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4-14: Learning Goals

- Let’s explore area and volume when fractions are involved.

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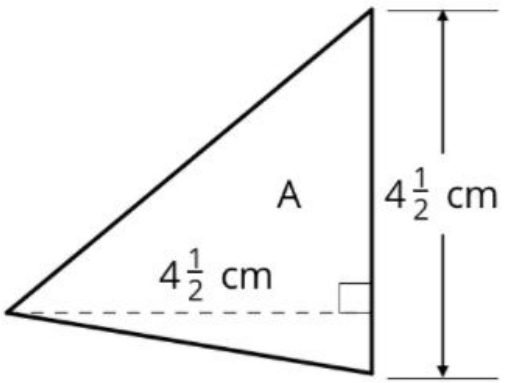
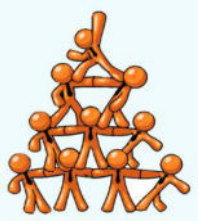
4-14-1: Area of a Triangle

Find the area of Triangle A in square centimeters.
Show your reasoning.





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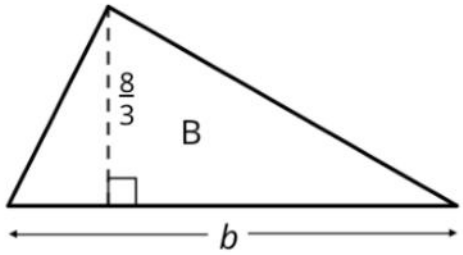
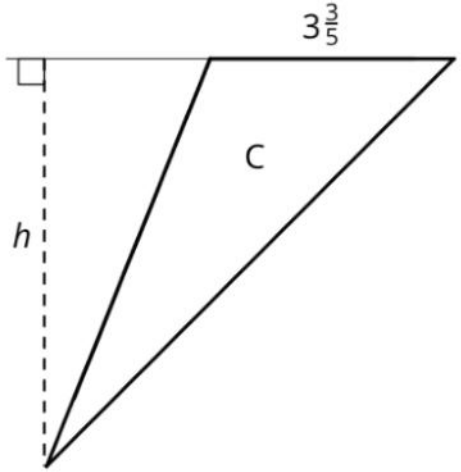
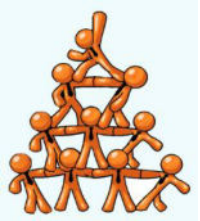
4-14-2: Bases and Heights of Triangles

1. The area of Triangle B is 8 square units. Find the length of b. Show your reasoning.



2. The area of Triangle C is $\frac{54}{5}$ square units. What is the length of h? Show your reasoning.





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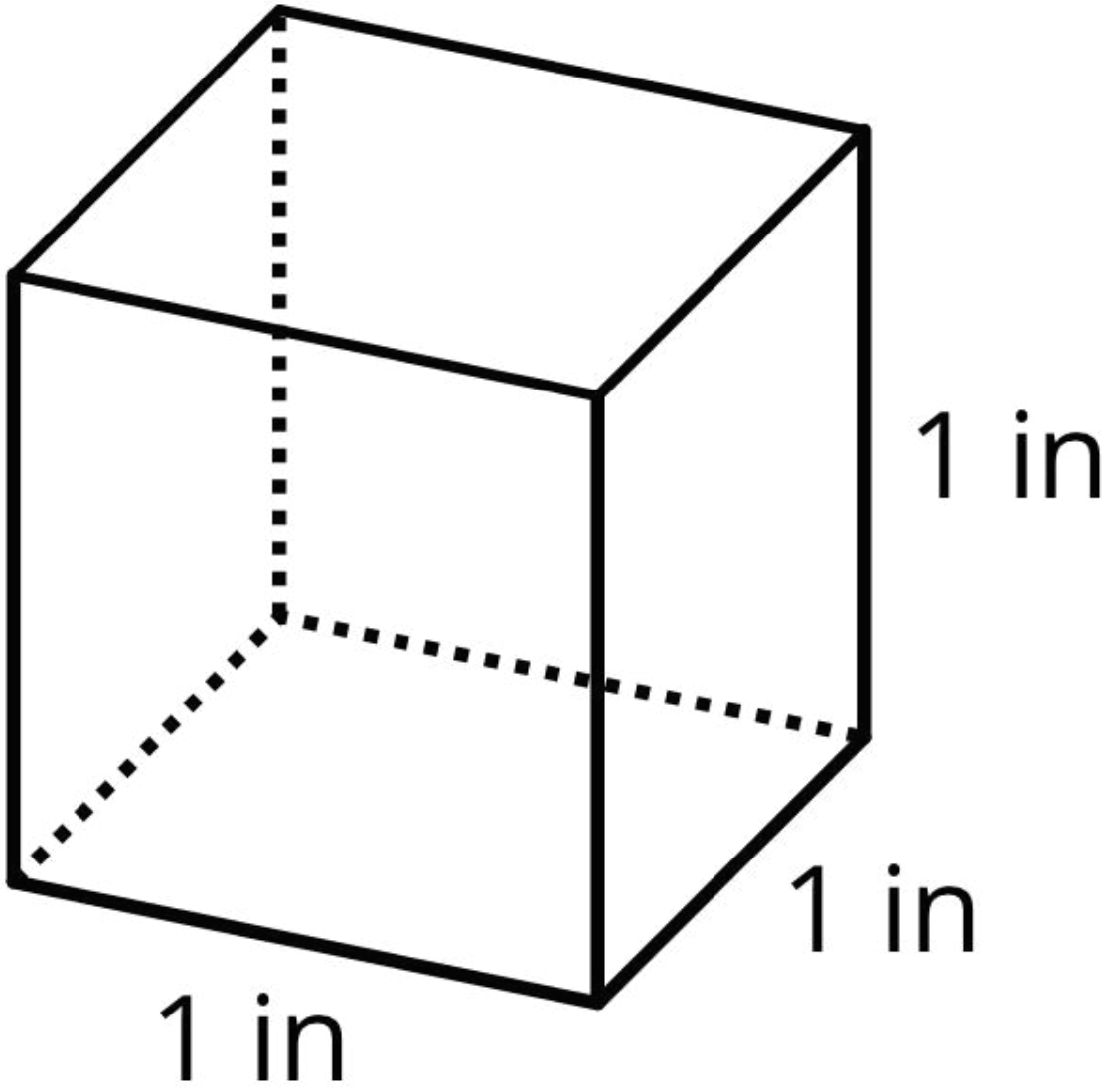
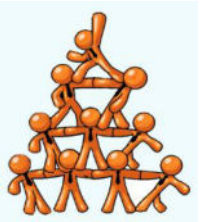
4-14-3: Volumes of Cubes and Prisms





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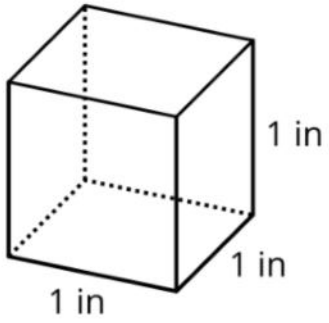
4-14-3: Volumes of Cubes and Prisms

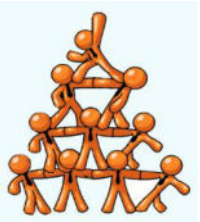
1. Your teacher will give you a set of cubes with an edge length of $\frac{1}{2}$ inch. Use them to help you answer the following questions.

   a. Here is a drawing of a cube with an edge length of 1 inch. How many cubes with an edge length of $\frac{1}{2}$ inch are needed to fill this cube?



   b. What is the volume, in cubic inches, of a cube with an edge length of $\frac{1}{2}$ inch? Explain or show your reasoning.

   c. Four cubes are piled in a single stack to make a prism. Each cube has an edge length of $\frac{1}{2}$ inch. Sketch the prism, and find its volume in cubic inches.



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4-14-3: Volumes of Cubes and Prisms

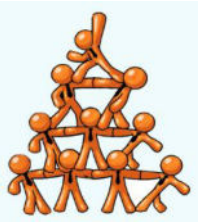
2. Use cubes with an edge length of $\frac{1}{2}$ inch to build prisms with the lengths, widths, and heights shown in the table.

   a. For each prism, record in the table how many $\frac{1}{2}$-inch cubes can be packed into the prism and the volume of the prism.

prism length (in)	prism width (in)	prism height (in)	number of $\frac{1}{2}$-inch cubes in prism	volume of prism (cu in)
$\frac{1}{2}$	$\frac{1}{2}$	$\frac{1}{2}$		
1	1	$\frac{1}{2}$		
2	1	$\frac{1}{2}$		
2	2	1		
4	2	$\frac{3}{2}$		
5	4	2		
5	4	$2\frac{1}{2}$		

   b. Analyze the values in the table. What do you notice about the relationship between the edge lengths of each prism and its volume?

3. What is the volume of a rectangular prism that is $1\frac{1}{2}$ inches by $2\frac{1}{4}$ inches by 4 inches? Show your reasoning.



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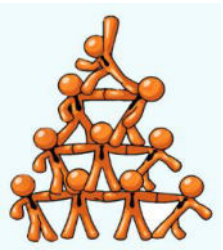
4-14: Lesson Synthesis

How is finding an unknown base or height in a triangle different than finding an unknown side length in a rectangle?

'What multiplication equation can we write to help us find the height of a triangle that has a base of $\frac{5}{4}$ cm and an area of 10 sq cm?'

How can we use cubes with $\frac{1}{2}$-inch edge lengths to find the volume of a prism that is $\frac{1}{2}$ inch by 2 inch by $3\frac{1}{2}$ inches?



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4-14: Learning Targets

- I can use division and multiplication to solve problems involving areas of triangles with fractional bases and heights.
- I can explain how to find the volume of a rectangular prism using cubes that have a unit fraction as their edge length.
- I know how to find the volume of a rectangular prism even when the edge lengths are not whole numbers.

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4-14-4: Triangles and Cubes

1. A triangle has a base of $3\frac{2}{5}$ inches and an area of $5\frac{1}{10}$ square inches. Find the height of the triangle. Show your reasoning.

2. Answer each of the following questions and show your reasoning.

   a. How many cubes with an edge length of $\frac{1}{3}$ inch are needed to build a cube with an edge length of 1 inch?

   b. What is the volume, in cubic inches, of one cube with an edge length of $\frac{1}{3}$ inch?