3.4 Volume

Name: key

Volume: amount of space an object occupies

The formula for calculating the volume of a rectangular prism, triangular prism, or cylinder is $V = A_{\text{base}} \times h$.

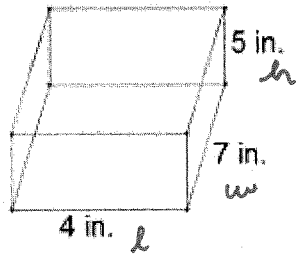
A_{base} = area of base $\quad$ h = height

Volume of a rectangular prism may also be calculated by using the formula: $V = lwh$

Volume is measured in cubic units. For example cm^3, in^3, yd^3.

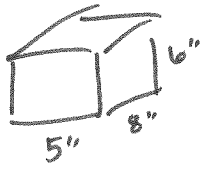
Examples:

1. Calculate the volume.



$V = lwh$
$= 4 \times 7 \times 5$
$= 140\ in^3$

2. Alfred has a bulk container that holds 2000 ($2000\ in^3$) cubic inches of dog biscuits. He plans to sell the biscuits in small boxes that measure 5" by 8" by 6". How many whole boxes will he need to sell all the dog biscuits?



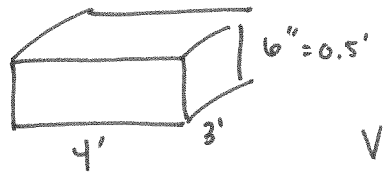
$V = lwh$
$= 5 \times 8 \times 6$
$= 240\ in^3$

$2000 \div 240 = 8.\overline{3} \rightarrow$ 9 boxes

can't sell part boxes

Alfred will need to sell 9 boxes.

3. A garden bed is 4' (feet) by 3', and a 6" (inches) layer of soil will be spread over the garden. A bag of soil contains $2ft^3$. How many bags are needed to cover the garden?



$6 \text{ inches} \times \frac{1 \text{ ft}}{12 \text{ in}} = 0.5 \text{ feet}$

$V = lwh$

$= 4 \times 3 \times 0.5$

$= 6 ft^3$

$6ft^3 \div 2ft^3 = \boxed{3 \text{ bags}}$

Try it!

1. A fish tank is a rectangular prism that is 30 inches long, 24 inches deep, and 18 inches high. How much water will it hold?
   a. in cubic inches?

   b. in cubic feet?

2. Petra must stack boxes that are 3 ft by $2\frac{1}{2}$ft by $2\frac{1}{2}$ft on a truck. What is the volume of each box?

3. Karl buys bales of hay that measure 15" x 24" x 36". He needs to buy 250 bales, and he needs to know if they will fit in his barn. What is the total volume of hay in cubic feet?