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Doing Things **SAFELY**

is not just the right way to
work—**it's the only way!**

Safety For Introductory Chemistry Students



American Chemical Society



THE CHEMISTRY LABORATORY INCLUDES HAZARDS AND RISKS!

Scientists understand the risks involved in the laboratory and have established a set of laboratory safety practices. This guide summarizes the safety rules that scientists follow in the laboratory.

PERSONAL PROTECTION

- Wear eye protection (chemical safety goggles)! This applies at all times to all persons in the laboratory—even guests. Contact lenses worn with goggles are acceptable, but safety glasses and prescription safety glasses without goggles do not provide adequate protection. Increase the degree of protection (use face shields, laboratory hoods, etc.) when the hazards increase.
- Take care not to ingest anything in the laboratory! Food, gum, beverages, and tobacco products are never allowed in the laboratory.
- Do not apply cosmetics in the laboratory.
- Never pipet by mouth!
- Clothing should protect you from accidental spills and splashes. Wear clothing you can remove easily in case of accident. Clothes should cover the body from the neck to at least the knees.
- Tie back long hair and remove jewelry before entering the laboratory.
- Wear practical shoes. Shoes with high heels, open toes, or made of woven materials are not allowed in the laboratory. Sandals and flip-flops are not appropriate!
- Don't use any distracting electronic devices while in laboratory.
- Nonflammable, nonporous lab aprons afford excellent protection. Always remove lab aprons or coats before leaving the laboratory.
- You will often need to wear gloves to avoid skin contact with hazardous materials.
- Always, even after wearing gloves, wash your hands with soap and water before leaving the lab!



LABORATORY PROTOCOL

- Your responsibility to prevent accidents in the laboratory extends to others in addition to yourself. The laboratory experience should be enjoyable but is serious; it is not a time for play. Be aware of what is happening around you and report any questionable behavior.
- Always plan laboratory work before executing it. Providing for safety and avoiding potential accidents are important elements of the plan. You should understand the hazards associated with the chemicals involved before you start the experiment. If you are unsure about the hazards and the protection that you need, Material Safety Data Sheets (MSDSs), which provide detailed information, are available from your instructor, or online.
- Use a safety shield when working with highly reactive chemicals and mixtures.
- Flames are never allowed when flammable gases or liquids are in use.
- Always alert others before lighting a flame!
- Know where to find and how to use all emergency equipment (such as fire extinguishers, eye washes, and safety showers) in the laboratory.
- Always assemble laboratory apparatus away from the edge of the laboratory bench.
- Always check your glassware and discard any with chips, breaks, or obvious flaws.
- When using a laboratory hood, set the equipment and chemicals back at least 15 centimeters from the hood.
- Be certain that you understand the proper use and operation of all laboratory equipment.
- Never work in the laboratory alone.
- Never leave experiments unattended unless you take special precautions to avoid accidents and you notify the responsible individuals.
- Use laboratory hoods for all operations in which toxic, corrosive, irritating, or flammable chemicals are involved. Be certain that the hood is operating properly prior to execution of your work!
- Never put your face inside the laboratory hood.
- Never perform unauthorized experiments or deviate from the experimental plan, especially do not scale up the experiment. Report unauthorized experiments to the instructor.
- Report all injuries to the instructor.



HOUSEKEEPING

- You are responsible for ensuring that a clean workspace is maintained both in your own working area and in the common working areas. The laboratory environment should be at least as clean and orderly when you finish your work as when you began.
- Place broken glassware in the proper receptacles. Do not allow it to accumulate on the bench top.
- Keep laboratory benches free of spilled chemicals. Clean up spills immediately as directed by your instructor.
- Avoid physical hazards by keeping drawers and cabinets closed.
- Prevent tripping and contamination hazards—never place materials on the floor.
- Always clean glassware before returning it to storage. Do not allow dirty glassware to accumulate.
- Follow your instructor's directions for disposal of chemicals. If you don't know, ask! Improper disposal results in possible personal hazard or environmental contamination.
- Contaminated wastepaper must be handled separately from normal wastepaper.

This guide briefly reviews the major principles that guide scientists in performing their laboratory work safely. The American Chemical Society publication *Safety in Academic Chemistry Laboratories* (<http://chemistry.org/committees/ccs>) provides more detailed information both about these topics and about managing the hazards of specialized operations.

