GUIDANCE DOCUMENT

Topic : Laboratory Safety guidelines for Science Department of Patharkandi College.

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Laboratory Safety Guidelines for Science Departments of Patharkandi College

Prepared by Research and Development Cell,
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Introduction:

Considerations for health, safety, and security are equally crucial to the teaching of science to pupils as any other subject. A constant threat to one's health and the environment is there while working with chemicals, bacteria, etc. The responsibility to maintain lab-specific safety information and documentation is critical because every lab is unique and processes change with new student arrival. Documenting information specific to the lab is the Head of Department's / Lab in-charge's responsibility. When new processes are added, when current processes change considerably, or at least once a year, lab-specific information must be evaluated and authorized by the Departmental Safety Committee or Governing Body.

This guideline book aims to increase laboratory workers' understanding of safety issues and to promote safe working procedures. These succinct instructions, which are applicable to all laboratory users, should serve as a reminder of the steps you can take to perform more safely.

The guidelines and recommendations in this Laboratory Safety Guidelines won't fully protect you unless you put effort into your everyday tasks or at least take a break from them occasionally to look around.

One can maintain complete cleanliness when working with chemicals by following some rules and acting responsibly. Here are a few rules to follow in order to protect our PKDC fraternity, and its properties as well.

General Laboratory Protocols

Basic Rules

- Safety goggles are required for all lab personnel.
- Lab personnel shouldn't work by themselves there.
- Everyone should wear lab coats and full pants when working in the lab.
- Lab coats are not permitted in public spaces such as the cafeteria, restrooms, etc.
- Lab personnel should be familiar with where laboratory safety equipment is located and how to use it.
- Become familiar with the building's and laboratory's exits
- Using blast shields while performing potentially hazardous reactions is highly advised (such as dealing with peroxides, diazo-compounds, high pressure vessels, distillation of high boiling substances).
- When working in the lab, gloves must be worn; they must be taken off before touching surfaces outside the work area (i.e., doorknobs, computers etc).
- Shoes with suitable heel heights should entirely enclose the feet.
- Avoid wearing half pants or shorts and open-toed sandals in the lab.

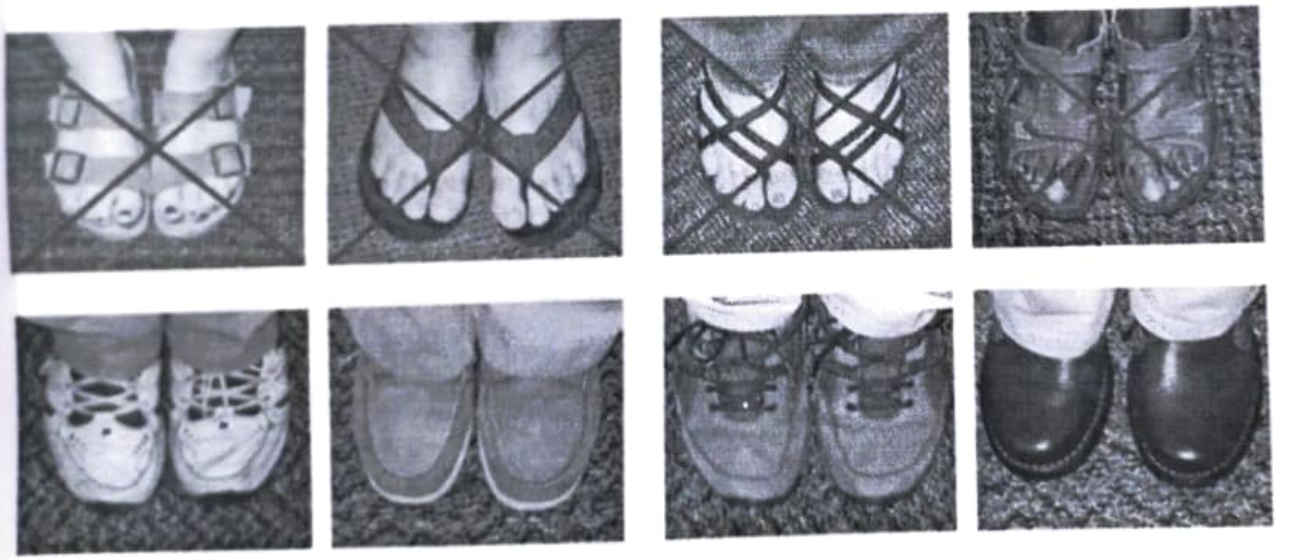
Good Personal Habits & Behavior

- Students should always conduct themselves professionally.
- It is not permissible to eat, drink, chew gum, or use tobacco in the lab.
- It is strictly forbidden to use a cell phone in the lab.
- Do not smell or taste chemicals. Do not utilise ice from the ice makers for laboratory use for beverages, food, or food storage.
- Students and researchers should speak with the appropriate PI or lab manager before handling any unfamiliar chemicals or biological samples.

- Avoid coming into contact with chemicals on your skin.
- Before leaving the lab, hands should be completely cleansed.

Housekeeping

- Lab spaces must be kept tidy and free of clutter.
- Spills need to be cleaned up right away from flooring and work spaces.
- Before requesting repair or calibration services, equipment and instrumentation must be cleaned to remove spills and contaminants.
- Personnel within fume hoods must be able to see clearly through the protective glass sashes.
- Check aisles, exits, and corridors for anything that could cause slipping or tripping risks (e.g., boxes, electrical cords or other items on the floor).
- Ensure that none of the following are blocked:
    - Eyewash/safety showers
    - Electrical panels
    - Fire extinguishers
    - Chemical storage cabinets
    - Fume hoods
    - Waste containers

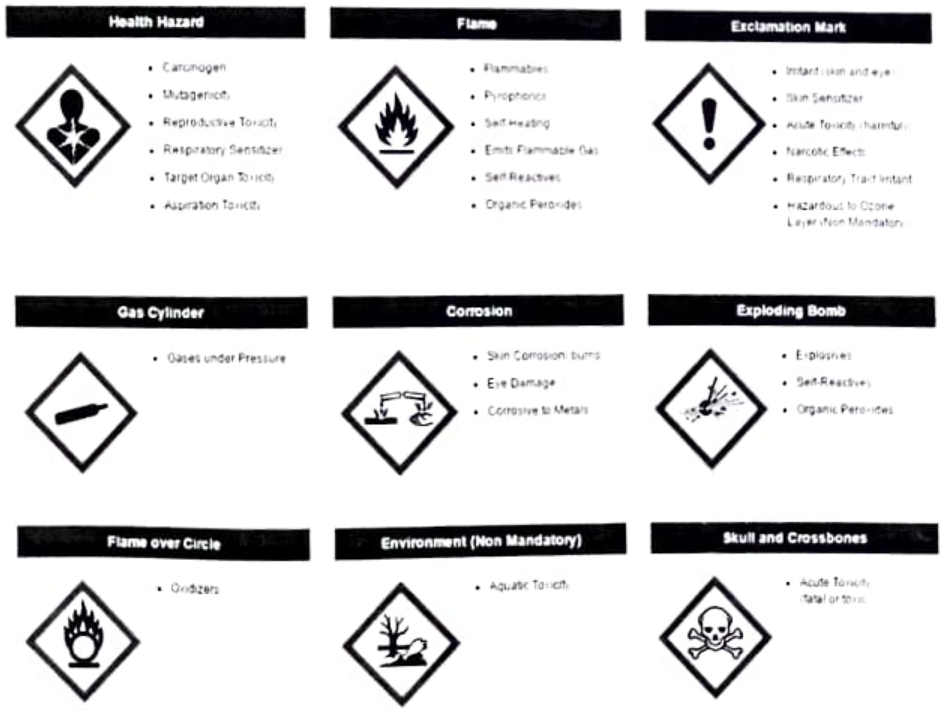


Possible ways to avoid clutters in Labs

- Researchers, students, and visitors are all at risk for many types of safety dangers in congested laboratories. The following are some typical techniques for reducing clutter in laboratories:
- Dispose of chemicals and outdated equipment in a responsible manner.
- Before acquiring chemicals in bulk, inquire about their availability in other concerned labs. • Do not purchase chemicals, solvents, or other stocks in bulk unless there is space available to safely store the commodity. The lab inventory created by each lab should be reviewed by the students.
- Schedule "lab cleanup days" on a regular basis.
- Clear away any debris from fume hoods and make sure they aren't being used as long-term storage for tools, chemicals, or supplies that aren't frequently used there.
- Regularly empty containers containing waste (including trash), and never let them overflow.
- Store extra items neatly and securely so that they are easy to access and have a lower chance of rolling, falling, or spreading.
- Chemical equipment, supplies, and containers should not be kept close to the edges of benches or shelves, and overhead storage should only be used for lightweight, non-hazardous products.
- Never place chemical containers on top of one another directly (unless they are in original cartons that may be properly stacked and/or contain chemicals that are incompatible) (such as acids with bases or flammables with oxidizers).
- Chemical storage containers shouldn't be kept on the floor. Containers should be kept in secondary containment when this cannot be avoided, such as plastic tubs.
- Use radiation tape and sorbent pads to clearly designate any portions of a bench that contain radioactive materials.
- Quickly clean up any spillage. On floors or work surfaces, never leave puddles, dust, or unidentified items.
- Extension cables and/or power strips may not be connected in a daisy chain. Keep supplies, glasses, and other items that aren't frequently used away from workstations.
- Avoid using the leg room underneath desks and benches in a way that interferes with good ergonomic posture.
- Keep your own desk and other areas tidy (free of all hazardous research materials).
- Never store hazardous chemicals in freezers that hold food. • Store lab coats and safety glasses neatly away from potential sources of contamination.
- Only use designated spaces to consume or store food. Keep the laboratory's open space large enough to handle acquisition

Globally Harmonized System

The Globally Harmonized System of Classification and Labeling of Chemicals, or GHS, is a system for defining and categorising chemical product dangers and disseminating information about their health and safety. The intention is for the classification of risks to follow a standard set of guidelines, and for labels and safety data sheets (SDS) to follow a standard format and content. It's crucial that anyone handling chemicals is aware of all the markings and symbols present on the containers. The emblem and associated warning details that are frequently seen in research labs are listed below..



GENERAL SAFETY GUIDELINES

Workers in scientific laboratories are subject to a variety of risks. The majority of workplace dangers have well-defined actions to control the situation (those of regular fire, for example). However, a wider range of potential risks exist in laboratories, and some of these risks need for special safety measures. The list below provides an introduction to safe practises for several frequently used laboratory procedures.

GENERAL SAFETY AND OPERATIONAL RULES

1. It is not allowed to sprint or jump in a lab. Access to the fire extinguisher(s), safety equipment, or other emergency supplies must not be impeded by stacked objects or equipment. Access to emergency equipment and/or exits must be maintained dry and unhindered; this means there must be no storage, equipment, phone lines, or other obstructions in these areas. No flammable items, such as paper, wooden crates, pallets, etc., should be kept in hallways or under stairwells. So that exits and regular travel routes are not obstructed, hallways must be kept clear of boxes and other objects.

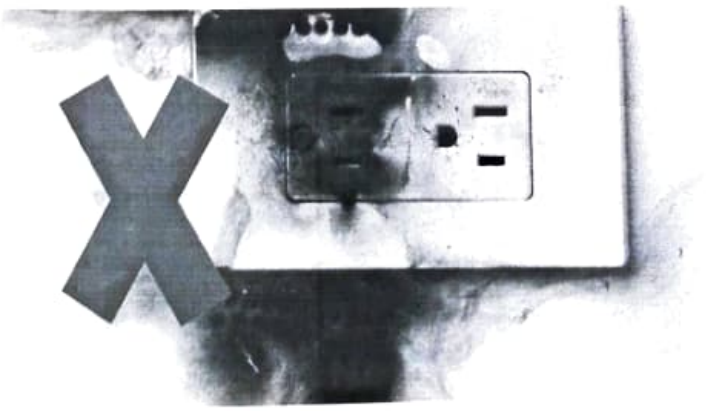
2. It is forbidden to eat or drink in laboratories. In collaboration with the Safety Committee, specific office spaces in all laboratories may be set aside for food. Physical separation is required between them and any laboratory procedures. No consumables, chemicals, or tools of any kind should be shared with work areas in the designated office spaces.

3. No food or drink may be kept in the lab refrigerators and freezers or cold rooms or on the working area in lab.

4. The typical working day at Patharkandi College is from 10:00 am to 4:00 pm (Monday-Saturday). Outside of the regular working hours, no employee shall work in a laboratory or chemical storage facility by themselves. Students and staff must receive written permission from the primary investigator (PI) in charge before working outside of core hours.
5. Lab attire should provide protection from splashes and spills and be simple to take off in case of an accident. Aprons made of nonflammable, nonporous materials provide the best protection for the smallest price. To make them easier to take off, lab coats and jackets should have snap fasteners rather than buttons. When working, these coats must be tied, and they must be taken off before leaving the lab. It is strongly advised that laboratory staff refrain from wearing sandals or open-toed footwear inside the lab. Laboratory attire should be kept spotless and changed as needed. Lab coats, gloves, closed-toed shoes, and safety glasses must be used for biosafety level 2 and chemical procedures.
6. Mouth pipetting is not allowed for acid/base.

Electrical Safety

A significant portion of the laboratory is made up of electrical equipment and wiring, creating a new set of potential hazards. Regular laboratory inspections should focus especially on electrical safety.



A list of possible wiring hazard are as follows:

- Spliced cables
- Worn-out cables
- Tripping hazards from poorly draped cables near hot plates etc.
- Sliced cables near sinks or other wet locations.

Are high current or high voltage a cause for concern? Actually, it has elements of both. It may be quite safe to touch an electrical circuit that can provide significant current if the voltage is not high enough. On the other hand, you can still be safe if the voltage is very high but the supply's maximum deliverable current is very low.

The passage of charged particles is all that electricity is. It is the movement of electrons in most of our everyday settings. From a high potential to a low potential, electrons move. When you are shocked, electricity travels through your body on its way from a high potential electrical circuit to the ground.

There are electrical resistances in your body. Normal circumstances call for a distance of around 100 km from the tip of your finger to your feet. The resistance can, however, decrease to roughly one kilo-ohm if you are moist. Therefore, under typical circumstances, if you are touching a 100 V terminal, the current that can pass through your body is roughly 1 milliamp. The subsequent shock scarcely registers (see table below)! Although harmful, once the current has passed through the body, its resistance falls and additional current begins to flow. The initial current can be up to 100 mA if your body is wet, which is lethal. You are most likely safe, though, assuming the power supply is not malfunctioning and can only give a maximum of one milliamp of current. The resulting current could be fatal if there is a problem with the power supply's grounding. Therefore, refrain from touching any electrical terminals that seem odd.

One thing to keep in mind right now is that once the electricity begins to flow through your body, your resistance will significantly drop, allowing more current to flow A description of how the human body reacts to various current levels is provided in the box below.

[Source: https://pubmed.ncbi.nlm.nih.gov/19907637]

1 mA	Barely perceptible
16 mA	Maximum current an average man can grasp and "let go"
20 mA	Paralysis of respiratory muscles
100 mA	Ventricular fibrillation threshold
2 Amps	Cardiac standstill and internal organ damage
15/20 Amps	Common fuse or breaker opens circuit*

*Contact with 20 milliamps of current can be fatal. As a frame of reference, a common household circuit breaker may be rated at 15, 20, or 30 amps.