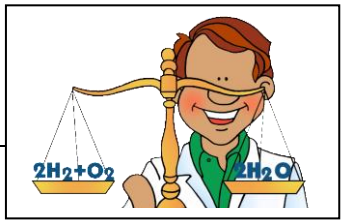
Week 15 – SCIENCE NOTE PAGE
Chemical Formulas & Equations



Remember, **The Law of Conservation of Mass**

- The Law of Conservation of Mass states: the mass of substances does _____ change during chemical reactions.

Writing Chemical Formulas

- **Chemical formulas** represent the atoms of each element in a molecule of a substance
- Example: C_3H_8O = rubbing alcohol

  C_3 = ___ atoms of carbon **H_8** = ___ atoms of hydrogen **O** = ___ atom of oxygen

Ionic Compound Formulas

- While ionic compounds deal with ions –charged atoms– the compound formulas are balanced or neutral with a charge of _____.
- Example: Salt –Sodium Chloride (NaCl)
  1. Sodium (Na) ion has a positive charge of one (Na1+)
  2. Chloride (Cl), has a negative charge of one (Cl1-).
  3. Positive and negative charges have the sum of zero if there is one sodium atom for every chlorine, so the formula NaCl is correct.

Covalent Compound Formulas

- For a covalent compound, the chemical formula shows how many _____ of each kind join together to form the molecules of the compound. Therefore, it is called a molecular formula.
  - _____ are used to signal how many atoms of each element are in the molecular formula.
  - Example: Sulfur trioxide = SO_3
    - TRY ONE: di-nitrogen tri-oxide
    - _____

Number of atoms	Prefix
1	mono-
2	di-
3	tri-
4	tetra-
5	penta-
6	hexa-
7	hepta-
8	octa-
9	nona-

Using Chemical Formulas to write Chemical Equations

- **Chemical formulas** (example: H_2O) are used to write **chemical** _____.
- Just like a math equation, a **chemical equation** shows a relationship between substances on the left (reactants) and right (products) sides of the equation.
  - A "___" sign means two substances are added together.
  - The "____ " is similar to an equal sign. (→ means "yields")
  - Example: the reaction of carbon and oxygen to form carbon dioxide.

    $C + O_2$ → **CO_2**

    reactants **product**
- Example: Aluminum is not found "pure" in nature. A chemical reaction is used to produce the aluminum for your aluminum foil. Here's **the reaction** and it's **chemical equation**:

  aluminum chloride + potassium → aluminum + potassium chloride

  $AlCl_3$ + K → Al + KCl

  _____ → _____

- The equation tells you the basic facts of the reaction. But as written, this reaction violates a basic law of nature. Something is missing. **What is it?** _____

Balancing Equations

- Both sides of a chemical equation need to have the _____ number of atoms of each element for the equation to be _____.
- How to balance chemical equations:
    1. Write the chemical equation with chemical symbols.
    2. _____ the number of atoms of each element on both sides of the equation.
    3. Balance atoms using coefficients. (A coefficient is a number placed _____ the element or compound.)
    4. Check to make sure the equation is balanced.
- Example: balance the aluminum reaction

$$AlCl_3 + K \rightarrow Al + KCl$$

$$\_\_\_AlCl_3 + \_\_\_K \rightarrow \_\_\_Al + \_\_\_KCl$$