

BIOLOGICAL SCIENCE DEPARTMENT SAFETY RULES FOR TEACHING LABORATORIES

IMPORTANT PHONE NUMBERS

Microbiology Service Center:	Veronica Zavala	4-4926
Biology Department Office:		4-4900
College of Science Safety:	Randy Kirchner	4-5004
	Huong Nguyen	4-4875
	Mikey Walsh	4-4875
University Police:		4-2222

SAFETY IN THE LABORATORY

A. PERSONAL PROTECTIVE EQUIPMENT

- I. Various lab courses may require personal protective equipment including lab coat, gloves, and eye protection. Always follow instructor directions.
- II. Clothing should be appropriate to the laboratory. There should be minimum skin exposure when working with hazardous materials. Long pants or equivalent, shoes that cover the entire foot, and shirts that overlap with pants are required. Laboratory aprons or lab coats protect clothing and provide an additional barrier to hazardous materials. Confine long hair.

B. ONLY THOSE LABORATORY EXERCISES DEMONSTRATED AND DISCUSSED DURING CLASS ARE PERMITTED.

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

D. BIOLOGY 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 4-5004 or 4-4875 for the chemical safety office in Duncan Hall or for the Biology Office for assistance 4-4900. After 5:00 pm or on weekends call 911 from campus phones.

2. Building Evacuation

If you hear the emergency alarm, or are told to evacuate by Emergency Coordinators or Monitors, turn off gas at your lab bench, 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 people will move them to safety. Evacuation devices are located on the 4th and 6th floor of every stairwell in Duncan Hall.

Follow the instructions of the Emergency Coordinators. Once outside, move immediately to the other side of San Salvador Street once exiting from Duncan Hall. Be alert in crossing the street to avoid emergency vehicles, downed power lines and other hazards. 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, line up against the inner hall walls and protect your head. Remain inside the building pending instructions from University Police or Emergency Coordinators. Evacuation monitors will attempt to direct building occupants away from windows and other hazards such as falling objects, electrical wires, chemical spills, fires, etc., if evacuation becomes necessary. Once outside, move away from building and be alert for any emergency vehicles, downed utility poles/wires and natural gas leaks.

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 in the case of a small, incipient fire. If the fire cannot be controlled or is large, close all doors and confine the fire.

Stay calm. Use the back of your hand to test whether doors or handles are radiating heat. Avoid breathing heated air. Use a moist towel or piece of 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 in the building.

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 stay at your lab station and have your partner 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. First aid should be started at once on anyone who has been contaminated by the spill. Take care that the first aid treatments given are appropriate to the material spilled and that spreading of the contamination does not occur. Report spills to Randy Kirchner (4-5004) for assistance and record keeping.

Some specific chemicals have very particular first aid procedures, such as hydrofluoric acid and phenol. Always consult the Safety Data Sheet for first aid response instructions before using a chemical. In general, the following procedures detail how to respond to an exposure in the laboratory:

For a hazardous chemical exposure to the eyes:

1. Move the exposed person to the eyewash station and activate the eyewash system.
2. Forcibly hold both eyes open under an emergency eyewash, ensuring an effective wash behind both eyelids.
3. Remove contacts while flushing, if worn.
4. Wash for at least 15 minutes.
5. See medical attention if needed or desired. For emergency response, dial the SJSU Police Department at 408-924-2222 or at 911 from any campus phone.
6. Report the injury to the Principal Investigator and to EH&S (408-924-1969).

For a non-hazardous chemical exposure to the eyes:

1. If the eye(s) is exposed to glass, metal, wood, or another type of particulate, do NOT flush with the emergency eyewash.
2. Cover or close the eye(s).

3. Seek medical attention, dial the SJSU Police Department at 408-924-2222 or at 911 from any campus phone.
4. Report the injury to the Principal Investigator and to EH&S (408-924-1969).

For a skin exposure to a hazardous chemical:

1. Wash the affected area with tepid water from an emergency safety shower (or sink if the site is small and localized, such as an exposure to the wrist only).
2. Remove or cut contaminated clothing while rinsing. Do not pull contaminated clothing over the head.
3. Rinse affected area for at least 15 minutes or as is indicated in the Safety Data Sheet.
4. See medical attention if needed or desired. For emergency response, dial SJSU Police Department at 408-924-2222 or at 911 from any campus phone.
5. Report the injury to the Principal Investigator and to EH&S (408-924-1969).

For inhalation of chemical vapors, fumes, or smoke:

1. If exposed person is unconscious, DO NOT ENTER THE LAB and become the next victim if the possibility of oxygen depletion, toxic vapors, or an explosive atmosphere exists. Dial 911 for emergency response (or 408-924-2222 from a non-campus phone).
2. If the exposed individual is conscious, move the person to fresh, uncontaminated air. Seek medical attention if necessary or desired.
3. Report the injury to the Principal Investigator and to EH&S (408-924-1969).

For chemical ingestion:

1. If it is safe to do so, move the affected individual to an uncontaminated area.
2. Dial 911 from a campus phone or 408-924-2222 from a non-campus phone.
3. Do not induce vomiting or drink water or other liquids unless told to do so by emergency personnel.
4. Report the injury to the Principal Investigator and to EH&S (408-924-1969).

For cryogenic liquid exposure:

1. If skin comes in contact with a cryogen, place affected area in a warm water bath (NOT above 40 °C/104 °F). Never use hot or cold water or dry heat. Thawing of the affected area must be done slowly.
2. If a burn from a cryogen occurs, do not rub the burned area. Rubbing can cause further tissue damage.
3. Seek medical attention as soon as possible for all frostbite injuries.
4. Report the injury to the Principal Investigator and to EH&S (408-924-1969).

6. Injuries

All injuries must be reported to the instructor. In the event of a serious injury or life threatening situation, call 911 immediately, and then try to obtain help and to provide first aid. All injuries require an injury report to be filled out by the instructor and turned in to the department office. For the treatment of minor any injuries, the student should be escorted to the Student Health Center. Report any injuries to the Department Chair.

E. INGESTION HAZARDS

1. No pipetting by mouth! Pipetting by mouth is absolutely prohibited. Pipetting devices will be provided.
2. No foods and drinks are allowed in lab. Eating, drinking, or use of cosmetics in the laboratory is also not permitted.
3. Never use chemical equipment as containers for food or drink.
4. Never use food or drink containers to store chemicals.

5. Smoking / vaping 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, and how to use them. In case of serious accidents, where more than one student's eyes are exposed to chemicals, transport them to the next closest shower/eyewash.
2. If chemicals are spilled on the skin, immediately wash with copious amounts of water for 15 minutes.
3. Clothing should be appropriate to the laboratory. There should be minimum skin exposure when working with hazardous materials. Long pants or equivalent, shoes that cover the entire foot, and shirts that overlap with pants are required. Laboratory aprons or lab coats protect clothing and provide an additional barrier to hazardous materials. Confine long hair.

G. INHALATION HAZARDS

1. Experiments which generate airborne contaminants such as dusts, mists, fumes or vapors shall be performed in the fume hoods, not laminar flow hoods or biosafety cabinets.
2. Do not inhale fumes.
3. So that hoods draw properly, laboratory windows and doors should be kept closed. 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

1. Learn the location of the fire extinguisher and fire blanket-use them if you have proper training.
2. Learn what substances are flammable. Never use an open flame to heat a flammable liquid.
3. Only permitted materials should be stored in teaching lab lockers. Such materials should be clearly labelled with the chemical name (not formula or structure).

I. BIOHAZARDOUS WASTE

1. Biohazardous Waste Segregation:

SHARPS include devices that have acute rigid corners, edges, or protuberances capable of cutting or piercing, including, but not limited to hypodermic needles, needles with syringes, lancets, blades, acupuncture needles, blood vial contaminated with biohazardous waste, and broken glass items.

BIOHAZARDOUS includes laboratory waste, human or animal specimen cultures; stocks of infectious agents, wastes from production of bacteria, viruses, spores, discarded animal vaccines, and devices used to transfer, inoculate, and mix cultures; human or animal surgical specimens or tissue, and fluids suspected to be infected with agents known to be contagious to humans; waste containing recognizable fluid blood, fluid blood products.

PATHOLOGY is biohazardous waste including surgical specimens or tissues that have been fixed in formaldehyde or other fixatives. It also includes recognizable human body parts.

2. Biohazardous Waste Containment

Approved containers with labels shall be rigid, leak resistant with tight fitting lids and separated from all other waste. Biohazardous waste shall be placed in red biohazard bags labeled "Biohazardous Waste" and placed in containers with appropriate labels.

1. Biohazard containers should not exceed 75% capacity. If it becomes full, inform your instructor to replace with a new biohazard bag. **DO NOT** place any glass into the biohazard container (e.g., test tubes, slides, cover slips, and broken glass).
2. All gloves are to be disposed of into the biohazard containers. Gloves are **NOT** to be placed into the regular trash. Gloves must not be worn outside the laboratory. No gloves are permitted in the hallway.
3. Pipet tip discard containers should not exceed 75% capacity. If it becomes full, inform your instructor to replace with a new biohazard bag.
4. Contaminated serological pipets are to be discarded into the serological pipet discard only. Place pipets into the discard with tips down.
5. Do not overfill sharps containers. Replace sharps containers once they become 3/4 full.
6. All discard containers must have lids to them. Place lids back onto all containers before leaving lab.
7. All used glassware is to be placed on assigned discard areas or carts. Remove all markings from glassware.
8. Place discarded tubes into appropriately sized racks on discard cart. Small tubes slip out of large racks and spill or break.

J. CHEMICAL WASTE AND CLEAN-UP

1. For each experiment, take only the minimum amount of chemicals actually needed. Place them in **labeled** containers.
2. 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.
3. **WASTE CONTAINERS SHOULD NOT EXCEED 75% CAPACITY.**
4. Place broken glass in the appropriate container. If biohazardous, broken glass should be disposed of in a sharps container. Otherwise, a standard broken glass discard box (cardboard) will suffice for non-contaminated glassware.

K. HOUSEKEEPING

1. 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. Laboratory bench space must be sponged down at the end of each laboratory period with the appropriate cleansers.
2. Chemical spills must not be cleaned up without the help of trained personnel. Contact your instructor in the event of a chemical spill.
3. Spills on the floors should be cleaned promptly. Notify instructor for proper clean up of chemical or hazardous spills.
4. Access to exits, emergency equipment, and controls should never be blocked.
5. Backpacks and personal items should not be left where they will interfere with movement through the lab.
6. 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.

7. Do not store anything in teaching lab lockers except for equipment and materials approved by the instructor. All materials must be labeled according to item 7 above. Do not store concentrated acids, bases, flammable substances or oxidizers in your locker.

L. GLASSWARE

1. Broken glass should be handled and disposed of properly (hand brooms or use of tongs).
2. Broken non-contaminated glass should be disposed of in appropriate containers. No paper or gloves are to be disposed of into the glass disposal container unless they contain glass shards.
3. Use Sharpie pens to write on glassware but do not write on any white marked areas on glassware.

M. USE OF DEPARTMENT INSTRUMENTATION AND TRAINING

1. All individuals will be appropriately trained to use any instrument or device. This training can be done by instructor or staff member. Equipment will not be operated until instruction is received.
2. Individuals intending to use department equipment will sign in on the sign-up sheet (when appropriate) in order to identify and contact the person should any problem arise during instrument use.

N. WORK OUTSIDE REGULAR LABORATORY HOURS

No work will be done in the laboratory outside of scheduled times unless first approved by the instructor. If approved, students must sign in to use the lab. No student should do experimental work in the laboratory unless an instructor is in the vicinity. Working alone is extremely dangerous. At least two persons should be present in the laboratory. Visitors are not permitted in the laboratory unless first approved by the instructor.

O. GENERAL SAFETY

1. Work with chemical materials only after you have learned about their flammability, reactivity, corrosiveness and toxicity. The hazard pictograms on reagent labels can provide some of this information. Ask your instructor when in doubt of specific chemicals you are handling.
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 materials 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 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. Inspect glassware for cracks (especially ‘star cracks’) before use.
10. No persons other than class members are allowed in the laboratory without permission of the instructor.
11. Do not leave an open flame unattended when using Bunsen burners. Make sure that the gas is completely turned off before leaving lab.

12. Wash your hands thoroughly before leaving the laboratory and after handling potentially hazardous materials or laboratory animals.
13. The laboratory instructor will provide additional safety rules and instructions for specific procedures or materials used in this course. Any additional information received or attached herewith shall be considered an integral part of these instructions.

P. ACCIDENT REPORTING

Any accident should be reported to your instructor immediately.

Q. 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 health hazards (toxic, carcinogens or reproductive toxins).
 - c) They may be flammable.

**ADDITIONAL SAFETY RULES FOR
UPPER DIVISION LABORATORIES**

A. 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.

B. COLD TRAPS AND CRYOGENIC HAZARDS

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

FIELD SAFETY

Some laboratories may involve off-campus field trips. During these trips, you are expected to stay with the group and explicitly follow all instructions and safety regulations provided by your instructor. You are also expected to comply with all the safety requirements of the agency that oversees the site that you are visiting.

A. Emergency Contact Information

All students are required to fill out a student field trip form with emergency information that includes next of kin contact and known allergies, prior to doing fieldwork, for each course. These documents are kept on file in the Department of Biological Sciences for the semester.

B. Motor Vehicle Safety

All drivers using University owned or rented vehicles for field trips must be SJSU employees or registered volunteers with a valid driver's license, must observe all traffic safety laws, and pass the CSU Defensive Driving Training Exam.

1. Students need to be aware of their surroundings at all times, especially when boarding or exiting vehicles and walking along any type of road exposed to traffic.

Students are encouraged to use University transportation when available; however, the University is not liable for accidents that occur when students provide their own transportation to meet at a pre-determined field trip site.

C. Precautions

1. Students should dress appropriately for field trips and anticipate inclement weather conditions. Instructors should monitor students for sunstroke and hypothermia symptoms and inform students of basic weather patterns to determine if weather should create hazardous conditions.
2. A basic first aid kit should be carried by the instructor when in the field. Students are responsible for personal items including sunscreen, insect repellent, and prescription medications.
3. All individuals are encouraged to bring water and food as appropriate for the length of the field trip.
4. Instructors should familiarize themselves with emergency services locations (clinics, hospitals, park ranger station, etc.) prior to trips.
5. Students should inform their instructors of any individual medical conditions prior to going into the field such as allergies to insect stings, diabetes, asthma, and/or physical disabilities.
6. Any student who is uncertain about the types of potential hazards or physical requirements that may exist should consult the instructor. Any student who feels that a particular activity exceeds his/her physical capabilities should alert the instructor prior to a field trip.

D. Field Safety

1. A "buddy system" should be used when in the field. This ensures that each individual has a partner who knows his or her whereabouts at all times. Do not wander off alone.
2. Potential environmental hazards may include, but are not limited to:
 - a. **Stings from venomous insects (bees/wasps).** Medication for immediate relief from stings may be carried in the first aid kit, but students who know they react severely to such stings are advised to carry appropriate medications.
 - b. **Bites from venomous snakes.** Care should be taken to note and avoid poisonous snakes in the field. When in doubt, if a snake is poisonous, ask the instructor. In case of snake bite, return to the vehicle and seek prompt medical attention.
 - c. **Poisonous plants.** Students should be shown how to identify common poisonous plants and should be instructed to avoid them. This precaution includes poison oak that can cause contact dermatitis, and plants that might be poisonous upon ingestion (some mushrooms and berries). Students should not eat field-collected plants or fruit.
 - d. **Ectoparasites (ticks).** Tick-borne Lyme disease poses a threat to individuals working in grassy, wooded areas. Students should be advised on tick safety measures including tucking and taping pant legs, using repellents, and frequent tick body checks. Any ticks found on the body should be carefully removed. Consult your doctor promptly if you experience symptoms (fever, joint aches, swollen glands, reddish flushing of skin) following a tick bite.
 - e. **Endoparasites (*Giardia*).** Never drink untreated water. Water obtained from sources in the field should be boiled, filtered, or chemically treated before consumption. Wash hands after handling soil, especially before eating.

- f. **Lightning.** If a thunderstorm threatens, seek shelter in a building or vehicle. Seek protected areas such as ravines or valleys, and avoid open areas and exposed and or elevated landscape areas such as hilltops. Never stand near or under isolated tall objects, such as trees or power poles, and avoid cover under rock overhangs or in other situations where an individual could become part of the shortest path of lighting to ground.
- g. **Uneven terrain.** Students may be exposed to areas of uneven terrain, and at risk to injury to due falls. Instructors should remind students to exercise caution when hiking in steep terrain, and slippery areas such as moss-covered rocks and waterfalls.

E. Aquatic Field Exercises

Special precautions will be taken for any field research around or in water and will be provided by the instructor for a specific course.

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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:

Signature: Date:

SJSU ID:

Course: