AL-Mustaqbal University Facility of Science Department of Biochemistry	**Biology--** First Stage	Prepared By Assist Lect Summer Hussein AL-Mamouri

Lab 1 - Laboratory safety and microscope review

Lab Safety Begins Before You Go to the Lab

1) Wear the clothing and protective wear identified in your risk assessment.
2) Laboratory coats must be kept fastened.
3) Don't wear sandals or open shoes.
4) Long hair must be tied back.

What are the general hazards in a laboratory?

1) Fire
2) Breakage of glassware
3) Sharps
4) Spills
5) Pressure equipment (autoclave)
6) Extremes of heat & cold
7) Chemical hazards
8) Biological hazards
9) Radiation

Before You Leave the Laboratory

1) Clean your workbench with disinfectant at the beginning and at the end of the laboratory exercise.
2) Leave all equipment, samples and reagents correct position.
3) Wash your hands with soap and water.

Microscope

A **microscope** (from the Ancient Greek, *mikrós*, "small" and, *skopeîn*, "to look" or "see"): is an instrument used to see objects that are too small for the naked eye. The science of investigating small objects using such an instrument is

called **microscopic**. Microscopic means invisible to the eye unless aided by a microscope.

There are many types of microscopes, the most common and first to be invented is the optical microscope which uses light to image the sample:

1-Dark field microscope.	**2-** X-ray microscopy (XRM).
3- Fluorescence microscope.	**4-** Digital microscope.
5- Phase contrast microscope.	**6-**Electron microscope.

Compound Light Microscope Parts and Functions

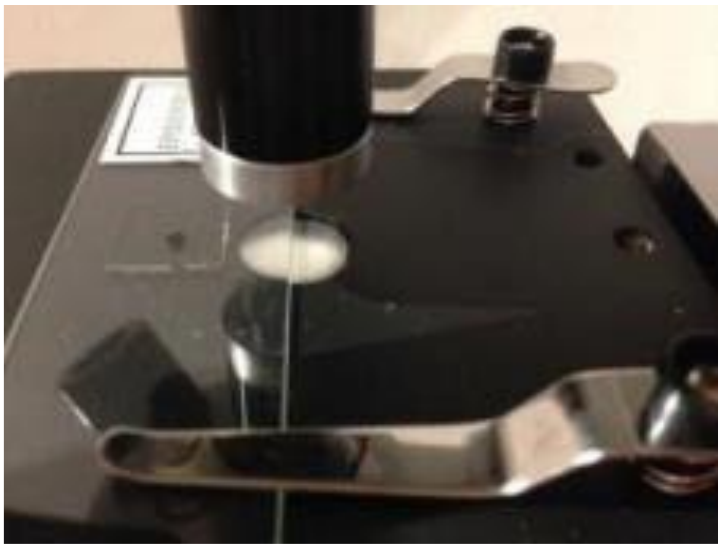
Ocular / Eyepiece

An eyepiece is that part of the microscope, which is directed to the viewer. It is a construction of at least one or more lenses. The function of the eyepiece in a microscope is to convert the real-image from the objective into an enlarged-image.

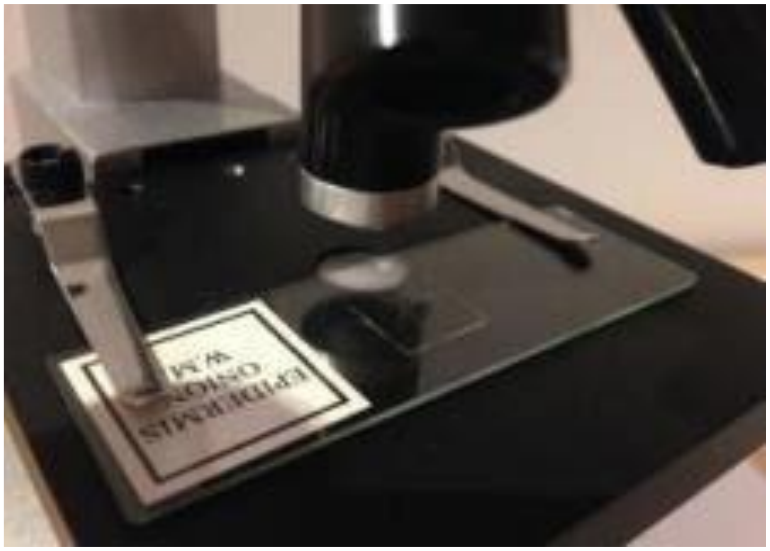
Nose piece

It's used to carry and rotate multiple objective lenses, that have different magnification power.

Stage Clip
The clip serves as a holder for the object plate and makes sure, that it doesn´t get out of its place.



Mechanical Stage
On the stage, one can place the slide. By shifting the plate, one can choose the part of the object, which one wants to look at.



Objective lens
An objective (lens) is that part of the microscope, which is directed to the object. It´s task is to collect the light rays, that are reflected from the observed item.

Fine & Coarse focus adjustment
With the fine focus one can regulate the distance between slide and objective lenses, to achieve the necessary sharpness. The fine focus moves the stage only minimally.
The coarse focus also moves the
stage to regulate the difference between slide and objective lenses. His task is to catch the right distance roughly and quickly.

Light Source

The early microscopes used concave mirrors to reflect light on the objects. Later, they used light bulbs. Most microscopes operate with LED light. The light source´s task is to illuminate the object.

Arm

Its function is connecting all components and holding them together.

To calculate magnification

Biological / Compound Microscope

Eyepiece at 10x

Objective lens at 4x

eyepiece x objective lens = magnification

(10x) x (4x) = 40x

❖ How to use a microscope

Examine some of the samples using an optical microscope:
1- Move the nose piece so that the lowest power objective lens (eg. 4x) is clicked into position.

2- Place the microscope slide on the stage and fasten it with the stage clips.

3- Turn the coarse adjustment so the stage moves upward. Move it up as far as it will go without letting the objective touch the coverslip.

4- Look through the eyepiece and move the fine adjustment until the image comes into focus.

5- Adjust the condenser and light intensity for the greatest amount of light.

6- Move the microscope slide around until the sample is in the center of the field of view.

7- When you have a clear image of your sample with the lowest power objective, you can change to the next objective lenses.

8- When finished, lower the stage, rotate the noise piece into the low power lens and remove the slide.