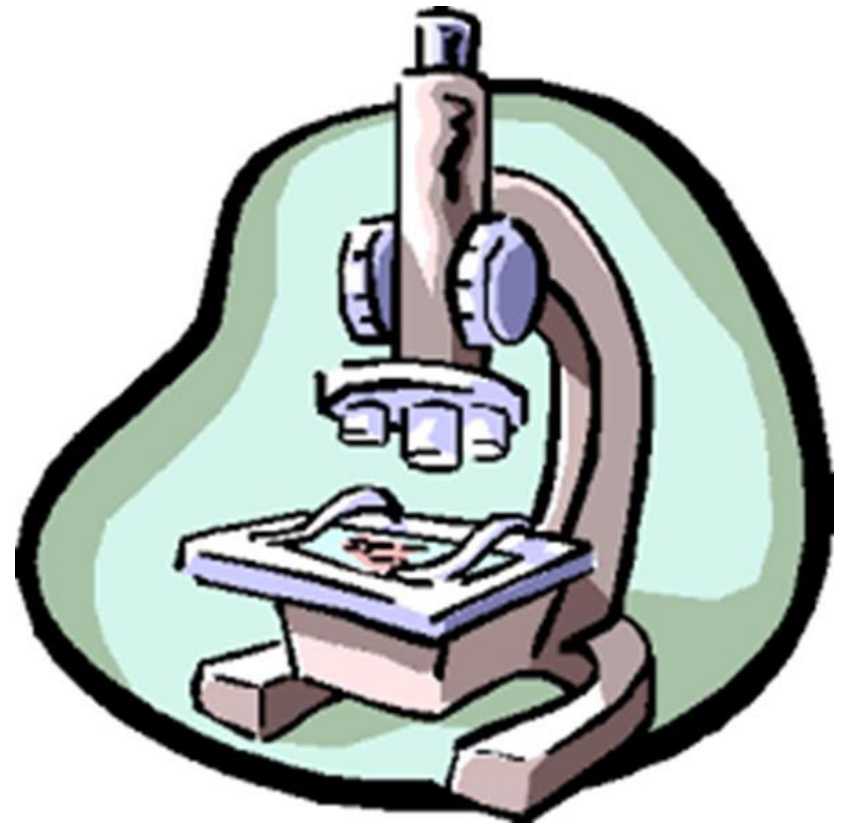


Microscopy



Microscope

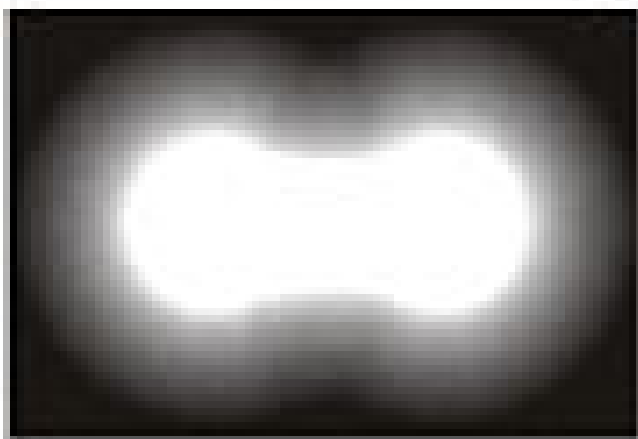
- It is an instrument used to see objects that are too small for the naked eye

Function of microscope:

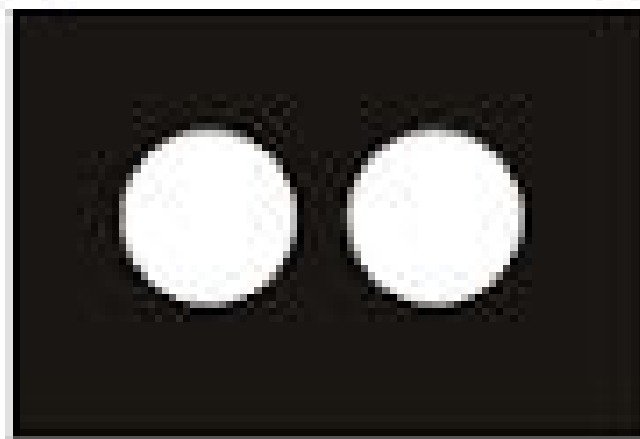
1. Magnification : to enlarge the object being examined.
2. Resolution: to resolve the image seen.

- **Resolution:** the ability to distinguish between two points at short distances from each other.

Lower resolution image



Higher resolution image



Types of Microscopes

A. Light microscope:

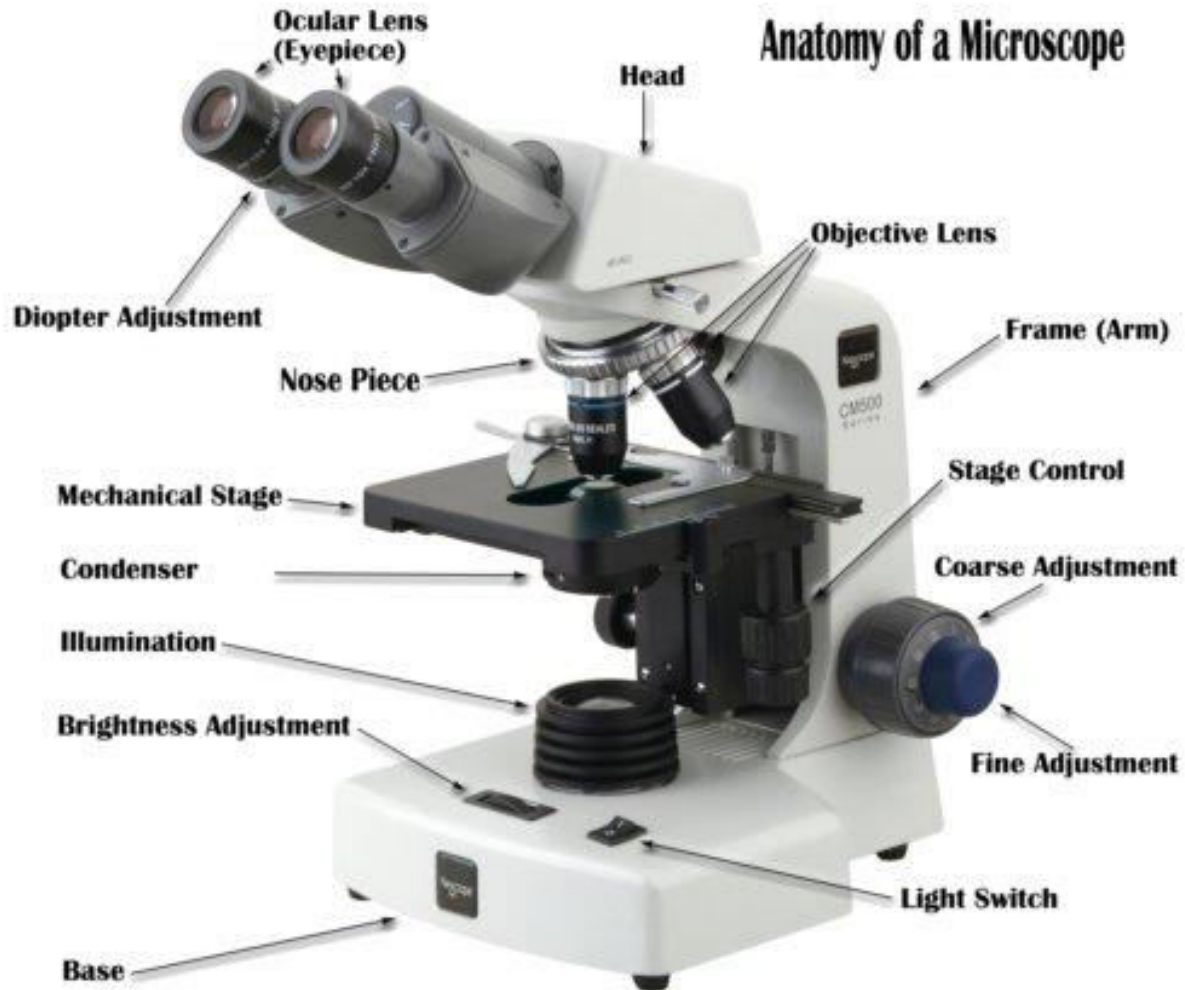
- 1) Bright field microscope
- 2) Dark field microscope
- 3) Phase contrast microscope
- 4) Inverted microscope
- 5) Dissecting microscope

Types of Microscopes

B. Non-light microscope:

- 1) Fluorescent microscope
- 2) Electron microscope (E.M)

Bright Field Microscope



Bright field Microscope parts & Function

1) Eye piece (ocular):

- To look at the image of object through it.
- To provide further magnification of image (X10).

2) Eye piece distance scale:

- To adjust the distance between the two eye pieces.

3) Revolving Nose-piece:

- It holds the objective lenses.

4) Objective lenses:

- To produce a magnified image with different magnification power (x4, x10, x20, x40, x100).
- **X100 objective lens called:** Oil immersion objective.

To calculate the total magnification of the microscope:

- Total mag . = objective lens mag. X ocular lens mag.
- The lowest mag. = $4 \times 10 = \times 40$
- The highest mag. = $100 \times 10 = \times 1000$

5) Microscope arm: to hold the microscope and connect its parts together.

6) Mechanical stage: to put the slide on it.

7) Stage control: to move the stage right and left, forward and backward.

8) Slide holder: to hold the slide and prevent it from moving.

9) Condenser: to collect the light in a cone shape from the light source to the object.

10) Condenser knob: move the condenser up and down .

11) Iris diaphragm: control the intensity of light that goes to the condenser.

12) Coarse adjustment knob: move the stage up and down rapidly to get approximate focusing.

13) Fine adjustment knob: move the stage slowly to get fine focusing.

14) Light source.

15) Power switch.

16) Microscope base: hold all parts of the microscope.

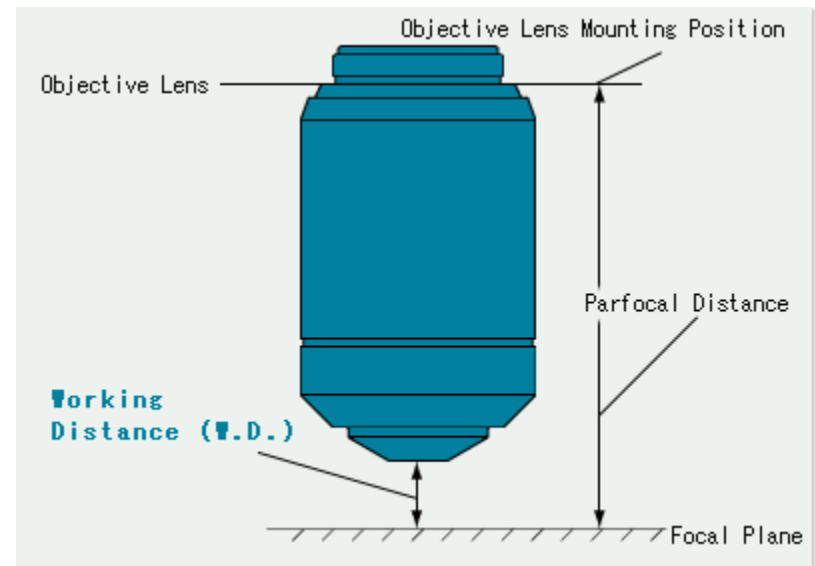
- Usually bright field microscope used for stained slide.
- **Magnification**= X1000
- **Resolution**= 200 nm

- **Working distance:**

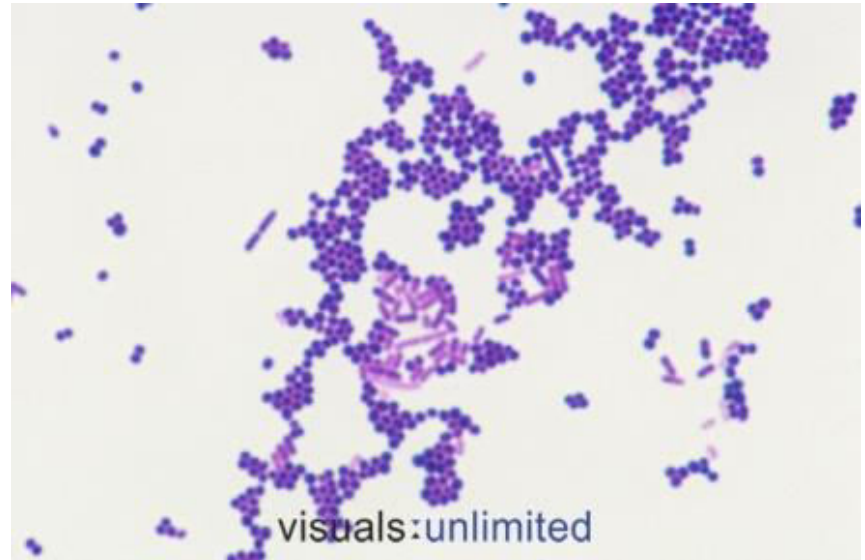
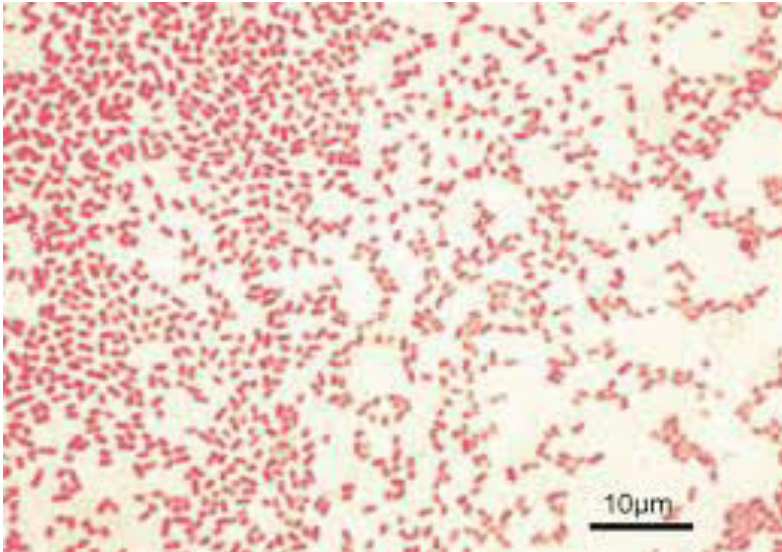
The distance between the objective and the object when the object is in focus.

- **Parfocal:**

When move from one objective lens to another you are still in approximate focusing.

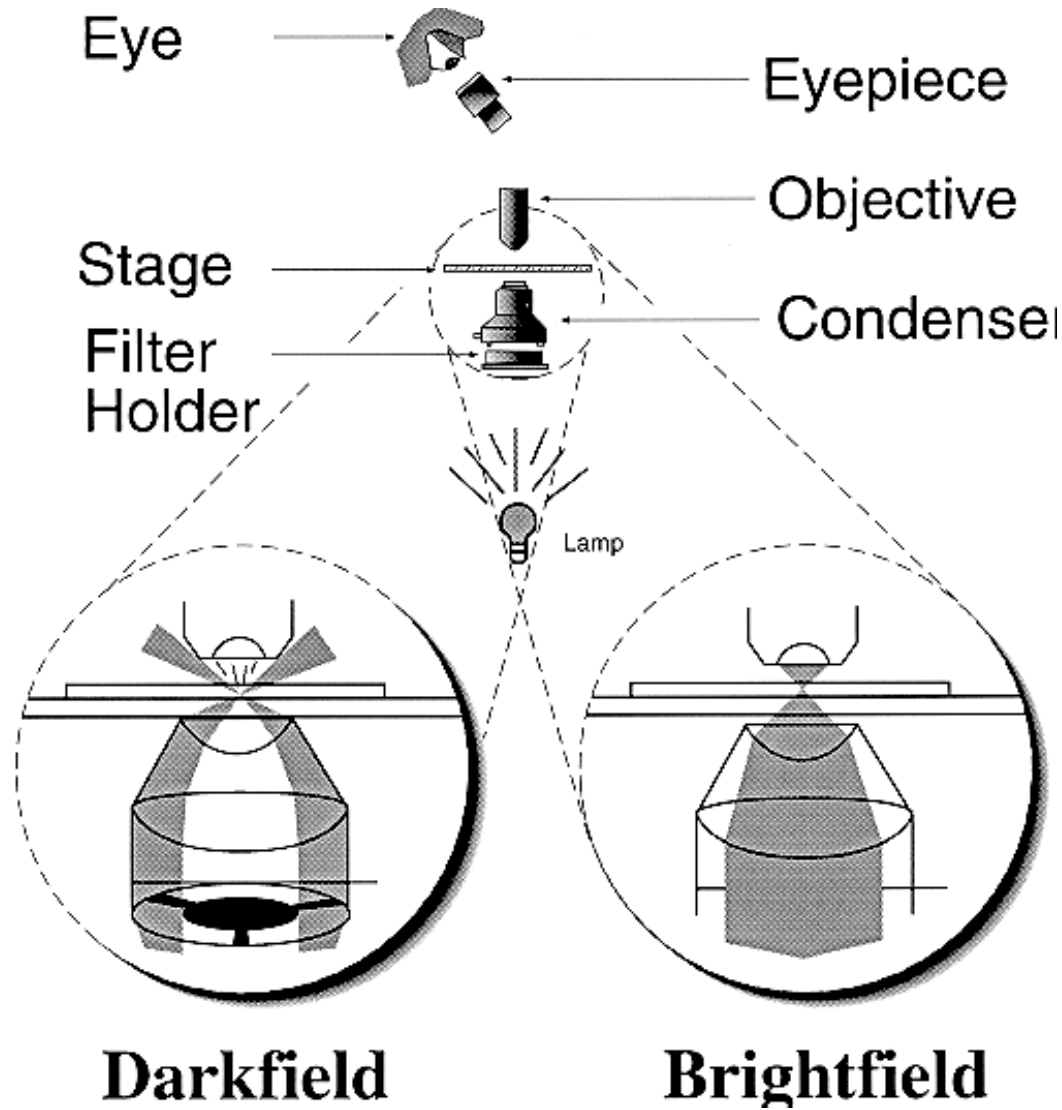


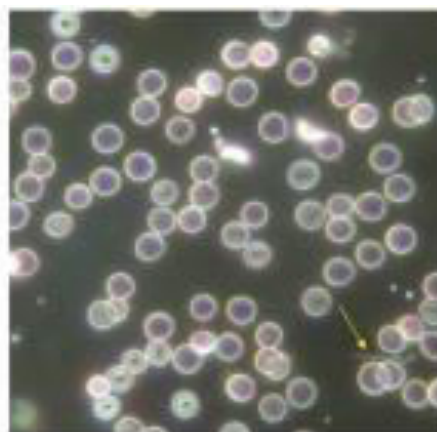
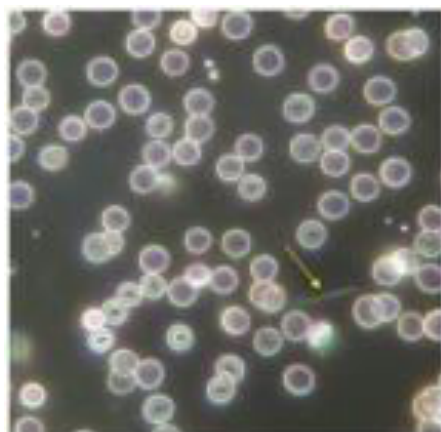
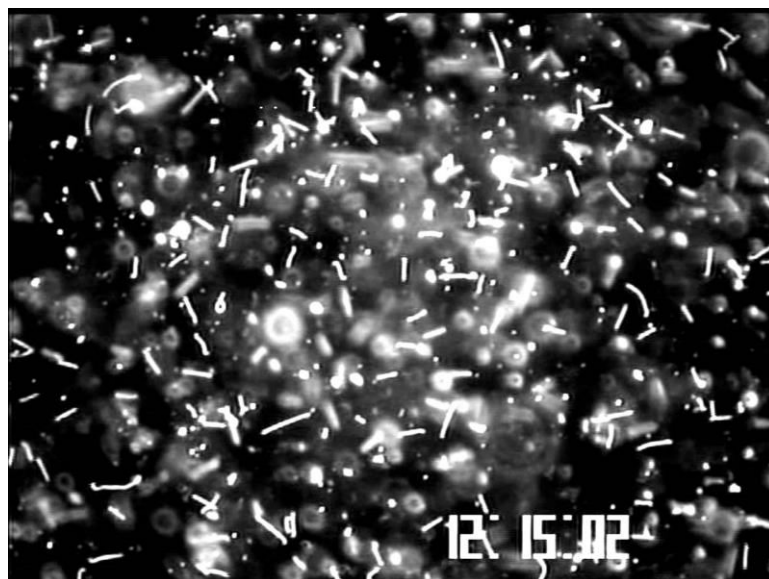
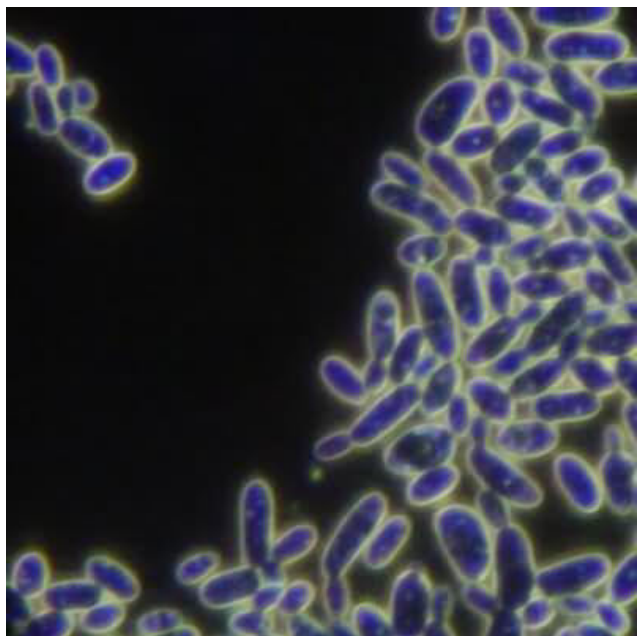
Bright field microscope



Dark field microscope:

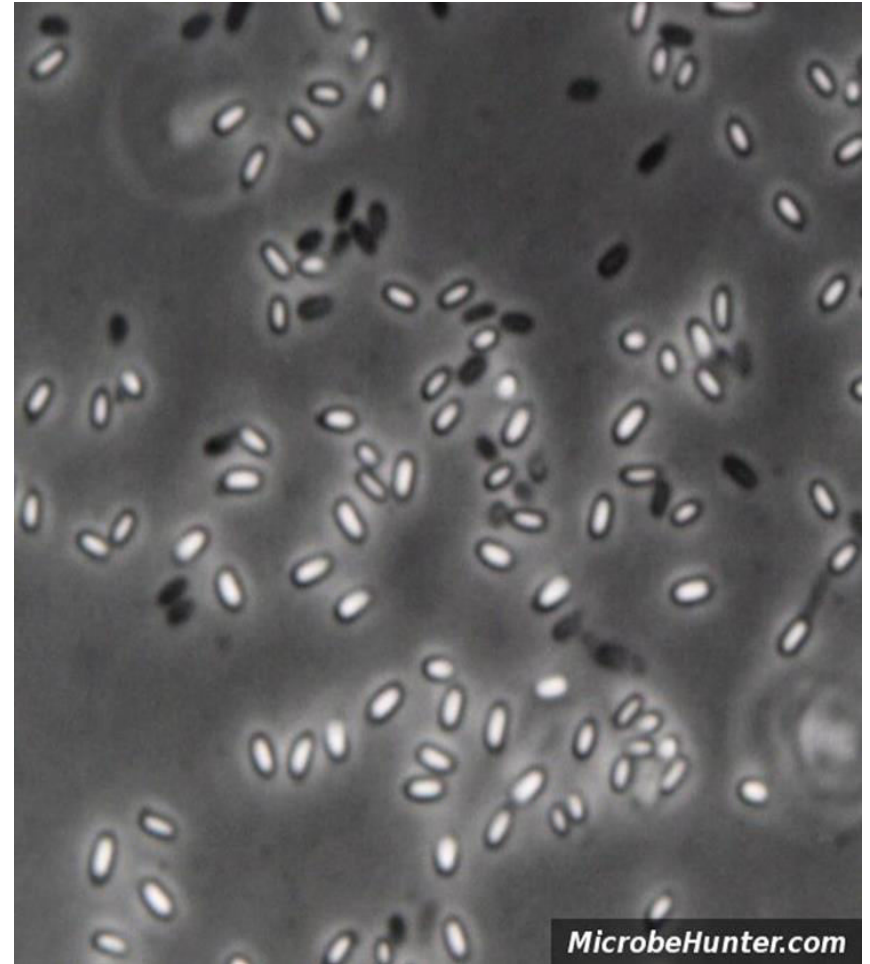
- The condenser condense the light on the object or specimen but out of the objective. The result is dark background and bright object.
- Used to see the motility of bacteria.





Phase contrast microscope:

- Produce contrast between the cell and the background.
- The cell appear darker against a brighter background.
- Used in examination of wet preparation.

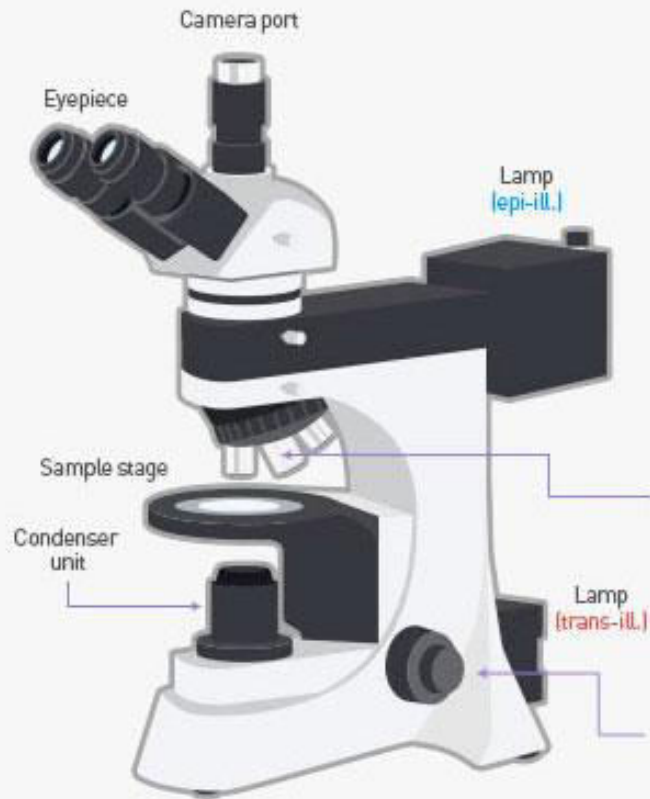


Inverted microscope:

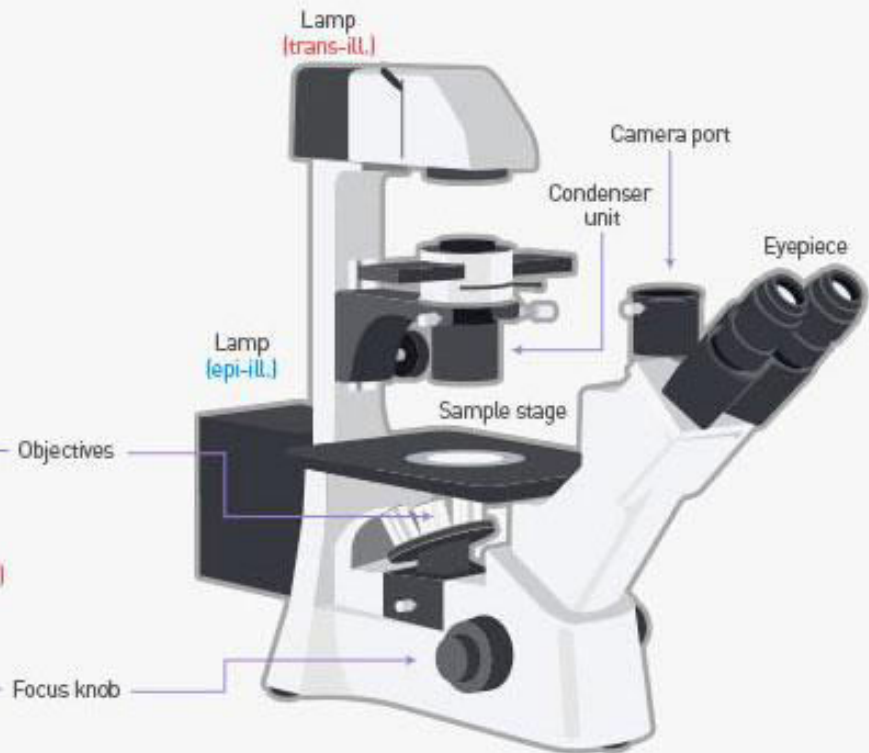
- The condenser is above the stage while the objectives below the stage.
- Used to see the effect of virus on the cells (cell culture flasks).



Upright microscope

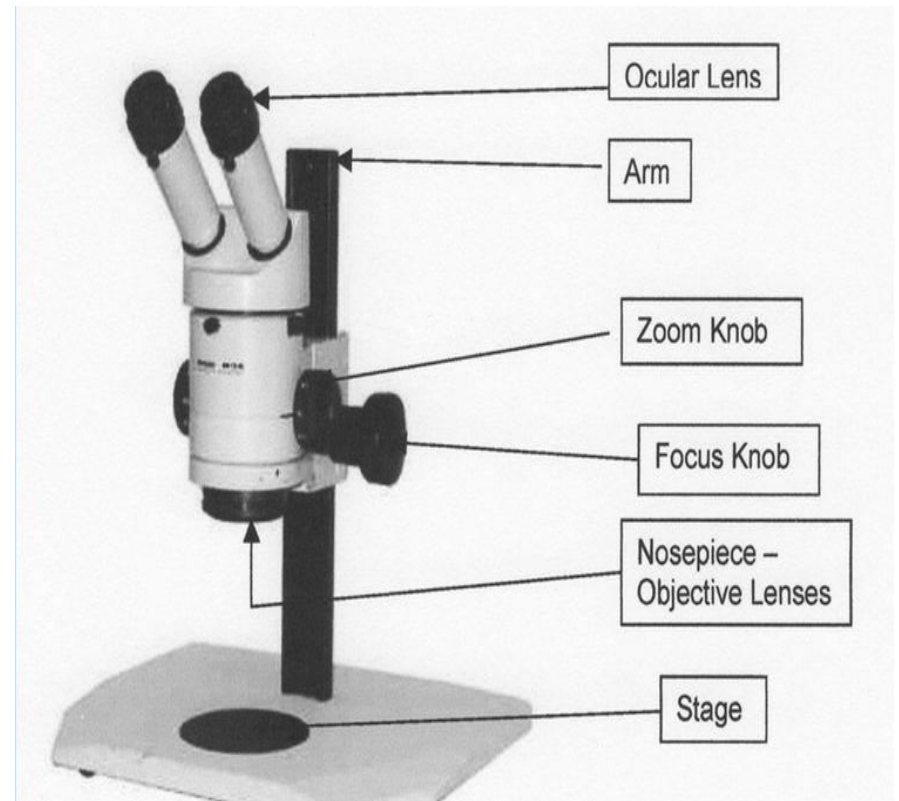


Inverted microscope



Dissecting microscope:

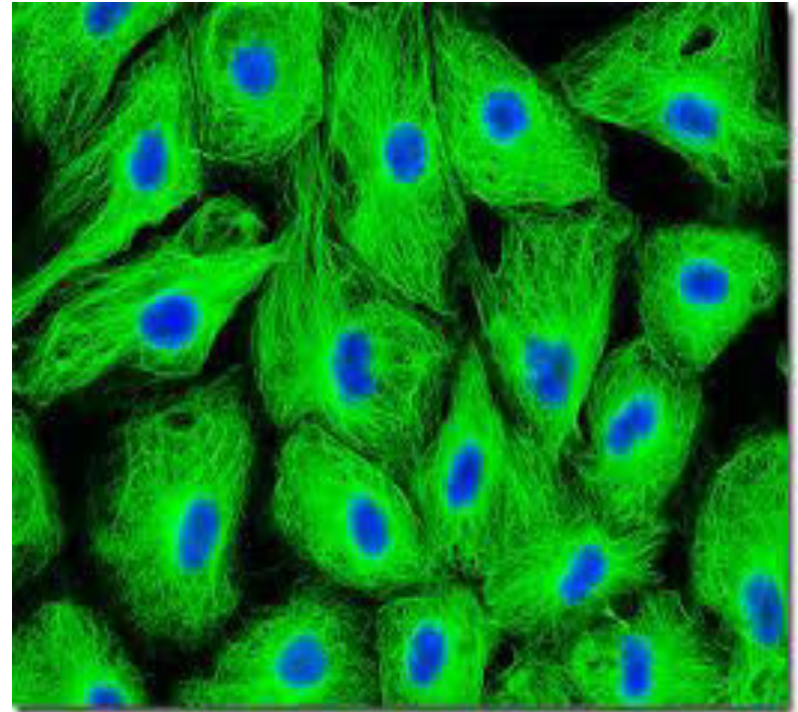
- It is a simple microscope.
- Used in mycology to see the plate of fungi + dissecting of insect and some parasites





Fluorescent microscope:

- Use ultra violet light.
- The slides stained with fluorochrome.
- Used in immunology.



Electron microscope (E.M):

- Use electrons (electron beam).
- Magnification= X100 000 - X300 000
- Resolution= 0.3 nm
- Used to see viruses and the cell ingredients.

