

Salahaddin University- Erbil
College of Agricultural Engineering Sciences
Unit of Basic Sciences
Class: 1st year/1st sem. 2022-2023



SUBJECT:

PRACTICAL OF GENERAL ZOOLOGY

Assist. Lecturer

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M. Sc. Biology

Microscope

MICROSCOPE



- **What are Microscopes?**
- Microscope is the combination of two words; "**micro**" meaning **small** and "**scope**" meaning **view**.
- Microscopes are instruments which enable the human to see those substances and organisms, which cannot be seen with the **naked eye**.
- There are different types of microscopes, the three basic types are **light (optical)**, **electron** and **scanning** microscopes.
- The different types of microscopes have a common aim, (**i.e, enlargement of images**).
- The only difference between them is that the method of illuminating the objects vary as per the type.

Compound Light Microscope



- The microscope pictured bellow is referred to as a compound light microscope.
- The term **light** refers to the method by which light transmits the image to your eye.
- **Compound** deals with the microscope having more than one lens.
- Early microscopes, like **Leeuwenhoek's**, were called simple because they only had one lens.
- Simple scopes work like **magnifying glasses** that you have seen and/or used.
- These early microscopes had limitations to the amount of magnification no matter how they were constructed.

Microscope



The microscope: instrument used to obtain magnified image of minute objects or minute details of objects, the most widely used microscope are **optical microscope**, which use **visible light** to create a **magnified image** of an object.

There are two major parts of microscope:

A / Mechanical Parts

- 1. The base:** supports the microscope.
- 2. The arm:** used for handling and transporting the microscope.
- 3. The stage:** to place the slide on it.
- 4. Head or body tube:** supports the objective lens system and the eyepiece.

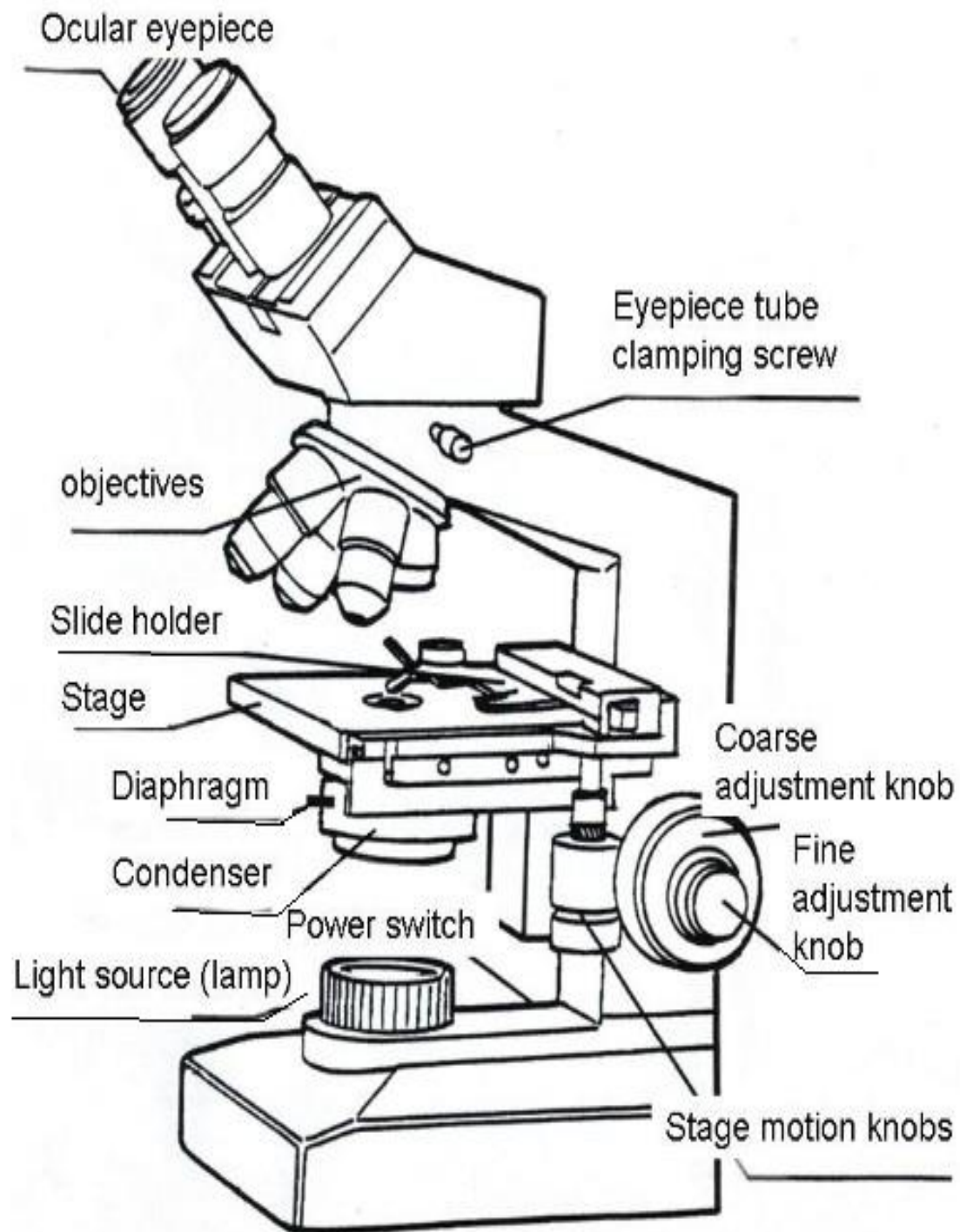


Fig. 13 Compound microscope

Microscope



5. **Nosepiece:** movable piece that carries the objective lenses.
6. **Light source:** located in the base of the microscope, the light passes directly upward through the specimen.
7. **The knobs :** they are of two kinds :
 - a-**Coarse adjustment knob:** to bring the microscope field to **view**, and any movement of this knob moves the stage a **large distance**, and this knob used with **low power** objective lenses.
 - b- **Fine adjustment knob:** to bring the microscope field to **focus**, and this knob is used with **high power** objective lenses

Microscope



B / Optical parts:

- 1. The condenser:** located under the stage and it concentrates the light on the specimen.
- 2. Iris diaphragm:** increases or decreases the opening of condenses lens.

Microscope



3. Objective lenses :

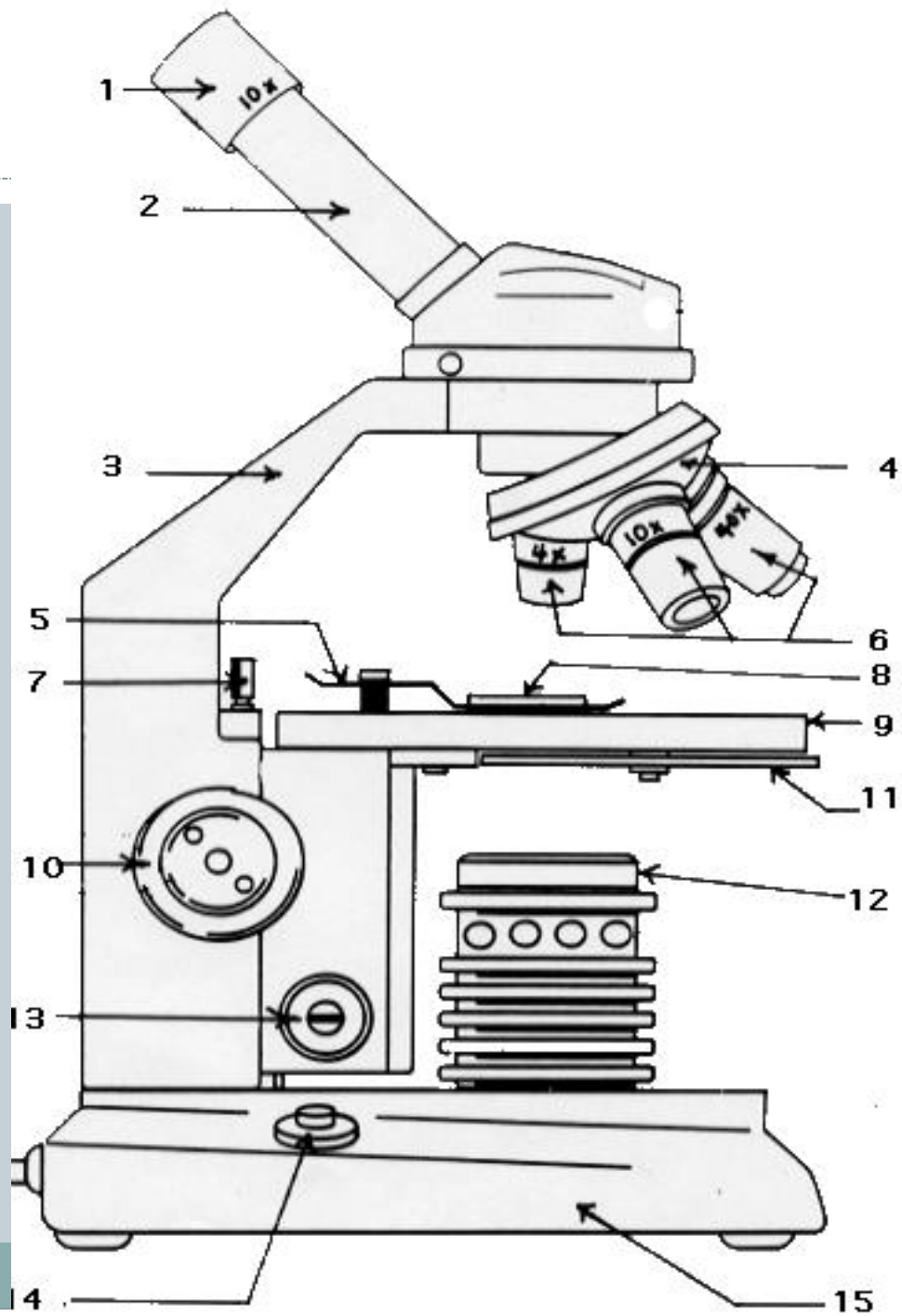
a- **low power lenses**: it has a magnification power of (4X) and (10X) .

b- **high dry lens**: it has a magnification power of (40X) .

c- **oil immersion lens**: it has a magnification power of (100X) and with this power the oil must be used.

4. **Ocular eyepiece**: located at the superior end of the body tube, this lens has specialized magnification power such as (12X, 8X,....), this lens some time have **pointer** used to pointed on some parts of specimen.

Standard Microscope



Total Magnification:



X



= 40 X

4X Scanning Objective 10X Eyepiece



X



= 100 X

10X Objective 10X Eyepiece



X



= 400X

40X Objective 10X Eyepiece

Steps/ How it works



1. When viewing a slide through the microscope make sure that the stage is all the way down and the 4X scanning objective is locked into place.
 - Look through the eye piece and raise the condenser until light is seen as a circle in the center of the field called “**a bright full moon**”.
2. Place the slide that you want to view over the aperture and gently move the stage clips over top of the slide to hold it into place.

Steps/ How it works



3. Beginning with the 4X objective, looking through the eyepiece making sure to keep both eyes open (if you have trouble cover one eye with your hand) slowly move the stage upward using the coarse adjustment knob until the image becomes clear.
- ❖ This is the only time in the process that you will need to use the coarse adjustment knob.
 - ❖ The microscopes that you will be using are parfocal, meaning that the image does not need to be radically focused when changing the magnification.

Steps/ How it works



4. To magnify the image to the next level rotate the nosepiece to the 10X objective.
 - ❖ While looking through the eyepiece focus the image into view using only the fine adjustment knob, this should only take a slight turn of the fine adjustment knob to complete this task.
5. To magnify the image to the next level rotate the nosepiece to the 40X objective.
 - ❖ While looking through the eyepiece focus the image into view using only the fine adjustment knob, this should only take a slight turn of the fine adjustment knob to complete this task.

Steps/ How it works



- When the image comes into focus with the low-power objective, the nose piece is rotated to the next lens (i.e., 40x or 100x), with slight adjustment of focusing.
- Place a drop of immersion oil on the cover glass for oil immersion objective.
- Now look through the eye piece and focus the object with fine-adjustment knob.