

Measuring Liquid Volume

Reporting Category	Measurement
Topic	Measuring volume, using U.S. Customary and metric units
Primary SOL	3.9 The student will b) estimate and use U.S. Customary and metric units to measure liquid volume in cups, pints, quarts, gallons, and liters.

Materials

- Measuring cups of various sizes
- Pint, quart, gallon, and liter containers with labels removed
- Graduated cylinders that show liters
- Water
- Rice (optional)
- Masking tape
- How Much Does It Hold? Recording Sheet (attached)

Vocabulary

cup, pint, quart, gallon, liter, volume

Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

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

1. Explain to students that they will be estimating the *liquid volume* of a jar—i.e., how much liquid it will hold. Display a 1-cup measuring cup, and state the amount of liquid it will hold. Display several larger measuring cups (e.g., 2-cup, 4-cup), and ask students to estimate how much water each will hold. Follow the same process with a pint container, quart container, and 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.
2. 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 actual 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 (rice) into his/her container and mark the level of the water 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. Have students write “1 cup” on the strips of tape. Have those with large containers repeat this process with additional cups of water (rice) and strips of tape until the containers can hold no more.
3. 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.

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 things that would normally be measured using cups. List three things that would normally be measured using pints, three things using quarts, three things using gallons, and three things 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 equal 1 gallon.” or “Four quarts is equivalent to 1 gallon.”)

Extensions and Connections (for all students)

- Adapt this lesson for use with the liter—i.e., the metric unit used to measure liquid volume. Third graders are introduced to milliliters in science lessons and are very 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 his/her measuring container in comparison with his/her partner’s.

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