

AP Physics 1

Mrs. Nurnberg

2018-2019

Course Overview

AP Physics 1, as described by the *College Board AP Physics 1 Course Overview*, “is an algebra-based, introductory college-level physics course that explores topics such as Newtonian mechanics (including rotational motion); work, energy, and power; mechanical waves and sound; and introductory, simple circuits. Through inquiry-based learning, students will develop scientific critical thinking and reasoning skills.”

Supplies

Textbook:

We will be using the online version of this textbook:

Knight, Randall D., Brian Jones, and Stuart Field. *College Physics: A Strategic Approach*, AP[®] Edition, 3rd ed. Boston: Pearson, 2015. This will give us access to the Mastering Physics platform which will allow your textbook to be interactive. When we solve problems, you will get instant feedback whether you are correct or not. Some problems will provide you with hints and guidance. You will be able to add notes to your text and access videos and more! If there is an issue with internet access, I do have some books to check out. Come talk to me!

Additional Materials:

Calculator: We will have access to graphing calculators in the classroom, but having your own TI-84 would be really helpful, even if you just want to leave it at home. (You can use it on the AP exam!) You at least need a quality scientific calculator for at home use.

Binder: You need a 3 ring binder divided as you see fit. Some of you may want to divide by notes, assignments, etc. Some may find it more helpful to have all of your things organized by topic. (Personally, this would be my preference, as this would help me most when preparing for the exam.) The only exception might be keeping one place for assignments and scratch work so that doesn't become distracting. A spiral notebook within your binder might be a good choice for this.

Composition Book: This is an absolute requirement for labs. When you take (and pass!) the AP exam, colleges may give you credit for the Physics course, but not the corresponding lab course. By showing the college this lab journal, you may just get that credit too! This is an incredibly important document that you will be creating.

The Usual: paper, pencils, etc.

Grading

- Tests and quizzes will represent 60% of the grade. Quizzes will be given periodically, particularly during longer units. Tests will be administered after each unit of material. Each test will consist of 2 sections:
 1. Multiple-choice questions
 2. Free-response problemsAfter each test, you will have the ability to do test corrections to earn up to a maximum of 10% back by correctly reworking the missed questions. Corrections must be done on separate paper

and give a **detailed** explanation of why the correct answer is correct. **All missed questions must be corrected for the corrections to be graded.** You will have one week after the return of the test to complete corrections. Because tests contain questions that I am not allowed releasing to students, these must be done in the classroom, before school, after school, or during FIT.

- Labs will represent 25% of the grade. Most labs will be inquiry based so that students are given the objective and available equipment, and they will design their own procedure, data gathering, and data analysis.
- Assignments will represent 15% of the grade. This will include homework and class work problems. These may come from the Mastering Physics online assignments, AP Released Exams, Ranking Tasks, or nTIPERS.

Course Outline

Unit 1: Kinematics in One and Two Dimensions (Chapters 1-3) (4.5 weeks)

- A. Vectors/Scalars
- B. One Dimensional Motion (including graphing position, velocity, and accelerations)
- C. Two Dimensional Motion

Unit 2: Dynamics/Newton's Laws of Motion (Chapters 4,5) (4.5 weeks)

- A. Newton's 3 Laws of Motion
- B. Friction
- C. Interacting Objects (ropes and pulleys)

Unit 3: Gravitation and Circular Motion (Chapter 6) (2 weeks)

- A. Circular Motion
- B. Newton's Law of Universal Gravitation

Unit 4: Torque and Rotational Motion (Chapters 7 and 8) (3.5 weeks)

- A. Rotational Kinematics and Energy
- B. Torque
- C. Rotational Dynamics

Unit 5: Impulse, Linear Momentum, and Conservation of Momentum (Chapter 9) (3 weeks)

- A. Impulse
- B. Momentum
- C. The Law of Conservation of Linear Momentum in Collisions
- D. Angular Momentum and Conservation of Angular Momentum

Unit 6: Work and the Conservation of Energy (Chapter 10) (4 weeks)

- A. Work
- B. Energy
- C. Conservation of Energy
- D. Power

Unit 7: Simple Harmonic Motion (Chapter 8.3 and Chapter 14) (2 weeks)

- A. Simple Pendulums
- B. Mass-Spring Oscillators

Unit8: Mechanical Waves and Sound (Chapters 15 and 16) (2.5 weeks)

- A. Mechanical Waves
- B. Sound
- C. Superposition Principle

Unit 9: Electrostatics and Simple DC Circuits (Chapter 20, 22, 23) (3 weeks)

- A. Electric Charge and Conservation of Electric Charge
- B. Electrostatic Forces
- C. Introduction to Current, Potential Difference, and Resistance
- D. Analyzing Simple, Series and Parallel Circuits using Ohm's law and Kirchhoff's laws

Lab Activities

We will be doing many lab activities, accounting for at least 25% of our class time. As said before, all labs MUST be completed in your composition notebook, even when other handouts are provided. Most labs will be open-inquiry labs, meaning that step-by-step procedures will not be provided. Just as scientists who are trying to solve a problem must determine their own procedure, in this class you will do the same. You will determine how you will need to gather the data, and even what data you will need to gather. Inquiry is a major focus of this course. A separate handout will detail the exact method of how to write a lab report, but in general each lab will contain:

- Title
- Statement of the problem/purpose
- Materials/Setup
- Essential Background
- Data and Graphs
- Analysis and Conclusion (including error analysis) ***THIS SECTION IN PARTICULAR WILL BE DONE INDEPENDENTLY! ANY COPYING WILL BE CONSIDERED PLAGIARISM ON THE PART OF BOTH PARTIES AND A GRADE OF 0 WILL RESULT FOR ALL INVOLVED. COMPLETE SENTENCES WILL BE REQUIRED.**

Suggestions for Success

- Form a study group and meet outside of class.
- READ THE TEXT! (Maybe even more than once!)
- See me for help when you are struggling. You are welcome before and after school. You can also schedule a lunch meeting with me as my prep is during lunch.
- **FIT** – You are welcome any day in FIT.
- **TRY** the problems! If you don't know what to do, GUESS!
 - **G** - Givens
 - **U** - Unknown
 - **E** - Equation
 - **S** - Substitute
 - **S** - Solve

AP EXAM: Tuesday May 7, 2019 at 12:00 p.m.

Section	Timing	Scoring	Question Type	Number of Questions
I. Multiple Choice *4 choices per question	90 Minutes	50% of Exam Score	Part A: Multiple Choice – Discrete items and items in sets	45
			Part B: Multiple Correct – Items with 2 correct answers	5
II. Free Response	90 Minutes	50% of Exam Score	Experimental Design	1
			Qualitative/Quantitative Translation	1
			Short Answer (Including one paragraph length response)	3

*Students will be able to use a scientific or graphing calculator on the entire AP Physics 1 exam.

*Tables containing equations commonly used in physics will be provided during the entire exam.