**Parts of the Swift M5 Microscope**

- **Headpiece**
- **Ocular lens (10X)**
- **Objectives** – 5X (red), 10X (yellow), 40X (blue), 100X (white)
- **Arm**
- **Coarse Focus**
- **Fine Focus**
- **Condenser Lens Control** – Raises and lowers condenser lens
- **Light Source**
- **Power Switch**
- **Light Intensity Control**

**Condenser Lens** – focuses the light from the source. The blue filter is attached to the bottom of the lens, beneath the iris diaphragm.

**Iris Diaphragm Lever** – controls the light that enters the condenser.

**Mechanical Stage Control** – moves the slide forward, back, left, and right

**Mechanical Stage** – holds the slide, is moved with the mechanical stage control.
How to Use the Swift M5 Microscope

**Carrying the Microscope:**
1. Always use two hands, one of which should support the base while the other holds the arm of the microscope. Microscopes contain delicate optical structures that could be damaged through impact. Thus, be very careful and gentle when setting down the scope and moving it.

**Setting Up:**
2. The eyepieces (oculars), condenser lens, and light source should be clean and dust-free. You may want to wipe these surfaces with a lens-grade Kim Wipe prior to using the microscope.
3. Ensure that the **lowest power objective** is selected before placing your slide on the stage.

**Ocular Distance and Focusing: Preventing Eye Strain, Headaches, and Dizziness**
4. Place your slide on the stage with the specimen over the condenser lens. Use the mechanical stage controls to position your slide.
5. Move the Iris Diaphragm Lever to the left and use the condenser lens knob to raise the condenser lens to the highest position possible, which should be immediately beneath the slide.
6. Turn on the microscope and use the rheostat wheel on the front of the stage to adjust the light so that it is not too bright or dim – go for what is comfortable for your eyes.
7. Look through the eyepieces – What do you see? Two circles, one blurry circle, or one clear circle? Do not worry about whether you can see the slide clearly – all you should be focusing on right now is the circle – if you see two circles, you need to push your eyepieces together a bit. If you see a blurry circle, you need to widen them. When you find the right distance for your eyes, look at where the dial is between the eyepieces. You can select the best distance for you using that number whenever you need to use your microscope for the rest of the quarter.
8. Finally, set the ocular focus – look at the slide on 4X power (red objective). Bring it into focus using the coarse focus knob and then the fine focus knob. Look through the right eyepiece with your right eye – close your left eye. Use the fine focus to make the image as sharp as possible. Now look through the left eyepiece with your left eye and close your right eye. If the image is blurry in any way, sharpen it by *rotating the eyepiece clockwise or counterclockwise*.

**Viewing Slides – Red means “Go.” - Always start with the red objective and work your way up.**
9. With each slide, ALWAYS start with the scanning (4X, red) objective. With the 4X objective, you may start with the coarse focus knob and then use the fine focus knob to sharpen the image.
10. Next, look at the slide with the low power (10X, yellow) objective. The objectives should be parfocal, which means that you should *only need to use the fine focus knob*. Note how the objectives increase in length with magnification power. The coarse focus moves the stage up and down, and you may run the slide into the objective if you use coarse focus with the longer objectives.
11. Finally, look at the slide with the high power (40X, blue) objective. Again, only use the fine focus knob – you can turn it in either direction to sharpen the image. If the image does not become clear in a couple rotations in one direction, you should probably rotate the focus knob in the other direction.
The Condenser Lens and Iris Diaphragm
12. When you are viewing a slide, experiment with the positioning of the condenser lens and the iris
diaphragm lever. Find the knob that raises and lowers the condenser lens under the left-hand side
of the stage. You should not loosen the condenser lens with the pins that are used to hold it under
the stage. When you lower the condenser lens at high power, it will sharpen the image. For
scanning and low power, it is best to keep the condenser lens in the highest position possible.
13. The iris diaphragm controls how much light passes through the slide to the objectives. View your
slide with the lever in various positions – far left, middle, far right, and see how it changes the
image that you see. You should not use the lever to control the actual light level. For this, use the
rheostat dial on the front of the base.

Putting the Microscope Away
14. Select the scanning (4x, red) objective, and remove your slide from the stage.
15. If you used methylene blue or any wet mounts, gently wipe the high power (40x, blue) objective
with a dry lens tissue. If it is clean and dry, use the same tissue to wipe the eyepieces and stage. If
you see fluid or stain on the tissue, use a small amount of lens cleaner to wipe the objective. Then
wipe the eyepieces and stage.
16. Center the mechanical stage so none of the gearing is hanging out on the side. The electrical cord
should be bound with the velcro strap.
17. Carry the microscope properly and place it in the appropriately numbered space in the cabinet with
the arm facing outward. When the arm is facing outward, the number is visible, and the scope is
more easily retrieved from the cabinet.

Parking Tickets
18. If you put away your microscope improperly, the next user may write up a ticket and attach it to
your microscope.
19. If you find something wrong with your microscope, notify your instructor. If it was put away
improperly, you can write a ticket, and attach it to the arm so that it is visible from outside the
cabinet. Your microscope will probably be used by at least 10 other students this quarter. The
purpose of the tickets is to foster awareness for proper handling and use of the microscopes. They
are very expensive, useful tools for your learning and should be respected as such. Some faculty
may deduct points for improper handling of the microscopes.

Troubleshooting
“The light doesn’t work”
• Ensure that the worktable is plugged in – the worktables should be plugged into overhead electrical
outlets. If your table is not plugged in, it won’t have power.
• Ensure that your power cord is properly inserted into the base. The power cords are removable and
sometimes come loose.
• Ensure that the rheostat is not dialed all the way down.
• If you have tried all of the above, and the light still does not work, notify your instructor. The
lightbulb, power cord, or fuse may need to be replaced. Your instructor may have you use a different
microscope for the time being. If your instructor is unable to repair the microscope, the lab technician
should be notified.
“I cannot see anything.”
- Ensure that the scanning (4x, red) objective is fully locked into place.
- Make sure the light is on.
- Make sure your slide is centered properly and not upside down.
- Check the condenser to make sure the iris diaphragm lever is set to the left.
- You will need to use the coarse adjustment knob to raise the stage so that the slide is quite close to the objective before an image can be seen.
- If you have tried all the above and still cannot see anything, notify your instructor. You may be directed to put away your microscope and use a different one. In this case, the lab technician should be notified.

“The image is blurry.”
- First, make sure you followed all of the focusing steps described in steps 2 through 11.
- CLEAN EVERYTHING. Clean the ocular lenses, the light source, the condenser lens, the objective, and the slide. DO NOT REMOVE ANYTHING. You should be able to clean the objective without removing it. Make sure the slide is not upside down!
- If you’ve tried all of the above, and the image is still not sharp, please notify your instructor. Your instructor may attempt further cleaning or direct you to put the microscope away and use a different one. The lab technician should be notified in this case.