Chemistry
Notes: Ch 8

- A chemical reaction can be concisely represented by a chemical equation
- In a **chemical equation** the arrow separates the formulas of the reactants (left) from the formulas of the products (right)
  The substances that undergo a chemical change are the reactants
  The new substances formed are the products

- Special symbols are written after formulas in equations to show a substance's state
  (s) solid
  (l) liquid
  (g) gas
  (aq) substance dissolved in water
- a **skeleton equation** is a chemical equation that does not indicate the relative amounts of the reactants and products involved in the reaction
- a **catalyst** is a substance that speeds up the rate of a reaction but that is not used in the reaction.
  written above the arrow in a chemical equations
- **Coefficients** are the numbers placed in front of the symbols for the respective parts
  when there is no coefficient it is an understood 1
  used so the same number of atoms of each element are on each side of the equation
- in every **balanced equation** each side of the equation has the same number of atoms of each element
- Rules for balancing equations
  1. Determine the correct formulas for all the reactants and products in the reaction, use parentheses to indicate the sate in
     which the reactants and products exists
  2. Write the formulas for the reactants on the left and the formulas for the products on the right with an arrow in between. If
     two or more reactants or products are used, separate their formulas with plus signs. This leaves you with a skeleton equation
  3. Count the number of atoms of each element in the reactants and products. For simplicity, a polyatomic ion appearing
     unchanged on both sides of the equation is counted as a single unit.
  4. Balance the elements one at a time by using coefficient. It is best to begin the balancing operation with elements that
     appear only once on each side of the equation. You must not attempt to balance an equation by changing the subscripts
     in the chemical formula.
  5. Check each atom or polyatomic ion to be sure that the equation is balanced
  6. Finally, make sure all the coefficients are in the lowest possible ration that balances

- **Combination reaction** is when two or more substances combine to form a single substance.
  most common with with either 2 elements or 2 compounds

- **Decomposition reaction** is a single compound broken down into two or more substances
  usually the combination of elements and compounds

- **Single-replacement reaction** is when atoms of one element replace the atoms of a second element in a compound

- **Activity series of metals** lists metals in order of decreasing reactivity. A reactive metal will replace any metal listed below in in the series.

Activity Series of Metals	
Name	**Symbol**
Lithium	Li
potassium	K
Calcium	Ca
Sodium	Na
Magnesium	Mg
Aluminum	Al
Zinc	Zn
Iron	Fe
Lead	Pb
(Hydrogen)	(H)*
Copper	Cu
Mercury	Hg
Silver	Ag

* Metals from Li to Na will replace H from acids and water, from Mg to Pb they will replace H from acids only

- **Double-replacement reactions** involve an exchange of positive ions between two reacting compounds.
  usually take place between two reacting compounds in aqueous solution
  precipitate formed in double-replacement reactions can be identified using a table of solubilites

- Both single and double replacement reactions can written as net ionic equations in which spectator ions are deleted from both sides of the equation
- **Combustion reaction** an element or a compound reacts with oxygen often producing energy as heat and light
  commonly involve hydrocarbons, compounds of hydrogen and carbon

- **Complete ionic equation** an equation that shows dissolved ionic compounds as their free ions

- **Spectator ion** ions that are not directly involved in a reaction

- **Net ionic equation** the equation that indicates only those particles that actually take part in the reaction