

AP Physics 1

Teacher's Name: Elmira Lising Room #: 1015 Email Address: elmira.lising@salinasuhd.org

COURSE DESCRIPTION

Splitting the AP Physics B course into two separate, full-year courses allows students to achieve in-depth understanding. They will have more time for hands-on explorations of physics content and inquiry labs. The full year also allows time for inclusion of physics content specified by state standards.

- **AP Physics 1: Algebra-Based** is the equivalent to a first-semester college course in algebra-based physics. The course covers Newtonian mechanics (including rotational dynamics and angular momentum); work, energy, and power; and mechanical waves and sound. It will also introduce electric circuits. There is heavy emphasis placed on conceptual based problems rather than calculation heavy problems.
- **Students need to be concurrently enrolled in Math 3 or higher math classes. Students must have received a grade of A or B in Math 2.**

Expectations

As an AP class, the coursework will be college level and rigorous. Since this course covers both lecture and lab, it is essentially the equivalent of one and a half full courses. Prepare to work hard

To be successful in physics, one must give it time and effort. Albert Einstein once said "It's not that I'm so smart, it's just that I stay with problems longer."

GRADING

Homework (10% of grade)

You should expect homework to be assigned every day and due at the beginning of the next class. In order to receive full credit on an assignment, the work must be done complete and on-time. Late assignments will be accepted but not given full credit

Labs (20% of grade)

Most of the labs will be hands-on and designed by students. Each lab group will have access to computer interfaced probe ware to complete their investigations. Each student is required to write his/her findings in a lab journal. There will be deductions for late labs. (10% for each day late)

Exams/Quizzes (70% of grade)

There will be one exam for each chapter in the course outline. Exams will usually be given on the day after lab investigations. Each exam will follow the AP Physics 1 exam format consisting of a multiple-choice section and free-response section.

COURSE OUTLINE

The main course which will prepare the students for the AP Physics 1 exam consists of 10 units as outlined below.

Chapter	Labs	Topics
Unit I: Kinematics	Pendulum Lab	Motion in One Dimension
	Translational Equilibrium	Motion in Two Dimensions
	Kinematics Lab (constant velocity and constant acceleration)	
	Motion in 2 -D lab	
Unit II: Dynamics	Newton's Second Law (modified Atwood's machine)	Static Equilibrium (First Law)
	Coefficient of Friction Lab	Dynamics of a Single Particle (Second Law)
		Systems of Multiple Objects (Third Law)

		Applications of Newton's Laws
		Friction
		Interacting Objects: ropes and pulleys
Unit III: Work, Energy and Power	Mechanical Energy(Capstone)	Work and Work-Energy Theorem
	Verifying Work-Energy Theorem	Forces and Potential Energy
	Elastic Potential Energy Lab (dynamics cart) Hooke's Law included	Conservation of Energy
		Power
Unit IV: Systems of Particles and Linear Momentum	Impulse-Change in Momentum Theorem Lab	Momentum
	Conservation of Linear Momentum in Explosions	Impulse
	Conservation of Momentum in Collision	Conservation of Linear Momentum
		Elastic and Inelastic Collision in 1-D
		Elastic and Inelastic Collision in 2-D
Unit V: Circular Motion and Gravitation	The Flying Pig	Uniform Circular Motion
	Difference between Inertial Mas and Gravitational Mass	Dynamics on Uniform Circular Motion
		Universal Law of Gravitation
		Circular Orbits of Planets and Satellites
Unit VI: Simple Harmonic Motion	Motion of a Spring (Capstone)	Simple Harmonic Motion
		Mass on a Spring
		Pendulum and Oscillations
Unit VII: Rotational Motion	Torque Lab	Torque
	Rotational Inertia Lab (PVC)	Center of Mass
		Rotational Kinematics
		Rotational Dynamics and Rotational Inertia
		Rotational Energy
		Angular Momentum
		Conservation of Angular Momentum
Unit VIII: Wave Motion	The Velocity of Sound	Wave Basics
	Standing Wave	Traveling Waves
		Standing Waves
		Sound Waves and Doppler Effect
Unit IX: Electrostatics		Charge and Coulomb's Law
		Electric Field
Unit X: Electric Circuits	Ohm's Law and Kirchoff's Law in Circuits	Current, Resistance and Power
	Series and Parallel	DC Circuits with Batteries and Resistors
		Series and Parallel Connection
		Kirchoff's Laws