AP Physics 1 Syllabus

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AP Physics 1 is an introductory algebra-based physics course designed to mirror a university-level first semester physics course. This means that this is a college prep course! I will treat it as such. This means that much of the onus is put upon you, the student. It will be up to you to succeed, but I will be there with you every step of the way.

**Textbook:**

The text used in this course is an e-text. You have choice of downloading the text or just accessing it online. If you are unable to access the equipment please come, see me and I will make sure you are able to access the text. The address below will allow you to access your text.

<https://openstax.org/details/college-physics>

**Website:**

I have a class website that can be accessed anytime. I will strive hard to update this website daily, but more likely than not it will be updated every other day. The website will consist of the days activities, any handouts, notes, labs, and questions done during the day. In addition, it will include supplemental videos and activities if you are struggling with a concept or if you miss a day’s lecture.

https://hphysicschs.weebly.com

Other online and on-level resources will be shared/utilized. Some of these resources are created by me and other resources are externally created but we have been given permission to use them.

**Overview:**

AP Physics 1 is based on six “Big Ideas” that form the basis of the course (and classical physics in general) as well as seven scientific practices. Specific learning objectives are derived from these big ideas and practices. These objectives can be found in the official course description and will be shared in detail as they are covered/discussed in class.

* Big Idea 1 – Objects and systems have properties such as mass and charge. Systems may have internal structure.
* Big Idea 2 – Fields existing in space can be used to explain interactions.
* Big Idea 3 – The interactions of an object with other objects can be described by forces
* Big Idea 4 – Interactions between systems can result in changes in those systems.
* Big Idea 5 – Changes that occur because of interactions are constrained by conservation laws.
* Big Idea 6 – Waves can transfer energy and momentum from one location to another without the permanent transfer of mass and serve as a mathematical model for the description of other phenomena.
* Work with scientific explanations and theories {SP6}
* Connect and relate knowledge across various scales, concepts, and representations in and across domains {SP7}.

**Coursework and Labs**

Through generous donations our AP Physics 1 classes are being gifted with carbonless lab books that are to be used exclusively by you. Some universities/colleges require students turn in lab work to receive credit with a successful passing of the AP exam to receive credit. This will allow both you and me to keep track of your work. Most labs will need to be handwritten, as your exam requires a lot of written work (words not just math).

Labs are meant to increase understanding. Most labs are cookie cutter labs that are there to reinforce concepts learned before the lab. We will do some of these, but most labs will be inquiry-based labs. I will present a question and supplies, and you will strive to answer the question. This means that creativity and outside the box thinking are encouraged! I will not grade on your data, or how you approach the question, but on your conclusions. Each lab you will need to assess how your group approached the lab, your increase in understanding, where error lies.

After each lab, we will have a peer review party. This is where we will present how we went about the lab and the results gained. We will approach each lab as peers and discuss results and error that is a part of every lab. This will also be considered for your grade.

**Exams**

Each unit will end in a cumulative exam. Students will answer a variety of multiple choice and free response questions designed to mimic the AP Exam. Students must understand physics beyond its mathematical rigor to succeed on these exams.

The 3-day exam:

Day 1: You will be given a practice test that you will do (if you want) on your own time the day before the practice test’s answers and methods will be available for you to check your work and go over any last-minute questions

Day 2: You will take the exam during one class period (or more if it is required). I will guarantee that the tests will be graded and ready for you the following day.

Day 3: This day you will be able to do test corrections (in purple pen only). You will also be given the opportunity to defend your test. If there is something that you think should or would be granted more points in the AP setting this is your chance to tell me so. This needs to be a thought-out argument with justification.

Like many college courses your grade is mainly based upon exams. 75% of your grade will be exam based. The other 25% will be labs.

**Homework**

A variety of writing assignments, problem sets, and projects will be used throughout the year to enhance and assess student-learning. I will have the correct answers to all homework in each class. You can check your work. This will not be graded. This is up to you. Those who choose to do their homework problems will probably see an increase in understanding.

Daily problem sets will be given. We will review one of these problems daily while the rest may be turned in

**The Nitty-Gritty:**

The pass rate for AP Physics 1 is one of the lowest out of all AP tests. I don’t want this to be discouraging. Know that not matter what, you will learn in this class and hopefully you will have fun doing it. Also, know that those who score an average of 70% and above receive 5’s on their test.

Below is the pass rate for the previous year:

5: 5.2% 4: 15% 3: 19.5% 2: 29.1% 1: 31.2%

39.7% pass rate!

My hope is that we are above the national average but know this may not be the case. Remember that we are a first year AP Physics 1 course and I will do my best to make sure everyone in this class feels prepared for the test!

**The Year**

Unit 1: Kinematics

* One-dimensional kinematics
* Vectors
* Free-fall
* Two-dimensional motion (projectiles)

Unit 2: Dynamics

* Force types and free-body diagrams
* Vectors
* Newton’s Laws of Motion and Applications of Newton’s 2nd Law
* Friction

Unit 3: Circular Motion and Gravitation

* Circular motion
* Newton’s Law of Universal Gravitation

Unit 4: Energy

* Energy, work, kinetic energy, and power
* Potential energy: gravitational and elastic
* Conservation of energy

Unit 5: Momentum

* Impulse and momentum
* Conservation of linear momentum
* Elastic and inelastic collisions

Unit 6: Rotational Motion

* Torque and center of mass
* Rotational kinematics and dynamics
* Rotational inertia
* Rotational energy and angular momentum
* Conservation of angular momentum

Unit 7: Simple Harmonic Motion

* Linear restoring forces and simple harmonic motion
* Simple harmonic motion graphs
* Simple pendulum and mass-spring systems

Unit 8: Mechanical Waves

* Mechanical Waves
* Sound
* Superposition and interference
* Standing waves

Unit 9: Electricity and DC Circuits

* Electric charge and conservation of charge
* Electric force: Coulomb’s law
* Current, potential difference, resistance
* Analysis of simple circuits; series and parallel circuits
* Ohm’s Law and Kirchhoff’s Laws