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<b>Target Level:</b> EE.MS-PS1-2 Interpret and analyze data on the properties of substances before and after a chemical change	<b>Precursor Level:</b> Gather data on the properties of substances before and after a chemical change	<b>Initial Level:</b> Observe and identify examples of change (color, temperature, odor)	<b>Accessibility Considerations for Practice</b> <ul style="list-style-type: none"> <li>Data may be presented in graphical and/or tactile representations or by using objects for key visuals that represent concepts</li> <li>Provide brief verbal description of visual phenomena, results, or patterns in the data</li> <li>Consider the sensory capabilities of the student when selecting the best chemical change to use for the activity</li> </ul>
<b>Activity Title:</b> Chemical changes	<b>Estimated Classroom Time Needed:</b> Varies depending on which chemical reaction activity is selected.	<b>Essential Questions for Concept</b> <ul style="list-style-type: none"> <li>Does the student recognize that a chemical process results in a new substance?</li> <li>Can the student recognize which properties of a substance change due to the chemical process?</li> </ul>	
<b>Suggested Materials</b> <b>Option 1:</b> Steel wool, water, dish <b>Option 2:</b> 3-5 pennies, vinegar, paper towel, saucer <b>Option 3:</b> Effervescent tablet, 100 mL water, zip-top plastic bag <b>Option 4:</b> 1L plastic bottle, a large balloon (18 in), a teaspoon of baking soda, 3 Tablespoons of vinegar, cellophane tape		<b>Engage Students in the Activity</b> Tell students they are performing an experiment. Ask them to predict if anything will happen when the two substances (e.g., Option 4 - baking soda and vinegar) are combined. Tell the students they will be identifying changes in properties.	
<b>Activity Description</b> Teachers may choose an appropriate activity from the options below or may use another example of chemical change according to the needs of the student. <i>See Activity Option 3 for use with students with visually impairments.</i>  <b>Activity Option 1:</b> Students will observe changes in a piece of steel wool once it gets wet. A piece of steel wool should be handled and observed by each student. Direct students to describe specific traits of the steel wool. Make a list of the traits in order to use in a compare/contrast activity later. The teacher or a student will place a new piece of steel wool in water. Without squeezing the water out, the teacher/student will place the steel wool in a dry dish. Over the next several days or weeks, make observations about the changes that occur. Draw students' attention to specific words and observations to help them compare and contrast the changes. Take pictures of the changes from day to day. Once there is noticeable rust, help students to observe the changes. Finish by comparing and contrasting the original piece to the rusty piece. Discuss that the rust is a different substance than the steel wool. We know that rust is a different substance than steel wool because it has different properties.  <b>Activity Option 2:</b> Students will observe changes in pennies when exposed to acetic acid (i.e., vinegar). Fold the paper towel into a square. Place the folded towel in the saucer. Pour vinegar into the saucer to wet the towel. Place the pennies on top of the wet paper towel. Wait 24 hours. The tops of the pennies will turn green. This reaction occurs because the acetate part of the acid from the vinegar combines with the copper on the pennies. The green coating is composed of copper acetate. A copper-colored penny should be handled and observed by each student. Direct students to describe specific traits of the penny. Make a list of the traits in order to use in a compare/contrast activity later. Complete activity as described above. Over the next several days or weeks, make observations about the changes that occur. Draw students' attention to specific words and observations to help them compare and contrast the changes. Take pictures of the changes from day to day. Once there is a noticeable reaction, help students to observe the changes. Finish by comparing and contrasting a copper-colored penny to a green-colored penny. Discuss that the green on the penny is a different substance than the copper penny, and that we know this because it has different properties.			

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**Activity Option 3:** Students will observe phase and chemical changes when an Effervescent tablet is placed into water. Place 100 mL of water into a zip-top plastic bag. While the student is holding the bag, the teacher or the student will place a single effervescent tablet into the water. Carbon dioxide gas will form during the reaction between citric acid, sodium bicarbonate, and the water. The effervescent tablet and bag of water should be handled and observed by each student. Direct students to describe specific traits of each. Make a list of the traits in order to use in a compare/contrast activity later. Complete activity as described above. Make observations about the changes that occur. Draw students' attention to specific words and observations to help them compare and contrast the changes, including what they hear and feel as the reaction takes place. Help students to observe the changes the reaction occurs. Finish by comparing and contrasting the original reactants (i.e., the tablet and water) to the product. Discuss that the product is a different substance than the reactants, and that we know this because it has different properties (e.g., has bubbles). Note how the reaction consists of all three phase of matter, and how matter can be transformed.

**Activity Option 4:** Students will observe a chemical change when vinegar and baking soda mix together. Pour the baking soda into the bottle, and the vinegar into the balloon. Attach the open end of the balloon to the mouth of the bottle. Use the tape to secure the balloon to the bottle. Raise the balloon to allow the vinegar to pour into the bottle. As the chemical reaction takes place, the balloon will inflate because it becomes filled with the carbon dioxide gas produced. The baking soda and vinegar should be handled and observed by each student. Direct students to describe specific traits of each. Make a list of the traits in order to use in a compare/contrast activity later. Complete activity as described above. Make observations about the changes that occur. Draw students' attention to specific words and observations to help them compare and contrast the changes, including what happens to the balloon as the reaction takes place. Help students to observe the changes the reaction occurs. Finish by comparing and contrasting the original reactants (i.e. the baking soda and vinegar) to the product. Discuss that the product is a different substance than the reactants, and that we know this because it has different properties (e.g., phase change to gas). Note how the reaction consists of all three phase of matter, and how matter can be transformed.

**Ideas for differentiating the activity**

<i>At the target level:</i>	<i>At the precursor level:</i>	<i>At the initial level:</i>
Determine the property changes that occur during chemical reactions by analyzing a table of the properties of substances before and after a chemical reaction. Interpret the meaning of property changes that occur during a chemical reactions. (e.g., Option 1 - steel wool and water): Day 1: steel wool is dry and silver Day 2: steel wool is wet and silver Day 3: steel wool is wet and has brown spots.	Make a table to display data on the properties of substances (e.g., Option 2 - copper penny) before and after a chemical reaction. -Combine a picture format with text to assist with understanding	Make simple observations (phase of matter, texture, smell, color, hardness, etc.) of properties of substances, focusing attention on changes that occur with chemical reactions. (e.g., Option 3 - Effervescent tablet and water) -Allow the students to touch, smell, etc.

**Checks for Understanding**

<i>At the target level, students will:</i>	<i>At the precursor level, students will:</i>	<i>At the initial level, students will:</i>
Complete the table with text information or a timeline of pictures from the experiment. Compare the final properties to the initial properties. Understand that during a chemical change a different substance is formed. The new substance has different properties than the original substances.	Students put descriptions of properties in an organized data table. Properties include: state of matter, color, texture, and odor. Students sort pictures of the items into a before and after chart.	Indicate which picture shows the substances after the reaction (e.g., Option 2 - Which picture shows the penny after it reacts with vinegar?). Provide symbol support for the student to show understanding

