

Properties of Liquids

BROWARD COUNTY ELEMENTARY SCIENCE BENCHMARK PLAN

Grade 1—Quarter 1

Activity 8

SC.A.1.1.2

The student recognizes that the same material can exist in different states.

SC.A.2.1.1

The student recognizes that many things are made of smaller pieces, different amounts, and various shapes.

SC.H.1.1.1

The student knows that in order to learn, it is important to observe the same things often and compare them.

SC.H.1.1.3

The student knows that in doing science, it is often helpful to work with a team and to share findings with others.

SC.H.1.1.5

The student uses the senses, tools, and instruments to obtain information from his or her surroundings.

ACTIVITY ASSESSMENT OPPORTUNITIES

The following suggestions are intended to help identify major concepts covered in the activity that may need extra reinforcement. The goal is to provide opportunities to assess student progress without creating the need for a separate, formal assessment session (or activity) for each of the 40 hands-on activities at this grade level.

1. Remind students that all liquids have some properties in common. Ask, *What properties do chocolate milk, lemonade, and apple juice all have in common?* (All these are liquids that are wet, can be poured easily, and take the shape of their container.)
2. Use the Activity Sheet(s) to assess student understanding of the major concepts in the activity.

In addition to the above assessment suggestions, the questions in bold and tasks that students perform throughout the activity provide opportunities to identify areas that may require additional review before proceeding further with the activity.

Properties of Liquids

OBJECTIVES

Students are introduced to liquids. They examine water and then use their observations to describe the properties of liquids in general.

The students

- ▶ examine properties of water
- ▶ learn that water takes the shape of its container and pours easily
- ▶ operationally define *liquid*
- ▶ describe the properties of liquids

SCHEDULE

About 40 minutes

VOCABULARY

liquid

MATERIALS



For each student

- 1 Activity Sheet 8
- 1 crayon, red*
- 1 pair safety goggles*

For each team of four

- 1 cup, plastic, 1-oz
- 1 cup, plastic, 9-oz
- 1 petri dish top or bottom
- 1 tray, sorting
- 1 vial, plastic

For the class

- 1 chart, Describing Properties (from Activity 6)
 - 1 btl food coloring, red
 - 1 marker, felt-tip*
 - paper towels*
 - 1 pitcher*
 - 1 spoon, plastic
 - water, tap*
- Delta Science Reader, *Properties*

*provided by the teacher

PREPARATION

- 1 Make a copy of Activity Sheet 8 for each student.
- 2 Before class, fill a pitcher with tap water and add a few drops of red food coloring. Stir the water with the plastic spoon. Then fill the 1-oz plastic cups with colored water.
- 3 Have paper towels on hand during this activity so that students can wipe up any spills as they occur.
- 4 Each team of four will need the following items on a sorting tray: a 9-oz plastic cup, a petri dish top or bottom, a plastic vial, and a 1-oz plastic cup filled with colored water. Each student will need a red crayon.

BACKGROUND INFORMATION

Matter commonly exists in one of three states: solid, liquid, or gas. This activity takes a closer look at the properties of *liquids*.

In Activity 6, students learned that solids have a definite shape and always take up the same amount of space. By comparison, liquids have a definite volume (always take up the same amount of space) but no definite shape; their shape changes depending on the container that is holding them. Unlike solids, liquids flow and therefore can be poured easily from one container to another.

In this activity, students study water and observe how it behaves when it is poured from one container into other containers of different shapes. Students then decide on properties that are common to all liquids.

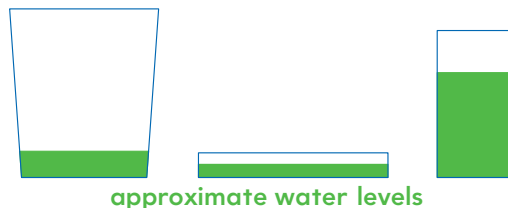
▼ Activity Sheet 8

Properties of Liquids

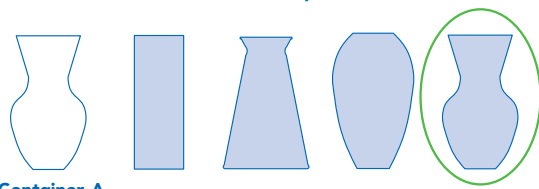
1. Use your red crayon. Color in the level and shape of the water in your small plastic cup.



2. Pour the water into each container. As you do, color in the level and shape of the water.



3. Suppose you fill Container A with water. What do you think the shape of the water will look like? Circle the correct shape.



Container A

Water takes the shape of its container.

Guiding the Activity

- 1 Tell students that they are going to examine the properties of water. Borrow a 9-oz plastic cup from one of the sorting trays and fill it with plain water. Hold it up and have students describe the water in the cup. Ask, **What properties does water have?**

Record student responses on the board. Pour the water out of the cup and return the cup to the correct tray.

- 2 Distribute a copy of **Activity Sheet 8** and a red crayon to each student. Give a sorting tray of items to each team.

Have students color in the level and shape of the water in their small plastic cups in question 1 on their activity sheets. Then tell students to pour the water from their small plastic cups into one of the other differently shaped containers on their trays.

Additional Information

Students might say that it is clear; it has no color; it has no smell; it is wet; it sloshes around when moved.

Tell students that you have added some food coloring to the water to make it easier to see.

Help students read the instructions on their activity sheets.

Tell students to be careful not to spill the colored water on their clothes and to wipe up any spills as soon as they occur.

Guiding the Activity

Each time students pour their water into a new container, they should color in the level and shape of the water in the space provided in question 2 of their activity sheets.

- 3** Allow students some time to experiment with the behavior of water as they pour it into containers of different shapes (see Figure 8-1). Ask, **What can you say about the shape of the water when you pour it from one container to another? Does water pour easily?**

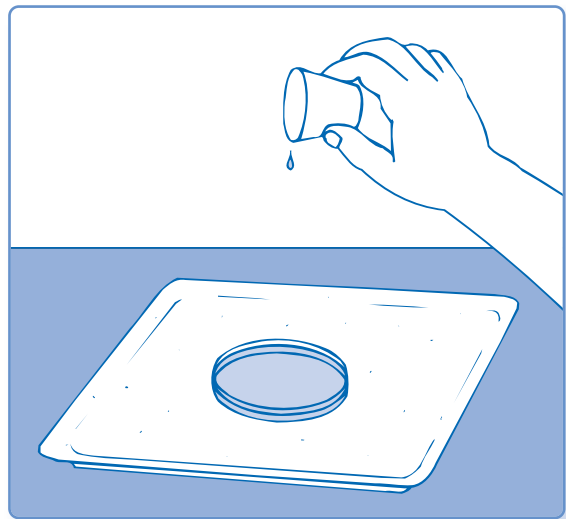
Record student responses on the board.

- 4** Tell students to pour a small amount of water onto their trays and watch what happens. Ask, **What happens to the water when you pour it on the tray?**

Summarize students' observations by asking, **Does water have a shape of its own? Is water easy or hard to move from one place to another?**

Additional Information

Students should say that the shape of the water changes when they pour it from one container to another. They should also observe that water flows easily from one container to another.



▲ **Figure 8-1.** Water takes the shape of its container.

Students should say that its shape changes; it forms a thin pool as it spreads out on the tray.

Help students conclude that water does not have a shape of its own, but takes the shape of the container it is in, or spreads out if the container is flat. The students should observe that water flows easily from one container to another. (Note that the volume of the water, or amount of space it takes up, does not change as its shape changes. Students probably will not understand this concept.)

Guiding the Activity

- 5 Encourage students to think of other things that have the same properties as water. Ask, **What else do you drink besides water? What is something white that is good to drink? What is something orange that is good to drink?**

Ask, **Do milk and orange juice have the same properties as water?**

Ask, **What are some properties of milk and orange juice that are different from water?**

- 6 Write the word *liquid* on the board and tell students that water, milk, and orange juice are all liquids (see Figure 8-2). Tell students that although liquids can be different colors and have different smells, all liquids have several properties in common.

Ask, **Can you list these properties?**

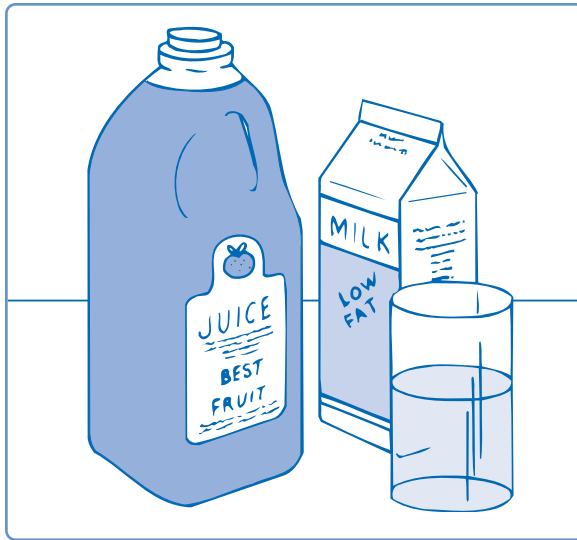
Write the properties of liquids that students come up with on the Describing Properties chart under the heading *Properties of Liquids*.

Additional Information

Students should say that milk is something white that we drink and orange juice is something orange that we drink.

Students should say that milk and orange juice have some of the same properties as water. They are both wet, they both pour easily from one container to another, and they both take the shape of their container.

Students should say that although water is clear, milk is white and orange juice is orange. Furthermore, both milk and orange juice have a distinctive smell, whereas water does not.



▲ **Figure 8-2.** Milk, orange juice, and water are all liquids.

*Students should be able to say that all **liquids** are wet, pour easily from one container to another, and take the shape of their container.*

Guiding the Activity

- 7 Remind students that all objects are made of tiny pieces. Explain that in liquids, the pieces are packed loosely together. Add this property to the *Properties of Liquids* column of the Describing Properties chart.

Hold up one of the teams' cups of water and ask, **What would happen to this water if its pieces were packed together tightly instead of loosely?**

Have students complete their activity sheets. Go over student responses once they have finished.

- 8 As appropriate, read or review pages 9–11 and 15 of the Delta Science Reader *Properties*.

Additional Information

Accept all answers that address the properties of a liquid. For example, students might say that the water would be like a solid block of ice, would not be wet, and would not pour easily from one container to another.

REINFORCEMENT

Set up a water station in the classroom with a variety of different containers and a large tub of tap water. Let students experiment with pouring water from one container to other containers with different shapes.

SCIENCE JOURNALS

Have students place their completed activity sheets in their science journals.

CLEANUP

Have the students rinse and dry the cups, petri dishes, and vials. Return these containers, along with the sorting trays, to the kit. Leave the Describing Properties chart on display.

Connections

Science Challenge

- ▶ Give each student an egg-sized lump of silicone-based play-putty. Let students experiment with molding the putty into different shapes, as described in the Science and the Arts connection for Activities 6 and 7, but also tell them to leave the putty undisturbed for a few minutes after making each shape. (The putty will slowly lose its shape and “melt” into a shapeless puddle.) Ask them whether they think the putty is a solid or a liquid and to explain why. Accept all reasonable answers. (The putty is somewhere between a solid and a liquid, with some properties of both.)
- ▶ Ask students to think of things that change from solid to liquid or from liquid to solid over time. Students may suggest snow or an ice cube melting, water freezing, plaster of Paris becoming hard as it dries, and pudding or gelatin becoming firm as it “sets.” As much as possible, give students direct experience with different examples.

Science Extension

- ▶ Show the class three clear containers of different shapes: a tall, thin bottle or vase; a wide, shallow dish; and a container of “medium” height. Ask students to predict which container will hold the most water and which the least. Record their predictions on the board. (Young children often think that taller containers hold more water than shallower containers, regardless of the containers’ other dimensions. Keep this in mind when you choose containers, and make sure the tallest one does not hold the most water.) Have three volunteers (one for each container) come to the demonstration table and fill the containers with cupfuls of water, counting as they pour. (Make sure the cups are identical and that students fill them equally.) Write the number of cupfuls each container holds on a separate index

card and prop it up against the container. Help students compare these actual results with their predictions. Ask them to try to explain any discrepancies. As needed, guide them to understand that it is the overall size of a container—the amount of space inside it—that determines how much water it can hold, not just how tall (or wide) it is.

- ▶ Provide a sand table in the classroom stocked with containers of different shapes. Let students experiment freely with trying to mold the dry sand into different shapes and pouring it from one container into another. Then ask the class whether sand is a liquid or a solid. Guide students to recognize that although a quantity of sand acts like a liquid (in that it takes the shape of its container and can be poured bit by bit), sand is actually made up of many tiny solid pieces that hold their shape. Let students use a magnifier to closely examine a spoonful of sand on black paper.

Science and the Arts

Let students use glasses and water to create an eight-note scale for playing simple tunes. In addition to being fun, the activity will give them practice in measuring a liquid. Each team will need a set of eight identical glass bottles, jars, or drinking glasses, a pitcher of water, a measuring cup or graduated cylinder, and a metal spoon. Tell students to leave one container empty and to measure and pour different amounts of water into the other seven containers—for example, 50 cm^3 , 100 cm^3 , 150 cm^3 , and so forth. (As needed, demonstrate how to use the measuring cup or cylinder and help students make the measurements.) Have students tap the eight containers in sequence with the spoon and describe what they hear. (The empty container will produce the highest note and the fullest one the lowest note.) Tell students to adjust the amount of water in each container to create a full eight-note scale. Then let each team try picking out tunes on the glasses.