

## General Lab Safety in TCNJ Chemistry Labs

### *General Safety Precautions:*

1. Protective glasses must be worn in the lab at all times – **NO EXCEPTIONS!!!!!!** Failure to comply with this rule will constitute sufficient grounds for dismissal from the lab and a zero for the experiment.
2. Know the location of the exit nearest to your work area, as well as the location of safety equipment (sinks, eye wash stations, safety showers, etc.)
3. All injuries or incidents, no matter how trivial, *must* be reported to the instructor immediately.
4. Food or beverages are not permitted in the lab at any time.
5. Unauthorized experiments are not permitted.
6. In case of spill, accident, or fire, **immediately** notify the instructor.
7. Never work alone in the laboratory.
8. Do not taste anything in the lab. Exercise caution in noting odors and avoid breathing fumes.
9. Shoes completely covering the feet should be worn in the lab. No flip-flops or open-toed shoes are permitted.
10. Long pants and long-sleeved shirts are advisable in the lab.
11. Approved lab apron or lab coat may be worn to afford additional protection.
12. Long hair should be tied back.
13. A laboratory is a dangerous place intended for serious study. **HORSEPLAY WILL NOT BE TOLERATED!**

### **I. Specific Guidelines for Personal Apparel in the Laboratory**

- A. Students must wear approved safety glasses or goggles (over regular eyeglasses) and should wear only approved laboratory aprons or lab coats in the laboratory. **NO EXCEPTIONS FOR GLASSES!!!!!!** Failure to comply with this rule will constitute sufficient grounds for dismissal from the lab and a zero for the experiment.
- B. The use of contact lenses in the laboratory is not recommended. In the event of a chemical splash or vapor release, contact lenses can increase the degree of injury to the eye and may prevent prompt first-aid and eye-flushing procedures. If you feel you must wear contacts, then you should wear goggles instead of safety glasses.
- C. Students should wear (preferably) non-synthetic clothing that provides better protection from chemical spills. Clothing which completely covers the legs and torso are recommended in the laboratory. Shorts and skirts that do not completely cover to below the knees are inappropriate apparel in the laboratory and are not permitted.
- D. Wear shoes which cover the feet. Sandals, perforated shoes, open-toed shoes, open-backed shoes are not permitted in the laboratory. High-heeled shoes are generally not recommended in the laboratory.
- E. For your safety, longer hair and loose sleeves must be confined when working in the laboratory.

- F. Wear disposable gloves that are provided in each laboratory when working with hazardous chemicals. Inspect the gloves for defects before wearing. Be sure to notify your instructor if you have an allergy to latex. Remove gloves before exiting the laboratory. Upon removal, discard the disposable gloves in the wastebasket unless they have been contaminated with chemicals.
- G. You are advised to avoid wearing synthetic fingernails in the chemistry laboratory as they can be damaged by solvents and are made of extremely flammable polymers that can burn to completion and are not easily extinguished.
- H. For your protection, jewelry should not be worn in the laboratory. Dangling jewelry can become entangled in equipment and can conduct electricity. Chemicals can seep under the jewelry and cause injuries to the skin. Chemicals can ruin jewelry and change its composition.

## **II. Procedures to Avoid Exposure to Hazardous Chemicals**

- A. Minimize all chemical exposure. Avoid ingestion, injection, inhalation, eye contact and skin contact with all hazardous materials in the laboratory.
- B. No chemical should ever be tasted. Do not pipette by mouth in the laboratory; use a pipette aid.
- C. If you are instructed to smell a chemical, you should gently waft the vapors toward your nose using your gloved hand or a folded sheet of paper. Do not place the container directly under your nose and inhale the vapors.
- D. Use the fume hood when there is a possibility of release of toxic chemical vapors, dust, or gases. When using the fume hood, the sash opening should be kept at a minimum to protect the user and to ensure the efficiency of the operation. Keep your head and body outside of the hood face. All chemicals and equipment should be placed at least six inches from the hood face to ensure proper airflow.
- E. If any chemical spills onto the skin, immediately flush the affected area with water and notify the instructor.
- F. Eating, drinking, chewing gum, applying cosmetics, etc. are prohibited in the laboratory. Beverage containers, cups, bottled water, and food containers are not permitted in the laboratory. Never use laboratory glassware for eating or drinking purposes.
- G. Remove gloves before exiting the laboratory. Dispose of gloves in a wastebasket, not in the solid waste container (unless they have become contaminated).
- H. Notify your instructor if you spill any chemicals. Clean up spills (including water) immediately. Do not leave spilled chemicals on the bench top or floor. At the termination of your experimental work, the desktop and student hood must be thoroughly cleaned before you leave the laboratory.
- I. Notify the instructor about any chemical sensitivity that you may have at the beginning of the semester, and to any particular chemical sensitivity you have prior to the start of the particular laboratory experiment.

- J. Due to possible contamination of laboratory coats with chemicals, students are advised that they should not wear laboratory coats outside of the chemistry lab and that they should not wash laboratory coats with personal clothing items.
- K. Always wash your hands at the end of each laboratory session before you exit the laboratory.

### **III. General Guidelines for Laboratory Procedures**

- A. Do not enter the laboratory room without the supervision of your instructor. Working in the laboratory without supervision by the instructor is expressly prohibited. The performance of unauthorized experiments and the use of any equipment in an unauthorized or unsafe manner are strictly forbidden.
- B. When diluting concentrated acids always pour the acid slowly into the water with stirring. Never add water to concentrated acids because of the danger of splattering.
- C. Always exercise caution when working with glass. When cutting glass tubing, always protect your hands with heavy gloves. Always avoid placing too much pressure on glass joints. Take care when removing or working with hot glass.
- D. All water, gas, air, electrical, and other service connections must be made in a safe and secure manner.
- E. Practical jokes, boisterous conduct, and excessive noise are prohibited. The use of personal audio and visual equipment is also prohibited in the laboratory.
- F. Gas, vacuum, and steam valves must be kept closed except when in use.
- G. Do not heat flammable liquids with a Bunsen burner or other open flame. If in doubt about the flammability of a liquid, consult your instructor.
- H. Dispose of waste chemicals in the containers that have been provided and labeled for this purpose. Do not dispose of waste chemicals in the sinks or the wastebaskets. Paper towels and gloves should be placed in the wastebasket, not the chemical waste containers. Used filter paper and weighing dishes must be placed in the containers that are marked for this purpose.
- I. Examine all apparatuses for defects before performing any experiments. Do not use damaged, cracked or otherwise defective glassware. Dispose of broken glassware in the containers provided in the laboratory. If you break a thermometer (or find a broken thermometer), report it to your instructor immediately.
- J. Do not insert medicine droppers or other dispensing items into reagent bottles unless they are specifically supplied with the bottles.
- L. Never return unused chemicals to the stock reagent bottles, unless you are told to do otherwise by your instructor. Take only what you need. Use the quantities of reagents recommended in your laboratory manual. Do not waste chemicals.

- M. Do not remove stock reagent bottles from the dispensing areas without the permission of the instructor.
- N. All materials (i.e., chemicals, paper, towels, broken glass, stoppers, and rubber tubing) must be kept out of the sinks at all times to minimize the danger of plugging drains. Such items are to be kept away from positions where they might fall into the sinks or drains.
- O. Maintain clean glassware and equipment. When cleaning glassware with water, wash your equipment with tap water then use distilled water for rinsing. Ethanol and acetone rinses must be placed in the appropriately labeled container in the laboratory as directed by the instructor.
- P. Heavy pieces of glass apparatuses should be supported with clamps.
- Q. Coats, bags and other personal items should be stored in the proper areas; not on the bench tops or in the aisle ways.
- R. When heating, carrying out or working up a reaction, never point the opening toward your neighbor or yourself.
- S. All containers containing chemicals or solutions of any kind that are retained between laboratory sessions must be labeled so that the contents can be identified by chemistry personnel. The label must also contain the date and the name of the responsible person.
- T. Caps must be kept firmly in place on all reagent bottles and waste containers when not in use.
- U. Return all of your equipment and glassware to your student drawer. Your drawer should be locked at the end of each laboratory session.
- V. At the end of the laboratory session, return all common equipment to the common equipment drawer. Do not place the common equipment in your assigned student drawer.

#### **IV. Departmental and Institutional Laboratory Policies**

- A. Know the location of the fire extinguisher nearest to your work area, as well as the location of the eye wash stations, safety showers, and other safety equipment. Plan an emergency exit route from the laboratory.
- B. When the fire alarm sounds you must evacuate the building via the nearest exit unless otherwise instructed. Extinguish all flames, gases, and water. Close chemical hoods and turn off all equipment, as appropriate, before exiting.
- C. All personal injuries and illnesses (however slight) occurring in the laboratory must be reported immediately to the instructor.
- D. Report any accident to your instructor immediately.

- E. Chemical should not be poured down the laboratory drains or placed in the wastebaskets. Properly dispose of all waste chemicals in the containers that have been provided in the laboratories.
- F. Visitors, including children and pets, are not permitted to enter laboratory rooms.
- G. As a reminder of institutional policy, smoking is prohibited in all chemistry laboratories.
- H. Do not take laboratory equipment, glassware, or chemicals from the laboratory room without the permission of the instructor.

#### *Chemistry Hazards:*

Organic and inorganic chemistry labs are potentially much more hazardous than other science labs you have encountered. It is important to be aware of all possible hazards around you at all times. Among the principle hazards:

1. *Flammable chemicals* – Most organic compounds, particularly the commonly used solvents such as ethers, alcohols, acetone, and ethyl acetate. Based on the flammability aspects of these materials, heating must be performed with water/steam baths, hot plates, sand baths, or heating mantles.
2. *Toxic chemicals* – Many of the compounds with which you will be working are poisonous. Vapors of many of the solvents are toxic and breathing them must be kept to a minimum. **USE YOUR HOOD AS A TOOL TO PROTECT YOURSELF!** Likewise, avoiding contact with solids is a good general rule of thumb.
3. *Corrosive and Irritating Chemicals* – The well-known dangers in handling strong acids and bases must be kept in mind. Some chemicals act as vesicants (skin irritants) and must be handled carefully with gloves.
4. *Metals*– Many organometallic compounds are reactive, particularly when exposed to protic materials and with oxygen. Particular caution should be exercised when working with hydrides and alkali metals.

#### **SAFETY VIOLATIONS**

All students must abide by all safety policies while in the chemistry laboratories. The Chemistry department will manage its personal protective equipment policies as follows:

1. *Grace Period*– During the first two laboratory periods the instructor will warn students, if necessary, to wear personal protective equipment.
2. *First violation*– Upon first violation, students enrolled in laboratory courses will be immediately dismissed from the laboratory for the remainder of the period, with no opportunity for make-up. The course instructor will have the student sign under *Violation 1* on the *Departmental Violation Reporting Form*. This form will be returned to the department office for record keeping.
3. *Second Violation*– Upon second violation the student will be immediately dismissed from the laboratory for the remainder of the period, with no opportunity for make-up. Both instructor and student will sign under *Violation 2 of the Departmental Violation Reporting Form*. The form will be brought to the department office for additional signatures (department chair and safety

coordinator) and the form filed for record keeping. The student will be required to meet with the chemistry department chair, instructor, and safety coordinator to discuss the situation and importance of following safety policies prior to being readmitted to the laboratory.

4. *Third Violation*– Upon third violation, the student will be immediately dismissed from the laboratory for the remainder of the period, with no opportunity for make-up. Both instructor and student will sign under *Violation 3* of the *Departmental Violation Reporting Form*, and the form will be sent to the department office for signatures of the department chair and safety coordinator. Students who receive a third violation will immediately receive an F for the course and will not be permitted to return to the laboratory for the remainder of the term.

**The College of New Jersey  
Safety Rules for Undergraduate Students**

***I have read and I understand the Safety Rules for Undergraduate Students in Chemistry Laboratories issued by the Department of Chemistry at The College of New Jersey. In consideration of being allowed to take this course, I will abide by these guidelines and policies.***

\_\_\_\_\_  
Student Signature                      DATE \_\_\_\_\_

\_\_\_\_\_  
Name (print)

\_\_\_\_\_  
Student ID Number

\_\_\_\_\_  
Course Number

\_\_\_\_\_  
Room Number

\_\_\_\_\_  
Desk/Drawer Number

Please return this completed form to your instructor. It will be maintained as a permanent record.

