Microscope Lab

Objectives: To learn the parts and use of a microscope.

- To make a wet mount slide and make measurements using the microscope.
- To compare plant, animal, and Protista cells.

Procedure Part 1: Letter "e"

1. Cut out the letter "e" and place it on the slide face up.
2. Add a drop of water to the slide.
3. Place the cover slip on top of the "e" at a 45-degree angle and lower it.
4. Place the slide on the stage with the "e" in the normal reading position, focus using the coarse adjustment knob only. Center the "e" in your field of view. Draw what you see, exactly how you see it. Make sure all drawings are labeled with the name of the object and what the total magnification is.
5. Move the slide to the left, what happens? Move the slide to the right, what happens? Up? Down?
6. Change to the medium power objective. Focus using the fine adjustment only. Change to the high power objective. Focus using the fine adjustment only. Draw exactly what you see and label as much as you can.

Part 2: Measurement under the microscope

1. Change the objective back to low power. Remove the slide from the stage.
2. Place the ruler on the stage. While looking through the eyepiece, place one line of the ruler at the edge of the field of view. Determine the diameter of the field of view at low, medium, and high powers. Covert the measurements into micrometers (1mm = 1000um).
3. Place the slide back on the stage at low magnification. Focus and determine how big the letter "e" is at low and high powers. Add the measurements to your drawings.

Part 3: Magazine picture

1. Place a small piece of colored magazine picture on your slide. Make a wet mount and place it on the stage.
2. Focus and draw under low and high power.

Part 4: Cotton fibers

1. Obtain a few cotton fibers. Make a wet mount and place the slide on the stage. Focus and view under low power. Be sure that the fibers cross each other directly in the center of the field of view. Draw using different colors.
2. Change to high power. Focus on the point the fibers cross. Draw what you see.

Part 5: Onion cells

1. Using your fingernail, remove the thin membrane found on the concave side of a small piece of onion.
2. Lay the membrane flat on a slide. Add a drop of iodine/Lugol and put the cover slip on top.
3. View and focus under low power. Draw what you see. Label the nucleus, cell membrane, cell wall, and cytoplasm.
4. View and focus under medium and then high powers. Draw what you see. How big is an onion cell under high power?

Part 6: Cheek cells

1. Using a toothpick, gently scrape the inside of your cheek.
2. Wipe the toothpick on the slide. Add 1 drop of methylene blue stain and place the cover slip on.
3. Place the slide on the stage. Focus and view under low power. Draw what you see. Label the nucleus, cell membrane, and cytoplasm.
4. Switch to high power. Draw 2 or 3 cells. How big is a cheek cell?

Part 7: The Elodea leaf

1. Place a drop of water on a clean slide
2. Place an Elodea leaf in the drop of water; place a cover slip on top.
3. Observe under low power, the under high power. Draw at both magnifications. Label the following organelles: nucleus, cytoplasm, cell wall, chloroplasts. How big is an Elodea cell?

Part 8 Live Protista Cultures

1. Obtain a drop of Protista culture/pond water. Add a cover slip but do not use stain. Focus and observe under low and high powers. Draw 3-4 different types of organisms that you see under high power. Please specify the magnification used in each case.

Lab report: You should have drawings of parts 1,3,4,5,6, and 7 under low and high power and part 8 under high power only. Each cell should be drawn at least as large as a Petri dish, labeled with the name of the object, its total magnification and its size. If it appears colored under the microscope, it should be colored in your drawing. Draw exactly what you see. All drawings must be done in pencil.

Analysis Questions:

1. How does the letter "e" as seen through the microscope differ from the way and "e" normally appears to the naked eye?
2. When you move the slide to the left, in what direction does the letter "e" appear to move? When you move it to the right? Up? Down?
3. How does the ink appear under the microscope compared to normal view?
4. Why does a specimen placed under the microscope have to be thin?
5. Describe how the picture looks under the microscope compared to how it looks to your unaided eye.
6. Can you see both fibers sharply at the same focus level? How can you use the fine adjustment knob to determine which fiber crosses over the other?
7. Why did we add iodine or methylene blue to the cells?
8. What structure in the onion and cheek cells was stained with darkest? Why?
9. Is it difficult to see the plasma membrane in the plant cells? Why or why not?
10. Did you see anything moving in the Elodea cell? If yes, describe what you saw.
11. What structures were in both the plant and animal cells?
12. What structures were only in the Elodea cell?
13. Why didn't you stain the live Protista cultures?
14. What is the relationship between the magnification and the field of view?