

General Medical Microbiology Laboratory

Lab 1: Safety Rules

Dr. Hala Altarawneh

Laboratory Safety Rules

- Laboratory safety involves all the measures taken by the laboratory worker, laboratory owner, institution and regulatory agencies to eliminate potential harm to human health and well-being.
- It is the responsibility of each person in the lab to know and follow basic laboratory safety rules, to understand how to safely operate equipment, understand the hazards of materials they are working with and to work to reduce potential risks.
- In the event of an accident, it is critical to know the location and use of emergency equipment. Having this knowledge should help to prevent accidents and minimize damage that might occur in the event of an accident.

Laboratory Safety Rules

Our Lab: Biosafety Level 2 (BSL-2): Moderate-risk organisms
(can cause disease, treatable)

Examples: *S. aureus*, *Salmonella*, *E. coli*

Requires strict aseptic technique

Laboratory Safety Rules: General Rules

- No guests are allowed in the lab.
- Report all accidents, no matter how insignificant they appear, to a laboratory supervisor
- Be aware of your surroundings and potential dangers created by others.
- In case of fire, evacuate the room and assemble outside the building.

Laboratory Safety Rules: General Rules

Know Before You Need!

Emergency Equipment Locations:



Safety shower



Eyewash station



Fire extinguisher



First aid kit



Emergency exits

Laboratory Safety Rules

The 4 Routes of Exposure to microorganisms:

- **Contact with skin and mucous membranes:** can be minimized by wearing PPE
- **Ingestion** can be minimized by prohibiting eating, drinking, or applying cosmetics in the lab
- **Inhalation** can be minimized by avoiding aerosols
- **Inoculation** can be minimized by following rigid protocols for the use and disposal of sharps (needles, slides, broken glass, etc.)

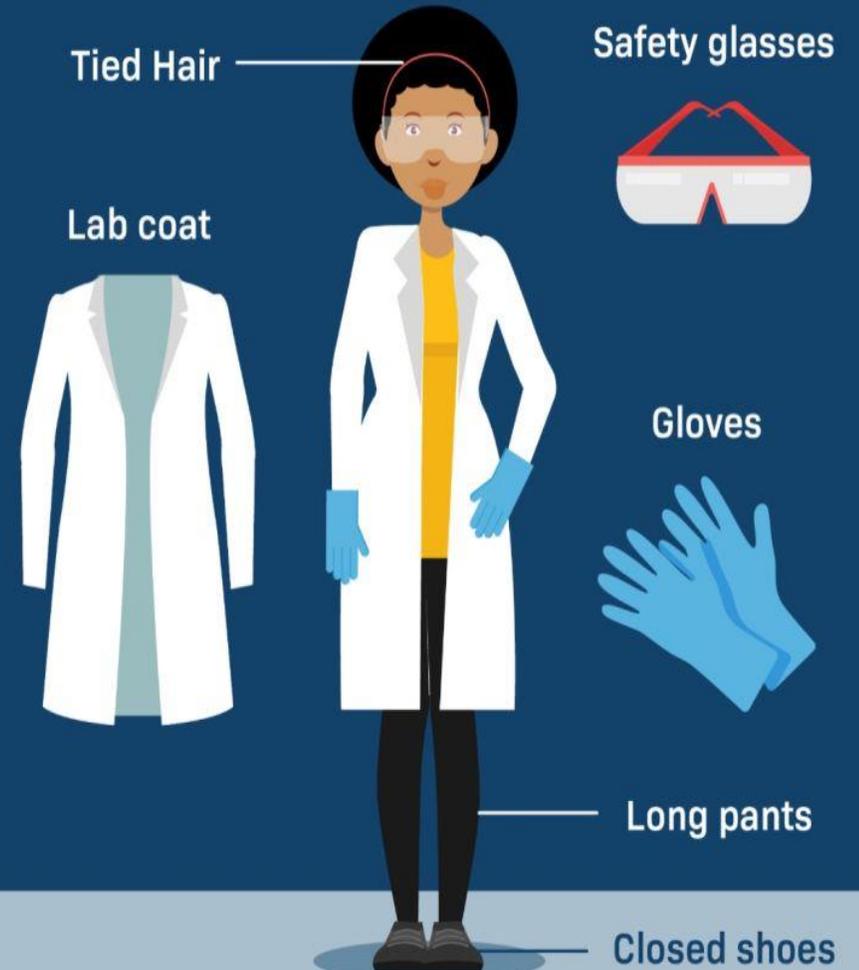
Laboratory Safety Rules

Required PPE - No Exceptions:

-  Lab coat (fully buttoned)
-  Gloves (change between specimens)
-  Closed-toe shoes
-  Long hair tied back
-  No jewellery or watches



REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE)



Handling Biological Materials

- Assume all specimens are infectious
- Keep work area clean and organized
- Use aseptic technique
 - Disinfect bench before/after
 - Flame your loop before AND after
- Avoid creating aerosols
- Close plates immediately
- Proper labelling of specimens

Summary

✗ NO eating or drinking
(includes gum, candy)

✗ NO smoking

✗ NO applying cosmetics or
lip balm

✗ NO handling contact lenses

✗ NO phones or bags on lab
benches

✓ ALWAYS wash hands
before and after lab work

✓ ALWAYS notify instructor of
any cuts or injuries

✓ ALWAYS work carefully and
deliberately

General Medical Microbiology Laboratory

Lab 2: Use and Care of the Microscope

Dr. Hala Altarawneh

Types of Microscopes - Overview

- **Compound light microscope** ← Today's focus
 - Magnification: 40x to 1000x
 - Most common in clinical and teaching labs
- **Electron Microscopes:**
 - Magnification: up to 100,000x
 - reveal the internal ultrastructure of cells and viruses

Parts of the Microscope - Mechanical Components

1. **Base:** Heavy, stable support. Houses light source

2. **Arm:**

- Connects to base
- **ALWAYS carry microscope by arm + base** (Never lift by eyepiece or stage)

3. **Stage**

- Flat platform for slides
- Stage clips hold slides in place
- Mechanical stage: X-Y movement controls
- Central opening for light passage

Parts of the Microscope - Mechanical Components

4. Body Tube: Maintains correct distance between eyepiece and objectives

5. Revolving Nosepiece

- Holds 3-4 objective lenses
- Rotates to change magnification

Parts of the Microscope - Magnification System

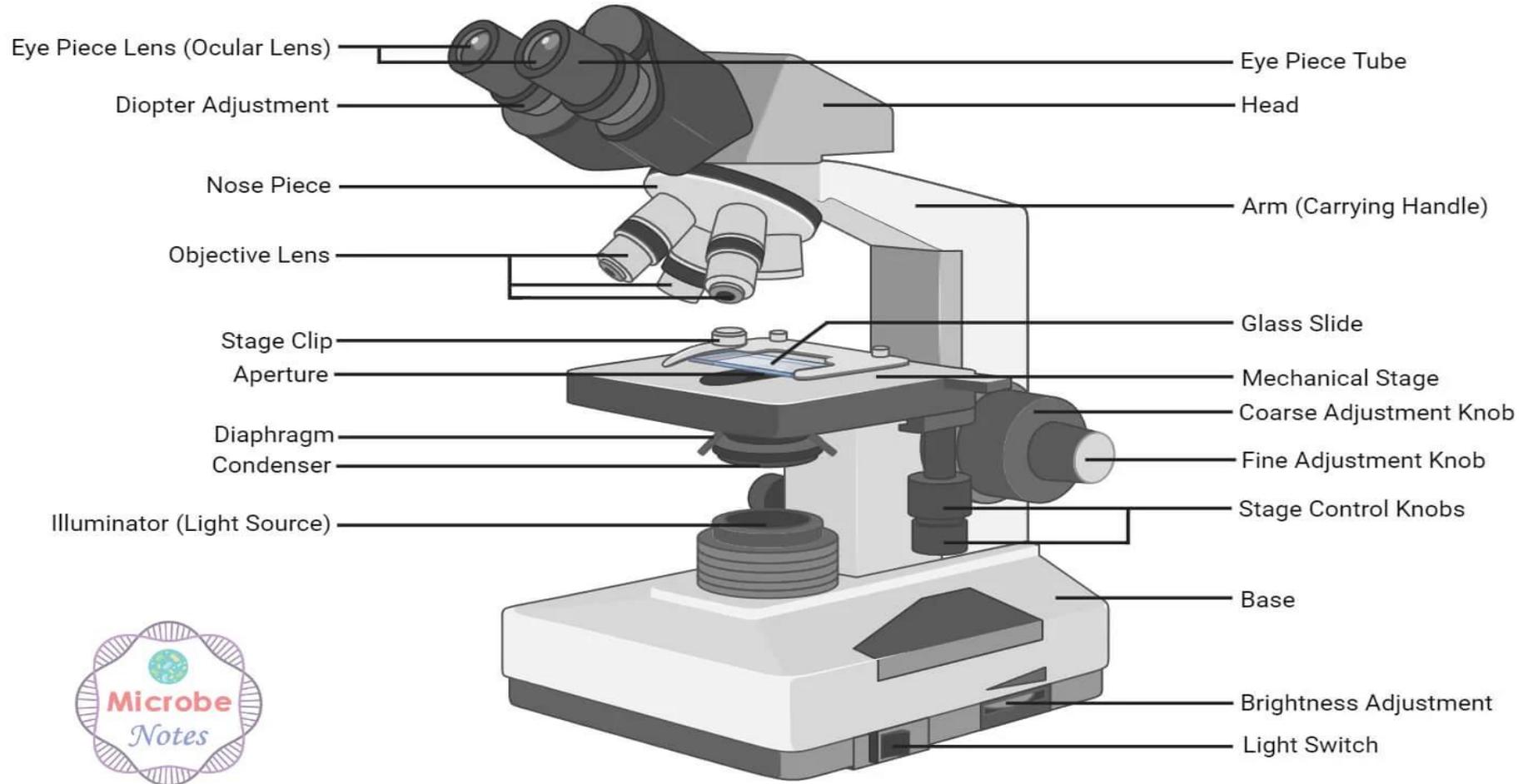
- **Eyepiece (Ocular Lens)**
 - Located at top of body tube
 - Usually 10x magnification (marked "10x")
 - Monocular (one) or binocular (two)
- **Objective Lenses** (on revolving nosepiece)
 - **Scanning power:** 4x (red band)
 - **Low power:** 10x (yellow band)
 - **High power:** 40x (blue band)
 - **Oil immersion:** 100x (white or black band)

Parts of the Microscope - Magnification System

Total Magnification Formula: Ocular × Objective = Total Magnification

- Examples:
- 10x eyepiece × 10x objective = **100x total**
- 10x eyepiece × 40x objective = **400x total**
- 10x eyepiece × 100x objective = **1000x total**

Microscope Parts Worksheet Answer Key



Parts of Compound Microscope



Thank you

Further references for Lab

- <https://www.youtube.com/watch?v=saXFQR86ziM>
- <https://www.youtube.com/watch?v=kxr0ZWtkW8A>
- https://www.youtube.com/watch?v=RKA8_mif6-E