Cornwall-Lebanon School District Curriculum Overview

Honors Chemistry – Grade 10

length of time in weeks	Concepts & Competencies	Common Assessments	Academic Standards (PA Core if applicable)
Unit 1 — 3	**Matter and Change** Students will differentiate between physical properties and chemical properties. Students will differentiate between pure substances and mixtures; differentiate between heterogeneous and homogeneous mixtures. Students will explain the difference between endothermic and exothermic reactions. Students will apply knowledge of mixtures to appropriate separation techniques	➢ Lab – "Cupric Chloride and Aluminum Lab" ➢ Element Symbols Quiz ➢ Homework ➢ Unit Assessment	3.2.C.A1 3.2.C.A1 3.2.10.A4
Unit 2 — 4	**Measurement and Density/Specific Heat** Students will identify properties of matter that depend on sample size. Students will explain how heat energy will move from a higher temperature to a lower temperature until equilibrium is reached. Students will examine the status of existing theories. Students will evaluate experimental information for relevance and adherence to science processes. Students will judge that conclusions are consistent and logical with experimental conditions.	○ Dimensional Analysis Quiz ○ Lab – "Calculating Density" ○ Formal Lab Report – "Searching for Regularity" ➢ Lab – "Specific Heat" ➢ Homework ➢ Unit Assessments	3.2.10.A1 3.2.10.B3

	Interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution. Communicate and defend a scientific argument.		
Unit 3 1	<u>Atomic Theory</u> Students will explain why compounds are composed of integer ratios of elements. Students will distinguish among the isotopic forms of elements. Students will describe the historical development of models of the atom and how they contributed to modern atomic theory. Students will interpret and apply the laws of conservation of mass, constant composition (definite proportions), and multiple proportions. Students will 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. Students will 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.	➢ Element Symbols Quiz ➢ Element Project ➢ Chain-Link Fence Activity ➢ Lab – "Law of Conservation of Mass" ➢ Homework ➢ Unit Assessment	3.2.10.A2 3.2.12.A2 3.2.10.A5 3.2.C.A4 3.2.C.A5 3.2.C.A5
Unit 4 2	<u>Nuclear and Radioactivity</u> Students will explain the probabilistic nature of radioactive decay based on subatomic rearrangement in the atomic nucleus. Students will identify the three main types of radioactive decay and compare their properties. Students will describe the process of radioactive decay by using nuclear equations and explain the concept of half-life for an isotope.	➢ Lab- "Candium" ➢ Negative Ions Quiz ➢ Homework ➢ Unit Assessment	3.2.12.A2 3.2.12.A3 3.2.12.A3

Unit 5 2	<u>Electrons in the Atom</u> Students will predict properties of elements using trends of the periodic table. Students will compare the electron configurations for the first twenty elements of the periodic table. Students will 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. Students will explain how light is absorbed or emitted by electron orbital transitions.	➢ Spectrum and Wavelength Quiz ➢ Lab – "Flame Test" ➢ Lab – "Relationship of Wavelength to Color" ➢ Lab – "Absorption Spectra" ➢ Unit Assessment	3.2.10.A1 3.2.C.A2 3.2.C.A2 3.2.12.A2
Unit 6 1	<u>Periodic Table</u> Students will predict properties of elements using trends of the periodic table. Students will explain the relationship of an element's position on the periodic table to its atomic number, ionization energy, electro-negativity, atomic size, and classification of elements. Students will use electro-negativity to explain the difference between polar and nonpolar covalent bonds. Students will 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.	➢ Periodic Trends Graphing ➢ Activity – "Exercise on the Periodic Table" ➢ Electron Configurations Lab ➢ Unit Assessment	3.2.10.A1 3.2.C.A1 3.2.C.A1 3.2.C.A2
Unit 7 3	<u>Nomenclature</u> Students will predict properties of elements using trends of the periodic table. Students will compare and contrast different bond types that result in the formation of molecules and compounds. Students will explain how atoms combine to form compounds through both ionic and covalent bonding.	➢ Ions Quizzes ➢ Lab – "7 Solutions" ➢ Unit Assessment	3.2.10.A1 3.2.10.A2 3.2.C.A2 3.2.C.A2 3.2.C.A2 3.2.C.A2 3.2.12.A4

	Students will predict chemical formulas based on the number of valence electrons. Students will draw Lewis dot structures for simple molecules and ionic compounds. Students will predict the chemical formulas for simple ionic and molecular compounds. Students will describe the interactions between acids and bases.		
Unit 8 5	<u>Chemical Reactions</u> Students will differentiate between physical properties and chemical properties. Students will predict the chemical formulas for simple ionic and molecular compounds. Students will describe chemical reactions in terms of atomic rearrangement and/or electron transfer. Students will balance chemical equations by applying the laws of conservation of mass. Students will classify chemical reactions as synthesis (combination), decomposition, single displacement (replacement), double displacement, and combustion.	➢ Reaction Quizzes ➢ "13 Reactions Lab" ➢ Unit Assessment	3.2.C.A1 3.2.C.A2 3.2.10.A4 3.2.C.A4 3.2.C.A4
Unit 9 4	<u>The Mole</u> Students will explain why compounds are composed of integer ratios of elements. Students will predict the chemical formulas for simple ionic and molecular compounds. Students will use the mole concept to determine number of particles and molar mass for elements and compounds. Students will determine percent compositions, empirical formulas, and molecular formulas.	➢ Lab – "Mole Calculations" ➢ Lab - % Composition ➢ Lab – "Empirical Formula of a Compound" ➢ Activity – Mole Flight 1023 ➢ Lab – "% Water in Hydrates" ➢ Lab – "Make a Solution" ➢ Mole Conversions Quiz 1 & 2 ➢ Solutions/Molarity Quiz ➢ Unit Assessment	3.2.10.A2 3.2.C.A2 3.2.C.A2 3.2.C.A2 3.2.10.A4 3.2.10.A5

	Students will predict the amounts of products and reactants in a chemical reaction using mole relationships. Students will apply the mole concept to determine number of particles and molar mass for elements and compounds.		
Unit 10 5	<u>The Mole and Solutions</u> Students will explain why compounds are composed of integer ratios of elements. Students will predict the chemical formulas for simple ionic and molecular compounds. Students will use the mole concept to determine number of particles and molar mass for elements and compounds. Students will determine percent compositions, empirical formulas, and molecular formulas. Students will predict the amounts of products and reactants in a chemical reaction using mole relationships. Students will apply the mole concept to determine number of particles and molar mass for elements and compounds.	➢ Lab – "Mole Calculations" ➢ Lab - % Composition ➢ Lab – "Empirical Formula of a Compound" ➢ Activity – Mole Flight 1023 ➢ Lab – "% Water in Hydrates" ➢ Lab – "Make a Solution" ➢ Mole Conversions Quiz 1 & 2 ➢ Solutions/Molarity Quiz ➢ Unit Assessment	3.2.10.A2 3.2.C.A2 3.2.C.A2 3.2.C.A2 3.2.10.A4 3.2.10.A5
Unit 11 2	<u>Stoichiometry</u> Students will predict the amounts of products and reactants in a chemical reaction using mole relationships. Students will use stoichiometry to predict quantitative relationships in a chemical reaction.	➢ Stoichiometry Lab ➢ Unit Assessment	3.2.10.A4 3.2.C.A4
Unit 12 2	<u>Gas Laws</u> Students will describe phases of matter according to the kinetic molecular theory. Students will describe the three normal states of matter in terms of energy, particle motion, and phase transitions. Students will predict the amounts of products and reactants in a chemical reaction using mole relationships.	➢ Gas Law Simulations (on computer) ➢ Gas Law Demonstrations and Explanations ➢ Lab – "Molar Volume" ➢ Lab – "Molar Mass of Butane" ➢ Gas Law Quizzes ➢ Unit Assessment	3.2.10.A3 3.2.C.A3 3.2.10.A4