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 1	Lab Skills 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 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 2	<u>Forces and Newton's Laws</u> Students will use Newton's 1 st Law to analyze balanced force situations. Students will use Newton's 2 nd Law to analyze unbalanced force situations. Students will use Newton's 3 rd 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	Energy 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	Rotational Motion 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	Universal Gravitation and Kepler's Laws 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

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Unit 8	Simple Harmonic Motion	Virtual Spring Lab	3.2.12 B1
	² Students will identify the properties of waves.	Virtual Pendulum Lab	3.2.12 B2
	Students will use the properties of Simple Harmonic Motion to	Unit 8 Test	3.2.12 B6
	solve problems involving springs and pendulums.		3.2.12 B7
	Students will apply the properties of springs and pendulums to		
	multi-concept problems involving forces, energy, and		
	momentum		
Unit 9	Electric Forces and Fields	Scotch Tape Lab	3.2.12 B1
onne s	2 Students will determine the electric force between multiple	Unit 9 Quiz 1	3.2.12 B4
	charged objects using Coulomb's Law and Newton's Laws.	Unit 9 Quiz 2	3.2.12 B6
	Students will calculate the electric field due to a point charge.	Unit 9 Test	3.2.12 B7
	Students will calculate the electric field due to various charge		
	distributions		
Lipit 10	Gauss's Law	Unit 10 Quiz	3.2.12 B4
	1 Students will calculate the electric flux through a closed	Unit 10 Test	3.2.12 B6
	surface		5.2.12 55
	Students will apply Gauss's Law to determine the electric field		
	created by various charge distributions		
Linit 11	Electric Potential	Electric Potential Virtual Lab	3.2.12 B2
	1 Students will differentiate between and calculate the Electrical	Unit 11 Test	3.2.12 B4
	Potential Energy, Electric Potential, and Potential Difference.		3.2.12 B6
	Students will calculate the electric potential due to point		3.2.12 B7
	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		
Linit 12	DC Circuits	Virtual Capacitance Lab	3.2.12 B2
Unit 12	4 Students will calculate the capacitance of a capacitor or	 Play-Doh Resistor Lab 	3.2.12 B4
	capacitors in combination.	Ohm's Law Lab	3.2.12 B6
	Students will recognize and apply the properties of Voltage	 Kirchhoff Lab 	3.2.12 B7
	Current and Resistance	RC Circuit Lab	
	Students will solve problems using Ohm's Law and Watt's Law	\blacktriangleright Unit 12 Quiz 1	
	stadente win solve problems doing onin s Law and Watt s Law.		I

Unit 13 2	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. <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	 Unit 12 Quiz 2 Unit 12 Quiz 3 Unit 12 Test 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	Maxwell's Equations Faraday's Law and Electromagnetic Induction 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