Chemistry Conversion Units 11-Sept-07 **Prof George W.J. Kenney, Jr** **Updated 20-Aug-2013**

Distance & Length **2.54 centimeters per inch, 2.54 cm / in** **1 m = 39.37"**

I assume that you already know:

1 km = 1000m or 10^3 m
1 Meter = 10 decimeters = 100 cm = 1000 millimeters
10 mm = 1 cm
10 cm = 1 dm = 100 mm
12 in = 1 ft
3 ft = 1 yd 1 yard = 36 inches 1 yard = 3 ft
5280 ft = mile

Temperature **Celsius, Farenheit, Kelvin** **Deg F = (Deg C * 9/5) + 32**
Deg C = (Deg F – 32 deg) * 5/9
Dec C = Deg K - 273
Deg K = Deg C + 273

Freezing Point of Water **0 deg C = 32 deg F = 273 deg K**
Boiling Point of Water **100 deg C = 212 deg F = 373 deg K**

Volume **1 Liter = 1.056688209 Quart** **1 L = @1.057 Quart**

Liter, cubic meter, cubic decimeter, cubic centimeter, cubic millimeter
Gallon, quart, pint, ounce

I assume that you already know:

10 mm^3 = 1 cm^3 = 1 mL
1000 mL = 1 Liter 1000 L = 1 kL
1 Liter = 10 decimeters - deci = ten
1 Liter = 100 centiliters - centi = hundred
1 Liter = 1000 millimeters - milli = thousand
1 gallon = 4 quarts 1 quart = 2 pints
1 pint = 16 ounces 1 pint = 2 cups

Weight and Mass **453.59237 grams / pound** **@454 g / lb**

Gram, kilogram **Ounce, pound, ton**

I assume that you already know:

10 milligram = 1 centigram 1000 mg = 1 gram 1000 g = 1 kg
1 pound = 16 ounces 1 Ton = 2000 pounds

Energy 1 Calorie = 4.184 Joules 1 Cal raises 1 g of water 1 deg C

Time Second, minute, hour, day, millisecond, year

Metric Kilo, milli, micro, nano, mega, giga, tera, pico

Energy and Work Joule, Calorie [foot-pount, kilowatt-hour, BTI]

Currancy US Dollar, quarter, dime, nickel, penny
Euro, British Pound, Canadian Dollar

Notes on performing Calculations

1. WRITE DOWN THE MAIN FORMULA: e.g. Density g/cm^3 = Mass (g) / Volume (cm^3)
2. Write down any derived formula for what is to be calculated; Volume (cm^3) = Mass (g) / Density g/cm^3
3. Put in your values with units: Volume (cm^3) = 123.34 g / 1.00 cm^3
4. Cancel out the units – be sure your answer is in the correct units
5. Do The Math Add / Subtract Multiply / Divide Do it to many digits
6. Calculate the number of Significant Digits that need to be in the answer, use proper rounding.
7. Put the answer in the correct Scientific Notation [Power of 10], if needed
8. **SHOW ALL MATH ALL FORMULAE ALL UNITS AND ALL UNITS CANCELING.**

Steps for BALANCING AN EQUATION

5.01 grams of Iron (III) Carbonate is reacted with xcs [Excess] Sulfurous Acid. What are the products and how much of each is formed?

1. Translate the English to Chemical REACTANTS
   $Fe\ CO_3 + H_2SO_3 \rightarrow$
2. Balance the ions in each Reactant Compound so the net charge is zero
   $Fe^{+3}\ CO_3^{-2} + H_2^{+1\ ea\ =\ +2}\ SO_3^{-2} \rightarrow$

   $Fe_2^{+3}\ (CO_3)_3^{-2} + H_2^{+1\ ea\ =\ +2}\ SO_3^{-2} \rightarrow$ **Need 2 Fe's and 3 CO_3**

   $Fe_2\ (CO_3)_3 + H_2SO_3 \rightarrow$ **Correct Reactants**
3. Determine the Products and write down the basic compounds. AB + CD -> AD + CB
   Use the simple ionic exchange
   $Fe_2\ (CO_3)_3 + H_2SO_3 \rightarrow$ **$Fe\ SO_3$ + $H\ (CO_3)$**
4. Balance the ions in each Product Compound so the net charge is zero
   $Fe_2\ (CO_3)_3 + H_2SO_3 \rightarrow$ **$Fe^{+3}\ SO_3^{-2}$ + $H^{+1}\ (CO_3)^{-2}$**

   $Fe_2\ (CO_3)_3 + H_2SO_3 \rightarrow$ **$Fe_2^{+3}\ (SO_3^{-2})_3$ + $H^{+1}{}_2\ (CO_3)^{-2}$**

   $Fe_2\ (CO_3)_3 + H_2SO_3 \rightarrow$ **$Fe_2\ (SO_3)_3$ + $H_2\ CO_3$**
5. Balance the equation so there are equal number of each element on each side of the reaction arrow
   $Fe_2\ (CO_3)_3 + 3\ H_2SO_3 \rightarrow$ **$Fe_2\ (SO_3)_3$ + $3\ H_2\ CO_3$**
6. With the known amount of starting compound / reactant, determine the molecular weight of that compound
7. Determine the molecular weight of each of the Product Compounds.
8. Set up the simple ratio of known amount of starting material to molecular weight equals x over the mw of each product and calculate the amount of each product. Don't forget to put in all the units!!
9. Write out the answers – the amount of each product in grams [or milligrams] corrected to the proper number of significant digits with the units.