Extra Stoichiometry Practice
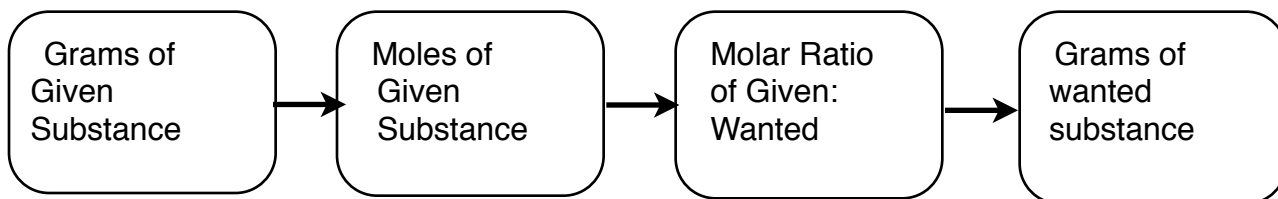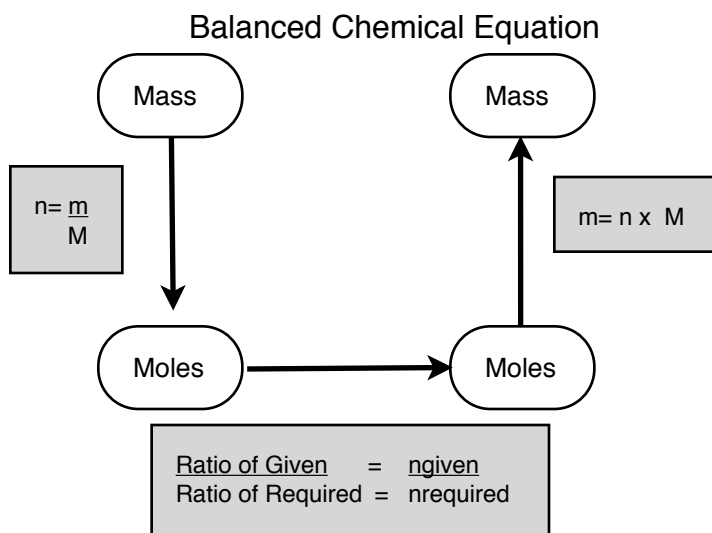
Reminder:

Start: Read the question carefully
1) Write the unbalanced equation
2) Balance the equation and determine the molar masses
3) Convert mass to given amount (moles)

$$\frac{\text{Ratio of Given}}{\text{Ratio of Required}} \quad \begin{matrix} = \\ = \end{matrix} \quad \frac{n_{given}}{n_{required}}$$

4) Convert amount of given substance to amount of required substance
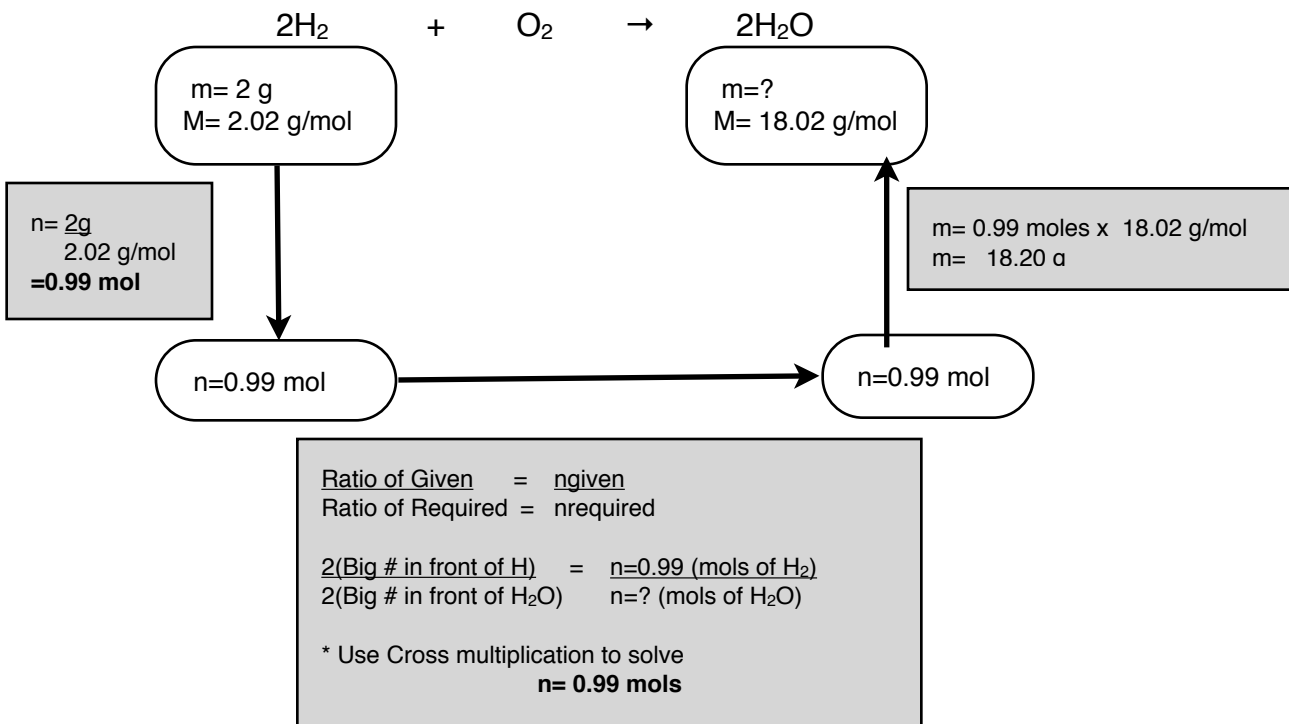5) Convert amount of required substance to required values (mass or atom #)

Grams of Given Substance	→	Moles of Given Substance	→	Molar Ratio of Given: Wanted	→	Grams of wanted substance

Alternate:

Balanced Chemical Equation

Mass		Mass

$n = \dfrac{m}{M}$

$m = n \times M$

Moles	→	Moles

$$\frac{\text{Ratio of Given}}{\text{Ratio of Required}} \quad \begin{matrix} = \\ = \end{matrix} \quad \frac{n_{given}}{n_{required}}$$

Example Using Alternate:

How many grams of water is produced if you have 2 g of hydrogen?

$$2H_2 \quad + \quad O_2 \quad \rightarrow \quad 2H_2O$$

m= 2 g M= 2.02 g/mol	m=? M= 18.02 g/mol

n= $\underline{2g}$
   2.02 g/mol
=0.99 mol

m= 0.99 moles x 18.02 g/mol
m=   18.20 a

n=0.99 mol   n=0.99 mol

$\underline{\text{Ratio of Given}}$ = $\underline{\text{ngiven}}$
Ratio of Required =   nrequired

$\underline{\text{2(Big \# in front of H)}}$ = $\underline{\text{n=0.99 (mols of }H_2)}$
2(Big # in front of H_2O)   n=? (mols of H_2O)

* Use Cross multiplication to solve
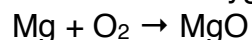**n= 0.99 mols**

Therefore 18.02 g of water are produced if you have 2 grams of hydrogen.

Now you solve (* Note, equations are NOT balanced!)
1) Solid aluminum reacts with oxygen to produce aluminum oxide. Given 25.0g of Al, how much Al_2O_3 is produced?

       $Al + O_2 \rightarrow Al_2O_3$
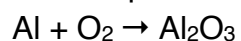
2) How much magnesium is required to produce 4.03 g of magnesium oxide. Solid magnesium reacts with oxygen gas.

       $Mg + O_2 \rightarrow MgO$

3) If 3.2 g of barium chloride ($BaCl_2$) is reacted with excess potassium sulfate(K_2SO_4), what mass of solid barium sulfate is produced?

       $BaCl_2 + K_2SO4 \rightarrow BaSO_4 + KCl$
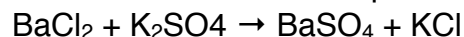
4) What mass of oxygen gas is required to produce a complete combustion 34.95g of propane, C_3H_8?

       $C_3H_8 + O2 \rightarrow CO_2 + H_2O$
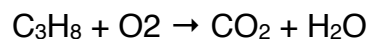
5) Bauxite ore contains aluminum oxide(Al_2O_3), which is decomposed using electricity to produce aluminum metal and oxygen. What mass of aluminum metal can be produced from 125g of aluminum oxide?

       $Al_2O_3 \rightarrow Al + O_2$