

Microscope

A scientific tool used to produce magnified images of structures that are too small to be seen with the unaided eye.

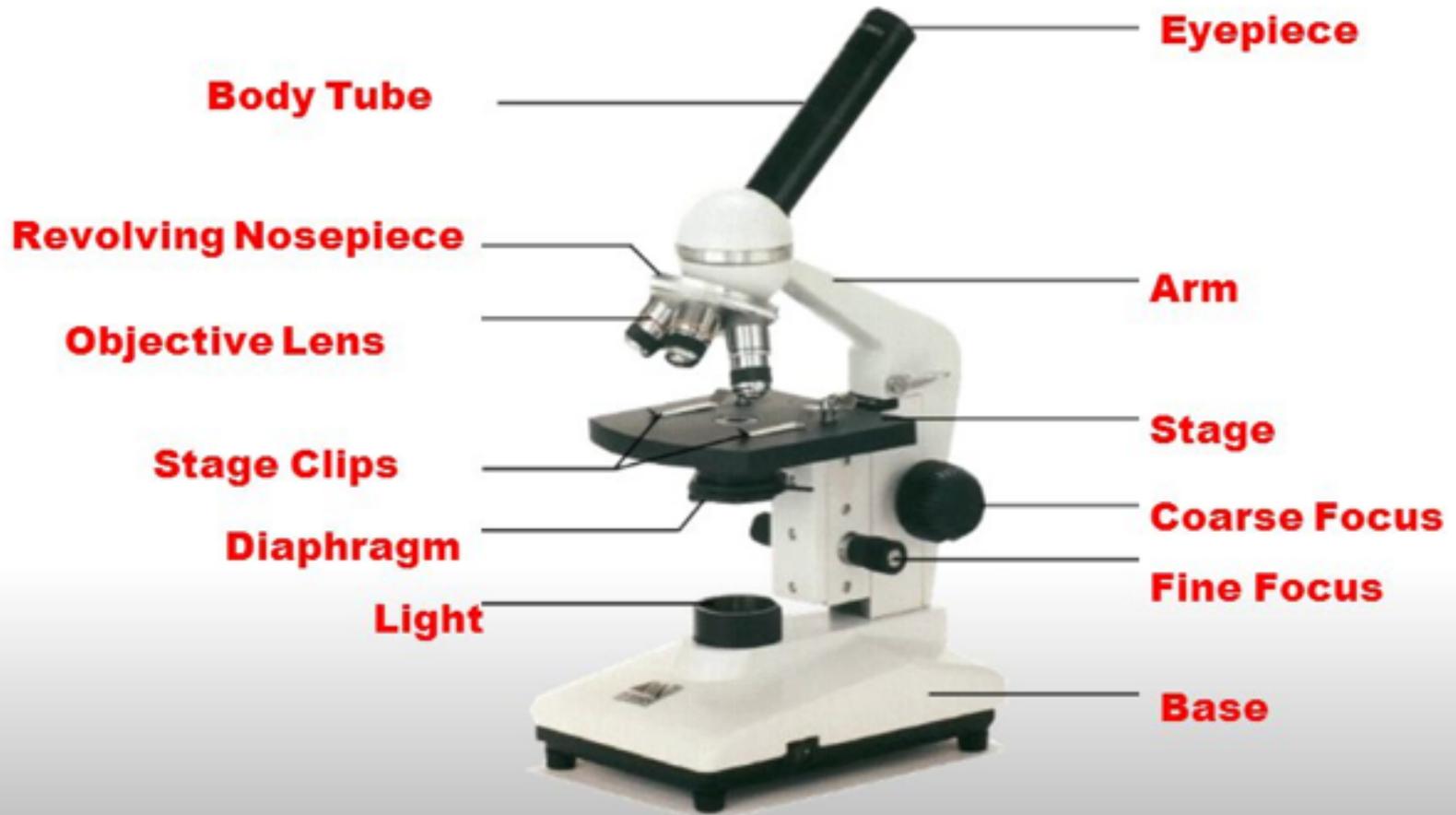
Light Microscope

- most commonly used microscope
- can magnify up to 1000x
- has a light source

Compound Microscope:

- light passes through 2 lenses to form an image

Microscope Parts



<i>Part</i>	<i>Function</i>
<i>eyepiece</i>	<i>contains 10X magnifying lens</i>
<i>arm</i>	<i>supports body tube</i>
<i>stage</i>	<i>supports slide being observed</i>
<i>fine adjustment</i>	<i>sharpens the image</i>
<i>coarse adjustment</i>	<i>focuses the image (only use on low power)</i>
<i>base</i>	<i>supports microscope</i>
<i>Illuminator</i>	<i>produces light</i>
<i>diaphragm</i>	<i>regulates the amount of light</i>
<i>stage clips</i>	<i>hold slide in place</i>
<i>low power objective</i>	<i>magnification of 4X</i>

<i>Part</i>	<i>Function</i>
<i>medium power</i>	<i>magnification of 10X</i>
<i>high power objective</i>	<i>magnification of 40X</i>
<i>nosepiece</i>	<i>holds objectives; can be rotated to change magnification</i>
<i>body tube</i>	<i>maintains proper distance between eyepiece and objectives</i>

Magnification & Resolution

Magnification: Enlargement of image through lenses

Resolution: Clarity of the image; capacity of microscope to show 2 points that are close together

Calculating Magnification

Total magnification = (eyepiece) (objective)

If the objective is 40x and the eyepiece is 10x, what is the total magnification?

$$(10)(40) = 400x$$

If the total magnification is 100x and the eyepiece is 10x, which objective are you using?

$$100 = (10) (X)$$

$$10 = X$$

Preparing a Wet Mount

1. Obtain a clean slide and coverslip
2. Place the specimen in the middle of the slide
3. Using a dropper pipette, place a drop of water on the specimen
4. Lower one edge of the coverslip so that it touches the side of the drop of water at approximately a 45° angle
5. Slowly lower the coverslip over the specimen and water. Try not to trap any air bubbles under the coverslip. If air bubbles are present, **GENTLY** tap the surface of the coverslip over the air bubble with a pencil eraser.
6. Remove any excess water at the edge of the coverslip with a paper towel. If the specimen begins to dry out, add a drop of water at the edge of the coverslip.

Staining techniques

1. Obtain a clean slide and coverslip
2. Place the specimen in the middle of the slide.
3. Using a dropper pipette, place a drop of water on the specimen
4. Lower one edge of the coverslip so that it touches the side of the drop of water at approximately a 45 angle
5. Slowly lower the coverslip over the specimen and water
6. Add a drop of stain at the edge of the coverslip
7. Touch a small piece of paper towel or lens paper to the opposite edge of the coverslip. This causes the stain to be drawn under the coverslip and to stain the cells of the specimen

Micro-measurement

Micrometer: 1/1000 of a millimeter

1 micrometer (μm) = .001 millimeters (mm)

1000 micrometer (μm) = 1 millimeter (mm)

Converting from mm to um:

multiply by 1000

Converting from um to mm:

divide by 1000

Estimating Size of an Object Using the Microscope

- determine the diameter of the field of view by measuring in mm with a ruler
- estimate how many objects would fit across the field of view
- divide the diameter of the field of view by the number of estimated objects to determine approximate size of each object
- convert to micrometers if necessary