

Lab Safety Guided Notes - Teacher Edition

One of the best parts of being a scientist is conducting experiments in a laboratory! Experiments are used to test **theories** and collect **data**; however, they must be carried out safely to prevent damage occurring to the **lab** and most importantly to protect the **scientist** and those they work with. Therefore, labs have strict safety **procedures** that must be followed so that we are safe while making our discoveries.

What is Laboratory Safety (Lab Safety)?

Laboratory Safety refers to the rules and **safety guidelines** that anyone working in a laboratory must follow. Most of the lab safety procedures you learn at school are also followed in **university** and workplace settings.

Why is Lab Safety important?

Many of the materials and equipment used in the lab are **dangerous** and there are risks involved with students using them. The danger may be **chemical**, sharp objects, heating equipment or **biological** substances that could injure you in some way. Having lab safety rules that everyone follows ensures that there is minimal **chance** of you, or your classmates being hurt when in the school lab.



Major Lab Safety Rules

1. Be Responsible!

Being able to conduct experiments in the lab is a **privilege** and should be taken seriously. Always think your actions through and be on your best classroom behavior. **Practical jokes** could lead to your or your classmates getting hurt.

2. Dress like a Scientist!

Wear the appropriate personal **protective** equipment (PPE) when asked to. This includes:

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- **Hair ties for long hair** - It is important to keep **long hair** pulled back off your face. This prevents it from catching **alight** when using a Bunsen/matches and away from any chemicals which could damage it.
- **Safety goggles**- Eye protection is **always** necessary when using **chemicals** and **heating** equipment to avoid permanent eye damage. Most safety goggles can fit comfortably over **glasses**.
- **Lab Coat/Apron** - Protects your **clothing** from chemicals and heat.
- **Closed toe shoes** - No **sandals** or flip-flops. This ensures that if glassware **breaks** or chemicals spill off your bench your feet are protected.
- **Gloves** - Gloves protect your **hands** from both chemicals and biological specimens. Ensure all grazes and cuts are **covered** to protect the wound site.
- **Oversized clothing items** – Items such as **bulky jackets** should not be worn in the lab. The material often melts quickly and can react with many common lab chemicals.

Safety Goggles

Hair in Ponytail

Gloves

Longsleeved Lab Coat

Long Pants

Enclosed Shoes



3. No eating or drinking in the laboratory

Food, gum, and **drinks** should not be brought to the lab. Do not use lab containers to store food. Even after being washed, the residues of **chemicals** and some microbes can remain in containers which can contaminate the food making you sick.

4. Always listen carefully and follow your teacher's instructions!

Ensure that you understand the **instructions** before starting a lab. Ask questions if you don't understand what to do. Wait until your teachers says it's OK before handling any **lab equipment** or chemicals. Once the lab has begun, ensure that you follow each step of the instructions carefully, e.g., only mix **chemicals** which you are told to mix and **heat** objects which should be heated.

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5. Keep your space organized

Your workspace should be **tidy**. Anything you do not need to help you carry out your lab (e.g. backpacks, lunch boxes, purses, **devices**, water bottles, or **books**) should be put on a shelf or left in the classroom away from your workspace.

6. Avoid touching your face, **eyes**, and mouth.

When conducting an experiment keep your hands away from your face, eyes, and mouth. You should thoroughly wash your **hands** after being in a lab.

7. Notify your teacher of any accidents or mistakes immediately.

Accidents and mistakes do happen in the lab. When they do, let your teacher know **immediately**, so that they can direct you how best to fix it. If the accident involves injury to yourself or someone near you, acting quickly is essential as it can **reduce** the chance of long-term or even permanent **damage**.

8. Know your lab's safety equipment locations

Be sure to know the location and proper use of your laboratory's:

- Fire **extinguisher**
- Fire blanket
- Eyewash station
- Safety shower
- First **aid** kit
- Chemical **spill** kit.
- Material Data Safety Sheets.

These may be essential if an accident happens.



9. Take care of your equipment

Make sure to handle all **equipment** with care. Larger, heavier items like electronic balances and large beakers should be carried with **two** hands. Only collect the items that are on your equipment list for your lab.

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10. Know and use proper clean up procedures

Your teacher will tell you about the **safe** and correct disposal of **waste** materials from your lab. Don't pour anything down the **sink** unless instructed to do so. If unsure on how to dispose of a material, check with your teacher. Wash your hands with soap and water after every lab.

Chemical Safety

Things to remember for safely handling chemicals.

1. Read all safety information (MSDS)
2. Treat all chemicals in the lab as **poisonous**. Always handle them with extreme care and use the proper protective equipment (gloves, and or goggles).
3. Never **mix** chemicals together to just 'see what happens'.
4. Never taste, **drink**, smell or touch any chemicals in the lab.
5. Tell your teacher immediately if there is a **chemical spill**. They will have instructions on the proper clean up procedure.

Material Data Safety Sheet (MSDS)

Material data safety sheets (MSDS) are required in lab to provide a scientist with accurate **information** on all the chemicals they have access to. These outline the **dangers** of the chemicals being used, any extra steps that need to be taken when they are in use (e.g., they must be used in a fume hood, or with a full face mask rather than just goggles). They also provide information on how best to **clean up** any spills involving this chemical and **medical** information should a person encounter them.

- You should always know **how** and **where** to access Safety Data Sheets in case of an emergency.
- Your teacher may briefly go through the MSDS sheets for the **chemicals** that you will be using in each lab. Listen and make sure to note down any extra information that could be useful and is not already on your **lab instruction** sheet.
- Becoming familiar with chemicals encourages **safety** and knowledge of how to correctly handle substances in the lab.



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Safety Symbols on Chemicals

All chemicals used in the lab will have a symbol on their containers to alert the user to their danger. Some of the common ones you will see, particularly when doing chemistry topics are shown below:



Other symbols you may see around the lab or on equipment are:



First Aid Procedures

Accidents in the lab are **serious** and should be addressed quickly to ensure there is minimal damage to the person/people/ equipment involved.

First Aid Procedures for Chemicals on the Skin

These are one of the most common lab injuries. You should:

1. Remove any **clothing** that you may have on that is wet from chemical spill.
2. Rinse the affected area with **water** at the wash station continuously for **15 minutes**.
3. If pain or irritation persists, visit the school **nurse** so that the injury can be checked. She will want to see the **MSDS sheet** for the chemical.

First Aid Procedure for Chemicals in the Eyes

1. Remove **goggles** and flush out eyes at the **eyewash station** immediately and continuously for 10-15 minutes.

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2. Make sure to open and close the eye(s) **repeatedly** while flushing.
3. If irritation continues, call the school nurse, and have a copy of the (**MSDS**) and samples or names of chemicals you used in the lab ready for her.

First Aid Procedure for Chemical Inhalation

1. Remove the person from the lab to get fresh air.
2. If they continue to show signs of **breathing difficulty** contact the school nurse.
3. Ensure that the name of the chemical and the **MSDS** is available for the school nurse.

Fire Safety in the Lab




Ways to minimize fire risks in the lab:

1. Check your heating equipment before using it for frayed **cords** or lose **joints**.
2. Only start your burner/ hot plate when **instructed** to do so by your teacher.
3. Keep the mouth of the test tube pointed **away** from you when heating a **chemical**.
4. Never leave heating equipment switched on and **unattended**.



How to stop a fire.

A fire needs the following things to burn:

-  **Heat** - A source of heat to spark a flame or reaction.
-  **Fuel** - A source of fuel (something flammable) to keep the fire going.
-  **Oxygen** - All fires need a source of oxygen to burn.

By removing one or more of these three things a fire can be controlled very quickly. There are several tools which can help us do this.

Fire Safety Tools in our Lab

All labs have the following tools to help prevent and minimize the damage that a fire can cause:

- Fire Alarm

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- Fire **Exit**
- (Action) Stop, Drop, & Roll
- Fire Blanket (usually teacher operated)
- Fire **Extinguisher** (usually teacher operated)

What to do if you hear/see a fire alarm going off in your lab:

1. Extinguish all **flames** and turn off all **gas** sources.
2. Exit the room in an **orderly** manner. Do not take your **personal belongings** with you as this will slow you down.
3. Meet outside at your **pre-appointed** location.



What to do if clothing or hair catch fire:

1. STOP! (Stand still)
2. DROP! (Lie down on the floor and cover your face)
3. ROLL! (Roll over repeatedly to smother the flames)

