

## Introduction

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### Lab Options

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

- Dry labs require no additional materials.
- Hands-on labs require the materials listed below. Apex Learning has partnered with a third-party vendor to create a custom laboratory kit that contains all the materials needed for this course. The kit may be purchased via Apex Learning or directly from the vendor's website at <http://www.qualitysciencelabs.com/apex-learning-science-kits/>. Once there, select the "[Apex High School Chemistry Kit](#)."

### 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.

### Hazardous Materials

Proper lab safety equipment should be worn at all times. Additionally, some of the materials contained in these labs may be dangerous if misused. Refer to the Material Safety Data Sheets (MSDS) for all materials before completing the labs. These lists may be obtained through the chemical supplier or online at the Physical and Theoretical Chemistry Laboratory, Oxford University: Chemical and Other Safety Information <http://msds.chem.ox.ac.uk/>.

Additional precautions are contained in the instruction materials for particular laboratory activities. The lab supervisor must be familiar with the MSDS and with the precautions detailed in the course. Students must take care to verify that they are working with the correct chemicals before conducting any experiments.

### 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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### Observing and Inferring

Semester 1: 1.3

- 0.1M HCl (an acid)
- 0.1M KOH (a base)
- Bromothymol blue (BTB)
- Goggles

- Ruler with mm markings
- Paper towels

Extension materials: Same as lab.

## Mass, Volume, and Density

Semester 1: 2.4

- 50 mL graduated cylinder
- 150 mL beaker
- Polyethylene (*PE*) rod
- Aluminum bar, rectangular
- Ruler
- Goggles
- Digital scale
- Steel (iron) bolt
- Tape measure
- Sodium chloride (table salt)
- Stirring utensil
- Water

Extension materials:

- 30 mL plastic beaker
- 150 mL plastic beaker
- Clear plastic bottle with cap, 2 oz
- Digital scale
- Graduated cylinder, 50 mL
- Gray rods, 2
- Red beads, 2
- Rubbing alcohol 91% or greater (isopropyl alcohol)
- Table salt (NaCl)
- Water (warm)

## Periodic Properties

Semester 1:3.4

- Slide of elements:
  - Carbon
  - Germanium
  - Silicon
  - Tin
- Digital voltmeter
- Hot water

- Ice
- Goggles
- Periodic table
- Shallow dish

Extension materials: Same as lab.

## Precipitation Reactions

Semester 1: 4.4

- Reagents:
  - M calcium nitrate,  $\text{Ca}(\text{NO}_3)_2$
  - M copper nitrate,  $\text{Cu}(\text{NO}_3)_2$
  - M nickel nitrate,  $\text{Ni}(\text{NO}_3)_2$
  - M potassium iodide, KI
  - M potassium hydroxide, KOH
  - M sodium oxalate,  $\text{Na}_2\text{C}_2\text{O}_4$
  - M sodium sulfate,  $\text{Na}_2\text{SO}_4$
  - M zinc nitrate,  $\text{Zn}(\text{NO}_3)_2$
- 96-well reaction plate
- Goggles

Extension materials: Same as lab.

## Oxidation-Reduction Reactions

Semester 1: 5.4

- Reagents:
  - M copper nitrate,  $\text{Cu}(\text{NO}_3)_2$
  - M iron nitrate,  $\text{Fe}(\text{NO}_3)_3$
  - M zinc nitrate,  $\text{Zn}(\text{NO}_3)_2$
- 96-well reaction plate
- Copper metal
- Goggles
- Iron metal
- Sandpaper
- Zinc metal
- Scissors, metal cutting

Extension materials:

- 24-well reaction plate
- 0.1M HCl
- Bromophenol blue
- Digital scale

- Iron filings
- Graduated pipette
- Paper towels
- Stopwatch or cell phone
- Sink or cake pan
- Water (hot)

## Freezing Point

Semester 2: 1.4

- 1 cc spoon
- 30-mL and 150-mL beakers
- Digital scale
- Test tube, 13 x 100 mm
- Thermometer
- Cup, clear plastic, 9 oz
- Goggles
- Crushed ice/small ice cubes
- Distilled water
- Tablespoon
- Table sugar (sucrose,  $C_{12}H_{22}O_{11}$ )

Extension materials:

- 150 mL beaker (plastic or glass)
- Thermometer
- Crushed ice
- Table salt
- Teaspoon

## Disturbing Equilibrium

Semester 2: 2.4

- 24-well reaction plate
- Bromophenol blue indicator
- Goggles
- Hydrochloric acid (HCl), 0.1 M
- Plastic toothpick
- Sodium Hydroxide (KOH), 0.1 M
- Distilled water

Extension materials:

- 150 mL beaker

- Digital scale
- Graduated pipette
- Iodine solution
- Starch powder
- Test tube, large, 13 x 100 mm
- Vitamin C tablet (2)
- Hot water
- Orange juice (optional)

## Heats of Reaction

Semester 1: 3.4

- 50 mL graduated cylinder
- Foam cup cover
- Steel wool
- 30 mL plastic beaker
- Foam cups, 8 oz (2)
- Goggles
- Spoon, 1 cc
- Stopwatch
- Thermometer
- Baking soda (sodium bicarbonate)
- Tape
- Vinegar

Extension materials:

- Calcium chloride (15 mL)
- Thermometer
- Foam cup, 8 oz (2)
- Cup cover, foam
- Crushed ice
- Table salt (sodium chloride)

## Radioactivity and Radiation

Semester 2: 4.4

- 50 small cubes (dice)
- 50 small spheres
- 50 dimes (or pennies)
- Goggles
- Graph paper
- Foam cup, 8 oz

Extension materials:

- 24-well reaction plate
- Food coloring
- Graduated pipette

## Molecular Models

Semester 2: 5.4

- Molecular model kit

Extension materials: Same as lab.