="list-style-type: none"> • Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water. L.1. • Recognize that people and other animals interact with the environment through their senses of sight, hearing, touch, smell, and taste. L.6. 	<ul style="list-style-type: none"> • Graphs recording eye color, hand size or height of everyone in the class and statements that summarize some of the information on the graph.
<i>Organisms</i>	<p>Life Science Students Create and maintain a woodland habitat in the classroom containing pine seedlings, moss, pill bugs and bess beetles. Students also set up, observe and maintain a freshwater habitat consisting of Elodea and Cabomba plants, pond snails and guppies.</p>	<ul style="list-style-type: none"> • Plants and animals are two kinds of organisms. • There is a wide diversity of living things on earth. • Organisms have basic needs, such as food, water, air, space and shelter. 	<ul style="list-style-type: none"> • Recognize that plants and animals have life cycles, and that life cycles vary for different living things. L.3. • Recognize changes in appearance that animals and plants go through as the seasons change. L.7. • 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). L.8. 	<ul style="list-style-type: none"> • Observational drawings of seeds and plants over time. • Class graphs showing growth of peas, kidney beans, sunflower seeds and pumpkin seeds. • Students observe, discuss, write and draw the woodland home and its changes over time.

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Grade 1

Curriculum	Science Unit Description	Major Science Concepts	Related Massachusetts Science & Technology/Engineering Standards	Examples of Evidence of Student Learning
<i>Weather</i>	<p>Earth Science Students construct and use a variety of tools that help them learn to read thermometers, estimate wind, gauge rainfall and recognize cloud formations. They collect and record weather data and consider how weather phenomena affect their daily lives.</p>	<ul style="list-style-type: none"> • Weather has elements such as temperature, cloud cover, wind speed and precipitation • Weather changes day to day, week to week and month to month. • Weather impacts choices we make. 	<ul style="list-style-type: none"> • Understand that air is a mixture of gases that is all around us and that wind is moving air. E.2. • Describe the weather changes from day to day and over the seasons. E.3. • Recognize that the sun supplies heat and light to the Earth and is necessary for life. E.4. • Identify some events around us that have repeating patterns, including seasons of the year, day, and night. E.5. 	<ul style="list-style-type: none"> • Graphs of collected weather data (temperature, cloud cover, wind speed and precipitation) by month and questions that ask students to use the data. For example: Which month had the most sunny days? Which month had the coldest temperature? Did the coldest month also have the most cloudy days?
<i>Living Things</i>	<p>Life Science Students explore nature outside and observe changes in a tree, as well as in the plants and animals around the tree. They consider the needs of living things as they build classroom terraria.</p>	<ul style="list-style-type: none"> • Living things have similarities and differences. • Living things grow and develop over time. • Living things have needs that they meet in a variety of ways to survive. 	<ul style="list-style-type: none"> • Recognize that animals (including humans) and plants are living things that grow, reproduce, and need food, air, and water. L.1. • Differentiate between living and nonliving things. • Group both living and nonliving things according to the characteristics that they share. L.2. • Recognize that plants and animals have life cycles, and that life cycles vary for different living things. L.3. • Recognize changes in appearance that animals and plants go through as the seasons change. L.7. 	<ul style="list-style-type: none"> • Terraria in the classroom along with: class list of what students think living organisms need to survive and observational drawings of two or more living organisms. • Lists of living things observed during an outdoor learning experience
<i>Balls and Ramps</i>	<p>Physical Science Students observe and compare properties of different balls, experiment with them both on the ground and on ramps</p>	<ul style="list-style-type: none"> • Balls have different characteristics such as weight, size, and composition. • Gravity causes balls to fall. • The size and weight of a ball and the steepness of a ramp affect the movement of a ball on an inclined plane. 	<ul style="list-style-type: none"> • Sort objects by observable properties such as size, shape, color, weight and texture P.1 • Describe the various ways that objects can move, such as in a straight line, zigzag, back-and-forth, round-and-round, fast, and slow. P.3. • 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. P.4. • Recognize that under some conditions, objects can be balanced. P.5. • Identify tools and simple machines use for a specific purpose, e.g., ramp, wheel, pulley, lever. T.E. 2.1 	<ul style="list-style-type: none"> • Charts and group data sheets that compare: ball size to ball movement (bouncing and rolling distance) and ball weight to ball movement. • Students record physical properties, similarities and differences of balls and ramps in Science Journals.

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Grade 2

Curriculum	Science Unit Description	Major Science Concepts	Related Massachusetts Science & Technology/Engineering Standards	Examples of Evidence of Student Learning
<i>Animal Lifecycles</i>	Life Science Students observe and record the growth and metamorphosis of painted lady caterpillars. By observing other animals such as mealworms (beetle larvae) and guppies, students continue to develop the concept of life cycle in animals.	<ul style="list-style-type: none"> • Animals have observable and predictable life cycles, including growth and death. • Some animals change appearance as the mature (metamorphosis) while other animals maintain a similar appearance and increase in size as they mature. • Mature off spring resemble their parents in physical characteristics and behaviors. 	<ul style="list-style-type: none"> • Describe ways in which many plants and animals closely resemble their parents in observed appearance. L.4. • Recognize that plants and animals go through predictable life cycles that include birth, growth, development, reproduction, and death. L.2.3 	<ul style="list-style-type: none"> • Observational drawings and science journal entries about one animal as it matures. • Class plans for the release of butterflies.
<i>Liquids</i>	Physical Science Students identify physical properties common to all liquids, examine how some properties differ among liquids, and develop an understanding of the ways liquids interact with other liquids and solids.	<ul style="list-style-type: none"> • All liquids pour and take the shape of their containers • Different liquids vary in physical properties [such as color, cohesion ("stickiness"), viscosity ("thickness") and density ("heaviness")] • Solid objects in liquids either (a) float on the surface or part way down or (b) sink • Floating depends on properties of the liquid and on the shape, size, and weight of the object 	<ul style="list-style-type: none"> • 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. P.1.2 	<ul style="list-style-type: none"> • Class chart or individual journal entries that describe properties of water, corn syrup and oil. • Class "Sinking and Floating" chart that records students' predictions, what happened and some of their ideas about why.
<i>Soils</i>	Earth Science Students investigate local soil to discover its different components - sand, humus and clay. They test these soil components for characteristic properties as a scientist would and use the results to explore and predict the relationship between soil composition and root growth and plant development.	<ul style="list-style-type: none"> • Soils have different properties such as color, particle size, water absorbency and cohesion. • Plant germination and growth depend upon the properties of soil. • Organic matter decomposes and becomes part of the soil. 	<ul style="list-style-type: none"> • Recognize that water, rocks, soil, and living organisms are found on the Earth's surface. E.1. • Identify and describe characteristics of natural materials (e.g. wood, cotton fur, wool) and human-made materials (e.g. plastic, Styrofoam) T.E. 1.1. 	<ul style="list-style-type: none"> • Students growing seeds in clay, humus, sand and local soil. Predictions about what will happen to the seeds and why, either on class chart or in a science journal entry. • Students observe and discuss the properties of clay, humus and sand.