

Chemistry Safety Guidelines

In order for your work in the lab to be as safe as possible, it will be necessary for you to learn and practice several safety rules and regulations. This packet is your guide to these rules and regulations. You are responsible for understanding the following these rules at all times. You must score 100% on the safety quiz before you will be allowed to work in the lab.

General Safety Rules

1. Listen to all instructions give by your teacher and follow them carefully.
2. Read your lab assignments before coming to class.
3. Perform only those experiments on which you have been instructed.
4. While you are performing your lab, talk quietly. Frequently, you will be given announcement that will be very beneficial, or there may be a dangerous situation of which you need to be informed.
5. If you are in doubt about any procedures, ask your teacher.
6. Eating and drinking are prohibited in the lab. Chemicals might contaminate your food and cause sickness, etc.
7. Wash your hands after each lab experiment.
8. Walk, don't run in the lab.
9. Tie back long hair. It could catch on fire when working with flames or it could block your view and cause an accident.
10. Know the location and use all safety equipment (goggles, aprons, eye wash, fire blanket, fire extinguishers, lab shower and safety charts.)
11. Wear your lab apron for all experiments.
12. Goggles or protective eye cover (face shields) should be worn at all times by all students during lab.
 - Students who wear contact lenses must wear unvented goggles when working with chemicals. If a chemical splashes in the eye of a contact lens wearer, it could be trapped behind the contact lens, burning the cornea and causing loss of sight. Fumes from some chemicals can cause damage to some lenses.
13. When performing a lab, make sure your work area has been cleared of purses, books, jackets, etc. Have out only those things related to the experiment.
14. Never work alone in the lab.
15. Report all accidents to the teacher, even if they are minor ones.
16. It is your responsibility to take care of the lab equipment. Use it only as instructed. Report any damages to your teacher.
17. Clean and dry your lab work area at the close of the lab period. Return all equipment and materials to their proper places.
18. Be very careful when operating electrical equipment. Lab work area, equipment and your hands should be dry. Check all cords and plugs to be sure they are in good condition. Look for exposed or broken wires and insulation in poor condition. Report any problem to the teacher.
19. Set up apparatus as far back on the lab table as conveniently possible so it will not tip onto the floor.
20. Apparatus that can roll, such as thermometers, should be placed on the table at right angles to the edge to keep them from rolling onto the floor.
21. Chipped or broken glassware should be disposed of in the proper place (as your teacher instructs.)
22. When holding glassware with a test tube holder or test tube clamp, fasten the holder as near to the opening as possible.
23. A wire gauze with a white center should be used when heating beakers or flasks directly with a Bunsen burner. It supports the glassware and spreads the heat.
24. After each experiment, clean up your area as instructed by the teacher. Check the sinks to be sure liquids have been flushed down the drain and that there are NO solids just sitting in the sink.

Emergency Procedures

The main thing to remember when an accident occurs is to be calm and carry out the emergency procedure. Be sure the teacher has been notified.

1. **Chemical spills:** If any chemical gets on you or your clothing, flush with lots of water. Use the safety shower for extensive spills. Do not apply ointment. If any chemical spills onto the desk or floor, flush with lots of water and wipe up with rags or paper towels and dispose of rags. If any chemical gets in the eye, immediately irrigate the eye with a gentle stream of water from the eye wash to wash away the chemical. Do this for 20 minutes. Do not put anything on the eye. The presence of contact lenses often hinders the treatment of chemical splashes. The eye needs urgent irrigation after injury and removal of contact lenses is made difficult by the spasm of the eyelids.
2. **Cuts and abrasions:** Immediately cleanse wound and surrounding skin with water. Notify the teacher and see the nurse.
3. **Burns:** Immerse burned area in clean, cold water. Notify teacher.
4. **Poisoning:** (Chemicals accidentally taken into mouth.) You should never touch your eyes or your mouth while in the lab. It does not take large quantities of some chemicals to cause poisoning. If you have taken something into your mouth, immediately flush your mouth with water. Notify your teacher. For your general knowledge, a poison victim should not always be made to vomit. If a corrosive substance burns going down, it will also burn coming up! Call poison control.
5. **Fires:**
 - Small fires: Extinguish with water, camp rags or wet towels.
 - Clothing fires: Don't run. Use a fire blanket, safety shower if close by, or roll on the floor to put it out.

If a fire cannot be put out by the above, then select the correct fire extinguisher for the type of fire.

Extinguisher Type	Extinguisher Ingredient or Alternative	Type of Fire
Type A	Water, foam, soda-acid or CO ₂	Wood, paper or cloth
Type B	Foam, CO ₂ , dry chemical extinguisher, but NEVER water	Burning oils, solvents
Type C	CO ₂ or dry soda	Live electricity
Type D	Sand but NEVER use water, CO ₂ or foam	Alkali metals

- Major fires: Alert personnel in the vicinity, evacuate building and summon aid.

Working with Chemicals

Most chemicals used in the lab are extremely pure substances and the successful outcome of most lab exercises depends upon keeping contaminating substances out of the reaction. The following will minimize the possibility of contamination.

1. Never taste any chemical in the lab.
2. Never touch any chemical unless instructed to do so.
3. Carefully read the label twice on any bottle prior to using it. Many formulas and chemical names look very much alike and confusing them could be dangerous.
4. If a container is unlabeled, or if the label is difficult to read, never guess. Ask your teacher.
5. Always label a container before filling it with a certain material.
6. Use the specified amounts of materials called for in the experiment. Small quantities produce reactions which are easier to control.
7. Do NOT carry supply bottles to your desk as other students will need them and waste time looking for them. Bring the appropriate container up to the supply area and take only what you need. Don't waste materials.
8. Do NOT return unused portions of chemicals to their containers as you could contaminate the entire bottle. Dispose of the excess as directed.
9. Do NOT use the same spatula to remove chemicals from two different containers. Each container should have a different spatula.

10. When you remove the stopper from a bottle, do NOT lay it on the desk, but place the stopper between your two fingers and hold the bottle so that the label is in the palm of your hand. This prevents the stopper from being placed in the wrong bottle. It also prevents drips from ruining the label. Be sure to rinse and/all drips that may have gotten on the outside of the bottle.
11. Never pick up a bottle by its stopper or cap. Always tighten caps securely. Replace all stoppers and caps on bottles as soon as you finish with them.
12. Be careful not to interchange stoppers from two different containers.
13. Never remove liquids from a reagent bottle with an eye dropper. Pour a small quantity into a clean beaker or bottle and then use the eye dropper.
14. If possible, wash glassware while it is still wet. Chemicals that dry on glass are sometimes difficult to remove. If possible, rinse all glassware with small amounts of distilled water after washing.
15. Always be sure that you are using the proper concentration of a solution.
16. When pouring liquids, try to do so over the sink.
17. Whenever you are asked to note the odor of any chemical, fill your lungs with GOOD air, then carefully waft the fumes toward your nose. Do not inhale the fumes directly.
18. Use a rubber bulb or syringe to fill a pipette. You NEVER use your mouth to suck the liquid into the pipette.
19. Water soluble liquids should be carefully poured into the drain and flushed with plenty of water.
20. Dispose of solids in the proper container, NOT in the sink.
21. Do NOT weigh chemicals directly on a balance pan. Use a weighing boat, weighing paper, or previously weighed container.
22. Mercury spills must be cleaned up immediately and if the spills run into an inaccessible area cover the spill with sulfur to reduce vaporizing. If there is a spill, notify the teacher.
23. Many chemicals are hygroscopic; that is, they absorb water from the air and become mushy or even dissolved. That is why it is so important to cap bottles as quickly as possible.
24. When diluting acids, always pour the acid into water while stirring since the acid is more dense and will mix better. If the container becomes too hot, either let it cool down before continuing or immerse it in a cool water bath and continue.
25. When handling chemicals, keep your hands away from your face, eyes and body until after they have been washed thoroughly. If some chemical does get on your hand, don't be terrified as it takes a concentrated or caustic chemical to really damage your skin. Calmly wash off the spill with plenty of water and notify the teacher.

Heating

1. When you are working with an open flame or heating some material, never leave them unattended.
2. Never reach across a flame.
3. Keep a lighted burner away from your clothing, books, and other combustibles.
4. Before heating glass beakers, tubes, etc., check to see that they are DRY on the outside and contain no cracks.
5. Do not clamp test tubes and other glassware more tightly than necessary to hold them in place. The glass will expand when heated and may break if it is clamped too tightly.
6. Never look down into a tube containing a chemical (or hot water) while it is being heated.
7. When heating liquids in a test tube, place the clamp near the mouth of the tube and always hold the test tube at an angle. Heat the side of the tube as well as the bottom. If just the bottom is heated, vapor can be produced at that point which will cause the entire contents to spurt out.
8. When heating any solids or liquids in a test tube, keep the tube in constant motion and do not point the mouth of the tube at anyone.
9. Do not heat a liquid in a closed vessel. Be sure to remove any cork or stopper. If not removed, vapor could build up inside the tube and cause an explosion.
10. Use a water or steam bath to heat volatile or flammable solvents. Do this within a fume hood if available. Never apply a direct flame to a container of volatile or flammable materials. Never place an open flame near such containers.

Working with Glass

1. Carry long pieces of glass tubing or glass rods vertically, not like a spear.
2. To cut glass tubing or a glass rod:
 - Use a triangular file and place two scratches as the point of desired break (be sure both scratches at the same place.)
 - Moisten the scratch.
 - Turn the scratch away from you and anyone else.
 - Place the thumbs directly behind the scratch, and your forefingers next to the scratch.
 - Press gently with the thumbs while pulling back with your forefingers.
 - A towel is often used around the tubing to protect both hands and in case the tubing or rod shatters.
3. Always fire polish the ends of glass tubing or rod after they have been cut. To fire polish, you place the end in the hottest part of the flame until it is smooth.
4. When bending or pulling glass, be sure you have plenty of room and that your neighbors know what you are about to do.
5. Hot glass looks just like cold glass. Most of our accidents are from burns due to hot glass or the hot ring stand. Hot glass or other objects should always be placed on the white center of the wire gauze to cool. This serves as a reminder to you and as a caution to others. If you ever want to see if an object is hot, SLOWLY approach it with your hand. DO NOT TOUCH IT. If it is dangerously hot, you will feel the heat radiating from it.
6. Lubricate glass tubing or thermometers with glycerin before inserting them into rubber stoppers. (Water can sometimes be used.) Use a cloth towel and grasp the tubing close to the stopper. Gently twist the tubing into the stopper – inching it along. NEVER force the tubing.
7. Broken glass should be removed with a brush and dust pan. Absorbent cotton may be used to pick up fine pieces of broken glass. Hold the cotton with tongs. Never use a towel or paper towel to clean up broken glass.





MSDS: Colors, Numbers and Symbols

Colors represent different types of hazards.

Color	Hazard
Yellow	Stability Hazard (how easily the chemical breaks down)
Red	Flammability Hazard (how easily it catches fire)
Blue	Health Hazard
White	Special Hazard

Numbers represent how dangerous the chemical is.

- 0 – No danger
- 4 – May cause death

Symbol	Hazard
	Highly reactive to water
	Reacts violently with air
	Radioactive
	Cancer causing

