# TPHS Course Profile

# Physics P

**Recommended for 11th -12th grade (10 Credits)**

- ***Meets high school graduation requirement for physical science***
- ***Meets the UC/CSU subject area Lab Science requirement***

## General Information

### Description

The Torrey Pines Physics P course surveys the fundamental concepts of physics including kinematics (velocity and acceleration), forces, momentum, circular motion, energy, thermodynamics, electricity and magnetism, waves, sound and optics, relativity and nuclear physics. Emphasis is placed on problem solving skills and the analysis of results. Students will explore these topics through discussions, laboratory investigations, teacher demonstrations, and assignments.

### Expectations and Goals

This course will focus on building multi-level problem solving skills, the integration of mathematics as a tool for learning and predicting, and analysis of data as applied to the physical world.

A student entering Physics P should:

- Be able to perform basic algebraic and trigonometric calculations.
- Be able to graph functions and interpret graphs
- Be able to translate prose into diagrams and mathematical equations (e.g. story problems).

Examples of the type of problem encountered in the class include:

Determine the acceleration of an object that travels a distance of 400. meters in 12 seconds when starting at rest. (The equation used to solve this problem is $x = v_o t + \frac{1}{2}at^2$ )

Using the Universal Law of Gravitation ($F_g = G\left[\frac{m_1 m_2}{r^2}\right]$ where $G = 6.67 \times 10^{-11}\ Nm^2/kg^2$ ), determine the strength of the gravitational force between two objects placed 42 meters apart, one with a mass of 110 kg and the other with a mass of 214 kg.

What would happen to the strength of the force if the distance between the two objects is doubled?

Physics P has a significant laboratory component. The goal of this component is to allow students to relate everyday activities and phenomena to the science and mathematics behind those activities and phenomena. The laboratory component of the course is geared towards increasing the student's abilities to

- Critically observe and record data.
- Analyze and interpret data, including construction of appropriate graphs.
- Apply mathematical skills to data collected and look for relationships.
- Apply concepts learned through experimentation.
- Derive conclusions

Students entering Physics P are expected to do the following things:

- Complete homework, unfinished classwork problems, lab reports, and study for exams and quizzes
- Attend class every day for activities, labs, and instruction.
- Bring all necessary materials to class.
- Handle the rigor of learning new concepts every day and being able to apply them in novel situations throughout the year.

### Estimated Homework

Homework will include regular assignments, laboratory reports and two research papers (one each semester) pertaining to the topics under study. Time required for completion of homework will vary depending on the skills a student brings to the classroom. A student who has difficulty with algebraic skills can succeed in this class but will require more study time.

### This Class Is Best For…

Students interested in furthering their interest in the physical sciences who have completed biology and have completed or are concurrently enrolled in Algebra II or Integrated Math III.

## Course Materials

### Required Materials

- Text: Physics A World View, 6th edition and Problem Solving for Physics A World View, 6th edition by Kirkpatrick and Francis
- All worksheets and laboratory exercises are posted on Blackboard. Students are expected to bring copies of the materials to class.
- Students will need a basic scientific calculator for the class.

## Additional Information and Resources

- There are several helpful websites that offer tutorials and practice. One of the most beneficial to the class is http://www.physicsclassroom.com