Fill It Up Lab

Draw

1. Draw a picture that shows how you will find the volume of your containers. In your picture, show the sizes and shapes of your containers and the names you will give them in the data table.

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Collect

2. Find the volume of at least three containers of different sizes. Your measurements may contain some experimental error, so you should measure the volume of each container at least three times and find the median. Record your data in a table like the one below.

Container	Volume in _____ (unit)			
	Trial 1	Trial 2	Trial 3	Median

Find the median:
• Order the numbers from least to greatest.
• The "middle" number is the median.

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Questions 1–10

1–3. Responses to *Questions 1–3* will vary. See Figures 2–4 and discussion in the lesson.

The answers to *Questions 4–6* are based on the data in *Questions 1–3.*

4. jelly jar

5. oil jar

6. A.* 6 jelly jars would give 1380 cc.

   B. We need 170 cc more to fill the large container.

   C. Answers will vary.

   D. Answers will vary.

   E.* Answers will vary.

7. A. 578 cc

   B. $125 + 125 + 125 + 125 + 78 = 578$ cc

   C. $125 \times 4 + 78 = 578$ cc

8. $80 + 80 + 80 + 80 + 55 = 375$ cc

9. A. 5 small jars will give 200 cc.

   B. 30 cc more will be needed.

   C. Sentences will vary. Possible sentence: $40 \times 5 + 30 = 230$ cc

10. A.* Estimates will vary.

   B.* You can fill 5 jars full and part of a 6th jar.

   C.* 15 cc

   D.* $240 \div 45 = 5$ R15

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

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Graph

3. Graph the median volume data on a sheet of *Centimeter Graph Paper.*
   • Will you make a bar graph or a point graph?
   • What variable will you put on the horizontal axis?
   • What variable will you put on the vertical axis?
   • Remember to title the graph, number the axis, and include units.
   • How will you number the axis so that your data will fit?

Explore

Use the data shown in your graph and data table to answer each question.

4. Which container has the smallest volume? _____

5. Which container has the largest volume? _____

For Question 6, try to make your predictions as accurate as possible.

6. A. Use your graph or your data table to predict the number of full small containers you can pour into your large container. _____ Explain how you made your prediction.

   B. How many more cubic centimeters of water do you think you will need to fill the large container the rest of the way? _____ Explain your prediction.

   C. Check your prediction. How many full small containers did you pour into your largest container without it overflowing?

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D. How many more cubic centimeters of water did you need to fill the large container completely?

E. Was your prediction close to the actual result? Why or why not?

7. Luis poured 4 full small jars of 125 cc into his large jar. Then he filled the large jar with another 78 cc of water.
   A. What is the volume of Luis's large jar?

   B. Write an addition sentence for the volume of the large jar.

   C. Write your number sentence a different way. This time use multiplication and addition.

8. Keenya fills her 80 cc graduated cylinder with water and empties it into a jar four times. The jar is still not full. She fills the graduated cylinder again. She uses this water to fill the jar to the top. Her graduated cylinder still has 25 cc of water in it. What is the volume of the jar? Show your work.

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9. Natasha has a small jar with a volume of 40 cc and a big jar with a volume of 230 cc.
   A. How many full small jars of water can Natasha pour into her big jar?

   B. How much more water does she need to fill the big jar to the top? Show your work.

   C. Write a number sentence for your answer.

10. A container has a volume of 240 cc. You have many small jars, each with a volume of 45 cc. You want to pour all the water from the big container into the small jars.
   A. About how many jars do you think you can fill? _____

   B. Solve the problem to find out how many jars you can fill.

   C. How much water will be in the last jar?

   D. Write a division sentence for the problem.

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