**Conversion Problems**

1. Decide what you are starting with or what you are given
2. Decide what you are looking for

**Units cancel** Not numbers!

**Grams to Moles:**

$\frac{Given grams}{1}×\frac{1mole}{\\_\\_\\_\\_\\_\\_\\_grams }=\\_\\_\\_\\_\\_\\_\\_moles$

**Grams to Moles to atoms:**

$\frac{Given grams}{1}×\frac{1mole}{\\_\\_\\_\\_\\_\\_\\_grams }×\frac{6.02 ×10^{23 }atoms}{1 mole}=\\_\\_\\_\\_\\_\\_\\_\\_\\_atoms$

**Moles to atoms:**

$\frac{Given moles}{1 }×\frac{6.02 ×10^{23 }atoms}{1 mole}=\\_\\_\\_\\_\\_\\_\\_\\_\\_atoms$

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Atoms to moles:**

$\frac{given atoms}{1}×\frac{1 mole}{6.02 ×10^{23}atoms}=\\_\\_\\_\\_\\_\\_\\_\\_moles$

**Atoms to grams:**

$\frac{given atoms}{1}×\frac{1 mole}{6.02 ×10^{23}atoms}×\frac{\\_\\_\\_\\_\\_\\_\\_grams }{1 mole}=\\_\\_\\_\\_\\_\\_\\_\\_grams$

**Moles to grams:**

$\frac{given moles}{1}×\frac{\\_\\_\\_\\_\\_\\_grams}{1 mole}=grams$

**Milliliters (ml) to liters (L):**

$\frac{given milliliters}{1}×\frac{1 liter}{1000 milliliters}=liters$

**Liters (L) to milliliters (ml):**

$\frac{given liters }{1}×\frac{1 milliliters}{1000 liters}=milliliters$

**Molarity (M) =** $\frac{moles }{liters (L)}$$liters (L)$ **=** $\frac{moles }{Molarity (M)}$

$$Molarity \left(M\right)×liters (L)=moles$$

$$M×L=moles$$

**Starting Molarity (M1) x Starting Liters (L1) = Final Molarity (M2) x Final Liters (L2)**

$ \left(M1\right)\left(L1\right)= $**(M2) (L2)**

**NOTE: This equation is the same as** $\left(M1\right)\left(V1\right)= $**(M2) (V2). Liters measure volume (V)!**

**Starting Molarity (M1) =** $\frac{Final Molarity \left(M2\right) x Final Liters (L2)}{Starting Liters (L1)}$

**Final Molarity (M2) =** $\frac{Starting Molarity (M2) x Starting Liters (L2)}{Final Liters (L1)}$

$Starting Liters (L1)$ **=** $\frac{Final Molarity \left(M2\right) x Final Liters (L2)}{Starting Molarity (M1)}$

$Final Liters \left(L2\right)$ **=** $\frac{Starting Molarity \left(M1\right) x Starting Liters (L1) }{Final Molarity (M2) }$