

Safety in the Chemistry Laboratory

Chemicals are not toys

Any chemical can be dangerous if it is misused. Always follow the instructions for the experiment. Pay close attention to the safety notes. Do not do anything differently unless told to do so by your teacher.

Chemicals, even water, can cause harm. The trick is to know how to use chemicals correctly so that they will not cause harm. If you follow the rules stated in the following pages, pay attention to your teacher's directions, and follow the cautions on chemical labels and the experiments, then you will be using chemicals correctly.

These safety rules always apply in the lab

1. Always wear a lab apron and safety goggles.

Even if you aren't working on an experiment, laboratories contain chemicals that can damage your clothing, so wear your apron and keep the strings of the apron tied. Because chemicals can cause eye damage, even blindness, you must wear safety goggles. If your safety goggles are uncomfortable or get clouded up, ask your teacher for help. Try lengthening the strap a bit, washing the goggles with soap and warm water, or using an antifog spray.

2. No contact lenses are allowed in the lab.

Even while wearing safety goggles, chemicals could get between contact lenses and your eyes and cause irreparable eye damage. If your doctor requires that you wear contact lenses instead of glasses, then 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. Never work alone in the laboratory.

You should always do lab work only under the supervision of your teacher.

4. Wear the right clothing for lab work.

Necklaces, neckties, dangling jewelry, long hair, and loose clothing can cause you to knock things over or catch items on fire. Tuck in neckties or take them off. Do not wear a necklace or other dangling jewelry, including hanging earrings. It isn't necessary, but it might be a good idea to remove your wristwatch so that it is not damaged by a chemical splash.

Pull back long hair, and tie it in place. Nylon and polyester fabrics burn and melt more readily than cotton, so wear cotton clothing if you can. It's best to wear fitted garments, but if your clothing is loose or baggy, tuck it in or tie it back so that it does not get in the way or catch on fire.

Wear shoes that will protect your feet from chemical spills—no open-toed shoes or sandals and no shoes with woven leather straps. Shoes made of solid leather or a polymer are much better than shoes made of cloth. Also, wear pants, not shorts or skirts.

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

Do not bring other textbooks, purses, bookbags, backpacks, or other items into the lab; keep these things in your desk or locker.

6. Read the entire experiment before entering the lab. Memorize the safety precautions. Be familiar with the instructions for the experiment. Only materials and equipment authorized by your teacher should be used. When you do the lab work, follow the instructions and the safety precautions described in the directions for the experiment.
7. Read chemical labels. Follow the instructions and safety precautions stated on the labels. Know the location of Materials Safety Data Sheets for chemicals.
8. Walk carefully in the lab. Sometimes you will carry chemicals from the supply station to your lab station. Avoid bumping other students and spilling the chemicals. Stay at your lab station at other times.
9. Food, beverages, chewing gum, cosmetics, and smoking are NEVER allowed in the lab. You already know this.
10. Never taste chemicals or touch them with your bare hands. Also, keep your hands away from your face and mouth while working, even if you are wearing gloves.
11. Use a sparkler to light a Bunsen burner. Do not use matches. Be sure that all gas valves are turned off and that all hot plates are turned off and unplugged when you leave the lab.
12. Be careful with hot plates, Bunsen burners, and other heat sources. Keep your body and clothing away from flames. Do not touch a hot plate after it has just been turned off. It is probably hotter than you think. The same is true of glassware, crucibles, and other things after you remove them from a hot plate, drying oven, or the flame of a Bunsen burner.
13. Do not use electrical equipment with frayed or twisted cords or wires.
14. Be sure your hands are dry before using electrical equipment. Before plugging an electrical cord into a socket, be sure the electrical equipment is turned off. When you are finished with it, turn it off. Before you leave the lab, unplug it, but be sure to turn it off first.
15. Do not let electrical cords dangle from work stations; dangling cords can cause tripping or electrical shocks. The area under and around electrical equipment should be dry; cords should not lie in puddles of spilled liquid.
16. Know fire drill procedures and the locations of exits.
17. Know the location and operation of safety showers and eyewash stations.
18. If your clothes catch on fire, walk to the safety shower, stand under it, and turn it on.
19. If you get a chemical in your eyes, walk immediately to the eyewash station, turn it on, and lower your head so that your eyes are in the running water. Hold your eyelids open with your thumbs and fingers, and roll your eyeballs around. You have to flush your eyes continuously for at least 15 min. Call your teacher while you are doing this.

20. If you have a spill on the floor or lab bench, call your teacher rather than trying to clean it up by yourself. Your teacher will tell you if it is OK for you to do the cleanup; if it is not, your teacher will know how the spill should be cleaned up safely.
21. If you spill a chemical on your skin, wash it off under the sink faucet, and call your teacher. If you spill a solid chemical on your clothing, brush it off carefully so that you do not scatter it, and call your teacher. If you get a liquid on your clothing, wash it off right away if you can get it under the sink faucet, and call your teacher. If the spill is on clothing that will not fit under the sink faucet, use the safety shower. Remove the affected clothing while under the shower, and call your teacher. (It may be temporarily embarrassing to remove your clothing in front of your class, but failing to flush that chemical off your skin could cause permanent damage.)
22. The best way to prevent an accident is to stop it before it happens. If you have a close call, tell your teacher so that you and your teacher can find a way to prevent it from happening again. Otherwise, the next time, it could be a harmful accident instead of just a close call.
23. All accidents should be reported to your teacher, no matter how minor. Also, if you get a headache, feel sick to your stomach, or feel dizzy, tell your teacher immediately.
24. For all chemicals, take only what you need. On the other hand, if you do happen to take too much and have some left over, DO NOT put it back in the bottle. If somebody accidentally puts a chemical into the wrong bottle, the next person to use it will have a contaminated sample. Ask your teacher what to do with any leftover chemicals.
25. NEVER take any chemicals out of the lab. You should already know this rule.
26. Horseplay and fooling around in the lab are very dangerous. NEVER be a clown in the laboratory.
27. Keep your work area clean and tidy. After your work is done, clean your work area and all equipment.
28. Always wash your hands with soap and water before you leave the lab.
29. Whether or not the lab instructions remind you, ALL of these rules APPLY ALL OF THE TIME.

QUIZ

Determine which safety rules apply to the following.

- Tie back long hair, and confine loose clothing. (Rule ? applies.)
- Never reach across an open flame. (Rule ? applies.)
- Use proper procedures when lighting Bunsen burners. Turn off hot plates, Bunsen burners, and other heat sources when not in use. (Rule ? applies.)
- Heat flasks and beakers on a ring stand with wire gauze between the glass and the flame. (Rule ? applies.)
- Use tongs when heating containers. Never hold or touch containers with your hands while heating them. Always allow heated materials to cool before handling them. (Rule ? applies.)
- Turn off gas valves when not in use. (Rule ? applies.)