Curriculum Map Summary
Course: Chemistry

Course Summary:

General Chemistry is a semester-long course for one science credit. Students explore the fundamental principles of chemistry which characterize the properties of matter and how it reacts. Computer-based and traditional laboratory techniques are used to obtain, organize and analyze data. Conclusions are developed using both qualitative and quantitative procedures.

Overarching Key Concepts and Enduring Understandings:

Topics include, but are not limited to laboratory safety, matter and change, measurement, atomic structure, electron configuration, the periodic table of the elements, ionic and covalent bonding, and balancing equations.

Units	Key learning objectives	Key Concepts	Major projects/assessments
Laboratory Safety	-The student will be able to apply laboratory safety procedures. -The student will be able to identify basic laboratory equipment.	-Laboratory Safety -Laboratory Equipment Identification	-Laboratory Safety Test -Laboratory Safety Contract -Equipment Quiz
Measurement and Significant Figures	-The student will be able to identify and apply the scientific method. -The student will be able to identify and use appropriate units of measurement and uncertainty in measurements.	-Scientific method -Measurements	Scientific Method Quiz The Escape Room

Measurement/ Dimensional Analysis	-The student will be able to convert among unit prefixes. -The student will be able to convert between amu and moles using Avogadro's number.	-Conversion Factors -Avogadro's Number and the Mole	Dimensional Analysis Dice Game
Matter	-The student will be able to describe substances of matter according to its extensive and intensive properties. -The student will be able to demonstrate the ability to classify the different types of matter. -The student will be able to demonstrate the ability to explain how matter may be identified, classified, and changed.	- Properties of Matter -Classification of Matter -Changes in Matter -Writing a lab report (initial)	-Classification of extensive and intensive properties -Small group models (solid, liquid, gas, plasma, Bose-Einstein condensates) -Laboratory Option 1
Atomic Structure	-The student will be able to demonstrate the ability to trace the history of the development of the modern atomic theory and model. -The student will be able to distinguish between the three main subatomic particles and be able to describe the structure of an atom using appropriate language (e.g.: atom, ion, isotope, subatomic particle, atomic number, mass number, average atomic mass, and atomic mass unit). -The student will be able to	Atoms The Nuclear Model of the Atom	-Formal Assessment

	demonstrate the ability to analyze the fundamentals of radioactivity.	Isotopes and Atomic Mass	-Candium Laboratory
Periodic Table	-The student will be able to demonstrate the ability to describe the origin and organization of the modern Periodic Table of the Elements. -The student will be able to compare ionization energy, electronegativity, and atomic radius. -The student will be able to contrast the trends in electron configuration properties as one proceeds across a period and down a family of elements on the Periodic Table.	-The Periodic Table of the Elements -Electron Configuration -Periodic Trends	-Battleship Electron Configurations -Assessment
Chemical Nomenclature	-The student will be able to recognize, interpret, explain, and create formulas for ionic compounds. -The student will be able to name a molecular compound given its formula and vice versa. -The student will be able to identify acids and bases based on their products when	-Ionic Compounds -Molecular Compounds -Acids and Bases	-Laboratory

	dissolved in water. Students will also be able to recognize and recall chemical formulas and names for acids and bases.		
Ionic and Covalent Bonding	-The student will be able to determine the number of valence electrons for any element and draw an electron dot diagram for any atom. -The student will be able to apply the octet rule to predict the charges of the most common ions formed by the representative elements. -The student will be able to explain how various physical properties result from the ionic crystal lattice, such as strength, hardness, high melting points, brittleness, and electrical conductivity. -The student will be able to explain and draw the process that illustrates how ionic bonds are formed when electrons are transferred in terms of the electrostatic attraction.	-Ions -Ionic Bonds and Ionic Compounds -Lewis Dot Structure -Nomenclature	
Covalent Bonding and Nomenclature	-The student will be able to describe how a covalent bond forms, including the energy change involved in the process. -The student will be able to use the octet rule to draw Lewis electron dot structures for simple molecules. Know how and when to incorporate double and triple bonds into	- Lewis Electron Dot Structures	

	the structures. -The student will be able to predict the shapes of molecules and polyatomic ions using VSEPR theory. -The student will be able to describe how the electronegativity difference between two atoms in a covalent bond results in the formation of a nonpolar covalent, polar covalent, or ionic bond. -The student will be able to describe the process of electron promotion and hybridization during the formation of hybrid orbitals. -The student will be able to explain the relationship between electron domain geometry and the various types of hybrid orbitals.	-Molecular Geometry -Polarity and Intermolecular Forces -Hybridization of Atomic Orbitals	ADI - Lab One
Chemical Equations and Reactions	-The student will be able to use coefficients to balance chemical equations so that the law of conservation of mass is followed. -The student will be able to use the activity series to correctly predict whether a given reaction will occur. -The student will be able to predict the products of simple reactions, given only the reactants.	-Chemical Equations -Types of Chemical Reactions	

The Mole and Stoichiometry	-The student will be able to define the mole and its relationship to Avogadro's number. -The student will be able to identify three methods for measuring the amount of matter in a sample. -The student will be able to explain Avogadro's hypothesis and how it relates to the volume of a gas at standard temperature and pressure. -The student will be able to use the mole road map to make two-step conversions between mass, number of particles, and gas volume. -The student will be able to calculate the percent composition of a compound either from mass data or from the chemical formula. Use percent composition to calculate the mass of an element in a certain sample of a compound. -The student will be able to use mole ratios to convert between amounts of substances in a chemical reaction. -The student will be able to use volume ratios and other stoichiometric principles to solve problems involving mass, molar amounts, or volumes of gases. -The student will be able to analyze a chemical reaction in	- The Mole Concept -Mass, Volume, and the Mole -Chemical Formulas -Mole Ratios -Stoichiometric Calculations -Limiting Reactant and	

	order to determine which reactant is the limiting reactant and which is the excess reactant.	Percent Yield	