

# Lab Safety Guided Notes – Student Edition

Working in a biology laboratory can be fun and interesting, but it can also be dangerous. Because of this, safety \_\_\_\_\_ have been put in place in order to ensure that the \_\_\_\_\_ to students, researchers, teachers and other staff members working there are minimized.



## Risks in the Laboratory

There are a number of different risks for people who learn and work in the laboratory. These include exposure to \_\_\_\_\_ chemicals, pathogenic (\_\_\_\_\_ - \_\_\_\_\_) biological materials and sharp objects like scalpels, blades and broken glass. Thus, it is very important to have safety precautions in place when working in the laboratory to ensure the safety of the workers.



**Personal Protective Equipment (PPE)**

## 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 \_\_\_\_\_ inside the laboratory. Shoes should be \_\_\_\_\_ to avoid any injuries from chemical spills to sharp objects falling.

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**Lab Coat**

- The workbench or workstation should be clean and organized. All water bottles, lunch boxes, purses, bags, books, notebooks, etc. should be kept on a separate shelf or in a locker.
- Keep your laboratory area \_\_\_\_\_. Clean up any spillages and used equipment as you go.
- There is no drinking or \_\_\_\_\_ allowed inside the laboratory.
- Listen to the instructor before handling any equipment or chemicals.
- Only mix chemicals which you are told are safe to mix.
- When handling chemicals of any kind, wear \_\_\_\_\_ to avoid possible eye damage. This also applies to those who wear glasses and contact lenses.
- When handling certain chemicals or pathogenic materials, you may need to wear \_\_\_\_\_. If a chemical spills onto your skin, you should wash it off straight away and inform your teacher.
- Masks should be worn if working with chemicals that produce fumes, allergens and also while handling microorganisms.
- Mouth pipetting is strictly prohibited.
- Do not taste chemicals or solvents.
- \_\_\_\_\_ should be tied back, and loose or bulky clothing, like jackets and scarves should be removed.
- All glassware must be washed thoroughly after use and should be left to \_\_\_\_\_.
- When handling hot objects, \_\_\_\_\_ are used to avoid burnt fingers.
- Know the location of first aid box, fire \_\_\_\_\_ and other safety features of your laboratory.










**Safety Symbols:** Safety symbols, hazard symbols or safety labels are signs that \_\_\_\_\_ the user about the substance he/she is about to handle. They tell the user about the \_\_\_\_\_ of the substance. There are many safety symbols used in the laboratory. The table on the following pages gives some of the symbols and their meanings.

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## Safety Symbols

Safety Symbol	Name	Meaning
		The material is toxic and should not be consumed, inhaled or exposed to skin.
	<b>Flammable and Combustible</b>	The material will burn in the presence of air/oxygen. Flammable substances include various gases, aerosols, liquids such as solvents and solids.
	<b>Explosive</b>	The material is _____ in nature and may explode if not handled properly.
	<b>High voltage</b>	The substance, (usually found on live wires) is carrying high voltage and should not be touched with _____ hands.
	<b>Biohazard</b>	The material is hazardous and may be _____ in nature.
		The chemical is corrosive in nature and might irritate the _____.
		The surface of this material is either hot or may lead to an electric shock. The substance should not be touched with bare hands.
		The area is wet or slippery, and extra care is needed to avoid physical injury.

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Safety Symbol	Name	Meaning/Interpretation
	<b>Safety Goggles</b>	Safety goggles are needed for this experiment, or, inside this area of the laboratory at all times.
		Gloves must be worn when handling this material as it may contain pathogenic microorganisms or _____ chemicals.
	<b>Safety Footwear</b>	Safety footwear (usually boots) are required to be worn in the laboratory.
		Ear protection is necessary for work in this area.
	<b>Non-ionizing Radiation</b>	The material emits _____ which is non-ionizing in nature.
	<b>Radioactive</b>	The material being used is _____ in nature and is known to _____ harmful radiation.
	<b>Sharp object</b>	The object is sharp and might cause _____ injuries like cuts.
		This equipment/glassware should be handled with care as it breaks easily.
	<b>Disposal</b>	Waste materials that can be disposed of should be placed in this container.

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## Chemical Safety



There are specific chemical safety guidelines which must be followed while handling chemicals in the laboratory.

1. Always wear safety \_\_\_\_\_.
2. Chemicals should not be mixed together unless you have been instructed to do so. This can be hazardous.
3. Do not taste, drink or smell any chemicals as they are often toxic.



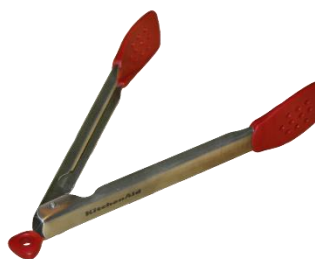
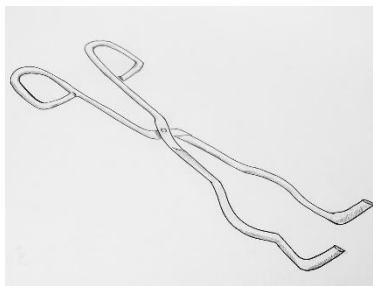
### Drinking of Chemicals are Prohibited

4. Chemicals should not be poured directly down the \_\_\_\_\_. Ask the instructor for the correct disposal procedures for each chemical. For some organic solvents, a waste receptacle will be set up.
5. Be extra careful while working with concentrated acids.
6. While diluting an acid, pour the \_\_\_\_\_ into the \_\_\_\_\_ and not the \_\_\_\_\_ into the \_\_\_\_\_.
7. In case of an \_\_\_\_\_, ask the instructor for proper instructions of how to clean it up. They may require it be neutralized with a base first.

## Heating and Fire Safety

1. Never touch a hot object with bare hands. Use \_\_\_\_\_ to pick up these objects.

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**Tongs**

- Heat resistant \_\_\_\_\_ can also be used to handle hot objects.
- While heating a chemical in a test tube, point the mouth of the test tube away from you and other people in the lab.
- Use large \_\_\_\_\_ glassware to heat chemicals as this avoids splashes.
- Switch off the burner or spirit lamp after use. If the burner is being used frequently during a lab session, return it to the \_\_\_\_\_ safety flame while it's not being used.

**Glassware Safety:** Glassware should be handled with care.

- Always \_\_\_\_\_ glassware after use and leave them to air dry.
- Broken test tubes or chipped glassware should not be used.
- Use a \_\_\_\_\_ mat while heating any chemical on a burner. Only use heat resistant glassware when heating chemicals, keeping the glassware directly on the flame.



**Glassware**



**Wire Gauze on a Tripod Stand**

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**Safety for Lab Specimens and Dissection:** Some lessons will require you to examine specimens and tissues from organisms to observe their anatomical structure and function. This is a valuable tool for learning, however, it does have some associated risks.

1. Always treat the tissue respectfully, remembering that this was once a living \_\_\_\_\_.
2. Always wear \_\_\_\_\_ and assume the tissue you are examining is \_\_\_\_\_.
3. Never ingest specimens.
4. When using sharp instruments such as scalpels and scissors, always cut \_\_\_\_\_ from your body.
5. Thoroughly \_\_\_\_\_ your hands after completing the lab, even though gloves have been worn.
6. Thoroughly clean your work area with \_\_\_\_\_ after finishing the lab activity.

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

1. Follow the instructions of the \_\_\_\_\_ while handling microorganisms.
2. Always wear \_\_\_\_\_ when handling cultures or plates.
3. Use \_\_\_\_\_ technique when working with microorganisms.
4. Do not \_\_\_\_\_ any microorganisms.
5. Close the lid on cultured plates while they are not in use.
6. Discard Petri dishes or culture media into designated bins so that they can be destroyed correctly.



**Petri Plates to Discard**