

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. A passing score is very high because of the importance of safety.

General Rules

1. No eating, drinking, or smoking is permitted in the laboratory or anywhere inside the chemistry building.
2. Shoes and appropriate clothing must be worn in the laboratory. Sandals, shorts, etc. do not provide sufficient protection in the event of an accident. Avoid wearing expensive clothing in the lab as there are many possibilities for damage. (Aprons can be provided upon request.)
3. No unauthorized experiments or unsupervised laboratory work is permitted. If you are curious and wish to do an experiment which is not assigned, you must get permission from the instructor. An unauthorized experiment at Bakersfield College in the early 1960's resulted in an explosion that caused extensive damage to a student's eyes.
4. Visitors and children are not allowed in the laboratory. If someone needs to talk to you, you should go outside and talk to them there.
5. Report any accident, no matter how minor, to the instructor.
6. Never leave your experiment unattended when there is a hazard such as a lit burner.
7. Before you leave the laboratory, always clean your work area, lock your drawer, and make certain that the water and the gas are shut off.

Eye Safety

1. Safety glasses must be worn at all times when any experiments are being done. This is required by California and Federal laws. Safety glasses should provide protection from the sides as well as the front. The safety glasses must meet the ANSI Z87.1 specifications. Normal prescription glasses are not satisfactory. You may not wear tinted safety glasses in the lab.
2. If any chemicals do 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. (Most chemical laboratories will not allow workers to wear contact lenses because of this hazard and because they can absorb fumes.) Know the location of the three eyewashes, but also remember that your sink may be the fastest way to begin rinsing.
3. 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. 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.
4. Do not look directly at burning magnesium (UV -light) 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 you may have inadvertently contacted with your hands.
2. Do not drink water from any of the faucets in the laboratory or from your wash bottle. Do not eat any ice that is being used in the laboratory.
3. Never taste chemicals in the laboratory.
4. Always work under the exhaust hoods at the rear of 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 towards your nose with your other hand. Gradually move the container closer to your nose. Do not breathe deeply when you are checking 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 at a greater distance 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. If any chemicals come in contact with your body or clothes, rinse off immediately with large amounts of water. (There are emergency showers located inside the stockroom.) Check with the instructor for appropriate follow-up treatment.
7. In the case of an accidental chemical spill or vapor release, notify the instructor and prepare to leave the laboratory, if necessary.
8. Do not leave spilled chemicals on the countertops or on the floor. Neutralize spilled acids or sodium hydroxide solutions 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, and consult your instructor for help.

Burns

1. Do not touch Bunsen burners except at the base as the barrel can become very hot. Also be careful with iron rings as they can stay hot for a long time.
2. 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 and waiting to see if too much heat reaches the nerves. 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.)
3. For minor burns on your fingers, 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.

Glassware

1. 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.) Do not nest beakers as this is the leading cause of chipped spouts.
2. For glassware which is “dirty” with a dilute solution, rinse glassware with four minimal portions of deionized water. Only rinse with a wash bottle (with the lid fastened securely). Only wash bottles should be filled at the deionized water (DI) faucet. Rinsing should always be done at your sink.
3. For glassware which contained a concentrated solution, rinse once or twice with tap water and the rinse as described above with DI. For test tubes which have had a precipitate in them, clean with tap water and your test tube brush and then rinse as described above with DI.
4. 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 melted enough to smooth the edges.
5. Always lubricate the holes in rubber stoppers with glycerol before inserting glass tubing (fire-polished) or thermometers (unless specifically given other instructions). Use the rubber safety grips when inserting or removing tubing or thermometers from rubber stoppers.

Fires

1. Know the locations of the fire extinguishers in the laboratory and know 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.
2. Be sure that the plastic (not rubber latex) tubing is firmly attached to the Bunsen burner at your work station 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.
3. Do not allow used paper towels to gather in your work area, and never use paper to light a burner.
4. Only light burners with the strikers. Replace the flint when it is worn down to the metal and remember to not put them in your drawer. Keep the strikers on the center shelf.
5. A small fire due to a burning liquid in a container should never be moved and can usually be smothered with a wet paper towel over the container. Do not spill. Do not panic or do anything sudden without thinking.

Emergencies

1. If the building is on fire, turn off the gas jets and 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 window. You must leave the building if the fire alarm sounds.
2. In case of an earthquake or nuclear attack, turn off all gas jets and get away from the windows. Crouch down in a central aisle 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 twice or three times on any reagent bottle and double check the 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. If possible, hold the lid or stopper in the same hand as the bottle while pouring to eliminate the possibility of putting the wrong lid on the bottle. If you are not sure which lid or stopper belongs on the solution bottle, rinse it with four small portions of deionized water before putting it 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. Pour liquids and solutions out of bottles with the label on the bottle towards the palm of your hand so that any drips will be on the side opposite the label.

Waste Disposal

1. Most solids should be discarded in the trash receptacles underneath the sinks. (This includes chewing gum, which should first 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, sulfur, 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 collection container and it will be disposed of professionally.

Academic Honesty

1. Primary data are the measurements and readings taken in the laboratory, and the observations made during an experiment. All primary data is to be recorded according to the following: a. directly on experiment sheets b. at the time that the measurement or observation is made, and c. in permanent (non-erasable) waterproof ink. Neatness is less important than each of the three items above.
2. 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 a measurement, line out the entire number with one line and write the correct number nearby. Do not write over any number, change, or attempt to change one digit into 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~~ 23.03g

3. Any fabrication of data or other forms of academic dishonesty will be dealt with as seriously in the laboratory as it is in lecture. Possible punishments are no credit for the experiment, a large loss of points, being dropped from the class or expulsion from the college.