

Plymouth Public Schools' Science and Technology/Engineering Program

Advanced Placement Physics 1 Course Syllabus

STE0061 Physics Advanced Placement 1

STEL061 AP Physics 1 Lab Advanced Placement

Full year course intended for students in grades 10 through 12 worth 5 credits and accompanying one-semester lab course worth additional 2.5 credits

Course Description

This laboratory course is designed for talented students to provide an opportunity equal in rigor to a first-semester college course in algebra-based physics. Emphasis is placed on topics including kinematics; Newton's laws of motion; torque; rotational motion and angular momentum; gravitation and circular motion; work, energy, and power; linear momentum; oscillations, mechanical waves, and sound; and an introduction to electric circuits. This course also emphasizes specific science practices outlined for AP Physics by the College Board. Laboratory experiences will focus on small group cooperative learning experiences that will incorporate data collection and analysis. Several open-ended project-based investigations will also be incorporated through the year. Please note that students are required to take the Advanced Placement Test. In order to meet the curriculum requirements of the Advanced Placement program, this course will be scheduled for two blocks in one semester and a single block in the other semester. Students should consider this additional time factor when planning their course selections. The prerequisites include enrollment in Pre-Calculus or enrollment/completion of Algebra 2 and departmental recommendation.

Instructional Objectives

Students will independently and collaboratively:

1. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to answer a question or solve a problem.
2. Draw evidence from literary or informational texts to support analysis, reflection, and research.
3. Produce clear and coherent writing in which the development, organization and style are appropriate to task, purpose and audience.
4. Use representations and models to communicate scientific phenomena and solve scientific problems.
5. Use mathematics appropriately.
6. Engage in scientific questioning to extend thinking or to guide investigations within the context of AP Physics 1.
7. Plan and implement data collection strategies appropriate to a particular scientific question.
8. Perform data analysis and evaluation of evidence.
9. Work with scientific explanations and theories.

10. Connect and relate knowledge across various scales, concepts and representations in and across domains.
11. Demonstrate proficiency in physical science concepts including, but not limited to the following: kinematics; Newton's laws; circular motion and universal law of gravitation; simple harmonic motion; impulse, linear momentum, and conservation of linear momentum; work, energy and conservation of energy; rotational motion; electrostatics; direct current circuits; and mechanical waves and sound.

Themes and Topics

1. Objects and systems have properties such as mass and charge. Systems may have internal structure.
2. Fields existing in space can be used to explain interactions.
3. The interactions of an object with other objects can be described by forces.
4. Interactions between systems can result in changes in those systems.
5. Changes that occur as a result of interactions are constrained by conservation laws.
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.
7. The mathematics of probability can be used to describe the behavior of complex systems and to interpret the behavior of quantum mechanical systems.

Text and Instructional Materials

1. Knight, R. D., Jones, B., & Field, S. (2015). *College Physics: A Strategic Approach*.
2. [Web-based product that accompanies textbook](#); see teacher for access

Cheating/Plagiarism

The excerpt from the Plymouth Public Schools' Student Handbook on plagiarism and copyright infringement states, "Existing copyright law will govern the use of material accessed through network. The user will not plagiarize works found on the Internet. Plagiarism is taking the ideas or writings of others and presenting them as if they were yours. All copyrighted material used must have the express written permission of the person or organization that owns the copyright. Any student who has cheated on any academic exercise will receive no credit for that exercise. Plagiarism is a form of cheating. A parent/guardian will be notified by the involved teacher in all instances of cheating. The investigation of the claim of cheating and plagiarism will involve the student, teacher, and administration."

Grading Policy and Assessment

Levels of proficiency on various tasks and assignments determine student grades. During each grading term, students' grades will be based upon the following:

- 15% Assignments
- 35% Labs
- 50% Tests

The final year average will be calculated as follows:

22.5% Term 1 Grade

22.5% Term 2 Grade

22.5% Term 3 Grade

22.5% Term 4 Grade

10% Final Exam

Please note that a grade of pass or fail will be issued for the AP Physics 1 Lab Advanced Placement (STEL061). This will not be included in the student's grade point average. Student performance will be based on Science and Engineering Practices outlined in the Massachusetts' Science and Technology/Engineering Curriculum Framework and College Board.