AP Physics 1 Summer Assignment

AP Physics 1 is a college level course and it will be offered in 2018-2019 school year and you will be somewhat challenged, after all it is a college level course where you will be using your knowledge and understanding of everything you have learned in all of your classes to solve problems, analyze situations, arrange materials, compare data, design labs, and build incredible things. That is physics!

Success. Effectiveness, and Performance

Organization is the first step in helping you adapt to the demands of the class. Expect significant work outside of class each week. To be successful, students need to be able to monitor their own progress and be willing to get help when they need it. We must move at a fast pace so you will need to be able to work consistently throughout the year. Here are some general recommendations:

• Pace yourself and never allow yourself to get stuck on a problem for more than ten minutes.

If you are stuck, take a break. Ask me or a friend or me for help.

• Form a study group to work with other people. Get a group of 2 to 4 people that you can work with productively. Meet regularly to discuss problems and get help. You will be surprised at how much you will learn by teaching someone else how to solve a problem.

• Do research and ask questions. Rest assured that there are several people in the class that are wondering about the same thing as you are. In this course we value learning so if you have a question, see if you can answer your question with the resources you have available (textbook, google, peers, etc.). If you cannot get your question answered with the available resources, then hopefully I can answer your question.

• Keep a positive attitude and don't get angry. It is very possible that you will face academic challenges that you have never encountered before. Be patient and know that your efforts are not wasted.

• Study on a regular basis and don't cram. It takes time to assimilate the concepts in this course so give yourself time to do so. Cramming for tests might have worked for you in your honors classes, but it probably won't in this one. Allow yourself quality time for the physics.

• You cannot expect to acquire the understanding you need to do well on an AP Exam by merely attending class and listening to the teacher. You have to become INVOLVED.

It is imperative that YOU have to participate.

• You must study regularly. Students who study regularly have a good foundation to build on for new topics. Trust me, this will pay off!

AP physics 1 Topics (will be covered in the course)

Unit 1: Kinematics in One and Two Dimensions

Unit 2: Dynamics

Unit 3: Circular Motion and Gravitation

Unit 4: Energy and Conservation of Energy

Unit 5: Impulse, Momentum, Conservation of Momentum

Unit 6: Simple Harmonic Motion

Unit 7: Rotational Motion and Conservation of Angular Momentum

Unit 8: Mechanical Waves and Sound

Unit 9: Electrostatics

Unit 10: Circuits

Details

- Feel free to e-mail me over the summer with any questions you may have. My e-mail address is mmechail@epsd.org
- Do not wait until the last week of summer to do this assignment. This is an ongoing assignment that should be completed over the course of the summer.
- Copying assignments is a violation of the School Academic Integrity Policy and will not be tolerated.
- You will have a test on this material the first week of school.

Part 1

Solve the following equations for the quantity indicated. Show all of your work! (Show every step in each process.)

a. $v=d/t$, $t=$

b. $PE=mgh$, $m=$

c. $vf^2=vi^2 + 2a(x-xi)$, $a=$

d. $EPE= \frac{1}{2} kx^2$, $x=$

e. $F=Gm_1m_2/r^2$, $r=$

f. $F=kq_1q_2/d^2$, $d=$

g. $mgh=\frac{1}{2}mv^2$, $v=$

h. $x=x_i+v_it+\frac{1}{2}at^2$, $t=$

i. $x=m\lambda L/d$, $d=$

j. $pV=nRT$, $n=$

k. $\sin\theta=n_1/n_2$, $\theta=$

l. $KE=\frac{1}{2}mv^2$, $v=$

m. $1/f=1/x_i+1/x_f$, $x_i=$

Part 2Factor-Label Method for Converting Units

In physics we will work and record units for various quantities measured. However, sometimes the units you currently are working with aren't the units that are needed for your work. This particularly important when working with derived units, such as (km/h to m/s)

To do that you would use the process of dimensional analysis (AKA factor labeling)

The key to doing dimensional analysis problems is taking what you are given (the "thing" you are trying to convert into something else) and placing the whole thing over the number "1" to make a fraction out of it. Then you simply need to multiply that fraction by a series of fractions that are themselves equal to 1 (so it doesn't change the value of the amount you are given). To make sure that you have done everything correctly, all of your units should cancel out to leave only the unit you want in the top portion of a fraction (the numerator).

Show every bit of your work (including the canceling of your units!) just like in the example problem from above

1. How many seconds are in a year?

2. Convert 28 km/h to m/s.

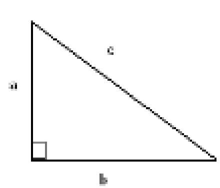
3. Convert 45 kg/min to grams/sec.

4. Convert 85 cm/min to m/s.

5. Convert the speed of light, 3 x 108 m/s, to km/day.

Part III. Trigonometry and Basic Geometry

Solve for all side and all angles for the following triangles. Show all your work. Your calculator must be in degree mode! Show all your work.



1. $\Theta=55^{o}$ and c=32 m, solve for a and b.

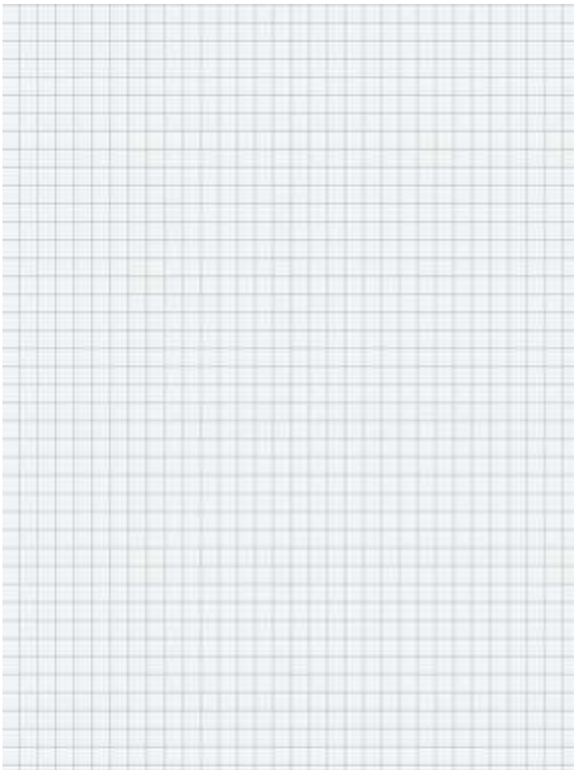
2. $\Theta=45^{o}$and a=15 m/s, solve for b and c.

3. B=17.8 m and $\theta=65^{o}$m, solve for a and c

Part IV. Graphing Techniques

Graph the following sets of data using proper graphing techniques. The first column refers to the y-axis and the second column to the x-axis. Plot a graph for the following data recorded for an object falling from rest:

Velocity m/s	Time (s)
32	1
63	2
97	3
129	4
159	5
192	6
225	7



What kind of trend line did you obtain?

What is the relationship between the variables?

What do you expect the velocity to be after 3.5 s?

How much time is required for the object to attain a speed of 100 m/s?