

Microscope Lab

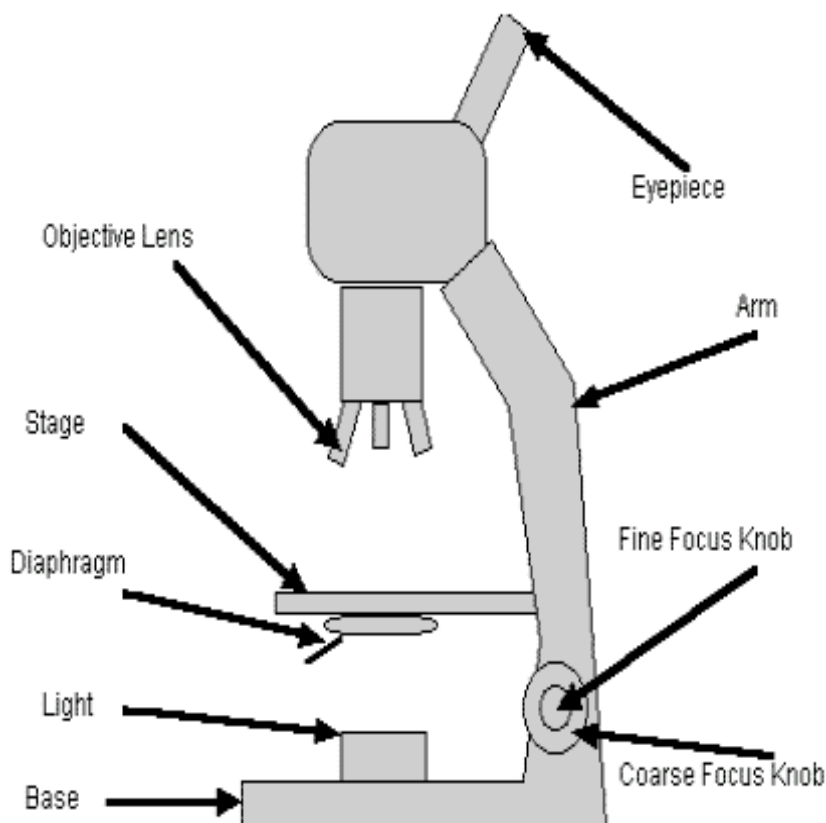
PART 1: PARTS OF THE COMPOUND MICROSCOPE

Compound light microscopes, like the models we have at school, use compound lenses and light to magnify objects. The lenses bend (or refract) the light, which makes the object beneath them appear closer. If you examine a hand-held magnifying glass, you can see the convex light-bending shape of the lens. This is the same type of lens in the compound microscopes.

Examine the drawing of a compound microscope below to familiarize yourself with the parts. Refer to the description of each of the parts on the back of the page. Be sure to reference it when you are working on the other parts of the lab.

Answer the following questions in your notebook:

1. What part of the microscope would you use if you need to let more light show through the slide? How do you use it?
2. What objective lens should you use when should you first use?
3. On high power what adjustment knob do you use?
4. Describe the differences between the fine and coarse adjustment knobs?
5. Use the parts of the microscope listed in Station 1 to describe the steps to using a compound microscope. You should try to use ALL of the parts listed.



Eyeiece: the lens at the top that you look through; it has a magnification of 10X.

Arm: supports the tube and connects it to the base

Coarse Focus Knob: an adjustment knob that moves the stage up and down for focusing; use this knob to find the item and get it into view (never use on high power)

Fine Focus Knob: an adjustment knob that moves the stage slightly for sharpening the image; use this to bring the image into clear view

Base: the bottom of the microscope, used for support

Diaphragm: a rotating disk under the stage to vary the intensity of light that is projected upward into the slide. There is no set rule regarding which setting to use for a particular power. Rather, the setting is a function of the transparency of the specimen, the degree of contrast you desire and the particular objective lens in use.

Stage: The flat platform where you place your slides. Stage clips hold the slides in place.

Objective Lens: usually you will find 3 or 4 objective lenses on a microscope. They almost always consist of 4X, 10X, 40X and 100X powers. **The shortest lens is the lowest power and the longest one is the lens with the greatest power. ALWAYS start on low power to find the object and then move to high power!**

PART 2: LAB STATIONS

Station A: Using a Compound Microscope with a Prepared Slide

1. Select one of the prepared slides at this station, record the name of it in your notebook, and put it on the microscope stage.
2. Examine the slide under low power, record 1-2 observations, and draw a sketch of what you see. (Remember to start with the coarse adjustment knob to get it into focus and then use the fine adjustment knob to sharpen the image. Also, you may need to manipulate the amount of light coming through the slide with the diaphragm.)
3. Examine the same slide under high power, record 1-2 observations, and draw a sketch of what you see. (Remember only use the fine adjustment knob on high power!)

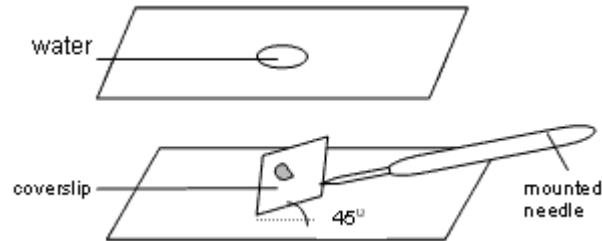
Station B: Using a Compound Microscope with a Wet Mount Slide

Use the following set of instructions along with fibers from a cotton ball to learn how to make a **wet mount slide**.

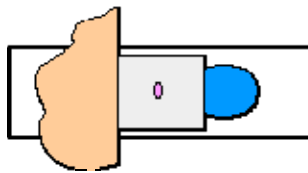
1. Get a few strands of cotton ball fibers and place them in the middle of the microscope slide.

Station B Continued on next page →

- Place ONE drop of water directly over the specimen. If you put too much water over the specimen, then the coverslip will float on top of the water, making it harder to draw the specimen as it float past the field of view!
- Place the coverslip at a 45 degree angle with one edge touching the water drop and let go.



- You can now examine your slide under the microscope on low power.
- Record 1-2 observations and draw a sketch.
- Switch to a higher power, record 1-2 observations, and draw a sketch.
- Remove the slide from the microscope.
- Place one a SMALL drop of **Methylene Blue** stain on one edge of the coverslip.
- Lay the flat edge of a piece of paper towel on the other edge of the coverslip. The paper towel will draw the water out from under the coverslip.



- Now examine the slide under the microscope again and record 1-2 observations.

Station C: Using a Dissecting Microscope

The dissecting microscope is configured to allow low magnification of three-dimensional objects-- objects larger or thicker than the compound microscope can accommodate. Furthermore, the two separate lenses of the binocular dissecting microscope allow one to see objects in three dimensions (i.e., in stereo). Dissecting microscopes do not magnify to the extent of compound microscopes.

- Chose 2-3 different objects to observe under the dissecting microscope.
- Make a sketch of each of the objects you are observing.
- Describe a specific situation in which you would use the dissecting microscope instead of the compound microscope.

Station D: Mystery SEM Photos—What in the World?

The photos placed on the desks were taken using scanning electron microscope (SEM), an extremely powerful and expensive microscope, which allows scientists to view a universe too small to be seen with a light microscope. SEMs magnify objects up to two million times.

1. Look at the photos and record 3-5 observations for each of the 10 photos.
2. Use your observations to try to guess what you are looking at. Don't worry about getting it wrong! I just want you to have fun and take a guess!

PART 3: LAB ASSESSMENT

1. When you feel confident that you can use a compound microscope prepare a wet mount slide of a letter you cut out from the newspaper.
2. Find the letter using the microscope and raise your hand to show me.