

# Lab Safety Guided Notes

Working in any science laboratory such as a biology laboratory, chemistry laboratory, etc is very exciting and interesting. This is because the experiments conducted in these laboratories always provide some information and the theoretical knowledges in the book can be well experienced in the practical form. In order to maintain the safety of any science laboratory whether small, medium or large there are some safety guidelines that must be strictly followed by the students, researchers, teachers and other staff members working there.



## What is laboratory safety (lab safety)?

Laboratory safety refers to safety guidelines that should be followed while working inside a laboratory. Every lab personnel and staffs must be aware of the lab safety guidelines and must strictly follow them.

## Importance of Laboratory Safety

The laboratory workers are constantly exposed to hazardous chemicals, pathogenic biological materials and sharp hurting objects. Thus, it is very important to have some safety measures that should be followed while working in the laboratory to ensure the safety of the workers.



**Personal Protective Equipments (PPE)**

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**Common Lab Safety Guidelines/ General Safety Rules:** These guidelines must be followed by everyone working in the laboratory.

1. Always wear a **lab coat** or **apron** inside the laboratory. The shoes should be **close toed** to avoid any injuries.



**Lab Coat/Apron**

2. The working bench or working station should be clean and organized. all the water bottles, lunch boxes, purses, bags, books, notebooks, etc should be kept at a separate place or cabinet.
3. Keep your laboratory area clean.
4. Drinking, eating and munching is not allowed inside the laboratory area.
5. Listen to the instructor before handling any equipment and in case of any doubts the instructor should be contacted.
6. While handling hot chemicals or organic solvents, wear **safety goggles** to avoid any injuries to the eyes. If you are wearing contact lenses, it is important to inform the instructor about it.
7. Wear gloves in case you have any allergies to certain chemicals. Gloves should also be worn while handling contaminated plates with microorganisms.
8. Masks should also be worn if working with chemicals that produce fumes, allergens and also while handling microorganisms.
9. **Children** should not be allowed inside the laboratories.
10. Mouth pipetting is strictly prohibited.
11. Tasting of chemicals and solvents are not allowed.
12. **Hair** should be tied properly and headware should be worn in case of fuming chemicals.
13. All glasswares should be washed properly after use and should be left to air dry.
14. In case of handling hot objects tongs should be used to avoid burning of the fingers.
15. All the staffs and students should know the location of first aid box and other safety locations.

# Lab Safety Guided Notes

**Safety Symbols:** Safety symbols or hazard symbols or safety labels are signs that warn the user about the substance he/she is going to handle. These symbols also have important interpretation that tell about the nature of the substance. There are various safety symbols used in the laboratory.









Clon padre







 Flammable materials	 Explosion risk	 Toxic	 Corrosive	 Danger overhead crane	 Fork lift trucks	 High voltage
 General Warning	 Laser Radiation	 Biohazard	 Oxidising	 Hot surface	 Danger of entrapment	 Danger of death
 Irritant	 Slippery floor	 Watch your step	 Cutting	 High temperatures	 Glass hazard	 Danger of suffocation
 Gas bottles	 Watch for falling objects	 Electricity	 Danger for cutter	 Entrapment hazard	 Battery hazard	 Rotating parts
 Low temperature	 Strong magnetic field	 Optical radiation	 Non ionizing radiation	 Radiation	 Hazardous to the Environment	 Danger of harming your hands

## Safety Symbols






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Safety Symbol	Name	Meaning/Interpretation
	<b>Poison/ Toxic Material</b>	This symbol indicates that the material is toxic and should not be consumed, inhaled or exposed to skin.
	<b>Flammable and Combustible</b>	This symbol indicates that the material will burn in the presence of air. The flammable substances include various gases, aerosols, liquids such as solvents and solids.
	<b>Explosive</b>	This symbol indicates that the material is explosive in nature and might explode if not handled properly.
	<b>High voltage</b>	This symbol indicates that the substance, generally wire is carrying high voltage and should not be touched with bare hands.
	<b>Biohazard</b>	This sign indicates that the material is hazardous in nature and might be infectious in nature.
	<b>Corrosive chemicals</b>	This symbol indicates that the chemical is corrosive in nature and might irritate the <b>skin or eyes</b> .

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Safety Symbol	Name	Meaning/Interpretation
	<b>Electric Shock/ Hot surface</b>	This symbol indicates that the surface is either hot might lead to electric shock. The substance should not be touched with bare hands.
	<b>Physical Safety</b>	This sign indicates that when an experiment is involving any physical activity then everyone should ensure their safety and avoid any physical injuries.
	<b>Safety Goggles</b>	These goggles are used to protect the eyes from irritants and heat.
	<b>Safety Boots</b>	These safety boots are used to protect the feet from getting injured.
	<b>Hearing Protection</b>	While working in loud working space, the ears are protected by these hearing protection aids.
	<b>Safety Gloves</b>	<b>Safety gloves</b> are used to handle pathogenic microorganisms and contaminated plates. These are also used to protect the hands from any allergic chemicals.

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Safety Symbol	Name	Meaning/Interpretation
	<b>Non-ionizing Radiation</b>	This symbol indicates that the material emits radiation which is non-ionizing in nature.
	<b>Radioactive</b>	This symbol indicates that the material is radioactive in nature and might emit harmful radiations.
	<b>Sharp object</b>	This symbol indicates that the object is sharp and might cause physical injuries like cuts.
	<b>Breakage</b>	This symbol indicates that the object is a glassware and should be handled with care.
	<b>Disposal</b>	This symbol is of a trash can that indicates that the waste materials that can be disposed should be disposed in this can.

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## Chemical Safety



There are various chemical safety guidelines to be followed while inside the science laboratory such as

1. Chemicals should not be mixed in one another as a fun purpose. This can be hazardous.
2. Touching, tasting, drinking and smelling of chemicals are prohibited inside the lab.



### Drinking of Chemicals are Prohibited

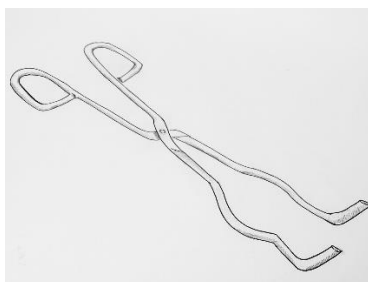
3. Chemicals should not be directly disposed in the **sink**. Ask the instructor for proper disposal process of the chemicals.
4. Be careful while working with concentrated acids.
5. While diluting any acid pour the acid into the water and not the water into the acid.
6. In case of **acid spill**, use wet cloth to wipe it or ask the instructor for proper instructions.



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## Heating and Fire Safety

1. Never touch any hot object with bare hands. Use **a clamp or tongs** to pick the hot objects.



**Tongs**

2. Heat resistant gloves can also be used to handle hot objects.
3. While heating any chemical in a test tube keep the mouth of the test tube away from you.
4. Use large capacity glassware to heat chemicals to avoid splashes while boiling.
5. Switch off the burner or spirit lamp after use.

**Glassware Safety:** Glassware should be handled with care because these are breakable.

1. Always wash the glassware after use and let them to air dry.
2. Broken tubes or chipped glassware should not be used.
3. Never use the laboratory glassware for personal use.
4. Use **wire gauge** while heating any chemical on a flame. Never heat any chemical in the glassware, keeping the glassware directly on the flame.



**Glassware**



**Wire Gauge on a Tripod Stand**



## Lab Safety Guided Notes

**Safety While Handling Microorganisms:** Certain microorganisms are pathogenic and can cause diseases if mishandled.

1. All the contaminated plates and glassware should be **sterilized** properly before use.
2. Follow the instructions of the instructor while handling microorganisms.
3. Follow aseptic rules when working with microorganisms and strictly follow them.
4. Do not inhale any microorganisms.
5. Do not keep the cultured plates with their lid open.
6. Never discard the petri plates or culture media without autoclaving.



**Petri Plates to Discard**