



AP[®]

INCLUDES

- ✓ Course framework
- ✓ Instructional section
- ✓ Sample exam questions

AP[®] Physics 1

COURSE AND EXAM DESCRIPTION

Effective
Fall 2021

AP[®] Physics 1: Algebra-Based

COURSE AND EXAM DESCRIPTION

Effective
Fall 2021

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Please visit AP Central (apcentral.collegeboard.org) to determine whether a more recent course and exam description is available.

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College Board strongly encourages educators to make equitable access a guiding principle for their AP programs by giving all willing and academically prepared students the opportunity to participate in AP. We encourage the elimination of barriers that restrict access to AP for students from ethnic, racial, and socioeconomic groups that have been traditionally underrepresented. Schools should make every effort to ensure their AP classes reflect the diversity of their student population. College Board also believes that all students should have access to academically challenging coursework before they enroll in AP classes, which can prepare them for AP success. It is only through a commitment to equitable preparation and access that true equity and excellence can be achieved.

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Contents

v Acknowledgments

1 About AP

4 AP Resources and Supports

6 Instructional Model

7 About the AP Physics 1 Course

7 College Course Equivalent

7 Prerequisites

7 Laboratory Requirement

COURSE FRAMEWORK

11 Introduction

13 Course Framework Components

15 Science Practices

17 Course Content

20 Course at a Glance

25 Unit Guides

25 Introduction

27 Using the Unit Guides

31 UNIT 1: Kinematics

41 UNIT 2: Dynamics

59 UNIT 3: Circular Motion and Gravitation

77 UNIT 4: Energy

91 UNIT 5: Momentum

107 UNIT 6: Simple Harmonic Motion

117 UNIT 7: Torque and Rotational Motion

LABORATORY INVESTIGATIONS

135 Lab Experiments

136 How to Set Up a Lab Program

INSTRUCTIONAL APPROACHES

141 Selecting and Using Course Materials

142 Guided Inquiry in AP Physics 1

144 Instructional Strategies

155 Developing the Science Practices

EXAM INFORMATION

- 169 **Exam Overview**
- 174 **Sample Exam Questions**

SCORING GUIDELINES

- 187 **Question 1: Quantitative/Qualitative Translation**
- 193 **Question 2: Paragraph Argument Short Answer**

APPENDIX

- 199 **Table of Information: Equations**

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About AP

College Board’s Advanced Placement® Program (AP®) enables willing and academically prepared students to pursue college-level studies—with the opportunity to earn college credit, advanced placement, or both—while still in high school. Through AP courses in 38 subjects, each culminating in a challenging exam, students learn to think critically, construct solid arguments, and see many sides of an issue—skills that prepare them for college and beyond. Taking AP courses demonstrates to college admission officers that students have sought the most challenging curriculum available to them, and research indicates that students who score a 3 or higher on an AP Exam typically experience greater academic success in college and are more likely to earn a college degree than non-AP students. Each AP teacher’s syllabus is evaluated and approved by faculty from some of the nation’s leading colleges and universities, and AP Exams are developed and scored by college faculty and experienced AP teachers. Most four-year colleges and universities in the United States grant credit, advanced placement, or both on the basis of successful AP Exam scores; more than 3,300 institutions worldwide annually receive AP scores.

AP Course Development

In an ongoing effort to maintain alignment with best practices in college-level learning, AP courses and exams emphasize challenging, research-based curricula aligned with higher education expectations.

Individual teachers are responsible for designing their own curriculum for AP courses, selecting appropriate college-level readings, assignments, and resources. This course and exam description presents the content and science practices that are the focus of the corresponding college course and that appear on the AP Exam. It also organizes the content and science practices into a series of units that represent a sequence found in widely adopted college textbooks and that many AP teachers have told us they follow in order to focus their instruction. The intention of this publication is to respect teachers’ time and expertise by providing a roadmap that they can modify and adapt to their local priorities and preferences. Moreover, by organizing the AP course content and science practices into units, the AP Program is able to provide teachers

and students with free formative assessments—Personal Progress Checks—that teachers can assign throughout the year to measure student progress as they acquire content knowledge and develop science practices.

Enrolling Students: Equity and Access

College Board strongly encourages educators to make equitable access a guiding principle for their AP programs by giving all willing and academically prepared students the opportunity to participate in AP. We encourage the elimination of barriers that restrict access to AP for students from ethnic, racial, and socioeconomic groups that have been traditionally underserved. College Board also believes that all students should have access to academically challenging coursework before they enroll in AP classes, which can prepare them for AP success. It is only through a commitment to equitable preparation and access that true equity and excellence can be achieved.

Offering AP Courses: The AP Course Audit

The AP Program unequivocally supports the principle that each school implements its own curriculum that will enable students to develop the content understandings and science practices described in the course framework.

While the unit sequence represented in this publication is optional, the AP Program does have a short list of curricular and resource requirements that must be fulfilled before a school can label a course “Advanced Placement” or “AP.” Schools wishing to offer AP courses must participate in the AP Course Audit, a process through which AP teachers’ course materials are reviewed by college faculty. The AP Course Audit was created to provide teachers and administrators with clear guidelines on curricular and resource requirements for AP courses and to help colleges and universities validate courses marked “AP” on students’ transcripts. This process ensures that AP teachers’ courses meet or exceed the curricular and resource expectations that college and secondary school faculty have established for college-level courses.

The AP Course Audit form is submitted by the AP teacher and the school principal (or designated administrator) to confirm awareness and understanding of the curricular and resource requirements. A syllabus or course outline, detailing how course requirements are met, is submitted by the AP teacher for review by college faculty.

Please visit collegeboard.org/apcourseaudit for more information to support the preparation and submission of materials for the AP Course Audit.

How the AP Program Is Developed

The scope of content for an AP course and exam is derived from an analysis of hundreds of syllabi and course offerings of colleges and universities. Using this research and data, a committee of college faculty and expert AP teachers work within the scope of the corresponding college course to articulate what students should know and be able to do upon the completion of the AP course. The resulting course framework is the heart of this course and exam description and serves as a blueprint of the content and science practices that can appear on an AP Exam.

The AP Test Development Committees are responsible for developing each AP Exam, ensuring the exam questions are aligned to the course framework. The AP Exam development process is a multiyear endeavor; all AP Exams undergo extensive review, revision, piloting, and analysis to ensure that questions are accurate, fair, and valid and that there is an appropriate spread of difficulty across the questions.

Committee members are selected to represent a variety of perspectives and institutions (public and private, small and large schools and colleges) and a range of gender, racial/ethnic and regional groups. A list of each subject's current AP Test Development Committee members is available on apcentral.collegeboard.org.

Throughout AP course and exam development, College Board gathers feedback from various stakeholders in both secondary schools and higher education institutions. This feedback is carefully considered to ensure that AP courses and exams are able to provide students with a college-level learning experience and the opportunity to demonstrate their qualifications for advanced placement or college credit.

How AP Exams Are Scored

The exam scoring process, like the course and exam development process, relies on the expertise of both AP teachers and college faculty. While multiple-choice questions are scored by machine, the free-response

questions and through-course performance assessments, as applicable, are scored by thousands of college faculty and expert AP teachers. Most are scored at the annual AP Reading, while a small portion is scored online. All AP Readers are thoroughly trained, and their work is monitored throughout the Reading for fairness and consistency. In each subject, a highly respected college faculty member serves as Chief Faculty Consultant and, with the help of AP Readers in leadership positions, maintains the accuracy of the scoring standards. Scores on the free-response questions and performance assessments are weighted and combined with the results of the computer-scored multiple-choice questions, and this raw score is converted into a composite AP score on a 1–5 scale.

AP Exams are **not** norm-referenced or graded on a curve. Instead, they are criterion-referenced, which means that every student who meets the criteria for an AP score of 2, 3, 4, or 5 will receive that score, no matter how many students that is. The criteria for the number of points students must earn on the AP Exam to receive scores of 3, 4, or 5—the scores that research consistently validates for credit and placement purposes—include:

- The number of points successful college students earn when their professors administer AP Exam questions to them.
- The number of points researchers have found to be predictive that an AP student will succeed when placed into a subsequent, higher-level college course.
- Achievement-level descriptions formulated by college faculty who review each AP Exam question.

Using and Interpreting AP Scores

The extensive work done by college faculty and AP teachers in the development of the course and exam and throughout the scoring process ensures that AP Exam scores accurately represent students' achievement in the equivalent college course. Frequent and regular research studies establish the validity of AP scores as follows:

AP Score	Credit Recommendation	College Grade Equivalent
5	Extremely well qualified	A
4	Well qualified	A-, B+, B
3	Qualified	B-, C+, C
2	Possibly qualified	n/a
1	No recommendation	n/a

While colleges and universities are responsible for setting their own credit and placement policies, most private colleges and universities award credit and/or advanced placement for AP scores of 3 or higher. Additionally, most states in the U.S. have adopted statewide credit policies that ensure college credit for scores of 3 or higher at public colleges and universities. To confirm a specific college's AP credit/placement policy, a search engine is available at apstudent.org/creditpolicies.

BECOMING AN AP READER

Each June, thousands of AP teachers and college faculty members from around the world gather for seven days in multiple locations to evaluate and score the free-response sections of the AP Exams. Ninety-eight percent of surveyed educators who took part in the AP Reading say it was a positive experience.

There are many reasons to consider becoming an AP Reader, including opportunities to:

- **Bring positive changes to the classroom:** Surveys show that the vast majority of returning AP Readers—both high school and college educators—make improvements to the way they

teach or score because of their experience at the AP Reading.

- **Gain in-depth understanding of AP Exam and AP scoring standards:** AP Readers gain exposure to the quality and depth of the responses from the entire pool of AP Exam takers and thus are better able to assess their students' work in the classroom.
- **Receive compensation:** AP Readers are compensated for their work during the Reading. Expenses, lodging, and meals are covered for Readers who travel.
- **Score from home:** AP Readers have online distributed scoring opportunities for certain subjects. Check collegeboard.org/apreading for details.
- **Earn Continuing Education Units (CEUs):** AP Readers earn professional development hours and CEUs that can be applied to PD requirements by states, districts, and schools.

How to Apply

Visit collegeboard.org/apreading for eligibility requirements and to start the application process.

AP Resources and Supports

By completing a simple activation process at the start of the school year, teachers and students receive access to a robust set of classroom resources.

AP Classroom

AP Classroom is a dedicated online platform designed to support teachers and students throughout their AP experience. The platform provides a variety of powerful resources and tools to provide yearlong support to teachers and enable students to receive meaningful feedback on their progress.



UNIT GUIDES

Appearing in this publication and on AP Classroom, these planning guides outline all required course content and science practices, organized into commonly taught units. Each unit guide suggests a sequence and pacing of content, scaffolds skill instruction across units, organizes content into topics, and provides tips on taking the AP Exam.



PERSONAL PROGRESS CHECKS

Formative AP questions for every unit provide feedback to students on the areas where they need to focus. Available online, Personal Progress Checks measure knowledge and science practices through multiple-choice questions with rationales to explain correct and incorrect answers, and free-response questions with scoring information. Because the Personal Progress Checks are formative, the results of these assessments cannot be used to evaluate teacher effectiveness or assign letter grades to students, and any such misuses are grounds for losing school authorization to offer AP courses.*



PROGRESS DASHBOARD

This dashboard allows teachers to review class and individual student progress throughout the year. Teachers can view class trends and see where students struggle with content and science practices that will be assessed on the AP Exam. Students can view their own progress over time to improve their performance before the AP Exam.



AP QUESTION BANK

This online library of real AP Exam questions provides teachers with secure questions to use in their classrooms. Teachers can find questions indexed by course topics and science practices, create customized tests, and assign them online or on paper. These tests enable students to practice and get feedback on each question.

*To report misuses, please call, 877-274-6474 (International: +1-212-632-1781).

Digital Activation

In order to teach an AP class and make sure students are registered to take the AP Exam, teachers must first complete the digital activation process. Digital activation gives students and teachers access to resources and gathers students' exam registration information online, eliminating most of the answer sheet bubbling that has added to testing time and fatigue.

AP teachers and students begin by signing in to **My AP** and completing a simple activation process at the start of the school year, which provides access to all AP resources, including AP Classroom.

To complete digital activation:

- Teachers and students sign in to, or create, their College Board accounts.
- Teachers confirm that they have added the course they teach to their AP Course Audit account and have had it approved by their school's administrator.
- Teachers or AP Coordinators, depending on who the school has decided is responsible, set up class sections so students can access AP resources and have exams ordered on their behalf.
- Students join class sections with a join code provided by their teacher or AP coordinator.
- Students will be asked for additional registration information upon joining their first class section, which eliminates the need for extensive answer sheet bubbling on exam day.

While the digital activation process takes a short time for teachers, students, and AP coordinators to complete, overall it helps save time and provides the following additional benefits:

- **Access to AP resources and supports:** Teachers have access to resources specifically designed to support instruction and provide feedback to students throughout the school year as soon as activation is complete.
- **Streamlined exam ordering:** AP Coordinators can create exam orders from the same online class rosters that enable students to access resources. The coordinator reviews, updates, and submits this information as the school's exam order in the fall.
- **Student registration labels:** For each student included in an exam order, schools will receive a set of personalized AP ID registration labels, which replaces the AP student pack. The AP ID connects student's exam materials with the registration information they provided during digital activation, eliminating the need for pre-administration sessions and reducing time spent bubbling on exam day.
- **Targeted Instructional Planning Reports:** AP teachers will get Instructional Planning Reports (IPRs) that include data on each of their class sections automatically rather than relying on special codes optionally bubbled in on exam day.

Instructional Model

Integrating AP resources throughout the course can help students develop the course science practices and conceptual understandings. The instructional model outlined below shows possible ways to incorporate AP resources into the classroom.



Plan

Teachers may consider the following approaches as they plan their instruction before teaching each unit.

- Review the overview at the start of each **unit guide** to identify essential questions, conceptual understandings, and science practices for each unit.
- Use the **Unit at a Glance** table to identify related topics that build toward a common understanding, and then plan appropriate pacing for students.
- Identify useful strategies in the **Instructional Approaches** section to help teach the concepts and science practices.



Teach

When teaching, supporting resources can be used to build students' conceptual understanding and mastery of science practices.

- Use the topic pages in the **unit guides** to identify the required content.
- Integrate the content with a skill, considering any appropriate scaffolding.
- Employ any of the instructional strategies previously identified.
- Use the available resources on the topic pages to bring a variety of assets into the classroom.



Assess

Teachers can measure student understanding of the content and science practices covered in the unit and provide actionable feedback to students.

- At the end of each unit, use **AP Classroom** to assign students the online **Personal Progress Checks**, as homework or as an in-class task.
- Provide question-level feedback to students through answer rationales; provide unit- and skill-level feedback using the progress dashboard.
- Create additional practice opportunities using the **AP Question Bank** and assign them through **AP Classroom**.

About the AP Physics 1 Course

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, electric charge and electric force, DC circuits, and mechanical waves and sound.

College Course Equivalent

AP Physics 1 is a full-year course that is the equivalent of a first-semester introductory college course in algebra-based physics.

Prerequisites

There are no prerequisite courses. 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 twenty-five percent of instructional time will 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.

Inquiry-based laboratory experiences support the AP Physics 1 course and AP Course Audit curricular requirements by providing opportunities for students to engage in the seven science practices as they design plans for experiments, make predictions, collect and analyze data, apply mathematical routines, develop explanations, and communicate about their work.

Colleges may require students to present their laboratory materials from AP science courses before granting college credit for laboratory work, so students should be encouraged to retain their laboratory notebooks, reports, and other materials.

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AP PHYSICS 1

Course Framework



Introduction

The AP Physics 1 course outlined in this framework reflects a commitment to what physics teachers, professors, and researchers have agreed is the main goal of a college-level physics course: to help students develop a deep understanding of the foundational principles that shape classical mechanics. By confronting complex physical situations or scenarios, the course is designed to enable students to develop the ability to reason about physical phenomena using important science practices, such as explaining relationships, applying and justifying the use of mathematical routines, designing experiments, analyzing data, and making connections across multiple topics within the course.

To foster this deeper level of learning, the AP Physics 1 course defines concepts, science practices, and understandings required by representative colleges and universities for granting college credit and placement. Students will practice reasoning skills used by physicists by discussing and debating, with peers, the physical phenomena investigated in class, as well as by designing and conducting inquiry-based laboratory investigations to solve problems through first-hand observations, data collection, analysis, and interpretation.

This document is not a complete curriculum. Teachers create their own local curriculum by selecting, for each concept, content that enables students to explore the course learning objectives and meets state or local requirements. The result is a course that prepares students for college credit and placement.

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Course Framework Components

Overview

This course framework provides a clear and detailed description of the course requirements necessary for student success. The framework specifies what students must know, be able to do, and understand to qualify for college credit or placement.

The course framework includes two essential components:

1 SCIENCE PRACTICES

The science practices are central to the study and practice of physics. Students should develop and apply the described practices on a regular basis over the span of the course.

2 COURSE CONTENT

The course content is organized into commonly taught units of study that provide a suggested sequence for the course and detail required content and conceptual understandings that colleges and universities typically expect students to master to qualify for college credit and/or placement. This content is grounded in big ideas, which are cross-cutting concepts that build conceptual understanding and spiral throughout the course.

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Science Practices

The table that follows presents the science practices that students should develop during the AP Physics 1 course. These practices form the basis of many tasks on the AP Physics 1 Exam.

The unit guides that follow embed and spiral these practices throughout the course, providing teachers with one way to integrate the practices into the course content with sufficient repetition to prepare students to transfer those science practices when taking the AP Physics 1 Exam.

More detailed information about teaching the science practices can be found in the Instructional Approaches section of this publication.



AP PHYSICS 1 Science Practices

Practice 1	Practice 2	Practice 3	Practice 4	Practice 5	Practice 6	Practice 7
Modeling 1 The student can use representations and models to communicate scientific phenomena and solve scientific problems.	Mathematical Routines 2 The student can use mathematics appropriately.	Scientific Questioning 3 The student can engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course <i>(not assessed on the AP Exam)</i> .	Experimental Methods 4 The student can plan and implement data-collection strategies in relation to a particular scientific question.	Data Analysis 5 The student can perform data analysis and evaluation of evidence.	Argumentation 6 The student can work with scientific explanations and theories.	Making Connections 7 The student is able to connect and relate knowledge across various scales, concepts, and representations in and across domains.
1.1 The student can create representations and models of natural or man-made phenomena and systems in the domain.	2.1 The student can justify the selection of a mathematical routine to solve problems.	3.1 The student can pose scientific questions.	4.1 The student can justify the selection of the kind of data needed to answer a particular scientific question.	5.1 The student can analyze data to identify patterns or relationships.	6.1 The student can justify claims with evidence.	7.1 The student can connect phenomena and models across spatial and temporal scales.
1.2 The student can describe representations and models of natural or man-made phenomena and systems in the domain.	2.2 The student can apply mathematical routines to quantities that describe natural phenomena.	3.2 The student can refine scientific questions.	4.2 The student can design a plan for collecting data to answer a particular scientific question.	5.2 The student can refine observations and measurements based on data analysis.	6.2 The student can construct explanations of phenomena based on evidence produced through scientific practices.	7.2 The student can connect concepts in and across domain(s) to generalize or extrapolate in and/or across enduring understandings and/or big ideas.
1.3 The student can refine representations and models of natural or man-made phenomena and systems in the domain.	2.3 The student can estimate quantities that describe natural phenomena.	3.3 The student can evaluate scientific questions.	4.3 The student can collect data to answer a particular scientific question.	5.3 The student can evaluate the evidence provided by data sets in relation to a particular scientific question.	6.3 The student can articulate the reasons that scientific explanations and theories are refined or replaced.	
1.4 The student can use representations and models to analyze situations or solve problems qualitatively and quantitatively.		4.4 The student can evaluate sources of data to answer a particular scientific question.			6.4 The student can make claims and predictions about natural phenomena based on scientific theories and models.	
1.5 The student can express key elements of natural phenomena across multiple representations in the domain.					6.5 The student can evaluate alternative scientific explanations.	

Course Content

Based on the Understanding by Design® (Wiggins and McTighe) model, this course framework provides a clear and detailed description of the course requirements necessary for student success. The framework specifies what students must know, be able to do, and understand, with a focus on six big ideas that encompass core principles, theories, and processes of physics. The framework also encourages instruction that prepares students to make connections across domains through a broader way of thinking about the physical world.

Big Ideas

The big ideas serve as the foundation of the course and allow students to create meaningful connections among concepts. They are often abstract concepts or themes that become threads that run throughout the course. Revisiting the big ideas and applying them in a variety of contexts allows students to develop deeper conceptual understanding. Below are the big ideas of the course and a brief description of each.

BIG IDEA 1: SYSTEMS (SYS)

Objects and systems have properties such as mass and charge. Systems may have internal structure.

BIG IDEA 2: FIELDS (FLD)

Fields existing in space can be used to explain interactions.

BIG IDEA 3: FORCE INTERACTIONS (INT)

The interactions of an object with other objects can be described by forces.

BIG IDEA 4: CHANGE (CHA)

Interactions between systems can result in changes in those systems.

BIG IDEA 5: CONSERVATION (CON)

Changes that occur as a result of interactions are constrained by conservation laws.

UNITS

The course content is organized into commonly taught units. The units have been arranged in a logical sequence frequently found in many college courses and textbooks.

The 7 units in AP Physics 1 and their relevant weightings on the multiple-choice section of AP Exam are listed below.

Pacing recommendations at the unit level and on the Course at Glance provide suggestions for how teachers can cover both the required course content and the

Personal Progress Checks. The suggested class periods are based on a schedule in which the class meets five days a week for 45 minutes each day. While these recommendations have been made to aid in planning, teachers are free to adjust the pacing based on the needs of their students, alternate schedules (e.g., block scheduling), or their school's academic calendar.

TOPICS

Each unit is divided into teachable segments called topics. Visit the topic pages (starting on page 36) to see all required content for each topic.

Exam Weighting for the Multiple-Choice Section of the AP Exam

Units	Exam Weighting
Unit 1: <i>Kinematics</i>	12–18%
Unit 2: <i>Dynamics</i>	16–20%
Unit 3: <i>Circular Motion and Gravitation</i>	6–8%
Unit 4: <i>Energy</i>	20–28%
Unit 5: <i>Momentum</i>	12–18%
Unit 6: <i>Simple Harmonic Motion</i>	4–6%
Unit 7: <i>Torque and Rotational Motion</i>	12–18%

Spiraling the Big Ideas

The following table shows how the big ideas spiral across units by showing the units in which each big idea appears.

Big Ideas	Unit 1 <i>Kinematics</i>	Unit 2 <i>Dynamics</i>	Unit 3 <i>Circular Motion and Gravitation</i>	Unit 4 <i>Energy</i>	Unit 5 <i>Momentum</i>	Unit 6 <i>Simple Harmonic Motion</i>	Unit 7 <i>Torque and Rotational Motion</i>
1-Systems SYS	✓	✓	✓				
2-Fields FLD		✓	✓				
3-Force Interactions INT	✓	✓	✓	✓	✓	✓	✓
4-Change CHA	✓	✓	✓	✓	✓		✓
5-Conservation CON				✓	✓	✓	✓

Course at a Glance

Plan

The Course at a Glance provides a useful visual organization of the AP Physics 1 course components, including:

- Sequence of units, along with approximate weighting and suggested pacing. Please note, pacing is based on 45-minute class periods, meeting five days each week for a full academic year.
- Progression of topics within each unit.
- Spiraling of the big ideas and science practices across units.

Teach

PRACTICES

Science practices spiral throughout the course.

- | | |
|---------------------------------|-------------------------------|
| 1 Modeling | 4 Experimental Methods |
| 2 Mathematical Routines | 5 Data Analysis |
| 3 Scientific Questioning | 6 Argumentation |
| | 7 Making Connections |

+ Indicates 3 or more science practices for a given topic. The individual topic page will show all the science practices.

BIG IDEAS

Big ideas spiral across topics and units.

- | | |
|---------------------------------|---------------------------|
| SYS 1-Systems | CHA 4-Change |
| FLD 2-Fields | CON 5-Conservation |
| INT 3-Force Interactions | |

Assess

Assign the Personal Progress Checks—either as homework or in class—for each unit. Each Personal Progress Check contains formative multiple-choice and free-response questions. The feedback from these checks shows students the areas where they need to focus.

UNIT 1

Kinematics

~19-22 Class Periods

12-18% AP Exam Weighting



1.1 Position, Velocity, and Acceleration



1.2 Representations of Motion

UNIT 2

Dynamics

~21-24 Class Periods

16-20% AP Exam Weighting



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

Personal Progress Check 1

Multiple-choice: ~15 questions

Free-response: 2 questions

- Experimental Design
- Paragraph Argument Short Answer

Personal Progress Check 2

Multiple-choice: ~40 questions

Free-response: 2 questions

- Quantitative/Qualitative Translation
- Short Answer

UNIT 3

Circular Motion and Gravitation

~8-10 Class Periods

6-8% AP Exam Weighting

FLD	3.1	Vector Fields
INT	3.2	Fundamental Forces
INT	3.3	Gravitational and Electric Forces
FLD	3.4	Gravitational Field/Acceleration Due to Gravity on Different Planets
SYS	3.5	Inertial vs. Gravitational Mass
CHA	3.6	Centripetal Acceleration and Centripetal Force
INT	3.7	Free-Body Diagrams for Objects in Uniform Circular Motion
INT	3.8	Applications of Circular Motion and Gravitation

Personal Progress Check 3

Multiple-choice: ~40 questions

Free-response: 2 questions

- Experimental Design
- Paragraph Argument Short Answer

UNIT 4

Energy

~22-25 Class Periods

20-28% AP Exam Weighting

CON	4.1	Open and Closed Systems: Energy
INT	4.2	Work and Mechanical Energy
CON	4.3	Conservation of Energy, the Work-Energy Principle, and Power

Personal Progress Check 4

Multiple-choice: ~30 questions

Free-response: 2 questions

- Quantitative/Qualitative Translation
- Short Answer

UNIT 5

Momentum

~14-17 Class Periods

12-18% AP Exam Weighting

INT	5.1	Momentum and Impulse
CHA	5.2	Representations of Changes in Momentum
CON	5.3	Open and Closed Systems: Momentum
CON	5.4	Conservation of Linear Momentum

Personal Progress Check 5

Multiple-choice: ~35 questions

Free-response: 2 questions

- Experimental Design
- Paragraph Argument Short Answer

UNIT 6

Simple Harmonic Motion

~4-7 Class Periods

4-6% AP Exam Weighting

INT
+

6.1 Period of Simple Harmonic Oscillators

CON
+

6.2 Energy of a Simple Harmonic Oscillator

Personal Progress Check 6

Multiple-choice: ~20 questions

Free-response: 2 questions

- Experimental Design
- Short Answer

UNIT 7

Torque and Rotational Motion

~14-19 Class Periods

12-18% AP Exam Weighting

INT
1
2

7.1 Rotational Kinematics

INT
+

7.2 Torque and Angular Acceleration

CHA
+

7.3 Angular Momentum and Torque

CHA
+

7.4 Conservation of Angular Momentum

Personal Progress Check 7

Multiple-choice: ~40 questions

Free-response: 2 questions

- Quantitative/Qualitative Translation
- Paragraph Argument Short Answer

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