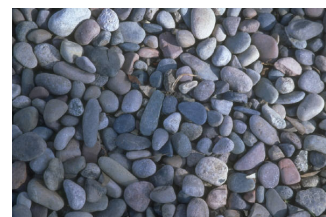


# IS IT A SOLID OR A LIQUID?

## **BENCHMARK 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, and shape).

- The student manipulates and observes three different states of matter: solid, liquid, and gas.
- The student compares and contrasts solids, liquids, and gases.



## **KEY QUESTION**

How is a solid different from a liquid?

## **BACKGROUND INFORMATION**

Matter exists in three forms on earth: solid, liquid, and gas. The particular state of a type of matter depends both on the matter itself and the temperature. A change in temperature can result in a change in the state of matter.

A solid is something that maintains its shape. The atoms of a solid vibrate in a fixed place. A liquid maintains its volume (the amount of space it takes up), but takes the shape of its container. The atoms of a liquid vibrate and move around slowly. A gas has no fixed volume, but takes up the volume of its container. The atoms of a gas move around quickly and are spaced far apart.

A fourth state of matter is called plasma. Like a gas, plasma does not have a definite shape or volume. Plasmas only exist at very high temperatures. Stars, including the sun, are made of matter in a plasma state.

## **MATERIALS**

### **Teacher**

variety of liquids, such as soda, water, vinegar, liquid detergent, Kool-aid

several empty containers

food coloring

liter box

pencil

*Solid or Not?* (Benchmark Education Co.)

### **Per group**

3 clear, plastic containers of various shapes, such as a plastic cup, jar, liter box, graduated cylinder, or beaker (These should be the same for all groups.)

1 measuring cup containing a small amount of colored water

crayons

pencil

paper towels

*Solid and Liquid Shapes* recording sheet

## DAY ONE

### ENGAGE

1. Display several liquids (such as soda, water, vinegar, milk) in different sized containers. Pour liquid #1 into a different container. Ask a student to pass his/her finger through the liquid.

Continue doing the same with each of the liquids: pouring into different containers and having a student pass his/her finger through the liquids.

Ask: *What do we know about liquids now?* (They can be poured and solids pass through liquids easily.)

2. Tell the students that they will be exploring these and other properties of liquids. Introduce the word “liquid” by telling them that scientists have a word for matter that has the above properties. This word is liquid.

### EXPLORE

1. Pour some colored water from a measuring cup into an empty container, such as a liter box.

Ask:

*What do you see?*

*What is the shape of the water that is in the container?*

2. Distribute materials to each group.
3. Each group should have one student draw the **shape of each container** at the top of the three columns on the recording sheet. Tell groups to pour their water into the liter box or similar container. Then the student will draw the **shape of the water** as it appears in that container under the picture of the same container on the worksheet.
4. Students should pour the water back into the measuring cup. (This will allow students to see that they are pouring the same amount of water each time.) They should then pour the water into the second container, such as the graduated cylinder. On the worksheet, one student should draw a picture of the water as it appears in the graduated cylinder.
5. Students should repeat the activity, pouring water back into the measuring cup and then into the beaker or jar. The group member should illustrate the results on the worksheet.

### EXPLAIN

Ask different students to come to the board and draw the shape of the water in each of the three containers. Discuss their observations:

*What can you tell us about the pictures that you drew?*

*Are the pictures the same or are they different?*

*Did the shape of the water stay the same when you poured it?*

*Did the shape of the water change when you poured it?*

*How did the shape of the water change?*

*How would you describe the shape of the water?* (Students should notice that the water is always the same shape as the container.)

*What does this tell us about the shape of liquids?* (Liquids take the shape of their containers.)

## DAY TWO

### EXPLORE

1. Hold up a pencil. Place the pencil in an empty liter box.

Ask:

*What do you see?*

*What is the shape of the pencil now that it is in the container?*

2. Give students time to place the pencil in each of their three containers. Remind them to have a group member draw a picture of the pencil in each container on the recording sheet, just like they did with the water.

### **EXPLAIN**

1. Ask different students to come to the board and draw the shape of the pencil as they observed it in each of the three containers.
2. Discuss their observations:  
*What can you tell us about the pictures you drew?*  
*Are the pictures the same or are they different?*  
*Did the shape of the pencil stay the same when you placed it in different containers?*  
*Did the shape of the pencil change when you placed it in different containers?*  
*What does this tell us about the shape of solids? (Solids do not take the shape of their containers.)*  
Introduce the word “solid” by telling them that scientists have a word for matter that has the above properties. This word is solid.  
*How is the shape of solids different from the shape of liquids?*

### **EXTEND/APPLY**

1. Just before going to lunch, ask the students to observe their food at lunch and think about whether it is a solid or a liquid. Tell them to ask themselves, *Does it take the shape of its container?*
2. Make a chart of the solids and the liquids served at lunch one day. (This could also be done as a take-home assignment.)
3. Read and discuss *Solid or Not?*

### **ASSESSMENT**

Have a display of liquids and solids. Students will classify each item as liquid or solid and tell why they are classified as a liquid or a solid.



<b>Shape of container</b>			
<b>Shape of water</b>			
<b>Shape of pencil</b>			