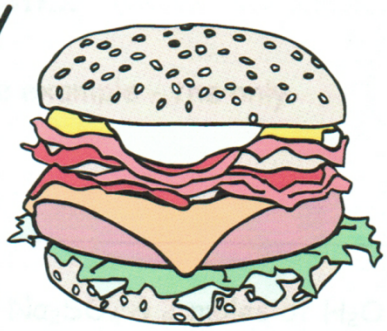
The Hamburger Analogy



One recipe for a bacon double cheeseburger is:

- 1 hamburger bun
- 2 hamburger patties
- 2 slices of cheese
- 4 strips of bacon

based on this recipe:

1. If i have five bacon double cheeseburgers:
    a. how many hamburger buns do i have? _____
    b. how many hamburger patties do i have? _____
    c. how many slices of cheese do i have? _____
    d. how many strips of bacon do i have? _____

2. How many bacon double cheeseburgers can you make if you start with:
    a. 1 bun, 2 patties, 2 slices of cheese, 4 strips of bacon _____
    b. 2 buns, 4 patties, 4 slices of cheese, 8 strips of bacon _____
    c. 1 dozen buns, 2 dozen patties, 2 dozen slices of cheese, 4 dozen strips of bacon _____
    d. 1 mole bun, 2 mole patties, 2 mole slices of cheese, 4 mole strips of bacon _____
    e. 10 buns, 20 patties, 2 slices of cheese, 40 strips of bacon_____

3. If you had fixings for 100 bacon double cheeseburgers, but when you were cooking you ruined 10 of them. What percentage of the bacon double cheeseburgers do you actually make? _____

Now, the chemistry problem...

NOTE: the math and the concepts are identical to the above example - the only difference is the recipe.

here are two example chemical recipes:

- $Na + Cl \rightarrow NaCl$
- 1 mole of H_2SO_4 & 2 moles of NaOH produce 1 mole of Na_2SO_4 & 2 moles of H_2O

Based on the recipes above:

1. If i have 1 mole of NaCl
   a. how many moles of sodium do i have? _____
   b. how many moles of chlorine do i have? _____

2. If i want to make 5 moles of Na_2SO_4:
   a. how many moles of H_2SO_4 do i need? _____
   b. how many moles of NaOH do i need? _____

3. How much Na_2SO_4 can i make if i have:
   a. 1 mole of H_2SO_4 and 2 mole of NaOH _____
   b. 10 mole of H_2SO_4 and 20 mole of NaOH _____
   c. 0.1 mole H_2SO_4 and 0.2 mole of NaOH _____
   d. 1 mole of H_2SO_4 and 20 mole of NaOH _____
   e. 0.42 mole of H_2SO_4 and 0.65 mole of NaOH _____
   f. 5 grams of H_2SO_4 and 5 grams of NaOH _____

YOU MUST WATCH THE ASSIGNED VIDEOS BEFORE PROCEDING TO THIS PAGE.

2. $4\ NH_3 + 6\ NO \rightarrow 5\ N_2 + 6\ H_2O$

a. How many moles of NH_3 are needed to produce 20 moles of N_2?

b. How many moles of NO are needed to produce 30 moles of H_2O?

c. Given 9 moles of NO, how many moles of N_2 are produced?

d. Given 12 moles of N_2, how many moles of H_2O are produced?

stoichiometry: grams to mole calculations

1. $C_7H_{16} + O_2 \rightarrow CO_2 + H_2O$

   a. If 400.0 grams of C_7H_{16} are used, how many moles of H_2O are produced?

   b. Given 15.4 moles of CO_2 are produced, how many grams of O_2 are needed?

   c. Given 360 grams of H_2O are produced, how many moles of C_7H_{16} were used?

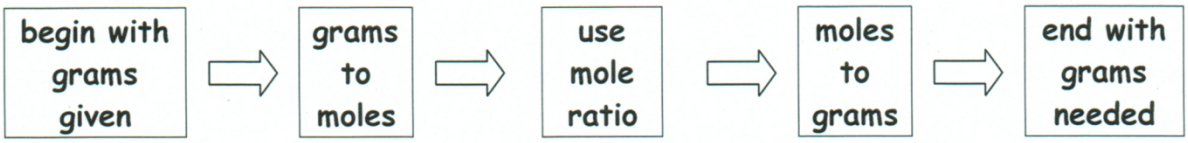
2. $Fe_2O_3 + C \rightarrow CO + Fe$

   a. Given 720.0 grams of Fe_2O_3, how many moles of CO can be produced?

   b. If 18.5 moles of iron are produced, how many grams of Fe_2O_3 are needed?

   c. Given that 11.3 moles of CO are produced, how many grams of C are required?

Stoichiometry: gram to gram worksheetiometry



Directions: Solve the following problems. Remember, a balanced chemical equation is needed before you begin.

1. If 10.0 g of magnesium react with hydrochloric acid, how many grams of magnesium chloride are produced?

   $Mg(s) + HCl(aq) \rightarrow MgCl_2(aq) + H_2(g)$

2. How many grams of chlorine gas must be reacted with excess sodium iodide if 10.0 g of sodium chloride are needed?

   $NaI(aq) + Cl_2(g) \rightarrow NaCl(aq) + I_2(s)$

3. How many grams of oxygen are produced in the decomposition of 5.00 g of potassium chlorate?

   $KClO_3(s) \rightarrow KCl(s) + O_2(g)$