

Cornwall-Lebanon School District Curriculum Overview

AP Physics C – 11th & 12th Grade

 length of time in weeks	Concepts & Competencies	Common Assessments	Academic Standards (PA Core if applicable)
Unit 1 	<u>Lab Skills</u> Students will apply the scientific method to determine solutions to problems or relationships between measured quantities. Students will properly analyze data from an experiment Students will communicate the methods and results from scientific investigations.	➤ Uncertainty Lab ➤ Unit 1 Test	3.2.12 B6
Unit 2 	<u>Kinematics</u> Students will analyze the motion of an object using graphs. Students will distinguish between vector and scalar quantities. Students will solve problems involving position, velocity, and acceleration. Students will add and resolve vectors Students will solve projectile motion problems.	➤ Open-Inquiry Kinematics Lab ➤ Projectile Motion Lab ➤ Unit 2 Quiz 1 ➤ Unit 2 Quiz 2 ➤ Unit 2 Quiz 3 ➤ Unit 2 Test	3.2.12 B1 3.2.12 B6 3.2.12 B7
Unit 3 	<u>Forces and Newton's Laws</u> Students will use Newton's 1st Law to analyze balanced force situations. Students will use Newton's 2nd Law to analyze unbalanced force situations. Students will use Newton's 3rd Law to analyze action/reaction force pairs. Students will identify and use the centripetal force.	➤ Elevator Lab ➤ Coffee Filter Lab ➤ Uniform Circular Motion Lab ➤ Unit 3 Quiz ➤ Unit 3 Test	3.2.12 B1 3.2.12 B6 3.2.12 B7

Unit 4	2	<u>Energy</u> Students will identify and calculate the energies present in a given system. Students will apply the law of Conservation of Energy to solve problems. Students will recognize that Work is the change of energy in a system. Students will calculate the amount of Work done on a system. Students will recognize that Power is the rate of doing Work.	➤ Conservation of Energy & Projectile Motion Lab ➤ Unit 4 Test	3.2.12 B2 3.2.12 B6 3.2.12 B7
Unit 5	2	<u>Momentum</u> Students will calculate the momentum of an object. Students will use the Law of Conservation of Momentum to solve problems. Students will recognize that the change in momentum is due to an impulse. Students will distinguish between Elastic and Inelastic collisions. Students will calculate the center of mass for uniform and nonuniform objects.	➤ 2-Dimensional Conservation of Momentum Lab ➤ Unit 5 Test	3.2.12 B1 3.2.12 B6 3.2.12 B7
Unit 6	2	<u>Rotational Motion</u> Students will solve problems involving angular position, velocity, and acceleration. Students will calculate the Torque acting on an object. Students will recognize and apply the conditions for Static Equilibrium. Students will derive and Calculate the Moment of Inertia for various shapes. Students will calculate the Angular Momentum of an object and apply the conservation of angular momentum	➤ Static Equilibrium Lab ➤ Unit 6 Quiz 1 ➤ Unit 6 Quiz 2 ➤ Unit 6 Quiz 3 ➤ Unit 6 Test	3.2.12 B1 3.2.12 B2 3.2.12 B6 3.2.12 B7
Unit 7	1	<u>Universal Gravitation and Kepler's Laws</u> Students will solve problems using Universal Gravitation. Students will apply the conservation of energy to satellite motion. Students will analyze planetary motion using Kepler's three laws.	➤ Gravity, Orbits, and Kepler's Laws Virtual Lab ➤ Unit 7 Test	3.2.12 B1 3.2.12 B2 3.2.12 B6 3.2.12 B7

Unit 8	2	<u>Simple Harmonic Motion</u> Students will identify the properties of waves. Students will use the properties of Simple Harmonic Motion to solve problems involving springs and pendulums. Students will apply the properties of springs and pendulums to multi-concept problems involving forces, energy, and momentum	➤ Virtual Spring Lab ➤ Virtual Pendulum Lab ➤ Unit 8 Test	3.2.12 B1 3.2.12 B2 3.2.12 B6 3.2.12 B7
Unit 9	2	<u>Electric Forces and Fields</u> Students will determine the electric force between multiple charged objects using Coulomb's Law and Newton's Laws. Students will calculate the electric field due to a point charge. Students will calculate the electric field due to various charge distributions.	➤ Scotch Tape Lab ➤ Unit 9 Quiz 1 ➤ Unit 9 Quiz 2 ➤ Unit 9 Test	3.2.12 B1 3.2.12 B4 3.2.12 B6 3.2.12 B7
Unit 10	1	<u>Gauss's Law</u> Students will calculate the electric flux through a closed surface. Students will apply Gauss's Law to determine the electric field created by various charge distributions.	➤ Unit 10 Quiz ➤ Unit 10 Test	3.2.12 B4 3.2.12 B6
Unit 11	1	<u>Electric Potential</u> Students will differentiate between and calculate the Electrical Potential Energy, Electric Potential, and Potential Difference. Students will calculate the electric potential due to point charge Students will determine the electric potential difference created by various charge distributions Students will relate electric field to electric potential difference and be able to calculate one when the other is known. Students will Use conservation of energy to analyze problems involving potential difference	➤ Electric Potential Virtual Lab ➤ Unit 11 Test	3.2.12 B2 3.2.12 B4 3.2.12 B6 3.2.12 B7
Unit 12	4	<u>DC Circuits</u> Students will calculate the capacitance of a capacitor or capacitors in combination. Students will recognize and apply the properties of Voltage, Current, and Resistance. Students will solve problems using Ohm's Law and Watt's Law.	➤ Virtual Capacitance Lab ➤ Play-Doh Resistor Lab ➤ Ohm's Law Lab ➤ Kirchhoff Lab ➤ RC Circuit Lab ➤ Unit 12 Quiz 1	3.2.12 B2 3.2.12 B4 3.2.12 B6 3.2.12 B7

		Students will use Kirchhoff's Laws to determine the current in complex circuits Students will use the properties of capacitors to determine the current flowing through an RC Circuit at any time.	➤ Unit 12 Quiz 2 ➤ Unit 12 Quiz 3 ➤ Unit 12 Test	
Unit 13	2	<u>Sources of Magnetism</u> Students will determine the magnetic field created by current carrying loops by using Biot-Savart Students will calculate the magnetic field created by current carrying wires and solenoids by using Ampere's Law. Students will determine the direction of Magnetic Fields and Forces by using Right Hand Rules. Students will calculate the amount of Magnetic force acting on moving charges Students will calculate the torque acting on current carrying loops. Students will recognize and explain the meaning of each of Maxwell's Equations	➤ Magnetic Force Lab ➤ Unit 13 Test	3.2.12 B1 3.2.12 B4 3.2.12 B6 3.2.12 B7
Unit 14	2	<u>Faraday's Law and Electromagnetic Induction</u> Students will calculate the induced EMF and current by applying Faraday's Law to various situations. Students will determine the direction of induced current using Lenz's Law Students will calculate the amount of energy stored within an inductor. Students will apply the properties of inductors to analyze circuits containing inductors.	➤ Virtual Faraday's Law Lab ➤ Virtual Generator Lab ➤ Unit 14 Test	3.2.12 B1 3.2.12 B2 3.2.12 B4 3.2.12 B6 3.2.12 B7