# Physics 1

SCIH035059

Credits: 0.5 units / 5 hours | NCAA Approved

## Course Description

Physics 1 represents a continuing effort to solve problems and interpret experience in a logical way. This first semester course encourages students to observe and relate physics principles to the world around them and investigate various physical phenomena related to forces, vectors, Newton's laws of motion, acceleration, velocity, resistance, and projectile motion. They will also learn about gravitational fields, satellite motion, special relativity, momentum, and inertia. Students will explore the world they live in through the properties of matter: elements, solids, liquids, and gases. This course includes both hands-on and virtual lab activities and projects. A graphing calculator is required.
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**PREREQUISITES:** Students should have completed two years of Algebra prior to enrolling in this course.

## Graded Assessments

6 Unit Evaluations; 3 Projects; 3 Proctored Progress Tests; 6 Teacher Connect Activities

## Course Objectives

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

1. Understand the nature of science, and how physics fits into the broad scheme of the physical sciences.
2. Understand linear motion in terms of equilibrium and forces.
3. Differentiate projectile motion from linear or circular motion.
4. Use Newton’s laws to explain the behavior of objects in motion and predict their future behavior.
5. Understand the relationship between speed and momentum.
6. distinguish mechanical energy from potential energy.
7. Relate the concepts of energy, work, and power.
8. Explain how circular motion is both similar to and different from linear motion.
9. Understand the concepts of torque and angular momentum.
10. Use Newton’s Law of Universal Gravitation to determine the force of attraction between any two objects.

11. Explain the motion of satellites, the moon, and the planets using Kepler's Laws and Newton's Law of Universal Gravitation.
12. Recognize the theories of special and general relativity and state the significant consequences of each.
13. Understand the atomic nature of matter.
14. Understand the differences between solids, liquids, and gases in terms of atomic structure and arrangement.
15. Explain the behavior of fluids, including pressure and buoyancy.

## Course Outline

**Unit 1: Introduction to Physics and Motion**

Teacher Connect Activity 1

Lesson 1: Introduction to Physics

Lesson 2: Representing Motion

Lesson 3: Accelerated Motion

Unit 1 Evaluation

**Unit 2: Force and Displacement**

Lesson 4: Forces in One Dimension

Lesson 5: Displacement and Force in Two Dimensions

Unit 2 Evaluation

Teacher Connect Activity 2

Project 1

Progress Test 1

**Unit 3: Concepts in Motion and Gravitation**

Lesson 6: Motion in Two Dimensions

Lesson 7: Gravitation

Unit 3 Evaluation

Teacher Connect Activity 3

**Unit 4: Rotational Motion and Changes in Motion**

Lesson 8: Rotational Motion

Lesson 9: Momentum and Its Conservation

Unit 4 Evaluation

Teacher Connect Activity 4

Project 2

Progress Test 2

**Unit 5: Work, Energy, and Machines**

Lesson 10: Work, Energy, and Machines

Lesson 11: Energy and Its Conservation

Unit 5 Evaluation

Teacher Connect Activity 5

**Unit 6: Thermal Energy**

Lesson 12: Thermal Energy

Lesson 13: States of Matter

Unit 6 Evaluation

Teacher Connect Activity 6

Project 3

Progress Test 3

## Required Textbook and Materials

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

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

Calculator: TI-83, TI 84 Plus or similar graphing calculator
Physics 1 SCIH 035 059 is the print version of the online course content. This printed course content is **optional** for this course.

There is no LAB kit for this 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 of your course.

| **Project 3: Projectile Motion with Stomp Rockets** | |
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| 1/2" PVC pipe (5 pieces around 18" or ½ meter each)<br>1/2" PVC 4 way connector<br>1/2" PVC t-joint<br>1/2" PVC 45 degree elbow<br>1/2" PVC 90 degree elbow (Qty. 2) | 2-L soda bottles (empty)<br>cardstock or plastic for fins<br>paper<br>cellophane tape<br>weight of at least 2 pounds<br>water |