

Honors Physics

Instructor:

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Honors Physics is an intensive, math-based science course for motivated students. The pace of the course is rapid and students accept much of the responsibility for their own learning. The first semester will focus on the topics of kinematics (motion) and dynamics (the causes of motion), including energy and momentum. The second semester will focus on electricity and magnetism, wave motion, sound and light. Students must be highly proficient with algebra, trigonometry and geometry; concurrent enrollment in calculus supports integration of advanced math with physics. The class will include an intensive laboratory component as well as rigorous problem-solving exercises. Students who are committed to the course will complete it with the skills and confidence necessary to be successful in college level science courses, including algebra-based or calculus-based physics.

Graduation Standards (the number of the standard is referenced in the performance indicators listed in each unit):

PHYSICAL SCIENCES STANDARD:**2: FORCES AND MOTION****3: ENERGY, WAVES, AND ELECTROMAGNETIC RADIATION****Unit 1 Motion in One Direction**

- Summary
- Physics and mathematics relation to everyday life.
 - The relationship between displacement, velocity, and acceleration.
 - Graphs importance in determining motion of an object.

Performance Indicators Assessed in Unit 2A. Use motion and kinematic equations in one dimension to calculate acceleration, velocity, time, and displacement.

Unit 2 Motion in Two Directions

- Summary
- Differentiate between scalar and vectors
 - The relationship between motion and reference point
 - Projectile flight path

Performance Indicators Assessed in Unit 2B. Use motion and kinematic equations in two dimensions to calculate acceleration, velocity, time, and displacement.

Unit 3 FORCES AND THE LAWS OF MOTION

- Summary
- Differentiate between inertia and force
 - The relationship between Newton's law and motion

Performance Indicators 2C. Use Newton's Laws of Motion to precisely calculate an object's change in motion when a net force is applied.

Assessed in Unit	
Unit 4	ENERGY
Summary	<ul style="list-style-type: none"> • Differentiate between physics and everyday work • The relationship between Law of conservation of Energy and motion • The relation between work, energy, and power
Performance Indicators Assessed in Unit	3A. Understand that all energy can be considered to be either kinetic or potential and can involve both work and power.
Unit 5	Momentum and Collisions
Summary	<ul style="list-style-type: none"> • Differentiate between force and impulse • The relationship between different types of momentum conservation • Impulses effect of collisions in real world interactions
Performance Indicators Assessed in Unit	3B. Demonstrate knowledge of conservation of momentum and impulse.
Unit 6	Circular Motion and Gravitational Force
Summary	<ul style="list-style-type: none"> • What is centripetal force? • The relationship between centripetal and centrifugal force. • Satellites natural orbits.
Performance Indicators Assessed in Unit	2D. Model gravity as a universal force that each mass exerts on another mass, and circular motion.
Unit 7	Electric Forces and Fields
Summary	<ul style="list-style-type: none"> • What electric charges are. • The relationship between force, magnitude, and distance. • Electric field causes and results.
Performance Indicators Assessed in Unit	2E. Demonstrate that electric forces are universal forces that exist between any two charged objects.
Unit 8	ELECTRICAL ENERGY AND VOLTAGE
Summary	<ul style="list-style-type: none"> • What electric potential is. • The relationship between potential and gravitational potential energy. • Batteries and generators supply power.

Performance Indicators Assessed in Unit	3C. Understand the relationships between electric potential, capacitance, and current and resistance.
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