EUREKA MATH™ TIPS FOR PARENTS

KEY CONCEPT OVERVIEW

In this topic, students apply their knowledge of the formula for **volume** of a **right rectangular prism** (Volume = length × width × height, or $V = lwh$) to calculate the volumes of right rectangular prisms with fractional side lengths. They pay attention to the units and record volume in cubic units. Later in the topic, students explore another way to find the volume of a right rectangular prism using the formula Volume = area of the base × height ($V = Bh$), and they apply both volume formulas to various problems. The topic wraps up with students calculating the volumes of composite solid figures. They use one of the volume formulas to find the volume or unknown dimension in real-world situations.

You can expect to see homework that asks your child to do the following:

- Calculate the volume of a right rectangular prism using the formulas $V = lwh$ and $V = Bh$.
- Write numerical expressions to represent the volume of a right rectangular prism in different ways, and explain how those expressions are the same.
- Given the area of the base, calculate the volume of a right rectangular prism for various values of the height.
- Given the volume and the height, write and solve an equation to determine the area of the base of a right rectangular prism.
- Given a figure and its dimensions, calculate the volume if the dimensions are changed (e.g., cut in half).
- Describe how volume changes as the length of a prism changes by a specified amount (e.g., one-third or three times as long).
- Determine the volume of a composite figure.

SAMPLE PROBLEMS *(From Lesson 11)*

Use the prism in the diagram at the right to answer the following questions.

a. Calculate the volume.

$V = lwh$

$$V = \left(5\frac{1}{3}\text{ cm}\right)\left(\frac{2}{3}\text{ cm}\right)\left(1\frac{1}{3}\text{ cm}\right)$$

$$V = \left(\frac{16}{3}\text{ cm}\right)\left(\frac{2}{3}\text{ cm}\right)\left(\frac{4}{3}\text{ cm}\right)$$

$$V = \frac{128}{27}\text{ cm}^3 \textit{ or } V = 4\frac{20}{27}\text{ cm}^3$$

b. If you have to fill the prism with cubes whose side lengths are less than 1 cm, what size would be best?

The best choice would be a cube with side lengths of $\frac{1}{3}$ cm.

SAMPLE PROBLEMS *(continued)*

c. How many of the cubes would fit in the prism?

$16 \times 2 \times 4 = 128$, ***so 128 cubes will fit in the prism.***

d. Use the relationship between the number of cubes and the volume to verify your volume calculation.

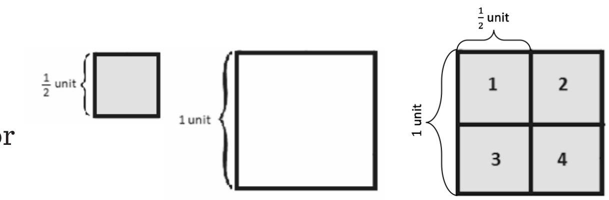
The volume of one cube is $\left(\frac{1}{3}\text{ cm}\right)\left(\frac{1}{3}\text{ cm}\right)\left(\frac{1}{3}\text{ cm}\right) = \frac{1}{27}\text{ cm}^3$.

Since there are 128 cubes, the volume is $128 \times \frac{1}{27}\text{ cm}^3 = \frac{128}{27}\text{ cm}^3$, ***or*** $4\frac{20}{27}\text{ cm}^3$, ***which matches the answer found previously.***

Additional sample problems with detailed answer steps are found in the *Eureka Math Homework Helpers* books. Learn more at GreatMinds.org.

HOW YOU CAN HELP AT HOME

You can help at home in many ways. Here are some tips to help you get started.



- Discuss this problem with your child: How many squares with $\frac{1}{2}$-unit side lengths can fit inside a square with 1-unit side lengths? Encourage your child to explain (using words or drawings) why 4 squares can fit inside and not just 2, which is a common misconception. (Possible solution: The area of the larger square is 1 square unit. The area of the smaller square with $\frac{1}{2}$-unit side lengths is $\frac{1}{4}$ square unit, that is, $\frac{1}{4}$ of the area of a square with 1-unit side lengths. So, 4 of the smaller squares will fit inside the larger square.)
- The ability to multiply fractions and mixed numbers efficiently is very important for the work in this topic. Ask your child to determine and simplify the products of the fractions or mixed numbers in the table at the right.

$\frac{3}{8} \times \frac{4}{5}$	$\frac{12}{40} = \frac{3}{10}$
$\frac{6}{11} \times \frac{2}{15}$	$\frac{12}{165} = \frac{4}{55}$
$1\frac{2}{3} \times \frac{3}{5}$	$\frac{15}{15} = 1$
$2\frac{1}{6} \times \frac{3}{4}$	$\frac{39}{24} = 1\frac{15}{24} = 1\frac{5}{8}$
$1\frac{2}{5} \times 3\frac{2}{3}$	$\frac{77}{15} = 5\frac{2}{15}$

TERMS

Right rectangular prism: A three-dimensional solid shape with six faces that are all rectangles. (See Image.)

Volume: The amount of space inside a three-dimensional object, such as a cube or prism, measured in cubic units.