



SAMPLE SYLLABUS #2

AP[®] Physics 1

Curricular Requirements

CR1	Students and teachers have access to college-level resources, including a college-level textbook and reference materials in print or electronic format.	<i>See page:</i> 2
CR2	The course provides opportunities to develop student understanding of the required content outlined in each of the units described in the AP Physics 1 Course and Exam Description.	<i>See page:</i> 2
CR3	The course provides opportunities for students to develop the skills related to Science Practice 1: Creating Representations.	<i>See page:</i> 2
CR4	The course provides opportunities for students to develop the skills related to Science Practice 2: Mathematical Routines.	<i>See page:</i> 2
CR5	The course provides opportunities for students to develop the skills related to Science Practice 3: Scientific Questioning & Argumentation.	<i>See page:</i> 3
CR6	Students spend a minimum of 25% of instructional time engaged in hands-on laboratory investigations.	<i>See page:</i> 3
CR7	Students engage in hands-on laboratory investigations representative of the topics outlined in the AP Physics 1 Course and Exam Description.	<i>See page:</i> 4
CR8	The course provides opportunities for students to record evidence of their scientific investigations in a portfolio of lab reports or a lab notebook (print or digital format).	<i>See page:</i> 3

Advanced Placement Physics 1 Sample Syllabus #2

Textbook provided on the AP Course Audit form. **CR1**

Instructional Plan

All topics listed in the current AP[®] Physics 1 Course and Exam Description will be covered in this course. The course will include these units of study: **CR2**

- Unit 1, Science Practices (*Chapter 1, Introducing Physics*)
- Unit 2, Constant Velocity (*Chapter 2, Motion in One Dimension*)
- Unit 3, Constant Acceleration (*Chapter 2, Motion in One Dimension*)
- Unit 4, Interactions I (*Chapter 3, Newtonian Mechanics*)
- Unit 5, Interactions II (*Chapter 4, Applying Newton's Laws*)
- Unit 6, Impulse and Momentum Transfer (*Chapter 6, Impulse and Linear Momentum*)
- Unit 7, Projectile Motion (*Section in Chapter 3, Newtonian Mechanics*)
- Unit 8, Energy Transfer (*Chapter 7, Work and Energy*)
- Unit 9, Uniform Circular Motion and Gravity (*Chapter 5, Circular Motion*)
- Unit 10, Rotation (*Chapter 9, Rotational Motion*)
- Unit 11, Oscillation (*Chapter 10, Vibrational Motion*)
- Unit 12, Fluids (*Chapter 13, Static Fluids and Chapter 14, Fluids in Motion*)

CR2

The syllabus must include an outline of course content by unit title to demonstrate the inclusion of the required course content listed in the current AP Physics 1 Course and Exam Description.

Science Practice 1

The course provides opportunities for students to develop the skills related to Science Practice 1. In Units 2 and 3, students are required to represent motion in multiple ways, including verbal descriptions; motion/dot diagrams showing instantaneous position, velocity, and acceleration of an object over time; graphs of position-time, velocity-time, and acceleration-time; and mathematical equations. This approach is carried on to all other units, with additional representations added as necessary (free-body diagrams, force/extended-object diagrams, energy bar charts, etc.). **CR3**

CR3

The syllabus must include a section labeled “Science Practice 1” describing one assignment, activity, or lab where students create representations that depict physical phenomena.

Science Practice 2

The course provides opportunities for students to develop the skills related to Science Practice 2. Beginning in Unit 1, Science Practices, students learn to derive algebraic expressions, reason proportionally, and calculate mathematical answers. This emphasis is repeated in all units, for example in Unit 8, Energy Transfer, students learn to use the conservation of energy principle to derive equations for the initial or final velocity of objects in various situations during which energy is transferred, and then calculate predicted values for that initial or final velocity. **CR4**

CR4

The syllabus must include a section labeled “Science Practice 2” describing one assignment, activity, or lab where students use mathematical routines.

Science Practice 3

The course provides opportunities for students to develop the skills related to Science Practice 3. In Unit 11, Oscillation, students will carry out a paradigm lab for a mass-spring oscillating system. Students will observe the system in motion, make claims about variables that could affect the period/frequency of the system, and then design labs to collect data, plot a graph, and determine the validity of their claims. **CR5**

Lab Component of Course

Students spend at least 25% of this course in laboratory work. **CR6** All labs are designed as guided inquiry. All lab assignments require student data analysis and writing to be graded by the instructor. All lab work is recorded by the students in a lab notebook, which may be submitted electronically. **CR8**

CR5

The syllabus must include a section labeled “Science Practice 3” describing one assignment, activity, or lab where students design experimental procedures, and make and justify claims.

CR6

The syllabus must include an explicit statement that at least 25% of instructional time is spent engaged in hands-on laboratory investigations, with an emphasis on inquiry-based labs.

CR8

The syllabus must include an explicit statement that students are required to maintain a lab notebook or portfolio (hard copy or electronic) that includes all their lab reports.

Major Lab Activities by Unit **CR7**

Unit 1, Science Practices

Pendulum Lab: Design an experiment to investigate a variable that may affect the period/frequency of a simple pendulum. Analyze data to determine the result of your claim.

Unit 2, Constant Velocity

“Blinky Buggy” Constant Velocity Cart: Given setups with different initial and final conditions, student groups produce multiple representations of constant velocity motion.

Unit 3, Constant Acceleration

Fan Cart Lab: Students produce multiple representations of the motion of a fan cart after collecting data using video analysis.

Unit 4, Interactions I

Bowling Ball and Broom: Students make observations of the motion of and forces applied to a bowling ball by a broom, and deduce Newton’s first and second laws from the observations.

Unit 5, Interactions II

Modified Atwood’s Machine: Students derive Newton’s second law from lab data and consider the importance of the system concept in applying Newton’s second law.

Unit 6, Impulse and Momentum Transfer

Cart and Force Sensor Collisions: Students observe different impulses when carts with different masses, bumpers, and initial speeds collide with a force sensor.

Cart Collisions: Students measure mass and velocity of moving carts to investigate the principle of momentum conservation.

Unit 7, Projectile Motion

Projectile Motion Challenge: Students predict the landing position of a ball bearing launched from an air-powered projectile launcher, given only the initial conditions, then check the accuracy of their predictions.

Unit 8, Energy Transfer

Elastic Potential Energy to Kinetic Energy Conservation: Students use a spring cart launcher to derive the relationship between spring stretch and cart speed, and derive formulae for elastic potential energy and kinetic energy from the data.

Unit 9, Uniform Circular Motion and Gravity

Flying Pig: Given only a ruler, stopwatch, and balance, students make multiple representations of the motion and forces, and make an experimental determination of the speed of and tension force exerted on the pig.

Unit 10, Rotation

Falling Mass Acceleration: Students design an experiment to confirm that constant acceleration equations translate to a rotational situation.

Balanced Torques with Meter Stick Lever Apparatus: Students derive the rules for static equilibrium.

Rotational Inertia: Students experimentally determine the rotational inertia of an unknown object by collecting data from the acceleration of a falling mass attached to the object by a string.

Unit 11, Oscillation

Mass on a Spring: Students design and carry out a lab to determine the variables that affect the period of a mass-spring oscillator.

Unit 12, Fluids

Buoyancy: Students measure the forces exerted on an object loaded into a beaker of water, including the force exerted on the beaker, and derive the proportionalities in buoyancy.

CR7

The syllabus must include a title and brief description for each laboratory investigation. The labs listed should be representative of the topics outlined in the AP Physics 1 Course and Exam Description.