Lab Safety

"Chemistry done carelessly is nothing, except hazardous to one's health..."
Henry Bent, North Carolina State University

From the Safety with Chemicals section of the Quality Science *Advanced Microchem Manual*.

Common Sense: Your best defense against an accident is to use your own common sense. Think before you act.

Eye Protection: You must wear approved safety goggles, such as those provided, when performing chemistry experiments. Approved goggles will have the "Z87" code. Eye glasses do not provide adequate protection because the sides, top, and bottom are open to possible splashes.

Acids and Bases: Strong acids and strong bases are the source of most chemical accidents. They can cause holes in your clothing and can burn your skin. This chemistry lab kit uses only dilute acids and bases which diminish these effects.

Work Habits

1. Always wear safety goggles.
2. Always act in a mature, responsible manner.
3. Make sure your body is covered from the shoulders to the knees.
4. Never be barefoot, wear sandals, or open-toed shoes.
5. Never eat or drink while doing chemistry experiments.
6. Never touch, taste, or smell any chemicals.
7. Keep chemicals and equipment away from small children.
8. Never work near an electrical outlet.
9. Follow procedures carefully. If not certain, read again, then think.
10. Never become distracted, but always focus on the experiment.
11. Keep chemical containers closed when not in use.
12. Never pipet by mouth.
13. Never leave heat sources unattended.
14. Never point the open end of a test tube containing a substance at yourself or others.
15. Check with local regulations, but it should be okay to dispose of the chemicals in this kit by rinsing them down the drain with plenty of water. This is because of the chemicals selected, the dilute preparation of the chemicals, and the small quantities used.
16. Wash hands thoroughly with liberal amounts of soap and water when finished with chemistry experiments.
17. If your work space is the kitchen, wash the counter top or table very carefully with soap and water before preparing any food.

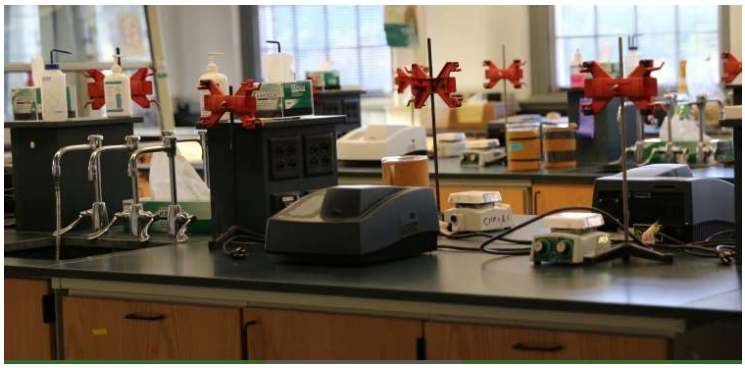
Safety in the chemistry laboratory is a team activity whether you are working alone or in a school laboratory. The authors of this chemistry laboratory manual have done their part in selecting chemicals and equipment and in writing procedures to keep you and others around you from harm while providing you with the laboratory experience you need in your chemistry education. It's your responsibility to follow the directions specifically, carefully, and exclusively. Since the authors cannot oversee your practices, they assume no responsibility for your safety.

What follows are laboratory rules compiled from several college lab courses. I have amended some of the instructions for the home lab.

There have not been any questions on lab safety on the most recent version of the AP Chemistry exam.

COLLEGE LABORATORY LABS AND SAFETY PROCEDURES:

These safety rules in the outlined tables are quotes from the Dartmouth Chemistry Lab
If you follow the Dartmouth Lab link[1]. you will see a typical college chemistry lab station.



I strongly recommend that you not opt out of the first-year college lab experience. Colleges typically offer the lab as a separate class from their actual chemistry class. The equipment at a single station is worth about $5000. It is a unique experience that you should not miss out on.

Fire Blanket

	Every lab has a fire blanket that can be used to smother a fire. **Clothing fires**. Call for help and a blanket. When someone's clothing catches fire, the flame and smoke can rise and be inhaled. Unless a shower is immediately available or can be reached without inhalation damage, put the victim prone on the floor, forcibly if necessary, and roll the victim in the blanket. This will immediately smoother fire.

A wool blanket (NOT SYNTHETIC, they melt) is the best method of putting out a fire. A blanket will smother a fire faster than a fire extinguisher. Chemical and carbon dioxide fire extinguishers are ineffective and may harm the person. If your hair or clothing should catch fire, stop, drop and roll and your lab assistant will smother any remaining flames with a blanket. Fire blankets should not be used unless the person on fire is prone on the floor. Wrapping a fire blanket around a standing person creates a chimney effect causing severe facial burns.
Many college labs including Dartmouth do not have open flames in their first-year classes. Instead, they use hot plates. We will not be using open flames either.

Fire Extinguishers

	Your TA has been trained to use fire extinguishers in the lab. In the event of fire, first clear the area, then ask your TA for help.

[1] https://sites.dartmouth.edu/genchemlab/general-information/

Fire extinguisher: Fire extinguishers are overrated for putting out a fire. The Dartmouth lab doesn't even tell students to use the fire extinguisher. They say clear the area. While your home should have a fire extinguisher and you should KNOW where it is, a fire blanket is still better than a fire extinguisher.

Don't be trapped in a room without a ready exit. Your lab area should not be between you and an exit. Look at your lab area and think: How would I get out of here quickly if I had to?

Eye Wash

In the event of an eye injury or chemical splash, use the eyewash immediately. Help the injured person by holding their eyelids open while rinsing. Rinse copiously and have the eyes checked by a physician afterwards.

Eyes. GET HELP IMMEDIATELY! Chemicals in the eyes must be removed at once by flooding with copious quantities of water. Help the victim use the eye wash station, if possible. Otherwise, place the victim on the floor, by force if necessary. One person should straddle the victim with knees on the floor, pouring a moderate stream of water from a flask or beaker onto the bridge of the victim's nose so that both eyes are flooded. Another person should squat at the head of the victim and roll back the eyelids of both eyes; use the thumb and forefinger to spread the eyelids open. The victim will not be able to do this voluntarily. Use at least several liters of water. When it is reasonably certain that the excess chemicals have been washed away, take the victim to the Emergency Room for immediate medical attention.

Your eye-wash fountain is the nearest water faucet.

If it has a pull-out shower attachment, excellent! Should a caustic chemical splash on your eyes, **immediately** go to the faucet, turn on the cold water, place your eyes under the running water.

Eyelids should be forcibly held open to flush the eyeballs with plenty of cold water for at least 5 minutes. This is a long time, but it will save your eyes. This picture from the University of Wisconsin–Milwaukee shows the correct use of an eyewash because the student is holding their eyelids open.

Safety Shower

Use a safety shower in the event of a chemical spill. Pull the overhead handle and remove clothing that may be contaminated with chemicals, to allow the skin to be rinsed.

Safety Shower: Since you will be using only small amounts of chemicals, this safety procedure is one that I doubt you will have to use. If there ever is a situation where significant amounts of a caustic chemical or hot water are spilled on your body, immediately go to the shower, turn on the **cold** water. Remove the soaked clothing. Some college chemistry clubs use lab safety shower demonstrations as fund raisers.