

# WHAT'S THE MATTER?



## **BENCHMARKS AND TASKS**

**SC.A.1.1.1** The student knows that objects can be described, classified, and compared by their composition (e.g., wood or metal) and their physical properties (e.g. color, size, shape).

**SC.A.1.1.3** The student verifies that things can be done to materials to change some of their physical properties (e.g., cutting, heating, freezing), but not all materials respond the same way (e.g., heating causes water to boil and sugar to melt).

- The student classifies matter as a solid, liquid, or gas, based on its properties and/or behaviors.
- The student demonstrates that some common materials, such as water and sugar, can be changed from one state to another by heating or cooling.
- The student recognizes that matter is made of the same original material even after a physical change such as cutting, melting, freezing, dissolving, or evaporating.

## **KEY QUESTION**

What happens to matter when there is a physical change?

## **BACKGROUND INFORMATION**

Matter can often be manipulated to change its shape and size without changing its physical properties (e.g., crumpling a piece of paper).

## **MATERIALS**

### **Teacher**

pencil  
pencil sharpener  
scissors

### **Per student**

cookie  
paper towel  
clay  
1 pkg. of presweetened Kool-Aid  
pitcher of water to dissolve Kool-Aid  
2 small paper cups  
ice cube tray

## **TEACHING TIPS**

1. Before you begin this activity, make arrangements with the cafeteria manager to use a freezer.
2. The teacher or another adult may choose to pour the Kool-Aid into the cups and into the ice cube tray rather than having the students do it.

## **ENGAGE**

1. Show the students an unsharpened pencil.  
Ask: *What can I do to change this pencil?* (sharpen it, use the eraser)  
*Will it still be a pencil?*  
Sharpen the pencil and tear off a bit of the eraser.  
*How have I changed the pencil?*  
*Have I changed its size or shape?*  
*Is it still a pencil?*
2. If possible, bring in a doll with hair and show the doll to the students.  
Cut off some of the doll's hair.  
Ask:  
*How have I changed the hair?*  
*Have I changed the size or shape of the hair?*  
*Is it still hair?*
3. Tell students they will be experimenting with objects to see what happens when some changes are made to those objects.

## **EXPLORE Part 1**

1. Give each student a chocolate chip cookie on a paper towel. Ask the students to describe the cookie. Tell them to take a small bite from their cookie.
2. Tell the students to break their cookie into small pieces and to think about how the cookie has changed and how it has stayed the same. Tell them to eat a small piece of their broken cookie.

## **EXPLAIN**

Discuss the changes to the cookie.

Ask:

*How did the taste of the bite of the whole cookie and the taste of the small piece of the broken cookie compare?*

*Did breaking up the cookie change its taste?*

*Are the small pieces of broken cookie still the same material as the whole cookie?*

*What state of matter is the cookie? solid*

*Why is it a solid?*

Allow students to eat the rest of their cookie.

## **EXPLORE Part 2**

1. Give each student a ball of clay.
2. Have the students create something from their ball of clay.

## **EXPLAIN**

Allow the students time to share their clay creations.

Discuss the changes to the clay.

Ask:

*How did you change the clay?*

*Is your creation still clay?*

*Will the clay change into a different material when it is molded into another figure?*

*What state of matter is the clay? solid*

*Why is it a solid?*

Students should recognize that matter is made of the original material even after a **physical** change has taken place.

### **EXPLORE Part 3**

1. Give each group the Kool-Aid and pitcher of water. Discuss the two states of matter.
2. Have students mix the Kool-Aid and water and pour a small cup for each student.  
Tell the students to drink their Kool-Aid and to think about the taste as they're drinking.
3. Have the students or an adult pour the remaining Kool-Aid into the ice cube trays and place the trays in the cafeteria freezer.
4. When frozen, give each student a Kool-Aid ice cube in a paper cup. Tell the students to taste (a small bite) the ice cube.
5. Tell the students to place and to leave the ice cube in the paper cup and allow the cube to melt.
6. After the cube has melted, tell the students to drink the Kool-Aid.

### **EXPLAIN**

1. Discuss:  
*What state of matter was the Kool-Aid in the package?*  
*What state of matter was the Kool-Aid after mixing it with the water?*  
*Why is it a liquid?*  
*What state of matter was the Kool-Aid ice cube?*  
*Why is it a solid?*  
*Other than temperature, how did the taste of Kool-Aid and the Kool-Aid ice cube compare?*  
*Did freezing the Kool-Aid and then melting the Kool-Aid ice cube have any effect on the taste?*
2. Help students realize that matter is made of the original material even after a **physical** change has taken place.

### **EXTEND/APPLY**

Discuss physical changes we make to vegetables (e.g., shredding carrots, tearing lettuce, cutting tomatoes) when we make a tossed salad.

If you have a Play-doh machine, allow students the opportunity to put a ball of the dough into the machine and observe what size/shape comes out.

Help students realize that matter is made of the original material even after a **physical** change has taken place.

Changes in size and shape can also be explored and discussed by bending, tearing, and breaking other materials to determine differences and similarities between them and the original material.

### **ASSESSMENT**

Provide students with a new material and give instructions on what to do with the material to make a physical change. Ask questions that are similar to the ones in the **Explain** sections. Use the following rubric to assess understanding as demonstrated in the student responses:

*Exceeds:* Correctly identifies the physical change, and states that the changed object is made of the same material as the original object.

*Meets:* Correctly identifies the physical change, but **does not** state that the changed object is made of the same material as the original object.

*Basic:* **Incorrectly** identifies the physical change, and **does not** state that the changed object is made of the same material as the original object.