Physics 2

SCIH036059

Credits: 0.5 units / 5 hours | NCAA Approved

Course Description

In this second semester Physics course students will continue their exploration of the world around them through an investigation into sound and light vibrations and waves, color, reflection and refraction, lenses, electrostatics, electric currents, magnetism, electromagnetism, and finally quantum theory and atomic and nuclear physics. This course includes both hands-on and virtual lab activities and projects. A graphing calculator is required.

PREREQUISITES: Students should have completed two years of Algebra prior to enrolling in this course.

Graded Assessments

5 Unit Evaluations; 3 Projects; 3 Proctored Progress Tests; 5 Teacher Connect Activities

Course Objectives

When you have completed the materials in this course, you should be able to:

1. Describe the structure of waves and show how wavelength, frequency and speed are related.
2. Use waves to explain how we experience sound, light and color.
3. Recognize reflection, refraction, diffraction, and interference as behaviors of waves.
4. Use ray diagrams to predict images formed from both convex and concave lenses.
5. Recognize the dual nature of light as both particle and wave.
6. Explain that the fundamental principal underlying all of electricity is that opposite charges attract while like charges repel.
7. Explain the relationships between voltage, current, resistance, and power.
8. Recognize the components of a circuit and distinguish between parallel and series circuits.
9. Explain how magnetism is related to electricity
10. Distinguish between motors and generators and explain how they are similar
11. Understand the significance of transformers in power distribution.
12. Describe the quantum model of the atom.
13. Explain radioactive decay and recognize its applications, such as medicine and radioactive dating.
14. Distinguish between fission and fusion and explain the pros and cons of each.

Course Outline

Unit 1: Waves, Sound, and Light

Teacher Connect Activity 1

- Lesson 1: Vibration and Waves
- Lesson 2: Sound
- Lesson 3: Fundamentals of Light

Unit 1 Evaluation

Unit 2: Mirrors and Lenses

- Lesson 4: Reflections and Mirrors
- Lesson 5: Refraction and Lenses
- Lesson 6: Interference and Diffraction

Unit 2 Evaluation
Teacher Connect Activity 2
Project 1
Progress Test 1

Unit 3: Electricity and Current

- Lesson 7: Static Electricity
- Lesson 8: Electric Fields
- Lesson 9: Electric Current
- Lesson 10: Series and Parallel Circuits

Unit 3 Evaluation
Teacher Connect Activity 3

Unit 4: Magnetism

- Lesson 11: Magnetic Fields
- Lesson 12: Electromagnetic Induction
- Lesson 13: Electromagnetism

Unit 4 Evaluation
Teacher Connect Activity 4
Project 2
Progress Test 2

Unit 5: Subatomic Physics

- Lesson 14: Quantum Theory
- Lesson 15: The Atom
- Lesson 16: Solid-State Electronics
- Lesson 17: Nuclear and Particle Physics

Unit 5 Evaluation
Teacher Connect Activity 5
Project 3
Progress Test 3

Required Textbook and Materials

(available through Follett virtual bookstore at http://highschool.nebraska.bkstr.com)

Textbook: Textbook: *Glencoe Physics*: *Principles & Problems.* McGraw-Hill Education. 2017. ISBN: 9780076774760

Calculator: TI-83, TI 84 Plus or similar graphing calculator

Physics 2 SCIH036059 (Print Course) is the print version of the online course content and is **optional** for this course.

Lab materials purchased by the student/parent–list is provided in the course.

The Laboratory Activities and Projects in this course require special materials that can be found your local hardware store. All of these materials will need to be *provided by you, the student.* Before doing an activity, gather all the items you will need for that and put them on a clear work space. Doing the lab activities will be more enjoyable if you have the materials ready and available to use as you need them. The lab and project instructions are found within the lessons in your course.

Project 1: EM Radiation and the Speed of Light

- Laser
- Clear Jello (gelatin) packet
- Protractor
- Ruler
- Pencil
- Graph paper

Project 2: Simple Harmonic Motion

- Mass (Various materials can be used. You can use small household items such as metal washers, a small bag of sand, a rock, a 9-V battery, or any other small item that has a significant mass for its size and can be attached to the end of the string.)
- String (lightweight, strong—like dental floss)
- Protractor
- Scale or balance
- Timer / Stopwatch / Watch with a second hand
- Meter stick (or equivalent)

Project 3: Combination of four Lab Activities from Lessons 11, 13, 15, and 17

- two bar magnets
- sheet of paper
- compass
- 1.5 V alkaline C or D battery
- small nail or drywall screw
- one neodymium disc magnet (found in plastic toys)
- copper wire approximately 6 in. in length
- safety glasses
- two mirrors
- flashlight
- calculator