NOTES: CC.6.NS.1; CC.6.G.2

Standard 6.G.2 Objective: ***Investigate the volume of rectangular prisms with fractional edge lengths.***

Name_____ Date_____

Part I: Volume of Rectangular Prisms

WHAT IS VOLUME?

The number of cubic units needed to fill the space in a three-dimensional figure.

Volume is measure in cubic units (units³.)

The formula for volume of a rectangular prism:

Volume = _____ x _____ x _____

DEFINITION:

Unit Cube – A cube that is 1 unit on each dimension.

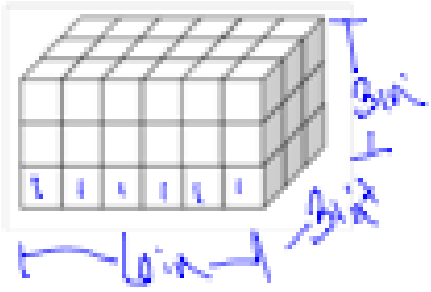
FACT:

If a rectangular prism is filled with unit cubes, then the volume of the prism is equal to number of cubes.

Example 1:

The right rectangular prism-shaped box shown is filled with one inch cubes.

Find the volume, in cubic inches.



V = l x w x h

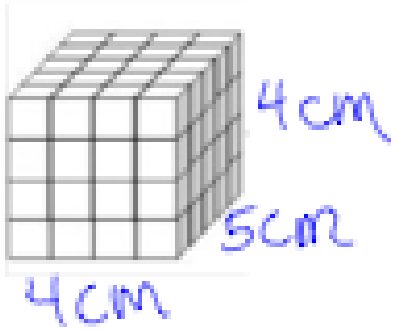
= 6 x 3 x 3 = 54

The volume is 54 in³.

NOTES: CC.6.NS.1; CC.6.G.2

Standard 6.G.2 Objective: ***Investigate the volume of rectangular prisms with fractional edge lengths.***

Example 2:



The right rectangular prism-shaped box shown is filled with one centimeter cubes.

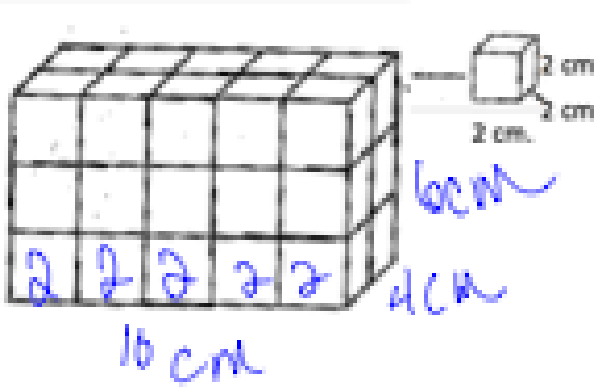
Find the volume, in cubic centimeters.

$V = 4 \times 5 \times 4$

The volume is 80 cubic centimeters.

$80\ cm^3$

Example 3:



The right rectangular prism-shaped box shown is filled with 2-centimeter cubes.

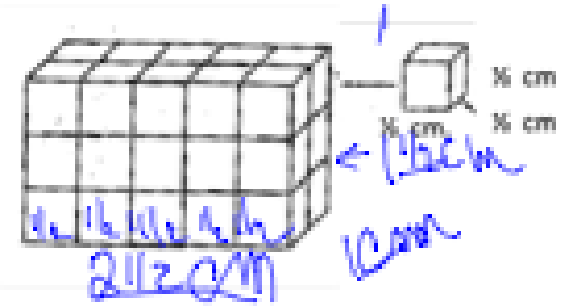
Find the volume of the figure in cubic centimeters.

$V = 10 \times 4 \times 6$

The volume is 240 cubic centimeters.

$240\ cm^3$

Example 4:



The right rectangular prism-shaped box shown is filled with ½ ' - centimeter cubes.

Find the volume of the figure in cubic centimeters.

The volume is 7 1/2 cubic centimeters.

$37\frac{1}{2}\ cm^3$

NOTES: CC.6.NS.1, CC.6.G.2

Name_____Date_____

MORE ON AREA AND VOLUME

AREA

Area is measured in units squared (units^2) since...

AREA is the number of square units inside a two-dimensional figure.

Area of a Rectangle= $\frac{b \times h}{l \times w}$

Example 1: Calculating Area

Find the area of the following rectangle.

$A = l \times w$

$= 1\frac{1}{4} \times \frac{3}{4}$

$= \frac{5}{4} \times \frac{3}{4} = \frac{15}{16}$

The area is $\frac{15}{16}$ in^2.

You Try:

The dimensions of a rectangular garden are $\frac{5}{8}$ inches by $1\frac{1}{5}$ inches. Find the area of the garden.

$\frac{3}{4}$ in^2

The area is 3/4 square inches.

NOTES: CC.6.NS.1, CC.6.G.2

VOLUME

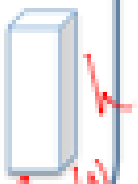
Volume is measured in units cubed (units^3) since....

VOLUME is the number of cubic units inside a three-dimensional figure.

Volume of a Rectangular Prism = $l \times w \times h$

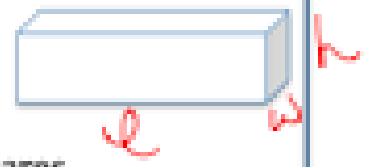
and

Volume of a Prism = $B \times h$ (Base x height)



Some More Vocabulary:

Rectangular Prism: A three-dimensional solid object that has six faces, which are rectangles.



Cube: A rectangular prism whose faces are all squares.

Base: (B) is the area of the bottom layer of a prism.

Example 1: Calculating Volume of a Cube

What is the volume of a cube with an edge-length of ¼ inch?

3 faces

$\frac{1}{4}in \times \frac{1}{4}in \times \frac{1}{4}in$

in^3

Volume = $l \times w \times h$

$= \frac{1}{4}in \times \frac{1}{4}in \times \frac{1}{4}in$

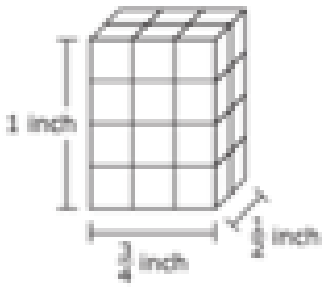
$= \frac{1 \times 1 \times 1}{4 \times 4 \times 4} = \frac{1}{64}$

The volume of the cube is $\frac{1}{64}$ in^3 or $\frac{1}{64}$ cubic inches

NOTES: CC.6.NS.1, CC.6.G.2

Example 3: Calculating Volume

What is the volume in cubic inches of the right rectangular prism?



$V = \frac{1}{2} \times \frac{3}{4} \times 1$

$\frac{1}{2} \times \frac{3}{4} \times \frac{1}{1}$

Volume of one cube?

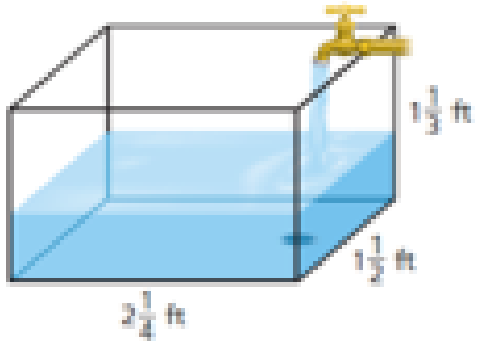
The volume is 3/8 cubic inches.

$\frac{3}{8}$ in^3

4

Example 4: Application

A sink is shaped like a rectangular prism. How much water can the sink hold? → volume - capacity



$V = l \times w \times h$

$= 2\frac{1}{4} \times 1\frac{1}{2} \times 1\frac{1}{3}$

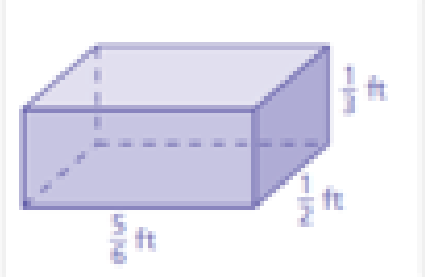
$= \frac{9}{4} \times \frac{3}{2} \times \frac{4}{3}$

$= \frac{9}{2}$

The sink can hold $4\frac{1}{2}$ ft^3 of water

You Try:

Find the volume of the figure shown.



$V = \frac{5}{6} \times \frac{1}{2} \times \frac{1}{3}$

The volume is 5/36 cubic feet.

$\frac{5}{36}$ ft^3