



Units of Volume

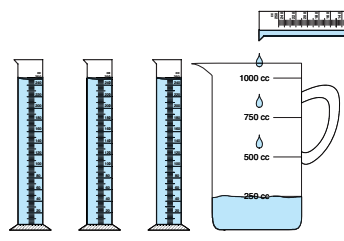
Discuss



Nicholas wants to measure the volume of a lemon. He has a 250-cc graduated cylinder, but he knows the lemon will not fit in it. Mrs. Dewey gave him a marker and a large, clear pitcher. She said, "You can find the volume with these."



- Work with a partner to find a way for Nicholas to measure the volume of the lemon. You can use words or pictures.
- Nicholas put water in the graduated cylinder until it reached the 250-cc mark. He emptied the water into the pitcher. He wrote the measurement on the pitcher. He did this four times until the pitcher was full.

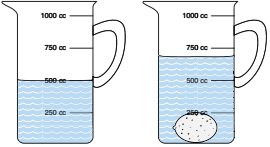


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- What is the volume of the pitcher in liters?
- What is the volume of the pitcher in cubic centimeters?

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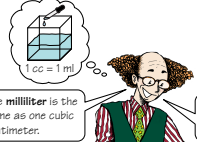
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- Nicholas emptied the pitcher to the 500-cc mark. How many cubic centimeters of water are in the pitcher? What part of a liter is that?
 - Nicholas placed the lemon in the pitcher with 500 cc of water. As he expected, the water level rose. What should Nicholas do next to find the volume of the lemon?
 - Is the volume of Nicholas's lemon more or less than 0.5 liter? Explain your thinking.
 - Is the volume of his lemon more or less than 250 cc? Explain.
- Nicholas said, "The volume of the water and the lemon together is about 700 cc." What is the volume of just the lemon? How do you know?

Is Nicholas's measurement reasonable? Why or why not?
- Maya notices that the volume measurement on her soda can is 355 ml. What do you think that means? Are there more or less than 250 cc in the can? Explain your thinking.



Professor Peabody explains:



One milliliter is the same as one cubic centimeter.

We sometimes measure liquid volume in **milliliters (ml)** or **liters (l)**.

 - How many milliliters are in a 250-cc graduated cylinder?
 - How many cubic centimeters are in Maya's can of soda in Question 4?
 - A 1-liter pitcher holds 1000 cc. How many milliliters does it hold?
 - Grace filled three 2-liter bottles with water. How many milliliters of water does she have?

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Questions 1–12 (SG pp. 566–568)

- * See discussion in the lesson.
- 1 liter
 - 1000 cc
- 500 cc; $\frac{1}{2}$ liter or 0.5 liter
 - Mark the water level, remove the lemon and use a graduated cylinder to measure the volume to that line on the container. This will be the volume of the lemon and the water. So he should subtract 500 cc from the volume of the water to then find the volume of the lemon.
- Less, because if it was a 0.5 liter, then the water level would have risen to 1 liter when Nicholas put the lemon in the pitcher of water.
- Student responses will vary. Possible response: I think the lemon is more than 250 cc but less than 500 cc. If the lemon was 500 cc, the water would have been displaced to 1 liter. 250 cc, one graduated cylinder, seems too small for a lemon.
- 200 cc; $700 \text{ cc} - 500 \text{ cc} = 200 \text{ cc}$
- Student responses will vary. Possible response: I think Nicholas's measurement is reasonable. I estimated the measurement would be more than 150 cc but less than 500 cc.
- Student responses will vary. Possible responses: ml means milliliters; I think ml is the same as cc. So the soda can has 355 cc or 355 ml.
- 250 ml
- 355 cc
- 1000 ml
- 6000 ml

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*Answers and/or discussion are included in the lesson.

9. 2 liters
10. 150 cc; $650 \text{ cc} - 500 \text{ cc} = 150 \text{ cc}$
11. A. 0.25 liters
 B. 0.5 liters
 C. 1 liter
 D. 0.5 liters
 E. 0.25 liters
 F. 1 liter
12. A. 4000 cubic centimeters
 B. 5 liters
 C. 10,000 ml
 D. 750 milliliters
 E. 2500 cc
 F. 2.5 liters or $2\frac{1}{2}$ liters

Homework


Questions 1–3 (SG p. 568)

Student responses will vary. Students should draw and label a picture of the containers they used and indicate how they used the smaller container to measure the larger container in milliliters.


9. Luis has 2000 milliliters of water. How many liters of water does he have?

10. Nila filled a pitcher with 0.5 liter of water to measure the volume of a ball. She measured the volume of the ball and the water together to be 650 cc. What is the volume of just the ball in cubic centimeters?


11. Tell whether the volume of each container is closer to 0.25 liter, 0.5 liter, or 1 liter.



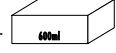
A. 250ml




B. 500cc



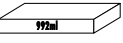
C. 850ml



D. 400ml



E. 900ml




F. 992ml

Check-In: Question 12

12. Use what you know about cubic centimeters, milliliters, and liters to complete each statement so it is true.

A. 4 liters = <u> ? </u> cubic centimeters	B. <u> ? </u> liters = 5000 cc
C. 10 liters = <u> ? </u> ml	D. 0.75 liters = <u> ? </u> milliliters
E. $2\frac{1}{2}$ liters = <u> ? </u> cc	F. <u> ? </u> liters = 2500 ml



1. Find two empty containers of different sizes. The smaller container should be labeled with milliliters and the larger container labeled with liters. For example, you can use a soda can and a liter bottle or a soup can and a 2-liter bottle. Draw and label a picture of each container.
2. Fill the smaller container with water, and empty it into the larger container. How many times can you do this without making the larger container overflow?
3. About how many milliliters are in the larger container? Explain your thinking.

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