Name________________________________ Class __________ Date ____________

Mathematical Science Conversions

Introduction: Mathematical Conversions are used a lot in science. An example is when we need to know how many kilograms are found in 635 g.

The key to conversions is setting the problem up.

A. Remember that if you multiply anything by one, the value is not changed. So if we know that there are 1000g in 1 kg, we can use that as a fraction (called conversion factor) to change the units into what we need. It could be written with either number in the numerator: either 1000 g/1 kg or 1 kg/ 1000 g

B. You'll know whether to put the units in the numerator or denominator if you keep in mind, that you are trying to get the units to cancel out.

See the example below.

Problem: Convert 635 g → kg

Solution: $\frac{635\ \cancel{g}}{1} * \frac{1\ kg}{1000\ \cancel{g}} = 0.635$ g

Notice that the grams cancel out just like numbers would, and you are left with just the kg!

Compound units work using the same principles. See example below:

Problem: Convert 60 mi/hr to ft/sec

$$\frac{60\ \cancel{mi}}{1\ \cancel{hr}} * \frac{5280\ ft}{1\ \cancel{mi}} * \frac{1\ \cancel{hr}}{60\ \cancel{min}} * \frac{1\ \cancel{min}}{60\ sec} = 88.0\ ft/sec$$

See how the miles, hours and minutes all cancel out.

Length:	Volume:	Mass
1 m = 10 dm	1 l = 1000 ml	1 kg = 1000 g
1 m = 100 cm		1 g = 1000 mg
1 cm = 10 mm		
1 km = 1000 m		

Practice: Now its your turn. Do the following conversions, setting up the conversion factors and crossing off the units to show how they cancel out. Above are the conversion factors you may choose from.

1) 49 m → cm

2) .00976 km → mm

3) 65.04 cm/min → m/hr

4) 762 l → ml

5) 376 ml/g → l/kg

More Practice: Ok, now for our Virtual Neuroscience Application. When anesthetizing a rat to prepare for surgery, the amount of anesthesia given must be carefully calculated based on the weight of the rat. The rat should receive 1 ml of drug for each kilogram of the weight. The conversion factor is: 1ml/kg. However, rats don't usually weigh a kilogram, so you'll need to convert kg to grams. Do the following problems, showing how the units cancel out.

The conversion factor is: $\frac{\text{1ml of anesthesia}}{\text{1 kg of rat weight}}$

6) How much anesthesia should you give a 225 g rat?

7) How much anesthesia should you give a 860 g rat?

8) How much anesthesia should you give a 475 g rat?

9) How much anesthesia should you give a 579 g rat?

10) How much anesthesia should you give a 480 g rat?