

Big Idea:  
 How can objects change? Are all changes reversible?  
 Guiding Questions:  
 In what ways can an object made of a small set of pieces be disassembled and made into a new object?  
 Can all changes caused by heating or cooling be reversed?

21st Century Themes/Skills:

DCI (Disciplinary Core Ideas)	Science and Engineering Practices	Cross Cutting Concepts	Student Learning Objectives	Differentiated Activities (Consider the 5 Es)	Resources/Technology	Formative Assessments	Benchmark Assessment
<p>PS1.A: Structure and Properties of Matter</p> <ul style="list-style-type: none"> <li>Different properties are suited to different purposes. (2-PS1-3) (2-PS1-3)</li> <li>A great variety of objects can be built up from a small set of pieces. (2-PS1-3)</li> </ul> <p>PS1.B: Chemical Reactions</p> <ul style="list-style-type: none"> <li>Heating or cooling a substance may cause changes that can be observed. Sometimes these changes are reversible, and sometimes they are not. (2-PS1-4)</li> </ul>	<p>Analyzing and Interpreting Data</p> <ul style="list-style-type: none"> <li>Analyze and interpret data to make sense of phenomena using logical reasoning. (3-LS3-1)</li> </ul> <p>Make observations ( firsthand or from media) to construct an evidence-based account for natural phenomena. (2-PS1-3)</p> <p>Engaging in Argument from Evidence • Construct an argument with evidence to support a claim. (2-PS1-4)</p>	<p>Cause and Effect</p> <ul style="list-style-type: none"> <li>Events have causes that generate observable patterns. (2-PS1-4)</li> </ul> <p>Energy and Matter</p> <ul style="list-style-type: none"> <li>Objects may break into smaller pieces and be put together into larger pieces, or change shapes. (2-PS1-3)</li> </ul>	<p>SWBAT: Observe and describe how matter can change in size, mass, color, position, quantity, time, temperature, sound, and movement by breaking objects into smaller pieces and/or building new objects</p> <p>SWBAT: Observe and describe how temperature can change the physical properties of some materials by heating or cooling a substance</p>	<p><b>ENGAGE:</b>  <b>Activate Prior Knowledge</b>        Ask students if they have ever folded a piece of paper to make a paper airplane, glider, or a paper hat. Ask if they have ever rolled up a piece of paper (to make a type of bullhorn) and talked through it to make their voice louder. Ask if they have ever cut up paper to make confetti. Then, with a sheet of paper, demonstrate folding it to make one of the objects you just described. Ask students to describe how you have changed the shape of paper to make something. Ask: Is the paper still paper even after you made something out of it? Encourage students to tell how they know that the paper is still paper after being manipulated in different ways. Ask if they think any of the changes you made can be measured. Next, ask students to think about ways in which temperature might change a material. Encourage students to think about cooking or baking and have them share their ideas.</p> <p>Provide each student with a piece of paper. (If possible, use paper from the recycling bin to avoid unnecessary waste.) Invite them to make something out of it by cutting, folding, or rolling the paper. Ask: How has the paper changed? How is it the same? Encourage students to fold or scrunch their piece of paper into any shape they wish. Then, have volunteers describe the way they changed the original flat sheet of paper. Prompt the discussion by asking the following questions:        What did you do to change the paper?        How can you describe the way in which your paper is different from the flat piece of paper you started with?        How can you describe the way in which your paper is the same as the flat piece of paper you started with?</p> <p>Tell students that size, shape, and color are physical properties. Say: Physical properties describe how an object looks or feels. Physical properties are features or characteristics of an object, such as size, shape, color, or texture.</p> <p>Review with students what they may have already learned about the physical properties of materials and some ways physical properties can be changed.</p> <p>Tell them they will view a video about how the physical properties of solid objects can be changed.</p> <p>Show students the video Physical Changes (show through mixtures; stop video before discussion of solutions at 2:44).</p> <p>After the video, ask students to describe how the properties of the materials were changed.</p>	<p><a href="#">Unit 3 Resources</a></p>	<p>Have students complete the Constructed Response (CR) items titled Primary Assessment: Changes in Matter.</p>	

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				<p><b>EXPLORE 1:</b>            Present students with the Lesson Questions and have them complete the first section of the Scientific Explanation: Changes in Matter using these questions. Students may type their responses directly into the digital resource, or they may write or draw their responses on a printed copy of the resource. The digital resource includes a link to a PDF version of the Student Sheet.            Guide students to think about what they already know about each question and record their prior knowledge in the Prior Knowledge section. Encourage students to think about and record how they know what they do (evidence and reasoning).            Introduce the Evidence section, explaining to students that they will fill this in as they go through the rest of the lesson.            Have students begin the Evidence section with information gathered during Engage.</p> <p><b>EXPLORE 2:</b>            Remind students of the physical changes they observed in the Engage. Have them read (or read aloud as a class) the Core Interactive Text section How Can I Tell If Matter Has Changed? What Are Some of the Ways That You Can Change Materials?            Have students read the passage Melting Ice. Tell them to look for what heat does to ice and what ice does to liquid.            Have students complete the Hands-On Activity: Forms of Water. Write the following vocabulary words on the board or chart paper: liquid, solid, temperature.            Review the following definitions and encourage students to view the animations in the Interactive Glossary to solidify their understanding:            A solid is a material that keeps a fixed shape.            A liquid is a material that flows or changes shape based on the container that it is in.            Temperature is how hot or cold an object is.</p> <p><b>EXPLORE 3:</b>            Review the ways in which changes in temperature change water and other substances.            Show students the video segment Discovery Science Alliance: Investigating Heat Changes.            Ask students the following questions to confirm their understanding:            Why is the water in the fish bowl decreasing over time? (evaporation due to heat from the Sun)            What investigation helps the children learn about this question? (placing water and crayons under a heat lamp)            What does the heat lamp represent? (the Sun)            What evidence that heat changes matter did the children in the video observe? (lower water levels, melted crayons)            What conclusion did the people in the video draw about what caused the changes to the water and to the crayons? (They concluded that heat changed the state of the water to a gas and the solid crayons to a liquid.)            Introduce the Hands-On Lab: Heating and Cooling by discussing physical changes. Ask: What are some examples of physical changes? Create an anchor chart with the student examples of physical change.            Ask students to complete a think-pair-share. Read the following question aloud: Can these changes be reversed?            Discuss chemical changes by defining a chemical change as a change in which the materials change into other substances. The individual substances cannot be easily changed back to what they were before. Give examples such as burning a log, noting that ashes cannot be changed back into the log. We know a chemical change occurs when a different substance forms. Let students know that matter is not actually created; it just changes forms.            We can also use clues to show that a chemical change has happened. Write the following on an anchor chart and give examples of each:            change in color odor presence of light heat            Refer to the Procedure on the Teacher Guide for the Hands-On Lab for additional instructions. Use the Analysis and Conclusions questions as discussion questions after groups have completed the lab. Have groups discuss the questions, and then share their ideas in a class discussion. Display the following statement and read it aloud: Some changes caused by heating or cooling can be reversed and some cannot. Have groups discuss the Hands-On Activity and the Hands-On Lab, and list evidence from those activities that supports the statement.            Have a spokesperson from each group read aloud the evidence the group compiled. Make a master list of evidence on the board, and have volunteers summarize the strongest evidence using the list.</p>	<p><a href="#">Video Segment: Physical Changes</a></p>		



