Chemistry – Unit 7 Chemical Reactions
Rearranging Atoms

Background

Describe what you already know about each of these ideas. Give an example in each of the last 4 items.

Features of Our Current Model of Matter

Conservation of Mass

Chemical Formula

Subscripts in formulas

Coefficient (Hint: what is the function of a coefficient in math?)

Procedure:

1. Use your atom model kit to construct the reactant molecules for each chemical change below. Then rearrange the atoms to form the product molecules. Add more reactant molecules as needed to form complete product molecules with no left-overs.

2. Draw particle diagrams for each reactant molecule used and each product molecule produced under the reaction.

3. Determine the number of each <u>reactant</u> molecule you needed in order to make the product(s) with no leftovers (a complete reaction) and record each number as a coefficient in front of its reactant formula.

4. Determine how many <u>product</u> molecules you would get from the complete reaction. Write that number as a coefficient in front of each product formula.

Name _____

Date _____ Pd __

Rearranging Atoms

Data and Observations:

1. ____H_2 + ____O_2 → ____ H_2O

Diagram:

2. ____H_2 + ____Cl_2 → ____ HCl

Diagram:

3. ____Na + ____O_2 → ____ Na_2O

Diagram:

4. ____N_2 + ____H_2 → ____ NH_3

Diagram:

5. ____CH_4 + ____O_2 → ____CO_2 + ____H_2O

Diagram:

6. _____NO + ____O_2 → ____ NO_2

Diagram:

7. ____Fe + ____Cl_2 → ____ $FeCl_3$

Diagram:

8. ___CH_3OH + ____O_2 → ____CO_2 + ____H_2O

Diagram:

Analysis

1. In the equation for each reaction, compare the total number of atoms you have before the reaction (reactant atoms) to the total number after the reaction (product atoms).

2. At the beginning of the year we observed that mass is conserved in changes. How does your answer to question 1 explain conservation of mass?

3. Look at the product molecule (ammonia) in reaction #4.
   a. What does the coefficient tell us about this substance?

   b. What do the subscripts on the nitrogen and hydrogen in NH_3 tell us about the composition of the ammonia molecule?

   c. Note that the sum of the reactant coefficients does not equal the sum of the product coefficients for reaction #4. Yet in reaction #2, the sums are equal. Explain why the sums of coefficients do not necessarily have to equal one another in a reaction.