

## SAFETY RULES FOR TEACHING LABORATORIES

<b>Duncan Hall Service Center:</b>	<b>Irene Lin</b>	<b>4-3441</b>
	<b>Stephen Cappelloni</b>	<b>4-4921</b>
<b>Science Service Center: (Spring 2020 Semester)</b>	<b>Stephen Cappelloni</b>	<b>4-4990</b>
<b>College of Science Safety:</b>	<b>Randy Kirchner</b>	<b>4-5004</b>
	<b>Huong Nguyen/Mikey Walsh</b>	<b>4-4875</b>
	<b>University Police</b>	<b>4-2222</b>

### A. PERSONAL PROTECTIVE EQUIPMENT

Minimum personal protective equipment includes eye protection and appropriate clothing:

#### I. EYE PROTECTION

OSHA approved eye equipment (at a minimum meeting ANSI Z87 impact standard) shall be worn whenever any experimental work is in progress in the laboratory. Though no eye protection can prevent all injuries you should note that goggles that seal against the face are very strongly advised since they generally provide better protection against chemical splashes than safety glasses. Regular glasses cannot be substituted for approved eye equipment. It is very strongly advised that you do not wear contact lenses in the lab. Contact lenses can react with or absorb laboratory chemicals resulting in significantly greater eye damage. If for some reason you need to wear contact lenses please let the instructor know and place a sticker indicating you are wearing contact lenses on the side of your goggles. In case of an emergency the instructor might need to remove these from your eyes.

If an irritant should get in your eye, wash the eye for 15-20 minutes at the eye wash fountain; then see a physician. Permanent eye damage can occur in less than 15 seconds from a chemical in the eye.

#### II. CLOTHING

Clothing should be appropriate to the laboratory. There should be minimum skin exposure. Shorts, swim suites, tank tops, etc. leave large amounts of skin unprotected and thus are inappropriate in a laboratory. Shoes must be closed toe and heel; high heels, platform shoes or sandals are not appropriate.

### B. EXPERIMENTS NOT AUTHORIZED ARE ABSOLUTELY PROHIBITED

### C. HORSEPLAY, PRANKS AND OTHER ACTS OF MISCHIEF ARE ESPECIALLY DANGEROUS AND ABSOLUTELY PROHIBITED!

### D. CHEMISTRY DEPARTMENT EMERGENCY PROCEDURES

#### 1. Emergencies

Emergency phone numbers are posted by the phone and at the top of this document.

Anyone who comes upon an emergency situation should call the University Police (911 from campus phones or 408-924-2222 from cell phones) if time is critical. Blue light and elevator phones call directly to the police. In any situation involving fire, chemical spill or personal injury, and a faculty or staff member is not available, **call 4-3441, 4-4921 or 4-5000 in Duncan Hall or 4-4990 in Science Bldg.** for assistance. After 5:00 pm or on weekends call 911.

#### 2. Building Evacuation

If you hear the emergency alarm, or are told to evacuate by Emergency Coordinators or Monitors, walk quickly to the nearest stairway and exit the building. Take your personal belongings with you as you may not be allowed to return immediately. Do not use the elevators. Handicapped persons should be safely positioned on the stairwell landings outside the hall fire doors, from where assigned emergency

## **SAFETY RULES FOR TEACHING LABORATORIES**

people will move them to safety. Evacutrac evacuation devices are located on the 4th and 6th floor of every stairwell in Duncan Hall and on the 3rd floor of every stairwell in science.

Follow the instructions of the Emergency Coordinators. Be quiet so you can hear them. Once outside, move immediately towards the grassy area on the San Carlos Street Mall or- to the other side of San Salvador Street if you exited from Duncan Hall. If you evacuated from the Science Building, move to the grassy area near Tower Hall or across Fourth Street. Do not return to the building unless the Police or Emergency Coordinators announce that it is permissible.

### **3. Earthquake**

Find cover even in a light earthquake. If doorways, desks, or lab benches are unavailable, face up against the inner hall walls and protect your head. Remain inside the building pending instructions from University Police or Emergency Coordinators.

### **4. Fire**

Call a faculty or staff member immediately if nearby and/or call 911. Trained personnel may attempt to control the fire using a fire extinguisher. If the fire cannot be controlled, close all doors and confine the fire.

Stay calm. Do not open doors hot to the touch. Avoid breathing heated air. Use a towel or clothing to protect your lungs. Remember the air is clearer near the floor.

If you become trapped, place clothing or other marker outside window, stay near the floor, and shout at regular intervals. Stairwells are the most fire resistant areas.

### **5. Chemical Spills**

Non-hazardous spills can be cleaned up with paper towels and water but see your instructor for clarification. For spills of hazardous materials notify a faculty or staff member immediately if nearby. He/she will assess the seriousness of the situation and act accordingly. Do NOT attempt to clean up the spill on your own, unless you have been trained to do so. First aid should be started at once on anyone who has been contaminated by the spill, taking care that the first aid treatments given are appropriate to the material spilled and that spreading of the contamination does not occur.

### **6. Injuries**

In the event of a serious injury or life threatening situation, call 911 immediately. Then try to obtain help and to provide first aid. All injuries must be reported to the instructor. You must complete an accident report. For the treatment of injuries go to the Student Health Center.

## **E. INGESTION HAZARDS**

1. No pipetting by mouth! Use a pipet bulb
2. No eating, drinking, or use of cosmetics in the laboratory
3. Never use chemical equipment as containers for food or drink
4. Never use food or drink containers to store chemicals
5. Smoking in the laboratory is prohibited
6. Normally, never taste, or deliberately inhale any chemicals. (Special experiments may involve odors of non-hazardous substances.)

## **F. CONTACT HAZARDS**

1. Learn the location of the eyewash fountain and the safety shower. Learn how to use them. In case of serious accidents, where more than one student's eyes are exposed to chemicals, using a sink filled with water or running water to rinse eyes might be necessary.

## SAFETY RULES FOR TEACHING LABORATORIES

- If chemicals are spilled on the skin immediately wash with copious amounts of water. for 15 minutes
- Clothing should be appropriate to the laboratory. There should be minimum skin exposure.
- Shorts, sandals, swim suites, tank tops, etc. leave large amounts of skin unprotected and thus are inappropriate in a laboratory. Shoes should cover the full foot. Loose, long clothing and long hair should be confined.
- Do not wear rings or bracelets to the laboratory (These are a potential hazard that could result in a destroyed ring or damaged finger.)
- Gloves are recommended and can be purchased at the service center.
- A laboratory apron or labcoat affords desirable protection for clothing

### G. INHALATION HAZARDS

- Experiments which generate airborne contaminants such as dusts, mists, fumes or vapors shall be performed in the hoods.
- Do not inhale fumes.
- So that hoods draw properly large objects should not occupy hoods. The hood sashes should be at the appropriate location to ensure proper hood action and should be closed when the hood is not in use. Hoods should not be used as storage areas.

### H. FLAMMABLE HAZARDS

- Learn the location of the fire extinguisher and fire blanket. Learn how to use them.
- Learn what substances are flammable. Never use an open flame to heat a flammable liquid.
- Store flammable liquids properly, separate oxidizing agents from reactive chemicals.
- When volatile flammable materials may be present, use only non-sparking electrical equipment.
- Confine long hair and loose clothing
- Only permitted materials should be stored in teaching lab lockers. Such materials should be clearly labelled with the chemical name (not formula or structure) and hazard class (corrosive, flammable, toxic, reactive) of the contents, your name and the date. Especially do not store concentrated acids, bases, flammable substances or oxidizers in your locker

### I. WASTE AND CLEAN-UP

- For each experiment, take only the minimum amount of chemicals actually needed. Place them in **labeled** containers
- As directed by the instructor, dispose of excess and waste chemicals in the appropriate labeled waste container. Please make certain you read the label and check if the bottle is the correct waste container **prior** to placing your chemical in the bottle. **Improper waste disposal has been the main cause of serious accidents in the laboratories!** If in doubt ask your instructor for assistance
- DO NOT OVERFILL WASTE CONTAINERS**
- Place broken glass in the appropriate container

### J. HOUSEKEEPING

- Work areas should be kept clean and free from obstructions. Cleanup should follow the completion of any operation or at the end of each day. Wash and dry the laboratory bench.
- Spilled chemicals should be cleaned up immediately and disposed of properly. Spill control chemicals should be used as appropriate for major spills. Check with your instructor.
- Unlabeled containers and chemical wastes should be disposed of promptly.
- Spills on the floors should be cleaned promptly.
- Access to exits, emergency equipment, controls and such should never be blocked.

## SAFETY RULES FOR TEACHING LABORATORIES

6. Backpacks and personal items should not be left where they will interfere with movement through the lab.
7. Chemicals and equipment should be stored properly; chemicals should only be stored with compatible materials, should be clearly labelled with the chemical name (not formula or structure) and hazard class (corrosive, flammable, toxic, reactive) of the contents, and should be provided with secondary containment with 110% of the volume of the container.
8. Only permitted materials should be stored in teaching lab lockers. Such materials must be labelled according to item 7 above. Especially do not store concentrated acids, bases, flammable substances or oxidizers in your locker

### **K. GLASSWARE**

1. Use only boro-silicate (Pyrex, Kimax, etc.) containers for heating solutions.
2. Do not force glass tubing or thermometers into rubber stoppers. Lubricate fire-polished tubing and protect hands with a towel when inserting tubing/thermometers.
3. Vacuum-jacketed glass apparatus should be handled with extreme care to prevent implosions.
4. Hand protection should be used when picking up broken glass.
5. Broken glass should be disposed of in appropriate containers.

### **L. WORK OUTSIDE REGULAR LABORATORY HOURS**

1. Permission from your instructor is required for work outside regular laboratory hours. Working alone is extremely dangerous. No student can do experimental work in the laboratory unless under active supervision of an instructor.

### **M. GENERAL SAFETY**

1. Work with materials only after you have learned about their flammability, reactivity, corrosiveness and toxicity. Colored diamond shaped labels on the reagent bottles can provide some of this information. For additional information, you can receive Material Safety Data Sheets on-line at [www.msdsonline.com](http://www.msdsonline.com).
2. Although pregnancy is a personal issue, for your health and the health of your child, please inform your instructor if you are pregnant. Consult with your physician! We want to make sure you and your physician are aware of the chemicals that will be used in the lab so that you are able to make an informed decision about continuing with a laboratory course.
3. Know the types of protective equipment available and proper type for each job.
4. Know the location of, and how to use, safety equipment such as fire blankets, eye washes, and safety showers.
5. Know the safety rules and procedures that apply to the work to be done.
6. Be alert to unsafe conditions and actions and call attention to these so the corrections can be made as soon as possible.
7. Be certain that all chemicals are correctly and clearly labeled. Post warning signs when unusual hazards exist.
8. Use equipment only for its designated purpose.
9. Heat solutions in test tubes so that there is no hazard to self or neighbors.
10. Inspect glassware for cracks (especially 'star cracks') before use.
11. Construct and clamp reaction apparatus thoughtfully in order to permit manipulation without the need to move the apparatus until the entire reaction is completed.
12. Use a plastic safety bucket when transporting liquid chemicals, reactive solids, and large amounts of glass equipment from the service center.

## SAFETY RULES FOR TEACHING LABORATORIES

13. No persons other than class members are allowed in the laboratory without permission of the instructor. All visitors are required to wear protective eye wear.
14. Wash your hands thoroughly before leaving the laboratory.
15. Think, act, and encourage safety until it becomes habit.

### **N. ACCIDENT REPORTING**

1. Any accident should be reported to your instructor.

### **O. HAZARD WARNING**

1. CAUTION – the solids, liquids and gaseous substances, and combinations thereof, used in experiments are potentially hazardous in one or more of the following ways:
  - a) They may be irritants to or have caustic action on the skin, mucous membranes, lungs, and eyes
  - b) They may be systemic poisons
  - c) They may be flammable or explosive

### **P. ORIGIN OF HAZARDS**

Unexpected and possibly dangerous situations can result from one or more of the following:

1. Incorrect transfer and handling procedures
2. Incorrect reaction temperatures
3. Using incorrect amounts of chemicals
4. Incorrect order of addition of two or more substances
5. Incorrect rate of addition of two or more substances
6. Using one or more incorrect substances
7. Incorrect disposal of chemicals
8. Incorrect dilution of concentrated acids (REMINDER: acids are ALWAYS added to water, slowly, carefully and with stirring)
9. Heating a closed system

### **Additional Items for Upper Division Labs**

### **Q. COMPRESSED GASES**

1. Secure all compressed gas tanks in upright position with chains positioned at 1/3 and 2/3 of the cylinder's height.
2. Use only the appropriate regulators. Never substitute.
3. When using a compressed gas tanks, never open the main valve more than one-half turn.
4. Shut off tanks when not in use.
5. Transport and store tanks properly. Use hand trucks for transportation. Mark empty tanks with "MT."

### **R. COLD TRAPS AND CRYOGENIC HAZARDS**

1. Use appropriate gloves and eye protection with all cryogenic liquids; use gloves with dry ice.

# **SAFETY RULES FOR TEACHING LABORATORIES**

This page intentionally left blank

## **SAFETY RULES FOR TEACHING LABORATORIES**

---

### **NON COMPLIANCE WITH SAFETY RULES**

#### **FAILURE TO COMPLY WITH THE PROPER PROCEDURES AND PRESCRIBED SAFETY PRECAUTIONS SHALL SUBJECT THE STUDENT TO DISCIPLINARY ACTION!**

1. Any student who engages in unauthorized experimentation, or who seriously disregards safety, thereby endangering self or others shall be withdrawn immediately from the class with a failing grade.
2. Any student who shows persistent disregard for safety may have his/her laboratory grade lowered and may eventually be withdrawn from the class with a failing grade.

Print Full Name: \_\_\_\_\_

SJSU ID: \_\_\_\_\_

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

Course: \_\_\_\_\_

Section: \_\_\_\_\_