

Content: Physical Science	Grade or Course: Honors Physics	Date Developed: 3/7/2018
<p>Overview:</p> <p>Honors Physics builds physics concepts through the modeling process, building knowledge through the use of experimentation, graphing, and algebra-based mathematics. In addition, development and appreciation of inquiry and critical thinking skills is stressed; students are regularly asked to apply fundamental physics principles, in conjunction with general problem solving skills, to a wide variety of “real-life” situations.</p> <p>This 1 credit course, which is intended primarily for students in their senior year, provides a strong background for students intending to pursue a life science or non-science major in college; it will fulfill any college’s requirement of a high school lab-based physics course. Primary topics include kinematics, forces, dynamics, and momentum. Students enrolled in Honors Physics must have completed or be enrolled in Algebra 2.</p>		
<p>Essential Questions:</p> <p>How can scientific models be used to describe and quantify the nature and interactions of matter?</p> <p>How can experimental data be used to create mathematical models, graphical models, and verbal models that describe the physical world?</p> <p>How can we use the past and present conditions of the physical world to predict the future?</p> <p>How accurately can we predict the condition of the physical world based on past and present conditions?</p> <p>How are physics principles relevant to everyday life?</p>		
<p>EO’s addressed to proficiency level:</p> <p>Students will understand, demonstrate, and be evaluated on the following Scientific Practices:</p> <ul style="list-style-type: none"> • Asking Questions and Defining Problems • Planning and Carrying Out Investigations • Analyzing and Interpreting Data • Using Math and Computational Thinking • Obtaining, Evaluating, and Communicating Information 		

Standards:

Students will understand and use the following additional Scientific Practices:

- Developing and Using Models
- Constructing Explanations and Designing Solutions
- Engaging in Argument over Evidence

Students will understand and use the following Cross-Cutting Concepts:

- Patterns
- Cause and effect: Mechanism and explanation
- Scale, proportion, and quantity
- Systems and system models
- Stability and change

Students will understand, use, and be evaluated on the following Disciplinary Core Ideas:

- Students will understand that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration. (*HS-PS2-1*)
- Students will understand that the total momentum of a system of objects is conserved when there is no net force on the system. (*HS-PS2-2*)
- Students will design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision. (*HS-PS2-3*)
- Students will understand how Newton's Law of Gravitation and Coulomb's Law can be used to describe and predict the gravitational and electrostatic forces between objects. (*HS-PS2-4*)
- Students will understand and be able to predict the motion of orbiting objects in the solar system. (*HS-ESS1-4*)
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Units:

Introductory Unit	Prerequisite Skills
Unit 1	Kinematics: Graphs and Models
Unit 2	Kinematics: Using Equations with Simple and Complex Motion
Unit 3	Newton's Laws of Motion
Unit 4	Interacting Systems
Unit 5	Two Dimensional Motion

EO Assessments:

- Newton's Second Law Lab
- Mars Rover Project
- Dissipated Energy Lab