

PACIFIC AMERICAN SCHOOL  
**HS Physics 2021~2022**

Mon and Thurs 9:30~10:55, Wed 10:30~11:15. Room S203.

Ms. Liu

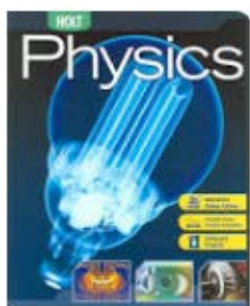
## Course Description

Welcome to the wonderful world of physics! HS Physics is an introductory survey course with a lot of breadth. Topics include mechanics, fluid mechanics, thermal physics, electromagnetism, waves and optics, and atomic and nuclear physics. While concepts are emphasized, students will also be expected to apply math to solve problems and will prepare formal lab reports. Students who earn an A or above in this course satisfy the prerequisite for and are encouraged to take AP Physics.

## Objectives

The learning objectives for this course are based on the Next Generation Science Standards, Science Content Standards for California Public Schools, and the College Board AP Course Description.

- First-year physics provides a solid foundation for prospective scientists and engineers.
- Math is the language of physics.
- Students will develop creativity and reasoning skills in order to interpret physical concepts, apply scientific methods to conduct experiments and obtain reasonable conclusions, and use mathematical modeling to analyze phenomena.
- Practice makes perfect! Learn from mistakes.
- Always wonder “why?” and try to find the answer. Could you derive the formulas? What could you apply them for?
- Enjoy physics!



## Primary Textbook and Required Materials

1. Serway, Raymond A. and Jerry S. Faughn. *Holt Physics*. Holt, Rinehart and Winston, 2006. ISBN: 0-03-073548-6
2. Notebook for classwork, loose-leaf paper for homework
3. Lab folder

## References

1. Anton Hewitt, Lyons, Suchocki, and Yeh. *Conceptual Integrated Science Explorations*. Pearson Education, 2010.
2. Giancoli, Douglas C. *Physics: Principles with Applications*. 7<sup>th</sup> Edition. Pearson Education, 2014
3. Young, Hugh D., Roger A. Freedman, and A. Lewis Ford. *Sears and Zemansky's University Physics with Modern Physics*. 12<sup>th</sup> Edition. Pearson Education, 2008.

## Classroom Behavior Expectations

Failure to comply with the policies may result in parent conferences and/or Administrative referral. Please refer to the Student Handbook for existing guidelines.

1. Be prepared at the bell. Stationary, books, and homework should be out and ready.
2. Remain in your assigned seat and stay on task. Do not sleep in class or speak out of turn.
3. No electronics or another course's material during class.
4. Raise your hand before speaking and speak English. Respectfully listen while others are speaking. Be courteous to classmates, faculty and staff at all times.
5. Restrooms are to be used before and after class. If a student needs to leave class, he/she must have a hall pass. Stay in the classroom during breaks.
6. Students are not allowed in lab rooms when teachers are not present.
7. Keep your work area neat and tidy. Pack up your books and stationery, remove eraser crumbs from the tabletops, and push your chair in before leaving your desk. Do not write on the tables.
8. Walk, do not run, in the lab area. Follow directions and ask permission before using classroom equipment.
9. Clean up your lab station before leaving.
10. I am happy to help answer questions outside of class, but please gather your questions in a list beforehand and make an appointment. Also, it's best not to ask teachers during their lunch break.
11. Please keep track of pencils/pens/erasers, and use your own. There is a lost and found box.

## Course Requirements

1. Students should at least be concurrently taking Precalculus. Algebra and trigonometry are often used.
2. Before starting an experiment, complete a pre-lab including your question, hypothesis, derivations, procedure, and chart setup for data collection.
3. Students are expected to take notes during class, review notes at home, and read the textbook.
4. Keep an agenda book recording assignment due dates, listed on the board and class website.
5. In case of absence, students are responsible for checking the class website for announcements and new assignments, as well as reviewing a classmate's lecture notes. Missing work must be turned in within one week of the student's return.
6. An unexcused absence on a test day will result in a loss of 7 points in the make-up test. To be excused from the late test penalty, a note from the doctor or parent/guardian explaining a valid reason for absence is required on the day of return.
7. Homework should be turned in on time, by the start of class. Late work will have points deducted.
8. Academic honesty is expected of all students. Homework must be completed independently.
9. Doing well on the tests does not guarantee an A+. The highest grade is only awarded if the student not only shows understanding but also is respectful, participates during lessons, and completes homework responsibly.

## Grading (Category weights are subject to change.)

### **Homework 30%**

- Due at the start of class. Late work has points deducted.
- Completeness and neatness are graded, not just the correct answer. When asked to "explain" or "describe", please do not give one-word answers. Explain concepts clearly, showing formulas or diagrams when necessary. All questions must be attempted.
- Include SI units.
- For each assignment: Turn in homework on loose-leaf paper, stapled and labeled with the homework number, chapter/section number, and page number at the top of the first sheet.
- Integrity and honesty are mandatory! Only honest effort will help you gain the understanding, speed, and accuracy needed for projects and tests. The purpose of

homework is to practice and identify questions for discussion and clarification. To make sure students are doing homework honestly, similar questions that appear on the test will affect the homework grade.

**Labs 15%**

- Please do not cross out or white out any work in your lab notebook. Show all attempts and raw data. The lab report should follow the format shown below.
- When working on teams, it is expected that all students participate and contribute fairly to the project. You may discuss ideas with others, but you must not email/copy/paste any work from other students! If you collect data together, keep your own record of data and make the charts yourself. Integrity and honesty are mandatory.

**Tests 35%**

- Unit tests cover approximately 2 chapters.
- Take good notes and review at home. The best way to prepare for tests is to pay attention in class, review class examples before attempting homework, complete homework honestly by applying the techniques from the examples (like a closed-book mini self-quiz), ask questions/go back and review the patchy areas, and review once more before test day.
- We will be testing in another room, one student per table. I will show you your seat.
- Only a pencil, pen, eraser/white-out, bare calculator without the shell/cover, and your test paper are allowed on your table. No clutter, no pencil boxes, no folders, etc.
- Cell phones must be put away. They may not be used as calculators. If I find a phone, you will automatically be deducted 10 points, especially if hidden in your pocket, sleeve, or pencil box. If you need to use the restroom during the test, put your phone at the front table before leaving the room.
- Projects may count as 1 test grade.

**Class Participation 20%**

- Notes, worksheets, and class practice will be checked for completion.
- This score will be affected by noncompliance with classroom behavior expectations, such as arriving to class late or unprepared, sleeping during or disrupting the lesson.

**Bonus Points**– available on homework and exams

**Honors**–Students with strong performance in Quarter 1 will be selected to earn “Honors” credit for HS Physics. Honors students are required to complete extra, more challenging questions in homework and on tests.

## Lab Report Format

1. Include the date, your name, and the names of your lab partners.
2. Title
3. Objective/Question – What is the goal of this lab? This should be clear and concise.
4. Hypothesis – Make an educated guess to answer your question. Include background information and derivations with cited references.
5. Independent, Dependent, and Controlled Variables –
  - a. Independent variables are manipulated, input conditions that affect the outcome of your experiment.
  - b. Dependent variables are responding, output conditions that you measure.
  - c. Controlled variables are other factors that could affect your measurements. You need to control them so that your data is not biased.
6. Procedure – Provide step-by-step instructions on how you conducted your experiment so that others can replicate your results. Please summarize the steps in your own words. Labeled diagrams and pictures should be included. Throughout the year, you should develop skills on how to design an experiment and to use the proper tools and methods for measurements.
7. Data – Measurements should be recorded neatly in tables, charts, and graphs. Be sure to have more than one trial, indicate SI units, and use significant figures appropriately.
8. Analysis – This is a very important part of the lab report.
  - Explain your observations using scientific principles. If calculations are included, clearly show what formulas you are using and cite references if necessary. Do your results support your hypothesis? Why or why not?
  - Were there any errors? Distinguish between blunders and experimental errors. How could you improve your procedure to prevent them or to improve precision next time?
9. Conclusion – Briefly summarize the lab's goal and how your results support or contradict your hypothesis. How could your results benefit society? What further research could be done on the topic?

## Course Outline

### Quarter 1

#### Unit 1: Kinematics (5 weeks)

##### Chapter 1: The Science of Physics

Chapter 2: Motion in One Dimension

Chapter 3: 2D Motion and Vectors

Unit 2: Force (2 weeks)

Chapter 4: Forces and the Laws of Motion

## Quarter 2

Unit 3: Work, Energy, Momentum (3.5 weeks)

Chapter 5: Work and Energy

Chapter 6: Momentum and Collisions

Unit 4: Applications of Mechanics (2.5 weeks)

Chapter 7: Circular Motion and Gravitation

Unit 5 (3 weeks)

Chapter 11: Vibrations and Waves

Chapter 12: Sound

## Quarter 3

Unit 6 (4 weeks)

Chapter 8: Fluid Mechanics

Chapter 9: Heat

Chapter 10: Thermodynamics

Unit 7: Electricity (5 weeks)

Chapter 16: Electric Forces and Fields

Chapter 17: Electrical Energy and Current

Chapter 18: Circuits and Circuit Elements

## Quarter 4

Unit 8: Magnetism (3 weeks)

Chapter 19: Magnetism

Chapter 20: Electromagnetic Induction

Unit 9: Light (4 weeks)

Chapter 13: Light and Reflection

Chapter 14: Refraction

Chapter 15: Interference and Diffraction

Unit 10 (2 weeks)

Chapter 21: Atomic Physics

Chapter 22: Subatomic Physics