Lab Handbook

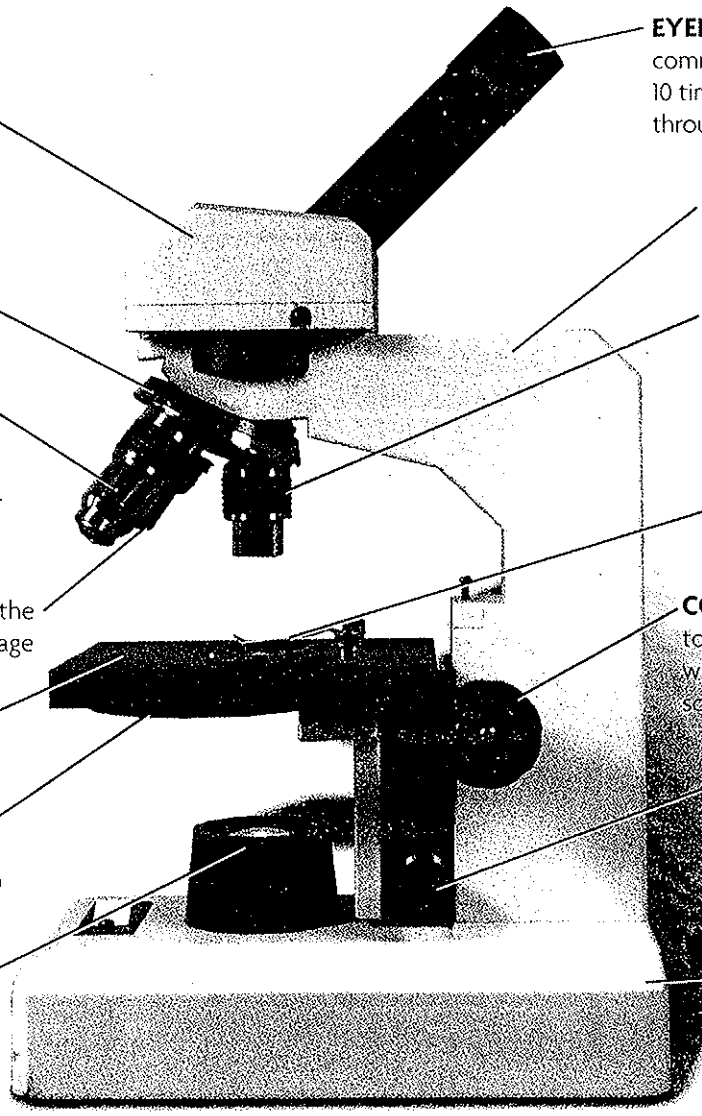
Using a Light Microscope

Microscopes are used to view objects too small to be seen with the naked eye.

Viewing an Object

Use these directions to view your specimen.

1. Use the coarse adjustment to raise the body tube.
2. Adjust the diaphragm so that you can see a bright circle of light through the eyepiece.
3. Place the slide on the stage. Be sure to center it over the hole in the stage and secure it with the stage clips.
4. Turn the nosepiece to click the scanning objective lens into place.
5. Using the coarse adjustment knob, slowly lower the lens and focus on the specimen being viewed. Be sure not to touch the slide or object with the lens.
6. When using the high power lens, use only the fine adjustment knob.
7. Move the slide on the stage with very small movements to view other parts of it. You may need to refocus using the fine adjustment.



BODY separates the lens in the eyepiece from the objective lenses below.

NOSEPIECE holds the objective lenses above the stage and rotates so that all lenses may be used.

HIGH-POWER OBJECTIVE LENS is the largest lens on the nosepiece. It magnifies an image approximately 40 times.

SCANNING OBJECTIVE LENS is the smallest lens on the nosepiece. It magnifies an image approximately 4 times.

STAGE supports the object being viewed.

DIAPHRAGM adjusts the amount of light passing through the slide and into the lens.

LIGHT SOURCE illuminates specimen being viewed.

EYEPIECE contains a lens that commonly magnifies an image 10 times. Objects are viewed through the eyepiece.

ARM supports the body above the stage.

LOW-POWER OBJECTIVE LENS is the medium lens on the nosepiece. It magnifies an image approximately 10 times.

STAGE CLIP holds a slide in place on the stage.

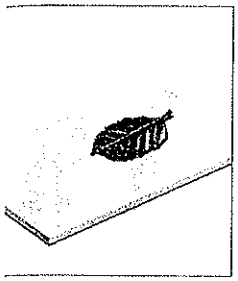
COARSE ADJUSTMENT is used to focus the image of an object when it is viewed through the scanning and low-power lenses.

FINE ADJUSTMENT is used to focus the image of an object when it is viewed through the high-power lens.

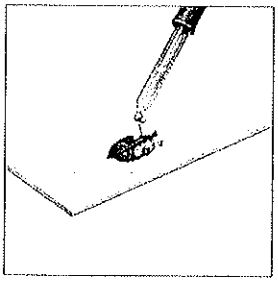
BASE supports the microscope.

aking a Wet Mount

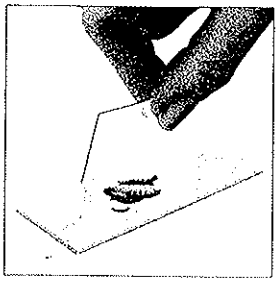
these steps to prepare a specimen to be viewed under a microscope.



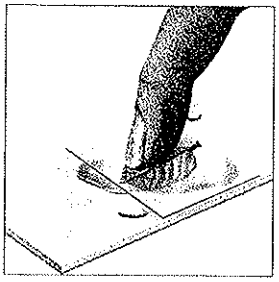
e the specimen in the ter of a clean slide.



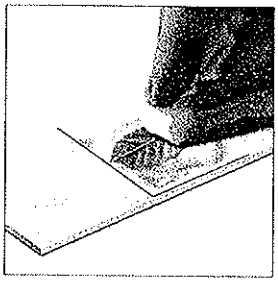
Place a drop of water on the specimen.



Place a cover slip on the slide. Put one edge of the cover slip into the drop of water, and slowly lower the cover slip over the specimen.



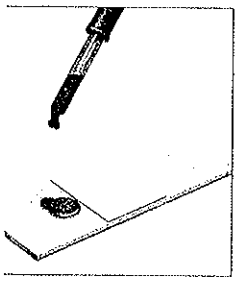
Remove any air bubbles from under the cover slip by gently tapping the cover slip.



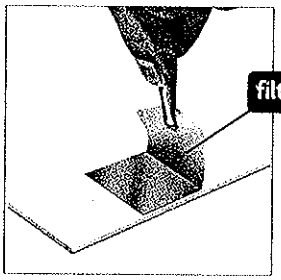
Dry any excess water before placing the slide on the microscope stage for viewing.

aining a Specimen

er you make a wet mount, use these steps to stain the specimen.



e a drop of stain at end of the cover slip.



Hold a piece of filter paper with forceps at the other end of the cover slip. The stain will flow underneath the cover slip and stain the specimen.

Lab Handbook

Calculating Magnification

When you look through a microscope, you see a magnified image of the specimen on the slide. Magnification describes how much larger an object appears when viewed through a microscope than its actual size. Calculating the magnification of the image will give you an idea of the sizes of its features.

There are two magnifying features of every microscope: the eyepiece and the objective lens. The **eyepiece** has a lens that magnifies the image 10× (times) its actual size. The objective lenses magnify the image by different levels.

Eyepiece 10× •	Scanning Objective	4×
	Low-Power Objective	10×
	High-Power Objective	40×

The total magnification of the image is the product of multiplying the eyepiece magnification by the objective lens magnification.

The examples below show how to calculate the total magnification of the daphnia under each lens.

EXAMPLE

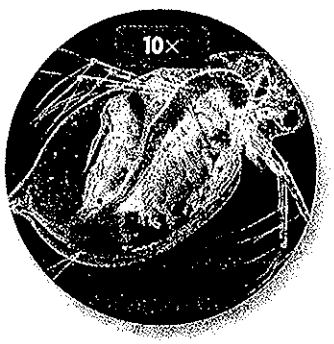
Eyepiece • Scanning Objective = Total Magnification
(10×) • (4×) = 40×
This image is magnified 40× its actual size.

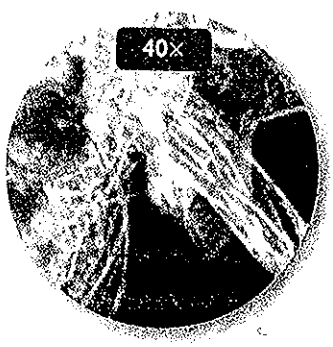
EXAMPLE

Eyepiece • Low-Power Objective = Total Magnification
(10×) • (10×) = 100×
The image is magnified 100× its actual size.

EXAMPLE

Eyepiece • High-Power Objective = Total Magnification
(10×) • (40×) = 400×
This image is magnified 400× its actual size.



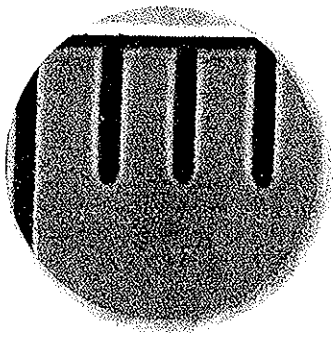


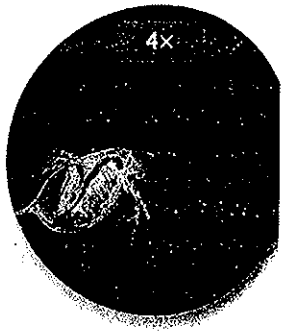
Calculating Specimen Size

The field of view is the area seen through the microscope eyepiece. You can calculate the estimated size in micrometers (μm) of a specimen or object you are viewing based on the size of the field of view. Since many specimens viewed are smaller than a millimeter, the sizes of specimens are usually written in micrometers. Use these steps to calculate specimen size.

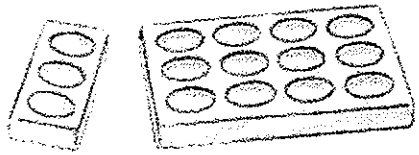
1. Place a ruler on the microscope stage and use the coarse adjustment to focus the image in the 4× objective lens.
2. Look at the markings on a ruler viewed in the eyepiece, as shown in the image below.
3. Estimate the diameter of the field of view to the nearest millimeter, which is approximately 4 mm in this example.
4. Remove the ruler and put the slide specimen on the stage.
5. Adjust the slide so the specimen is at one side of the field of view. Estimate the size of the specimen based on the field of view. The length of the daphnia specimen viewed under the scanning objective lens is about 2 mm.
6. Convert mm to μm.

length of specimen • 1000 μm/mm = ?
2 mm • 1000 μm/mm = 2000 μm





LABORATORY EQUIPMENT

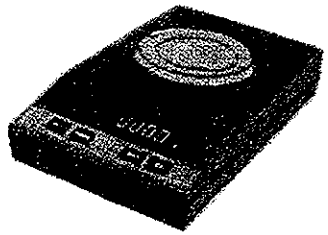

Spot Plates


Burner Wing Top


Clay Triangle

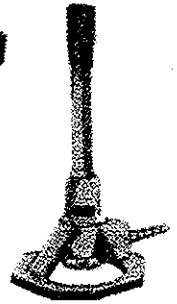

Pneumatic Trough


Splash Goggles


Electronic Balance


Funnel Support


Rubber Stoppers


Burner


Wire Gauze


Test Tube Rack


Beam Balance, Low Form


Buret Clamp


Crucible and Cover


Forceps

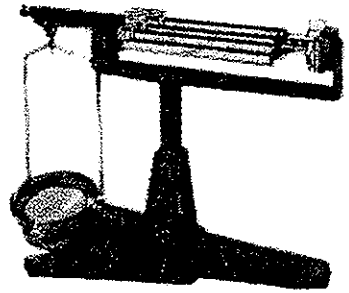

Ring Support


Cork Stoppers


Rubber Tubing


Dropper Pipet


Triangular File

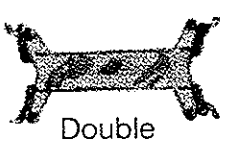

Beam Balance, High Form

Scoop


Evaporating Dish

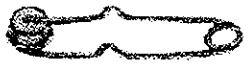

Watch Glass


Test Tube Brush


Double Buret Clamp

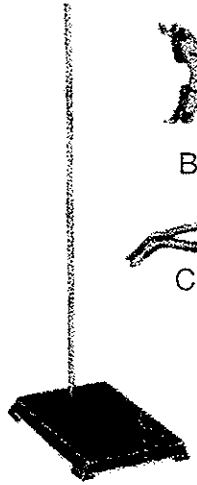

Test Tube Holder


Pipet Bulb


Flint Striker


Pinch Clamp

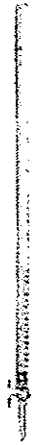

Crucible Tongs


Support Stand

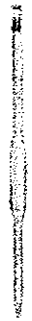

Beaker


Funnel


Erlenmeyer Flask


Buret


Gas-Collecting Tube


Volumetric Pipet

Stirring Rod

Thermometer

Volumetric Flask

Wash Bottle

Graduated Cylinder

Gas-Collecting Bottle

Tes Tub

TRA..SFERRING LIQUIDS

LIGHTING A