

<b>DEPARTMENT: SCIENCE</b>	<b>COURSE TITLE: HONORS PHYSICS</b> <b>COURSE NUMBER: 246</b>
<b>GRADE(S): 12 (WITH SOME EXCEPTIONS)</b>	<b>PRE-REQUISITES (IF ANY): PRE-CALCULUS (OR CONCURRENT ENROLLMENT)</b>

<b>UNIT</b>	<b>LENGTH</b>	<b>CONTENT</b>	<b>SKILLS</b>	<b>METHODS OF ASSESSMENT</b>	<b>FRAMEWORK STRAND(S) &amp; STANDARD(S)</b>
Introduction to Physics and Measurement	5 days	<ul style="list-style-type: none"> <li>Identifying units of measure</li> <li>Basic versus compound units</li> <li>Error and uncertainty in measurement</li> <li>Tools for measuring</li> <li>Representing physical phenomena with mathematical models</li> </ul>	Students will: <ul style="list-style-type: none"> <li>Demonstrate understanding of measurement.</li> <li>Perform unit conversion.</li> <li>Demonstrate computer skills of data collection, data analysis, and modeling.</li> <li>Formulate questions.</li> <li>Make models.</li> </ul>	<ul style="list-style-type: none"> <li>Lab practical</li> <li>Homework</li> <li>Written class work</li> <li>Short writing</li> </ul>	Motion and Forces: 1.1, 1.12, Conservation of energy and momentum: 2.6, Waves: 4.2
Analysis of motion in a straight line	10 days	<ul style="list-style-type: none"> <li>Describing position in one dimension</li> <li>Describing constant velocity motion in one dimension</li> <li>Describing acceleration in one dimension</li> <li>The use of graphs to describe position, velocity and acceleration</li> <li>Equations of motion in one dimension</li> </ul>	Students will: <ul style="list-style-type: none"> <li>Demonstrate understanding of measurement.</li> <li>Create and interpret graphs and diagrams of motion.</li> <li>Demonstrate proper use of calculator.</li> <li>Demonstrate computer skills of data collection, data analysis, and modeling.</li> <li>Work collaboratively.</li> </ul>	<ul style="list-style-type: none"> <li>Electronic classroom polling (PRS)</li> <li>Written quiz</li> <li>Homework</li> <li>Lab report</li> </ul>	Motion and Forces: 1.1, 1.2, 1.3, 1.4, 1.5
Introduction to Vectors and Kinematics	10 days	<ul style="list-style-type: none"> <li>Describing position, displacement, velocity and acceleration in two dimensions</li> <li>Maps</li> <li>Orienteering</li> <li>Equations of motion in two dimensions</li> </ul>	Students will: <ul style="list-style-type: none"> <li>Create and interpret maps.</li> <li>Navigate using a map and compass.</li> <li>Decompose a vector into components using trigonometry.</li> <li>Demonstrate proper use of a calculator.</li> </ul>	<ul style="list-style-type: none"> <li>Short writing</li> <li>Electronic classroom polling (PRS)</li> <li>Orienteering activity (lab practical)</li> <li>Written quiz</li> </ul>	Motion and Forces: 1.1, 1.2, 1.3, 1.4, 1.12
Free Fall and Projectile Motion	5 days	<ul style="list-style-type: none"> <li>Recognizing and describing free fall</li> <li>Recognizing and describing projectile motion</li> <li>Range of a projectile</li> <li>Mathematical analysis of projectile motion</li> </ul>	Students will: <ul style="list-style-type: none"> <li>Making inferences from observation.</li> <li>Use a computer for collection and analysis of data.</li> <li>Use a computer for modeling with simulations.</li> <li>Demonstrate proper use of a calculator.</li> </ul>	<ul style="list-style-type: none"> <li>Homework</li> <li>Electronic classroom polling (PRS)</li> <li>Written test</li> </ul>	Motion and Forces: 1.2, 1.3, 1.4, 1.5, 1.6

Interactions I: Introduction to Forces and Newton's Laws	10 days	<ul style="list-style-type: none"> <li>Recognizing the presence of forces</li> <li>Naming common forces</li> <li>Introduction of Newton's First Law and the concept of Inertia</li> <li>Introduction to Newton's Second Law</li> <li>Introduction to Newton's Third Law</li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>Identify forces that act in common situations.</li> <li>Use a computer for data collection and analysis.</li> </ul>	<ul style="list-style-type: none"> <li>Homework</li> <li>Electronic classroom polling (PRS)</li> <li>Written class work</li> </ul>	Motion and Forces: 1.1, 1.2, 1.4, 1.5, 1.6, 1.7, 1.10, 1.11 Heat and Energy Transfer: 3.1
Vector Addition and Subtraction, Relative Motion	10 days	<ul style="list-style-type: none"> <li>Vector addition using various methods</li> <li>Vector subtraction using various methods</li> <li>Relative motion</li> <li>Navigation in a moving medium</li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>Add and subtract vector quantities.</li> <li>Create and interpret scale drawings.</li> </ul>	<ul style="list-style-type: none"> <li>Lab practical</li> <li>Written class work</li> <li>Written quiz</li> </ul>	Motion and Forces: 1.1, 1.2, 1.8
Interactions II: Forces as Vectors, Net Force and Free Body Diagrams	10 days	<ul style="list-style-type: none"> <li>Review of forces and Newton's Laws</li> <li>Free body diagrams</li> <li>The concept of net force</li> <li>Relating net force to the motion of an object</li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>Create and interpret free body diagrams.</li> <li>Decompose a vector into components using trigonometry.</li> <li>Add and subtract vector quantities.</li> </ul>	<ul style="list-style-type: none"> <li>Short writing</li> <li>Written class work</li> <li>Electronic classroom polling (PRS)</li> <li>Lab report</li> </ul>	Motion and Forces: 1.1, 1.2, 1.1.6, 1.7, 1.8, 1.9, 1.10, 1.12
Problem Solving in Mechanics: Statics and Dynamics	15 days	<ul style="list-style-type: none"> <li>Developing and analyzing solution plans in dynamics</li> <li>Using dynamics to analyze and predict outcomes in physical situations</li> <li></li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>Develop solutions.</li> <li>Create and interpret graphs and diagrams.</li> <li>Use a computer for data collection and analysis.</li> <li>Use a computer for modeling and simulations.</li> </ul>	<ul style="list-style-type: none"> <li>Homework</li> <li>Group project</li> <li>Written test</li> </ul>	Motion and Forces: 1.3, 1.4, 1.5, 1.7, 1.8, 1.10
Circular Motion and Universal Gravitation	10 days	<ul style="list-style-type: none"> <li>Examples of circular motion</li> <li>Calculating circular motion quantities</li> <li>Universal gravitation</li> <li>Describing motion of orbit</li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>Use a computer for data collection and analysis.</li> <li>Use a computer to create models.</li> <li>Demonstrate proper use of a calculator.</li> <li>Make inferences from observations.</li> </ul>	<ul style="list-style-type: none"> <li>Written class work</li> <li>Electronic classroom polling (PRS)</li> </ul>	Motion and Forces: 1.1, 1.2, 1.3, 1.6, 1.7, 1.10, 1.11 Conservation of Energy and Momentum: 2.1
Energy and Momentum	20 days	<ul style="list-style-type: none"> <li>Types of mechanical energy</li> <li>Conversions of energy</li> <li>Momentum</li> <li>Conservation principles for momentum and mechanical energy</li> <li>Using energy and momentum ideas in problem solving</li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>Use a computer for data collection and analysis.</li> <li>Use a computer to create models and simulations.</li> <li>Create and interpret graphs.</li> <li>Develop solutions.</li> </ul>	<ul style="list-style-type: none"> <li>Group project</li> <li>Electronic classroom polling (PRS)</li> <li>Lab report</li> </ul>	M & F: 1.1, 1.2, 1.4-1.10 Energy and Mom.: 2.1- 2.6 Heat & Energy: 3.1, 3.3 Waves: 4.4

Introduction to Electromagnetic Phenomena	15 days	<ul style="list-style-type: none"> <li>• Investigating the nature of charge and electrostatics</li> <li>• Identifying conductors and non-conductors (insulators)</li> <li>• Charge flow in a circuit</li> <li>• Voltage and resistance in a circuit</li> <li>• The behavior of a capacitor</li> </ul>	<p>Students will:</p> <ul style="list-style-type: none"> <li>• Make models.</li> <li>• Take measurements using appropriate tools.</li> </ul>	<ul style="list-style-type: none"> <li>• Written class work</li> <li>• Written quizzes</li> <li>• Lab practical</li> </ul>	<p>M&amp;F: 1.7, 1.12  Energy &amp; Mom.: 2.2, 2.3, 2.4  Waves: 4.4  Electricity and Magnetism: 5.1, 5.2, 5.4</p>
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