

Care and Use of Dissecting and Compound Microscopes

The proper use of microscopes will:

- Greatly improve what you see and learn during this course.
- Decrease eye strain so you avoid getting a headache.
- Provide a skill you can list on your curriculum vitae.
- Increase the life of these microscopes and decrease the cost to future students.

Using a microscope correctly takes a bit of extra time and practice. However, it is well worth it!

Here are some rules for proper care of microscopes.

1. Don't get seawater on your microscopes!
2. When you break rule #1 and get seawater on your microscopes, clean it off! Use a damp (with freshwater) cloth or sponge to wipe off the seawater, and then wipe again with freshwater. If you get seawater on the lenses of a compound scope, use lens paper and lens cleaner to remove it.

3. Don't use the highest power objective (100x) on your compound microscope unless there is immersion oil on the slide. I can show you how to do this if you don't know how. When finished using oil immersion, clean the oil off of the lens with lens paper and lens cleaner.
4. Always carry a microscope right-side-up with two hands, one holding the arm and the other holding the base.

Setting up your microscopes

Set up both scopes so the specimen stage faces you. Turn each scope head around so that the eyepieces face you (unless they already do). Plug in the light sources. Turn the objective ring on your compound scope so that the lowest power objective is pointing towards the stage. **Do not** switch objectives by holding the objective and spinning the objective ring. Put an object on the stage of the dissecting scope, or glass slide on the stage of the compound scope. Focus on the specimen using the focus control on the column of the microscope. Adjust the distance between the two eyepieces on both microscopes so that it's appropriate for your eyes. If the images in the eyepieces are not both in focus, fo-

cus for one eye using the column focus control. Then focus for the other eye using the diopter ring the eyepiece.

For the compound scope only

Your compound microscope will have a small scale (an ocular micrometer) mounted in one of the eyepieces. For measuring objects on slides, you can (and should) calibrate this ocular micrometer using a stage micrometer (which is just a tiny ruler etched into a slide) for each objective. Heres how to do this:

1. Put the stage micrometer on the compound scope stage, and focus on it using the lowest objective. Make sure both eyepieces are in focus for your eyes.
 2. Line up the stage and ocular micrometer by rotating the eyepiece so that they are parallel. Now measure the stage micrometer using your ocular micrometer. For example, the 78 units on your ocular micrometer equal 42 units on your stage micrometer.
 3. Each unit on the stage micrometer equals some known distance-say 0.1 mm (=100m or microns). Now you can figure out the distance per ocular unit by dividing the stage micrometer distance by the number of ocular micrometer units. So, for the example above, divide 42 mm by 78 which = 0.54 mm per ocular unit.
2. Close down the iris all the way by pushing the level under the stage to the right.
 3. Lower the condenser by turning the knob below the stage on the left side clockwise.
 4. Now look through the eyepieces and slowly raise the condenser by turning the condenser knob counter-clockwise. Watch the background. When it looks a little like sand stop, and lower the condenser until the "sand" is gone.

You have just achieved Koehler illumination-give yourselves a pat on the back! You can adjust the depth of field, contrast, and resolution of your image with the condenser iris. If the condenser iris is closed down, you have maximum contrast and depth of field, but low resolution. Wide open gives you minimal contrast and depth of field, but high resolution. You may want to play with this to optimize it for every specimen you examine.

The best illumination for normal bright-field microscopy is called Koehler illumination. Heres how to achieve it:

1. Focus on an object on a slide with the 4x objective.