

## Policies and Rules

**Safety:** Safety glasses and closed-toe shoes (*i.e.* **no** sandals) are absolute requirements of the University's Department of Safety and Risk Management (DSRM) for anyone in any University laboratory space. You are to purchase a pair of safety glasses and wear them at all times in the laboratory, including the first week. ***No one will be allowed in the laboratory who is not wearing safety glasses.*** Chemistry Department faculty members have the responsibility to monitor this. Persons who do not wear safety glasses in lab will be asked to leave for the rest of that day and will receive a zero on work in progress at the time.

Furthermore, we suggest that you **not wear** your best clothes to lab. Because of the use of flames and the possibility of broken glass and spilled chemicals, long hair must be tied back, shoes are required, and the use of lab aprons or lab coats is encouraged.

**Attendance:** You are expected to attend every lab session on your assigned day and time. Absences will be excused for cause--examples of which include serious illness, a death in your immediate family, or participation in scheduled functions of a group representing the University, such as an athletic team on an out-of-town trip. Your lab instructor will decide whether an absence is excused or not. You will be held responsible for work missed in such absences, and arrangements should be made to make up such work, ***prior to the absence*** if at all possible. You can only make up a lab on another day of the week in which the lab is performed and then only when space is available in the lab on the other day. Since you will not be allowed to make up unexcused absences, formal permission from your instructor is required to make up a lab.

**Notebook:** You are to purchase a bound notebook for recording observations and data in lab (See Laboratory Notebook Set Up and Notebook Format below). You will be required to have this notebook with you each time you enter the lab to work.

**Preparation:** Prior to coming to lab each week, you are expected to have read the experiment description in detail and prepared your lab notebook appropriately.

### ***General Laboratory Rules***

1. No smoking, eating, or drinking in the laboratory.
2. ***Safety glasses must be worn at all times. Feet must be protected at all times. All long hair must be tied back out of the way.*** Appropriate clothing should be worn - no full sleeves, sandals, etc.
3. Under no circumstances are you to begin working in the lab unless an instructor is present.

4. Report any accident or hazardous conditions to your instructor. When in need of first aid, see your instructor.
5. Stay out of the stockroom unless you are specifically directed to go there by an assistant or instructor.
6. Although some of the equipment and reagents will be dispensed from the lab benches, as much labwork as possible should be carried out in the fumehoods. Each group will be assigned a fume hood for this purpose.
7. Much of your labwork will involve using expensive state-of-the-art analytical instrumentation, which is a shared resource for several chemistry teaching laboratories as well as for chemistry research. Thus, it is critical that, when using this instrumentation, you take extra care to pay attention to what you are doing in order to maintain the proper function of the instruments. In particular, you to take extra care to avoid spills in the instruments and the workspace around the instruments; and if you do spill, make sure to clear up promptly and properly in order to maintain a safe working space for others who will use the instrument after you.
8. If you break something, report it to the instructor before throwing it away.
9. You are responsible for cleaning up your own lab-station/fumehood before leaving for the day. This includes turning off the gas and water at your lab-station/fumehood.
10. Working with chemicals require proper disposal of any chemical waste generated. Appropriately labeled **Waste Containers** will be maintained in separate fumehoods at the front-left of the lab for this purpose. Additionally, special **Glass Waste** containers will be available for any glass waste. Ask your lab instructor for the proper disposal procedure for each experiment. Do not dispose of any waste, excess reagents or solvents, or glass pipettes in the sinks or trash-cans.
11. Familiarize yourself with the locations of the fire blankets, eye washes and showers in the lab.

### **Laboratory Safety Guidelines**

Safe practices in the laboratory are essential. Most of the rules you need to remember are based on common sense, but it is vital that you work safely. READ this section thoroughly. There will be a safety quiz in your laboratory lecture.

1. **EYE PROTECTION:** It is absolutely necessary to wear eye protection at all times in any laboratory. Contact lenses should not be worn in the laboratory. Vapors and fumes can get underneath the lens, causing irritation or damage to the eye. Side shield protection must be worn at all times.
2. **NEVER EAT, DRINK OR SMOKE IN LAB:** This should be common sense. Having food near chemicals in lab or smoking near flammable chemicals is obviously very hazardous.
3. **PROPER CLOTHING:** You may wear a laboratory coat if you desire. Do not wear your best clothes to lab. Sandals or bare feet are not allowed in lab. They offer no protection from spills. Long hair must be tied back so it can not fall into chemicals or

a flame. Similarly, loosely fitting long sleeves should be avoided. Clothes made of “Ramie” fabric are reported to be flammable; avoid them.

4. **LOCATION OF SAFETY EQUIPMENT:** The first time in any laboratory you should familiarize yourself with the locations of the fire extinguishers, fire blankets, safety showers, eye washes and first aid kits. Hopefully you will never need to use them, but you still need to know their locations.
  5. **STORE COATS AND KNAPSACKS IN DESIGNATED AREAS:** Your work space should have only lab instructions, lab notebook, a pen, and equipment for the experiment.
  6. **NEVER WORK ALONE:** A laboratory instructor or lab assistant should always be present and should know which experiment you are doing. **DO ONLY THE ASSIGNED EXPERIMENT:** Follow your laboratory instructions. Use the fume hood when directed to do so.
  7. **KEEP LABORATORY CLEAN:** Any chemical spilled on your skin or clothing should be washed immediately and thoroughly. Notify the instructor of spill or breakage. Clean up broken glass immediately. Wash your hands thoroughly when finished experiment before leaving laboratory. Be sure that the balance area is clean and the weights are all dialed back to zero when you finish using the balances.
  8. **HOT OBJECTS:** Hot glass and cold glass look the same. Place hot glass on a hot pad for cooling.
  9. **BUNSEN BURNERS:** Never leave a flame unattended. Be sure to turn gas off before leaving lab. **HEATING A TEST TUBE:** When heating a test tube, direct the mouth of the tube toward the splash divider, not toward yourself or a laboratory partner. **BUMPING** may occur when you are heating the contents of a test tube, and bumping can result in chemical spills.
  10. **REAGENTS:** Read a bottle label carefully before using. Think and ask if you're unsure. Be patient while waiting for equipment and chemicals. Dispense chemicals in the reagent area. Do not return unused chemicals to the reagent bottles, but dispose of properly. **SMELLING CHEMICALS:** To smell a chemical or the vapors from a reaction: Do not put your nose right up to the container. The proper way to test the odor is to waft a bit of the vapor toward your nose. **DISPOSE OF CHEMICALS PROPERLY:** Your instructor will tell you how to dispose of chemicals for each experiment. Follow those directions.
  11. **MIXING ACID AND WATER:** When mixing acid and water, acid should be slowly added to water with stirring. Adding in the reverse way can lead to spattering.
  12. **STOCKROOM:** If you find that you need a piece of equipment, ask your lab assistant to get it for you. Stay out of the stockroom area unless you are specifically directed to go there by an assistant or an instructor.
  13. **USE GOOD JUDGEMENT:** Think about what you are doing at all times and use your common sense. Report any accident or hazardous condition to your instructor. When in need of first aid, see your instructor. **NO HORSEPLAY!**
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## ***Safety Instructions for Accidents or Emergencies:***

1. A chemical is spilled on the laboratory bench: If the material is not particularly volatile nor toxic, clean up immediately. Small spills of acid can be diluted with water and wiped up. Larger spills of concentrated acid require an absorbent material which neutralizes them such as sodium hydrogen carbonate (a weak base). Spill kits have been placed in each laboratory for large spills. Notify your instructor of any chemical spills.
2. A chemical is spilled on you or your clothes: Wash area thoroughly with water. Notify your instructor. Be aware that putting water on a spill on your clothes drives the chemical through your clothes to your skin. As a general rule, then, a spill that requires washing the area with water also requires that you get out of those clothes very soon.
3. A chemical is splashed into the eyes: In case of such an insult to the eye, immediately flood the eye with lots of water and continue to rinse for at least 10 minutes. There are eyewash stations in each lab for this purpose. Alternatively, you pull the handle of the safety shower, and look into the water flow. Report any accident immediately to the instructor. (Remember normal safety glasses only protect against direct splash. Side shields are required for this reason.)
4. You cut or burn yourself: These are probably the majority of laboratory injuries, and mercifully, most of them are minor. Still, virtually all of these can be prevented by being careful. Particularly do not insert glass tubing into rubber stoppers without first moistening the tubing and the hole with water or glycerin. Also shield the hands with a cloth. Report all cuts and burns to the instructor. A report must be filed with the Chemistry Department safety committee for any injury.
5. A fire starts: All Bunsen burners and gas should be turned off. Notify the instructor immediately. If immediate efforts to extinguish the fire are not successful, an orderly, calm evacuation of the lab is the next step, to be followed by notification of campus police and emergency services.
6. You or your clothes catch fire: STOP, DROP, and ROLL: which means to STOP what you are doing, DROP to the floor (fire produces hot gases which rise; if your head is high, it is possible it could be engulfed in flames), and ROLL around (rolling smothers the fire by shutting off oxygen and by cooling, since the fire has to heat the floor as well as you and your clothes). There are safety showers in each side of the lab, and pulling the shower handle and standing in the water flow is a very good alternative. Fires do not always occur near a safety shower, however, so it is still good to know STOP, DROP, and ROLL. As mentioned earlier, we have had reports that "Ramie" fabric is particularly flammable, and we therefore suggest strongly that you avoid wearing clothing made of "Ramie" fabric when you come to lab.

## Laboratory Notebook Set Up

A laboratory notebook is a universal tool used by scientists. It is an original, permanent record of your work. All observations and data collected during a lab are recorded directly into your lab notebook. Lab reports are then to be supported by that record. In the scientific community notebook records can be used in legal proceedings such as patent applications so it is important that their integrity be preserved. To insure this, the following protocols are followed:

"Never do's":

- Rip out pages.
- Use white-out.
- Cross out writing so that it can not be read.

"Always"

- Use permanent ink.
- Put an "X" across a page you want to delete.
- Draw a single line through any words or numbers that you want to discard.
- Initial these changes.
- Sign and date the bottom of each page.

A good notebook record will contain:

1. Some indication of what is to be done in the day's work, and why – this could be accomplished by giving a title and by providing a statement of the purpose of the experiment(s).
2. A brief description of the procedures to be used in obtaining and analyzing data, as well as a record of the data so obtained; observations made during any chemical reactions conducted should be recorded as well.
3. All data in a table.
4. Any calculations that were required in the data treatment and analysis.
5. A report of conclusions.

Since this is a record of what you "have done" it should be in 3<sup>rd</sup> person, passive voice (it happened).

## **Notebook Format**

1. On the front cover write (legibly) in bold letters: Your Name, email, phone number (you want it back if lost). Repeat this information on the inside cover of the book
2. Pre-number all pages in the upper-right corner on fronts (if not already numbered)
3. Skip pages 1-2 and reserve these for table of contents
4. Keep an up-to-date Table of Contents with the title and page where the lab begins (like chapters in a book)
5. Write only on the right hand side—leave the left side for notes
6. This is a *working* journal not a manuscript. It must be neat, legible and have complete thoughts (someone else should be able to pick it up and understand what you have been doing) but it will not be "perfect".
7. For each experiment write down the following **before** coming to class:
  - \* Title: \* Date: (top right line)
  - \* Purpose: why you are performing the experiment, goals, expectations
  - \* Safety : refer to your safety contract
  - \* Materials : list of any chemicals by both name and formula
  - \* Equation(s): when applicable
8. Entries should be in bullet form rather than paragraph form so that the information is easier to find.
9. Observations should stand out from procedures, data in tables etc.
10. Spread things out – you have plenty of pages for the semester
11. Just like any story always give your experimental study an ending – conclusion
12. Finally be sure to pledge and date your work at the end.