University of Al-Maarif

Medical Laboratory Techniques Department

Laboratory instruments

First stage

Lab(1)

Microscope

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The Microscope

definition, is an optical instrument having a magnifying lens or a combination of lenses for inspecting and magnified objects which cannot be seen by the human naked eye.

Microscope is using to observe many small objects or details of objects such as the shape of bacteria, fungi, parasites and host cells The light microscope uses transmitted or reflected light to obtain the image .

TYPES OF MICROSCOPE :

The following types of microscopes are in use now-

- **light microscope or Bright field**
- **Dark field microscope**
- **Phase contrast microscope**
- **Fluorescence microscope**
- **Electron microscope**

1- light microscope or Bright field

- **A light microscope** is an instrument that uses visible light and a system of lenses to magnify small objects
- The name bright - field is derived from the fact that the specimen is dark and contrasted by the surrounding bright viewing field.
- **Light microscopes can begrouped into two**
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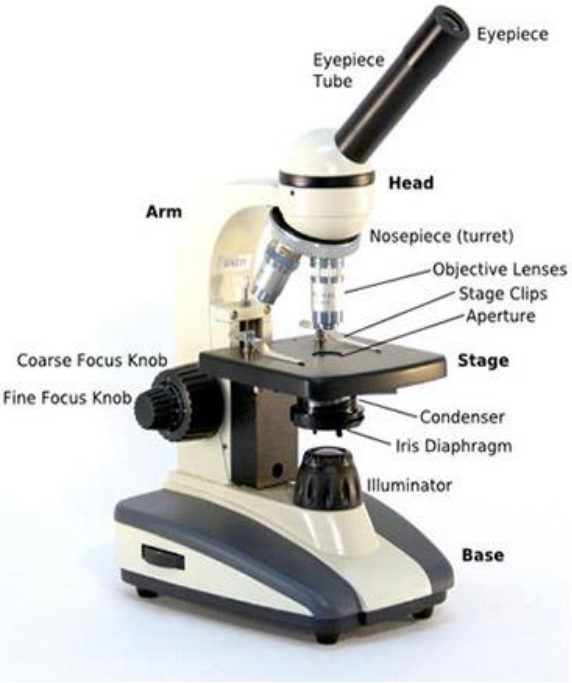
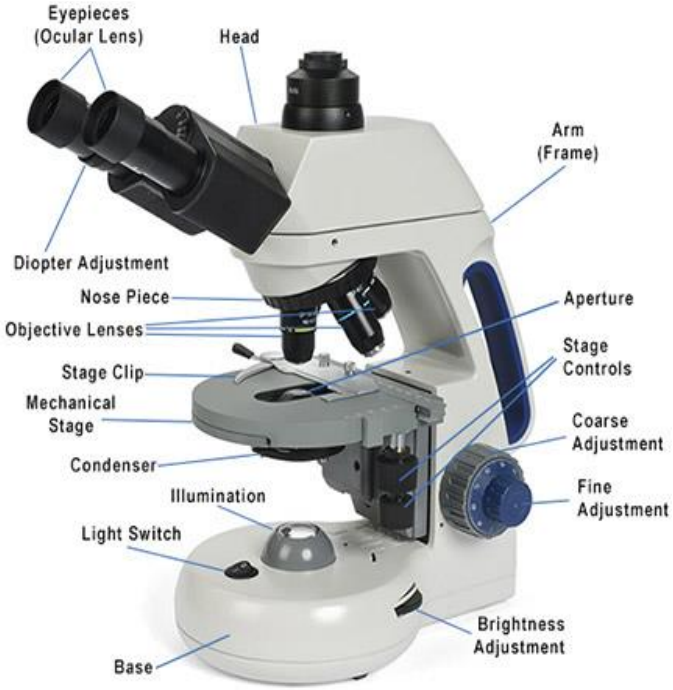
- (a) **Simple microscope**: It consists of only one bi-convex lens along with a stage to keep the specimen.
- (b) **Compound microscope:**It employs two separate lens systems namely, (i)objective and (ii) ocular (eye piece).





The following are the parts of microscope: -

- **Eyepiece or ocular lens:** Eyepiece is the lens, present at the top and is used to see the objects under study. Eyepiece lens contains a magnification of 10X .

- **Tube:**connects the eyepiece to the objective lenses.

- **Resolving nosepiece:**It is also known as the Turret. It allows the rotation of the lenses while viewing.
- **Objective lenses:**Generally, four objective lenses are found on a microscope, with ranges of 4X ,10X, 40X, 100X powers.

• **Diaphragm:**Diaphragm helps in controlling the amount of light that is passing through the opening of the stage.

Two focusing knobs i.e the **fine adjustment** knob and the **coarse adjustment** knob, which can move the stage the sharpen the image clarity.

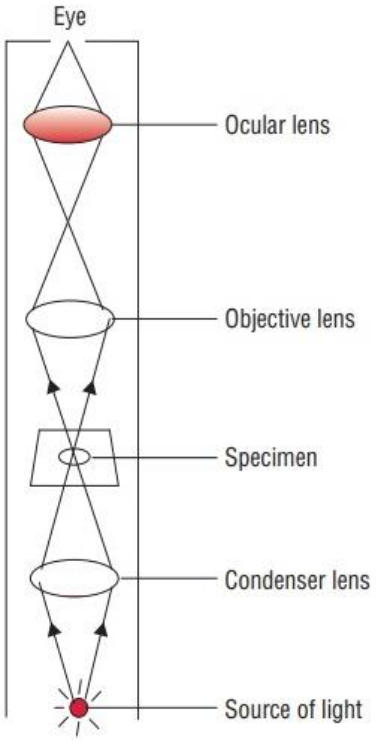
• **Arm:**It supports the tube of the microscope and connects to the base of the microscope.

• **Stage:** The platform that is flat used for placing the slides under observation.

• **Stage clip:** Metal clips that hold the slide in place.

• **Condenser**: mounted below the stage which focuses a beam of light onto the specimen. It can be fixed or movable, to adjust the quality of light, but this entirely depends on the microscope.

PRINCIPLES



- A specimen is placed on the stage of the microscope and incandescent light from the microscope's light source is aimed at a lens beneath the specimen (This lens is called condenser).
- The condenser usually contains an aperture diaphragm to control and focus light on the specimen.
- Then is collected by an objective lens.
- The objective lens magnifies the light and transmits it to an ocular lens and into the user's eye.

Magnification

Multiply the eyepiece magnification (10X) by the objective magnification (4X, 10X, 40X)

Example: 4 x 10 = 40X total

Carrying microscope:

Always carry your microscope with two hands, one grasping the arm or back slot and the other supporting the base.

Cleaningmicroscope:

Lenses must be clean for resolution. Use only lens paper or gauze and cleaning solution. Never use your finger, handkerchief, paper towels or spit to clean the lenses. Do not remove any parts for cleaning; it only allows dust to enter the microscope.

Putting away:

Turn off light & center mechanical stage. Position the nosepiece so that the lowest scanning (4X) objective is in place. Remove the slide from the stage, put in proper place. Clean the stage and lenses with gauze and lens cleaner, wipe off any oil. Wrap the cord around the arm.

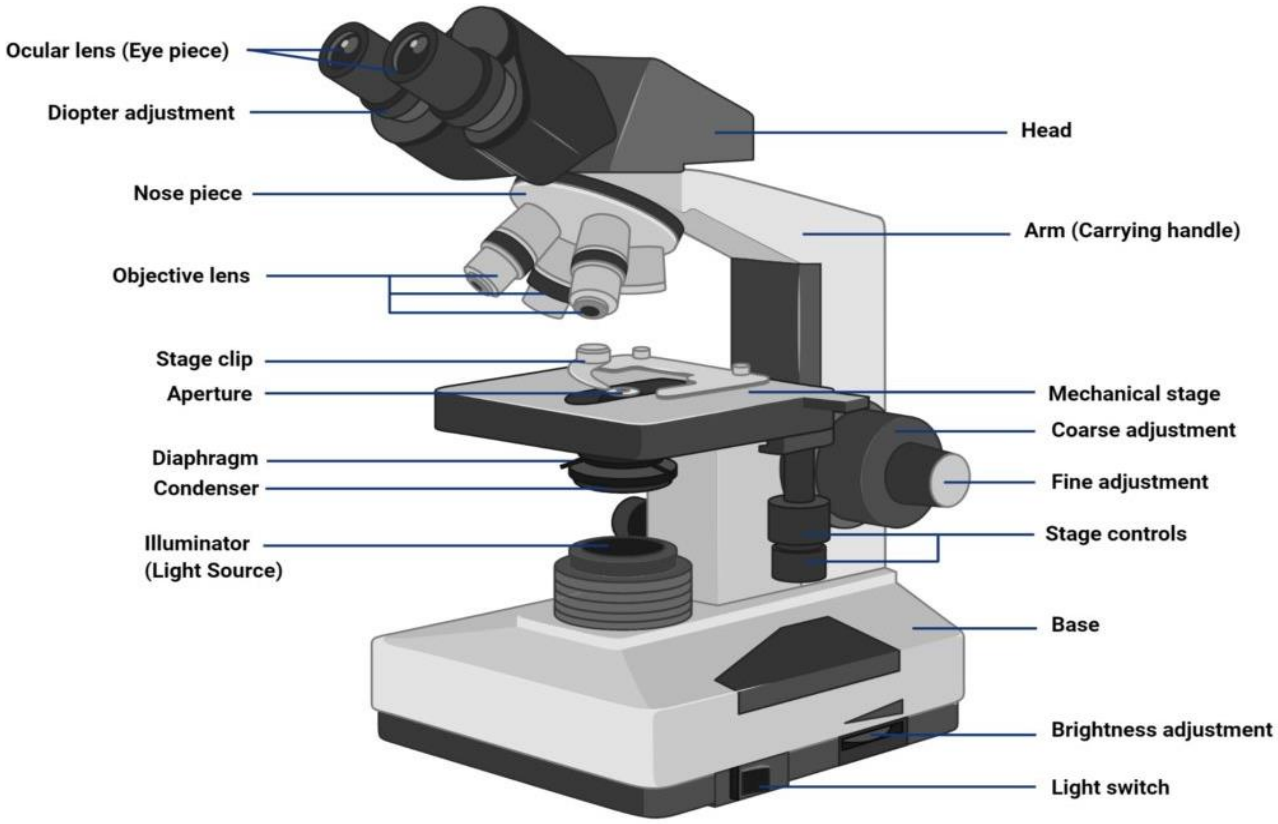


Figure: Parts of a microscope, Image Copyright © Sagar Aryal, www.microbenotes.com

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