

Outline of Course Topics for Honors Chemistry

Topics highlighted in red are specific to Honors Chemistry.

Honors Chemistry Course Description:

This course focuses on matter, its properties, and its changes. During the year, the following topics will be covered: measurement, problem solving, atomic structure, the periodic table, chemical bonding, stoichiometry, gases, solutions and oxidation-reduction reactions. There is an emphasis on the mathematical approach and experimental data analysis. **This course is designed to progress at a more rapid pace than the regular chemistry course and may cover more topics and laboratory experiments.**

Topics and order of topics are subject to change at instructor discretion.

First Nine Weeks Topics:

- Introduction: Procedures/Expectations
Defining chemistry
Periodic table/elements
Lab apparatus
Lab safety
- Unit 1: Scientific notation
Metric system
Significant figures
Measurement
Accuracy/precision/percent error
Dimensional analysis
- Unit 2: Properties of matter
Classifying matter
Conservation of Mass
Density
Specific heat
Endo/Exothermic
- Unit 3: Atomic history
Nuclear model of the atom
Subatomic particles
Average atomic mass
The mole
Avogadro's number
Molar mass
Mole dimensional analysis

Quarter One Examination

Second Nine Weeks Topics:

- Unit 4: Bohr Model of the atom
Quantum Mechanical model
Electron configurations
Electron dot diagrams
Ionic charge/valence number
Periodic trends
- Unit 5: Naming ions
Monatomic formula naming/writing
Polyatomic formula naming/writing
Naming acids
Percent composition/hydrates
Empirical/molecular formulas
- Unit 6: Electronegativity bond type
Metallic bonding
Ionic bonding
Covalent bonding
Lewis structures
VSEPR

Quarter Two Examination



Third Nine Weeks Topics:

Unit 7: Writing reactions
Identifying types of reactions
Balancing reactions
Predicting products w/ **complex synthesis and oxy-acid decomposition**
Activity series
Solubility/phase notation

Unit 8: Stoichiometric quantities
Limiting reactants
Percent yield
Excess Reactants

Unit 9: Kinetic theory of gases
Temperature/pressure scales and conversions
STP
Ideal gas law
Dalton's Law
Formula weight w/ideal gas law
Gases stoichiometry not at STP

Quarter Three Examination

Fourth Nine Weeks Topics:

Unit 10: Behaviors of gases
Boyle/Charles/Gay-Lussac gas laws
Combined gas law

Unit 11: Solution terms
Molarity/dilutions
Percent solutions
Molality
Solubility curves
Colligative properties
Formula weight determination

Unit 12: Naming acids/bases
Acid/base properties
Arrhenius acids/bases
pH/pOH calculations
K_a/K_w/K_{eq}
Neutralization w/net ionic equations
Titrations

Unit 13: **Redox reactions**
Oxidation numbers
Half reactions
Balancing

Unit 14: Nuclear properties
Alpha/beta decay
Half-Life
Calculating half-life
Waste
Energy

Unit 15: Organic chemistry
Properties of organics
Naming/drawing alkanes/
alkenes/alkynes

Quarter Four Examination