AP Physics 1 Student Name_____

Summer Assignment Date _____Per _____

We have read and understand the syllabus, policies and expectations for AP Physics 1 found on the AP Physics 1 Canvas page, and we accept these policies and expectations.
(This will not be possible until the district populates class rosters into Canvas. Please keep checking Canvas over the summer until you are able to access the page. In the meantime, please review the information provided on the link below, and don't wait to complete the rest of this assignment.)

AP® Physics 1: Algebra-Based

Student Signature: _____ Date _____

Parent / Guardian Name (print) _____

Parent / Guardian Signature:_____ Date _____

I. As is evident in the AP Physics Syllabus, we must cover a large number of topics before the AP exam in May. This necessitates a very fast pace. This summer homework will allow us to start on the Physics subject matter immediately when school begins. This assignment is an introduction to is a math review to brush up on valuable skills, and perhaps a means to assess whether you are correctly placed in Advanced Placement Physics.

II. Although the new AP Physics 1 and AP Physics 2 courses emphasize mastery of fundamental Physics concepts, Physics, and AP Physics in particular, requires algebra, trigonometry, and geometry skills. The following assignment includes mathematical problems that are considered routine in AP Physics 1. Please notice that this assignment emphasizes using algebra to isolate a variable. This is an extremely necessary skill in AP Physics 1. Memorizing equations and using them as vessels to plug and chug numbers is not a necessary process in this class. Other important skills in science include knowing several key metric system conversion factors and how to employ them, involving the rules of Significant Figures in your calculations, and Scientific Notation and how to manipulate Powers of 10 mathematically without a calculator (by simply moving the decimal point).

III. The attached pages contain a brief review, hints, and example problems. It is hoped that, combined with your previous math knowledge, this assignment is merely a review and a means to brush up before school begins in the fall.

IV. What is due the first day of class?

A. **Signed Class Expectations Sheet**
   1. **Read the above statements.**
   2. **Complete the section at the top of this form and obtain appropriate signatures.**

B. **Positive Physics (+P) Unit 0 assignment (pages 2-3 of this document)**

C. **Math Skills Worksheet (page 4 of this document)**

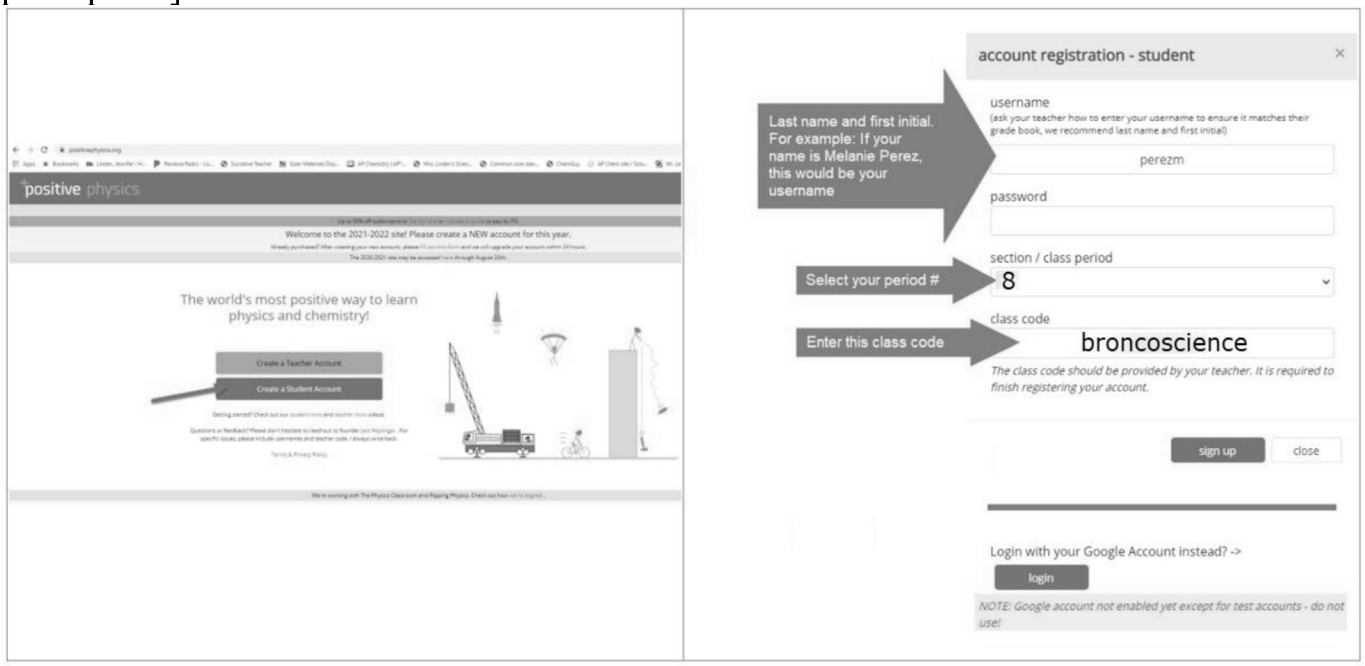
D. **Optional but highly recommended: Purchase an AP Physics 1 exam prep book (I believe old versions can be borrowed from our library). The AP Exam changed in 2025 (to include a unit on Fluid Mechanics and the test format is changing a bit), so you can choose to buy a used version, but I suggest buying no older than the version for the 2025 exam. Purchasing an older version would be sufficient enough and would be cheaper. I imagine you may need to wait until July or August for newly updated versions of prep books to be released if you want one for the 2027 exam. My personal favorite is "5 steps to a 5" but Barron's and Princeton Review are also highly rated.**

Note: There is no need to check out the AP Physics textbook for the summer assignment. You may check it out when you check out your other books at the beginning of the school year.

Positive Physics (+P) Unit 0: Science and Math Toolkit

Go to positivephysics.org and create your account USING YOUR **PERSONAL EMAIL** (BECAUSE WHEN SCHOOL STARTS YOU WILL GET A NEW ACCOUNT WITH YOUR SCHOOL EMAIL WHICH WILL BE LINKED TO CANVAS) by following the instructions in the image below:

1. For your username, be sure to make it **lastnamefirstinitial**, 2. Enroll in period **8** and, 3. Use the class code **broncoscience**, [and 4. use your **personal email** when prompted!]



In the Physics Course, go to Unit 0 (it should default to this unit for you) and complete the following 13 skills in the **work mode**.

Note: Your grade will be based on completion, not accuracy. To complete each skill, click the "Lesson & Questions" button. You'll watch a short video which models how to do the problems (I suggest taking notes in a notebook) and then you will have some problems to do on your own.*

**In the third week of school, you will take a test on these skills in the "assessment" mode on +P. I suggest you use the "Extra Practice" mode to review these skills leading up to the day you will be tested. So although your grade for this summer assignment is based on completion; take notes to yourself (and ask Mrs. Courtney for help at the start of the year) for skills you are struggling with.*

Name of Skill	# of problems
Counting Significant Figures *Note: You learned how to count significant figures in chemistry, so this should be a review. The Lesson shows you one way to count "sig figs" but there is another method you may find easier, called the Atlantic-Pacific Rule (my preferred method, by the way). Watch this 4 minute video to see how to use this method before attempting the problems in the skill. Use either method you feel more comfortable with.*	7
Experimental Variables	8
Rounding	8

Scientific Notation	8
Calculations with Significant Figures	8
1 Step Unit Conversions	8
2 Step Unit Conversions (*Question #7 is removed***)**	6
Solving Equations	8
Proportionality	5
Linearizing Equations Note: This is an essential skill you will need to know how to do for the Experimental Design FRQ (We will do more practice throughout the year so this FRQ can be "easy" points for you to grab)	8
Trigonometry	4
Vector Addition	4
Interpreting Graphs	4
Extrapolating Data	3
Challenge	7
Switch to the course: **Chemistry** and do the following skill in **Unit 0**: **Graph Concepts**	7
Switch back to the course: **Physics** and go to **Unit 1.** Complete the first skill: **Inquiry**	2

Math Skills Worksheet

1. The following are ordinary physics problems. Place the answer in scientific notation when appropriate and simplify the units (Scientific notation is used when it takes less time to write than the ordinary number does. As an example 200 is easier to write than $2.00\text{x}10^2$, but $2.00\text{x}10^8$ is easier to write than 200,000,000). Do your best to cancel units, and attempt to show the simplified units in the final answer.

   a. $T_s = 2\pi\sqrt{\dfrac{4.5\times10^{-2}\,kg}{2.0\times10^{3}\,kg/s^2}} =$ _____

   b. $F = \left(9.0\times10^{9}\,\dfrac{N\cdot m^2}{C^2}\right)\dfrac{\left(3.2\times10^{-9}C\right)\left(9.6\times10^{-9}C\right)}{\left(0.32m\right)^2} =$ _____

2. Often problems on the AP exam are done with variables only. Solve for the variable indicated, being sure to show your work. Don't let the different letters confuse you. Manipulate them algebraically as though they were numbers.

   a. $K = \frac{1}{2}kx^2$, $x =$ _____

   b. $T_p = 2\pi\sqrt{\dfrac{\ell}{g}}$, $g =$ _____

   c. $F_g = G\dfrac{m_1 m_2}{r^2}$, $r =$ _____

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

3. Often, problems on the AP exam have you derive an expression. Read the "Social Media Influence" problem below and derive the expression as instructed.

   Social Media Influence

   A social media influencer's follower count (F) depends on the trendiness of content (T), hours spent posting (H), and algorithm favorability (A).

   Given:

   $F = TH^2A$

   $T = 5V - 3L + Q^2$ where V is viral dances learned, L is lame jokes told, and Q is quirky outfits worn

   $A = (E/C) + D$ where E is engagement rate, C is competitors' average engagement, and D is donations to platform CEO's favorite charity.

   Derive an expression for the number of viral dances (V) needed to reach exactly F_{target} followers, in terms of F_{target}, H, L, Q, E, C, and D.

   Hint: Set $F = F_{target}$

   Finally, use your equation that you derived and enter the following values into it. **Box your answer**.

   F = 1000, H = 10, E = 14, C = 7, D = 1000, L = 50, Q = 10

Need help to derive the expression? You should follow the 3 steps below:

Step 1: Solve the second equation given to you for "V" since you are asked to derive an expression for "V".

Step 2: Solve the first equation given to you for T and substitute this into the equation you obtained in Step 1. (This eliminates T from your expression since T is not supposed to be in your final expression)

Step 3: Substitute the third equation you are given into the equation you obtained in Step 2. (This eliminates A from your expression since A is not supposed to be in your final expression)