Name:_____ Block:_____ Date:_____

AWM10 **Ch. 3.4 – Volume** Notes

The SI unit for measuring volume is the litre but the imperial unit for volume is the pint. However, volume can also be measured in millilitres, cubic metres, cubic inches, cubic feet or many others.

Especially in cooking, or other activities that use liquid measurements, it is important to be able to convert between different units of volume.

VOLUME: the amount of space an object takes up
- volume of a rectangular prism (box) = length x height x width = l·w·h
- units are "cubed" ex. in^3

CAPACITY: the maximum amount a container can hold
ie. the amount of volume inside an object

Some Conversions to note:

4 quarts = 1 US gallon	**1 teaspoon (tsp) = 5 millilitres (mL)**
1 cup = 250 mL	**1 tablespoon (tbsp) = 15 mL**
2 pints = 1 quart	**1 cup = 250 mL**
2 cups = 1 pint	1 litre = 0.26 US gallons

Finding the volume of a rectangular prism (box):

Ex. 1) What is the volume of a packing box that measures 10cm by 5cm by 3cm?

$V = \ell wh$ Write the formula for volume.

$V = 10cm \bullet 5cm \bullet 3cm$ Put in the side lengths.

$V = 150\ cm^3$

The volume of the box is $150cm^3$.

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

$V = \ell wh$ Write the formula for volume.

$V = 5'' \bullet 8'' \bullet 6''$ Put in the side lengths for the small box.

$V = 240\ in^3$ (or cu in)

$\frac{2000}{240} = 8.3$ Divide the volume of the larger box by the volume of the smaller box

Alfred would need 9 small boxes. Round up, so that all of the biscuits fit in boxes.

Converting between Units of Volume:

Ex. 3) You are travelling through the US and your car's gas tank has a capacity of 55 litres.

a) How much is this in American gallons?

$$55\text{L} \times \frac{0.26 \text{ US gallons}}{1 \text{ L}} = 14.3 \text{ US gallons}$$

Your car can hold 14.3 US gallons of fuel.

b) How much is this in British gallons?

1 British gallon = 6/5 US gallon (6/5 = 1.2)

$$14.3 \text{ US gallons} \times \frac{1 \text{ British gallon}}{1.2 \text{ US gallons}} = 11.9 \text{ British gallons}$$

Your car can hold 11.9 British gallons of fuel.

Ex. 4) You are opening a French bakery and want to make authentic French recipes. All the recipes are given in metric units, but you have imperial measuring devices. The crème brulée recipe requires 500 mL of cream and 1.25 mL of vanilla.

a) How much cream will you need, in cups?

Convert 500 mL to cups.

$$500\text{mL} \times \frac{1 \text{ cup}}{250\text{mL}} = 2 \text{ cups}$$

You will need 2 cups of cream.

b) How much vanilla will you need, in teaspoons?

Convert 1.25 mL to teaspoons.

$$1.25\text{mL} \times \frac{1 \text{ tsp}}{5\text{mL}} = 0.25 \text{ tsp (or } \tfrac{1}{4} \text{ tsp)}$$

You will need ¼ tsp of vanilla.

c) How much cream will you need, in fluid ounces? (1 fl oz = 30 mL)

Convert 500 mL to fluid ounces.

$$500\text{mL} \times \frac{1 \text{ fl oz}}{30\text{mL}} = 16 \text{ fl oz}$$

You will need 16 fl oz of cream.