

Microscope Lab Review

1. Honors Biology Labs use: COMPOUND LIGHT MICROSCOPES
 - a) Compound: many lens
 - b) The method used to observe your specimen is LIGHT>
 - c) Our objectives are PARFOCAL: when your specimen is in focus with the scanning objective (40X), the other two objective lenses will be positioned to be roughly in focus (you only need to turn the fine focus knob a quarter of a turn to sharply focus your image).
2. Pre-Lab Preparation:
 - a) Make sure all backpacks and school gear remain in the classroom or placed on the outside edges of the lab.
 - b) You need a pencil and colored pencils to properly draw your images from the microscope.
 - c) When moving the microscope to or from your lab table make sure that TWO hands are used, one underneath the scope and one on the ARM of the scope, holding the scope close to your body.
 - d) Position the scope on your lab table so that you have room to observe your specimen and draw your image (you do NOT want to move the scope once you start using it in your lab).
3. Preparing Your Microscope for Proper Use:
 - a) Position the scope on your table correctly.
 - b) Check to make sure that the RESET button on the electrical switch is pushed in (if you are not sure push the TEST button and reset your electrical switch).
 - c) Move the STAGE of your microscope to its very BOTTOM position by used the COURSE FOCUSING KNOB.
 - d) Rotate the REVOLVING NOSE PIECE until the RED (Scanning) objective lens is positioned over the center of the STAGE.
 - e) Turn your microscope on by using the POWER SWITCH located on the bottom back left hand corner of the BASE of the microscope (if the light in the PROJECTION LENS does not come on then rotate the LIGHT INTENSITY SWITCH found on the bottom front left corner of your microscope until the light goes on).
 - f) If the light does not go on notify your teacher. Make sure you have followed the steps above beforehand.
4. Parts of the Microscope (Label on your worksheet)
 - a) The circle with the line in it is the "Field-of-View" with a pointer positioned within this field.
 - b) #1: OCULAR LENS: A magnification lens that magnifies your image 10X. It has the field of view and pointer positioned within it.
 - c) #2: EYE PIECE: Holds the ocular lens and channels the light to the ocular lens.
 - d) #3: REVOLVING NOSE PIECE: Used to switch from one objective lens to another lens (MAKE SURE that the STAGE is positioned all the way down before attempting to rotate the objective lens).
 - e) #4: OBJECTIVE LENS (Magnification Lens):
 - i) RED or SCANNING: Magnifies objects 4X (Total Magnification 40X; THIS IS THE ONLY OBJECTIVE LENS THAT YOU CAN USE THE COURSE FOCUS KNOB).
 - ii) YELLOW or LOW POWER: Magnifies objects 10X (Total Magnification 100X; you CAN NOT use the COURSE FOCUS KNOB with this objective lens).
 - iii) BLUE or HIGH POWER: Magnifies objects 40X (Total Magnification 400X; you CAN NOT use the COURSE FOCUS KNOB with this objective lens) NOTE: If you cannot find your object/specimen then you must go back to the RED/SCANNING objective lens to find your specimen.
 - iv) NOTE: Increased magnification is commonly used to show the details within an observable specimen. Make sure that you observe/draw what you have been specifically directed to do.
 - f) #5: MECHANICAL STAGE: Where your specimen/microscope slide is attached for proper viewing.

- g) #6: ARM: Use to transport your microscope properly.
- h) #7: STAGE CLIP: Used to properly secure your microscope slide to the STAGE.
- i) #8: COURSE FOCUS KNOB: Makes large adjustments in focusing (ONLY USED WITH THE RED/SCANNING OBJECT).
- j) #9: FINE FOCUS KNOB: Makes very precise adjustments in focusing (only a quarter turn of this knob is needed to bring your specimen into focus; any more than this and you need to turn back to the RED/SCANNING objective and start over re-focusing your specimen).
- k) #10: IRIS DIAPHRAM: Focuses the light through the specimen (recommended that this switch, found under the front center position of the STAGE, be set all the way to the left to start with).
- l) #11: PROJECTION LENS: Houses the light source that will illuminate your specimen.
- m) #12: POWER SWITCH: Turns the power on to your microscope (remember to check the RESET button on the electrical outlet at your lab table).
- n) #13: LIGHT INTENSITY SWITCH: Changes the amount of light that is placed on your specimen (it is recommended that this switch be turned complete on to its maximum intensity).
- o) #14: BASE: Keeps the microscope stable on your lab table and is used to position one of your hands under when your microscope is transported.
- p) NOT NUMBERED:
 - i) CONDENSER LENS: Where the IRIS DIAPHRAM is housed. Used to focus the light on your specimen. Under the back left corner of your STAGE is a dial that is used to move the CONDENSER LENS up and down. The CONDENSER LENS should be positioned all-the-way to the top just underneath the STAGE. This helps to support your microscope slide.
 - ii) STAGING KNOBS: Located on the bottom back right hand corner of the STAGE. The large knob moves the staging from front to back and the smaller knob moves the STAGE from right to left.

5. Properly Mounting a Specimen to a Microscope Slide:

- a) Make sure you start with a CLEAN microscope slide (use soap and water and completely dry and any problems please notify your teacher for additional assistance).
- b) Make sure your specimen is TRANSLUCENT; light must be able to pass through your specimen. Remember, you are using a LIGHT microscope. If you need assistance, see your teacher.
- c) Place your specimen in the center of your clean microscope slide.
- d) In MOST cases you will need to use a clean COVER SLIP over your specimen to protect the objective lens.
- e) You must ALWAYS start with the lowest objective lens (RED/SCANNING) first.
- f) How can you distinguish between dust particles on your microscope versus being on the microscope?
 - i) If you move the STAGE by using the STAGING KNOBS and the particles move then the particles are on your slide and not on the microscope.
 - ii) On the microscope?
 - (1) If you switch from one objective lens to another and the particles are still there then the particles are probably on the CONDENSER LENS.
 - (2) If you switch from one objective lens to another and the particles disappear then the particles are probably on the OBJECTIVE LENS.
 - (3) To clean the OBJECTIVE LENS, see your teacher for assistance.
- g) Making a Wet Mount Specimen:
 - i) Position the specimen on the center of your slide.
 - ii) Place one drop of water on the center of your specimen.
 - iii) Place a clean COVER SLIP over the top of your specimen. It should be placed at a 45 degree angle so that any air bubbles will be released out of your specimen.
- h) Staining a Specimen:

- i) Why do we stain a specimen? Since specimens are usually transparent, stains will stick to your specimen to highlight important structures for observation.
 - ii) There are different procedures for different types of staining. Follow the procedures directed to you in the lab instructions.
6. Proper Procedures for Viewing a Specimen with your Microscope
 - a) Make sure you start with the STAGE positioned at the very bottom. This will allow you more room to position your specimen properly on your STAGE.
 - b) Properly secure your microscope to the STAGE by using the STAGE CLIP.
 - c) Start with the RED/SCANNING objective.
 - d) Adjust the LIGHT INTENSITY: (REMEMBER: Too much light can over illuminate your specimen creating problems in your viewing)
 - i) Use the LIGHT INTENSITY SWITCH
 - ii) IRIS DIAPHRAM
 - e) Use the COURSE FOCUS KNOB to bring the specimen into general focus.
 - f) Use the FINE FOCUS KNOB to sharply focus your specimen.
 - g) Need magnification? Use the REVOLVING NOSE PIECE to switch to the next more powerful YELLOW/LOW POWER OBJECTIVE LENS. Use the FINE FOCUS KNOB ONLY to bring your specimen into sharp focus.
 - h) Lost your sharp focus of your specimen and cannot find it??? Turn the REVOLVING NOSE PIECE to back to the RED/SCANNING objective and start all over again.
 - i) Need even more magnification? Use the REVOLVING NOSE PIECE to switch to the BLUE/HIGH POWER OBJECTIVE. Use the FINE FOCUS KNOB to sharpen your image of the specimen. Lost the image? Move your objective lens all the way back to the RED/SCANNING and start all over.
7. Proper Labeling of Each Observed Specimen:
 - a) PENCIL DRAWINGS ONLY (colored pencils are recommended when possible). Remember, it's a colorful world out there.
 - b) Remember, the circle represents the FIELD-OF-VIEW.
 - c) When drawing cells ONLY ONE cell is drawn (unless otherwise specified).
 - d) List the proper magnification for each drawing.
 - e) Correctly name each specimen drawn.
 - f) The following parts of an Animal Cell should be labeled:
 - i) Cell membrane
 - ii) Cytoplasm
 - iii) Nucleus
 - iv) Nuclear membrane
 - v) Nucleoplasm
 - vi) Chromatin
 - vii) Any other organelles present (not sure? Notify your teacher for help)
 - g) Plant Cell parts:
 - i) Same as Animal cells above
 - ii) Cell Wall
 - iii) Chloroplast.
 - h) NOTE: Apply your knowledge of cell structure to your drawings. UNLABELED drawings mean nothing.
8. Finish Up Strong:
 - a) Unplug & wrap the power cord around the base of your microscope.
 - b) Clean your microscope slides and cover slips and place these clean objects on the front part of the STAGE.
 - c) Return all lab equipment back to the center table or cabinets. Ask your teacher where to place your scopes.

- d) Clean up the lab table if necessary.
- e) Remember, if the teacher cleans up for you points will be deducted.