

### Properties Before and After Heat

<b>Sample type:</b>	Short Answer/ CR
<b>Subject:</b>	Physical Science
<b>Learner:</b>	Middle School
<b>Standards:</b>	NGSS: MS-PS1-2 Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred. SEP: Analyzing and Interpreting Data, Connections to Nature of Science: Scientific Knowledge is Based on Empirical Evidence DCI: PS1.A: Structure and Properties of Matter, PS1.B Chemical Reactions CCC: Patterns
<b>DOK:</b>	3
<b>Evidence of Achievement</b>	MS-PS1-2: Students use their knowledge of physical and chemical changes to determine if a chemical reaction has occurred and support their answer with data.

#### Body of sample

A teacher performs a demonstration for the class to show a material that can be changed by heat. The students in the class are invited to observe the material before, during, and after it is heated. They make a chart and record their observations:

	<b>Properties Observed Before Heating</b>	<b>Properties Observed During Heating</b>	<b>Properties Observed After Heating</b>
<b>Material</b>	solid white crystals mass 5 grams	liquid bubbling gives off vapor has strong odor	solid black crystals no longer visible mass 5 grams

- a. What type of reaction occurred in the material?
- b. Support your answer with data from the chart.

CR Rubric		
Score	Description	Sample Response
2	<p>The student demonstrates understanding of the Performance Expectation, specifically the ability to:</p> <ul style="list-style-type: none"> <li>identify the type of reaction;</li> </ul> <p><b>AND</b></p> <ul style="list-style-type: none"> <li>identify signs of a chemical change.</li> </ul>	<p>Possible answers include:</p> <ol style="list-style-type: none"> <li>A chemical change occurred.</li> <li>The material bubbled, gas was given off, and the color changed.</li> </ol>
1	<p>The student demonstrates partial understanding of the Performance Expectation. Student is able to:</p> <ul style="list-style-type: none"> <li>complete one of the tasks listed in the two-point score description; <b>OR</b></li> <li>do both of the tasks listed in the two-point score description, but they contain errors.</li> </ul>	<p>Possible answers include:</p> <ol style="list-style-type: none"> <li>The student stated that a physical change occurred.</li> <li>The student stated that the mass did not change. Although this supports the claim that a physical change occurred, because there were three signs of chemical change, this answer should be considered incorrect.</li> </ol> <p><b>OR</b></p> <ol style="list-style-type: none"> <li>The student stated that a chemical change occurred.</li> <li>The student did not provide evidence for the conclusion.</li> </ol>
0	<p>The student demonstrates little or no understanding of the Performance Expectation.</p>	<p>Possible answers include:</p> <ol style="list-style-type: none"> <li>The student stated a physical change occurred.</li> <li>The student stated that gas was given off or the color changed or provided no evidence at all.</li> </ol>

**Three-Dimensional Coach** Properties are characteristics of materials that help identify them. Properties can be described by using empirical evidence. Empirical evidence includes characteristics that involve measurements and numbers. Check to see if all observations in the chart are empirical evidence.

Sources: NA