






# Cornwall-Lebanon School District Curriculum Overview

## Chemistry 1 – College Prep

 length of time in weeks	Concepts & Competencies	Common Assessments	Academic Standards (PA Core if applicable)
Unit 1  3	<p style="text-align: center;"><b><u>Matter and Change</u></b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>➤ Lab – “Intro to Chemistry”</li> <li>➤ Lab – “Cupric Chloride and Aluminum Lab”</li> <li>➤ Unit 1 Test</li> </ul>	3.2.C.A1 3.2.C.A1 3.2.10.A4
Unit 2  3	<p style="text-align: center;"><b><u>Measurement and Dimensional Analysis</u></b></p> <p>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.            Students will interpret results of experimental research to predict new information, propose additional investigable questions, or advance a solution.            Students will communicate and defend a scientific argument.</p>	<ul style="list-style-type: none"> <li>➤ Dimensional Analysis Quiz</li> <li>➤ Unit 2 Test</li> </ul>	3.2.10.A1 3.2.10.B3
Unit 3  3	<p style="text-align: center;"><b><u>Density and Specific Heat</u></b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>➤ Lab – “Calculating Density”</li> <li>➤ Lab – “Searching For Regularity”</li> <li>➤ Lab – “Specific Heat”</li> <li>➤ Density Quiz</li> <li>➤ Specific Heat Quiz</li> <li>➤ MP 1 Exam</li> </ul>	3.2.10.A1 3.2.10.B3
Unit 4  3	<p style="text-align: center;"><b><u>Atomic Foundations</u></b></p> <p>Students will explain why compounds are composed of integer ratios of elements.</p>	<ul style="list-style-type: none"> <li>➤ Element Symbols Quiz</li> <li>➤ Chain-Link Fence Activity</li> <li>➤ Lab – “Law of Conservation of Mass”</li> <li>➤ Lab – “Isotopic Pennies”</li> </ul>	3.2.10.A2 3.2.12.A2 3.2.10.A5 3.2.C.A4

		<p>Students will distinguish among the isotopic forms of elements.</p> <p>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.</p> <p>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.</p> <p>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.</p>	<ul style="list-style-type: none"> <li>➤ Unit 4 Test</li> </ul>	<p>3.2.C.A5</p> <p>3.2.C.A5</p>
Unit 5	3	<p style="text-align: center;"><b><u>Spectrum and Electrons</u></b></p> <p>Students will predict properties of elements using trends of the periodic table.</p> <p>Students will compare the electron configurations for the first twenty elements of the periodic table.</p> <p>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.</p> <p>Students will explain how light is absorbed or emitted by electron orbital transitions.</p>	<ul style="list-style-type: none"> <li>➤ Spectrum and Wavelength Quiz</li> <li>➤ Lab – "Flame Test"</li> <li>➤ Lab – "Relationship of Wavelength to Color"</li> <li>➤ Lab – "Absorption Spectra"</li> <li>➤ Unit 5 Test</li> </ul>	<p>3.2.10.A1</p> <p>3.2.C.A2</p> <p>3.2.C.A2</p> <p>3.2.12.A2</p>
Unit 6	2	<p style="text-align: center;"><b><u>Periodic Table</u></b></p> <p>Students will predict properties of elements using trends of the periodic table.</p> <p>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.</p> <p>Students will use electro-negativity to explain the difference between polar and nonpolar covalent bonds.</p> <p>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.</p>	<ul style="list-style-type: none"> <li>➤ Periodic Trends Activity</li> <li>➤ Activity – "Exercise on the Periodic Table"</li> <li>➤ Unit 6 Test</li> <li>➤ Midterm</li> </ul>	<p>3.2.10.A1</p> <p>3.2.C.A1</p> <p>3.2.C.A1</p> <p>3.2.C.A2</p>
Unit 7	4	<p style="text-align: center;"><b><u>Nomenclature</u></b></p> <p>Students will predict properties of elements using trends of the periodic table.</p>	<ul style="list-style-type: none"> <li>➤ Common Negative Ion Quiz</li> <li>➤ Common Positive Ion Quiz</li> <li>➤ Lab – "7 Solutions"</li> <li>➤ Unit 7 Test</li> </ul>	<p>3.2.10.A1</p> <p>3.2.10.A2</p> <p>3.2.C.A2</p> <p>3.2.C.A2</p>

		<p>Students will compare and contrast different bond types that result in the formation of molecules and compounds.</p> <p>Students will explain how atoms combine to form compounds through both ionic and covalent bonding.</p> <p>Students will predict chemical formulas based on the number of valence electrons.</p> <p>Students will draw Lewis dot structures for simple molecules and ionic compounds.</p> <p>Students will predict the chemical formulas for simple ionic and molecular compounds.</p> <p>Students will describe the interactions between acids and bases.</p>		<p>3.2.C.A2</p> <p>3.2.C.A2</p> <p>3.2.12.A4</p>
Unit 8	5	<p style="text-align: center;"><b><u>Chemical Reactions</u></b></p> <p>Students will differentiate between physical properties and chemical properties.</p> <p>Students will predict the chemical formulas for simple ionic and molecular compounds.</p> <p>Students will describe chemical reactions in terms of atomic rearrangement and/or electron transfer.</p> <p>Students will balance chemical equations by applying the laws of conservation of mass.</p> <p>Students will classify chemical reactions as synthesis (combination), decomposition, single displacement (replacement), double displacement, and combustion.</p>	<ul style="list-style-type: none"> <li>➤ Chemical Reaction Quizzes</li> <li>➤ "13 Reactions Lab"</li> <li>➤ MP 3 Exam</li> </ul>	<p>3.2.C.A1</p> <p>3.2.C.A2</p> <p>3.2.10.A4</p> <p>3.2.C.A4</p> <p>3.2.C.A4</p>
Unit 9	3	<p style="text-align: center;"><b><u>Mole Conversations/Applications and Solutions</u></b></p> <p>Students will explain why compounds are composed of integer ratios of elements.</p> <p>Students will predict the chemical formulas for simple ionic and molecular compounds.</p> <p>Students will use the mole concept to determine number of particles and molar mass for elements and compounds.</p> <p>Students will determine percent compositions, empirical formulas, and molecular formulas.</p> <p>Students will predict the amounts of products and reactants in a chemical reaction using mole relationships.</p> <p>Students will apply the mole concept to determine number of particles and molar mass for elements and compounds.</p>	<ul style="list-style-type: none"> <li>➤ Lab – "Molar Quantities"</li> <li>➤ Lab – "Formula of a Hydrate"</li> <li>➤ Lab – "Empirical Formula of a Compound"</li> <li>➤ Lab – "Make a Solution"</li> <li>➤ Mole Conversions Quiz</li> <li>➤ Solutions/Molarity Quiz</li> <li>➤ Unit 9 Test</li> </ul>	<p>3.2.10.A2</p> <p>3.2.C.A2</p> <p>3.2.C.A2</p> <p>3.2.C.A2</p> <p>3.2.10.A4</p> <p>3.2.10.A5</p>

<b>Unit 10</b> <div style="border: 1px solid red; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin: 5px auto;">2</div>	<p style="text-align: center;"><b><u>Stoichiometry</u></b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>➤ Lab – “Stoichiometry”</li> <li>➤ Unit 10 Test</li> <li>➤ Final Exam</li> </ul>	3.2.10.A4 3.2.C.A4
<b>Unit 11</b> <div style="border: 1px solid red; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin: 5px auto;">2</div>	<p style="text-align: center;"><b><u>Gas Laws</u></b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>➤ Gas Law Simulations (on computer)</li> <li>➤ Gas Law Demonstrations and Explanations</li> <li>➤ Lab – “Molar Volume”</li> <li>➤ Lab – “Molar Mass of Butane”</li> <li>➤ Gas Law Quiz</li> </ul>	3.2.10.A3 3.2.C.A3 3.2.10.A4
<b>Unit 12</b> <div style="border: 1px solid red; border-radius: 50%; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin: 5px auto;">1</div>	<p style="text-align: center;"><b><u>Nuclear Chemistry</u></b></p> <p>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.</p>	<ul style="list-style-type: none"> <li>➤ Nuclear Chemistry Quiz</li> </ul>	3.2.12.A2 3.2.12.A3 3.2.12.A3