

# Science: Chemistry

UNIT/Weeks	Timeline/Topics	Essential Questions
8	<p><b><u>Structure and Properties of Matter</u></b></p> <ul style="list-style-type: none"> <li>• Periodic Table</li> <li>• Rutherford Model of the Atom</li> <li>• Bohr Atomic Model</li> <li>• Quantum-Mechanical Atomic Model</li> <li>• Trends in Atomic Properties: Electronegativity, Ionization Energy, Atomic/Ionic Radius</li> <li>• Ionic, Polar, and Covalent Bonds</li> <li>• Lewis Structures, VSEPR Shapes, Valence Hybridization Theory</li> </ul>	<ul style="list-style-type: none"> <li>• How can the substructures of atoms explain the observable properties of substances?</li> </ul>
4	<p><b><u>Energy of Chemical Systems</u></b></p> <ul style="list-style-type: none"> <li>• Enthalpy</li> <li>• Entropy</li> <li>• Gibb's Free Energy Equation</li> <li>• State Functions (Hess' Law of Heat Formation, etc.)</li> </ul>	<ul style="list-style-type: none"> <li>• How is energy transferred within a system?</li> </ul>
6	<p><b><u>Bonding and Chemical Reactions</u></b></p> <ul style="list-style-type: none"> <li>• Forward Rate</li> <li>• Reverse Rate</li> <li>• Reaction Quotient</li> <li>• Equilibrium Formula</li> <li>• Le Chatelier's Principle</li> <li>• Ionization Problems (<math>K_a</math> and <math>K_b</math> Dissociation)</li> <li>• Acid/Base Dissociation</li> </ul>	<ul style="list-style-type: none"> <li>• How can one explain the structure, properties, and interactions of matter?</li> </ul>
4	<p><b><u>Matter and Energy in Living Systems</u></b></p> <ul style="list-style-type: none"> <li>• Glycolysis/Krebs Cycle</li> <li>• Ketoacidosis</li> <li>• Osmotic Pressure</li> <li>• Denaturing of Proteins</li> </ul>	<ul style="list-style-type: none"> <li>• How do organisms obtain and use the energy they need to live and grow?</li> </ul>
6	<p><b><u>Nuclear Chemistry</u></b></p> <ul style="list-style-type: none"> <li>• Nuclear Fission/Fusion</li> <li>• Alpha/Beta/Gamma Radiation</li> <li>• Radioactive Dating</li> <li>• Nuclear Electric Power Plants</li> <li>• Medical Radioisotopes</li> <li>• Stellar Fusion and Fission</li> </ul>	<ul style="list-style-type: none"> <li>• What happens in stars?</li> </ul>

	<ul style="list-style-type: none"><li>• Big Bang Theory</li></ul>	
4	<p><b><u>Human Impact – The Chemistry of Sustainability</u></b></p> <ul style="list-style-type: none"><li>• Climate Change</li><li>• Ecosystem</li><li>• Geological Changes</li><li>• GMO (Genetically Modified Organism)</li><li>• Pesticides</li></ul>	<ul style="list-style-type: none"><li>• How do Earth's geochemical processes and human activities affect each other?</li></ul>