Chemistry (one year)
High School
Standards, Supporting Skills, Assessments, and Resources

Indicator 1: Describe structures and properties of, and changes in, matter.

Bloom's Taxonomy Level	Standard	Supporting Skills	Assessments	Resources
(Analysis)	**9-12.P.1.1A. Students are able to distinguish between the changing models of the atom using the historical experimental evidence.** **Examples**: Dalton, Thompson, Rutherford, Bohr, wave-mechanical models			
(Synthesis)	**9-12.P.1.2A. Students are able to predict electron configuration, ion formation, reactivity, compound formation, periodic trends, and types of compounds formed based on location on the Periodic Table.** **Examples**: periodic trends including ionization, energy, electronegativity, atomic and ionic size, and shielding effect.	Chemical Bonds and Electron Configuration Names and Formulas for Ionic Compounds - Binary -Ternary Names and Formulas for Molecular Compounds -Binary -Ternary Classification of Elements Groups Metals, Nonmetals, Metalloids		Chapter 8.1 Chapter 8.3 Chapter 6.2

		Natural vs. Synthetic Block s,p,d,f Electron Configuration Periodic Trend Atomic Radii Ionic Radii Ionization Energy Electonegativity Electron Affinity Shielding Affect Exceptions to Trends -"D" block - Row 2 & 3 Electronegativity Polarity in reference to bonding		Chapter 6.3
(Synthesis)	**9-12.P.1.3A. Students are able to identify five basic types of chemical reactions and predict the products.** • Single replacement, double replacement, synthesis, decomposition, and combustion reactions • Describe the properties and interactions of acids, bases, and salts. • Calculate pH, pOH, $[H_3O^+]$,	Physical and Chemical Properties Classification Arrhenius/Bronsted-Lowry/Lewis PH vs.pOH Strength of Acid/base Neutralization - Writing equation - Titration		Chapter 19:1 Chapter 19:3

	[OH^-]. • Distinguish between Arrhenius, Bronsted-Lowry, and Lewis definitions of acids and bases.	- Buffer -Salt of hydrolysis		
(Synthesis)	**9-12.P.1.4A. Students are able to describe factors that affect solution interactions.** • Calculate concentration of solutions. • "Like dissolves like" • Vander Waal's forces	Solutions - Characteristics - Types - Solvation Process - Solubility and Factors Affecting It Solution Concentration Colligative Properties with Calculations		Chapter 15:1 Chapter 15:2
(Application)	**9-12.P.1.5A. Students are able to examine energy transfer as matter changes.** **Examples**: Determine ΔH, ΔG, ΔS for thermo-chemical equations. Calculate energy involved in phase changes. Compare the specific heats of various substances. • Describe physical and chemical processes that result in endothermic and	Energy -PE vs KE -Heat Heat in Reaction - Calorimetry -Enthalpy Endothermic vs. Exothermic Thermochemical Equation - Stoichiometry Calculation		Chapter 16:1 Chapter 16:2 Chapter 16:3

	exothermic changes. • Describe energy transfer as matter changes from one phase to another.	- Hess's Law Calculating Enthalpy - Heating/Cooling Curve Reaction Spontaneity - Entropy - Gibb's Free Energy		Chapter 16:4 Chapter 16:5
(Application)	**9-12.P.1.6A. Students are able to perform stoichiometric calculations.** • Convert between moles, mass, particles, volume. • Calculate empirical and molecular formulas from mass percents. • Determine limiting and excess reactants and percent yield in chemical reactions.	Measuring Matter Mass and the Mole Moles of Compounds Empirical and Molecular Formula - Advance Calculations Formula of Hydrates - Advance Calculatons What is Stoichiometry Stoichiometry Calculations -Advance Calculations Limiting reactant -Advance Calculations Percent Yield		Chapter 12:1 Chapter 12:2 Chapter 12:3 Chapter 12:4

		-Advance Calculations		
(Application)	**9-12.P.1.7A. Students are able to apply the kinetic molecular theory to solve quantitative problems involving pressure, volume, temperature, and number of moles of gas.** • Apply Boyle's Law, Charles' Law, Gay-Lussac's Law, Combined Gas Law, and Ideal Gas Law.	Gas Laws - Boyle's law - Charles' Law - Gay-Lussac Combined Gas/Avogadro's law Ideal Gas Law Modification of ideal Gas law Gas Stiochiometry		Chapter 14:1 Chapter 14:2 Chapter 14:3
(Synthesis)	**9-12.P.1.8A. Students are able to use models to make predictions about molecular structure, chemical bonds, chemical reactivity, and polarity of molecules.** • Create Lewis structures for molecules and polyatomic ions. • Determine molecular shape using VSEPR theory. • Determine the polarity of a molecule.	Electronegativity vs. Polarity Lewis Structures Resonances VSEPR Hybridization		Chapter 9:5 Chapter 9:3 Chapter 9:4

(Analysis)	**9-12.P.1.9A. Students are able to describe the characteristics of equilibria.** • Apply LeChatelier's principle to equilibrium reactions. • Identify factors that drive reactions toward completion. • Calculate K_{eq} values for equilibrium reactions.	Equilibrium - characteristics - equilibrium expression - calculate equilibrium constants Factors Afrfecting Equilibrium - factors - LeChatelier's Principle Using Equilibrium constant/Calculation		Chapter 18:1 Chapter 18:2

Additional Concepts to Cover

Blooms Taxonomy Level	Standard/Objective	Supporting Skills	Assessments	Resources
		Kinetics - model of reaction rate - factors affecting reaction rate - instantaneous reaction - reaction mechanism Redox - oxidation/reduction - balancing redox equations - half-reactions balancing - acidic vs. basic conditions Electrochemistry - voltaic cell - types of batteries		Chapter 17:1 Chapter 17:2 Chapter 20:1 Chapter 21:1 Chapter 21:2

		- electrolysis Hydrocarbons - alkanes - acyclic alkane and properties - alkenes and alkynes - isomers - aromatic hydrocarbons Organic - functional groups - alcohols, ethers, amines - carbonyl - organic reactions		 Chapter 22:1 Chapter 22:2 Chapter 22:3 Chapter 23:1 Chapter 23:2 Chapter 22:3