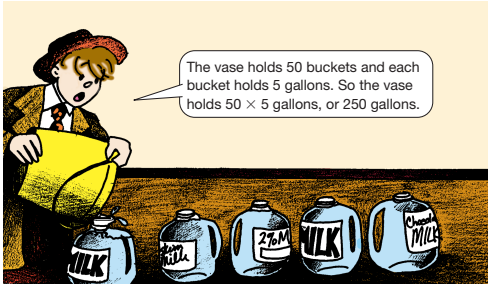


**Measuring Volume of Containers**

**Discuss**



In the story, *Elixir of Youth*, Sam and Tess use a bucket and gallon jugs to find the volume of the vase.



Copyright © Kendall Hunt Publishing Company

**Volume** is a measurement of size. It is the amount of space that an object takes up. If the object is a container, like a box or a bottle, then the volume is the amount of space inside it.

- Sam and Tess measured the volume of containers at the museum to solve a mystery. What are other times when we think about the volume of containers?
- What tools can you use to measure the volume of containers?

Complete the *Converting Standard Volume Units* pages in the *Student Activity Book* to practice solving problems with volume using standard units of measure.

**Student Guide**

**Measuring Volume of Containers (SG pp. 400–404)**

**Questions 1–8**

- \* Possible responses: When you order different-sized drinks from a restaurant; when you put gas in a car; when you measure in baking or cooking; when you buy products in different-sized containers.
- \* Possible responses: measuring cups, teaspoons, tablespoons, quarts, gallons, and liters
- A. 150 milliliters  
B. 4000 cubic centimeters  
C. 3000 milliliters  
D. 75 cubic centimeters

**Student Guide - Page 400**

**Metric Units of Volume**

A common metric unit of volume is the cubic centimeter. A **cubic centimeter (cc)** is the volume of a cube that is 1 centimeter long on each side.



A **milliliter (1ml)** is another metric unit of volume. It is the same as 1 cubic centimeter.

**1 cubic centimeter = 1 milliliter**

A liter (l) is a metric unit used to measure the volume of large objects. One liter holds 1000 milliliters. It also holds 1000 cubic centimeters.

**1 liter = 1000 cubic centimeters**  
**1 liter = 1000 milliliters**



Copyright © Kendall Hunt Publishing Company

- A. 150 cubic centimeters = \_\_\_\_\_ milliliters  
B. 4 liters = \_\_\_\_\_ cubic centimeters  
C. 3 liters = \_\_\_\_\_ milliliters  
D. 75 milliliters = \_\_\_\_\_ cubic centimeters

Copyright © Kendall Hunt Publishing Company

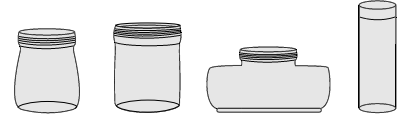
**Student Guide - Page 401**

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

- 4.\* 146 cubic centimeters
- 5.\* Possible response: Since there are spaces between the cubes in the container the volume will be greater when you measure with water.
6. **A.\***258 cubic centimeters
- B.** Possible response: Luis needed to fill the graduated cylinder more than once because the volume of the container was more than 100 cubic centimeters. He filled it once and wrote down 100 cc, then he filled it a second time and added another 100 cc, finally he filled it a third time and the water came to 56 cc, so he added another 56 cc.
- $$100 \text{ cc} + 100 \text{ cc} + 58 \text{ cc} = 258 \text{ cc}$$
7. Answers will vary depending on the containers used. Encourage students to share their results with the class.
8. Possible response: Using water and a graduated cylinder is much more accurate because when you use just the cubes there is a lot of space left in the container. When you use water, all the space is taken by the water, so it is more accurate.

**Measuring Volume with Metric Units**

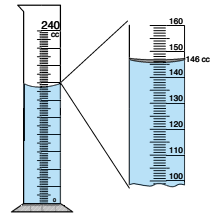
Mrs. Hunter brought some containers into the classroom so students could practice measuring volume with the graduated cylinder. She told them to first estimate the volume of each container using cubic centimeter cubes and then find the actual volume using the graduated cylinder.



Rosa used 84 centimeter cubes to fill the first container. She estimated the volume of the container to be 84 cubic centimeters.



Then she emptied the cubes from the container and filled it with water. She carefully poured the water into her graduated cylinder.



4. What was the actual volume of Rosa's container?

Copyright © Kendall Hunt Publishing Company

**Student Guide - Page 403**

5. Why do you think there was such a big difference between Rosa's estimate with connecting cubes and the actual volume using water and the graduated cylinder?
6. **A.** Luis's group used centimeter cubes and estimated the volume of the container to be 130 cubic centimeters. They had a 100cc graduated cylinder to find the actual volume. After they filled their container they carefully began pouring the water into their graduated cylinder. They filled the graduated cylinder 3 times. On the third time the water level was at 58 cubic centimeters. What is the actual volume of their container?
- B.** Show or tell the strategy Luis's group used to find the total actual volume.

✓ **Check-In: Questions 7-8**

7. Find the volume of several containers. First estimate the volume of each container by filling it with centimeter cubes. Then find the actual volume of each container using the graduated cylinder. Measure the volume of each container to the nearest cubic centimeter. Make a table like the one below to record the volume of each container.

Container	Estimated Volume	Actual Volume

8. Explain why using a graduated cylinder and water to find the volume of containers is more accurate than using centimeter connecting cubes.

Copyright © Kendall Hunt Publishing Company

**Student Guide - Page 404**

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

**Homework**

Look at the two scales on this page. Write the number for each letter.

1.

2.

Copyright © Kendall Hunt Publishing Company

Measuring Volume of Containers
SG • Grade 3 • Unit 13 • Lesson 7
405

**Homework (SG p. 405)  
Questions 1–2**

1.
  - A. 83 cubic centimeters
  - B. 68 cubic centimeters
  - C. 59 cubic centimeters
  - D. 41 cubic centimeters
  - E. 35 cubic centimeters
  - F. 20 cubic centimeters
2.
  - A. 121 cubic centimeters
  - B. 105 cubic centimeters
  - C. 72 cubic centimeters
  - D. 48 cubic centimeters
  - E. 24 cubic centimeters
  - F. 10 cubic centimeters

**Student Activity Book**

**Converting Standard Volume Units  
(SAB pp. 543–544)**

**Questions 1–10**

1. **A.** 2 cups  
**B.** 4 cups  
**C.** 16 cups
2. **A.** 2 pints  
**B.** 8 pints
3. **A.** 4 quarts
- 4.\*

Converting Standard Volume Units

	cup	pint	quart	gallon
number of cups in a	1	2	4	16
number of pints in a		1	2	8
number of quarts in a			1	4
number of gallons in a				1

- 5.\* 4 cups
- 6.\* 8 pints
7. **A.\*** 12 quarts  
**B.\*** Possible response: There are 4 quarts in one gallon so I multiplied  
 $4 \text{ quarts} \times 3 \text{ gallons} = 12 \text{ quarts.}$
8. **A.\*** 20 cups  
**B.\*** Possible response: There are 4 cups in each quart so I added 4 cups + 4 cups + 4 cups + 4 cups + 4 cups = 20 cups.
9. Possible response: I do not agree with Sara. A quart will hold only 4 cups. Sara will have to use a 2-quart pitcher for her lemonade.
10. Possible response: No, Sam will not fill the gallon pitcher. He will have to add more. If you change all the containers to cups and add, you will have 7 cups, and a gallon holds 16 cups.  
 $1 \text{ cup} + 1 \text{ pint} + 1 \text{ quart} = ?$   
 $1 \text{ cup} + 2 \text{ cups} + 4 \text{ cups} = 7 \text{ cups}$

Copyright © Kendall Hunt Publishing Company

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

**Converting Standard Volume Units**



1. Your smallest container is 1 cup. Use this container to answer the following questions.  
**A.** How many cups are in a pint? \_\_\_\_\_  
**B.** How many cups are in a quart? \_\_\_\_\_  
**C.** How many cups are in a gallon? \_\_\_\_\_
2. Use your pint container to answer the following questions.  
**A.** How many pints are in a quart? \_\_\_\_\_  
**B.** How many pints are in a gallon? \_\_\_\_\_
3. Use your quart container. How many quarts are in a gallon? \_\_\_\_\_
4. Use your answers to Questions 1–3 to fill in the boxes that are not shaded in the table.

Converting Standard Volume Units

	cup	pint	quart	gallon
number of cups in a				
number of pints in a				
number of quarts in a				
number of gallons in a				

Copyright © Kendall Hunt Publishing Company

Use the table to help you answer the following questions.

5. How many cups are in 2 pints? \_\_\_\_\_
6. How many pints are in 4 quarts? \_\_\_\_\_

Measuring Volume of Containers

SAB • Grade 3 • Unit 13 • Lesson 7 543

**Student Activity Book - Page 543**

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

7. **A.** How many quarts are in 3 gallons? \_\_\_\_\_  
**B.** Show or tell how you found your answer.
8. **A.** How many cups are in 5 quarts? \_\_\_\_\_  
**B.** Write a number sentence to show how you found your answer.

**✓ Check-In: Questions 9-10**

9. Sara is making lemonade. Her recipe is for 8 cups of lemonade. She decided to use a quart pitcher. Do you agree with Sara? Why or why not?
10. Sam wanted to fill a gallon container with water using different containers. First he poured in 1 cup of water. Then he poured in 1 pint of water, and finally he added 1 quart of water. Did he fill the gallon container with water? Show or tell how you know.

Copyright © Kendall Hunt Publishing Company

544 SAB • Grade 3 • Unit 13 • Lesson 7

Measuring Volume of Containers

**Student Activity Book - Page 544**

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

# Answer Key • Lesson 7: Measuring Volume of Containers

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



Use what you have learned about converting U.S. customary units of volume to solve these problems.

2 cups = 1 pint  
2 pints = 1 quart  
4 quarts = 1 gallon

1. Ms. Alfonso is making lemonade in a 5-gallon container for the class picnic. She is using a recipe that makes a 2-quart pitcher of lemonade. Fill in the table below to show how the volume of the lemonade changed each time Ms. Alfonso added a 2-quart pitcher to the 5-gallon container.

Volume of Lemonade

Number of Recipes	Quarts	Gallons
1	2	$\frac{1}{2}$
2		1
3	6	
4		2
5		$2\frac{1}{2}$
6	12	
7		
8		4
10		
12	24	

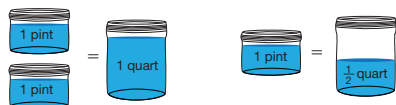
Copyright © Kendall Hunt Publishing Company

Measuring Volume of Containers SAB • Grade 3 • Unit 13 • Lesson 7 545

## Student Activity Book - Page 545

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

2. Nisha drew a picture to show that there were 2 pints in a quart. She used her picture to show Fern that there is  $\frac{1}{2}$  of a quart in 1 pint. Use Nisha's strategy to show the number of gallons in 1 quart. Your answer will be a fraction.



3. Romesh was helping his mom in the kitchen. She asked him to measure 1 cup of sugar for a recipe. Romesh could find only a pint container. Show or tell how Romesh can use the pint container to measure 1 cup of sugar.

Copyright © Kendall Hunt Publishing Company

546 SAB • Grade 3 • Unit 13 • Lesson 7 Measuring Volume of Containers

## Student Activity Book - Page 546

## Student Activity Book

### Homework (SAB pp. 545–546) Questions 1–3

1.

Number of Recipes	Quarts	Gallons
1	2	$\frac{1}{2}$
2	4	1
3	6	$1\frac{1}{2}$
4	8	2
5	10	$2\frac{1}{2}$
6	12	3
7	14	$3\frac{1}{2}$
8	16	4
9	18	$4\frac{1}{2}$
10	20	5

2. Possible response: There will be  $\frac{1}{4}$  of a gallon in one quart.
3. Possible response: Romesh can fill one half of the pint container, and that will be the same as 1 cup.

Copyright © Kendall Hunt Publishing Company