

Biology 201 Microscope Lab - Quiz prep

- The compound light microscope is used to study the small structures within a specimen that typically can't be seen with the naked eye.
- The microscope includes 3 functions.
- **Magnification:** Used to make the image "appear" larger through the lenses.
- **Resolution:** Used to distinguish 2 objects from each other (Low resolution would make the 2 objects appear as one).
- **Contrast:** Used to distinguish an object from its' background.

Parts of a compound light microscope + their functions:

- **Ocular lenses/Eye pieces:** Used to look into the microscope. They magnify the image for it to appear larger. A pointer can be placed in an eye-piece to indicate a specific location.
- **Head:** The part of the microscope that holds the ocular lenses.
- **Nose-pieces:** The part of the microscope that holds the objective lenses together. It can be rotated to select a specific objective lens.
- **Objective lenses:** The lenses right beside the specimen which magnify the image and increase the resolution. There are 4 different types of objective lenses.
 1. Scanner (4x): Used to direct a search to the desired part.
 2. Low power (10x): Used to see large features.
 3. High power (40x): Used to examine detailed, smaller features.
 4. Very high power (100x): Requires special techniques.
- **Frame:** The stand that holds the microscope together in position.
- **Coaxial Coarse & Fine Focus Adjustment Knob:** Moves the stage up or down to adjust the focus of the image.
 - **Coarse Adjustment:** The large part at the bottom that changes focus rapidly. Typically used to make small adjustments (Usually with scanner 4x or low power 10x)
 - **Fine Adjustment:** The small part that changes focus slowly. Usually used to bring an image to a sharp focus.
- **Stage:** The platform that the specimen is placed on.
- **Stage clip:** The clip that holds the slide that the specimen is placed on.
- **Coaxial stage motion knob:** The part that moves the slide held by the stage clip. The large part moves it away or towards the the frame, while the smaller part moves the slide left or right.
- **Condenser:** The part that focuses the light from the lamp onto the specimen.
 - **Adjustment knob:** Moves it up or down.
 - **Aperture iris diaphragm:** Controls the angle of light reaching the specimen (Adjusts contrast).
 - **Centring screws:** Hold the condenser in place and can centre it.
- **Lamp:** Provides light to illuminate the specimen.

- Lamp intensity knob: Adjusts the brightness of the lamp.
- Field iris diaphragm: Controls the width of the light reaching the condenser (Adjusts contrast).

*Field iris diaphragm + Aperture iris diaphragm control the brightness/width of light, thus they adjust the contrast.

**Ocular lenses magnify the image, while the objective lenses magnify AND increase the resolution of the image.

***The objective lenses have powers of 4x, 10x, 40x and 100x. The ocular lenses have powers of 5x, 10x and 20x. When the objective lenses is 4x and the ocular lens power is 5x, the total magnification would be 20x. Therefore, we are seeing the specimen 20 times greater.

Dissection microscope:

- All microscopes should be covered when not in use.
- When taking the cover off, make sure to use both hands.
- The dissection microscope is useful for examining large items.
- It includes ocular lenses at the top, which are connected to the head of the microscope.
- The head of the microscope contains a zoom objective lens.
- Further down the frame, there is the focusing knobs.
- The focusing knobs move the objective lens' head up and down.
- The bottom of the microscope includes the stage, which contains the light source.
- The zoom objective lens ranges from 0.8x to 3.5x
- Advantage: Light can be passed through from underneath the sample, but also from the top or side using an external light source.
- Objects can be viewed in 3 dimensions.

Advantages of compound microscope:

- Higher magnification can be achieved.
- It helps us see small things that would be impossible to be seen with the naked eye. (Helps us examine various viruses/bacteria).
- Reveal a great amount of detail.

Advantages of the dissecting microscope:

- Allows us to examine large specimens.
- Allows us to view objects in 3 dimensions
- Light can be passed from under the sample, the top and the side of it.