UNITS OF MEASUREMENT, WEIGHT AND DISTANCE MEASUREMENT NAMES

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Annotation: *In our section article, we want to shed light on our thoughts on metric systems. Data are provided in the example of different exercises for length and weight units.*

Key words: *Weight ,centimeter , conversion ratio, measurement, length, capacity, "cross multipy" , "quarts",metric system.*

The metric system is an internationally agreed decimal system of measurement created in France in 1799. The International System of Units (SI), the official system of measurement in almost every country in the world, is based upon the metric system.
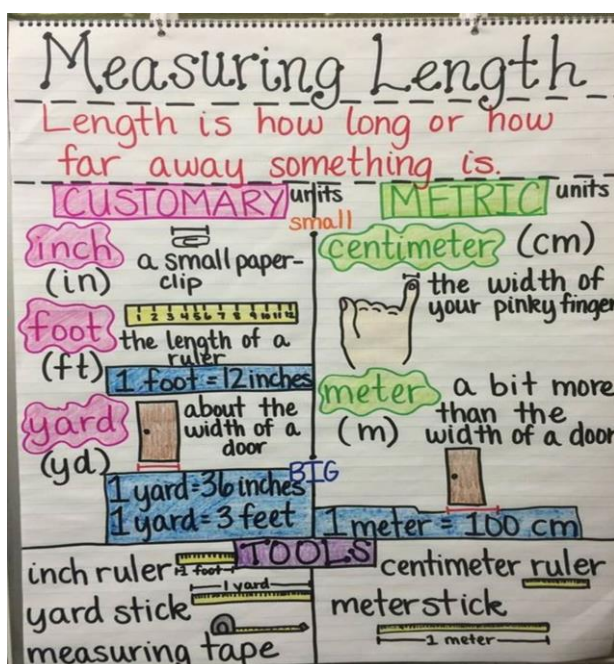
In the metric system, each basic type of measurement (length, weight, capacity) has one basic unit of measure (meter, gram, liter). Conversions are quickly made by multiplying or dividing by factors of 10. It is as simple as moving the decimal point to the right (for smaller prefixes) or to the left (for larger prefixes).

We know that the standard unit of length is '**Meter**' which is written in short as '**m**'.

A meter length is divided into 100 equal parts.

Each part is named **centimeter** and written in short as '**cm**'.

Thus, 1 m = 100 cm and 100 cm = 1 m

The long distances are measured in **kilometer**. This kilometer equals to 1000 meters. The kilometer is written in short as **km**.

1 kilometer (km) = 1000 meters (m) and 1000 m = 1 km
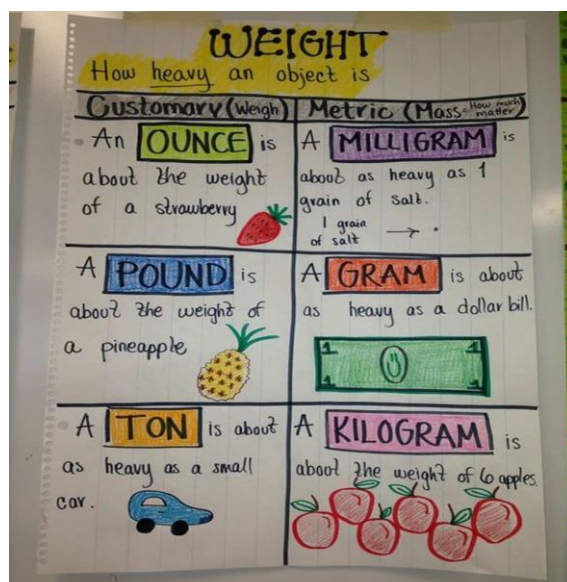
Measuring Weight

We know the main standard unit of mass or weight is **kilogram** which we write in short as **'kg'**. 1000th part of this kilogram is **gram** which is written in short as **'g'**.
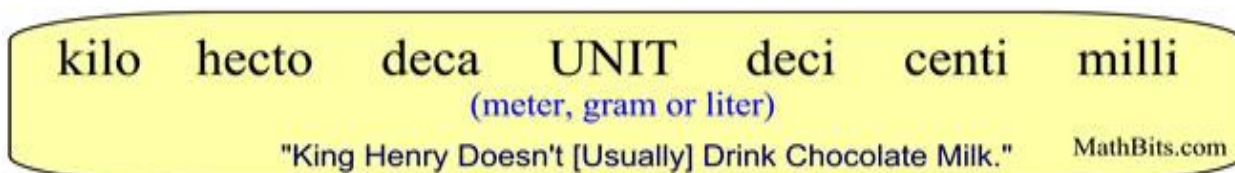
***Thus** 1000 gram = 1 kilogram **and** 1 kilogram = 1000 gram*

i.e. **1000 g = 1 kg and 1 kg = 1000 g.**

This gram (g) is a very small unit of mass

Metric System:

To remember the proper decimal movement, arrange the prefixes from largest to smallest:

kilo   hecto   deca   UNIT   deci   centi   milli
(meter, gram or liter)
"King Henry Doesn't [Usually] Drink Chocolate Milk."   MathBits.com

Example 1:   **Convert 10.25 kilometers to meters**. Notice in the listing above that meter is three places to the right of the prefix kilo. This tells us to move the decimal point three places to the right. The answer is 10,250 meters.

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Example 2: **Convert 650 mL to daL**. [mL is milliliters and daL is decaliters]. Notice in the listing above that the prefix deca is four places to the left of the prefix milli. This tells us to move the decimal point four places to the left. The answer is 0.0650 daL. (Note: dL is deciliters, daL is decaliters.)

Example 3: **Convert 750 grams to milligrams.** Notice in the listing above that the prefix milli is three places to the right of gram. This tells us to move the decimal point three places to the right. The answer is 750,000 milligrams.

● English System:

While the metric system was lawfully accepted for use in the United States in 1866, the US has not adopted the metric system as its "official" system of measurement. The US English System of measurement grew out of the manner in which people secured measurements using body parts and familiar objects. For example, shorter ground distances were measured with the human foot and longer distances were measured by paces, with one mile being 1,000 paces. Capacities were measured with household items such as cups, pails (formerly called gallons) and baskets.

Obviously this system allowed for discrepancies between measurements obtained by different individuals. A standard was eventually set to ensure that all measurements represented the same amount for everyone.

Length:	Weight:	Capacity:
1 foot (ft) = 12 inches (in)	1 pound (lb) = 16 ounces (oz)	1 tablespoon (tbsp) = 3 teasponns (tsp)
1 yard (yd) = 3 feet	1 ton = 2000 pounds	1 cup (c) = 16 tablespoons
1 mile (mi) = 5280 feet		1 cup = 8 fluid ounces (oz)
1 mile = 1760 yards		1 pint (pt) = 2 cups
		1 quart (qt) = 2 pints
		1 gallon (gal) = 4 quarts

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Conversion Ratio (or Unit Factor): While the Metric System simply moves the decimal point to convert between its measurements' prefixes, the English System requires a conversion ratio (or unit factor) to move between measurements. In the Metric System, the prefix itself gives the needed conversion ratio.

A conversion ratio (or unit factor) is a ratio **equal to one**. This ratio carries the names of the units to be used in the conversion. It can be used for conversions within the English and Metric Systems, as well as for conversions between the systems. The conversion ratio is based upon the concept of **equivalent values**. In the example below, one foot is substituted for its equivalent measure of 12 inches.

Conversion ratios ALWAYS equal 1.

$$\frac{12 \text{ inches}}{12 \text{ inches}} = \frac{1 \text{ foot}}{12 \text{ inches}}$$

Conversion Ratio (for in. and ft.)

MathBits.com

Example 1: Convert 84 inches to feet. A proportion can be set up using the appropriate conversion ratio. In a proportion the product of the means equals the product of the extremes. Use this "cross multipy" concept to find the answer.

$$\frac{? \text{ feet}}{84 \text{ inches}} = \frac{1 \text{ foot}}{12 \text{ inches}}$$

Conversion Ratio

ANSWER: 7 feet

Example 2: Find the number of cups in two gallons.

There is no stated conversion for cups to gallons, so we have to be a bit more creative. Since there are 4 cups in 1 quart, and 4 quarts in 1 gallon, we can set up the conversion ratio based on "quarts". Two gallons is 8 quarts.

ANSWER: 32 cups

Example 3: Convert 16 tons to pounds. Set up the conversion ratio and solve for the missing value.

ANSWER: 32,000 pounds

NOTE: As with all mathematical problems, there are other ways to arrive at these answers. Most other methods utilize the concept of the conversion ratio, but may be written in a different manner or calculated mentally.

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