

# Physics 2011-12

Paloma Valley High School

Tony DiMauro RM C104

951-672-6030 x2104

Course Website: <http://sdsu-physics.org>

email: [anthony.dimauro@puhsd.org](mailto:anthony.dimauro@puhsd.org)

*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.

# Course Concepts

Text: Physics, Holt

## First Semester

### Scientific Investigation and Experimentation

#### Kinematic Motion

Scientific Investigation and Experimentation, Scientific Theory, Principle and Law  
Powers of Ten, SI System, Units, Unit Analysis  
1-Dimensional Motion, Distance, Displacement, Speed, Velocity, Average Velocity, Acceleration  
Free Fall, Graphical Analysis  
Vectors, Trigonometry  
2-Dimensional Motion (Projectile Motion), Maximum Height, Maximum Range

#### Special Relativity

The Michelson-Morley Experiment, Einstein's Postulates, Time Dilation, Length Contraction,  
4-Dimensional SpaceTime, Velocity Transformations, General Relativity

#### Dynamics, Conservation of Energy and Momentum

Newton's Laws, Forces, Mass, FreeBody Diagrams, Friction  
Uniform Circular Motion, Gravitation, Kepler's Laws  
Work and Energy, Kinetic and Potential Energy, Conservation of Energy  
Linear Momentum, Elastic and Inelastic Collisions

#### Heat and Thermodynamics

Temperature, Heat, Heat Transfer, Thermodynamics, Heat Engines, Entropy

## Second Semester

#### Waves

Wavelength, Frequency, Speed, Transverse Waves, Longitudinal Waves, Standing Waves  
Energy in Waves, Reflection, Sound Waves, Beats, Doppler Effect

#### Optics

Wave Nature of Light, Reflection, Refraction, Ray Tracing, Diffraction,  
Magnifying Glass, Eye, Telescopes, Microscopes

#### Electric and Magnetic Phenomena

ElectroMagnetic Waves, Electric Charge, Insulators and Conductors, Electric Field, Capacitors  
Coulomb's Law, Electric Potential, Field Lines,  
Electric Circuits (DC), Electric Currents, Resistance, Voltage, Batteries, Ohm's Law  
Magnetism, Magnetic Fields and Currents, Mass Spectrometer, Electric Motors  
Faraday's Law, AC Circuits, Electric Generators, Transformers.

#### Quantum Mechanics

UltraViolet Catastrophe, Quanta, PhotoElectric Effect, Photons, Line Spectra  
Quantum Implications, Uncertainty Principle, Entanglement

#### Nuclear Physics

Radioactivity, Alpha, Beta and Gamma Decay, Half-life

## Class Requirements

Assessments	Total Number of Assignments	Required Number of Assignments	Points per assignment	Minimum Points each student needs
Notebook	3	3	100	300
Homework Assignments	16	12	25	300
Unit Packets (Classwork)	3	3	100	300
Lab Reports	12	10	50	500
Quizzes (Chapter Surveys)	9	8	150	1200
Unit Tests	2	2	250	500
Final Exam	1	1	400	400
<b>Total Points</b>				<b>3500</b>

**Students are allowed to miss 4 HW assignments, 2 Lab Reports and 1 Quiz.** Students are encouraged to use the missed assignments time to get other work done. The **Physics Notebook** is graded each grading period. Though, I will add back half the points missed on the Physics Notebook if you make up for lost work in the next grading period. For example; If you score 60/100 on your Physics Notebook in grading period 1, you can earn back 20 more points in the next grading period. I will also award more points than the max on every Assessment if students go above and beyond what is expected of them.

## Grade Determination

**A = 90-100%      B = 80-89.5%      C = 70-79.5%      D = 60-69.5%      F < 60%**

### Grading Rubric for Notebook

#### 3 Chapters at each Grading Period (100 points each period)

- 3 sets of Chapter Notes (3-4 pages) (60 pts)
  - Problem examples from the Chapter.
  - Defined Vocabulary and Scientific terms
  - Useful Diagrams to explain concepts
  - Indicated Physics Standards
- 3 One-Page Summaries: a creative, diagrammatic summary of each chapter. (30 pts)
- Homework and All Classwork Packets.
- Lab Reports
- Chapter Quiz
- Complete, Neat and Organized (10 pts)

Keep your Notebook up to date. Don't try to do it at the last minute. Use diagrams whenever possible. Linear notes are NOT the way our brains learn new materials. We learn in a non-linear random pattern. Get Organized and Be Neat.

## 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 unless the teacher finds the excuse legitimate. Each day the work is late, there will be a 25% deduction from the assignment total.

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

Quiz and Test Make-ups can be made with the teacher on an individual basis. Every student must take the End of Level Exam, which the School Board requires to be worth 10-25% of his or her grade.

### **Tutoring**

Tutoring will be available anytime 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 expect 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 student's 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, adultlike, polite behavior is expected at all times.

**Paloma Valley High School  
Honors Physics Schedule 2011  
Tony DiMauro**

Week	Chapter	Days of Instr	Topic	Lab/Activity
1 - (Aug 10-12)	1	8	<b>Introduction</b> , Powers of Ten, Units, Sci Notation, Sig Figs, Precision and Accuracy, Conversions	
2 - (Aug 15-23)				<a href="#">Measurement Lab</a>
3 - (Aug 24-26)	2	10	<b>Kinematics in 1-D</b> Displacement, Velocity, Acceleration, Freefall	Pitcher Madness
4 - (Aug 29-Sept 2)				Finding your Gravity Spot
5 - (Sept 5-9)	3	9	<b>Kinematics in 2-D</b> Vectors, Adding Vectors, Projectile Motion, Relative Motion.	Projectile Motion
6 - (Sept 12-16)				
7 - (Sept 19-27)		7	<b>Special Relativity</b>	
8 - (Sept 28-30)	4	10	<b>Forces</b> Newton's 3 Laws of Motion	Forces on an Incline Plane
9 - (Oct 3-11)				<a href="#">Make a Paper Jet Engine</a>
10 - (Oct 10-14)	5	9	<b>Work and Energy</b>	
11 - (Oct 17-25)				
12 - (Oct 26-28)	6	8	<b>Momentum</b>	
13 - (Oct 31-Nov 7)				
14 - (Nov 8-11)	7	8	<b>Circular Motion and Universal Gravitation</b>	
15 - (Nov 14-18)				
16 - (Nov 28-Dec 3)	9-10	14	<b>Heat and Thermodynamics</b>	
17 - (Dec 5-9)				
18 - (Dec 12-15)				

**Paloma Valley High School  
Honors Physics Schedule 2011  
Tony DiMauro**

Week	Chapter	Days of Instr	Topic	Homework Assignments
1 - (Aug 10-12)	1	8	<b>Introduction</b> , Powers of Ten, Units, Sci Notation, Sig Figs, Precision and Accuracy, Conversions	You are responsible for all problems.
2 - (Aug 15-19)				Turn in any 10 problems
3 - (Aug 22-26)	2	10	<b>Kinematics in 1-D</b> Displacement, Velocity, Acceleration, Freefall	You are responsible for all problems.
4 - (Aug 29-Sept 2)				Turn in any 20 problems
5 - (Sept 5-9)	3	9	<b>Kinematics in 2-D</b> Vectors, Adding Vectors, Projectile Motion, Relative Motion.	
6 - (Sept 12-16)				
7 - (Sept 19-23)		5	<b>Special Relativity</b>	
8 - (Sept 26-30)	4	10	<b>Forces</b> Newton's 3 Laws of Motion	
9 - (Oct 3-7)				
10 - (Oct 10-14)	5	9	<b>Work and Energy</b>	
11 - (Oct 17-21)				
12 - (Oct 24-28)	6	10	<b>Momentum</b>	
13 - (Oct 31-Nov 4)				
14 - (Nov 7-11)	7	9	<b>Circular Motion and Universal Gravitation</b>	
15 - (Nov 14-18)				
16 - (Nov 28-Dec 3)	9-10	14	<b>Heat and Thermodynamics</b>	
17 - (Dec 5-9)				
18 - (Dec 12-15)				

## 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 (50 points)

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. (up to 15 point deduction).
2. The Data Collection section should be neatly formatted, appropriate and clear. (Units and Significant figures are used correctly.) (10 points)
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! (10 points)
4. All important equations and calculations should be shown. (5 points)
5. There should be reasoning clearly stated in the Analysis section. (5 points)
6. Your conclusion should be complete, useful, and expressive. (5 points)

*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.*

Physics Notebook  
Period \_\_\_\_\_

Name \_\_\_\_\_  
Date \_\_\_\_\_

**Physics Notebooks Grading Criteria** (1.5 inch 3-ring binder with cover pocket)

- This notebook has to stay in excellent shape through out the semester.
- All required work must be in this binder upon grading
- Notebook may stay at home most of the time.

Criteria	Possible Points	Points
<b>Chapter Notes</b>		
Examples of Problems	15	
Vocabulary-Sci Terms	15	
Physics Diagrams	15	
Physics Standards	15	
One-Page Summary	30	
Q's and P's (redone)		
<b>Organization</b>		
Dividers	2	
Physics Standards	2	
Labs, Quizzes, HW, CW	2	
<b>Neatness</b>		
Binder	2	
Front Cover	2	
<b>Total Points</b>	<b>100</b>	

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.

# Article Report Form

Name \_\_\_\_\_

Class \_\_\_\_\_ Period \_\_\_\_\_

Name of Article \_\_\_\_\_

Author(s) \_\_\_\_\_

Source \_\_\_\_\_

Article Summary (Abstract - what is the article about?)

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Physics Concepts (be specific)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

Standards Connection to the Article Concepts

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

What did you like about the article?

Physics Chapter \_\_\_\_ Problem \_\_\_\_

Name \_\_\_\_\_

*Write the problem here.*

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***Please be clear, concise and complete. Use the DRS method***  
*Use scrap paper first, then use this sheet.*

*You should avoid writing in paragraphs. Write your reasoning next to what you are trying to explain. Diagrams should be complete, sharp and large. Solutions should start from first principles.*

***Diagram*** \_\_\_\_ ***Reasoning*** \_\_\_\_ ***Solution*** \_\_\_\_

### August 2011

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 2011

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 2011

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 2011

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 2011

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 2012

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 2012

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			

### March 2012

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 2012

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 2012

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 2012

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 2012

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