# First lab.
# The Microscope

## *An Introduction to the Laboratory*

There are a number of general rules that the Biology Department expects to be followed when you are in the Laboratories:

- Do not eat or drink in the laboratory
- Report all spills and accidents to your demonstrator immediately
- Always wash your hands at the end of a laboratory
- Upon completion of laboratory exercises, place all materials in the area or container designated by your demonstrator
- Leave the lab clean and organized at the end of each lab period.

**A microscope** is a precision instrument and an essential tool in the study of cells, tissues, and minute organisms. It must be handled and used carefully at all time.

**Or** :- is a designed to make objects visible that are to difficult or to small to see with the unaided eye.

There are two type of microscope can be study in this laboratory :-

**1-** Light (Compound ) microscope.

**2-** Stereo (Dissecting ) microscope.

Parts of the light microscope and its function:- figure -1-

1- **The base** :- rest on the table and act as a stand for the microscope and houses the lamp- and a light switch.
2- **Voltage control knob** :- which regulates light intensity, located near the light switch.
3- **The arm :-** rises from the base and supports the stage, lens system, and control mechanisms.
4- **The stage** :- supports the specimen to be viewed. A mechanical stage can be moved right and left and back and forth by tow stage adjustment knobs.
5- **Stage clips** :- hold the slide in place.
6- **A condenser :-** is located below the stage . It concentrate light on the object being observed . It may lowered or raised by condenser control knob**.**
7- **An iris diaphragm :-** is built into the condenser, which enables you to control the amount of light entering the lens system.
8- **The ocular lens (eyepiece) :-** is located at the upper end of the body tube if the microscope is monocular but in binocular microscopes , the oculars are attached to arotatable head .attached to the body tube.
9- **The rotatable head** :- allows a choice of viewing positions, and it is locked in place by a lack screw.

10- **A revolving nosepiece** :- a rotating piece by which a person can change the power of magnification easily while working (from low power to high power and vice versa ) .

11- **Objective lens** :-A combination of lenses attached to the revolving nosepiece. There are four type:-

A- **Scanning objective** :-The shortest lens which has a magnification of 4x.

B- **The low power objective** :- with a 10x magnification is intermediate in length.

C- **The high power objective** :- is the longest and usually has magnification of 40x.

D- **Oil- Immersion objective** :- with a 100x magnification that is a bit longer that the high power objective

12- **The coarse–focusing adjustment knob** :- has the longer diameter and it used bring objects into rough focus when using the 4x and 10x objective.

13- **The fine-focusing adjustment knob** :- has small diameter and it used bring objects into sharp focus when using the 40x and oil-immersion objective.

**Magnification power of Microscope =**

**Magnification power of eyepiece X Magnification Power of objective lens.**

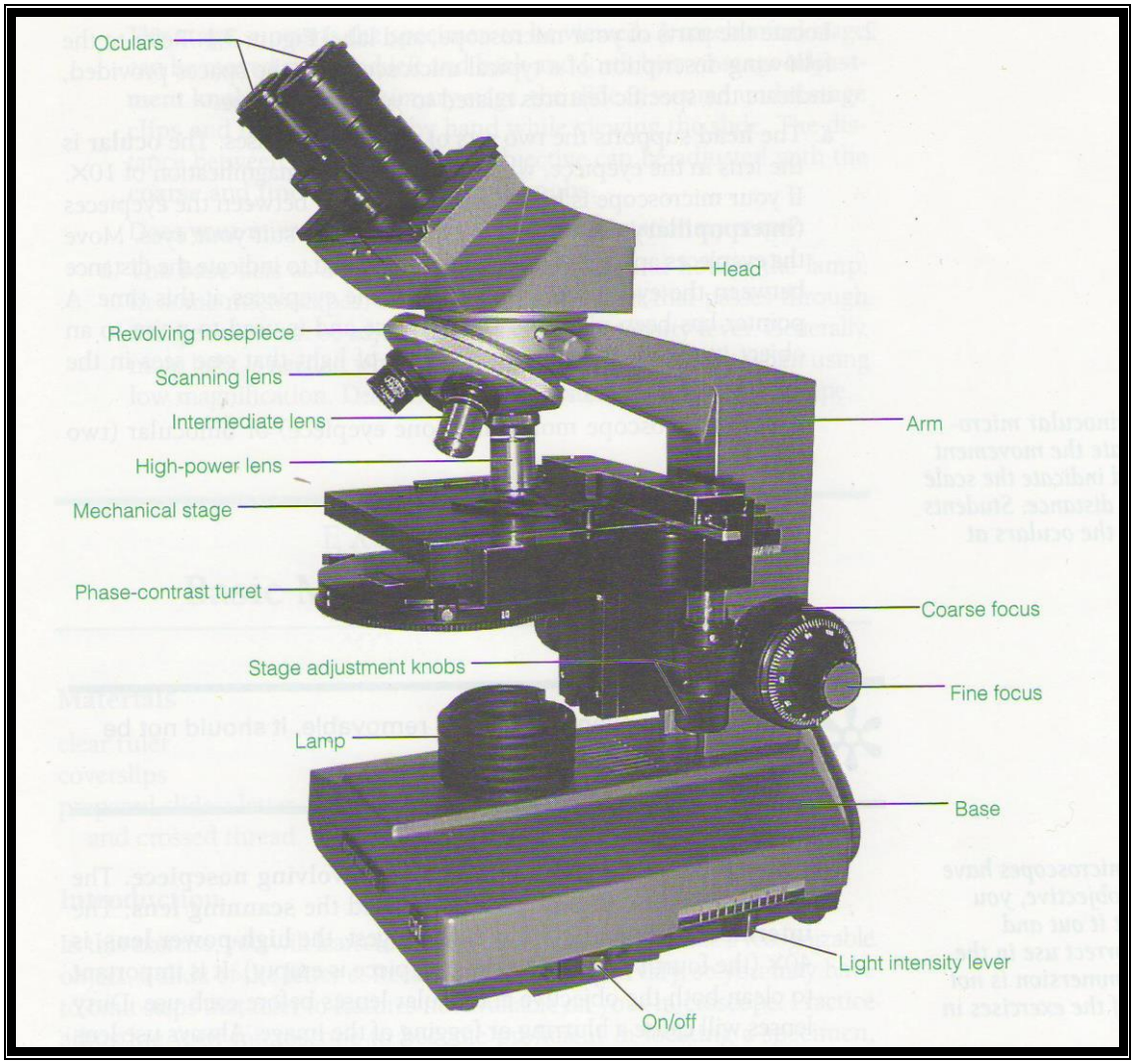


**Figure -1- The Light (Compound ) microscope.**

## The stereo (Dissecting) Microscope:-

It is used to view objects that are too large or to opaque to observe with a compound microscope . The two ocular enable stereoscopic observations and usually are 10x in magnification. Most student models have two objectives that provide 2x and 4x magnification so that total magnification is 20x and 40x. some models have a zoom feature that allows observations of intermediate magnifications. Objects are usually viewed with reflected light instead of transmitted light, although some stereo microscopes both types of light sources.

The parts of stereo microscope are shown in figure-2- Note the single focusing knob and the two oculars. The oculars may be moved inward or outward to adjust for distance between the pupils of your eyes. One ocular has focusing ring that may be adjust to accommodate for differences in visual acuity in your eyes.

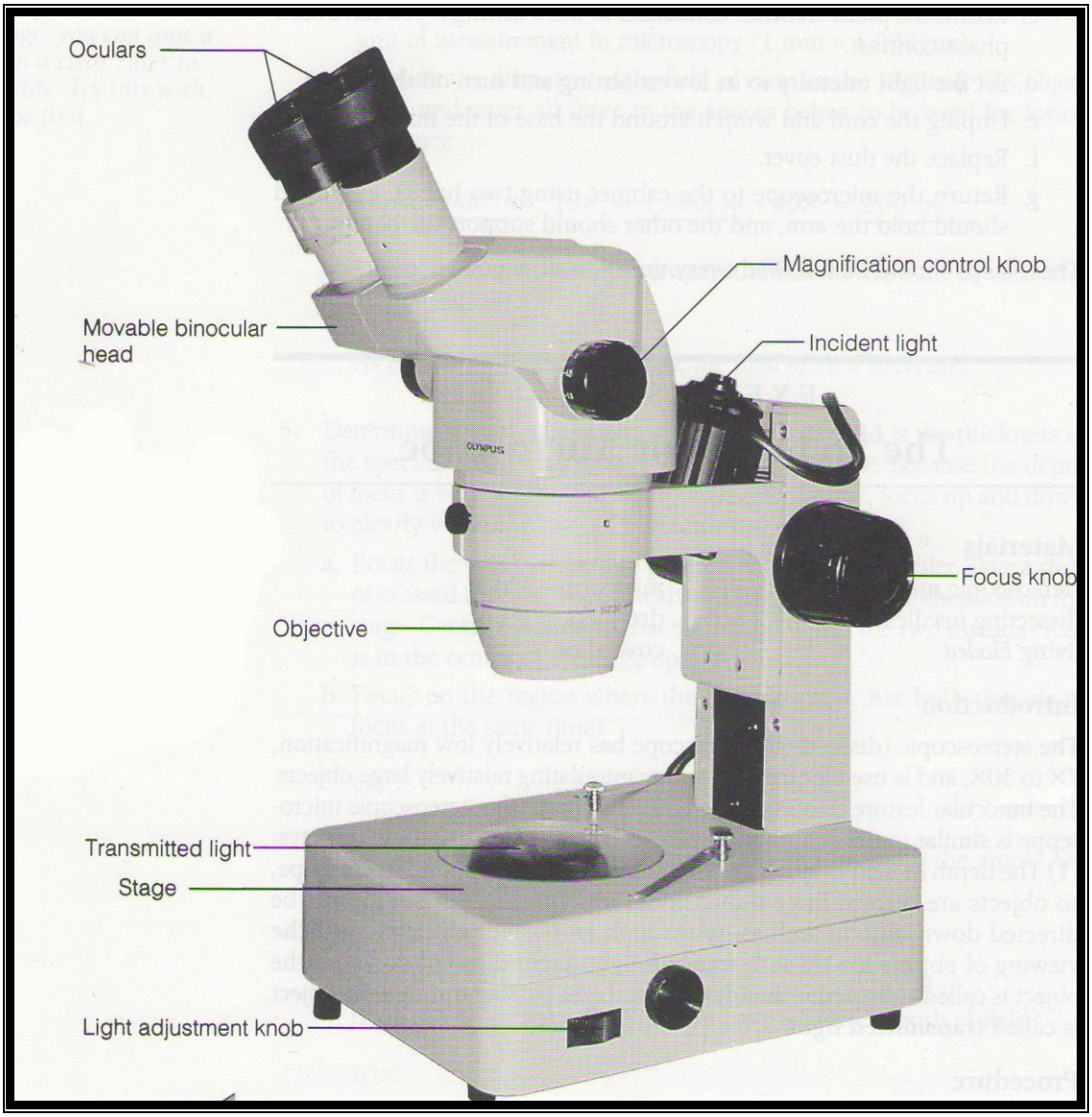


**Figure -2- The Stereo (Dissecting ) microscope**

## How can use the microscope

1- Obtain the microscope assigned to you Carry it by using one hand to support the base and the other to grasp the arm, and place it on the table in front of you .Clean the lenses with lens paper. Try the knobs and levers to see how they work.

2- Raise the condenser to its highest position and keep it there. Plug in the light cord and turn on the light . if your microscope has a voltage control knob, adjust it to an intermediate position to prolong the life of the bulb.

3- Rotate the 4x objective into viewing position and look through the oculars. If your microscope is binocular, adjust the interocular distance to match your interpupillary distance ( the distance between of pupils of your eyes) by

pushing the oculars together or pulling them apart. The circle of light that you see is called the field of view or simply the field.

4- While looking through the ocular, open and close the iris diaphragm and note the change in light intensity . Repeat for each objective and note that light intensity decreases as the power of the objective increases . therefore, you will need to adjust the light intensity when you switch objectives . Remember to use reduced light intensity when you are viewing unstained and rather transparent specimens.
5- If your microscope has voltage control knob , repeat item 4 while leaving the iris diaphragm open but changing the light intensity by altering the voltage.

When you finished using the microscope perform these steps:-

1- Turn off the light switch.
2- Remove the slide. Clean and dry the stage.
3- Clean the lenses with lens paper.
4- If your microscope has a rotatable head , rotate it so the oculars extend over the arm and lock it in place with the lock screw.
5- Rotate the nosepiece so no objective extends beyond in front of the stage.
6- Raised the stage to its highest position or lower the body tube to its lowest position in accordance with the type of microscope you are using.
7- Unplug the light cord and loosely wrap it around the arm below the stage. Add a dust cover , if present .
8- Return the microscope to the correct cabinet cubicle.