

Name: _____ Date: _____

Physical Science Notes 2 Measurement II

Converting between Metric Units

- There are times when quantities are measured using different metric units. In order to add, subtract, multiply, and divide these units, we must convert them into the same unit.
- To do this, we use a conversion factor. A conversion factor is a ratio that is equal to 1. We know now that $1 \text{ km} = 1000 \text{ m}$. Since these two numbers are equal, one divided by the other is 1 and therefore the following is a conversion factor:

$$\frac{1 \text{ km}}{1000 \text{ m}} \equiv 1$$

- Since the quantities are the same, we can even invert the ratio and it will still be equal to 1.

$$\frac{1000 \text{ m}}{1 \text{ km}} \equiv 1$$

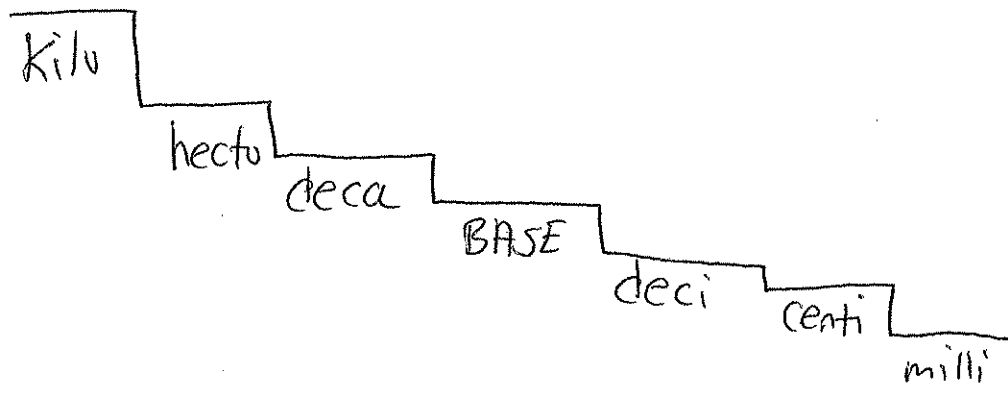
- So, if we need to convert 2m into km, we would simply multiply the 2m by the conversion factor above, where the number in the denominator has the old units (m) and the numerator has the new units (km).

$$2 \text{ m} = \underline{.002} \text{ km}$$

$$\frac{2 \text{ m}}{1} \times \frac{1 \text{ km}}{1000 \text{ m}} = \underline{.002} \text{ km}$$

A little trick to Converting between Metric Units

- **Please note:** this easier way to convert between metric units only applies to **METRIC** units. This will not work when converting between measurement systems, because other systems, such as US Customary, do not use multiples of 10.
- A blank staircase has been drawn for you. Beginning with kilo-, write one prefix under each step in order of magnitude from greatest to smallest as you go down the staircase.



- Now, all you have to do is either count up or count down the staircase starting with the old unit and ending on the desired unit. The number you get is the number of places you must move the decimal point on the new number. If you count up the staircase, move the decimal point to the left and if you count down the staircase, move the decimal point to the right.

• Class Example: $2\text{ m} = \underline{\hspace{2cm}} \text{ km}$

$$0.002\text{ m} = \underline{.002} \text{ km}$$

$$10 \text{ hm} = \underline{\hspace{2cm}} \text{ mm}$$

$$\overset{\text{hm}}{10.00000} = 10,000,000 \text{ mm}$$