



What's In It For Me? (Volume)

Suggested time: 45 minutes

What's important in this lesson:

It is important for you to understand where volumes are used and become comfortable with estimating and converting volumes. You will need to accurately use the volume formula for rectangular prisms and be able to use volume units correctly.

Complete these steps:

1. Read through the Lesson portion of the package independently.
2. Complete the required 'Practice' questions.
3. If you have questions about the examples or the 'Practice' questions seek assistance from the teacher as needed.
4. Use 'Practice' Answer Keys to check your answers as they work through the package. If you are making errors, have your teacher review these questions with you.
5. Complete the Volume Assignment

Hand-in the following to your teacher:

1. Practice Problems from the Student Handout
2. Volume Assignment.

Questions for the teacher:



What's In It For Me? (Volume)

We have studied the measurement of LENGTH (distance) and AREA (amount of surface) so far. But what about how much a container HOLDS? In order to determine this, we will look at VOLUME.

VOLUME can be used to study amounts of... LIQUIDS (water, milk, etc.)
 GASES (air, helium, etc.)
 (some) SOLIDS (flour, sugar, etc.)

Part A - Fill it Up: Getting to Know Your Units

We will be using the following units to study volume:

Prefix	Example	Symbol
---	litre	L
milli	millilitre	mL

ALSO...	1L = 1000mL
AND...	
1 teaspoon = 5mL	
1 tablespoon = 15mL	
1 (measuring) cup = 250mL	

Examples

1. Complete the statements
 - a. How many teaspoons of water fit in 1 tablespoon? **15mL ÷ 5mL = 3**
 So, there are _____ teaspoons in a _____.
 - b. How many teaspoons of sugar will fit in 1 cup? **250mL ÷ 5mL = 50**
 So, there are _____ teaspoons in a _____.
 - c. How many teaspoons of milk are there in a 1L carton? **1000mL ÷ 5mL = 200**
 So, there are _____ teaspoons in 1 _____.
(but you probably wouldn't want to check this!)

Review the other common volume measurements listed below:
 (ALL MEASUREMENTS ARE APPROXIMATES ONLY!)

Small juice box – 200mL	Gas tank (small car) – about 40L
Can of Pop – 350mL	Gas tank (truck) – 90L+
Largest Carton of Milk – 2L	Bathtub (full) – 300L
	Swimming Pool – 20,000L+



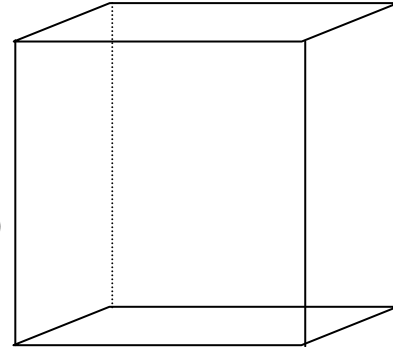
Part B - Calculating Volume

When a container is the shape of a RECTANGULAR PRISM (i.e. a box), the amount of material that will fit inside can be calculated with the formula:

$$V = L \times W \times H$$

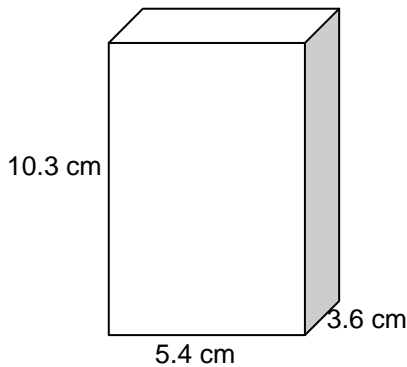
where... L = length, W = width, and H = height

(Like AREA, the order of these does not really matter)



Example

1. Find the volume of juice in a box that is 5.4cm long, 3.6cm wide, and 10.3cm high.



$$\begin{aligned} V &= L \times W \times H \\ &= 5.4\text{cm} \times 3.6\text{cm} \times 10.3\text{cm} \\ &= \underline{200.232\text{cm}^3} \text{ (rounded to } 200.2\text{cm}^3) \end{aligned}$$

NOTICE THE FOLLOWING ABOUT THIS ANSWER:

- the units are now CUBED (cm^3) – This exponent (3) must be used whenever we calculate the VOLUME using the L, W and H!

What does this have to do with OTHER units of VOLUME (mL, L, etc.)?

Well...

$$1\text{cm}^3 = 1\text{mL} !$$

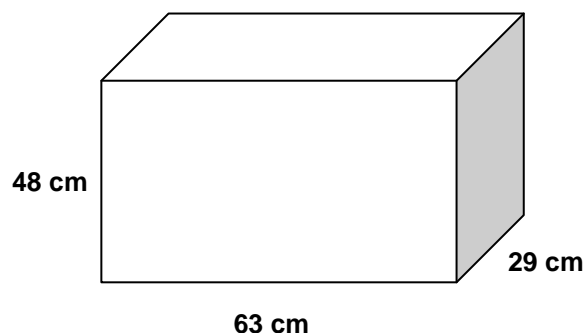
So, this juice box actually holds 200.2mL of juice. (Just like the chart on page 1!)

ALSO... $38\text{cm}^3 = 38\text{mL}$, $450\text{cm}^3 = 450\text{mL}$, and $1239\text{cm}^3 = 1239\text{mL}$
(or 1.239 L!)



Practice Problems

1. Calculate the volume of the cardboard box shown to the right. (in cm^3)



2. If this box was sealed (so that it didn't leak), could it hold 85L of flour?
Explain your answer.
3. Find the volume of air in an apartment that is 15m long, 8m wide, and 3m high.
Include a sketch with these measurements.
4. If you needed an air conditioner to cool the air in this apartment, should you buy the air conditioner listed in the ad below? Explain your answer.



Check the answers to these questions before moving on!



Volume Assignment

1. Circle the best response

a. A fuel tank on a full sized school bus is likely to hold...

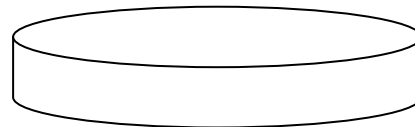
- A) 2L of fuel B) 20L of fuel C) 200L of fuel D) 2000L of fuel

b. An eyedropper is likely to hold what amount of medicine?

- A) 3mL B) 30mL C) 300mL D) 3L

c. The principal of your school wants to have a fountain built in front of the school. The circular fountain will be about as wide as the length of a car, and it will be less than 1m deep. The amount of water that will be needed to fill it is likely...

- A) 15L B) 150L C) 1500L D) 15,000L



d. A can of pop holds the equivalent of about...

- A) 25 teaspoons B) 25 tablespoons C) 25 cups D) 25 L

SHOW ALL WORK FOR THE QUESTIONS BELOW!

2. Deep Lake holds 84 million litres of water. How many average-sized swimming pools (20,000L) would this much water fill?

