

AP Physics 1 Course and Exam Description

AP Physics Program

The AP Program offers four physics courses: AP Physics 1: Algebra-Based is a full-year course that is the equivalent of a first-semester introductory college course in algebra-based physics. AP Physics 2: Algebra-Based is a full-year course, equivalent to a second-semester introductory college course in physics. AP Physics C: Mechanics is a half-year course equivalent to a semester-long, introductory calculus-based college course. AP Physics C: Electricity and Magnetism, a half-year course following Physics C: Mechanics, is equivalent to a semester-long, introductory calculus-based college course

AP Physics 1 Course Overview

AP Physics 1 is an algebra-based, introductory college-level physics course. Students cultivate their understanding of physics through inquiry-based investigations as they explore these topics: kinematics, dynamics, circular motion and gravitation, energy, momentum, simple harmonic motion, torque and rotational motion.

PREREQUISITES

Students should have completed Geometry and be concurrently taking Algebra II or an equivalent course. Although the Physics 1 course includes basic use of trigonometric functions, this understanding can be gained either in the concurrent math course or in the AP Physics 1 course itself.

LABORATORY REQUIREMENT

This course requires that 25% of instructional time be spent in hands-on laboratory work, with an emphasis on inquiry-based investigations that provide students with opportunities to demonstrate the foundational physics principles and apply the science practices.

AP Physics 1 Course and Exam Content

The course content is organized into seven commonly taught units, which have been arranged in the following suggested, logical sequence:

- Unit 1: Kinematics
- Unit 2: Dynamics
- Unit 3: Circular Motion and Gravitation
- Unit 4: Energy
- Unit 5: Momentum
- Unit 6: Simple Harmonic Motion
- Unit 7: Torque and Rotational Motion

Big Ideas

Systems: Objects and systems have properties such as mass and charge.

- Fields: Fields existing in space can be used to explain interactions.
- Force Interactions: The interactions of an object with other objects can be described by forces.
- Change: Interactions between systems can result in changes in those systems.
- Conservation: Changes that occur as a result of interactions are constrained by conservation laws.

AP Physics 1 Science Practices

The following science practices describe what skills students should develop during the course:

- Modeling: Use representations and models to communicate scientific phenomena and solve scientific problems.
- Mathematical Routines: Use mathematics appropriately.
- Scientific Questioning: Engage in scientific questioning to extend thinking or guide investigations.
- Experimental Methods: Plan and implement data collection strategies in relation to a particular scientific question.
- Data Analysis: Perform data analysis and evaluation of evidence.
- Argumentation: Work with scientific explanations and theories.
- Making Connections: Connect and relate knowledge across various scales, concepts, and representations in and across domains.

AP Physics 1 course and exam
UNIT 1 KINEMATICS
1.1 Position, Velocity, and Acceleration
1.2 Representations of Motion
UNIT 2 DYNAMICS
2.1 Systems
2.2 The Gravitational Field
2.3 Contact Forces
2.4 Newton's First Law

2.5	Newton's Third Law and Free-Body Diagrams
2.6	Newton's Second Law
2.7	Applications of Newton's Second Law
UNIT 3 CIRCULAR MOTION AND GRAVITATION	
3.1	Vector Fields
3.2	Fundamental Forces
3.3	Gravitational and Electric Forces
3.4	Gravitational Field/Acceleration Due to Gravity on Different Planets
3.5	Inertial vs. Gravitational Mass
3.6	Centripetal Acceleration and Centripetal Force
3.7	Free-Body Diagrams for Objects in Uniform Circular Motion
3.8	Applications of Circular Motion and Gravitation
UNIT 4 ENERGY	
4.1	Open and Closed Systems: Energy
4.2	Work and Mechanical Energy
4.3	Conservation of Energy, the Work-Energy Principle, and Power
UNIT 5 MOMENTUM	
5.1	Momentum and Impulse
5.2	Representations of Changes in Momentum
5.3	Open and Closed Systems: Momentum
5.4	Conservation of Linear Momentum

UNIT 6 SIMPLE HARMONIC MOTION	
6.1	Period of Simple Harmonic Oscillators
6.2	Energy of a Simple Harmonic Oscillator
UNIT 7 TORQUE AND ROTATIONAL MOTION	
7.1	Rotational Kinematics
7.2	Torque and Angular Acceleration
7.3	Angular Momentum and Torque
7.4	Conservation of Angular Momentum

AP Physics 1 EXAM: 3 Hours

The AP Physics 1 Exam assesses student application of the science practices and understanding of the learning objectives outlined in the course framework. The exam is 3 hours long and includes 50 multiple-choice questions and 5 free-response questions.

Další informace:

Ve školním roce 2023_24 jsou plánovány úpravy obsahu kurzu a zkoušek AP Physics 1 a AP Physics 2, které se projeví v AP zkouškách v květnu 2024. Plánované úpravy najdete zde:

<https://apcentral.collegeboard.org/pdf/ap-physics-1-course-and-exam-description.pdf?course=ap-physics-1-algebra-based>

AP Physics 1 Course Overview – 2 stránky

<https://apcentral.collegeboard.org/pdf/ap-physics-1-course-overview.pdf?course=ap-physics-1-algebra-based>

AP Physics 1 Course at a glance – 3 strany

<https://apcentral.collegeboard.org/pdf/ap-physics-1-course-a-glance.pdf?course=ap-physics-1-algebra-based>

AP Physics 1 Course and Exam Description – 210 stran

<https://apcentral.collegeboard.org/pdf/ap-physics-1-course-and-exam-description.pdf?course=ap-physics-1-algebra-based>

Příklady zkuškových otázek

<https://apcentral.collegeboard.org/pdf/ap21-frq-physics-1.pdf?course=ap-physics-1-algebra-based>