AP Physics 1 Summer Assignment – Bellville HS

Name _____

The purpose of this summer assignment is to accomplish the following:

1) Cover Page & Join Google Classroom & Join Remind & Flinn Contract
2) Familiarize yourself with the AP Physics 1 Curriculum and the Five Big Ideas.
3) Research different Universities and what score is needed for transferable credit in college.
4) Learn/Review a few vital Physics skills that will be needed for deeper understanding of the topics covered next school year.
5) Build a fun, physics based project to be tested at the start of school.

If you have questions over the summer, please email Mrs. McEnerney at nmcenerney@bellvillebrahmas.org.

It is expected that you work independently on this assignment and any form of academic dishonesty will be considered for dismissal from the class. All research must be cited in APA format.

This assignment will be your first major grade of the 1st 9 weeks. The entirety of this assignment is due **the first day of school** so that we will be able to "hit the ground running". This assignment is a compilation of necessary math/science skills that will guide you to victory over the AP Physics 1 test as well as a project. I look forward to teaching you next year!

The AP Physics Test has four free-response questions, so you will need to get comfortable with writing out your answers. You may **not** type these answers as this is to help get you working on writing neat scientifically based answers. Prepare all answers on scratch paper and only write your final draft of each answer on this sheet. All work must include units and significant digits where appropriate.

Definitions:The following are terms often used in free-response questions.

Compare-note the similarity between
Contrast-state of being different from something else
Explain-make (an idea, situation, or problem) clear to someone by describing it in more detail or revealing relevant facts or ideas
Justify-show or prove to be right
Predict-use scientific reasoning to state what will occur

PURPOSE 1:

Make a cover page for Binder: The cover page should have the following on it: AP Physics, your first and last name, a physics joke/cartoon, and use at least four colors. The joke/cartoon may be one of your own design, or one you print from the internet. If you print one from the internet, be sure to add the URL or name of the source such as *"Far Side"* by Gary Larson.

Join Google Classroom: the class code is whfvmz5

Join Remind: the class code is remind.com/join/76c3cbf or text @76c3cbf to 81010

Flinn Contract- Have the attached contract signed by both your parent and yourself and dated. You can find a copy to print on the Google Classroom.

PURPOSE 2:

Familiarize yourself with the AP Physics 1 Curriculum and the Big Ideas.

-Read the following AP Physics 1 Course Overview and answer the following questions.

https://apcentral.collegeboard.org/pdf/ap-physics-1-course-and-exam-description.pdf

1) What are the 7 units in the Course Overview?

1._____ 2. _____

3._____ 4._____

5._____ 6._____

7._____

2) List the Five Big Ideas of AP Physics 1.

1._____ 2. _____

3._____ 4._____

5._____

3) Explain how any of one Science Practice can be used to explain any of one Big Idea.

4) What is the expectation of Laboratory time in AP Physics 1 and how will Laboratory experiments be based?

5) Explain the Format of the AP Physics 1 Test. i.e. how much time, format of the test, % value, etc.

PURPOSE 3: Research different Universities and what score is needed for transferable credit in college.

-Choose three Universities that you have interest in attending and research if they accept AP Physics 1 credit and if so, what is the minimum score on the AP Physics 1 Exam needed for credit. In addition, how much credit will be given if that minimum score is met.

University 1:

University 2:

University 3:

PURPOSE 4: Learn/Review a few vital Physics skills that will be needed for deeper understanding of the topics covered next school year. Your answer should include, as needed, diagrams, graphs, equations, and perhaps calculations to support the line of reasoning.

Algebra Review

Directions: Solve the following equations for the given variable and conditions. Simplify if needed.

Example: $2x + xy = z$. Solve for *x*.

$$x(2+y) = z \qquad \boxed{x = \frac{z}{2+y}}$$

1.) $v_1 + v_2 = 0$. Solve for v_1 .

2.) $v_f^{\,2} = v_i^{\,2} + 2ad$ Solve for v_i.

3.) $a_c = \frac{v^2}{r}$. Solve for *v*.

4.) $F_g = G\frac{m_1 m_2}{r^2}$. Solve for *r*.

5.) $m_1 v_{i,1} + m_2 v_{i,2} = (m_1 + m_2) v_f$. Solve for $v_{i,2}$.

Relationships from equations: Consider $z = \frac{y}{x}$ and $a = bc$,

a.) As *x* increases and *y* stays constant, *z* _____.
b.) As *y* increases and *x* stays constant, *z* _____.
c.) As *x* increases and *z* stays constant, *y* _____.
d.) As *a* increases and *c* stays constant, *b* _____.
e.) As *c* increases and *b* stays constant, *a* _____.
f.) As *b* increases and *a* stays constant, *c* _____.

Systems of equations: Use the equations in each problem to solve for the specified variable in the given terms. Simplify.

7.) $F_f = \mu F_N$ and $F_N = mg\cos\theta$. Solve for μ in terms of F_f, *m*, *g*, and θ.
(Hint: combine the equations.)

Answer the following questions using dimensional analysis. You may use a calculator, but be sure to show all supporting work.

8. How many seconds are in 2 hours, 56 minutes, and 21 seconds?

9. Use your weight in pounds (while standing on the surface of the Earth) to calculate your mass in kilograms and in grams. (1 kg weighs approx. 2.205lb on the surface of the Earth).

Graphical Skills

10. Examine the graphs below. It represents the motion of a particle over a period of 60 seconds. Determine the answers to items A through F. Show your Work!

a. What is the total distance traveled?

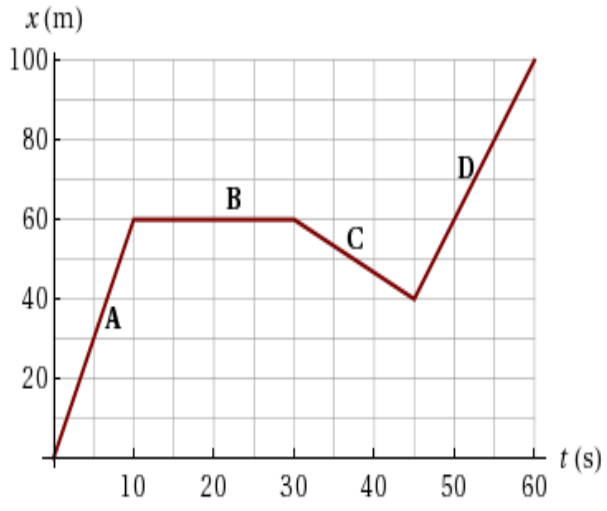
b. What is the slope of section A?

c. What information does the slope of section A tell us?

d. Describe what is happening in section B.

e. What is the slope of section C?

f. Describe what is happening in section C.

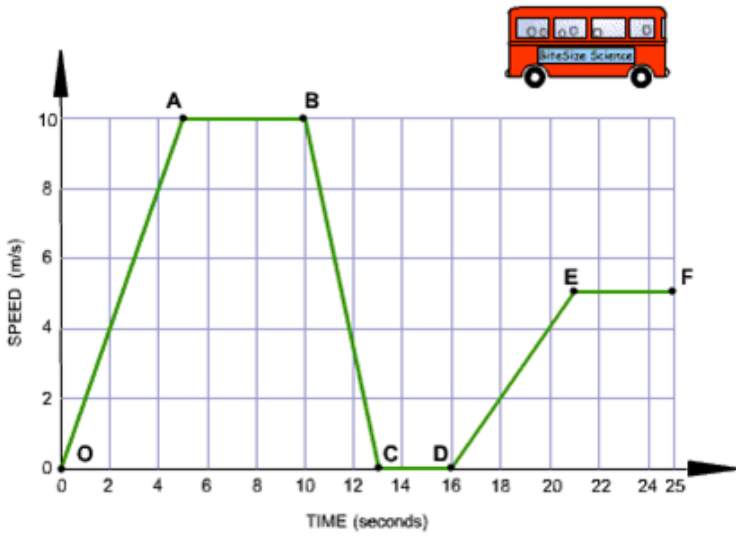


11. Using the graph for the bus, answer the following questions.

a. What is the slope of O to A?

b. What information does the slope from O to A tell us?

c. What is the slope of A to B?



d. What information does the slope from A to B tell us?

PURPOSE 5: Students will research, design, and construct a kite made of recycled materials from their home. Projects will be due ON THE FIRST DAY OF CLASS. The style/shape of the kite will be weighted to encourage students to step out of their comfort zone. Diamond, Sled and Box kites will be worth 10 points less than all other styles. Kites MUST be made from materials that are not typical for kite. NO parts **except for kite string** may come from a kite. Points are not awarded for following this instruction, instead fifty points will be deducted if not followed. Pictures of materials used should help with any questions of materials. If you have a question about using something – ASK first! **Kites will have no required dimensions.**

There will be three parts to this project: 1. Research 2. Pictures 3. Build

Part 1: Research

Your research should answer the following questions. Use complete sentences for questions 2, 6, and 7.

1. What is the name of the style/design you chose? _____

2. Why did you choose the design? _____
_____

3. What two forces are working against your kite (Hint: Air Resistance has a specific name when you are referred to flying objects)?
Vertical Force - _____ Horizontal Force - _____

4. What force helps your kite compensate for the force working against it in the Vertical Force? _____

5. What force helps your kite compensate for the force working against it in the Horizontal Force? _____

6. How does Newton's Third Law apply to kites? (What is the action; what is the reaction?)
_____
_____

7. What is Aerodynamics and in what way is your kite design affected by aerodynamics?
_____
_____

Part 2: Pictures

Students will take at **least 8** pictures of themselves building the kite. The pictures should show the process of the build. Pictures of the students practicing flying the kite may be included but only two may count towards the ten required. Students will send the pictures in a Google document to nmcenerney@bellvillebrahmas.org by the first day of school. All pictures must have a caption to be given points.

Part 3: Build

Again, kites may be any size. However, no kite kits will be allowed. Students will ten less points for sled, box, and diamond kits. **Weather permitting**; we will fly the kites on the first day of class. If the weather is not suitable, we will postpone flights and classwork will be done.☹ Kites MUST become airborne for more than 10 seconds to receive full points.