Date _____

7.5 Capacity and Volume Applications

Focus: unit conversion, rounding, proportional reasoning, problem solving

Chapter 7

Warm Up

1. Solve without a calculator.

a) $2 \times 3 \times 5 =$ _____

b) $4 \times 4 \times 10 =$ _____

2. a) Show what 10^3 means.

b) Therefore, $10^3 =$ _____.

3. a) 1 L = _____ mL

b) 500 mL = _____ L

4. a) 1 gallon = _____ quarts

b) 1 quart = _____ fluid ounces

5. List the following measures from least to greatest.

1 oz, 250 mL, 1 gallon, 2 L, 1 quart, 16 ounces, 500 mL

_____, _____, _____, _____, _____, _____, _____

Go to pages 187–188 to write the definitions for **capacity** and **volume** in your own words. Give an example of each.

Capacity and Volume

- **Capacity** is the amount of liquid a container can hold.
- **Volume** is the amount of space an object takes up.
- While the 2 terms do not mean the same thing, many people use the word volume when they are talking about an object's capacity.

1. In Canada, the label on most containers holding liquid gives their capacity in litres or millilitres. Estimate the metric capacity of the items below.

A. _____

B. _____

C. _____

D. _____

 978-0-07-090894-9

2. In the United States, many containers holding liquids state their capacity in ounces, quarts, or gallons. What is the Imperial capacity of the items in #1?

A. _____ **B.** _____

C. _____ **D.** _____

Painting

3. One of the first things that many people do when they move into a new home is paint. A typical large can of interior paint bought in a Canadian store has a capacity of 3.78 L.

a) Why do you think the container holds such an odd amount? Why not 3.5 L or 4 L?

Look at section 6.5.

b) Most paint manufacturers claim that 1 L of paint covers 10.5 m^2 or 110 ft^2. You can round the numbers to make this easier to remember:

"1 _____ of paint will cover about _____ m^2, which is about _____ ft^2."

4. Steve wants to paint the TV room in his basement. It is a big room, measuring 31 ft by 12 ft. The walls are 8 feet high.

a) Calculate the surface area of the ceiling.

b) Steve wants to put 2 coats of paint on the ceiling. Use your answer in #3b) to estimate the number of cans of paint Steve will need.

c) The walls will be a different colour than the ceiling. Calculate the surface area of the walls.

d) Estimate the number of cans of paint Steve will need in order to apply 2 coats of paint to the walls. _____

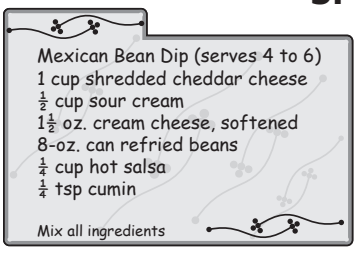
- Steve needs about _____ cans of paint for the ceiling.
- He needs about _____ cans of paint for the walls.

e) Research the price of a good quality interior latex paint. Calculate the total cost.

Area Painted	Brand of Paint	Price Per 3.78-L Can	Number of Cans	Cost of Paint
Ceiling				
Walls				
			Subtotal	
			Tax	
			Total	

Entertaining

5. Esther found a recipe for Mexican Bean Dip online.



a) She is making the dip for a family reunion that 30 people will attend. How much of each ingredient will she need?

Ingredient	Amount
Cheddar cheese	
Sour cream	
Cream cheese	
Refried beans	
Salsa	
Cumin	

b) What did you multiply each ingredient by? _____

Why? _____

c) When Esther goes shopping, she will likely find the ingredients sold in metric units. Use the conversion table on page 291 or do an Internet search for *unit converter*. Find one that will allow you to convert between Imperial and metric capacities.

Volume might be used instead of *capacity*.

Ingredient	Imperial Measure (from part a)	Exact Metric Conversion	Appropriately Rounded Metric Measure
Cheddar cheese			
Sour cream			
Cream cheese			
Refried beans			
Salsa			
Cumin			

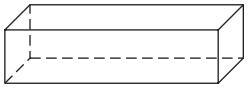
d) There are 2 sizes of sour cream at the grocery store. The 500-mL tub is $1.89. The 1-L tub is $2.99. Which tub do you suggest she buy?

e) Salsa also comes in 2 sizes. The 350-mL jar is $1.99. The 700-mL jar is $4.49. Which jar should she buy? Explain your reasoning.

f) Get a local grocery flyer and make a shopping list for Esther. Estimate the total cost of making the dip for 30 people.

Date _____

6. a) How many 2-cm cubes would you need to build a model of the volume of a brick with dimensions 8 cm × 2 cm × 2 cm?



b) Use 2-cm linking cubes to build the brick.

How many did you use? _____

An adjective that means "in the shape of a cube."

c) The volume of the brick is _____ cubic centimetres.

d) Using the same thinking, how many cubic inches are in a cubic foot? _____
Explain your answer and/or make a sketch below.

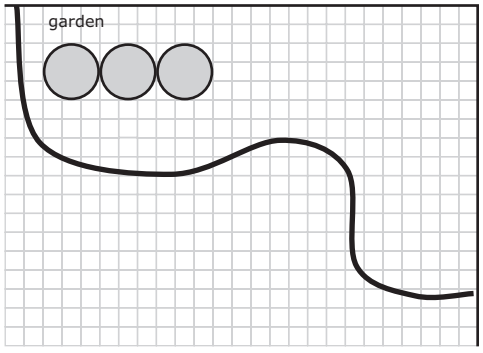
7. a) Use materials in the classroom to build a cubic foot.

b) How many cubic feet would you need to build a cubic yard? _____

c) Explain your answer to part b). _____

Landscaping

8. In section 7.3, you worked on a project involving the planting of cedar trees.



a) Sketch in the cedars that you decided on earlier.

b) Recall the scale of the diagram. Each square on the diagram represents an area of _____ in the garden.

c) Estimate the area of the garden. _____

d) Compare estimates with other students. Discuss the strategies that you used. Do you need to revise your estimate?

- The owners of the property are laying garden fabric on the ground to prevent weeds from growing.

e) Estimate the area of the garden that will be covered with fabric.

f) Garden fabric is sold in rolls that cover 50 ft^2. How many rolls will the owners need to buy?

- The owners will cover the fabric with 4 inches of mulch.

g) If you know the approximate area of the garden that needs mulch, how can you determine the amount of mulch needed? _____

h) What fraction of a foot is 4 inches?

i) Estimate the volume of mulch needed in cubic feet.

j) Mulch is often sold by the cubic yard. Convert your answer from part i) to yd^3.

k) Research the cost of mulch from a local retailer. Calculate the total price, including tax.

☑ Check Your Understanding

1. Looks easy! Painting. Landscaping. Entertaining. How many steps were involved in

a) painting the room? _____

b) finishing the garden? _____

c) making a dip? _____

2. Explain the difference between capacity and volume with respect to an in-ground pool made with 4-inch thick concrete walls.

Review the definitions on page 264.