

Montclair High School

Course Syllabus

Department: Science
Course: AP Physics 1
Level: Advanced Placement
Credits: 6

Course Description:

AP Physics B1 is the first of a two-year algebra-based AP Physics program. Classes meet six times a week (one double lab and four lectures). Topics covered include measurement, vectors, motion, force, energy, light, sound, electromagnetism and modern physics.

This course emphasizes the use of advanced algebra and trigonometry to solve problems and analyze data. Strong math and problem solving skills are therefore a necessity and it is strongly recommended that students enrolling in this course have first successfully completed courses in algebra and geometry. It is also recommended that the student have maintained at least a 'A' average in their math courses.

Standards:

HS-PS2, HS-PS3, HS-PS4

Anchor Text(s):

Text Title	Publisher/Author	Year/Edition	ISBN	Text Distribution
Physics	John Wiley & Sons/ John Cutnell and Kenneth Johnson	2015/ 10th edition	978-1- 118-48689- 4	Hard copy

Supplementary Materials:

- Walker, Jearl. Fundamentals of Physics 8th Edition. John Wiley and Sons Inc. New York, 2007.
- Fullerton, Dan. AP Physics 1 Essentials: An Aplusphysics Guide. Silly Beagle Productions, 2013
- Princeton Review: Cracking the AP physics 1 Exam. Random House 2015.
- Supplemental Resources and Problem Sets will be given with each unit>

Units of Study:

- UNIT I - KINEMATICS
 - One dimensional motion including graphs of position, velocity, and acceleration vs. time
 - Vectors/Scalars, Two dimensional motion and projectiles, Frames of motion and relative motion
 - (Big ideas 3 and 4)
- UNIT II - DYNAMICS
 - Newton's Laws of motion, Applications of Newton's laws, Free body diagrams, Friction (Big ideas 1, 2, 3, 4)
- UNIT III - UNIVERSAL GRAVITATION/CIRCULAR MOTION

- Uniform circular motion, Law of universal gravitation (Big ideas 1, 2, 3, 4)
- UNIT IV - WORK, ENERGY, AND POWER
 - Work, Kinetic Energy, Potential Energy, Conservation of Energy, Power (Big ideas 3, 4, 5)
- UNIT V - LINEAR MOMENTUM
 - Impulse/Momentum, Conservation of Momentum, Elastic and Inelastic Collisions (Big ideas 3, 4, 5)
- UNIT VI - TORQUES/ROTATION
 - Angular displacement, velocity, and acceleration; Rotational kinematics; Torques; Rigid Body Equilibrium; Rotational inertia, work, and energy; Angular momentum (Big ideas 3, 4, 5)
- UNIT VII - SIMPLE HARMONIC MOTION
 - SHM models and graphs, Simple and physical pendulums, Mass/spring systems (Big ideas 3 and 5)
- UNIT VIII - WAVES AND SOUND
 - Wave Nature, Periodic Waves, Sound, Doppler Effect (Big idea 6)
- UNIT IX - ELECTROSTATICS
 - Electrical Charge/ Conservation of Charge, Electrostatic Forces/ Coulomb's Law (Big ideas 1, 3, 5)
- UNIT X - DC CIRCUITS
 - Current, Capacitors, Ohm's Law, DC Circuits, Series and Parallel Connections, Kirchhoff's Laws (Big ideas 1 and 5)

Proficiencies:

By the end of this course, students will:

- Use geometric, algebraic, and physical models to explain and predict outcomes for systems listed in the above topics
- Use instruments and data collection methods normally available to high school students to collect, organize and analyze data.
- Develop problem-solving techniques while conducting inquires.

Evaluation & Assessment:

- Tests & Quizzes 60%
- Lab/Projects 30%
- HW 10%

Note: Not all Do Nows will be graded and not all homework will be graded, but failure to submit either on time will have a negative impact on your grade.

Prior to beginning any lab activities, all students must have submitted a Safety Contract which has been duly signed by both the student and their parent/guardian. This contract will be kept on file by the teacher for the duration of the course.