AP PHYSICS 1 SYLLABUS

2014-2015 Academic Year

COURSE NUMBER: 5768 **INSTRUCTOR:** Mr. D. Patel
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COURSE INTRODUCTION:

AP Physics 1 is an algebra-based course in general physics. General physics topics presented during the course closely follow those outlined by the College Board and also mirrors an introductory level university physics course.

AP Physics 1 is organized around six big ideas that bring together the fundamental science principles and theories of general physics. These big ideas are intended to encourage students to think about physics concepts as interconnected pieces of a puzzle. The solution to the puzzle is how the real world around them actually works. The students will participate in inquiry-based explorations of these topics to gain a more conceptual understanding of these physics concepts. Students will spend less of their time in traditional formula-based learning and more of their effort will be directed to developing critical thinking and reasoning skills.

Note: You are expected to take the AP Physics Exam .

Course Prerequisites:

Requirements for this course include successful completion of both Honors Chemistry (or higher) and Honors Algebra II (or higher), as well as concurrent enrollment in Pre-calculus (or higher).

Text: Giancoli, D. (2005). *Physics: Principles with Applications*, 6th rev. ed. Upper Saddle River, NJ: Prentice-Hall.
ISBN: 0-13-184661-2
Replacement cost of the book is $119

Supplemental Text: Das, B. (2005) Student Pocket Companion for Physics *Giancoli, Upper* Saddle River, NJ: Prentice Hall. ISBN: 0-13-035249-7
Replacement cost of the book is $13
Preparing for the Physics 1-2 AP Exam with Giancoli Physics*
5 Steps to a 5 on the AP: Physics 1-2, McGraw Hill

Materials List:

Three ring binder (2"width)
5 notebook Dividers (Notes, Assignments, Test/Quizzes, Labs, Free Response (Preceded by table that you are responsible for checking off as completed)
Calculator (may use the same that is intended for math)
Graph Notebook Pens, paper, pencils, color Highlighters (3-4 colors)
Composition Notebook (2)

NOTE: It is important that you bring all materials to class daily. Supplies will be available on a limited basis. Please see Mr. Patel if you are having difficulty purchasing any materials.

INSTRUCTIONAL STRATEGIES

The AP Physics 1 course is conducted using **inquiry-based instructional strategies** that focus on experimentation to develop students' conceptual understanding of physics principles. The students begin studying a topic by making observations and discovering patterns of natural phenomena. The next steps involve developing, testing, and applying models. Throughout the course, the students construct and use multiple representations of physical processes, solve multi-step problems, design investigations, and reflect on knowledge construction through self-assessment rubrics. In most labs, the students use either probe ware technology or simple lab equipment to obtain data. In the classroom, they use graphing calculators and digital devices for interactive simulations, Physletbased exercises, collaborative activities, and formative assessments. In addition, students will Whiteboard for the purpose of collaboration, presentation, and peer review.

COURSE SYLLABUS

UNIT 1. KINEMATICS (4 weeks)
- Kinematics in one-dimension: constant velocity and uniform accelerated motion
- Vectors: vector components and resultant
- Kinematics in two-dimensions: projectile motion

UNIT 2. DYNAMICS (5 weeks)
- Forces, types, and representation (FBD)
- Newton's First Law Newton's Third Law
- Newton's Second Law
- Applications of Newton's Second Law
- Friction
- Interacting objects: ropes and pulleys

UNIT 3. CIRCULAR MOTION AND GRAVITATION (1 week)
- Uniform circular motion
- Dynamics of uniform circular motion
- Universal Law of Gravitation

UNIT 4. ENERGY (5 weeks)
- Work
- Power
- Kinetic energy
- Potential energy: gravitational and elastic
- Conservation of energy

UNIT 5. MOMENTUM (3 weeks)
- Impulse
- Momentum

• Conservation of momentum
• Elastic and inelastic collisions

UNIT 6. SIMPLE HARMONIC MOTION (2 weeks)
• Linear restoring forces and simple harmonic motion
• Simple harmonic motion graphs
• Simple pendulum
• Mass-spring systems

UNIT 7. ROTATIONAL MOTION (4 weeks)
• Torque
• Center of mass
• Rotational kinematics
• Rotational dynamics and rotational inertia
• Rotational energy
• Angular momentum
• Conservation of angular momentum

UNIT 8. MECHANICAL WAVES (2 weeks)
• Traveling waves
• Wave characteristics
• Sound
• Superposition
• Standing waves on a string
• Standing sound waves

UNIT 9. ELECTROSTATICS (1 week)
• Electric charge and conservation of charge
• Electric force: Coulomb's Law

UNIT 10. DC CIRCUITS (3 weeks)
• Electric resistance
• Ohm's Law
• DC circuits
• Series and parallel connections
• Kirchhoff's Laws

LABORATORY INVESTIGATIONS AND THE SCIENCE PRACTICES

The AP Physics 1 course devotes over **25% of the time** to laboratory investigations. The laboratory component of the course allows the students to demonstrate the seven **science practices** through a variety of investigations in all of the foundational principles.

The students use **guided–inquiry (GI)** or **open–inquiry (OI)** in the design of their laboratory investigations. Some labs focus on investigating a physical phenomenon without having expectations of its outcomes. In other experiments, the student has an expectation of its outcome based on concepts constructed from prior experiences. In application experiments, the students use acquired physics principles to address practical problems. Students also investigate topic-related questions that are formulated through student designed/selected procedures.

All investigations are reported in a **laboratory journal**. Students are expected to record their Observations, data, and data analyses. Data analyses include identification of the sources and effects of experimental uncertainty, calculations, results and conclusions, and suggestions for further refinement of the experiment as appropriate. **Formal lab reports** will consist of the following components:
• Title
• Objective/Problem
• Design (if applicable): If the lab has no set procedure, what is to be done? Why are you doing? It this way?
• Data: All data gathered in the lab will go here
• Calculations/Graphs: Calculations are done here. Any graphs that need to be made go here.
• Conclusion: Data analysis occurs here, and a statement can be made about what was learned in the lab. Error analysis also occurs here. Evaluation of the lab occurs here as well.

*If you take AP Physics Exam , an additional 10 points will be added to your final grade for AP credit.

You are expected to keep a neat and organized notebook. Your notebook should be divided into the following sections:
1. Notes 2. Homework and supplemental materials 3. Tests

You will not regret keeping this notebook, as it will provide a safe haven for all of the materials you will need to use to prepare for assessments.

Daily: Consists of homework, class work, and quizzes. It is very important that you complete all homework assignments. Homework assignments are given to enhance learning and promote student success.

Tests/Projects Expect a test at the end of each chapter and/or unit which is about every two weeks. It is very important that you take every measure possible to prepare for tests because they are a major part of your grade. When projects are assigned you are expected to put forth your very best effort.

Laboratory Procedures You must follow all lab safety rules when conducting a lab. Specific safety issues will be emphasized at the beginning of each lab. You are also required to sign a lab safety contract to verify that you have read all lab safety rules before the first lab. **This is a legally binding document.** All lab work will be kept in a lab notebook which is separate from your notebook. Please follow the guidelines provided to you in class.

Make-up Work: All work is expected to be completed for any absences. Time allotted to complete work will be conducive to county guidelines. You will not be allowed to make up work for unexcused absences. **Please see late work policy below!!!**

50% OFF Late Work Policy: All students will have the opportunity to make up work that is not submitted on time (projects and research assignments excluded). **STUDENTS WILL BE ALLOWED TO TURN IN LATE WORK IN THE TIME PERIOD ALLOTTED FOR A 50% PENALTY. NO WORK WILL BE ACCEPTED AFTER THIS TIME PERIOD.**

Class Rules: **Daily Procedures**:
1. You are expected to adhere to all rules set forth by SHS.

2. Be prepared when you enter the classroom. **You will only be permitted to leave class 3-times/ semester. This includes restroom passes.**
3. No eating, drinking, or chewing gum.
4. Sharpen pencils or throw away paper at the very beginning of class. **Do not do this in the middle of class as it is very rude and disruptive.**
5. Enter the room prepared to work. All assignments are to be turned in upon entering to classroom. You are expected to sit in your assigned seat.
6. You must be acknowledged before contributing to any class discussions.
7. **Always clean up after yourself. It is not my job to clean after you.**
8. **Respect yourself and others. This is the golden rule in my class.**
9. Use very special care when handling lab materials. You are responsible for any broken materials due to negligence.

Tardy/Discipline Procedures:
Tardy (1st-Warning) (2nd- Detention Wednesday afterschool)(All others- Referral)
NOTE: A DETENTION OF ≥ 10 MINUTES WILL BE WRITTEN UP AS SKIPPING
First Offense: Warning (written and verbal)
Second Offense: Parent Contact
Third Offense: Detention (**With me in my class. Detention work will be provided**)
Fourth Offense: Office Referral
Certain offenses may warrant skipping the first three steps.
ELECTRONIC DEVICES- ADMINISTRATION WILL NOT HANDLE ISSUES REGARGING ANY ELECTRONIC DEVICES. YOU BRING THEM AT YOUR OWN RISK!!

Academic Honesty:
You are expected to do your own work. Cheating will result in a zero for the assignment, **discipline referral**, and immediate parent contact. You are only cheating yourself when you fail to do your own work.

Attendance:
Failure to attend class will negatively impacts your grade, please attend class. Make-up lab dates will be posted for each lab. Please review the attendance for Henry County in the student handbook as these govern the attendance policy for the class.

Technology:
Many of the laboratory activities are done online in the form of java applets. Please be sure that your personal computer has the most current java (this is free). I will also provide ancillary websites on a separate list and we will use social networking to create a healthy learning community. Anyone practicing unethical technological practices (i.e. cheating, cyber-bullying, hacking, etc.) will lose full credit for the assignment and may be subject to disciplinary action.

Letters of Recommendation:
I spend quite a bit of time writing letters of recommendations for college applications and scholarships. If I have taught you in AP Physics 1 and you are a student in good standing (good grades and conduct), I will be glad to write a recommendation for you. Do not just give me a form. Make an appointment with me and I will write your letter. I will need your academic resume complete with transcript, GPA and school and community involvement. Plan on spending about an hour with me for a normal reference.

Honor Code:
The work which I turn in reflects my own work and my own thoughts; if resources are used they are cited. Plagiarism is never acceptable. Even when utilizing the book and lab books quotes should be properly cited. If you are caught cheating, copying, plagiarizing or using any form of dishonesty to complete your course work, a conduct grade of N will be given for the first offense and U will be given if there are any other occurrences. A grade of zero will be given for the work in question. Furthermore, parents will be contacted and NO letter of recommendation for college or scholarships will be written by Mr. Patel!!
Your signature below signifies that you understand the Honor Code for AP Physics 1 and agree to abide by it.

Student Name (Printed)	**Student Signature**	**Date**
Parent/Guardian Name (Printed)	**Parent/Guardian Signature**	**Date**

Note: The instructor reserves the right to change any section of this course syllabus at any time during the semester to more adequately meet the needs, interest or abilities of the students.

This semester will offer many opportunities for you to develop and refine your study skills. I look forward to educating, encouraging and empowering you to your greatest potential. Do not hesitate to contact me by e-mail, phone or schedule conference if you have any questions or concerns. Thank you in advance for your help and support. I look forward to a very productive semester!

Instructor's Course Syllabus

"I understand the course requirements and expectations outlined in the course syllabus.

Student's Manuscript (Printed Name)	**Date**

Student's Signature

_____ _____

Parent's Manuscript (Printed Name) **Date**

_____

Parent's Signature

Parents, due to the lab nature of this course, it is very important that valid emergency contact numbers be given. This will be asked for on several forms that way the information is readily available. <u>Please Print Carefully. This is the Most Important information that you give.</u>
Daytime Emergency Contact Number _____ Name _____

Afterschool Emergency Contact Number _____ Name _____

Technology Code

"I. _____, understand that using the technological tools provided in AP Physics 1 is a privilege. I will adhere to all ethical guidelines stated in the syllabus. I understand that if I do not adhere to these guidelines that I will receive a zero on the assignment and disciplinary action may incur."

Student Name: _____ Student Signature: _____ Date: _____

Parent Name: _____ Parent Signature: _____ Date: _____

Photography/Video

"I give Mr. Patel permission to use appropriate content related photos and videos on relevant websites for my son/daughter."

Student Name: _____ Student Signature: _____ Date: _____

Parent Name: _____ Parent Signature: _____ Date: _____