

# Measuring Liquid Volume

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<b>Strand:</b>	Measurement and Geometry
<b>Topic:</b>	Measuring liquid volume, using U.S. customary and metric units
<b>Primary SOL:</b>	3.7 The student will estimate and use U.S. Customary and metric units to measure b) liquid volume in cups, pints, quarts, gallons, and liters

## Materials

- Measuring cups of various sizes
- Pint, quart, gallon, and liter containers with labels removed (ask students to bring from home, if possible)
- Graduated cylinders that show liters
- Water
- Rice (optional)
- Masking tape
- How Much Does It Hold? Recording Sheet (attached)
- Volume Exit Ticket (attached)

## Vocabulary

*actual measurement, cup, estimate, gallon, liter, pint, quart, volume*

## Student/Teacher Actions: What should students be doing? What should teachers be doing?

*Note: Before this activity, ask each student to bring from home an unbreakable, transparent container of unspecified volume (e.g., plastic jar; not a measuring cup) that will hold water.*

1. Ask students to define the term *volume*. Responses will likely refer to the level of sound on an electronic device. If so, explain that the word *volume* has two different meanings. Mathematicians use the word *volume* in a different way. Liquid volume is the amount of liquid a container holds. Ask for examples of containers seen in the classroom (e.g., water bottles, jugs, soda bottles). Explain that we can measure the liquid volume of each of these containers.
2. Explain to students that they will be estimating the *liquid volume* of a container (i.e., how much liquid it will hold). Display a one-cup measuring cup, and state the amount of liquid it will hold. Display several larger measuring cups (e.g., two-cup, four-cup), and ask students to estimate how much water each will hold. Follow the same process with a pint container, a quart container, and a gallon container. Model the different relationships among the various containers. Allow students to assist you in using water to verify the relationships. As each relationship is established (e.g., two cups = a pint), record it on the board.
3. Distribute measuring cups filled with water (or rice) and copies of the How Much Does It Hold? Recording Sheet. Have each student estimate the volume of his/her container brought from home and record it on the sheet. Explain that students will use their containers as measuring tools, but first some measuring marks must be added to them.

Give each student several short strips of masking tape. Direct each student to pour one cup of water (or rice) into their container and mark the volume by affixing a strip of tape on the outside of the container so that the top edge of the tape lines up with the top of the water or rice. Have students write “1 cup” on the strips of tape. Have those with large containers repeat this process with additional cups of water (or rice) and strips of tape until the containers can hold no more.

4. Set up stations with rice or water and various containers of different, unspecified sizes and shapes. Group students in pairs, and have partners move from station to station to record the station labels, estimate the volumes of the various containers, and measure the actual volumes, using their calibrated containers.
5. Review and summarize with the class what students did and learned in the activity.
6. Distribute the Volume Exit Ticket. Have students complete the activity for an assessment.

### Assessment

- **Questions**
  - When you and your partner used your own containers to measure the volume of each container at each measuring station, did your measurements match? Why or why not?
  - Which unit of measure would you use to measure the volume of a bucket? The volume of a baby bottle? The volume of a swimming pool? The volume of a school lunch milk carton?
- **Journal/Writing Prompts**
  - Explain how to measure the liquid volume of a container to someone who has never done it.
  - List three items that would normally be measured using cups. List three items that would normally be measured using pints, three items using quarts, three items using gallons, and three items using liters.
- **Other**
  - Use the completed recording sheet for assessment purposes.
  - Have students compare the volumes of two U.S. Customary units used to measure liquid volume by writing a true sentence relating the volumes (e.g., “Four quarts equals 1 gallon,” or “Four quarts is equivalent to 1 gallon.”)

### Extensions and Connections (for all students)

- Adapt this lesson for use with the liter (the metric unit used to measure liquid volume). Third-graders are introduced to milliliters in science lessons and are familiar with two-liter bottles. Graduated cylinders can be used as measuring tools.
- Allow time for students to compare their results to partners’ results and talk about why they are the same or different. Have each student consider the shape of their measuring container in comparison with their partners’.

**Strategies for Differentiation**

- Prepare masking tape labels for students to place on the containers that were brought from home.
- Have the students work in pairs, using one or both of their containers, to complete the activity.
- While discussing relationships among various units, provide a written representation in the classroom for students to view during the activity. Many visual manipulatives/representations can be found on the internet (i.e., [Gallon Man](#)). This would help aide students visually understanding the relationship between these units.

**Note: The following pages are intended for classroom use for students as a visual aid to learning.**

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## How Much Does It Hold? Recording Sheet

Name: \_\_\_\_\_ Date: \_\_\_\_\_

I estimate that my container holds \_\_\_\_\_ cup(s).

My container actually holds \_\_\_\_\_ cup(s).

Station Label	Estimated Volume	Actual Volume

## Volume Exit Ticket



Name \_\_\_\_\_

1. If you wanted to fill a bath tub with water, what measuring tool that we used today would be best to use? Why?

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2. Mr. Davis wants to wash his window using a bucket filled with water. About how much water will his bucket hold?

- a) 5 cups
- b) 5 gallons
- c) 1 pound
- d) 20 gallons



3. Explain why it is important to use a standard measuring tool when measuring liquid volume.

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