



Science

High School Physics

	What students will know and be able to do:	Standard
Motion & Forces	<ul style="list-style-type: none"> Apply Newton's three laws of motion Describe Newton's Law of Universal Gravitation Distinguish between displacement, distance, velocity, speed, and acceleration using vector quantities. Interpret graphs showing 1-dimension motion such as position vs. time, distance vs. time, speed vs. time, velocity vs. time, and acceleration vs. time where acceleration is constant. Show the forces acting on a system by utilizing a free-body force diagram. Distinguish between static and kinetic friction and how they affect an object's motion. Describe the forces involved in circular motion. 	<p>1.4</p> <p>1.7</p> <p>1.1, 1.2</p> <p>1.3</p> <p>1.5 & 1.1</p> <p>1.6</p> <p>1.8</p>
Conservation of Energy & Momentum	<ul style="list-style-type: none"> Interpret and provide examples that demonstrate the law of conservation of energy, including how energy changes forms (gravitational potential energy to kinetic energy). Describe qualitatively and quantitatively work and power. Calculate the momentum of an object showing that linear momentum is a product of mass and velocity and is always conserved. 	<p>2.1, 2.2</p> <p>2.3 & 2.4</p> <p>2.5</p>
Heat and Heat Transfer	<ul style="list-style-type: none"> Describe the transfer of heat energy by convection, conduction, radiation and by means of a temperature differential until equilibrium is reached. Show how temperature changes in a substance are affected by the amount of heat transferred, specific heat of a substance, and the amount (mass) of the substance. Define how temperature is a measure of the average molecular kinetic energy and that a change in physical state results in energy transfer through evaporation, condensation, cooling, and warming. 	<p>3.1, 3.2</p> <p>3.4</p> <p>3.3</p>
Waves & Electromagnetic Radiation	<ul style="list-style-type: none"> Describe wave properties: velocity, frequency, wavelength, amplitude, period. Give examples of harmonic motion. Distinguish between mechanical (transverse and longitudinal) and electromagnetic waves (travel at the speed of light through a vacuum). Use frequency and wavelength to describe electromagnetic radiation. Identify the types of 	<p>4.1</p> <p>4.2, 4.3, 6.1</p> <p>6.2</p>

	<p>electromagnetic radiation and location on the electromagnetic spectrum.</p> <ul style="list-style-type: none"> • Describe reflection and refraction of waves and how mechanical waves move at different speeds through various mediums (solids, liquids, gases). • Describe the Doppler Effect 	4.4, 4.5 4.6
Electromagnetism	<ul style="list-style-type: none"> • Energy can produce a separation of charges. Insulators cause charges to be static and movement of charge occurs in conductors • Use Ohm's Law to describe current, voltage, and resistance. • Analyze and construct schematic diagrams for series and parallel circuits using the appropriate symbols for batteries, connecting wires, switches, fuses, and resistances. • Use Coulomb's Law to conceptually describe the forces (attractive and repulsive) between charged objects as particular distances. • Describe how a potential difference causes the flow of electric current and calculate power which is current multiplied by voltage. • Explain how moving electric charges cause magnetic forces and moving magnets cause electric forces and how this principle is the basis for electric motors, generators, and other technologies. 	5.1 5.2 5.3 5.4 5.5 5.6