**Metric System**

-universal method of measuring used in science and medicine

-based on units of 10

-used to measure length, volume, mass and temperature

-Other countries use the metric system for all of their measurements.

* For example, speed signs in other countries are in km/hour.
* Gasoline in other countries is sold by the liter (L), not gallon
* Temperature is reported in degrees Celsius (°C)

**Basic Units**

Length-meter (m)

Volume-Liter (L)

Mass-gram(g)

Temperature-degrees Celsius (°C)

For length, volume and mass, prefixes are used:

**Prefix Meaning**

kilo- one thousand

hecto- one hundred

deca- ten

(meter, Liter, gram)

deci- one tenth

centi- one hundredth

milli- one thousandth

Example; One kilometer is equal to one thousand meters, because “kilo” means one thousand.

**Length**

Basic Unit -meter (m)

Tool used to measure-meter stick, tape measure or ruler

In the metric system, the most common measurements in length used are the kilometer (km), meter (m), centimeter (cm) and millimeter (mm)

* One meter is equal to about 39 inches, slightly larger than a yard.
* One kilometer is smaller than a mile, actually a mile is equal to 1.6 kilometers.

To calculate Area, multiply the length by the width

Area= Length x Width

**Example of problems;**

How much carpet will be needed for a room that is

12 meters by 8 meters?

A = L x W

A = 12m x 8m

A = 96 m2

What would be the area for a kitchen countertop that is 90 cm by 400 cm?

**Mass and Weight**

Mass- the amount of matter an object has

Basic Unit-gram (g)

Tool or Instrument used to measure-balance

Prefixes are added to make different units

Examples; kilogram (kg), milligram (mg)

Weight-measurement of the force of gravity on an object

Basic Unit-Newton (N)

DO NOT ADD PREFIXES TO THE NEWTON (N)

Tool or Instrument used to measure-spring scale

**Volume**-the amount of space an object takes up

Basic Unit-Liter (L)

Tool or Instrument used to measure-graduated cylinder

One gallon = 3.8 Liters

Prefixes are added to make different units

Examples;milliliter (mL)

\*In the metric system, there is a direct relationship between length and volume. One cubic centimeter (cm3 or cc) is equal to one mL…. Therefore, if you had a small box that was 1cm by 1cm by 1cm, it has a volume of 1mL

1mL= 1cc = 1cm3**Formula for calculating volume of a regularly shaped object** Volume = Length x Width x Height

V = L x W x H

Example of volume problems;

What is the volume of a fish tank that is 20 cm by 30 cm by 50 cm?

V = L x W x H

V = 20cm x 30cm x 50cm

V = 30,000 cm3 or 30,000 cc or 30,000 mL

To calculate the volume of an irregularly shaped object:

**Displacement**

-fill a graduated cylinder with water

-record the volume

-slowly lower the irregularly shaped object into the graduated cylinder

-record the new volume

-subtract the two volumes to get the volume of the irregularly shaped object

**Temperature**

-In the metric system, temperature is measured in

-Degrees Celsius (°C)

-Water Freezes at 0 °C and boils at 100°C

-The tool or instrument used to measure temperature is the thermometer

**Conversions Within the Metric System**

* Conversions within the metric system are very easy because the metric system is based on units of ten
* When converting, we multiply or divide by units of ten, so therefore, we simply move the decimal point.

**Steps:**  
 1. Decide whether you are moving the decimal place

to the right or the left.

**Small Large**

milli- centi- deci- (basic) deca- hecto- kilo-

-Small to Large, move it left

-Large to Small, move it right

2. Count how many places you are to move the

decimal point.

**For example;**

2.5 km = \_\_\_\_\_\_\_\_\_\_\_\_ m

In this problem, you are converting from larger to smaller units, so the decimal is moved to the right. Count the places……3….move the decimal 3 places to the right.

2.5 km = 2,500 m

4,200 mL = \_\_\_\_\_\_\_\_\_\_\_\_ L

In this problem, you are converting from smaller to larger units, so the decimal is moved to the left. Count the places……3….move the decimal 3 places to the left.

4,200 mL = 4.2 L