

# Basic Instructions for Lab Safety

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## 1 Personal Protective Equipment (PPE)

## 2 Lab Safety Equipment

- Fire Extinguishers
- Other

## 3 Basic Safety Measures

- Work Norms
- Waste Disposal
- Fire Prevention
- Other



- The lab coat provides effective protection for your clothing in case of any spills and should be worn at all times.
- Always wear safety goggles.

## Remark

There are several types of gloves, and they may give a false sense of protection if we don't choose them wisely:

- Latex: effective against bases, acids, alcohols and diluted solutions.
- Nitrile and neoprene: bases, oils, fats, and other solvents.
- Viton: organic solvents like benzene and carbon disulfide, but they may **not be used** with esters, ketones or amides.

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# Fire extinguishers

**Fires** and **fire extinguishers** are classified by the nature of the burning material:

- **Class A:** Organic materials that turn into embers. Wood, paper, plastic, tissues, etc.
- **Class A:** These extinguishers contain pressurised water, foam, or dry chemicals. They act by cooling and soaking, so the material won't ignite again.

- **Class B:** Flammable liquids and solids. Turpentine, alcohol, fat, oil, wax, gasoline, paint, etc.
- **Class B:** These extinguishers prevent the spread the chain reaction of combustion. They may contain foam, carbon dioxide, or in the case of multi-purpose extinguishers, dry chemicals and halogenated hydrocarbons (such as halons).

- **Class C:** Electrical equipment, wiring, etc.
- **Class C:** These extinguishers use carbon dioxide, dry chemicals, or in the case of multi-purpose extinguishers, dry chemicals and halogenated hydrocarbons.

### Remark (**Warning!**)

- Never use water based extinguishers to fight fire of electrical equipment.
- Class C carbon dioxide extinguishers must be used with low pressure, otherwise they may spread fire further.



- **Class D:** Highly reactive metals. Sodium, potassium, powdered aluminium, magnesium, etc.
- **Class D:** Made out of 'special' dry chemicals used to fight metal fires that burn at high temperature and that may react violently with water or other chemicals. They cool the burning material below its fire point.

## Fume hood (*Capilla de extracción*)



- Is a type of ventilation system that is commonly used in laboratory settings to control exposure to hazardous or toxic fumes, vapors, or dusts.
- The fume hood works by drawing in air from the laboratory and expelling it outside or filtering it before recirculating it back into the room.

- The fume hood is typically made of metal, such as stainless steel, and has a sash or sliding door made of glass or polycarbonate that can be raised or lowered to adjust the flow of air.
- Fume hoods are essential in protecting laboratory workers from inhaling harmful substances and preventing spills or accidents from spreading to other areas of the laboratory.
- They are commonly used when working with hazardous chemicals, or volatile substances.

## Air extractor (*Extractor de aire*)

- Used to remove and filter air from a space, such as a chemistry lab.
- It works by drawing in air through a vent or series of vents, and then filtering the air to remove any harmful contaminants, such as chemical vapors, dust, or other particulate matter.
- The filtered air is then either vented outside the building, or recirculated back into the laboratory space.

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## Fire blanket (*Manta ignífuga*)



- A fire blanket is used to put out small fires that may occur from experiments involving flammable liquids or gases.
- It can also be used to wrap around a person who has caught fire, providing quick protection and preventing the spread of flames.
- They can be reused.
- Additionally, a fire blanket can be

used as a shield to protect people from flames, heat, or sparks during an experiment.

## Emergency shower and eyewash station (*Ducha de seguridad y estación de lavado de ojos*)



- An emergency shower is a safety device that is designed to provide quick, easy access to water in the event of a chemical spill or splash. It consists of a large showerhead that delivers a high volume of water when activated, and is typically located near other safety equipment.
- Its primary use is to quickly flush any hazardous chemicals off of the skin or clothing of a person who

has been exposed. This can help to minimize the effects of the chemical and prevent further injury or damage.

- They can be activated quickly and easily, often with just a pull handle or cord. This allows anyone in the area to quickly access the shower and begin flushing the affected area without delay.
- Emergency showers are also designed to deliver a large volume of water at a high flow rate, which is important for effectively flushing away any hazardous chemicals. This high flow rate helps to ensure that any chemicals are removed from the skin or clothing as quickly as possible.
- Additionally, emergency showers are often equipped with additional safety features, such as eye and face wash stations, which can be used to flush hazardous chemicals from these sensitive areas as well.



## First aid kit (*Kit de primeros auxilios*)



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# Basic Safety Measures

## Work norms

- Eating or smoking in the laboratory is prohibited.
- Cleaning materials such as soap, brushes, towels, etc., should be kept in the drawer.
- If any substance gets on your face, hands, or skin, rinse the affected area thoroughly with cold water. Immediate action can prevent serious injury. Immediately report the accident to your teacher, who will decide if additional treatment is required.
- Never taste a chemical reagent; many poisonous substances are not always properly labeled. Wash your hands thoroughly after each lab period.

# Basic Safety Measures

## Work norms

- If any reagent spills, it should be cleaned up immediately. Neutralize acids and bases as follows:
  - Acids: Rinse as quickly as possible and with plenty of water. Then neutralize with a solution of sodium bicarbonate.
  - Bases: Rinse as quickly as possible and with plenty of water. Then neutralize with a diluted solution of acetic acid.

# Basic Safety Measures

## Work norms

- Carefully read the labels on bottles before using their contents. Be sure you know which reagent is required and if a solution is needed, make sure you know its concentration. You could be in danger if you mix unknown substances.
- When it is necessary to measure exact volumes of solutions, use a pipette, which is generally filled by suction. Never use your mouth to suction, use pipette bulbs.

# Basic Safety Measures

## Work norms

- Experiments involving the formation or use of unpleasant, corrosive, or poisonous substances, such as ammonia, hydrogen chloride, nitrogenous gases, chlorine, carbon disulfide, etc., must be conducted in the fume hood.
- Flames should not be brought near flammable solvents.
- Bottles containing solvents should not be kept on the workbench.

# Basic Safety Measures

## Work norms

- Hot objects and equipment must be handled carefully, using tongs or other appropriate equipment, and should be placed on an asbestos mat rather than directly on the work table.
- If heating a substance in a test tube, do not aim the mouth of the tube towards yourself or others. Do not leave the test tube fixed in the flame. Hold the tube with tongs and heat it by gently moving it up and down. Use test tubes that are resistant to heat.

# Basic Safety Measures

## Work norms

- Be very careful when trying to detect the odor of a substance. Generate air currents by gently waving your hand over the mouth of the container towards your nose, so that the vapors of the substance can be detected indirectly. Do not smell substances directly.
- If working with flammable substances, make sure there are no flames or sparks nearby.
- An appropriate funnel should be used for transferring acids and bases from storage bottles.



# Basic Safety Measures

## Waste Disposal

- Solid waste such as chemicals, filter paper, glass pieces, etc., should be disposed of in designated containers such as jars, bins, etc.
- Dispose of solid and liquid waste in the containers provided for this purpose, not in sinks, or trash cans.

# Basic Safety Measures

## Fire Prevention

- Empty fire extinguishers should never be kept.
- Burners (Bunsen burners) and resistance heaters without protection should not be placed on wood surfaces.
- Gas mains should be turned off when not in use.
- All electrical appliances must be disconnected from the main power supply once the work is finished.
- Coats, books, or other objects not related to the activity being performed should not be left on the workbench.
- Cylinders should be transported on special carts and firmly secured. They should be stored and used in a vertical position and secured to a support.
- Cylinders should be protected from heat and low temperatures.

# Basic Safety Measures

## Other

- Consult a teacher about possible risks when working with an unknown substance.
- All electrical appliances must have a grounding wire.
- Glassware must be mounted firmly.
- Broken glass accessories should not be used.
- To insert a thermometer or glass into a stopper, lubricate it with a lubricant and protect your hands with a cloth. Glycerin or glycerol is a commonly used lubricant.
- All containers holding substances must have a label clearly indicating the name or formula of the substance, the date of preparation, and the name of the person who prepared it.

## References

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