

Al-Mustaqbal University Faculty of Science Department of Biochemistry	-Biology-  First Stage	Prepared By Assist. Lect Summer Hussein Al-Mamouri
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## **Lab 1: Laboratory safety, introduction to lab equipment, observation of living organisms**

### **1. Introduction**

Working in a science lab — whether in biology, chemistry, or microbiology — gives us exciting opportunities to explore the natural world and conduct experiments. To do this safely and effectively, we must understand how to protect ourselves, identify and use equipment correctly, and observe living organisms responsibly.

### **2. Laboratory Safety / Why it matters**

Laboratory safety is the foundation of all scientific work. It keeps people healthy, prevents accidents, and protects the environment. Following safety rules helps scientists conduct experiments without harm or contamination.

### **3. Personal Protective Equipment (PPE)**

- Wear a clean lab coat
- Wear appropriate gloves when handling chemicals or samples
- Wear closed-toe shoes
- Wear safety goggles.

#### **4. Chemical & Sample Handling**

- Never smell, taste or touch chemicals directly.
- Do not use or touch equipment contaminated with chemicals.
- Follow specific safety precautions for each experiment.
- Aspirate liquids safely using a pipette.

#### **5. Equipment & Cleanliness**

- Do not force stuck glassware open.
- Always wash hands with soap and water after experiments.
- Use disinfectants to sanitize hands and the work area after handling samples.

**Note:** Laboratory accidents often happen due to carelessness or improper handling of equipment and materials. Knowing and following rules prevents these incidents.

#### **6. Laboratory Hazards & Emergency Procedures**

Working in a laboratory involves potential risks that must be recognized and managed properly. Understanding laboratory hazards and knowing how to respond to emergencies are essential for maintaining a safe working environment.

##### **Types of Laboratory Hazards**

Laboratory hazards can be classified into several categories

Biological Hazards Include bacteria, fungi, viruses and biological samples that may cause infection or contamination if not handled properly.

## **Chemical Hazards**

Involve toxic, corrosive, flammable, or reactive chemicals that can cause burns, poisoning, or respiratory problems

## **Physical Hazards**

Include broken glassware, sharp instruments, heat sources, and .electrical equipment that may cause injury if misused

## **Emergency Procedures**

In case of an accident or emergency, students must remain calm and follow laboratory instructions

- 1.Know the location of emergency exits, fire extinguishers, and first .aid kits
- 2.Wash affected areas with water in case of chemical exposure
- 3.Do not attempt to clean hazardous spills without proper guidance
- 4.Understanding these procedures helps minimize damage, prevents injuries, and ensures a safe laboratory environment for everyone.

## **7.Introduction to Common Laboratory Equipment**

Laboratories use basic tools to carry out experiments. Knowing the names of these tools and how they are used helps work correctly and safely in the laboratory.

## **8. Essential Biology and general lab equipment**

The most common tools you'll see:

**1-Microscope:** Magnifies tiny specimens like cells so you can see them clearly.



**2-Test Tubes:** Glass or plastic tubes used to hold, mix or heat small samples.



**3-Pipettes:** Tools for measuring and transferring precise amounts of liquids



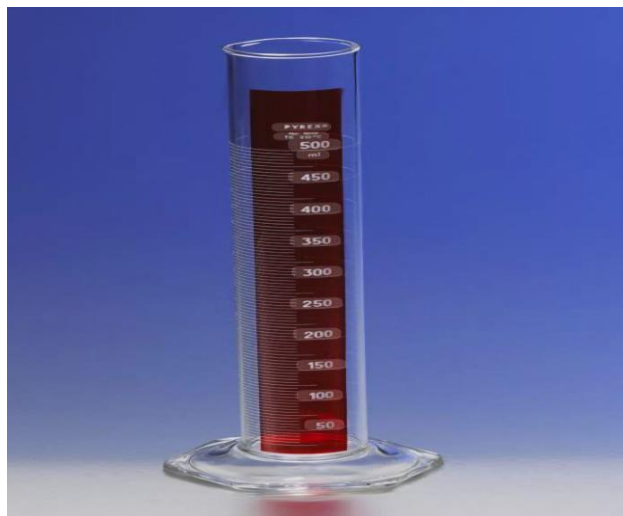
**4-Petri Dishes:** Shallow dishes used to grow cultures such as bacteria on nutrient media.



**5-Beakers and Flasks:** Containers for holding, mixing and heating liquids



**6-Funnels and Graduated Cylinders:** Used to measure and pour liquids accurately.



**7- Biosafety Cabinets:** Enclosed stations for safely handling potentially infectious samples.



## **9. Observing Living Organisms in the Lab**

Direct observation of living systems is central to experimental biology, enabling the study of life from cellular to organismal levels

## **10. Core Observation Methods**

### **Microscopy .**

The compound light microscope uses optical lenses and visible light to magnify and resolve microscopic specimens, such as cells and microorganisms, for structural and behavioural analysis.

### **Slide Preparation .**

Live specimens are often examined using a wet mount, where a sample is suspended in fluid between a slide and coverslip. Fixed and stained preparations are used for detailed morphological study.

### **Culturing .**

Microorganisms are grown under controlled conditions using sterile culture media in Petri dishes or tubes. This allows for the observation of growth, colony morphology, and physiological properties.