Chapter 3 → Stoichiometry

Atomic masses

- Mass spectrometer
  - Atoms/molecules are passed into a beam of high speed electrons which knock off electrons to be analyzed and changed into positive ions
- Avergae atomic mass
  - (mass of element × abundance) + (mass of element × abundance)

Moles

- Mole (mol)
  - Number equal to carbon atoms exactly in 12g of pure ^{12}C
  - Avagadro's constant
    - $6.02214 \cdot 10^{23}$
  - One mole has $6.02214 \cdot 10^{23}$ atoms of that substance

Molar mass

- Mass of 1 mole of Carbon is $12.01g$
- Molar mass
  - Mass in grams of 1 mole of a compound
  - Molar mass is also known as molar weight
- Formula unit is used instead of molecule because ionic compounds and polyatomic ions *do not count as molecules*

Percent composition of compounds

- Mass percent
  - Percent abundance of elements/compounds per solution/mixture

Determining the formula of a compound

- Empirical formula
  - Simplified version of the formula
- Molecular formula
  - Exact number of molecules involved
  - $molecular\ formula = empirical \times \frac{molar\ mass}{empirical\ mass}$

Chemical Equations

- Chemical change involves the reorganization of the atoms in one or more substances
- Atoms are neither created nor destroyed
- All atoms present in the reactants must be accounted for among the products
- Obeying the rules is accomplished by balancing the requation