



**Catholic
Memorial**
HIGH SCHOOL

Year Long Course Plan

Department: Science

Course: Honors Chemistry 734/735

Essential Learning Outcomes: After successfully completing this course, students will be able to:

1. Analyze data and draw conclusions relevant to the purpose of an experiment.
2. Become familiar with the language of chemistry.
3. Select and use appropriate equations, and explain the physical relationship described by the equation.
4. Describe the model of atomic structure and its development.
5. Describe the properties of atoms, molecules, and matter during physical and chemical interactions.
6. Explain the design of the periodic table in terms of trends and relationships and its relationship to atomic structure.
7. Explain exchanges of energy in chemical interactions and conservation of mass.
8. Explain how substances interact with one another to produce new substances.
9. Using patterns in chemical and physical properties, predict the outcome of chemical interactions and physical changes.
10. Evaluate current trends and advances in science and technology.

Quarter 1	Quarter 2
<p>Unit I – Chemistry: The Study of Change (ELO 1,2)</p> <ul style="list-style-type: none"> • Scientific method • Significant figures and scientific notation • Element names and symbols • Classification and properties of matter • Dimensional analysis • Physical and chemical changes and properties • ASSESSMENT: Names/Symbols Quiz • ASSESSMENT: Density Lab • ASSESSMENT: Experimental Tour of the Chemistry Lab • ASSESSMENT: Chemical/Physical Properties Lab • ASSESSMENT: Chemical Changes Lab • ASSESSMENT: Unit I Test <p>Unit II – Atoms, Molecules, and Ions (ELO 1,4)</p> <ul style="list-style-type: none"> • History of the discovery of the atom • Introduction to the periodic table • Molecules, ions, and isotopes • Writing chemical formulas and naming compounds • ASSESSMENT: Metals/Nonmetals Lab • ASSESSMENT: Names/Formulas Quiz • ASSESSMENT: Unit II Test 	<p>Unit III – Mass Relationships in Chemical Reactions (ELO 5,7,8)</p> <ul style="list-style-type: none"> • Atomic mass and isotope abundance • Avogadro’s number and molar mass • Mass, moles, atoms, and molecules conversions • % Composition and empirical and molecular formula determination • Chemical equations, balancing, and reaction types • Stoichiometry, limiting reagent, and % yield • ASSESSMENT: Unit III Part I Quiz • ASSESSMENT: Activity Series Lab • ASSESSMENT: CuSO₄ % Composition Lab • ASSESSMENT: CuSO₄ and Fe Limiting Reagent Lab • ASSESSMENT: Unit III Part II Quiz • ASSESSMENT: NaOCl/Na₂S₂O₃ Stoichiometry Lab • ASSESSMENT: Unit III Test
Quarter 3	Quarter 4
<p>Unit IV – Reactions in Aqueous Solutions (ELO 2,5,8)</p> <ul style="list-style-type: none"> • Oxidation and reduction 	<p>Unit VI – Quantum Theory and the Electronic Structure of Atoms (ELO 3,4,6,9)</p>

- Precipitation reactions and net ionic equations
- Molarity
- ASSESSMENT: Redox Lab
- ASSESSMENT: Unit IV Test

Unit V – Gases (ELO 3,5,8)

- Atmospheric composition
- Greenhouse effect and global warming: an objective look
- Ozone issues, indoor air pollution, and acid rain
- Boyle’s Law, Charles’ Law, Gay-Lussac’s Law, and Combined Gas Lab
- Ideal Gas Law
- Partial pressures
- Gas stoichiometry
- Kinetic theory, effusion, and diffusion
- ASSESSMENT: Boyle’s Law Graphing
- ASSESSMENT: HCl and Mg Gas Stoichiometry Lab
- ASSESSMENT: Gas Test
- ASSESSMENT: Atmosphere Test

- Properties of waves and electromagnetic radiation
- Quantum theory
- Bohr model and line spectra
- Quantum numbers and orbitals
- Electron configuration and orbital filling rules
- ASSESSMENT: Scientists Presentation
- ASSESSMENT: Spectroscope Calculations
- ASSESSMENT: Unit VI Test

Unit VII – Periodic Relationships Among the Elements (ELO 6,9)

- Effective nuclear charge
- Atomic and ionic radius trends
- Ionization energy and electronegativity
- ASSESSMENT: Unit VII Test

Unit VIII – Chemical Bonding (ELO 2,5)

- Lewis dot diagrams
- Resonance
- VSEPR and molecular shapes
- ASSESSMENT: Unit VIII Test

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