

# Physical Science –Grades 11-12

**Course Goal:** Students in Physical Science work to master essential high school standards in Introductory Physics and Chemistry. In Semester one students examine the composition and behavior of matter. In Semester two they study how matter and energy are related, transferred, and conserved. Practical applications and technology are used to promote understanding of Physics and Chemistry concepts in a laboratory based course.

Related Links	QUARTER 1	QUARTER 2
	<p><b><u>Students will:</u></b>  <b>review critical science and math concepts while inquiring into the history and nature of science; study the classification of matter using the relationships between atoms, elements, molecules, and compounds; and investigate physical and chemical changes, periodicity, bonding, acids and bases.</b></p> <p><b>Big Ideas / Enduring Understandings</b></p> <ul style="list-style-type: none"> <li>↘ The atom is basic to the study of matter and energy.</li> <li>↘ Elements are defined through the structure and characteristics of their atoms.</li> </ul> <p><b>Essential Questions</b></p> <ul style="list-style-type: none"> <li>↘ How is the atom like the cell in a living organism?"</li> <li>↘ How do the properties of a substance change as the atoms making up the substance change?</li> </ul> <p><b>Content Topics</b></p> <ul style="list-style-type: none"> <li>↘ Ionic and covalent bonding</li> <li>↘ Atomic theory</li> <li>↘ Properties and interactions of matter</li> <li>↘ The Periodic Table</li> <li>↘ Solutions and mixtures</li> <li>↘ The history and nature of science</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>↘ Science process skills, which may include observing, inferring, measuring, performing experiments, etc.</li> <li>↘ Laboratory skills, which may include use of the balance, bunsen burner, thermometer, etc.</li> <li>↘ Literacy skills, which may include math computation, writing, reading, scientific literacy, use of technology, etc.</li> <li>↘ Affective skills, which may include communication, cooperation, media preference, etc.</li> </ul> <p><b>Assessments</b></p> <p>Describe how water changes from ice to steam.</p>	<p><b><u>Students will:</u></b>  <b>investigate chemical reactions; the Laws of Conservation of Mass and Energy; acids and bases; nuclear energy; and fossil fuels.</b></p> <p><b>Big Idea / Enduring Understanding</b>          Atoms can be combined, conserved, or changed to produce energy in predictable ways that reflect the nature of all matter.</p> <p><b>Essential Questions:</b></p> <ul style="list-style-type: none"> <li>↘ How do electrons participate in chemical reactions?</li> <li>↘ What does thermodynamics have to do with atoms?</li> <li>↘ What are the risks and advantages of nuclear fuels and fossil fuels?</li> </ul> <p><b>Content Topics</b></p> <ul style="list-style-type: none"> <li>↘ Types of chemical reactions</li> <li>↘ Laws of Conservation of Mass and Energy</li> <li>↘ Thermodynamics</li> <li>↘ Nuclear energy</li> <li>↘ Fossil fuels</li> <li>↘ Nuclear forces</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>↘ Science process skills, which may include observing, inferring, measuring, performing experiments, etc.</li> <li>↘ Lab equipment skills, which may include use of the balance, bunsen burner, thermometer, etc.</li> <li>↘ Literacy skills, which may include math computation, writing, reading, scientific literacy, use of technology, etc.</li> <li>↘ Affective skills, which may include communication, cooperation, media preference, etc.</li> </ul> <p><b>Assessments</b></p> <ul style="list-style-type: none"> <li>↘ Predict and test whether common household chemicals are acids or bases.</li> <li>↘ Design an experiment to measure rainfall pH.</li> </ul>

	QUARTER 3	QUARTER 4
	<p><b><i>Students will:</i></b>  <b>study the nature of forces, motion and energy. They will examine evidence for the origin of the universe, and the stars, galaxies and our solar system within the universe.</b></p> <p><b>Big Idea / Enduring Understanding</b></p> <ul style="list-style-type: none"> <li>↘ The relationship between matter and energy can be investigated by exploring Newton's Laws of motion, kinetic and potential energy, and work and power.</li> <li>↘ The solar system, including Earth is part of a much bigger galaxy and universe.</li> <li>↘ A variety of scientific evidence indicates that the solar system was formed long after the beginning of the Universe and has changed significantly over time.</li> </ul> <p><b>Essential Questions</b></p> <ul style="list-style-type: none"> <li>↘ How are matter and energy related to motion?</li> <li>↘ How does the Earth fit into the big picture of the stars and galaxies in the universe?</li> </ul> <p><b>Content Topics</b></p> <ul style="list-style-type: none"> <li>↘ Motion</li> <li>↘ Speed</li> <li>↘ Velocity</li> <li>↘ Acceleration</li> <li>↘ Friction</li> <li>↘ Solar system</li> <li>↘ Stars</li> <li>↘ Galaxies</li> <li>↘ Evidence for the origin of the universe</li> <li>↘ History and nature of science</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>↘ Science process skills, which may include observing, inferring, measuring, performing experiments, etc.</li> <li>↘ Laboratory skills, which may include use of the balance, bunsen burner, thermometer, etc.</li> <li>↘ Literacy skills, which may include math computation, writing, reading, scientific literacy, use of technology, etc.</li> <li>↘ Affective skills, which may include communication, cooperation, media preference, etc.</li> </ul> <p><b>Assessments</b></p> <ul style="list-style-type: none"> <li>↘ Design an experiment that demonstrates how acceleration is related to force and mass.</li> <li>↘ Create a concept map of the forces acting on the planets in our solar system.</li> </ul>	<p><b><i>Students will:</i></b>  <b>investigate the electromagnetic spectrum, including electricity and magnetism. They will explore the nature of nuclear forces.</b></p> <p><b>Big Idea / Enduring Understandings</b>  The electromagnetic spectrum is a continuum of energy that includes electrical, magnetic, and light energy.</p> <p><b>Essential Questions</b>  How are matter and energy related to the forces of nature?</p> <p><b>Content Topics</b></p> <ul style="list-style-type: none"> <li>↘ Newton's Laws</li> <li>↘ Gravity</li> <li>↘ Energy</li> <li>↘ Work</li> <li>↘ Potential/Kinetic Energy</li> <li>↘ Electricity</li> <li>↘ Magnetism</li> <li>↘ Electromagnetic spectrum</li> <li>↘ History and nature of science</li> </ul> <p><b>Skills</b></p> <ul style="list-style-type: none"> <li>↘ Science process skills, which may include observing, inferring, measuring, performing experiments, etc.</li> <li>↘ Lab equipment skills, which may include use of the balance, bunsen burner, thermometer, etc.</li> <li>↘ Literacy skills, which may include math computation, writing, reading, scientific literacy, use of technology, etc.</li> <li>↘ Affective skills, which may include communication, cooperation, media preference, etc.</li> </ul> <p><b>Assessments</b>  Design an experiment that demonstrates the relationship how electricity and magnetism are related.</p>