

## Introduction

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### Lab Options

This course includes the option of hands-on or dry lab activities.

- Dry labs have no required materials.
- Hands-on labs require the materials listed below.

### Lab Manual

- Each lab contains complete instructions – there is no lab manual for this course. It is strongly recommended that students keep a detailed notebook of their work.

### Disclaimer

Apex Learning® has no liability whatsoever regarding any hands-on laboratory activities. The personnel at the school at which the student conducts the hands-on lab activities, or the student's parent or guardian if the lab activities are completed at home, are responsible for all such hands-on lab activities, including ensuring that qualified personnel are available to supervise the activities.

### Questions

Contact Apex Learning Support by phone at 1-800-453-1454 or by email at [support@apexlearning.com](mailto:support@apexlearning.com).

## Hands-On Lab Materials

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### Measuring and Estimating

Semester 1: 1.4.3

- Meter stick
- Aluminum foil
- Micrometer
- Scissors
- Triple beam balance or electronic scale
- Graduated cylinder
- Water
- Scientific calculator

## Conservation of Energy

### Semester 1: 2.4.3

- Balance
- Ring stand
- Meter stick
- Dynamics cart
- Dynamics track
- Photogate sail
- Computer-based photogate timer
- Calculator
- Ring clamp
- Varied masses, ~0.25-1 kg

### Materials for Exploring Further

- Computer with graphing capability
- Scientific graphing calculator

## Kinematics

### Semester 1: 3.3.3

- Ring stand
- Meter stick/metric ruler
- Marble
- Dynamics track or PVC pipe
- Protractor
- Stopwatch
- Calculator
- Computer with graphing software

### Materials for Exploring Further

- Ticker timer and ticker tape
- Graph paper and scotch tape
- Projectile apparatus
- Carbon paper
- White craft paper

## Force of Friction

Semester 1: 4.3.3

- Dynamics track
- Spring scale
- Friction block
- Nylon thread or string
- Smart pulley pulley connected to motion detector
- Table clamp
- Slotted hanging masses
- Force sensor
- Computer with graphing software

Materials for Exploring Further

- Ballistic cart

## Simple Harmonic Motion

Semester 1: 5.4.3

- String
- Scissors
- Slotted hanging masses
- Ring stand
- Ring 4 inch
- Pendulum support
- Spring or Slinky
- Ring clamp 90-degree rod clamps
- Meter stick
- Stopwatch
- Graph paper
- Presentation software

Materials for Exploring Further

- Balance
- Ballistic pendulum
- Collision apparatus

## Thermodynamics

### Semester 2: 2.3.3

- Water source with both hot and cold water, or cold water and a hot plate, or cold water and ring stand/ring stand screen and burner
- Calorimeter
- 2 500 mL beakers
- 2 temperature data acquisition probes
- 2 Celsius thermometers
- Computer
- 500 g metal mass or aluminum bar
- Balance
- Ring clamp
- Tweezers

### Materials for Exploring Further

- Computer with word-processing, spreadsheet, and scientific database functionality available

## Circuit Building

### Semester 2: 3.4.3

- Copper wire and alligator clips or insulated wires with clips already attached
- Electrical tape
- 20 V battery
- Battery eliminator/DC power source
- Resistors a variety, including 4, 5, 10, 12, 20, 25, 40, 50, 60, 75, 80, 100, 150  $\Omega$
- Insulated tweezers
- Multimeter that can measure current, voltage, and resistance
- Knife blade switch
- 3 mini lamps bulbs of equal wattage, and 3 sockets for the bulbs

### Materials for Exploring Further

- Simple plug-in night-light
- Electrostatics kit plastic rod and electroscope
- Small piece of wool
- Horseshoe magnet
- Cathode ray tube
- Bar magnet
- Container of iron filings
- White craft paper
- Magnetic compass

## Optics

### Semester 2: 4.4.3

- Optics bench
- Optics kit, including a lens/mirror mount
- Convex lens of known focal length
- Concave mirror of known focal length
- Light source/candle
- Screen
- Meter stick/metric ruler
- Two polarized films
- Prism
- Laser pointer
- Protractor
- Graph paper
- Electromagnetic spectrum chart
- Plane mirror

### Materials for Exploring Further

- Ripple tank, with sheet of plastic or glass that fits on part of the bottom of the tank, and objects that can be used as boundaries to obstruct the pathway of waves
- Wave-motion rope
- Tuning-fork kit
- Stroboscope
- Resonance-tube kit

## Nuclear Physics

### Semester 2: 5.4.3

- Small plastic or cardboard box with lid
- 200 pennies
- Computer with graphing software
- 50 thumbtacks with flat, domed heads

### Materials for Exploring Further

- Kit of radioactive rocks
- Geiger counter radiation monitor
- Gas discharge tubes with power supply H, He, Ne, Ar
- Handheld visual spectroscope
- Periodic table