

## AP Physics 1 Summer Assignment

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Greek Letters Quizlet

In physics, you will often see a variety of ways to name a variable, from  $v$  for velocity to  $F_N$  for normal force. In many cases, though, Greek letters are the default way to represent many variables. In the list below, you will find a list of Greek letters, their pronunciations, and the most common uses for them. You will need to know these by heart in this class. To effectively study them, please create a Quizlet or flashcard set with the following terms and definitions and practice these over the summer. You may expect to be quizzed on them on the first day of school.

Greek Letter	Pronunciation	Common Uses
$\alpha$	Alpha (Al-fuh)	Angular acceleration, nuclear radiation
$\beta$	Beta (Bay-tuh)	Nuclear radiation
$\epsilon$	Epsilon (Ep-salon)	Permittivity
$\eta$	Eta (Ey-tuh)	Charge density
$\gamma$	Gamma	Nuclear radiation
$\lambda$	Lambda (Lamb-duh)	Wavelength
$\mu$	Mu (Mew)	Friction coefficient
$\pi$	Pi (Pie)	Irrational number
$\theta$	Theta (they-tuh)	Angular position/displacement
$\rho$	Rho (Row)	Density, resistivity
$\sigma$	Sigma	Electrical conductivity
$\tau$	Tau (As in "towel")	Torque
$\omega$	Omega	Angular velocity/frequency
$\Delta$	Delta	A change in a quantity
$\Sigma$	Sigma	The summation of multiple quantities
$\Omega$	Omega	Measure of Resistance (Ohms)

### Essential Math Review

While a good portion of AP Physics I in the beginning is done in one dimension, the material quickly introduces you to 2-dimensional thinking. It is **crucial** that you understand how to analyze triangles and vectors, as they will be a major part of the material in this class.

Please sign up for Khan Academy using the following directions:

1. Go to [khanacademy.org](https://khanacademy.org).
2. Click on Start Learning Now.
3. Click Sign in with Gmail.
4. Create an Account.
5. Type in the Search Engine Bar the topic you would like to complete or click on the link provided.

Please watch all videos in the following modules on Khan Academy and be prepared to show your progress in them at the beginning of the year. 100% completion is expected.

- Algebra II
- High school geometry
- Trigonometry
- Precalculus

Be prepared to be quizzed in the first week on these concepts. Focus especially on the trigonometry and precalculus units, as these are crucial skills for AP Physics I.

### Metric System

For science courses you have already taken, you have most likely familiarized yourself with the metric system. This system of measurement is used in virtually every physics class and will be the way we quantify measured values in this course. Please be familiar with the following base units, their symbols, and the quantity of which they are a measure.

Name	Symbol	Measure of
Meter	m	Length
Kilogram	kg	Mass
Second	s	Time
Ampere	A	Electric current
kelvin	K	Thermodynamic temperature
Mole	mol	Atomic weight or molecular weight

In addition, please be familiar with the following prefixes, their abbreviation, and the way they alter the base units that proceed them:

Name	Abbreviation	Numerical value
Pico-	p-	$10^{-12}$
Nano-	n-	$10^{-9}$
Micro	$\mu$ -	$10^{-6}$
Milli-	m-	$10^{-3}$
Centi-	c-	$10^{-2}$
Kilo-	k-	$10^3$
Mega-	M-	$10^6$
Giga-	G-	$10^9$

## Significant Figures

When conducting an experiment, working a physics problem, or taking a simple measurement, there are specific rules governing the manner in which you record and report this information. IF using a ruler to measure a length in centimeters, you would logically not report it as 10.00000000000001 cm, because the human eye is not able to discern this measurement. But what about 10.2 cm, or 10.21 cm? It is a simple truth that measurements are only so certain. This is why significant figures are crucial to scientific experimentation.

In this class, you **MUST** understand when to report a number with three significant figures vs. two significant figures, what rules apply to the number of sig figs when adding, multiplying, dividing, or subtracting. Without these, you will make mistakes that will cost you easy points on quizzes, tests, and eventually the AP exam.

Please commit the following rules to memory before the beginning of class in the fall:

To determine the number of significant figures in a number use the following 3 rules:

1. Non-zero digits are always significant
2. Any zeros between two significant digits are significant
3. A final zero or trailing zeros in the decimal portion **ONLY** are significant

Example:     .500 or .632000 => the zeros **are** significant  
              .006 or .000968 => the zeros **are not** significant

For addition and subtraction use the following rules:

1. Count the number of significant figures in the decimal portion **ONLY** of each number in the problem
2. Add or subtract in the normal fashion
3. Your final answer may have no more significant figures to the right of the decimal than the **LEAST** number of significant figures in any number in the problem.

For multiplication and division use the following rule:

The **LEAST** number of significant figures in any number of the problem determines the number of significant figures in the answer. (You are now looking at the entire number, not just the decimal portion)

\*This means you have to be able to recognize significant figures in order to use this rule\*

Example:       5.26 has 3 significant figures  
                  6.1 has 2 significant figures

### Graphing and Graph Interpretation

Graphing in previous math classes had you look at the relationship between x and y variables or the function of x and x itself. In AP Physics I, you will assign physical significance to your graphs. In some cases, slope will represent velocity, acceleration, and many other possible variables. Please read the instructions in [this link](#) and commit the steps below to heart, as we will always use these in class.

For plotting and interpreting graphs follow the steps below:

1. Identify which physical variable is the x (x-axis) and which is the y (y-axis). [e.g. V, M]
2. Identify a physics equation that relates the variables. [e.g.  $M=\rho V$ ]
3. Note the relationship of your data i.e. linear, quadratic etc. [e.g. linear]
4. Write down the general form of the equation i.e.  $y=mx+b$ ,  $y=ax^2+bx+c$ , etc. [e.g.  $y=mx+b$ ]
5. Compare with physical equation to the equation of the fit. [e.g. Comparing  $M=\rho V$  to  $y=mx+b$  gives  $m=\rho$ ,  $b=0$ ]

Assigned Reading for Day One

Before coming into class on the first day, you must have some prerequisite understanding of the nature of physics. That is why your final task in your Summer Assignment is to completely read and take detailed notes on the 1<sup>st</sup> chapter of the LibreTexts OpenStax Physics: The Nature of Science and Physics, which can be found [here](#).

**Please have detailed notes (written, not typed) ready to be turned in on the first day of school.**

### Summer Assignment Checklist

Please use this checklist to keep track of which parts of the Summer Assignment you have completed. This will also serve as a guide for what to bring for the first day of class.

- Created Greek Letters Quizlet
- Reviewed Khan Academy Math Videos
- Memorized base metric units and their possible prefixes
- Memorized the Significant Figures Rules
- Followed instruction on how to analyze linear data
- Read the 1<sup>st</sup> chapter of OpenStax Physics and took notes to turn in on 1<sup>st</sup> day

First day of class, you must be ready for a quiz covering the following topics:

- Greek letters used in physics
- Trigonometry and linear plots
- Metric units and prefixes
- Significant figures
- Nature of physics