Chemistry Credit Recovery

COURSE DESCRIPTION: This course adheres closely to standards for the teaching of chemistry. It emphasizes the mathematical, theoretical, and experimental basis of modern chemistry. Emphasis is placed on the use of theoretical and mathematical concepts to explain and predict chemical behavior.

COURSE OBJECTIVES: This course has been specifically built with the credit recovery student in mind. The course content has been appropriately grouped into smaller topics to increase retention and expand opportunities for assessment. Students engage in learning through multimedia activities, enhancing the information through contextual presentations. Post-topic quizzes are presented with each topic of content. Audio readings are included with every portion of content, allowing auditory learners the opportunity to engage with the course. Test pools and randomized test questions are utilized as well as unit exams, ensuring that students taking the course will not be presented with the same assessment content. The course included pre-topic vocabulary lists that introduce the content vocabulary in English and in Spanish.

PREREQUISITES: None

COURSE LENGTH: Two Semesters

REQUIRED TEXT: No required textbook for this course.

MATERIALS LIST: No required materials for this course.

COURSE OUTLINE:

Module I: An Introduction to Chemistry

- Ethics and Pseudoscience
- Scientific Research, Advances, Costs, and Benefits
- Careers and Choices
- Data and Measurement
- Accuracy and Precision
- Powers of Ten and Scientific Notation
- Significant Figures
- Safety in the Laboratory
- Density Lab

Module II: Chemistry All Around Us

- Classifying Matter
- Physical Properties
- Physical Changes
- Chemical Properties
- Chemical Changes
- Chemical and Physical Changes Lab
- Separating Mixtures
- Separating Mixtures Lab

Module III: Atomic Structure

- History of the Atom
- The Changing View of the Atom
- Quantum Theory
- The Atom
- Atomic Orbitals
- Electron Configurations
- Light and the Electromagnetic Spectrum
- Atomic Spectra and Quantum Mechanics
- Atomic Spectrum Lab

Module IV: The Periodic Table

- History of the Periodic Table
- The Modern Periodic Table
- Elements
- Isotopes
- Valence Electrons and Ions
- Naming Ions
- Configuration Blocks
- Periodic Trends

Module V: Elements Form Compounds

- Bonds
- Ionic Compounds

- Covalent Compounds
- Ionic and Covalent Bonds Lab
- Resonance Structures
- Molecular Shapes
- Molecular Models Lab
- Polar Bonds and Molecules
- Intermolecular Forces
- Hydrocarbons
- Functional Groups and Polymers

Module VI: Chemical Reactions

- A Measure of Matter
- Molar Mass
- Percent Composition
- Empirical and Molecular Formulas
- Reading Chemical Equations
- Types of Chemical Reactions
- Balancing Equations
- Chemical Reactions Lab
- Stoichiometry
- Limiting Reagent and Percent Yield

Module VII: Solids, Liquids, and Gases

- Kinetic Molecular Theory
- Pressure
- Gas Laws
- Ideal Gas Law Lab
- Properties of Liquids
- Properties of Solids
- Phase Changes
- Phase Diagrams

Module VIII: Water and Solution Chemistry

- Properties of Water

- Solutions
- Precipitation Reactions
- Concentration
- Colligative Properties
- Acids and Bases
- Strong vs. Weak
- Acid-Base Reactions
- Titration
- Titration Lab
- Oxidation-Reduction
- Electrochemical Cells

Module IX: Chemical Thermodynamics and Equilibrium

- Heat and Temperature
- Heat Flow
- Enthalpy Changes
- Thermochemical Equations and Hess's Law
- Laws of Thermodynamics
- Spontaneity and Free Energy
- Collision Theory
- Reaction Rates
- Reaction Rates Lab
- Reaction Rates Lab Lesson
- Dynamic Equilibrium

Module X: Nuclear Chemistry

- Radioactive Decay
- Decay Rate
- Fission and Fusion
- Conservation of Energy
- Nuclear Energy in Society

CREDITS: **Semester A High School Credits**, **Semester B High School Credits**