

Volume: More or Less?

Strand:	Measurement and Geometry
Topic:	Comparing the volumes of two containers (as more or less), using direct comparison
Primary SOL:	K.9 The student will compare two objects or events, using direct comparisons, according to one or more of the following attributes: length (longer, shorter), height (taller, shorter), weight (heavier, lighter), temperature (hotter, colder), volume (more, less), and time (longer, shorter).
Related SOL:	None

Materials

- A variety of containers (e.g., cups of various sizes, food-storage containers, buckets, pitchers)
- A tall cup (about the size of a pint glass)
- A short cup (about the size of a child's cup)
- A shorter, wider cup (shorter than the tall cup but with a bigger capacity)
- Large tub of water (rice, sand, or beans could also be used)
- Towels

Vocabulary

compare, less, more, volume

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

1. Tell students that you want to fill a swimming pool. Hold up a drinking cup and a bucket. Have students tell you which they would choose to fill a pool and why. Guide them to the conclusion that a bucket can hold more. Explain that volume is the measure of the capacity of a container—how much the container holds.
2. Give another scenario: A student in class is really thirsty. Show a tall cup and a short cup. Again, ask students which cup they would choose and why. Ask: *How could you prove that the tall cup holds more?* (Students will most likely say to pour the water from the short cup into the tall cup.) Using the tub of water, fill the short cup and pour it into the tall cup. Ask: *Which one holds more? How do we know?* Students should notice that there is still room for more water in the tall cup, so this means the tall cup holds more.
3. Then, display the tall cup and a shorter, wider cup (that should hold just a bit more than the tall cup). Have students predict which cup will hold more and discuss why they made their choice. Because choices may be divided, tell students that we need to know for sure and ask how we can find out. Let the students decide which cup they want to fill and pour into the other. Compare the containers and discuss the results. Ask: *Which one holds more? How do we know? Demonstrate what happens when the tall cup is poured into the short, wide cup. Also check to see what happens when the short, wide cup is poured into the tall cup.*

4. Allow small groups of students to experiment with the tub of water and various containers with the teacher. Let each child choose two containers, fill one, and then pour it into the other one. Ask: *Which container holds more? Which container holds less?* Have students practice pouring water back and forth to ensure understanding. After they have explored the volume of different containers, have them clean up. While a group is working with the teacher, the remaining students could be engaged in other kinds of measurement stations. (See other measurement lessons for ideas.)
5. To end the lesson, tell students to fold a piece of paper in half. Label one side “holds more” and the other “holds less.” Have students illustrate one of the pairs they experimented with. Bring the students together and discuss their drawings.

Assessment

- **Questions**
 - What did you think about in order to compare two containers?
 - Can you name a container that holds more than one container but less than another?
 - Can you always tell by looking at two containers which one will hold more? Why or why not?
 - How can you find out about the volume of a container?
- **Journal/writing prompts**
 - Draw something that would hold more water than your water bottle. Draw something that would hold less water than your water bottle.
 - What are some things that could hold more than a milk carton you get at lunch? Draw them, and label them, if possible.
 - Zachary filled a cup and then poured it into a bowl. The water overflowed the bowl. Which container held more – the cup or the bowl? Draw the cup and bowl and write more or less under each one to show what you think.
- **Other assessments**
 - Observe students while they are at the water table. Can they use direct comparison to figure out which containers hold more and which containers hold less?
 - Provide two containers. Ask students to prove which one has the bigger volume.

Extensions and Connections (for all students)

- Instead of providing a method to compare capacities, allow students to come up with a way. Students may choose to count how many small cups of water it takes to fill each cup. They may choose to fill both cups and pour the contents into clear containers to compare visually. They may choose to pour from one container into another container to see whether there is extra room or not enough room to hold the contents of the first container.

Strategies for Differentiation

- Use a different filler (beans, cotton balls, marbles, ping pong balls, cubes) to compare the volume of two containers.
- Preteach or review the terms *more*, *less*, and *fewer* before teaching this lesson.
- Provide sentence frames for student use: The ____ holds more than the _____. The ____ holds less than the _____. The volume of the _____ is more than the volume of the _____. The volume of the ____ is less than the volume of the _____. I know this because _____.

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

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