

Science: Honors Chemistry

UNIT/Weeks	Timeline/Topics	Essential Questions
8	<p><u>Structure and Properties of Matter</u></p> <ul style="list-style-type: none"> • Periodic Table • Rutherford Model of an Atom • Bohr Atomic Model • Quantum-Mechanical Atomic Model • Trends in Properties • Ionic, Polar and Covalent Bonds • Lewis Structures, VSEPR Shapes and Valence Hybridization Theory • Stoichiometry • Avogadro's Number • Mole-to-Mole and Mole-to-Gram Conversion 	<ul style="list-style-type: none"> • How can the substructures of atoms explain the observable properties of substances?
5	<p><u>The Chemistry of Abiotic Systems</u></p> <ul style="list-style-type: none"> • Potential Energy • Kinetic Energy • Heat • Specific Heat • Heat Transfer Equation <p><u>Or</u></p> <p><u>Energy of Chemical Systems</u> (For students who have had the Capstone Science Course)</p> <ul style="list-style-type: none"> • Enthalpy • Entropy • Gibb's Free Energy Equation • State Functions (Hess' Law of Heat Formation, etc.) 	<ul style="list-style-type: none"> • How is energy transferred within a system? • Why are we so lucky that water has the physical properties that it does? • How do ancient carbon atoms drive economic decisions in the modern world?
6	<p><u>Bonding and Chemical Reactions</u></p> <ul style="list-style-type: none"> • Forward and Reverse Rate • Reaction Quotient • Equilibrium Formula • LaChatelier's Principle • Ionization Problems • Acid/Base Dissociation • PH Formula • Ionization Problems (K_a and K_b Dissociation) 	<ul style="list-style-type: none"> • How can one explain the structure, properties, and interactions of matter?

4	<p><u>Matter and Energy in Living Systems</u></p> <ul style="list-style-type: none"> • Glycolysis/Krebs Cycle • Ketoacidosis • Osmotic Pressure • Denaturing of Proteins • Lactose Digestion 	<ul style="list-style-type: none"> • How do organisms obtain and use the energy they need to live and grow?
6	<p><u>Nuclear Chemistry</u></p> <ul style="list-style-type: none"> • Nuclear Fission/Fusion • Alpha/Beta/Gamma Radiation • Radioactive Dating • Nuclear Electric Power Plants • Medical Radioisotopes • Stellar Fusion and Fission 	<ul style="list-style-type: none"> • What happens in stars?
4	<p><u>Human Impact – The Chemistry of Sustainability</u></p> <ul style="list-style-type: none"> • Climate Change • Ecosystem • Geological Changes • GMO (Genetically Modified Organism) • Pesticides 	<ul style="list-style-type: none"> • How do Earth's geochemical processes and human activities affect each other?