

Topics:

- 1) Electrolytes vs. non-electrolytes:
 - all soluble ionic compounds and strong acids are strong electrolytes (conduct well).
 - Weak acids and weak bases are weak electrolytes (conduct weakly).
 - All other covalent molecules are non-electrolytes (no conduction).
- 2) Know the strong acids: HI, HBr, HCl, HNO₃, H₂SO₄, HClO₄, [HClO₃]
 - All other acids are weak acids (examples: CH₃COOH [HC₂H₃O₂], HF, HNO₂)
 - Ammonia (NH₃) and other similar amines (NR₃, such as CH₃NH₂) are weak bases.
- 3) Precipitation Reactions:
 - Be able to use solubility rules (You only need to memorize alkali metal ions, NH₄⁺ and NO₃⁻.)
 - Predict products of precipitation reactions.
 - Be able to write molecular equations and net ionic equations.
- 4) Acid Base Reactions
 - Arrhenius Acids (release H⁺ in water) and Arrhenius Bases (release OH⁻ in water).
 - Brønsted Acids (proton donors) and Brønsted Bases (proton acceptors)
 - Monoprotic, diprotic and triprotic acids
 - Acid Base neutralization reactions: acid + base → salt + H₂O (Be able to predict products.)
 - Definition of a salt
- 5) Oxidation-Reduction Reactions
 - Identification of redox reactions (charges change because of loss and gain of electrons).
 - Determining oxidation numbers
 - Writing half reactions
 - Determining oxidizing agents and reducing agents
 - Types of Redox reactions: *Be able to predict products for all types.*
 - a) Combination reactions
 - b) Decomposition reactions
 - c) Displacement reactions: *Use Reduction Potential chart to determine if reactions occur.*
 1. Hydrogen & metal displacement
Compare E° values: using reduction potential chart, more (+) half reaction must be reduction (forward direction), more (-) half reaction must be oxidation (reverse direction)
 2. Halogen displacement: follows series: F₂ > Cl₂ > Br₂ > I₂ or use E° values, as above
 - d) Disproportionation reactions: a special redox reaction where the same species is both oxidized and reduced.
- 6) Concentration of Solutions (Molarity):
 - How to make solutions from solid or by dilution of a solution ($M_iV_i = M_fV_f$).
 - Always use a volumetric flask to make solutions with precise concentrations.
- 7) Gravimetric Analysis Calculations
- 8) Acid Base Titrations: calculations, equivalence point, use of indicators
- 9) Redox Titrations: calculations, equivalence point, use of indicators (sometimes internal indicators)
- 10) Beer's Law from Brass Lab prelab

Review Practice:

- **Chapter 4 Multiple Choice Review**
- **Review WKS (textbook questions)**

- **Study Guide (optional):** p. 76 #2, 4, 5, 6, 8, 12, 13, 14, 15, 16, 22, 23, 27, 30, 33
(Study Guide pp. 76-78 #2f, 22b & 22c answers are incorrect. Corrections are posted on website.)