

Scope and Sequence: SCIENCE  
 Chemistry (Grade 11) **DRAFT**  
 Links: [NHPS Science Overview](#)  
[CAPT Science Overview](#)

|  | QuarterOne   |   | QuarterTwo   |  | Quarter Three  | Quarter Four  |   |
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| Unit Titles  | Q1:Chemical Properties (inc phases/heat)   | Q1: Atomic Structure  | Q2: Nuclear  | Q2: Compounds/Bonding  | Q3: Reactions/Equations  | Q4: Gases and Heat  | Q4: Solutions/Organic Chemistry   |
| Learning Outcomes  |  |   |  |  |  |   |   |
| <b>INQUIRY STANDARDS ACROSS ALL UNITS</b><br><b>D INQ.1</b> Identify questions that can be answered through scientific investigation.<br><b>D INQ.2</b> Read, interpret and examine the credibility and validity of scientific claims in different sources of information.<br><b>D INQ.3</b> Formulate a testable hypothesis and demonstrate logical connections between the scientific concepts guiding the hypothesis and the design of the experiment.<br><b>D INQ.4</b> Design and conduct appropriate types of scientific investigations to answer different questions. | <p>-Use properties to distinguish types of matter.</p> <p>-Determine the density of objects from measurements and grap</p> <p>-Know that matter is composed of particles and how these particles are held together.</p> <p>-Describe the three phases of matter.</p> <p>-Know the properties of metals and non-metals.</p> <p>-Define and contrast physical, chemical, and nuclear changes.</p> <p>-Determine whether a substance is a mixture, element, or compound.</p> <p>-Use properties of matter to separate mixtures.</p> | <p>Develop atomic theory in an historical perspective comparing and contrasting different models.</p> <p>Describe the discovery of the parts of the atom.</p> <p>Know atomic structure in terms of protons, neutrons, and elections.</p> <p>Define and use concepts of atomic number, mass number, and isotopes.</p> <p>- Develop the concept of atomic weight.</p> <p>Describe the general structure of the atom, and explain how the properties of the first 20 elements in the Periodic Table are related to their</p> | <p>Describe the nuclear changes that release energy.</p> <p>Use the concepts of half life to predict the results of nuclear decay.</p> <p>Know natural and man-made occurrences of fission and fusion, including medical, industrial and military applications.</p> <p>Use the scientific concepts involved in nuclear power generation to make decisions about current societal issues.</p> | <p>Describe the historical development of the organization of the Periodic Table and the modern periodic law.</p> <p>Describe atomic properties such as atomic radius, ionization energy, oxidation number, and electron affinity using the periodic table and charts.</p> <p>Develop the concept of chemical activity as it relates to atomic structure.</p> <p>Know the trends in properties of the families and series on the Periodic Table.</p> <p>Describe the uses of some common elements.</p> <p>Write correct formulas for</p> | <p>Explain the chemical composition of acids and bases, and explain the change of pH in neutralization reactions.</p> <p>Develop the concept of conservation of mass.</p> <p>Be able to write and balance common equations.</p> <p>Identify the different types of chemical reactions.</p> <p>Develop the concept of mass relationships in a chemical reaction.</p> <p>Identify endothermic and exothermic reactions.</p> <p>Determine the molecular mass of a compound.</p> | <p>Identify endothermic and exothermic reactions.</p> <p>Identify the three basic assumptions of the kinetic molecular theory.</p> <p>Describe the basic differences between solids, liquids, and gases in terms of the kinetic theory.</p> <p>Be able to apply the concepts of phase change to explain everyday phenomena.</p> <p>Describe energy changes accompanying a change of state.</p> <p>Describe how the intermolecular forces affect the properties of condensed states of matter.</p> <p>Read and interpret</p> | <p>Explain how the chemical structure of polymers affects their physical properties.</p> <p>Explain how the structure of the carbon atom affects the type of bonds it forms in organic and inorganic molecules.</p> <p>Describe combustion reactions of hydrocarbons and their resulting by-products.</p> <p>Explain the general formation and structure of carbon-based polymers, including synthetic polymers, such as polyethylene, and biopolymers, such as carbohydrate.</p> <p>Explain how simple chemical monomers can be combined to create linear, branched and/or</p> |

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| <p><b>D INQ.5</b><br/>Identify independent and dependent variables, including those that are kept constant and those used as controls.</p> <p><b>D INQ.6</b> Use appropriate tools and techniques to make observations and gather data.</p> <p><b>D INQ.7</b> Assess the reliability of the data that was generated in the investigation.</p> <p><b>D INQ.8</b> Use mathematical operations to analyze and interpret data, and present relationships between variables in appropriate forms.</p> <p><b>D INQ.9</b> Articulate conclusions and explanations based on research data, and assess results based on the design of the investigation.</p> <p><b>D INQ.10</b> Communicate about science in different formats, using relevant science vocabulary, supporting evidence and clear logic.</p> | <p>identify the three basic assumptions of the kinetic molecular theory.</p> <p>Describe the basic differences between solids, liquids, and gases in terms of the kinetic theory.</p> <p>Be able to apply the concepts of phase change to explain everyday phenomena.</p> <p>Describe energy changes accompanying a change of state.</p> <p>Describe how the intermolecular forces affect the properties of condensed states of matter.</p> <p>Read and interpret phase change graphs.</p> <p>Describe the factors that effect phase changes.</p> | <p>atomic structures.</p> |                              | <p>compounds using ratios and ion charts.</p> <p>Identify names and formulas and uses for common compounds and elements.</p> <p>Determine whether a chemical bond between any two elements is ionic or covalent.</p> <p>Describe how atoms combine to form new substances by transferring electrons (ionic bonding) or sharing electrons (covalent bonding)</p> | <p>Determine empirical and molecular formulas for compounds.</p> <p>Calculate masses and yields of reactants and products in a reaction.</p> <p>Understand the concepts behind limiting reactions</p> | <p>phase change graphs.</p> <p>Describe the factors that affect phase changes.</p> <p>Describe the physical properties of gases.</p> <p>Describe volume, temperature, and pressure of a gas and their units of measurement.</p> <p>Apply the relationships between pressure, temperature, concentration and volume to gas behavior ( i.e. Boyle's Law, Charles' Law).</p> | <p>cross-linked polymers.</p> <p>Be able to draw structural formulas and name organic compounds.</p> <p>Describe the existence and uses of some organic compounds.</p> |
| <p><b>Significant Task</b></p>   | <p>Phase Change Lab, Density Lab</p>  | <p>Element Project</p>    | <p>Nuclear Energy Debate</p> | <p>Supermarket Chemistry</p>  | <p>Chemistry of A Car</p>   | <p>Coffe Cup Project<br/>Gas Laws and Hot Air Balloons</p>  | <p>Making Plastic Lab</p>  |

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| <b>Content<br/>Supporting<br/>Materials</b> | Textbooks, Labs,<br>NHPS Web<br>Materials | Textbooks, Labs,<br>NHPS Web<br>Materials | Textbooks, Labs,<br>NHPS Web<br>Materials,<br>Teaching Plastics,<br>CRISPY Programs | Textbooks, Labs,<br>NHPS Web<br>Materials | Textbooks, Labs,<br>NHPS Web<br>Materials | Textbooks, Labs,<br>NHPS Web<br>Materials | Textbooks, Labs,<br>NHPS Web<br>Materials |
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