

AP Physics C: Mechanics

Mr. Miller

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Course Goals: The objectives of this course include understanding how physics connects to other disciplines, particularly calculus, and to the world around us. Students are given the opportunity to ask questions, explore the answers, and obtain solutions both qualitatively and quantitatively. I hope to promote an appreciation of the physical world and physics, curiosity, creativity, and reasoned skepticism.

Evaluation:

Course grades will be determined by:

- Tests – 60% (Tests consist of both multiple-choice and free-response questions.)
- Labs – 20% (Labs will be documented in a bound notebook of lab reports.)
- Homework – 20% (Assignments will include textbook problems and multiple-choice and free-response problems from previously released AP exams.)

Lab Experiences: Since students should be as well versed in “doing” physics as they are in calculating physics problems, every new topic is introduced with a laboratory activity. Students gain experience, through guided inquiry and student-centered learning, manipulating equipment, recording and organizing data, and drawing conclusions as well as learning the new underlying concepts. Having a full year to cover the Mechanics section of the Physics C curriculum allows extra time for student experimentation and class demonstrations. As a result, **a minimum of 20 percent of class time spent on lab work is easily attained.** At the beginning of the year, the labs are prescribed experiments so students can learn the technology as well as the physics. Demonstrations, quite often using common toys, are used to introduce new concepts as well. The demonstrations are followed with student discussion and inquiry, including their hypotheses, as to how and why the demo worked and how it relates to other universal physical concepts, further developing their critical thinking skills. Each written lab report in their notebook will require: 1) their formed hypothesis based on in-class discussion of the presented problem or question, 2) their design of the experiment, also based on in-class discussion, to test their hypothesis, 3) a collection of their data and observations, 4) their calculations using the collected data, 5) their conclusions about how well the hypothesis held up based on the experiment, and 6) discussion of variance and error analysis based on their individual results as well as in-class discussions of other groups’ results.

Attendance: Good attendance is expected and absolutely necessary for successful learning. Excessive absences can cause you to fall behind and lead to unnecessary frustration. **YOU** are responsible for makeup work. If the absence is excused, you will have one day for each absence to turn in your makeup work. If you are absent on the due date of an assignment, you are to turn in that assignment on the first day of your return to class.

Tutorials: Tutorials are each morning from 8:20-8:40 am unless otherwise told. I will also be available some afternoons.

Class Expectations: There are only a few simple expectations in this classroom. You are expected to be prompt, be prepared, be productive, be polite, and be positive. These are necessary skills for future success.

Suggested Materials: Along with the textbook, students are encouraged to purchase a **TI-84** calculator. We will use these on a regular basis throughout the year. Students not owning a calculator are allowed to check one out for the year just as they do with textbooks. To keep your notes organized a 2-inch three-ring binder is suggested to keep any handout and lab sheet stored in. This binder should be dedicated solely to your AP Physics course.

AP Physics C: Mechanics Course Outline

Unit 1: Physics and Measurement

Unit 2: Motion in One Dimension (3 weeks)

Unit 3: Vectors (1 week)

Unit 4: Motion in Two Dimensions (3 weeks)

Unit 5: The Laws of Motion (3 weeks)

Unit 6: Circular Motion and Other Applications of Newton's Law (2 weeks)

Unit 7: Work and Energy (2 weeks)

Unit 8: Potential Energy and Conservation of Energy (3 weeks)

Unit 9: Linear Momentum and Collisions (3 weeks)

Unit 10: Rotation of a Rigid Object About a Fixed Axis (2 weeks)

Unit 11: Rolling Motion, Angular Momentum, and Torque (2 weeks)

Unit 12: Static Equilibrium and Elasticity (2 weeks)

Unit 13: Oscillatory Motion (2 weeks)

Unit 14: The Law of Gravity (2 weeks)

Unit 15: Review for AP Exam (3 weeks)

Unit 16: Other Topics of Interest (After the AP Exam) (2 weeks)

To the Parents: If you wish to contact me outside of class, the best method is through e-mail. I make it a point to check my e-mail several times a day. Should you wish to contact me over the phone, I will return all phone messages in a timely manor once the school day has completed.

Student's Signature

Parent's Signature

Date