**AP Physics 1 Syllabus**

**AP Physics 1** is an algebra-based, introductory college-level physics course. The course explores traditional Newtonian Physics (kinematics, dynamics, energy, momentum, rotation, simple harmonic motion, and mechanical waves) with an introduction of circuitry. The course stresses inquiry-based learning to develop scientific critical thinking and reasoning skills in students. Twenty-five percent of class time is devoted to laboratory work. In lab, students will use a variety of methods to collect data; in class, they will explore concepts using interactive simulations, collaborative activities, and formative assessments.

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**Conference period: 4th**

**Website: http://sciencewhiting.weebly.com**

**Text:** Open Source (free online)

**Class Policies:**

1. Be prepared for class each day. Be in your seat, prepared to work with pencil, paper and calculator when the tardy bell rings.
2. Bring binder, paper, quadrille paper, pen or pencil, and calculator to class each day. Having to leave class to retrieve materials is a tardy. Yes, quadrille paper is essential.
3. If you are absent, it is your responsibility to find out what you missed, and make arrangements for make-up tests or labs. Make-up work is only allowed for excused absences and pre-arranged absences according to school policy.
4. Cell phones must be put up at all times

**Grade Determination**

A student’s grade will be averaged according to categories – 70% tests and labs, and 30% daily work, spot checks and class participation. The class participation grade includes completion of homework, active participation during class time, and exemplary conduct during experiments. The semester letter grade and scale is determined by the school district. Grades should be updated each week. **NEW! All missing assignments are due by the day of the exam. All missing assignments will be marked as a zero until the tests are graded at which point the 0’s will change to your test grade up to a 50.**

Tests

* Tests are a mixture of multiple choice and free response questions.
* Major tests will be announced well in advance. Every effort should be made to be here for a major test. If you know you will be absent on test day, make arrangements *ahead of time* to make-up the test.
* *If you miss one day before a major test, you will still be required to take the test at the regular time.*
* If you are absent on test day, be prepared to take the test the day you return during class time. (An e-mail is an excellent way to communicate an absence).

**Make-up tests**: In cases where you have missed many days, the student has 2 days upon returning to school *to make arrangements* with the teacher to make up tests.

**Quizzes**: Quizzes may or may not be announced. They are composed of short answer questions.

**Academic Dishonesty**

Students are expected to perform their own work on all assignments in this course. Dishonesty on an exam, quiz, homework, classwork or lab report will result in a grade of zero for that assignment and an academic dishonesty report will be filed. School policy dictates that parents, department chair, and administration will be notified, the student will receive a zero on the assignment, and administrators will enforce other disciplinary action.

**Attendance**

Regular attendance is the most important component to success in this class. Students can never really make up or compensate for missed class time. Assignments will be posted on Moodle and my website each day.

Excused Absences: Make-up work will only be allowed for excused absences and absences. All arrangements for missed work should be made immediately upon returning to class except for pre-arranged absences. Students with pre-arranged absences should make arrangements for missed work *before the absence*. Make-up assignments/tests will not be identical to the original assignment.

Unexcused absences: Department policy is that work may not be made up for unexcused absences.

**Behavior**

Students are expected to behave in a mature way that does not detract from the learning environment. Disrespect of any kind will not be tolerated. Discipline problems will be handled by one or more of the following ways; teacher-student conference, phone call to parent, detention, teacher-parent conference, and/or referral to the office.

Lab misbehavior (dangerous lab actions) will result in expulsion from the laboratory and a zero on the assignment.

# Electronic Device Policy

NO CELL PHONES OR ANY ELECTRONIC DEVICES ARE ALLOWED NOT EVEN FOR TEACHERS! LEARN IT!

**The content for the course is based on six big ideas:**

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.

**The course focuses on seven scientific practices:**

1. Use representations and models to communicate scientific phenomena and solve scientific problems;
2. Use mathematics appropriately;
3. Engage in scientific questioning to extend thinking or to guide investigations within the context of the AP course;
4. Plan and implement data collection strategies in relation to a particular scientific question;
5. Perform data analysis and evaluation of evidence;
6. Work with scientific explanations and theories; and
7. Connect and relate knowledge across various scales, concepts, and representations in and across domains.

**Topics Covered:**

1. Kinematics (6 weeks)

* One Dimensional Motion (including graphing position, velocity, and acceleration)
* Vectors/Scalars
* Two Dimensional Motion

1. Dynamics (3 weeks)

* Forces, types and representation (FBD)
* Newton’s Laws of Motion
* Interacting objects (systems)

1. Universal Law of Gravitation (2 weeks)

* Circular Motion – kinematics and dynamics
* Kepler’s Laws of Planetary Motion

4. Energy (4 weeks)

* Work
* Energy
* Conservation of Energy
* Power

5. Linear Momentum (4 weeks)

* Impulse and Momentum
* Conservation of Momentum (Elastic and inelastic collisions)
* Center of Mass

6. Rotation (5 weeks)

* Rotational Kinematics
* Rotational Energy
* Torque and Rotational Dynamics
* Angular Momentum
* Conservation of Angular Momentum

7. Simple Harmonic Motion (2 weeks)

* Restoring forces and simple harmonic motion
* Simple Pendulums
* Mass-Spring Oscillators

8. Mechanical Waves and Sound (2 weeks)

* Wave characteristics
* Waves on a string
* Sound waves
* Superposition
* Resonance, Beats and the Doppler Effect

9. Electrostatics (1 week)

* Electric Charge
* Conservation of Electric Charge
* Electrostatic Forces, Coulomb’s Law

10. Circuits (2 weeks)

* Resistance
* Ohm’s Law
* Kirchhoff’s Laws
* Simple DC Circuits

**Real World Physics:**

In order for students to become scientifically literate citizens, students are required to use their knowledge of physics while looking at a real world problem.

* All students will be assigned to several teams, and each team will research sources of energy (solar, fossil fuels, wind, geothermal, hydroelectric, etc.) and the cost-benefit of each. Students teams will present findings to the class and debate the merits of their assigned energy source.

In addition, students may pick one of the following assignments to complete.

* Students will pick a Hollywood movie and will point out three (or more) instances of bad physics. They will present this information to the class, describing the inaccuracies both qualitatively and quantitatively.
* Students will research a thrill ride at an amusement park. They will present information to the class on the safety features of the ride, and why they are in place.
* Students will present information to the class on noise pollution, and it’s danger to both human and animal life. They will also propose solutions to noise pollution problems.