



AP Physics B

AP Physics B is a non-calculus survey course covering five general areas: Newtonian mechanics, thermal physics, electricity and magnetism, waves and optics, and atomic and nuclear physics. Students will gain an understanding of physics' core principles and then apply them to problem-solving exercises. They'll learn how to measure the mass of a planet without weighing it, find out how electricity makes a motor turn, and learn how opticians know how to shape the lenses for glasses. The equivalent of an introductory college-level course, AP Physics B prepares students for the AP Exam and for further study in science and engineering.

Course Length: Two semesters

Prerequisites: Algebra II, Math Analysis or Trigonometry. The College Board strongly recommends Physics B as a second-year course following the usual introductory physics course.

Syllabus

Semester 1

Unit 1: Welcome to Physics

- Lesson 1: Why Study Physics?
- Lesson 2: Math Tools
- Lesson 3: Unit Wrap-Up

Unit 2: Kinematics: Describing Motion

- Lesson 1: Motion in One Dimension
- Lesson 2: Motion in Two Dimensions
- Lesson 3: Unit Wrap-Up

Unit 3: Dynamics, Kinetic Energy, and Work

- Lesson 1: Newton: Three Laws of Motion
- Lesson 2: Kinetic Energy and Work
- Lesson 3: Momentum and Collisions
- Lesson 4: Unit Wrap-Up

Unit 4: Circular Motion, Gravitation, and Rotation

- Lesson 1: Circular Motion
- Lesson 2: Gravitation and Planetary Orbits
- Lesson 3: Rotational Statics
- Lesson 4: Fluids
- Lesson 5: Unit Wrap-Up

Unit 5: Vibration, Waves, and Sound

- Lesson 1: Oscillation (Vibration) and Simple Harmonic Motion
- Lesson 2: Waves
- Lesson 3: Sound
- Lesson 4: Unit Wrap-Up

Unit 6: Temperature, Heat, and Thermodynamics

- Lesson 1: Temperature, the Ideal Gas Law and Kinetic Theory
- Lesson 2: Heat and Phases of Matter
- Lesson 3: Thermodynamics

Lesson 4: Unit Wrap-Up

Unit 7: Semester Wrap-Up

Lesson 1: Semester Wrap-Up

Semester 2

Unit 8: Electrostatics

Lesson 1: Coulomb: Law of Electrostatic Forces

Lesson 2: Electric Fields and Potential

Lesson 3: Capacitance

Lesson 4: Unit Wrap-Up

Unit 9: Electric Current

Lesson 1: Ohm: Law of Electric Current and Resistance

Lesson 2: Introduction to Circuits and Circuits With Resistors

Lesson 3: Circuits With Capacitors

Lesson 4: Kirchhoff: Circuit Rules

Lesson 5: Unit Wrap-Up

Unit 10: Magnetostatics

Lesson 1: Introduction to Magnetic Fields

Lesson 2: Applied Magnetic Fields

Lesson 3: Electromagnetic Induction

Lesson 4: Unit Wrap-Up

Unit 11: Electromagnetic Waves and Light

Lesson 1: Introduction to EM Waves and Light

Lesson 2: Mirrors

Lesson 3: Lenses

Lesson 4: Optical Instruments

Lesson 5: Unit Wrap-Up

Unit 12: Physical Optics: Interference and Diffraction

Lesson 1: Interference

Lesson 2: Diffraction

Lesson 3: Unit Wrap-Up

Unit 13: Quantum Theory and Nuclear Physics

Lesson 1: Relativity and the Origins of Quantum Theory

Lesson 2: Atomic Structure: The Bohr Model

Lesson 3: Applied Nuclear Physics: Fission and Fusion

Lesson 4: Unit Wrap-Up

Unit 14: Preparing for the AP Exam

Lesson 1: Course Review

Lesson 2: Final Course Exam

Required purchase (by student or school)¹

- TI-83 or TI-83 plus calculator. Read "Getting Started" and chapter 1 in the TI Guidebook before your course starts.
- *Schaum's Outline of College Physics*. 9th ed. Frederick J. Bueche and Eugene Hecht. McGraw-Hill, 1997. ISBN: 0070089418

Recommended Preparation

In general, students should be self-motivated and good independent learners. Good writing skills are important to a student's ability to succeed in an AP course, and essay writing is important to do well on the free-response sections of an AP Exam. Because this course is computer-based, students should have basic keyboarding skills and be comfortable with getting online, using email, and using a word processor.