Microscope Lab - Using the Microscope and Slide Preparation

1. Magnification

The magnification written on the ocular lens (eyepiece) is __________

The magnification on the Scanning objective _______ Low Power Objective _______ High Power Objective _______

What is the total magnification for each lens? (multiply scanning x the objective)
Scanning Low Power High Power

2. Diaphragm

Examine the diaphragm, determine how to change the amount of light that passes through your viewing field. Diaphragms on microscopes can be different depending on the model. Describe how your diaphragm works.

3. Lenses

Twist the ocular lens, does yours have a pointer? __________ What is the purpose of the pointer? ______________

Find out what happens to your viewing field if you do not have an objective fully clicked.
Describe:________________________________________________________________________________

4. Viewing a Slide

Obtain a prepared "e" slide. Focus the slide first with the scanning objective, then click to lower power and focus again. Finally, focus the slide under high power. Remember, at high power, you should ONLY use the fine adjustment knob.

Draw the E exactly as it appears in your viewing field for each magnification. The circles below represent your viewing field. The E should take up as much space in the drawing as it does in your viewing field while you're looking at it.

Does the lens of the microscope reverse the image? __________

5. Depth Perception

Obtain a prepared thread slide. You will only need to view it under scanning at this point. Your task is to figure out which thread is on top, which is in the middle, and which is on bottom. You should notice that as you focus the thread, different thread will come into focus at different times. The one that comes into focus the first should be the top thread.

What is the color order of your threads? __________________________________________________________

6. Making a Wet Mount of a Slide

1. Gather a few strands of cotton from a cotton ball using forceps.
2. Place ONE drop of water directly over the specimen.
3. Place the coverslip at a 45 degree angle (approximately) with one edge touching the water drop and then gently let go. Performed correctly the coverslip will perfectly fall over the specimen and will not have air bubbles.

Draw the specimen as it appears in your viewing field under scanning, low and high power.

### Drawing Specimens

1. Use pencil - you can erase and shade areas
2. All drawings should include clear and proper labels (and be large enough to view details). Drawings should be labeled with the specimen name and magnification.
3. Labels should be written on the outside of the circle. The circle indicates the viewing field.

### 7. Staining a Specimen

1. Tear a small corner from a piece of paper (or this page) and use a pencil to make a mark on it. Make a wet mount as you did with the cotton. And check to make sure you can see your scrap under the microscope.

   Biologists learn to stain specimens that have already been created. You will not remake this slide, but use a procedure to draw a stain under the coverslip using the capillary action of water.

2. Place one drop of stain (methylene blue or iodine) on the edge of the coverslip you made with the cotton.

3. Place the flat edge of a piece of paper towel on the opposite side of the coverslip. The paper towel will draw the water out from under the coverslip, and the cohesion of water will draw the stain under the slide.

Draw your specimen as it appears under low power. Used color pencils to show how the stain appears. It may appear darker or lighter in spots. Use shading to show darker and lighter spots.

### 8. Investigation of Pond Water & Microorganisms

1. Prepare a wet mount of pond water - a sample of pond water is provided in a jar. The best specimens usually come from the bottom and probably will contain chunks of algae or other debris that you can see with your naked eye. (Be careful that

2. Use the microscope to focus on the slide - try different objectives, some may be better than others for viewing the slide..

3. Make three separate drawings below at different areas of the slide and at
4. Obtain preserved slides of various microorganisms and specimens. Draw your specimens and label with the name of the specimen and the MAGNIFICATION as seen through the eyepiece, specimens should be drawn to scale - ie..if your specimen takes up the whole viewing field, make sure your drawing reflects that.

9. Cheek Cell Smear

1. Place a drop of methylene blue on a slide.

2. Scrape the inside of your cheek with a toothpick and then swirl this sample into the droplet of methylene blue. Caution: methylene blue can stain skin and clothes.

3. Place a cover slip on the droplet. These cells will appear as light blue blobs with dark spots in the center, the nucleus and will be small at a 40x magnification.

Create a wet mount of your cheek cells and find them using the high power (400x) objective. Draw your cells (at 400x) and label the cell membrane and the nucleus.

9. Investigation of Large Specimen

Light microscopes are only useful for viewing small thin specimens. In biology, you will perform dissections on larger specimens an may need to magnify the area of interest. In this situation, a stereoscope may be the best instrument. Stereoscopes present a larger field of viewing and handle depth much better than the light microscope. The drawback of the stereoscope is that it does not have a high magnification. Examine one of the stereoscopes in the room. They will be positioned around the room with specimens.

Name/Description of specimen(s) viewed: _________________________________________________________
What is the magnification(s) of the stereoscope? _____________

Adjust the light settings. Some stereoscopes have a "Darkfield" setting or other light settings. Compare the way the specimen appears using different light settings. _____________________________________________________

10. Measuring with a Microscope

Use a clear ruler to determine the width of the viewing field under the scanning objective. Position the ruler so that the millimeter marks are visible in your viewing field. Remember that there are 1000 micrometers in a millimeter.

Estimate the length (diameter) of your viewing field in micrometers (scanning) __________
Repeat for low power ________________

You cannot use this method to determine the diameter under high power (try switching objectives). Instead, you can use a mathematical proportion method to determine the diameter under high power.

\[
\text{High Power Field of View} = \frac{\text{Low Power Field of View}}{\text{High Power Magnification}}
\]

What is the diameter (in micrometers) of your high power field ________________

Sketch – with estimated dimensions for length & width (in microns). Indicate the length and width of an individual cork cell and the DIAMETER of the viewing field under high power.

**PARAMECIUM**

**CORK**

**Slide Micrometers** – obtain one of these items and place it on the stage. It is basically an itty bitty tiny ruler that you can see with both the high and low power objectives. The stage micrometers are marked with a label that says .01 mm. .01 millimeters = 10 microns

Use the micrometer to determine the field of view sizes in microns and millimeters.

Low Power ______ (microns, µm) _______ (millimeters, mm)
High Power ______ (microns, µm) _______ (millimeters, mm)

Determine the size of the AMEBA shown on the picture

............................................................................................................. ______ µm ______ mm

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