How to attack Stoichiometry problems…

First thing is to use the information that you are given, and convert your way to what you are looking for.

You will be using three types of conversions:

$\frac{1 mol}{6.02 x 10^{23} particles ^{}}$ or the inverse $\frac{6.02 x 10^{23} particles ^{}}{1 mol}$

$\frac{1 mol}{22.4 Liters}$ or the inverse $\frac{22.4 Liters}{1 mol}$

$\frac{1 mol}{\left(molar mass\right)grams}$ or the inverse $\frac{\left(molar mass\right)grams}{1 mol}$

The main goal is to get amounts into moles! From moles we can convert to any other unit (grams-using molar mass, Liters at STP, or to particles)

And remember, the link to get from one substance to another is the mole ratios from the equation.

1. Given: Mg(HCO3)2 + 2 HCl → MgCl2 + 2 H2O + 2 CO2 .

How many grams of Mg(HCO3)2 will be needed to produce 0.0860 L of CO2?

Step 1: start with what you are given:

How many grams of Mg(HCO3)2 will be needed to produce **0.0860 L of CO2**?

$\frac{0.0860 L CO2}{}$

Remember: We want to get from CO2 to Mg(HCO3)2 . In order to do this we need to use the mole ratio!

Step 2: Convert to moles (since we were given L, we want to use our mol🡪L conversion):

$\frac{0.0860 L CO2}{}$ x $\frac{1 mole CO2}{22.4 L CO2}$

Step 3: Now that we are in moles of CO2, we must use the mole ratio from the equation to convert to moles of Mg(HCO3)2 .

$\frac{0.0860 L CO2}{}$ x $\frac{1 mole CO2}{22.4 L CO2}$x $\frac{1 mole Mg\left(HCO3\right)2}{2 mole CO2}$

Step 4: Now that we are in units of moles Mg(HCO3)2 , you can now use the molar mass to convert moles to grams.

Mg = 24 g , H = 2 x 1g = 2 g , C = 2 x 12g = 24g , O = 6 x 16g = 96g …

so 1 mole of Mg(HCO3)2 = 24+2+24+96 = 146g

Last step: Place our molar mass conversion into the equation

$\frac{0.0860 L CO2}{}$ x $\frac{1 mole CO2}{22.4 L CO2}$x $\frac{1 mole Mg\left(HCO3\right)2}{2 mole CO2}$x $\frac{146 g Mg\left(HCO3\right)2}{1 mole Mg\left(HCO3\right)2}$

Then go ahead and do your math! As you can see, all units cancel out. Tadaaa : )

