

### Chapter 18 Reference Sheet

- 4 factors that affect the rate of a reaction:
  - Temperature
    - Increase in temperature
      - Increase in particle movement
      - Increase in kinetic energy
      - Increase in rate of reaction
      - Cause it to go from a solid to a liquid or a liquid to a gas
    - Decrease in temperature
      - Decrease in particle movement
      - Decrease in kinetic energy
      - Decrease in rate of reaction
      - Cause it to go from a gas to a liquid or a liquid to a solid
  - Concentration
    - Increase in concentration = increase in rate of reaction
    - Decrease in concentration = decrease in rate of reaction
  - Particle Size
    - Decrease in particle size = increase in surface area = increase in rate of reaction
  - Use of a Catalyst
    - Decrease the activation energy (amount of energy needed for reaction to take place)
    - Decrease the amount of time a reaction will take place
    - Are not used up in the reaction (quantity of catalyst remains the same)
- Le Châtelier's Principle
  - Concentration
    - Adding product → reactants
    - Adding reactant → product
  - Temperature
    - Adding heat → reactants
    - Removing heat → product
  - Pressure
    - Adding pressure → product
    - Reducing pressure → reactants
  - Catalysts do not affect the amounts of reactants and products at equilibrium
- Types of Reactions
  - Exothermic – heat is exiting the system
  - Endothermic – heat is entering the system

### Chapter 20 Reference Sheet

- Types of Reactions
  - Synthesis: two or more substances combine to form one new compound
    - $A + B \rightarrow AB$
  - Decomposition: a single compound breaks down into two or more simpler substances
    - $AB \rightarrow A + B$
  - Single replacement: one element replaces a similar element in a compound
    - $AB + X \rightarrow AX + B$
  - Double replacement: two compounds trade places to form two new compounds
    - $AB + BY \rightarrow AY + BX$
  - Combustion: a substance combines with oxygen ( $O_2$ )
    - $A + O_2 \rightarrow$
  - Oxidation – Reduction
    - Change in oxidation numbers
  - Acid + Base  $\rightarrow$  salt +  $H_2O$ 
    - Also known as a neutralization reaction
- Oxidation
  - Gaining oxygen
  - Losing electrons
    - Complete loss of electrons
    - Shift of electrons away from an atom in a covalent bond
  - Loss of hydrogen by a covalent compound
  - Increase in oxidation number
  - Oxidizing agent accepts electrons
- Reduction
  - Losing oxygen
  - Gaining electrons
    - Complete gain of electrons
    - Shift of electrons towards an atom in a covalent bond
  - Gain of hydrogen by a covalent compound
  - Decrease in oxidation number
  - Reducing agent donates electrons
- Aqueous Solutions – water contains dissolved substances
  - Solute
    - Smaller quantity in a solution
    - Portion that is dissolved
  - Solvent
    - Larger quantity in a solution
    - Portion that does the dissolving
- Diffusion
  - Movement from an area of high concentration to an area of low concentration