

# AP Physics Part 1 2014-15

Paloma Valley High School

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*The trouble with the world is that the stupid are cocksure and the intelligent are full of doubt. ~ Bertrand Russell*

*Physics is fundamental. Physicists deal with basic concepts in science. From physics we are lead to chemistry, from chemistry to biology, from biology to psychology and from psychology to sociology. Each step is infinitely more complex than the one preceding it. Physicists can enjoy their orderly world of simple concepts but just outside that orderly world awaits a complex and chaotic reality! - Tony DiMauro*

**Physics is for everyone.** Every student should have the opportunity to be exposed to physical principles. Students should be encouraged to find their inner scientist. Scientists observe events---phenomena. From the multitudes of events they search for patterns in nature. From these patterns they develop fundamental principles. From these fundamental principles they make accurate predictions. These accurate predictions are what help us to survive. This is our their motivation.

Taking a Physics class builds **critical thinking skills**. Students learn to solve problems based upon a proven methodology. **Critical thinking** is that mode of thinking — about any subject, content, or problem — in which the thinker improves the quality of his or her thinking by skillfully analyzing, assessing, and reconstructing it. Critical thinking is self-directed, self-disciplined, self-monitored, and self-corrective thinking. It presupposes assent to rigorous standards of excellence and mindful command of their use. It entails effective communication and problem-solving abilities, as well as a commitment to overcome our native egocentrism and sociocentrism. (Criticalthinking.org)



## My Teaching Philosophy

I want my students to have lots of fun, feel safe and respected by others, desire to learn and explore science, come prepared to learn, perform at their best most of the time, help others, listen to their classmates, ask great questions and have some more fun.

What does it mean that students should come prepared to learn? Students should be aware of what is happening in class everyday. You should have your books, a pen and paper. (Colored pens - red, blue, green and black). Sometimes, ask relevant and interesting questions (even if you have to make it up). Respond to other students' inquiries and help fellow students with tough concepts. Have fun, tell jokes, laugh and be respectful and considerate of other students.

What do I consider good student behavior? A student who asks sharp questions, nearly always turns in excellent work, is polite and considerate to others, and most importantly, a good student is fun, positive, creative and has a great sense of humor. Students with these attributes are wonderful in a classroom.

So, relax, sit back, laugh a little and let learning begin. . .

## What do you do if you do not understand what is expected of you?

- ask clarifying questions in class,
- ask a friend in class or a group mate,
- see me after class, during nutrition or at lunch,
- write me an email, or text me.



## What do I expect of you?

- come to class prepared,
- ask relevant and interesting questions,
- turn in excellent work,
- have fun, learn a lot, laugh a lot.

# AP Physics Part 1 Concepts

## 1. Kinematics

- Vectors-Vector Components-Trigonometry-Scalars
- One-Dimensional Motion (graphing position, velocity, and acceleration)
- Two-Dimensional Projectile Motion

## 2. Dynamics

- Applications of Newton's 3 Laws of Motion and Forces
- FreeBody Diagrams - Normal Forces, Tension
- Friction

## 3. Universal Law of Gravitation

- Uniform Circular Motion
- Universal Law of Gravitation
- Kepler's Laws

## 4. Simple Harmonic Motion

- Restoring forces and SHO
- Simple Pendulums
- Mass-Spring Oscillators

## 5. Momentum

- Impulse and Momentum
- The Law of Conservation of Momentum
- Elastic and Inelastic Collisions

## 6. Energy

- Work
- Potential, Kinetic, Gravitational and Elastic Energy
- Conservation of Energy
- Power

## 7. Rotation

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

## 8. Electrostatics

- Electric Charge
- The Law of Conservation of Electric Charge
- Electrostatic Forces - Coulomb's Law

## 9. Circuits

- Electric Resistance
- Ohm's Law
- Kirchhoff's Laws
- Simple DC Circuits Series and Parallel

## 10. Mechanical Waves and Sound

- Traveling Waves
- Wave Characteristics
- Sound
- Superposition
- Standing Waves, Beat, Interference

## AP Physics Class Requirements

Assessment	Number of Assignments Graded	Points per Assignment	Total Points per Assignment	Percentage of Total
Class Binder	2	75	150	5.6%
Classwork / Activities	20	15	300	11.2%
Homework	22	15	330	12.4%
Lab Participation	8	30	240	9.0%
Lab Reports	7	50	350	13.1%
Outside Projects	1	150	150	5.6%
<i>all the above assignments can and will be re-done in a timely manner for 70% of the original points.</i>			<b>1520</b>	<b>56.9%</b>
Quizzes	4	150	600	22.5%
AP MidTerm	1	250	250	9.4%
AP Final	1	300	300	11.2%
<i>Quizzes and Tests can be re-done using the C-Quiz or C-Test (maximum 60% of the original points).</i>			<b>1150</b>	<b>43.1%</b>
<b>Total</b>			<b>2670</b>	<b>100.0%</b>

## AP Physics Grading Scale

A	B	C	D
100% - 90%	89.5% - 80%	79.5% - 65%	64.5% - 50%

*The grading scale may change*

## AP Physics Test Score Bump

AP Test Score	Final Student Grade in Class								
	A+	A	A-	B+	B	B-	C+	C	C-
5		A+	A+	A+	A+	A	A-	B+	B
4		A+	A+	A	A	A-	B+	B+	B
3				A-	A-	B+	B	B	B-
2					B+	B	B-	C+	C+

**Students final grades in both semesters will be bumped up with certain AP Physics test scores. There may be small changes made to this document.**

## AP Physics Score Scenario Analysis Example

	Classwork Percentage	Classwork Pts	Test Percentage	Tests Pts	Total Points	Percent	Grade
Highest Grade Possible	100%	2000	90%	1800	3800	100.0%	A+
	100%	2000	80%	1600	3600	94.7%	B+
	100%	2000	70%	1400	3400	89.5%	B+
	100%	2000	60%	1200	3200	84.2%	B+
	100%	2000	50%	1000	3000	78.9%	C+
	100%	2000	40%	800	2800	73.7%	C+
	90%	1800	90%	1800	3600	94.7%	A+
	90%	1800	80%	1600	3400	89.5%	B+
	90%	1800	70%	1400	3200	84.2%	B+
	90%	1800	60%	1200	3000	78.9%	C+
Lowest Grade Possible	90%	1800	50%	1000	2800	73.7%	C+
	90%	1800	40%	800	2600	68.4%	C-
	80%	1600	90%	1800	3400	89.5%	B+
	80%	1600	80%	1600	3200	84.2%	B+
	80%	1600	70%	1400	3000	78.9%	C+
	80%	1600	60%	1200	2800	73.7%	C
	80%	1600	50%	1000	2600	68.4%	C-
	80%	1600	40%	800	2400	63.2%	retake
	70%	1400	90%	1800	3200	84.2%	B-
	70%	1400	80%	1600	3000	78.9%	C+
	70%	1400	70%	1400	2800	73.7%	C
	70%	1400	60%	1200	2600	68.4%	C-
	70%	1400	50%	1000	2400	63.2%	retake
70%	1400	40%	800	2200	57.9%	retake	

Students can see from the above analysis that **Classwork is important**. Classwork allows the teacher to directly encourage and support student participation and completion of the daily classwork. Students will score higher on this material. Requiring no zeros on any assignment will help both the teacher and the student. *Struggling students are support greatly by the many different assessments.*

Quizzes and Tests are weighted equal to the Classwork. The student will be allowed to make-up the Quiz or Test. The makeup C-Test or C-Quiz will consist of only **basic physics questions and problems** that will determine if the student knows the basic physics concepts.

## **Course Policies**

### **Tardies**

The school has a tiered approach to tardies that will be followed in this classroom. All tardies are reported, regardless of the reason, and that a late arrival may mean a zero score on that day's quiz. Get to class on time.

### **Absences**

A calendar of daily activities is maintained on my class website. It is the absent student's responsibility to find out what was to be turned in, handed out and discussed on the days they were absent. Excessive absences will adversely affect your grade. Students should first ask their classmates for any information or assistance. Once the student knows what is to be made up then they can make arrangements with the teacher. Please do not walk in and ask what it is that you must do because you were sick the day before. You should know what it is that you missed and what you need to do to make it up. Make up work will be due two days after your absence. Previous work that was due the day of your absence will be due the day you come back.

### **Late Work**

Don't turn work in late. Late work will be accepted with a penalty (30%) unless the teacher finds the excuse legitimate. All late work will be made up in a timely manner.

### **Quiz and Test Make-ups**

Students are allowed to make-up any Quiz or Test with a C-Test or C-Quiz.

### **Tutoring**

Tutoring will be available after school. Please see the teacher to let him know that you want to come in to get some help. Please do not show up and expected to be retaught. Please be prepared with your work and where you specifically need the help.

### **Class Safety**

Please note that any unsafe conduct during any class or lab activity will be cause for an immediate two-day suspension from class and a zero on the lab assignment. In addition, a parent conference must be conducted before the student will be permitted to participate in any further lab activities. It is important for everyone to trust each other not to do any harm to one another.

### **Cheating**

If any student is caught copying another students' work or engaging in any form of cheating, both students involved will receive a zero for the assignment. Do not print up two or three copies of your work to hand out to your friends. A second offense will result in a referral to administration and possible removal from the class without credit.

### **Discipline**

A tiered discipline approach will be used in this classroom. Whenever possible, the teacher and student will work together to resolve any conflict that arises. If that is unsuccessful, parent involvement will be requested. If the problem cannot be resolved, support from school administrators will be sought. Though, I do want you to have a good time in my class. Respectful, adult like, polite behavior is expected at all times.

## Lab Reports

Your Lab Reports should be typed. Your diagrams should be done on the computer. You can write up equations as well. Everything done on the computer can be edited and saved for later use. You need to develop computer skills. Use Microsoft Word, Equation Editor, PowerPoint, Pages, Keynote, or any other program that will allow you to get this done. If you need help come and see me.

### Lab Report Requirements

**Title:** Be descriptive and creative

**Purpose:** Nail it here. Don't write what someone else wrote. You should think of the purpose after writing the conclusion. This could be a hypothesis but most of you know what we are trying to discover from the book, chapter or from me.

**Materials:** What did you use to discover what you wanted? Remember, the materials are important.

**Data Collection:** This will be different for every Lab Report. You need to show the data that you collected from your experiment in an appropriate format (table). You will use Excel Spreadsheet program (or a similar program) to produce formatted tables. Learning to use Excel is a skill you will need for college.

**Data Analysis:** This is where there should be a neat and complete diagram. Your diagram will explain what you did in this experiment. Drawing a diagram is easier and much more enlightening than a written procedure. You will also show calculations here. You need to explain what mathematical relationship you will use to discover what it is that you are looking for. Then, you will a conclusive statement. **Diagram-Reason-Solution Method.**

**Conclusion:** What did you learn from this experiment? What did your partner learn? Did you discover anything that you did not expect? What were some of the errors in the experiment? How could you reduce or eliminate these errors next time you performed the experiment. Be yourself, let loose. Don't be average!

### Grading Rubric for Lab Report

1. Your Lab Report must be done on a computer. Get away from hand-writing anything. If you need help please see me in my help session.
2. The Data Collection section should be neatly formatted, appropriate and clear. (Units and Significant figures are used correctly.)
3. The Diagram of your experiment should be neat and complete. It should show what you did in this experiment. **Visualize the problem. Draw a Diagram.** Your diagram demonstrates your understanding of the experiment. Your diagram speaks for you. Imagine that someone is analyzing your diagram. What do you think they think of your representation of this problem? Be meticulous, be complete, be clear, and be artistic. If your diagram is all of this---there should be few questions asked!
4. All important equations and calculations should be shown.
5. There should be reasoning clearly stated in the Analysis section.
6. Your conclusion should be complete, useful, and expressive.

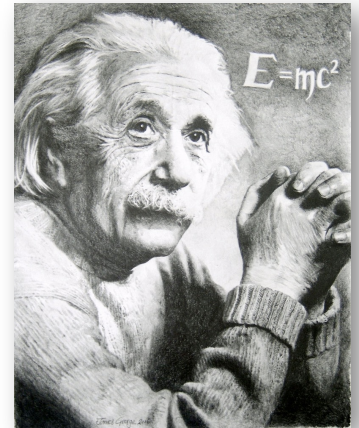
*It's easy to get all the points. Take this assignment seriously. Try to learn something from it. And show others what you learned. Be neat, organized, clear and creative.*

**AP Physics 1 and 2**  
**Paloma Valley High School**  
**2014-15**

Dear Parents

This coming school year is bringing big changes to AP Physics! The AP CollegeBoard has redesigned the AP Physics curriculum by dividing AP Physics up into **two parts**. Instead of a one-year program, it is now a two-year program. This change will allow teachers to provide a slower-paced, hands-on learning experiences and a more conceptual approach to AP Physics students.

Paloma Valley HS would like to open this class up to as many deserving students as possible. We are encouraging all our regular physics students to upgrade to AP Physics 1.



Compared to AP Physics

- Regular physics has **twice** as many concepts to cover.
- Regular physics involves the **same math skills**.
- Regular physics has **less** hands-on lab activities.
- Regular physics moves **much too fast** for most students to grasp.

To alleviate student or parent apprehension of upgrading to AP Physics 1 or 2, I will provide many different assessments to encourage both participation and success in AP Physics. I want my parents to be involved so please feel free to offer any suggestions.

All students will be encouraged and supported to pass my class. To pass the class, the student will show up to class, participate in class activities, participate in the lab activities and projects and in some way demonstrate basic knowledge of the material from either teacher-student dialogue, written tests or quizzes, or work performed in class and in labs. *Participation in class counts toward their grade*. If a student performs poorly on a quiz or test, I will offer a C-test and C-quiz or **an alternative assignment so that the student can raise their score back to a C**. Every student will be allowed to make up any work or raise a lower grade (within a specified time-frame). I will not allow a zero to occur on any assignment.

If you have any questions, I will be more than happy to talk with you on the phone, over email ([anthony.dimauro@puhsd.org](mailto:anthony.dimauro@puhsd.org)) or at school. Thank you.

Tony DiMauro  
Physics Teacher

Student signature \_\_\_\_\_

Date \_\_\_\_\_

Parent signature \_\_\_\_\_

Date \_\_\_\_\_



## AP Physics Student Binder - 2014

Student Name \_\_\_\_\_

Period \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_

Date \_\_\_\_\_

*6-week*

*12-week*

*Final Grading Period*

<b>Binder Component</b>	<b>First Grading</b>	First Grading	<b>Second Grading</b>	Second Grading	<b>Third Grading</b>	Third Grading
New Binder (1.5 in)	20					
Dividers	15					
Neatness	10		15		15	
Organization	10		15		15	
Chapter Notes Lecture or Reading	10		20		20	
Completed Chapter Worksheets	10		20		20	
Complete Corrected Chapter Homework	10		15		15	
Corrected Chapter Quizzes	5		25		25	
Corrected Tests			15		15	
One-Page Chapter Summaries	10		25		25	
<b>Extra Credit</b>						
1						
2						
<b>Total Points</b>	100		150		150	

*You can get some credit on previous gradings, if you fix things up as we go.*

*Keep this form in your Binder.*

*You will continue with this Binder into the next semester.*

*This scoring cubic can change.*

Physics is not what you may believe it is. Physics is not about equations, only. Physics is a process that every creature continually practices. Doing physics is the act of discovering patterns in nature and using these patterns in nature to extend the human experience. Becoming an expert, or a master at anything requires an adventurous, disciplined, creative, determined and resilient person. We all have many skills that may vary between, basic to expert. We are all learners as well as teachers. The best teachers are the best learners. I refuse to teach physics to my students without bringing in all the wonderful aspects of this all-inclusive discipline. This is not a class where one memorizes equations and hopefully chooses the correct multiple-choice answer in a vain hope to simply get it over with. You are always 'doing physics' every moment of your lives.

## Diagram, Reason and Solution Method

- 1) Read the Problem. Many of these problems are quite relevant. Reread the problem. This is really important. Read it slowly. Relax. There are no tricks. The strict wording of the problem is to train you to look closely at the question.
- 2) Draw a **Diagram**. Visualize the problem. Your diagram demonstrates your understanding more than you think! Can artwork sum up your mood? Do artists find patterns that resonate with your personality? Your diagram speaks for you. They are not your dirty laundry. Imagine that someone is analyzing your diagram. What do you think they think of your representation of this problem? Be meticulous, be complete, be clear, and be artistic. If your diagram is all of this---there should be few questions asked!
- 3) What is given in the problem? Start to use the clues given to you. What else do you know that is not given?
- 4) What are you solving for? Keep returning to this. You will forget.
- 5) **Reason** out your path to a solution. Explain it to yourself or a group member. What were the main concepts and guideposts that will help you discover the solution to this problem? Internalize this process! You will use it again and again. You must articulate your learning process through dialogue, diagramming and reasoning.
- 6) Find and utilize appropriate equations---manipulate them. Do not use derived equations. It's like getting a birthday cake from Von's. Someone else put these standard equations together. These standard equations are maps created by people before you. Do you always follow the map? Look at the equation for what it is and---it is not. Equations have feelings, too! Give them quality time.
- 7) Plug, Shove and find the **Solution**. This is the easy part. The calculator does the work. Monkeys can punch in numbers!
- 8) Check and reflect on your answer. How did this particular solution process relate to other solutions you have already done? How can you generalize this solution process for future problems? How does the answer compare to your prediction?

There are two goals that I would like to discuss. First, working with a group of students is both expedient and rewarding. Talk to a few people and agree to meet-up to discuss the problems. From 17 years experience, I have learned that students who form groups are the most successful students. Second, **you must practice articulating with your peers and your Instructors through open dialogue, diagramming and reasoning**. You need to practice your skills with other students. My two cats are constantly practicing their skills with each other. They want to get better at attacking and killing smaller prey. So, they chase each other. Sometimes they run into walls or slip on the floor. They are embarrassed! But, they are learning and they are learning through each other.

Problem Solving is not about how quickly one finds the solution. **Problem Solving is about the learning process---the journey**. Mountain climbers know how to scale shear walls because they have developed a process. Surfers know which waves are the right waves and how to ride different waves because of a learned process. What's the goal of either the mountain climber or the surfer? Is it to get to the top of the mountain, or the wave? I don't think so. I believe that it is learning how to get to the top. Once at the top, both the climber and the surfer are looking for new tougher challenges and more exciting adventures.

All the problems in this book are basic. The math is basic. The learning process is basic. It is NOT simple, but it is basic. Don't psych yourself out. Everyone in this class is quite capable of getting to the top. After the first four chapters, the concepts and the problem-solving process will become more evident. Hang in there. Since it is the learning process I respect, I will utilize Progressive Grading. Everyone has the ability to be successful (to get an A) in my class. I look forward to your success.

### August 2014

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

### September 2014

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

### October 2014

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

### November 2014

Su	Mo	Tu	We	Th	Fr	Sa
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

### December 2014

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

### January 2015

Su	Mo	Tu	We	Th	Fr	Sa
				1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

### February 2015

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

### March 2015

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

### April 2015

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

### May 2015

Su	Mo	Tu	We	Th	Fr	Sa
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

### June 2015

Su	Mo	Tu	We	Th	Fr	Sa
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

### July 2015

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

**Student and Parent Contract**

I want my students to feel safe in my classroom. I want them to be able to trust that I will do my best to inspire them. I want my students to have a good time in my classroom and enjoy the wonders of science and especially physics. I am always glad to talk with my students as well as the parents of my students. Students please see me if there are any problems. It's always best to talk with the teacher. Parents please do not hesitate to contact me for any reason. I do not expect many problems at all. I look forward to meeting and working with all my students.

Sincerely



Anthony DiMauro

**Student**

I have read your syllabus and the rules of your classroom and I agree to follow these rules. I understand your policies as laid out here. I will behave appropriately and show respect to everyone in the classroom.

\_\_\_\_\_  
Student Signature

\_\_\_\_\_  
Period

\_\_\_\_\_  
Date

**Parent**

I have read your syllabus and the rules of your classroom and I agree monitor my child's progress. I will personally login to Infinite Campus and monitor my child's grades during the semester. Within a few days after an exam, I will ask my child what grade they earned. If my child is experiencing difficulty, I will send a note or call the teacher. I understand that class sizes are large and by monitoring my child's grades myself, I might detect a potential problem before it becomes a failing grade.

\_\_\_\_\_  
Parent Signature

\_\_\_\_\_  
Date