

## SAFETY IN THE PHYSICS LABORATORY

### General Laboratory Safety:

1. Carefully read each experiment prior to beginning each investigation. If you have any questions, ask your teacher.
2. Proper eye protection devices are to be worn when engaged in activities involving potential hazards to the eye. Students wearing contact lenses MUST wear non-ventilated goggles.
3. All hot plates, steam generators and gas burners are to be turned off when not in use.
4. Food and beverages are not allowed in the laboratory, and laboratory equipment should not be used to hold food or beverages.
5. Use glassware that is neither cracked nor chipped.
6. Safety items such as safety tongs, heat-insulated mittens, aprons and rubber gloves should be used whenever indicated.
7. Know the location of all master cutoff valves and switches before laboratory work begins.
8. Cleanliness and order in the laboratory are to be maintained always.
9. The best object with which to smother a fire upon the clothing is a laboratory blanket. A wet paper towel or cloth will smother a small fire on the table top. Never attempt to blow out a fire or pour water on a chemical fire.
10. Any activity, behavior or noise that could cause a hazard to anyone in the laboratory is not permitted.
11. Report any personal injury that occurs in the classroom to the teacher AT ONCE!
12. Notify your teacher when you recognize hazardous conditions or materials in the classroom.

### Electricity and Electronic Equipment

A common cause of serious injuries in high school physics laboratories arises from electrical shock. Strict adherence to the following rules will greatly reduce the threat of injury.

13. Check all electrical equipment before using to see that there are no exposed or frayed wires. Should repair be needed, inform the teacher immediately.
14. Never handle electrical equipment with wet hands. To do so decreases the body's resistance to current flow thus increasing the risk of severe or fatal shock.
15. Never work around electrical equipment without wearing your shoes.
16. Extension cords pose potential problems. Refrain from using them whenever possible.
17. Hold the plug firmly (NOT THE WIRE) when inserting or removing it from an electrical outlet. Pulling the wire may result in a short.
18. When assembling an electrical circuit, make the live connection last. That is, attach the ground first, then the incoming current wire. When disassembling a circuit, remove the wire bringing current to the circuit first. Before proceeding have the instructor check your circuit.

19. Circuits that draw large currents may pose a danger. Resistors will heat up and remain hot for a period of time.
20. Never short circuit a dry cell or storage battery. Wires heat quickly and can cause severe burns.
21. Charge capacitors to a voltage that does not exceed their rated value. Polarized capacitors have clearly labeled connecting points.

Laser Safety:

Most of the lasers used in high schools are of the He-Ne type. Their low output (found to range from 0.19 to 3.0 milliwatts) does not mean that these devices should be considered safe for students to handle. To the contrary, even the low output He-Ne beams are capable of burning the retinal area of the eye, producing a blind spot. Sufficient energy is deposited in 0.01 seconds under direct viewing of a laser beam to cause retinal damage. Under no circumstances should you use a He-Ne laser without first knowing of the possible dangers and the proper rules of safety.

22. Never look directly into the beam. Should beams of higher power than the He-Ne type be used, avoid placing any portion of the body in the beam's path, as the possibility of skin burns increases with the beam's output power.
23. Never look at the reflected beam. Shiny objects that may scatter the beam introduce unnecessary risks to the eyes of both students and teacher. Commonly available goggles may not offer sufficient protection against the reflected beam.
24. Block or turn off the beam when not in use.
25. Whenever the laser beam is used, strict adherence to rules of safety will be enforced. Students wearing corrective lenses may accidentally come into contact with a reflected beam. For example, if a student sitting along a line opposite that of the beam's direction leans into the beam, the near side of one of the lenses may catch the beam and reflect it into the eye.