

<b>Grade: 2</b> <b>Subject: Science</b>	<b>Unit 2: Changes</b>
<b>Big Idea/Rationale</b>	<ul style="list-style-type: none"> <li>• In this unit, students expand their understanding of solids, liquids, and gases by exploring changes in state. They investigate freezing, melting, evaporation, and condensation of water. In a sequence of lessons, students produce a mixture of two solids and a mixture of solids with liquids and observe the results. They work through several methods to separate mixtures: sieving, filtration, evaporation, and chromatography. The students set up races that involve sugar dissolving in water and observe the effects of particle size and water temperature on the rate at which the sugar dissolves. They also observe crystals formed as a result of evaporation. Students observe some changes that occur immediately and some that occur over time, and they begin to recognize the characteristics of chemical reactions. They observe and collect the gas formed by mixing an effervescent tablet in water. Students have several opportunities to practice their new skills in lessons in which they devise ways of separating a mystery mixture and plan and carry out investigations that involve other changes</li> </ul>
<b>Enduring Understanding (Mastery Objective)</b>	<ul style="list-style-type: none"> <li>• Changes occur over time in the world around us.</li> <li>• Some changes happen quickly, and others take place over a period of time.</li> <li>• Substances can be classified as solids, liquids, or gases.</li> <li>• Solids liquids and gases can be described by their properties.</li> <li>• Water can freeze into a solid, then melt into a liquid again.</li> <li>• Temperature affects whether a substance is a solid, liquid, or gas.</li> <li>• Dark colors absorb more heat than light colors..</li> <li>• Mixtures can be made by combining solids, liquids, or gases, or a combination of these.</li> <li>• A substance can change in appearance, yet remain the same substance.</li> <li>• Some mixtures can be separated using various methods.</li> <li>• When some solids are added to water they dissolve and seem to disappear.</li> <li>• Some dissolved solids can be recovered as crystals through evaporation.</li> <li>• When a solid is dissolving in a liquid, the size of the solid particles, the temperature of the liquid, and stirring can affect the speed in which the solid dissolves.</li> <li>• When two or more substances are mixed, a chemical reaction may occur.</li> <li>• Indicators of chemical reactions include change in color, change in temperature, and production of a new substance.</li> </ul>
<b>Essential Questions (Instructional Objective)</b>	<ul style="list-style-type: none"> <li>• How and why do changes occur in the world around us?</li> <li>• What are the properties of solids, liquids, and gases?</li> <li>• Can one substance take the form of a solid, liquid, and gas?</li> </ul>

	<ul style="list-style-type: none"> <li>• How does temperature affect whether a substance is a solid, liquid, or gas?</li> <li>• How does the color of an object affect heat absorption?</li> <li>• What happens when a solid and liquid are mixed?</li> <li>• How can mixtures be separated?</li> <li>• What factors affect the speed at which a solid dissolves in a liquid?</li> <li>• How can I tell that a chemical reaction has occurred?</li> <li>• Can a solid be recovered from a solid and liquid mixture?</li> </ul>
<p><b>Content (Subject Matter)</b></p>	<p>Lesson 1: Thinking about How Things Change</p> <ul style="list-style-type: none"> <li>• Students will be able to describe how things around them change;</li> </ul> <p>Lesson 2: Freezing and Melting</p> <ul style="list-style-type: none"> <li>• Students will be able to understand the relationship between freezing and melting.</li> </ul> <p>Lesson 3: Where Did the Water Go?</p> <ul style="list-style-type: none"> <li>• Students will be able to investigate the process of evaporation.</li> </ul> <p>Lesson 4: Mixing and Separating Solids</p> <ul style="list-style-type: none"> <li>• Students will be able to perform the process of mixing and separating solids and discuss whether the salt and gravel have change as a result of being mixed and separated.</li> </ul> <p>Lesson 5: Mixing Solids and Liquids</p> <ul style="list-style-type: none"> <li>• Students will be able to perform an experiment demonstrating that mixtures can be made by mixing solids and liquids.</li> </ul> <p>Lesson 6: Separating Solid and Liquid Mixtures</p> <ul style="list-style-type: none"> <li>• Students will be able to perform an experiment in which mixtures can be separated using filters and the process of evaporation.</li> </ul> <p>Lesson 7: A Dissolving Race: Two Forms of Sugar</p> <ul style="list-style-type: none"> <li>• Students will be able to discover that a smaller solid dissolves more quickly than a larger one.</li> </ul> <p>Lesson 8: A Dissolving Race: Warm and Cold Water</p> <ul style="list-style-type: none"> <li>• Students will be able to discover that discover that solids dissolve more quickly at warmer temperatures.</li> </ul> <p>Lesson 9: Changing Salt Water to Crystals</p> <ul style="list-style-type: none"> <li>• Students will be able to discover that solids can be recovered from a solid and liquid mixture through evaporation.</li> </ul> <p>Lesson 10: Separating Mixtures of Color</p>

	<ul style="list-style-type: none"> <li>• Students will be able to perform an experiment to separate mixtures of color.</li> </ul> <p>Lesson 11: Separating a Mystery Mixture</p> <ul style="list-style-type: none"> <li>• Students will be able to demonstrate proficiency in using appropriate techniques for separating mixtures into their components.</li> </ul> <p>Lesson 12: Bubbles and Fizz: Observing a Chemical Reaction</p> <ul style="list-style-type: none"> <li>• Students will be able to perform an experiment involving a mixture and a chemical reaction and compare and contrast both.</li> </ul> <p>Lesson 13: Gas in a Bag</p> <ul style="list-style-type: none"> <li>• Students will be able to perform an experiment in which a chemical reaction occurs and a gas is produced</li> <li>• Supplemental Lesson: Heat with Light and Dark Colors</li> <li>• Students will investigate the effect of color on the absorption of heat energy</li> </ul>
<p><b>Skills/ Benchmarks (CCSS Standards)</b></p>	<ul style="list-style-type: none"> <li>• 5.1.P.A.1: Display curiosity about science objects, materials, activities, and longer-term investigations in progress.</li> <li>• 5.1.P.B.1: Observe, question, predict, and investigate materials, objects, and phenomena (e.g., using simple tools to crack a nut and look inside) during indoor and outdoor classroom activities and during any longer-term investigations.</li> <li>• 5.1.P.B.2: Use basic science terms and topic-related science vocabulary.</li> <li>• 5.1.P.B.3: Identify and use basic tools and technology to extend exploration in conjunction with science investigations.</li> <li>• 5.1.4.B.1: Design and follow simple plans using systematic observations to explore questions and predictions.</li> <li>• 5.1.4.B.2: Measure, gather, evaluate, and share evidence using tools and technologies.</li> <li>• 5.1.4.B.3: Formulate explanations from evidence.</li> <li>• 5.1.4.B.4: Communicate and justify explanations with reasonable and logical arguments.</li> <li>• 5.1.P.C.1: Communicate with other children and adults to share observations, pursue questions, and make predictions and/or conclusions.</li> <li>• 5.1.4.C.1: Monitor and reflect on one’s own knowledge regarding how ideas change over time.</li> <li>• 5.1.4.C.2: Revise predictions or explanations on the basis of learning new information.</li> <li>• 5.1.4.C.3 Present evidence to interpret and/or predict cause-and-effect outcomes of investigations.</li> <li>• 5.1.P.D.1: Represent observations and work through drawing, recording</li> </ul>

	<p>data, and “writing.”</p> <ul style="list-style-type: none"> <li>• 5.1.4.D.1: Actively participate in discussions about student data questions, and understandings.</li> <li>• 5.1.4.D.2: Work collaboratively to pose, refine, and evaluate questions, investigations, models, and theories.</li> <li>• 5.1.4.D.3: Demonstrate how to safely use tools, instruments, and supplies.</li> <li>• 5.2.P.A.1: Observe, manipulate, sort, and describe objects and materials (e.g., water sand, clay, paint, glue, various types of blocks, collections of objects, simple household items that can be taken apart, or objects made of wood, metal, or cloth) in the classroom and outdoor environment based on size, shape, color texture, and weight.</li> <li>• 5.2.2.A.1: Sort and describe objects based on the materials of which they are made and their physical properties.</li> <li>• 5.2.2.A. 2: Identify common objects as solids, liquids, or gases.</li> <li>• 5.2.4.A.2: Plan and carry out an investigation to distinguish among solids, liquids, and gasses.</li> <li>• 5.2.P.B.1: Explore changes in liquids and solids when substances are combined, heated, or cooled (e.g., mix sand or clay with various amounts of water; mix different colors of tempera paints; freeze and melt water and other liquids).</li> <li>• 5.2.2.C.1: Compare, citing evidence, the heating of different colored objects placed in full sunlight.</li> <li>• 5.4.2.G.1: Observe and discuss evaporation and condensation.</li> </ul>
<p>Materials and Resources</p>	<ul style="list-style-type: none"> <li>• STC Changes Kit</li> <li>• STC Changes Teacher’s Guide</li> <li>• Websites: <ul style="list-style-type: none"> <li>○ <a href="http://www.exploratorium.edu/snacks/giant_sieve_sorter/index.html">http://www.exploratorium.edu/snacks/giant_sieve_sorter/index.html</a> (Exploratorium Science Snacks—Giant Sieve Sorter)</li> <li>○ <a href="http://www.fossweb.com/modulesK-2/SolidsandLiquids/activities/changeit.html">http://www.fossweb.com/modulesK-2/SolidsandLiquids/activities/changeit.html</a> (Foss Solids and Liquids—Change It!)</li> <li>○ <a href="http://www.brainpopjr.com/science/matter/">http://www.brainpopjr.com/science/matter/</a></li> <li>○ <a href="http://www.brainpopjr.com/science/scienceskills/temperature/">http://www.brainpopjr.com/science/scienceskills/temperature/</a></li> </ul> </li> <li>• Recommended Book List: <ul style="list-style-type: none"> <li>○ Blume, Judy. <i>Freckle Juice</i>. New York: Dell, 1986.</li> <li>○ Cole, Joanna. <i>The Magic School Bus at the Waterworks</i>. New York: Scholastic, 1986.</li> <li>○ Gibbons, Gail. <i>From Seed to Plant</i>. New York: Holiday House, 1994.</li> <li>○ Keats, Ezra Jack. <i>The Snowy Day</i>. New York: Harper and Row, 1972.</li> <li>○ Maestro, Betsy. <i>Why Do Leaves Change Color?</i> New York: Harper and Row, 1994.</li> </ul> </li> </ul>

	<ul style="list-style-type: none"><li>○ Morgan, Allen. <i>Sadie and the Snowman</i>. New York: Scholastic, 1985.</li><li>○ Sharmat, Marjorie Weinman. <i>Nate the Great</i>. New York: Random House, 1977.</li></ul>
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