



Thomas County Central High School AP Physics Syllabus

4686 U.S. Hwy 84 Bypass
Thomasville, GA 31792

229-225-5050 EXT 2746
Mrs. Michele McCorkle
mmccorkle@tcjackets.net

Materials:

Pen or pencil



Three ring binder

Chromebook or personal laptop for AP Classroom and Google classroom

TI 84 Calculator with scientific functions (may be the same as your math class)

2 quad composition notebooks for labs

Textbook is Pearson: AP Edition *College Physics* by Etkina, Gentile and Van Heuvelen 2012, \$119.00

Students are responsible for books that they check out. They will be given an indebtedness notice if not returned by the end of the year, which will need to be cleared to be able to walk at the graduation ceremony.

Course Prerequisites

Unlike AP Physics C, no physics class pre-requisite is recommended for AP Physics 1. Students should have completed geometry and be concurrently taking Algebra II or an equivalent course.

Rules:

Be on Time.

Be courteous to others

Follow all written and oral directions

Respect others and their property.

Obey all of the TCCHS handbook rules.

Tutoring:

I provide tutoring to all of my students before or after school by appointment only. Tutoring is available in the afternoon until 3:30. Students may stay longer in the afternoons only with prior notice and with transportation arrangements made in advance. It is important for students to master the concept before the day of the test and I would recommend students to come to tutoring if they are unable to complete a quiz or daily practice problem without the help of others. Students can also schedule test corrections and extra lab time during the tutoring sessions.

Grading:

Daily/Quizzes	20%
Labs	20%
Tests	40%
<u>Benchmark</u>	<u>20%</u>
100%	

Course Outline:

The AP® Physics 1 course meets every day, five days a week for 50 minutes. It is a stand-alone course. The course is an inquiry-based course that focuses on experimentation and conceptual understanding. Lessons that are teacher oriented will include the derivation of equations, demonstrations of physical phenomena, vocabulary associated with the content, and addressing any questions from the students based upon the material covered. The content of this course is based upon 6 big ideas:

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 charges in those systems.

Big Idea 5 – Changes that occur as a result 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 discretion of other phenomena.

Student Practice

Throughout each unit, Topic Questions will be provided to help students check their understanding. The Topic Questions are especially useful for confirming understanding of difficult or foundational topics before moving on to new content or skills that build upon prior topics. Topic Questions can be assigned before, during, or after a lesson, and as in-class work or homework. Students will get rationales for each Topic Question that will help them understand why an answer is correct or incorrect, and their results will reveal misunderstandings to help them target the content and skills needed for additional practice.

At the end of each unit or at key points within a unit, Personal Progress Checks will be provided in class or as homework assignments in AP Classroom. Students will get a personal report with feedback on every topic, skill, and question that they can use to chart their progress, and their results will come with rationales that explain every question's answer. One to two class periods are set aside to re-teach skills based on the results of the Personal Progress Checks.

Labs

Laboratory investigations will occupy 25-50% of our class time, usually filling at least a two class periods. In the laboratory investigations students, will learn and master the usage of physical and scientific equipment. Students will use different methods of measuring, charting, calculating, and error analysis while completing the investigations. These investigations can be used to either introduce a new topic or to reinforce material previously covered. All investigations are typically guided, with the variables needed to be measured and calculated identified for the students. Of the labs performed, more than half are guided - and open-inquiry based. Below is a sample table of Lab Investigations: CR20

Colleges may require students to present their laboratory materials from AP science courses before granting college credit for laboratory, so students are encouraged to retain their laboratory notebooks, reports, and other materials.

In these laboratory investigations students, will work in groups, but each student is responsible for completing their own work and paper lab report. Each lab report will consist of:

Title

Purpose: What is the purpose of the lab? What are we trying to find?

Design: A diagram of the lab setup, list of equipment, and description of procedure

Data: All data that is collected in the lab.

Data Analysis: Any calculations done in the lab, including graphs

Error Analysis: Sources of error and their effect on results

Conclusion: A statement that describes the purpose and essence of the investigation.

All lab reports will be collected in a final lab portfolio in the quad composition notebooks.

Pens with Friends

One of the most important skills for success in AP Physics 1 is argumentation. During each unit, students will participate in two rounds of "Pens with Friends". "Pens with Friends" consists of two parts: "Friends without Pens" and "Pens without Friends". The first part, students are paired up randomly and given a problem that pertains to the current unit. Students will have a set amount of time to discuss the problem, without writing anything down. This will help students develop oral scientific argumentation skills. The second part, "Pens without Friends", students will work on the same problem, independently without discussing it with anyone else. This will help students develop writing scientific argumentation skills. When both parts are complete, students will then grade a random classmates written portion in hopes to help the student understand the AP grading process.

Final Project

After the AP Exam in May, students will work on their final projects. Students will have three different options to choose from. The first option is students can work in groups to perform a video analysis on a physical phenomenon using logger pro. The video analysis must include content from a minimum of 3 of the units listed above. The second option is students can independently complete a research project on how the laws of physics can be applied to situations in the real world. The paper must contain content from a minimum of 5 of the units listed above. Lastly students can choose a current real-life issue or scenario that is affecting society and discuss how physics impacts the issue. This must contain content from a minimum of 2 of the units listed above. There will be more information given about the final project after the AP exam.

Course Outline

First Semester (16 Weeks)

Summer Work, Intro, and Math Concepts (1 Week)

- Unit Conversion & Dimensional Analysis
- Algebraic manipulation & Trigonometry
- Vector mathematics
- Problem Solving

Unit 1 Kinematics (3.5 Weeks)

- Position, displacement, distance, speed, velocity, and acceleration
- Kinematic equations for uniform acceleration
- Graphical analysis of kinematics
- Kinematics of Falling Objects
- Vector addition and subtraction
- Components of vectors
- Two-dimensional motion/Projectile motion
- Relative motion (Frame of Reference)

Unit 2 Dynamics, Forces, Newton's Laws (2.5 Weeks)

- Force and free-body diagrams
- Equilibrium and Non-Equilibrium situations
- Newton's three laws of motion
- Properties of friction
- Coefficients of static and sliding friction
- Fluid friction
- Drag forces and terminal velocity

Unit 3 Circular Motion and Gravitation (2 weeks)

- Centripetal force & acceleration
- Banked curves
- Vertical circular motion
- Universal Gravitation
- Satellites and Kepler's Laws
- Apparent weightlessness and Artificial Gravity

Unit 4 Work, Energy, and Power (2 Weeks)

- Work with a constant and variable force
- Mechanical energy (kinetic and potential)
- Work/Energy Theorem
- Conservative and non-conservative forces
- Power

Second Semester (17 Weeks)

Unit 5 Linear Momentum and Collisions (2 Weeks)

- Center of mass
- Linear momentum
- Conservation of linear momentum
- Impulse and momentum
- One-and two dimensional elastic collisions, inelastic col.
- Frame of reference

Unit 6 Oscillations & Harmonic Motion (2 weeks)

- Simple harmonic motion
- Reference circle
- Displacement, velocity, acceleration
- Amplitude, frequency, period
- Energy of an oscillating system
- Pendulums
- Resonance

Unit 7 Rotational Kinematics (3 Weeks)

- Rotational mechanics
- Linear vs. angular variables (displacement, velocity, and acceleration)
- Rotational Kinematics formulas
- Center of gravity, Torque, Rotational inertia
- Rotational kinetic energy, rolling, translation vs rotation
- Angular momentum

AP Test Review (3 Weeks)

- Review for the AP Physics exam will be conducted during normal instructional time
- and during two after school study sessions prior to the exam date.

Post AP (3 Weeks)

- Science movies, physics challenges, problem based learning projects, Rube Goldberg Project

Syllabus and Contact Information

Please List the best way to be contacted during the day and evening hours.

Home Phone: _____

Cell Phone: _____

Work Phone: _____

E-mail: _____

I understand that the rules and requirements listed in the syllabus. I understand that my failure to uphold these rules and regulations could result in detention, parent conference, and/or referral to the administration.

Student's Name: _____

Student's Signature: _____

I understand the guidelines set in the syllabus. My child has read and fully understands the requirements in the class. I will give my child the appropriate support and guidance during the course.

Parent's Name: _____

Parent's Signature: _____

I will provide a safe, positive learning environment by upholding school policies set in the TCCHS student handbook. I will monitor your student's progress throughout the course and will provide updates on student's grades as needed.

Teacher's Name: Mrs. McCorkle _____

Teacher's Signature: _____