



MATH NEWS

Grade 5 | Module 5 | Topic B | Volume and Multiplication & Division Operations

Welcome

This document is created to give parents and students a better understanding of the math concepts found in the Eureka Math (© 2013 Common Core, Inc.) that is also posted in the Engage New York material taught in the classroom. Grade 5 Module 5 of Eureka Math (Engage New York) covers Addition and Multiplication with Volume and Area. This newsletter will discuss the concept that multiplying side lengths or multiplying the area by the number of layers yields an equivalent volume.

Objectives

- Use multiplication to calculate volume
- Use multiplication to connect volume as packing with volume as filling
- Find the total volume of solid figures composed of two non-overlapping rectangular prisms
- Solve word problems involving the volume of rectangular prisms with whole number edge lengths
- Apply concepts and formulas of volume to design a sculpture using rectangular prisms within given parameters.

Important Information

Words to Know

- area
- solid figure
- base
- volume
- cubic centimeters
- length/width/height
- face
- capacity
- milliliters

Things to Remember

Area: The number of square units that covers a two-dimensional figure

Volume: Measurement of space or capacity

Space: The amount of cubes that will fit inside a solid; **packing**

Capacity: The amount of liquid that fills a container; **filling**

Face: Any flat surface of a three-dimensional figure

Cubic Centimeter: All sides measure 1 centimeter; abbreviation cm

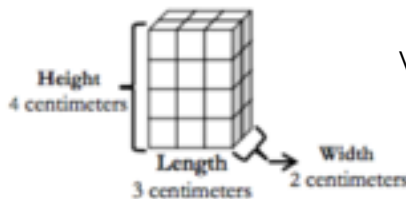
Milliliter: Unit of capacity equal to one-thousandths of a liter; abbreviate is mL

cm³: Is read centimeters cubed

cm²: Is read centimeters squared

Examples

Find the volume by multiplying side measures.



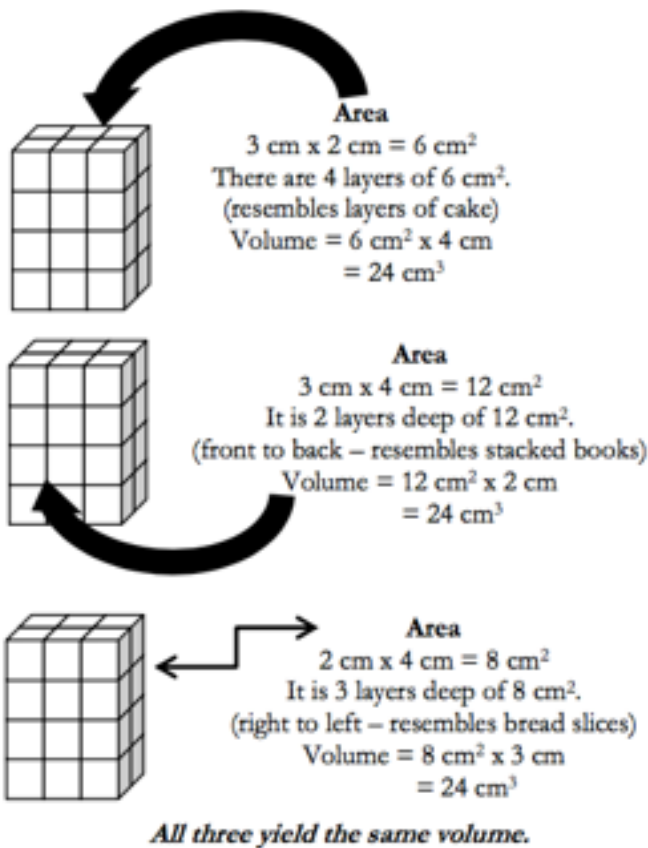
$$\begin{aligned} \text{Volume} &= (3 \text{ cm} \times 2 \text{ cm}) \times 4 \text{ cm} \\ &= 6 \text{ cm}^2 \times 4 \text{ cm} \\ &= 24 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Volume} &= (2 \text{ cm} \times 4 \text{ cm}) \times 3 \text{ cm} \\ &= 8 \text{ cm}^2 \times 3 \text{ cm} \\ &= 24 \text{ cm}^3 \end{aligned}$$

$$\begin{aligned} \text{Volume} &= (4 \text{ cm} \times 3 \text{ cm}) \times 2 \text{ cm} \\ &= 12 \text{ cm}^2 \times 2 \text{ cm} \\ &= 24 \text{ cm}^3 \end{aligned}$$

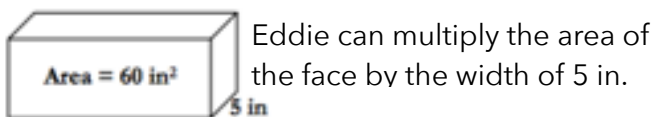
All three yield the same volume. This shows that the order does not matter when multiplying the measures of each side.

Calculate the volume by multiplying the area of one face by the number of layers



Application Problems

Eddie says more information is needed to find the volume of the rectangular prism. Explain why Eddie is mistaken and calculate the volume.



$$\text{Volume} = 60\text{ in}^2 \times 5\text{ in}$$

$$= 300\text{ in}^3$$

What is the volume of a jewelry box with a length of 10 centimeters, a width of 4 centimeters, and a height of 3 centimeters?

$$\text{Volume} = (10\text{ cm} \times 4\text{ cm}) \times 3\text{ cm}$$

$$= 40\text{ cm}^2 \times 3\text{ cm}$$

$$= 120\text{ cm}^3$$

The volume of the jewelry box is 120 cm^3

***Remember that order does not matter when multiplying the measures of each side.**

A rectangular prism has a volume of 30 cubic feet. Its height is 5 feet. What are the possible dimensions for the base of the prism?

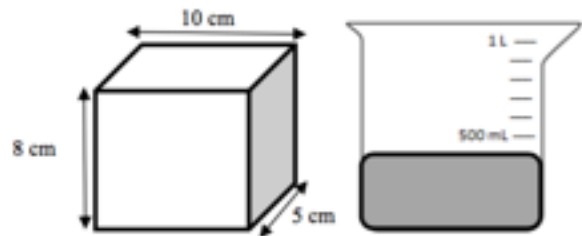
- A. 1 foot x 6 feet B. 3 feet x 10 feet
 C. 3 feet x 3 feet D. 12 feet x 12 feet

Correct Answer: A. (1ft x 6 ft) x 5 ft = 30 cubic feet

Liquid Volume

From an activity in Lesson 5, students will conclude that 1 cm^3 is equivalent to 1 mL. Milliliters are units of capacity which tell the amount of liquid a container will hold. There are 1,000 mL in a liter.

Problem: Find the volume of the prism and then shade the beaker to show how much liquid would fill the box.



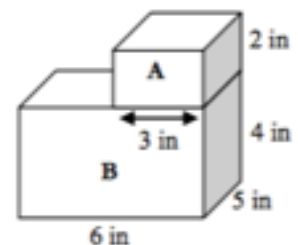
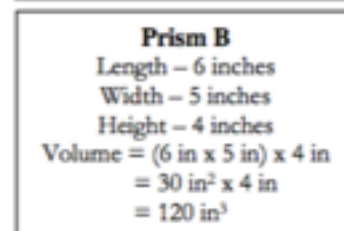
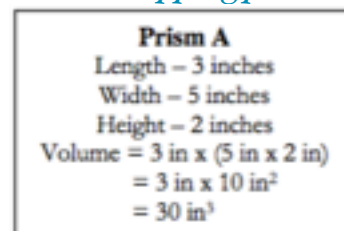
$$\text{Volume} = (8\text{ cm} \times 5\text{ cm}) \times 10\text{ cm}$$

$$= 40\text{ cm}^2 \times 10\text{ cm}$$

$$= 400\text{ cm}^3$$

Since 1 cm^3 equals 1 mL, 400 cm^3 equals 400 mL.

Total volume of a solid figure composed of two non-overlapping prisms



$$\text{Total Volume} = 30\text{ in}^3 + 120\text{ in}^3$$

$$= 150\text{ in}^3$$

Application Problem

A planting box pictured below is made of two sizes of rectangular prisms. One type of prism measures 2 inches by 5 inches by 12 inches. The other type measures 12 inches by 4 inches by 10 inches. What is the total volume of three such boxes?

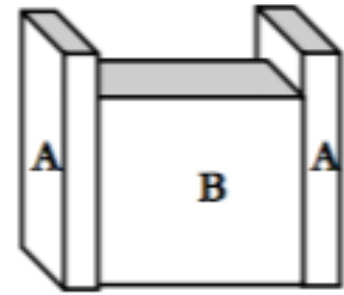
Prism A

$$\begin{aligned}\text{Volume} &= (2 \text{ in} \times 5 \text{ in}) \times 12 \text{ in} \\ &= 10 \text{ in}^2 \times 12 \text{ in} \\ &= 120 \text{ in}^3\end{aligned}$$

There are two prisms 'A'

$$120 \text{ in}^3 \times 2 = 240 \text{ in}^3$$

Prism B

$$\begin{aligned}\text{Volume} &= (12 \text{ in} \times 4 \text{ in}) \times 10 \text{ in} \\ &= 48 \text{ in}^2 \times 10 \text{ in} \\ &= 480 \text{ in}^3\end{aligned}$$


Answer: The total volume of the planting box is 720 cubic inches.

District Mathematics Website

Be sure to visit our District 97 5th Grade Math Resources Website. It has a ton of resources that can further assist your 5th Grade Family! Some of the specific elements are detailed below.

Website: <http://op97mathgrade5.weebly.com/module-5.html>

Homework Helper

Would you like written homework help specific for each lesson in this Topic? Click below to access it!

Website: http://op97mathgrade5.weebly.com/uploads/2/2/9/1/22918938/homework_helper-grade_5_module_5.pdf

Video Help

Flipped learning is a great way to review topics that your student is learning in the classroom. The following are links to videos that give detailed explanations for each lesson in this topic.

Website: https://www.tes.com/lessons/wQKIG_SZQLbceA/video-help-module-5

Module 5 Parent Tips

Eureka Math has created a guide to this Module specifically for parents. Click below to access it!

Website: http://op97mathgrade5.weebly.com/uploads/2/2/9/1/22918938/eureka_math_module_5_parent_tip_sheet.pdf