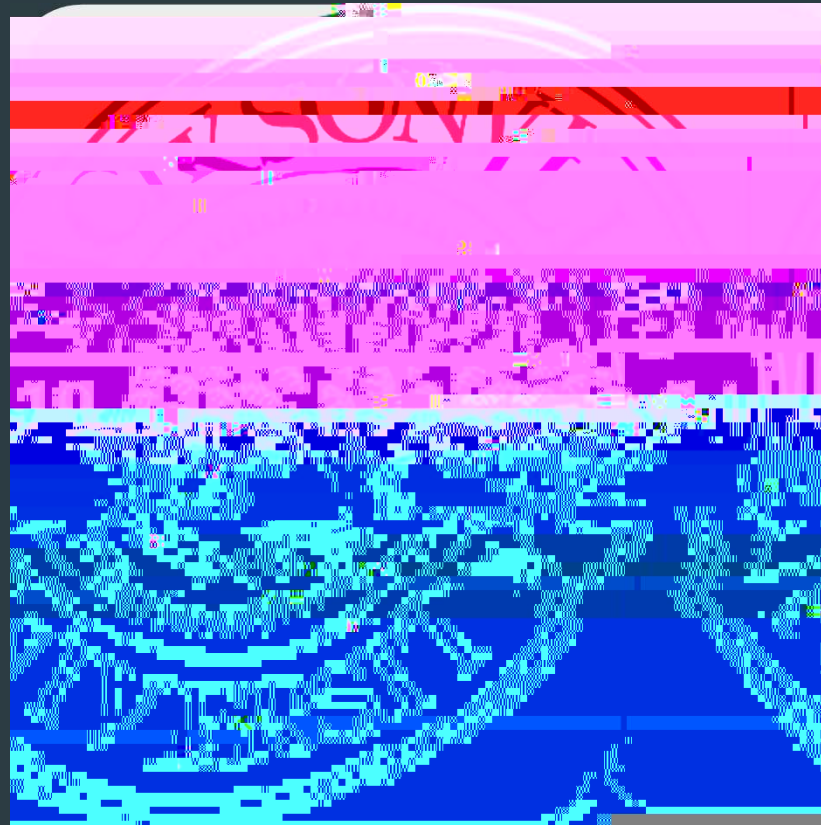


# Jacksonville University's Laboratory Safety and Chemical Hygiene Training



**14-August 2023**

# Purpose

**This training has been developed to provide an overview of safety policies and procedures that have been developed by Jacksonville University for safe attendance and performance in science laboratories on campus**

**Topics covered in this training will include:**

**General laboratory safety policies**

**Hazard communication**

**Personal protective equipment (PPE)**

**Emergency response**

**Chemical hygiene**

**Waste identification and disposal**

**Safety and security**

# Who should take this ..

**This training is required for all...**

**Faculty**

**Graduate students**

**Student workers**

**Appropriate staff**

**Chemistry students involved in the senior research project course**

**Undergraduate students participating in research with a faculty member**

# **But I did it last year...**

**All individuals involved with scientific laboratory instruction/research, must take this training on an annual basis**

**This should be completed by the 2<sup>nd</sup> week of the Fall semester**

**If an undergraduate student joins a scientific lab in the middle of the semester, they must first complete this training before starting any research activities**

**If a workstudy student is hired in the middle of the semester, they must first complete this training before starting duties**

# How do I get my certificate?

After reviewing all material regarding laboratory safety and chemical hygiene, you are required to take a short quiz, which is found on the blackboard site.

You must get at least 80% on the exit exam to pass.

All individuals who pass will receive a certificate from either Carla or Tabitha. This certificate should be saved for your personal records.

A record will also be kept by both Carla and Tabitha.

# Additional Training







# Laboratory Safety: General Practices

When working in the laboratory environment, there are some basic safety practices that all faculty staff, and students should engage in

**Never eat, drink, smoke, chew gum, or apply cosmetics in any lab or during any lab activity**

**Label all microwaves/ fridges used for lab operations**

**Do not smell or taste chemicals to identify**

**Do not use damaged glassware**

**Never use mouth suction for pipetting/ siphoning**

**Label hot glassware and hotplates recently used**

**ALWAYS wash hands & exposed skin before exiting lab**

**Know the location of safety data sheets (SDS) in your area; they should always be accessible to all employees/ students in the work area**

**Avoid working alone and/ or late at night. If unavoidable, do not conduct hazardous operations and have someone check on you periodically**











# Hazard Communication SDS



## Safety Data Sheets (SDS)

**Gives guidance for handling/ use/ storage of a hazardous material**

**Consult the SDS any time you are unfamiliar with a hazardous material**

**Copies of the SDS for each hazardous material used in a laboratory are accessible for all faculty/ staff/ students in the location where the material is used/ stored**

**Be sure to locate their storage area in relation to your lab**

**Additional copies are on file with Security and the Chemical Hygiene Officer**

# Hazard Communication Reading SDS



## Safety Data Sheets (SDS)

Comprised of many different sections

Usually several pages long however the new GHS system has standardized their organization

Each section details specific information regarding the hazard communication of that material

Sections 1- 11 give most of the pertinent information required for safe handling/ storage/ use of the substance





# Hazard Communication Reading SDS



## Section 7 – Handling and Storage

Safe handling and storage procedures

## Section 8 – Exposure Control/PPE

Recommendations for proper PPE, OSHA exposure limits, engineering controls

## Section 9 – Physical/Chemical Properties

Appearance, color, pH, flammability etc.

## Section 10 – Stability/Reactivity

Recommended storage to avoid reactivity with incompatible chemicals

## Section 11 – Toxicology

Toxicological information recorded on observed effects related to exposure



# PPE Clothing

The following are a list of guidelines to assist in recognizing the proper clothing for wet-chemistry lab activities

**Wear close-toed shoes that cover the top of the foot, and if possible low heeled shoes with non-slip soles**

**Wear pants or skirts which completely protect the entire leg from the waist to the ankle**

**Wear shirts or blouses which completely protect the torso from the waist to the neck**

**Shoulders must be completely protected with sleeves**

**Tanktops, halters, shorts, cutoffs, etc. are not acceptable**

**Avoid tights, leggings and pantyhose as they do not provide a significant barrier and may trap a chemical spill against your skin**

**Restrain loose hair and remove or restrain loose clothing and jewelry**

**When working**

**1**

**may trap a**

# PPE Lab Coats

Lab coats are recommended when handling any hazardous material, but are required when working with particularly hazardous substances (PHS), unsealed radioactive materials, pyrophorics, potentially hazardous biological agents (PHBAs) or when indicated by hazard assessment.

# PPE Lab Coats & Students



Store lab coat in sealed plastic bag if it must be removed from lab

**Faculty should include lab coats and other student supplied PPE in their adoptions each semester**

**Student lab coats are available in the bookstore and faculty should inform students of whether a disposable coat can be used or if a cloth coat is required**

**Disposable coats are typically not appropriate for chemistry labs**

**Students may turn in grossly contaminated coats or coats which cannot be decontaminated for disposal.**

**Coats can be decontaminated via the autoclave in Reid 109**

**See Lab Manager for assistance**

# PPE Aprons





# PPE Eye Protection

The following table gives guidance for the proper selection of safety eyewear in the laboratory setting

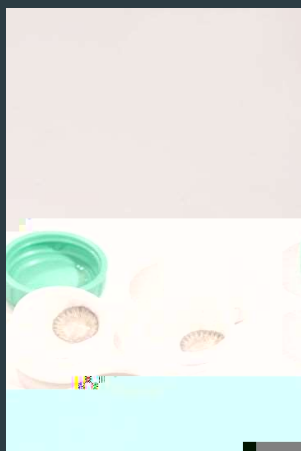
Type	Usage	Comments





# PPE Regarding Contact Lenses

**Staff/faculty/students are permitted to wear contact lenses in the lab, provided they adhere to the following instructions:**



**They are not banned by regulation or contraindicated by medical or industrial hygiene recommendations**

**Appropriate eye protection is always worn**

**Contacts do not provide eye protection**

**Contact lenses are removed in a clean environment after washing hands at the first sign of eye redness or irritation**

**Faculty/staff should also consult the SDS and other technical information to determine if contact use is contraindicated for a particular chemical**

**Instructors must inform students when contact lens use is prohibited**

**In the event of a chemical exposure, wearers begin eye irrigation immediately & remove contact lenses as soon as practical**

**Do not delay irrigation while waiting for lens removal**

# PPE Gloves

**Wear appropriate gloves when handling hazardous chemicals/PHBAs, when handling rough**

# Laboratory Safety: Emergency Response

**Prevention is the best response, so be prepared!**

**Familiarize yourself with the properties of chemicals prior to working with them, and know how to respond in an emergency**

**Contact Lab Manager or CHD if you are unsure or have questions**

**Be sure to ALWAYS go over lab safety and emergency response with students at the start of each term and when deemed necessary during the term**

**Know and show the location of emergency equipment:**

**Spill kits**

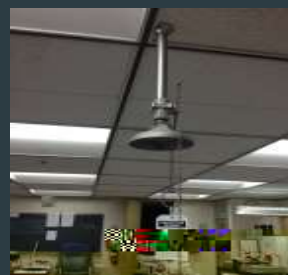
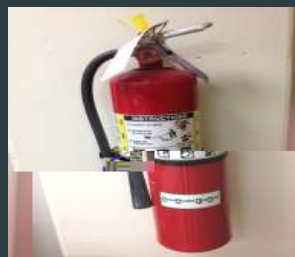
**Showers/Eye Washes**

**Fire Extinguishers, Fire Alarm Pull Stations, Fire Blankets, Etc.**

**SDS stations**

**Emergency Phone Numbers**

**Exits**



# Laboratory Safety: Emergency Response (Fire)

**Sound the fire alarm**

**Only attempt to extinguish small**

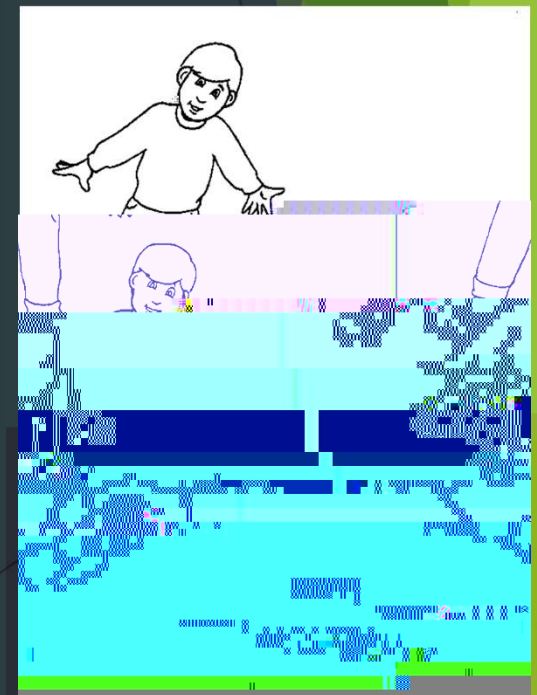
# Laboratory Safety: Emergency Response (Clothing Fire)

**If clothing catches on fire, STOP, DROP and ROLL on the floor while covering your face with your hands to smother the fire.**

**Others in the area can use a fire blanket to assist with smothering the flames. Be cautious of creating a smokestack effect and directing flames toward the person's face.**

**DONOT RUN to the safety shower; exit, or fire blanket as running will make the fire worse.**

**Be prepared and know how you will respond!**



# Laboratory Safety: Blocking Emergency Egress

Anyone teaching in Reid 105? Please DO NOT block the emergency egress point...



Whether working in a lab or lecture area, emergency exits need to remain unobstructed

Blocking an emergency egress point is a violation of policies from the National Fire Prevention Association (NFPA) and the Occupational Health and Safety Administration (OSHA) and presents a significant issue that can lead to loss of life in an emergency situation







# Laboratory Safety: Biological Pandemic Response

**In the event of an outbreak or defined pandemic by campus or outside authorities (such as COVID 19), the following additional guidelines should be followed for laboratory participation**

**Maintaining a minimum distance of 6 feet from others at all times**

**Regular use of hand sanitizer (minimum 70% alcohol) before and after laboratory activities**

# Laboratory Safety: Exposure Response

In the event of an exposure to a hazardous substance, always consult the SDS for that material/chemical for guidance. In general, the following are the proper responses to common exposures in the lab:

## Chemical Splash to Eye

Immediately proceed to closest eyewash and flush with water for at least 15 min while holding eyelids open and moving eye continuously

Remove contact lenses, contact Security immediately and ask for them to call for medical assistance

## Chemical Splash to the Skin (may not apply if water reactive or dry chemical)

Immediately flush with copious amounts of water; remove contaminated clothing while continuing to flush

Contact Security immediately and ask for them to call for medical assistance

# Laboratory Safety: Post-Incident Evaluation

**Campus Security (904) 256 7585**

## **Faculty Incidents**

**Faculty who need medical assistance or assessment after a laboratory incident will be directed to the Arlington CareSpot near campus for medical treatment/evaluation**

**CareSpot Arlington**

**1021 Cessery Blvd**

**Jacksonville, FL 32211**

**(904) 323 0714**

**<https://wwwcarespot.com/locations/florida/arlington-cessery>**

**Hours of Operation**

**MF 8AM- 8PM**

**Sat and Sun 8AM- 5PM**

## **Student Incidents**

**Students who need medical assistance or assessment can now go to the Student Health Center at the Health Center Complex on North campus for treatment/evaluation**

**Student Health Center: <https://wwwju.edu/healthcenter/>**

**Students are also able to go to the same CareSpot as faculty for services, if necessary or desired**

**Students will be billed for services through their own insurance**

# Something to Consider...

**As an instructor or graduate student/student worker**

# Chemical Hygiene: Chemical Storage

**Once a chemical is received by the University it must be properly stored in relation to its condition, state, or reactivity**

**Inspect for leaks, damaged, or deteriorating containers**

**Report faulty containers to the Lab Manager immediately**

**Store all chemicals on shelves with a 1/2' lip, when possible**

**Determine if specialized storage in a flammable, corrosive, or other vented cabinet is required**

**Use chemical's SDS for guidance; if unsure, seek out Lab Manager for help**

**Segregate incompatible chemicals on storage shelves or lab benches (if in use)**

**Use secondary containment whenever possible**

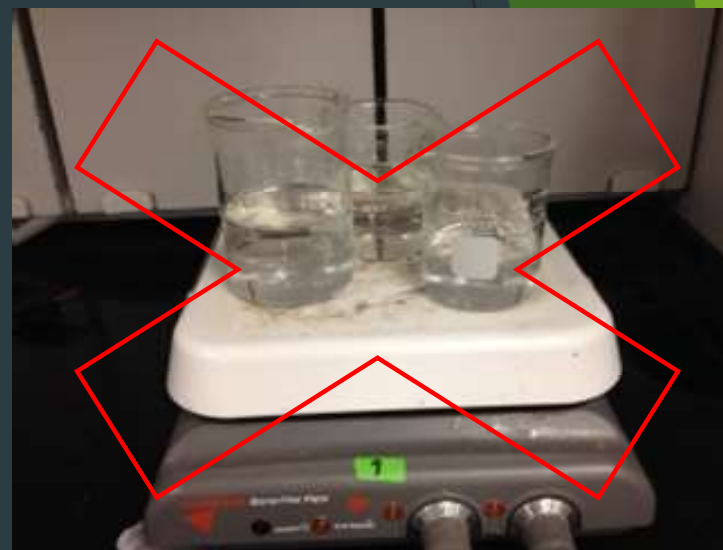
**Avoid storing chemicals above eye level whenever feasible**

# Chemical Hygiene: Chemical Storage



**Proper storage in closed container w/ GHS label on a shelf**

**VS**



**Unlabeled containers stored in fume hood (not proper storage)**

# Chemical Hygiene – Labeling

For the safety of all working in or around hazardous materials and chemicals in University laboratories, all non primary containers for utilizing or storing hazardous material or research samples are required to have the following information on the container itself (either directly or with the use of permanent marker and labelling tape):

**Full name of the constituents of the container**

No chemical abbreviations (i.e.,  $H_2O$ ,  $CH_3OH$  etc.) or short-hand abbreviations (TMS, HF, NSSH#3, UnknownA, etc.)

**Initials of the person who created/labeled the container**

In the case of undergraduate/graduate research, the initials of the faculty advisor or PI is recommended to be listed as well.

**Date the container was created/labeled**

**If available, the proper GHS classification pictogram for the contents within**

Check the SDS of your material for the proper hazard pictograms

See your Lab Manager for decal availability





# Chemical Hygiene: Fume Hoods

**Use a fume hood to handle chemicals when the manufacturer or SDS recommends it. A fume hood should also be used with**

**Chemicals with a National Fire Protection Association (NFPA) Health rating of 3 or 4**

**Toxic volatile materials (chloroform, formaldehyde)**

**Flammable chemicals**

# Engineering Controls – Fume Hoods

## **Key Safe Work Practices**

**Verify proper operation and annual certification prior to each use.**

**Discontinue use of and report non/in properly operating hoods**

**Do not place head in or lean into hood**

**Appropriate eye protection and other PPE is still required while using fume hood**

**Ensure unit exhaust on whenever chemicals present.**

**Do not store chemicals in hood. This can disrupt airflow or cause hazardous vapor buildup during set-back periods**

**Keep sash as low as possible & never higher than safe sash height. Close sash when not in use.**

**Avoid airflow disruption – work 6' inside face, keep doors/windows closed, elevate bulky equipment, avoid rapid movement and walking close to an in use hood**

**Do not place electrical power/ignition sources inside hood (e.g. power strips, extension cords, etc.).**

**Do not use for perchloric acid or radioisotopes unless designed**

**Do not use for biohazards**

# Chemical Hygiene -



# Engineering Controls – Biosafety Cabs

**Key Safe Work Practices for using Biosafety Cabinets**

# Chemical Hygiene: Waste Determination

**There are 5 main disposal processes in most laboratories**

**Regular Trash**





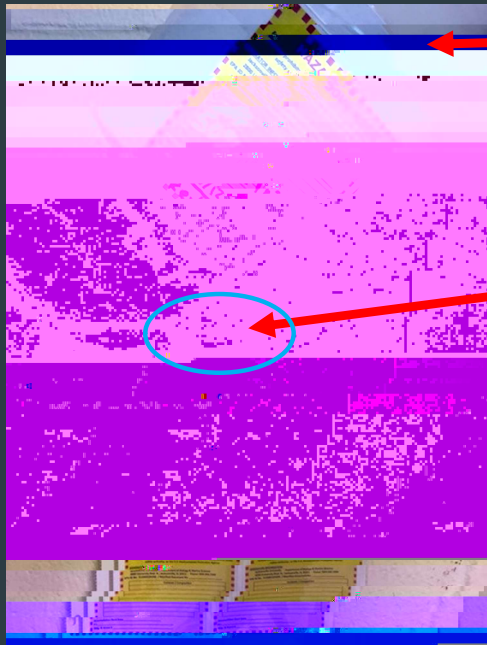






# Chemical Hygiene: Hazardous Waste Disposal

\_\_\_\_\_ : Does this look like the appropriate container for this waste method?



This is a 3L container

There is only about 200ml of actual waste in this 3L container...

\_\_\_\_\_ : NO Please be mindful of this situation in your labs and ask your Lab Manager for assistance to avoid this type of error in the future.

# Chemical Hygiene: Biohazardous Waste

Any waste that represents or comes in contact with an infectious agent or material that has the potential to transmit illness or disease is considered **biohazardous waste**

## Red Bag Waste (box)

**Infectious biological specimens**

**Biological samples/fluids, petri dishes of microorganisms**

**Materials utilized and exposed to infectious biological agents**

**Gloves, paper towels, etc.**

**ONLY if they've been exposed**

# Chemical Hygiene: Biohazardous Waste

## Red Sharps Containers

ONLY for sharp materials that have been exposed to infectious biological agents or

# Chemical Hygiene: Transporting Biohazardous Waste

When transporting biohazardous waste from a laboratory to Reid 109 for autoclave disposal, make sure the following guidelines are adhered to

**Proper PPE must be worn**

Lab coat

Chemical splash goggles

Gloves

**Secondary containment used to prevent incidental spill**

Examine waste bags for holes, tears, or protruding objects (pipette tips)

Place bags in secondary containment on cart and transport to autoclave table in Reid 109

NEVER transport a biohazardous waste bag by hand, or without secondary containment

Be sure to spray down cart and containment with Lysol (10%) when finished

**If Reid autoclave is offline...**

Autoclave at MRI can be used, but across campus transport of waste requires special handling

Contact Lab Manager for assistance

Boboxes can be used, must be disposed of within 30 days of closure

Let Lab Manager know this process was initiated

# Chemical Hygiene: Dissection Specimens

Recent developments in the last 10 years have now allowed us to purchase

# Chemical Hygiene: Drain Disposal

Materials \_\_\_\_\_ from drain disposal include, but are not limited to

Liquids with a flashpoint of less than 140° F

Halogenated hydrocarbons and aqueous mixtures containing halogenated hydrocarbons

Insoluble materials

Solutions containing heavy metals

Water reactive materials

Radioactive materials

Infectious materials

Photographic fixer and developer

Rinseate from acutely hazardous waste

Particularly Hazardous Substances

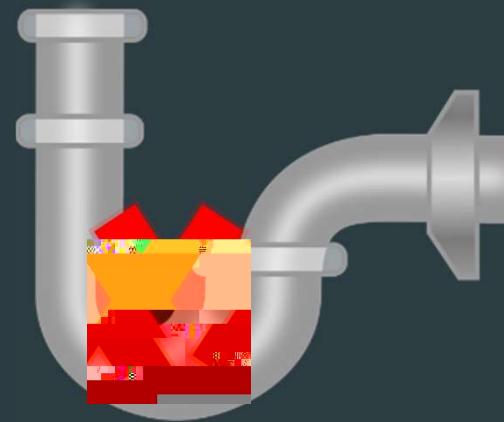
Gram & other stain waste

Pharmaceuticals

Waste with a pH less than 6 or greater than 8

Any waste classified as a hazardous waste

Any waste which violates JEAs Industrial Retreatment Regulations









# Chemical Hygiene - Review

Now that you've got some of the basic approaches down, always remember to consider and address the following before attempting to handle any chemical or biological materials in a laboratory:

**Be familiar with the hazards and standard operating procedures used with the chemical/biological material**

**Always use the recommended & proper engineering controls**

**Consult the SDS, if necessary, and look for proper GHS warning labels**

**Always wear appropriate PPE**

**Practice good housekeeping**

# Questions?

Please contact the following individuals with any questions or concerns

**Tabitha Hotman**

**Laboratory Manager, Department of Biology and Marine Science/  
Laboratory Safety Coordinator / Chemical Hygiene Officer**

**[Thotma@ju.edu](mailto:Thotma@ju.edu)**

**904 256 7323 (office – Nelms 22)**

**Carla Garcia**

**Laboratory Manager, Department of Chemistry / Chemical  
Hygiene Officer**

**[cgarcia12@ju.edu](mailto:cgarcia12@ju.edu)**

**904 256 7300 (office – Swisher 40)**