

Final Exam Study Topics

Unit 1: Intro

- Direct and inverse relationships
- Identify substances based on physical properties
- Metric conversions/dimensional analysis
- Percent error
- Read an instrument to correct sig figs
- Scientific notation
- Significant figures

Unit 2: Matter and the atom

- Atomic theory
- Chemical and Physical Changes
- Chemical and Physical Properties
- Determine number of protons, neutrons, electrons, atomic number, atomic mass, mass number, etc.
- Isotopes
- Mixtures
- States of matter properties
- Subatomic particles

Unit 3: Periodic Table, Quantum, e- configuration

- Bohr model
- Current periodic law
- Electron configuration (atoms and ions)
- Families/Groups of the periodic table
- Light Equations
- Metals, nonmetals, metalloid locations and properties
- Oxidation numbers
- Properties of elements
- PT history
- Quantum numbers
- Rules for electron configuration
- Trends
- Valence electrons

Unit 4: Ionic bonding and naming

- Anion
- Cation
- Characteristics of bond
- Combine elements to make a compound
- Name binary, ternary and hydrates
- Write formulas for binary, ternary and hydrates

Unit 5: Covalent bonding and naming

- Characteristic of bonds
- Diatomic molecules
- Intermolecular forces
- Lewis dot diagrams
- Name binary and acids (binary and ternary)
- Polar, nonpolar, coordinate, network bonds
- VSEPR theory
- Write formulas for binary and acids (binary and ternary)

Unit 6: Chemical reactions

- Balance equations
- Classify reactions
- Complete Ionic equations
- Interpret a phase diagram
- Law of Conservation of mass
- Net Ionic equations
- Phase Changes
- Predict products of reactions
- Symbols

Unit 7 Moles and Stoichiometry

- Empirical formula
- Formula mass
- Limiting reactants
- Mole conversions
- Molecular formula
- Percent composition
- Percent yield
- Stoich problems

Unit 8: Gases

- Boyle's law
- Charles' law
- Combined gas law
- Dalton's law
- Gay Lussac's law
- Ideal gas law
- Interpret a vapor pressure diagram
- Kinetic Molecular Theory
- Properties of an ideal gas
- Relationship between variables

Unit 9: Solutions, Acid, Base

- Acid, Base, Conjugate acid, Conjugate base
- Arrhenius definitions
- Bronsted-Lowry definitions
- Electrolytes
- Indicator definition and examples
- Interpret a solubility curve
- Likes dissolve likes
- Molarity calculations
- Neutralization reactions
- Parts of salt
- pH calculations
- Polyprotic vs. monoprotic acids
- Properties of acids and bases
- Solute vs. solvent
- Solutions, colloids, suspensions
- Strong vs. weak acids and bases
- Titration calculations

Unit 10: Thermodynamics and Kinetics

- Calculate Gibb's free energy
- Calculate K_{eq}
- Catalysts
- Difference between heat and temperature
- Effects on reaction rates
- Endo vs. exothermic
- Enthalpy vs. Entropy

- Heat calculations
- Heating curve
- Hess' Law
- Interpret a heating curve
- Interpret a reaction diagram
- LeChatlier's Principle

Unit 11: Nuclear

- Decay series
- Differences between nuclear reactions and chemical reactions
- Fill-in reactions
- Fission vs. fusion
- Half-life problems
- Identify type of decay
- Mass Defect
- Penetrating ability of particles
- Radioactive particles and their properties

Unit 12: Redox

- Anode and cathode
- Assign oxidation numbers
- Calculating E°
- Electrochemical cell
- Electrochemistry
- Identify substance oxidized and reduced
- Redox vs. Nonredox