Orange Coast College

Chemistry Laboratory Safety Rules

All chemistry students must successfully pass a test on the following material before they are allowed to work in the laboratory. The test consists of 20 multiple choice questions. The importance of safety requires a high passing score.

General Rules

1. No eating, drinking, chewing gum, smoking, or vaping is permitted in the laboratory.
2. Shoes (closed-toed) and appropriate clothing must be worn in the laboratory. Sandals, shorts, etc. do not provide sufficient protection from an accident. To prevent damage, avoid wearing expensive clothing in the lab.
3. Be prepared for lab. Read the procedures carefully before your scheduled lab period and follow all instructions.
4. No unauthorized experiments or unsupervised laboratory work is permitted. An unauthorized experiment is anything that is not in the experimental procedures or instructions given by your professor.
5. Visitors and children are **not** allowed in the laboratory. Exit the lab if you need to communicate with your visitors.
6. Clean up all chemical spills immediately, including water on the floor.
7. Report any accident, no matter how minor, to the instructor.
8. Never leave your experiment unattended when there is a hazard such as a lit burner.
9. Before you leave the laboratory, always clean your work area, lock your drawer, make certain that water and gas are off, and counters and floor are clean and dry. Safety goggles are to be removed only immediately before leaving lab.
10. Keep backpacks & personal items on the coat rack or shelves above them, to keep the aisles free of tripping hazards.
11. Pay attention and maintain a serious, work appropriate behavior while in the lab. Horse-play or aggressive behavior will not be tolerated as it creates an unsafe environment for everyone.
12. If you have special health conditions (i.e. pregnancy, heart conditions etc.), consult your physician before you enter the laboratory.
13. Cell phones and personal electronic devices are forbidden. All lab work must stay in the lab and may not be photographed or reproduced in any way.
14. Students that are under the influence are not permitted in the lab. Working in the lab when you are not alert may pose a danger to yourself and others.
15. Only English may be spoken in lab.

Eye Safety

1. Chemical safety goggles (indirect vent) must be worn at all times when any experiments are being done. This is required by California and Federal laws. The goggles must meet the ANSI Z87.1 and ISEA D3 specifications. Normal prescription glasses are **not** satisfactory. No tinted safety goggles. You may only remove safety goggles in the laboratory if you have been given permission by the instructor when no experimental work is occurring.
2. If any chemicals get in your eyes, immediately rinse your eyes with water and continue to rinse for at least 15 minutes. **If you are wearing contact lenses** remove them as quickly as possible so that no chemical will remain trapped between the lenses and your eyes. Know the location of the closest eyewash, but also remember that your sink may be the fastest way to begin rinsing your eyes.
3. The most common way that your eyes could become contaminated is by rubbing your eyes. While in the lab, you must assume that your hands are contaminated, and should get in the habit of keeping them away from your face.
4. Always keep your face at a distance from any glass container which is being heated or in which a reaction is occurring. When heating a substance in a test tube, always direct the mouth of the tube away from yourself and nearby people. Using a test tube holder, aim the test tube along the center of the counter top. Heat the top of the solution, not the bottom of the test tube, to avoid rapid expulsion of hot liquid out of the top of the tube.

5. Do not look directly at burning magnesium or at any electrical arc.

Chemical Hazards

1. Always wash your hands with water at the end of the laboratory period to remove any water soluble chemicals that may have inadvertently contacted your hand.
2. Do not drink water from any of the faucets in the laboratory or from your wash bottle. Do not eat any laboratory ice.
3. Never taste chemicals in the laboratory.
4. Always work under the exhaust hoods in the laboratory when you are directed to do so in an experiment, or when you anticipate that undesirable gases will be produced during an experiment. If you are not sure whether undesirable fumes will be produced, ask your instructor.
5. When determining the odor of a gas, hold the container far away and gently wave some of the gas toward your nose with the other hand. If you don't detect an odor, gradually move the container closer to your nose and wave gently. Do **not** breathe deeply when you are checking the odor. (Some people can't detect the odor of sulfur dioxide, so don't keep trying to detect the odor of this gas. If you notice a fellow student trying and you are at a greater distance and have no trouble detecting it, tell the student.)
6. Avoid contact of chemicals with your skin, as many toxic chemicals can be absorbed through the skin. For example, do **not** put your finger or thumb over the mouth of a test tube, even when shaking.
7. If any chemicals come in contact with your body or clothes, first rinse off with large amounts of water, immediately removing all contaminated clothing, then check with the instructor for appropriate follow-up treatment. If needed there are emergency showers located inside the stockroom.
8. In case of an accidental chemical spill or vapor release, notify the instructor and prepare to leave the laboratory, if necessary.
9. Do not leave spilled chemicals on the countertops or on the floor. Neutralize spilled acids or bases with solid $NaHCO_3$, which is in a container above each sink. Then mop up the spill with paper towels. Use caution if there is any broken glass. Remember that broken glass has to be disposed of in the glass disposal container in the hood. Consult your instructor for help.
10. Never take chemicals or equipment out of the lab.

Fires and Burns

1. Do not touch Bunsen burners except at the base because the barrel can become very hot. Also be careful with iron rings and glassware because they can stay hot for a long time.
2. Always keep your face far away from (never over) the Bunsen burner as you light it with a striker. Long hair must be tied back. Loose clothing and dangling jewelry should be avoided.
3. Glass tubing that has been heated in a flame should always be left to cool on a wire gauze. Allow sufficient time for cooling and then check very carefully to see if it is still hot. First check the amount of warm air rising from the glass. If the air isn't too hot, start at the cool end by touching the glass momentarily to see if it is hot. If it doesn't seem too hot, move closer to the hotter end or maintain contact with the glass for a slightly longer period of time.
4. For minor burns, quickly immerse the burned region in ice water and keep it in the ice water for 15 minutes. It is your responsibility to make sure that there is ice available in the tub by the stockroom door or under the hood **before** you light a burner.
5. Do not move a container with burning liquids because it could spill and spread the flames. It can usually be smothered with wet paper towel or watch glass over the container. Do not panic or do anything sudden without thinking.
6. Know the locations of the fire extinguishers in the laboratory and how to use them. Aim them at the base of the fire, not at the flames, to separate the air from the fuel. Make sure there is always an escape route (exit) behind you.

7. Be sure that the plastic (not rubber latex) tubing is firmly attached to the Bunsen burner at your workstation and be sure to turn off the gas completely as soon as you are through using the burner. Protect the tubing to the burner from the flame and any hot objects. Inform your instructor if the plastic tubing appears cracked, blackened or burned.
8. Do not allow used paper towels to gather in your work area, and **never** use paper to light a burner.
9. Keep all flammable liquids away from heat, sparks, and open flames.
10. Only light burners with strikers. Replace the flint when it is worn down to the metal, and remember not to put them in your drawer. Keep the strikers on the center shelf.
11. If you are unable to light the burner after several attempts, turn off the gas, check the flint and readjust the burner before attempting to relight. Consult your instructor if you continue to have problems lighting your burner.
12. Lighted wooden splints should be quenched in water before disposal.

Glassware

1. Store graduated cylinders horizontally in your drawer to avoid breakage. Do not place beakers inside each other (nesting) because this is the leading cause of chipped spouts. Thermometers and pipets should be placed on the upper counter of the lab bench to avoid rolling and breaking. Burets should not be placed on the counter top but only clamped on the buret stands.
2. Exchange any broken, chipped, or cracked glassware for a replacement. Examine the spouts of beakers and the rims of test tubes very carefully for chips.
3. For glassware which is "dirty" with a dilute solution, rinse glassware once with tap water, then with four minimal portions of deionized water. Rinse with a DI wash bottle (with the lid fastened securely) at your sink not at the DI tap. Glassware does not need to be dry on the inside but can be dried on the outside with paper towels. If the inside of the glassware needs to be dry, follow specific lab instructions.
4. For glassware which contained a concentrated solution, rinse thoroughly with tap water, and then four minimal portions of deionized water. For test tubes which have had precipitate in them, clean with tap water and your test tube brush, and then rinse as described above with DI.
5. Be sure that all pieces of glass tubing have been fire polished by holding the ends of the tubing in the burner flame until the glass has softened enough to smooth the edges.
6. Always lubricate the holes in rubber stoppers with glycerol before inserting fire polished glass tubing or thermometers, unless specifically given other instructions. Use the rubber safety grips when inserting or removing tubing or thermometers from rubber stoppers.
7. Clean up broken glass with a brush and dustpan, not your fingers.

Emergencies

1. If the building is on fire, turn off the gas jets and immediately leave the building in an orderly manner. You may have to go through the balance room and exit through a different room, or you may have to exit through the stockroom or lab window. You must leave the building if the fire alarm sounds.
2. If there is an active shooter situation, use "**Run, Hide, Fight"** strategy. If you can leave without putting yourself in harm's way, **run**. If the incident is too close to safely leave, **hide**. Secure doors, turn off lights, and silence phones. If your life is in immediate danger, **fight**. Throw items at the attacker.
3. In case of an earthquake or nuclear attack, turn off all gas jets and move away from the windows. Crouch down in a central isle and protect your head and neck. Do not walk or run from the room or building. Put $NaHCO_3$ on any spilled solutions on the floor to prevent burns from acids or caustic (basic) solutions.

Handling Reagents

1. Carefully read the label two or three times on any reagent bottle and double check the experiment instructions before using any chemical. Be sure that it is the correct reagent to be used in the experiment.

2. Read and follow any directions on the chemical labels.
3. Do not remove the reagent bottles from their designated areas. Transfer the reagent to your container at the designated area, and replace the bottle in its proper position with the lid on.
4. Handle lids properly so as to avoid contamination of the reagent or countertop. Hold the lid or stopper while pouring to eliminate the possibility of putting the wrong lid on the bottle.
5. Never put unused or excess chemicals back into reagent bottles, and never put any pipets, spatulas, wooden sticks, droppers, etc. into reagent bottles.
6. When pouring liquids and solutions out of bottles, check that the bottle is clean. Grasp the bottle with your palm on the label so that drips will be on the side opposite the label.
7. Review the physical and chemical hazard information for each chemical and consult Safety Data Sheets (SDS) for additional safety and handling information about the chemicals being used in experiments. These are available from your instructor.

Waste Disposal

1. Most solids should be discarded in the trash receptacles underneath the sink, wrapped in paper. (This includes chewing gum, which should also be wrapped in a small piece of paper.) Some water-soluble compounds may be washed down the drains, but most solids (litmus paper, boiling stones, metals, etc.) should not be thrown into the sinks.
2. Waste acids and bases should be poured into the sink and flushed down the drain with large amounts of water. Solutions with strong odors should be poured into the sink under the exhaust hoods and flushed with large amounts of water.
3. Certain experiments may generate waste that requires special disposal methods. Please follow the directions given with the experiments. You will be asked to pour your material into a specific collection container in the hood and it will be disposed of professionally.

Data Handling

1. Primary data are the measurements, readings and observations made during an experiment. All primary data is to be recorded according to the following:
    a. Directly on experiment sheets (not on another paper to be copy later)
    b. At the time that the measurement or observation is made,
    c. In permanent (non-erasable) waterproof ink. No white-out allowed.

   Neatness is less important than each of the three items above.
2. Secondary data is information that can be recorded without requiring direct measurement or observations. This includes calculations, writing chemical equations, drawing structures, and answering questions. Secondary data must be recorded in pencil. If you make an error writing secondary data, erase it and write the correction.
3. The integrity of primary data is an important aspect of honesty in scientific experimentation. Primary data should not be fabricated or altered. If you make a mistake in recording primary data, line out the entire error with **one** line and write the correction nearby. Do not write over any number, change, or attempt to change one digit to another as this can result in future mistakes in interpretation. If your pen skips or malfunctions, draw **one** line through the data and rewrite the data nearby. For example: ~~23.02 g~~ 23.03 g

Academic Honesty

Any fabrication of data or other forms of academic dishonesty will be dealt with as seriously in the laboratory as in lecture. Possible punishments are no credit for the experiment, a large loss of points, a failing grade, referral to the Dean of Students, or expulsion from the college.