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School:	Soldan International Studies High School
Grade Level:	11th Grade
Subject:	Chemistry I

COURSE OVERVIEW & TIMING

This section is designed to help you see the flow of your units/topics across the entire school year.

Unit		Unit Length
Unit 0:	Crime Scene Investigation	15 days
Unit 1:	Matter	9 days
Unit 2:	Atomic Structure	9 days
Unit 3:	The Periodic Table	9 days
Unit 4:	Bonding	9 days
Unit 5:	Reactions	12 days
Unit 6:	Gases	9 days
Unit 7:	Solutions	9 days
Unit 8:	Acids & Bases	9 days

OVERALL COURSE TIMING

This section is designed to help you compare the number of available instructional days/weeks to the number of days/weeks you have accounted for in your Long Term Plan.

	Course Length
Total number of instructional weeks/days in school year:	101 days
Total number of instructional weeks/days for all units included in Long Term Plan:	90 days

UNIT 0: Crime Scene Investigation	UNIT 0 LENGTH: 15 Days
UNIT 0 LEARNING GOALS	

	0.1 Use appropriate metric/standard international (SI) units of measurement for mass (g); length (cm); and time (s). • WWBAT identify a metric unit versus an American unit (CSI 1) • WWBAT recite the SI units of measurement for mass, length, and time (CSI 1) 0.2 Use common prefixes such as milli-, centi-, and kilo-. • WWBAT identify a base unit (CSI 1) • WWBAT identify a prefix (CSI 1) • WWBAT recall the values of milli-, centi-, and kilo- relative to a base unit. (CSI 1) • WWBAT identify the larger value when giving 2 values with different prefixes (CSI 1) 0.3 Measure with accuracy and precision (e.g., length, volume, mass, temperature, time) • WWBAT define accuracy and precision • WWBAT recognize difference between accuracy and precision • WWBAT define meniscus • WWBAT measure length, volume, mass, and temperature (CSI 1) 0.4 Convert within a unit (e.g., centimeters to meters). • WWBAT convert within a unit using dimensional analysis (CSI 3) 0.5 Use scientific notation, where appropriate. • WWBAT convert from standard to scientific notation (CSI 3) • WWBAT convert from scientific to standard notation (CSI 3) 0.6 Determine the correct number of significant figures. • WWBAT recite rules for identifying # of significant figures (• WWBAT determine the correct # of significant figures 0.7 Determine percent error from experimental and accepted values. • WWBAT define and state purpose of percent error • WWBAT determine percent error from experimental and accepted values 0.8 Use the Celsius and Kelvin scales. • WWBAT convert between Celsius and Kelvin (CSI 5) • WWBAT convert between Fahrenheit and Celsius (CSI 5) 0.9 Solve simple 1 and 2 step equations • WWBAT solve 1 step equations • WWBAT solve 2 step equations

UNIT 1: Matter	**UNIT 1 LENGTH: 9 Days**
UNIT 1 LEARNING GOALS	

	• 1.1 Identify and explain physical properties (e.g., density, melting point, boiling point, conductivity, malleability) and chemical properties (e.g., the ability to form new substances). Distinguish between chemical and physical changes. • WWBAT define physical (e.g. density, melting point, boiling point, conductivity, malleability) and chemical properties (e.g. the ability to form new substances) • WWBAT distinguish between physical and chemical properties • WWBAT define chemical and physical changes • WWBAT distinguish between chemical and physical changes • 1.2 Explain the difference between pure substances (elements and compounds) and mixtures. Differentiate between heterogeneous and homogeneous mixtures. • WWBAT define element, compound, and mixture • WWBAT differentiate between element, compound, and mixture • WWBAT define homogenous and heterogeneous mixtures • WWBAT differentiate between homogeneous and heterogeneous mixtures • 1.3 Describe the three normal states of matter (solid, liquid, gas) in terms of energy, particle motion, and phase transitions. • WWBAT define solid, liquid, and gas. • WWBAT identify differences in energy among solids, liquids, and gases. • WWBAT identify differences in particle motion among solids, liquids, and gases. • WWBAT identify differences in phase transitions among solids, liquids, and gases.

UNIT 2: Atomic Structure	**UNIT 2 LENGTH: 12 Days/Weeks**
UNIT 2 LEARNING GOALS	

	• 2.1 Recognize discoveries from Dalton (atomic theory), Thomson (the electron), Rutherford (the nucleus), and Bohr (planetary model of atom), and understand how each discovery leads to modern theory.
	  • WWBAT describe Dalton's atomic theory
	  • WWBAT describe Thomson's discovery of the electron
	  • WWBAT describe Bohr's model of the atom
	  • WWBAT describe how each discovery led to modern atomic theory
	
	• 2.2 Describe Rutherford's "gold foil" experiment that led to the discovery of the nuclear atom. Identify the major components (protons, neutrons, and electrons) of the nuclear atom and explain how they interact.
	  • WWBAT identify major components of the nuclear atom
	  • WWBAT describe properties of protons, neutrons, and electrons
	  • WWBAT describe the interactions between proton, neutron, and electrons
	
	• 2.3 Interpret and apply the laws of conservation of mass, constant composition (definite proportions), and multiple proportions.
	  • WWBAT define the law of conservation of mass
	  • WWBAT define the law of constant composition (definite proportions)
	  • WWBAT define the law of multiple proportions
	  • WWBAT prove the law of multiple proportions
	
	• 2.4 Write the electron configurations for the first twenty elements of the periodic table.
	  • WWBAT determine the # of electrons in an element from the periodic table
	  • WWBAT identify a period and group on the periodic table
	  • WWBAT list the 4 orbitals and identify the # of electrons in each
	  • WWBAT recall the order in which electrons are filled
	
	• 2.5 Identify the three main types of radioactive decay (alpha, beta, and gamma) and compare their properties (composition, mass, charge, and penetrating power).
	  • WWBAT define radioactive decay
	  • WWBAT compare the composition of alpha, beta, and gamma decay
	  • WWBAT compare the mass and charge of alpha, beta, and gamma decay
	  • WWBAT compare the penetrating power of alpha, beta, and gamma decay
	  • WWBAT list the emitted particles in alpha, beta, and gamma decay
	
	• 2.6 Describe the process of radioactive decay by using nuclear equations, and explain the concept of half-life for an isotope (for example, C-14 is a powerful tool in determining the age of objects).
	  • WWBAT describe the process of radioactive decay by using nuclear equations
	  • WWBAT define half-life
	  • WWBAT define isotope
	  • WWBAT describe the process of carbon dating
	
	• 2.7 Compare and contrast nuclear fission and nuclear fusion.
	  • WWBAT define nuclear fission
	  • WWBAT define nuclear fusion
	  • WWBAT compare and contrast nuclear fission and fusion

UNIT 3: The Periodic Table	UNIT 3 LENGTH: 9 Days
UNIT 3 LEARNING GOALS	
	• 3.1 Explain the relationship of an element's position on the periodic table to its atomic number. Identify families (groups) and periods on the periodic table. • WWBAT relate an element's position on the periodic table to atomic number • WWBAT identify families (groups) and periods on the periodic table • 3.2 Use the periodic table to identify the three classes of elements: metals, nonmetals, and metalloids. • WWBAT define and list properties of elements classified as metals • WWBAT define and list properties of elements classified as nonmetals • WWBAT define and list properties of elements classified as metalloids • WWBAT locate metals, nonmetals, and metalloids based on periodic table position • 3.3 Relate the position of an element on the periodic table to its electron configuration and compare its reactivity to the reactivity of other elements in the table. • WWBAT state the periodic trend for reactivity • WWBAT determine similarities in reactivity among elements based on period or group • WWBAT compare reactivity of elements based on periodic location • 3.4 Identify trends on the periodic table (ionization energy, electronegativity, and relative sizes of atoms and ions). • WWBAT define ionization energy and electronegativity • WWBAT state the periodic trends for ionization energy, electronegativity, and relative sizes of atoms and ions • WWBAT determine similarities in reactivity among elements based on period or group • WWBAT compare ionization energies, electronegativities, and relative sizes of atoms and ions of elements based on periodic location

UNIT 4: Bonding	UNIT 4 LENGTH: 9 Days
UNIT 4 LEARNING GOALS	

	• 4.1 Explain how atoms combine to form compounds through both ionic and covalent bonding. Predict chemical formulas based on the number of valence electrons.
	  • WWBAT define ionic bond
	  • WWBAT predict chemical formulas of ionic compounds based on # of valence electrons
	  • WWBAT define covalent bond
	
	• 4.2 Draw Lewis dot structures for simple molecules and ionic compounds.
	  • WWBAT draw Lewis dot structures for individual elements
	  • WWBAT diagram formation of an ionic bond using Lewis dot structures
	  • WWBAT diagram formation of a covalent bond using Lewis dot structures
	
	• 4.3 Use electronegativity to explain the difference between polar and nonpolar covalent bonds.
	  • WWBAT define polar covalent bond
	  • WWBAT nonpolar covalent bond
	  • WWBAT draw arrows on Lewis structures to indicate polarity
	  • WWBAT compare polar and nonpolar bonds using electronegativity
	
	• 4.4 Use valence-shell electron-pair repulsion theory (VSEPR) to predict the molecular geometry (linear, trigonal planar, and tetrahedral) of simple molecules.
	  • WWBAT memorize the terms for molecular geometry in VSEPR
	  • WWBAT predict the molecular geometry of simple molecules
	
	• 4.5 Identify how hydrogen bonding in water affects a variety of physical, chemical, and biological phenomena (e.g., surface tension, capillary action, density, boiling point).
	  • WWBAT define hydrogen bonding
	  • WWBAT identify hydrogen bonds
	  • WWBAT recite definitions for surface tension, capillary action, density, and boiling point
	  • WWBAT explain water as a polar molecule
	  • WWBAT describe effects of hydrogen bonding in water on surface tension, capillary action, density, and boiling point
	
	• 4.6 Name and write the chemical formulas for simple ionic and molecular compounds, including those that contain the polyatomic ions: ammonium, carbonate, hydroxide, nitrate, phosphate, and sulfate.
	  • WWBAT identify an element's ionic charge from periodic location
	  • WWBAT name simple ionic compounds
	  • WWBAT write chemical formulas for simple ionic compounds
	  • WWBAT name simple ionic compounds using polyatomic ions
	  • WWBAT write chemical formulas for simple ionic compounds using polyatomic ions
	  • WWBAT name simple ionic compounds using transition metals
	  • WWBAT write chemical formulas for simple ionic compounds using transition metals
	  • WWBAT name molecular compounds
	  • WWBAT write chemical formulas for molecular compounds

UNIT 5: Chemical Reactions	UNIT 5 LENGTH: 12 Days
UNIT 5 LEARNING GOALS	

	• 5.1 Balance chemical equations by applying the laws of conservation of mass and constant composition (definite proportions).
	  • WWBAT define subscript and coefficient
	  • WWBAT count atoms by element in a molecule or compound
	  • WWBAT balance chemical equations
	
	• 5.2 Classify chemical reactions as synthesis (combination), decomposition, single displacement (replacement), double displacement, and combustion.
	  • WWBAT define synthesis, decomposition, single displacement, double displacement, and combustion reactions
	  • WWBAT classify a reaction as synthesis, decomposition, single displacement, double displacement, or combustion
	
	• 5.3 Use the mole concept to determine number of particles and molar mass for elements and compounds.
	  • WWBAT define a mole
	  • WWBAT define molar mass
	  • WWBAT calculate the molar mass of an element and compound
	  • WWBAT calculate # of particles in a given mass of a compound or element
	  • WWBAT calculate the mass of a given # of particles of a compound or element
	
	• 5.4 Determine percent compositions, empirical formulas, and molecular formulas.
	  • WWBAT define percent composition
	  • WWBAT calculate percent compositions
	  • WWBAT define empirical formula
	  • WWBAT calculate empirical formula
	  • WWBAT define molecular formula
	  • WWBAT calculate molecular formula
	
	• 5.5 Calculate the mass-to-mass stoichiometry for a chemical reaction.
	  • WWBAT define molar ratio
	  • WWBAT determine molar ratios given a balanced reaction
	  • WWBAT calculate mass-to-mass stoichiometry for a chemical reaction
	
	• 5.6 Calculate percent yield in a chemical reaction.
	  • WWBAT define limiting reactant
	  • WWBAT define theoretical yield and actual yield
	  • WWBAT calculate theoretical yield (mass-to-mass stoichiometry)
	  • WWBAT calculate percent yield in a chemical reaction

UNIT 6: Gases	UNIT 6 LENGTH: 9 Days
UNIT 6 LEARNING GOALS	
	• 6.1 Using the kinetic molecular theory, explain the behavior of gases and the relationship between pressure and volume (Boyle's law), volume and temperature (Charles's law), pressure and temperature (Gay-Lussac's law), and the number of particles in a gas sample (Avogadro's hypothesis). Use the combined gas law to determine changes in pressure, volume, and temperature. • WWBAT state Boyle's Law • WWBAT state Charles' Law • WWBAT state Gay-Lussac's Law • WWBAT state Avogadro's hypothesis • WWBAT identify which gas law to use when solving for pressure, temperature, or volume • WWBAT calculate pressure, volume, and temperature values using Boyle's Law, Charles' Law, and Gay-Lussac's Law • 6.2 Perform calculations using the ideal gas law. Understand the molar volume at 273 K and 1 atmosphere (STP). • WWBAT perform calculations using the ideal gas law • WWBAT define standard temperature and pressure (STP) • 6.3 Using the kinetic molecular theory, describe and contrast the properties of gases, liquids, and solids. Explain, at the molecular level, the behavior of matter as it undergoes phase transitions. • WWBAT describe the properties of gases, liquids, and solids under KMT • WWBAT explain the behavior of matter during phase transitions at the molecular level • 6.4 Describe the law of conservation of energy. Explain the difference between an endothermic process and an exothermic process. • WWBAT state the law of conservation of energy • WWBAT define endothermic • WWBAT define exothermic • WWBAT summarize differences between endothermic and exothermic processes • 6.5 Recognize that there is a natural tendency for systems to move in a direction of disorder or randomness (entropy). • WWBAT define entropy • WWBAT recognize natural tendency for systems to move in a direction of increased entropy

UNIT 7: Solutions	UNIT 7 LENGTH: 9 Days
UNIT 7 LEARNING GOALS	

	• 7.1 Describe the process by which solutes dissolve in solvents.
	  • WWBAT define solute, solvent, and solution
	  • WWBAT describe the process by which solutes dissolve in solvents
	
	• 7.2 Calculate concentration in terms of molarity. Use molarity to perform solution dilution and solution stoichiometry.
	  • WWBAT define and calculate molarity
	  • WWBAT use molarity to perform solution dilutions
	
	• 7.3 Identify and explain the factors that affect the rate of dissolving (e.g., temperature, concentration, surface area, pressure, mixing).
	  • WWBAT explain effects of temperature, concentration, surface area, pressure, and mixing on the rate of dissolving
	
	• 7.4 Compare and contrast qualitatively the properties of solutions and pure solvents (colligative properties such as boiling point and freezing point).
	  • WWBAT define colligative property
	  • WWBAT define boiling point and freezing point
	  • WWBAT formulate a real life example of freezing point depression and boiling point elevation
	
	• 7.5 Identify the factors that affect the rate of a chemical reaction (temperature, mixing, concentration, particle size, surface area, catalyst).
	  • WWBAT identify factors that affect chemical reaction rates
	  • WWBAT describe ways in which chemical reaction rates are affected
	
	• 7.6 Predict the shift in equilibrium when a system is subjected to a stress (LeChatelier's principle) and identify the factors that can cause a shift in equilibrium (concentration, pressure, volume, temperature).
	  • WWBAT define equilibrium
	  • WWBAT state LeChatelier's principle
	  • WWBAT predict the shift in equilibrium when a system is subjected to a stress
	  • WWBAT list factors that can cause a shift in equilibrium (concentration, pressure, volume, temperature)

UNIT 8: Acids/Bases	UNIT 8 LENGTH: 9 Days
UNIT 8 LEARNING GOALS	

	• 8.1 Define the Arrhenius theory of acids and bases in terms of the presence of hydronium and hydroxide ions in water and the Bronsted-Lowry theory of acids and bases in terms of proton donors and acceptors.
	  • WWBAT recognize hydronium and hydroxide ions
	  • WWBAT define acid and base under the Arrhenius theory of acids and bases
	  • WWBAT define acid and base the Bronsted-Lowry theory of acids and bases
	
	• 8.2 Relate hydrogen ion concentrations to the pH scale and to acidic, basic, and neutral solutions. Compare and contrast the strengths of various common acids and bases (e.g., vinegar, baking soda, soap, citrus juice).
	  • WWBAT define pH and its scale
	  • WWBAT label acidic, basic, and neutral on the pH scale
	  • WWBAT relate hydrogen ion concentration to the pH scale and to acid, basic, and neutral solutions
	  • WWBAT calculate pH from [H+] and pOH from [OH-]
	  • WWBAT calculate [H+] from pH and [OH-] from pOH
	  • WWBAT compare and contrast the strengths of various common acids and bases
	
	• 8.3 Explain how a buffer works.
	  • WWBAT define buffer
	  • WWBAT explain how a buffer works
	
	• 8.4 Describe oxidation and reduction reactions and give some everyday examples, such as fuel burning and corrosion. Assign oxidation numbers in a reaction.
	  • WWBAT define oxidation reaction
	  • WWBAT define reduction reaction
	  • WWBAT assign oxidation numbers in a reaction
	  • WWBAT formula everyday examples of redox reactions