

Physics –Grades 11-12

Course Goal and Content: Physics students will use a variety of strategies including scientific investigation to master standards and benchmarks related to motion, mass, force, energy, electricity, magnetism, light, sound, and some aspects of astronomy.

Related Links	QUARTER 1	QUARTER 2
	<p><u>Students will:</u> review math and science concepts used to study Newtonian mechanics; inquire into the history and nature of science; and study motion, Newton's Laws, and the solar system.</p> <p>Big Idea / Enduring Understanding</p> <ul style="list-style-type: none"> ↘ Newton's Laws help explain the behavior of the physical world. <p>Essential Questions</p> <ul style="list-style-type: none"> ↘ How does the expression of a physical quantity indicate its nature, size and accuracy? ↘ How can the motion of a particle be described? ↘ What fundamental difference exists between vector and scalar quantities? ↘ What quantities need to be specified in order to predict the motion of an object? <p>Content Topics</p> <ul style="list-style-type: none"> ↘ Kinematics, the description of motion, including speed, velocity, acceleration, vectors, displacement, and projectile motion ↘ Introduction to Newton's Laws ↘ The Solar System, including distance, size, and scale ↘ The history and nature of science in the context of Physics, including scientific world view, scientific inquiry, scientific enterprise, and historic perspectives <p>Skills</p> <ul style="list-style-type: none"> ↘ Science process skills, which may include observing, inferring, measuring, performing experiments, etc. ↘ Laboratory skills, which may include use of the balance, bunsen burner, thermometer, etc. ↘ Literacy skills, which may include math computation, writing, reading, scientific literacy, use of technology, etc. ↘ Affective skills, which may include communication, cooperation, media preference, etc. <p>Assessments</p> <ul style="list-style-type: none"> ↘ Bulls eye lab investigation and/or a projectile motion lab ↘ Investigation and write up for the lab: When is Motion Significant? ↘ "The Bus Jump Project" 	<p><u>Students will:</u> Students will describe the relationships among force, work, energy and power.</p> <p>Big Ideas / Enduring Understandings</p> <ul style="list-style-type: none"> ↘ A body creates fields in the space around it, which causes forces to act on similar bodies in that space. ↘ The motion of a body can be predicted accurately by analyzing the forces acting on it. <p>Essential Questions:</p> <ul style="list-style-type: none"> ↘ How can you describe and demonstrate Newton's Laws? ↘ How can you differentiate between potential and kinetic energy? ↘ Using Newton's Laws of motion, how can you describe the structure of our solar system? <p>Content Topics</p> <ul style="list-style-type: none"> ↘ Newton's laws of motion ↘ Momentum ↘ Circular motion ↘ Energy and work ↘ Potential and kinetic energy ↘ Universe ↘ Satellite motion ↘ Kepler's laws ↘ The history and nature of science in the context of Physics <p>Skills</p> <ul style="list-style-type: none"> ↘ Science process skills, which may include observing, inferring, measuring, performing experiments, etc. ↘ Lab equipment skills, which may include use of the balance, bunsen burner, thermometer, etc. ↘ Literacy skills, which may include math computation, writing, reading, scientific literacy, use of technology, etc. ↘ Affective skills, which may include communication, cooperation, media preference, etc. <p>Assessments</p> <ul style="list-style-type: none"> ↘ Explain the operational physics of a device/activity involving energy transformation, eg. toy, roller coaster, trebuchet, dance

	QUARTER 3	QUARTER 4
	<p><u>Students will:</u> apply the laws of electricity and magnetism, and explain their roles in nature and technology.</p> <p>Big Idea / Enduring Understanding</p> <ul style="list-style-type: none"> ↘ Chemical compounds and solutions are important in the world. <p>Essential Questions</p> <ul style="list-style-type: none"> ↘ Why is water known as the "universal" solvent? ↘ Why are organic compounds so numerous and diverse? ↘ How can reactions be exothermic or endothermic? ↘ What are the characteristics of thermodynamics? ↘ What are the implications of stoichiometry to modern chemistry? ↘ What are the many uses of organic compounds? <p>Content Topics</p> <ul style="list-style-type: none"> ↘ Organic compounds and their nomenclature ↘ Exothermic and endothermic reactions ↘ Avogadro's number ↘ Stoichiometry ↘ Power ↘ Fossil fuel use, including societal implications ↘ Thermodynamics <p>Skills</p> <ul style="list-style-type: none"> ↘ Science process skills, which may include observing, inferring, measuring, performing experiments, etc. ↘ Laboratory skills, which may include use of the balance, bunsen burner, thermometer, etc. ↘ Literacy skills, which may include math computation, writing, reading, scientific literacy, use of technology, etc. ↘ Affective skills, which may include communication, cooperation, media preference, etc. <p>Assessments</p> <ul style="list-style-type: none"> ↘ Designing and performing an original experiment. ↘ Analyzing an iodine clock reaction. ↘ Identifying lab unknowns. 	<p><u>Students will:</u> explore sound, light and waves, including amplitude, wavelength, frequency, and compare energy transfer. Students will also explore characteristics of the universe.</p> <p>Big Idea / Enduring Understandings</p> <ul style="list-style-type: none"> ↘ Atoms react in many different ways to make the world in which we live. <p>Essential Questions</p> <ul style="list-style-type: none"> ↘ How does the electromagnetic spectrum impact our lives? ↘ How would you differentiate among acids, bases and salts based on their properties? ↘ What are the rules that determine the volume, temperature, and pressure of a gas? <p>Content Topics</p> <ul style="list-style-type: none"> ↘ Electromagnetic spectrum ↘ Nuclear chemistry <ul style="list-style-type: none"> - radioactivity - fission/fusion - half-life ↘ Acid-base reactions ↘ Gas Laws <ul style="list-style-type: none"> - volume, temperature and pressure relationships - gas stoichiometry, including a mole of a gas - reactions, including energy generated or used in a chemical reaction ↘ History and Nature of Science <p>Skills</p> <ul style="list-style-type: none"> ↘ Science process skills, which may include observing, inferring, measuring, performing experiments, etc. ↘ Lab equipment skills, which may include use of the balance, bunsen burner, thermometer, etc. ↘ Literacy skills, which may include math computation, writing, reading, scientific literacy, use of technology, etc. ↘ Affective skills, which may include communication, cooperation, media preference, etc. <p>Assessments</p> <ul style="list-style-type: none"> ↘ Recycling symbols