

# Safety Symbols

Remember that the safety symbols shown here apply to a specific activity, but the numbered rules on the following pages apply to all laboratory work.

## Eye Protection

- Wear safety goggles when working around chemicals, acids, bases, flames or heating devices. Contents under pressure may become projectiles and cause serious injury.
- Never look directly at the sun through any optical device or use direct sunlight to illuminate a microscope.

## Clothing Protection

- Secure loose clothing and remove dangling jewelry. Do not wear open-toed shoes or sandals in the lab.
- Wear an apron or lab coat to protect your clothing when you are working with chemicals.

## Chemical Safety

- Always wear appropriate protective equipment. Always wear eye goggles, gloves, and a lab apron or lab coat when you are working with any chemical or chemical solution.
- Never taste, touch, or smell chemicals unless your instructor directs you to do so.
- Do not allow radioactive materials to come into contact with your skin, hair, clothing, or personal belongings. Although the materials used in this lab are not hazardous when used properly, radioactive materials can cause serious illness and may have permanent effects.

## Electrical Safety

- Do not place electrical cords in walking areas or let cords hang over a table edge in a way that could cause equipment to fall if the cord is accidentally pulled.
- Do not use equipment that has frayed electrical cords or loose plugs.
- Be sure that equipment is in the “off” position before you plug it in.
- Never use an electrical appliance around water or with wet hands or clothing.
- Be sure to turn off and unplug electrical equipment when you are finished using it.
- Never close a circuit until it has been approved by your teacher. Never rewire or adjust any element of a closed circuit.

- If the pointer on any kind of meter moves off scale, open the circuit immediately by opening the switch.
- Do not work with any batteries, electrical devices, or magnets other than those provided by your teacher.

## Heating Safety

- Avoid wearing hair spray or hair gel on lab days.
- Whenever possible, use an electric hot plate instead of an open flame as a heat source.
- When heating materials in a test tube, always angle the test tube away from yourself and others.
- Glass containers used for heating should be made of heat-resistant glass.

## Sharp Object Safety

- Use knives and other sharp instruments with extreme care.

## Hand Safety

- Perform this experiment in a clear area. Attach masses securely. Falling, dropped, or swinging objects can cause serious injury.
- Use a hot mitt to handle resistors, light sources, and other equipment that may be hot. Allow all equipment to cool before storing it.
- To avoid burns, wear heat-resistant gloves whenever instructed to do so.
- Always wear protective gloves when working with an open flame, chemicals, solutions, or wild or unknown plants.
- If you do not know whether an object is hot, do not touch it.
- Use tongs when heating test tubes. Never hold a test tube in your hand to heat the test tube.

## Glassware Safety

- Check the condition of glassware before and after using it. Inform your teacher of any broken, chipped, or cracked glassware, because it should not be used.
- Do not pick up broken glass with your bare hands. Place broken glass in a specially designated disposal container.

## Waste Disposal

- Clean and decontaminate all work surfaces and personal protective equipment as directed by your instructor.
- Dispose of all broken glass, contaminated sharp objects, and other contaminated materials (biological and chemical) in special containers as directed by your instructor.

# Safety In The Physics Laboratory

Systematic, careful lab work is an essential part of any science program because lab work is the key to progress in science. In this class, you will practice some of the same fundamental laboratory procedures and techniques that experimental physicists use to pursue new knowledge.

The equipment and apparatus you will use involve various safety hazards, just as they do for working physicists. You must be aware of these hazards. Your teacher will guide you in properly using the equipment and carrying out the experiments, but you must also take responsibility for your part in this process. With the active involvement of you and your teacher, these risks can be minimized so that working in the physics laboratory can be a safe, enjoyable process of discovery.

## These safety rules always apply in the lab:

**1. Always wear a lab apron and safety goggles.**

Wear these safety devices whenever you are in the lab, not just when you are working on an experiment.

**2. No contact lenses in the lab.**

Contact lenses should not be worn during any investigations using chemicals (even if you are wearing goggles). In the event of an accident, chemicals can get behind contact lenses and cause serious damage before the lenses can be removed. If your doctor requires that you wear contact lenses instead of glasses, you should wear eye-cup safety goggles in the lab. Ask your doctor or your teacher how to use this very important and special eye protection.

**3. Personal apparel should be appropriate for laboratory work.**

On lab days avoid wearing long necklaces, dangling bracelets, bulky jewelry, and bulky or loose-fitting clothing. Loose, flopping, or dangling items may get caught in moving parts, accidentally contact electrical connections, or interfere with the investigation in some



potentially hazardous manner. In addition, chemical fumes may react with some jewelry, such as pearl jewelry, and ruin them. Cotton clothing is preferable to clothes made of wool, nylon, or polyester. Tie back long hair. Wear shoes that will protect your feet from chemical spills and falling objects. Do not wear open-toed shoes or sandals or shoes with woven leather straps.

**4. NEVER work alone in the laboratory.**

Work in the lab only while under the supervision of your teacher. Do not leave equipment unattended while it is in operation.

**5. Only books and notebooks needed for the experiment should be in the lab.**

Only the lab notebook and perhaps the textbook should be in the lab. Keep other books, backpacks, purses, and similar items in your desk, locker, or designated storage area.

**6. Read the entire experiment before entering the lab.**

Your teacher will review any applicable safety precautions before the lab. If you are not sure of something, ask your teacher.

- 7. Heed all safety symbols and cautions written in the experimental investigations and handouts, posted in the room, and given verbally by your teacher.**  
They are provided for a reason: YOUR SAFETY.
- 8. Know the proper fire-drill procedures and the locations of fire exits and emergency equipment.**  
Make sure you know the procedures to follow in case of a fire or emergency.
- 9. If your clothing catches on fire, do not run; WALK to the safety shower, stand under it, and turn it on.**  
Call to your teacher while you do this.
- 10. Report all accidents to the teacher immediately, no matter how minor.**  
In addition, if you get a headache, feel sick to your stomach, or feel dizzy, tell your teacher immediately.
- 11. Report all spills to your teacher immediately.**  
Call your teacher rather than trying to clean a spill yourself. Your teacher will tell you if it is safe for you to clean up the spill; if not, your teacher will know how the spill should be cleaned up safely.
- 12. Student-designed inquiry investigations, such as the Invention Labs in the *Laboratory Experiments* manual, must be approved by the teacher before being attempted by the student.**
- 13. DO NOT perform unauthorized experiments or use equipment and apparatus in a manner for which they are not intended.**  
Use only materials and equipment listed in the activity equipment list or authorized by your teacher. Steps in a procedure should only be performed as described in the book or lab manual or as approved by your teacher.
- 14. Stay alert in the lab, and proceed with caution.**  
Be aware of others near you or your equipment when you are about to do something in the lab. If you are not sure of how to proceed, ask your teacher.
- 15. Horseplay and fooling around in the lab are very dangerous.**  
Laboratory equipment and apparatus are not toys; never play in the lab or use lab time or equipment for anything other than their intended purpose.
- 16. Food, beverages, chewing gum, and tobacco products are NEVER permitted in the laboratory.**
- 17. NEVER taste chemicals. Do not touch chemicals or allow them to contact areas of bare skin.**
- 18. Use extreme CAUTION when working with hot plates or other heating devices.**  
Keep your head, hands, hair, and clothing away from the flame or heating area, and turn the devices off when they are not in use. Remember that metal surfaces connected to the heated area will become hot by conduction. Gas burners should only be lit with a spark lighter. Make sure all heating devices and gas valves are turned off before leaving the laboratory. Never leave a hot plate or other heating device unattended when it is in use. Remember that many metal, ceramic, and glass items do not always look hot when they are hot. Allow all items to cool before storing.
- 19. Exercise caution when working with electrical equipment.**  
Do not use electrical equipment with frayed or twisted wires. Be sure your hands are dry before using electrical equipment. Do not let electrical cords dangle from work stations; dangling cords can cause tripping or electrical shocks.
- 20. Keep work areas and apparatus clean and neat.**  
Always clean up any clutter made during the course of lab work, rearrange apparatus in an orderly manner, and report any damaged or missing items.
- 21. Always thoroughly wash your hands with soap and water at the conclusion of each investigation.**