

## MICROSCOPE PART II

### BACKGROUND INFORMATION:

In the life science laboratory, the microscope is used to examine organisms and objects that are too small to be seen with the unaided eye. In this course, the microscope is especially useful in examining cells. (If you have not already done so, you should now review the parts of the microscope and how to prepare a wet-mount slide.)

Before we can use the microscope to view cells, we must first become more experienced in analyzing what we see when using the microscope. We need to understand the ideas of resolving power, depth of view, and field of view.

### MATERIALS:

Microscope	Microscope slide
Scissors	Cover slip
Medicine dropper	Colored pencils
Magazine	Prepared slide of crossed threads
Water	

### PROCEDURE:

#### Part A- Preparing a Wet Mount Slide

- \_\_\_\_\_ 1. Find and cut out a piece of colored paper from a magazine. The paper should be about the size of your little fingernail and should have two different colors on it. It works best if the two colors are bright, different and clearly defined. A spot where two bright colors meet will give good results. **DO NOT USE BLACK OR WHITE** as one of your colors.
- \_\_\_\_\_ 2. Place the paper in the center of the slide keeping the colored side up.
- \_\_\_\_\_ 3. Place one or two drops of water on the paper. (Try not to touch the tip of the dropper to the paper as it may flip over.) **Make sure one color is on the left and the other on the right.**
- \_\_\_\_\_ 4. Now complete the slide by carefully placing a clean coverslip over the water and colored paper.
- \_\_\_\_\_ 5. **On the slide drawn on your record sheet**, make a drawing of the colored paper as you see it on the slide without your microscope. Use colored pencils.

#### Part B-Resolving Power

The microscope does not add detail to objects. The details are always there. What the microscope does is to spread the details apart so the human eye can make them out. To the unaided eye, two tiny spots close together blend into one. We cannot see them as separate spots. Under the microscope, these two spots are seen farther apart. Now we can see them separately.

The ability of a microscope to show two points that are close together as separate images is called its **resolution** or **resolving power**. Resolution is another term for the sharpness of an image. It does no good to increase the magnifying power of a microscope if its resolving power is not also increased. If only the magnification is increased, the image gets larger, but you cannot make out any more detail. Small blurred spots simply become larger blurred spots.

- \_\_\_\_\_ 6. Check your microscope to be sure the 4X objective is in position over the opening in the center of the stage.
- \_\_\_\_\_ 7. Clip the slide into place on the stage of the microscope. Try to position the slide so that the place where the two colors meet is directly down the center of the opening in the stage.
- \_\_\_\_\_ 8. Looking through the eyepiece (ocular), focus the image using coarse adjustment and move the slide until it is positioned so that the place where the two colors meet is directly down the center of the field of view circle.
- \_\_\_\_\_ 9. Now turn the revolving nosepiece so that the 10X objective is in place and focus using coarse and fine adjustment knobs. Move the slide until it is positioned so that the place where the two colors meet is directly down the center of the field of view circle.

- \_\_\_\_\_ 10. **IN FIELD OF VIEW CIRCLE #1 ON YOUR RECORD SHEET**, draw what you see under the 10X objective. Make sure you label your drawing correctly and use colored pencils
- \_\_\_\_\_ 11. **Answer Question # 1 on your answer sheet now.**
- \_\_\_\_\_ 12. While looking from the side to be sure the objective will not hit the slide, CAREFULLY turn the revolving nosepiece so that the 40X objective is in place. Turning the **fine adjustment knob** no more than one-fourth of a turn, focus the paper more clearly.
- \_\_\_\_\_ 13. Depending upon how dark your paper is, you may need to adjust the diaphragm until you get the best possible light.
- \_\_\_\_\_ 14. **ANSWER QUESTIONS #2 and #3 now.**
- \_\_\_\_\_ 15. **IN FIELD OF VIEW CIRCLE #2 on your record sheet**, draw the patterns and shapes you see under 40X with colored pencils. (fill half the circle for each color). Make sure you label your drawing and include the proper magnification.

#### Part D - Using the High Power Objective

Using the high power objective (the longest one) can be tricky, so we're going to practice by looking at prepared slides of protozoans. These single celled organisms have been stained with pink, blue, and green dyes to make them easier to see. In real life they are either transparent or green.

The high power objective can be scratched easily, so make sure you follow all the directions carefully. Reminder- the "field of view" is the circle of light you see when you look through the microscope.

- \_\_\_\_\_ 22. Obtain a prepared slide of mixed protozoa. Scan with your 4X objective in place until you find an interesting area of your slide. **In circle #4, draw what you see.**
- \_\_\_\_\_ 23. Center and switch to the 10X objective and focus. **Draw what you see in circle #5 on your record sheet.**
- \_\_\_\_\_ 24. Be sure there is a well-focused protist exactly in the center of your 10X field of view.
- \_\_\_\_\_ 25. WHILE LOOKING FROM THE SIDE, move the high power objective into place. If it looks like the objective will hit the slide STOP and ask the teacher for help.
- \_\_\_\_\_ 26. Looking through the eyepiece, use the fine adjustment knob to bring the protists into focus. Turn the knob slowly as the objects will come into and go out of focus very quickly and you might miss them.

### **NEVER USE THE COARSE ADJUSTMENT KNOB ON HIGH POWER.**

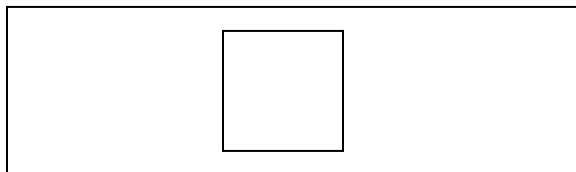
- \_\_\_\_\_ 27. **Draw what you see in circle #6 on the record sheet.**
- \_\_\_\_\_ 28. **Answer all remaining questions on your record sheet.**

Name \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

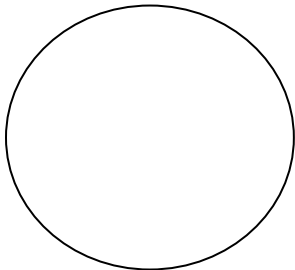
**FOLLOW THE PROCEDURE CAREFULLY TO MAKE SURE YOU ANSWER THE QUESTIONS AND COMPLETE THE DRAWINGS BELOW IN ORDER. DO NOT USE THIS RECORD SHEET AS YOUR GUIDE – USE THE PROCEDURE!**  
**PLEASE : ^)**

**PART A - The Slide****Drawing of slide with colored paper as it appears without the microscope:**

Colors: left side \_\_\_\_\_ right side \_\_\_\_\_

**PART B – Resolving Power**

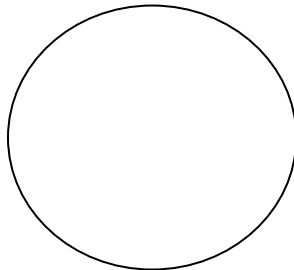
#1



Specimen: \_\_\_\_\_

Total Magnification: \_\_\_\_\_

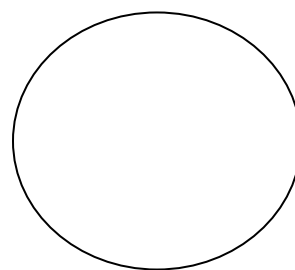
#2



Specimen: \_\_\_\_\_

Total Magnification: \_\_\_\_\_

#3



Specimen: \_\_\_\_\_

Total Magnification: \_\_\_\_\_

1. Compare your original drawing of the paper on the slide with the drawing you just made while looking through the microscope.

a. Which color is on the right side **without** the scope? \_\_\_\_\_

b. Which color is on the right side **with** the scope? \_\_\_\_\_

2. Why is it so important to be careful when moving the high power objective into place?

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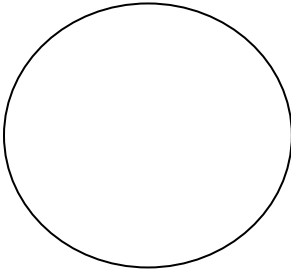
3. How does good resolving power affect the image you see through the microscope?

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## PART C – Using High Power

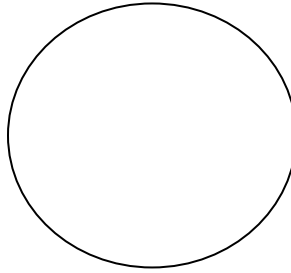
#4



Specimen: \_\_\_\_\_

Total Magnification: \_\_\_\_\_

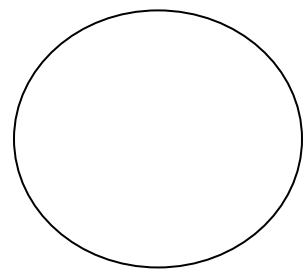
#5



Specimen: \_\_\_\_\_

Total Magnification: \_\_\_\_\_

#6



Specimen: \_\_\_\_\_

Total Magnification: \_\_\_\_\_

6. Compare your last two drawings. Do you see more **individual** organisms using 10X or highest power. COUNT THEM!!!!

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7. Does the field of view reveal more of your slide or less of your slide when using highest power? Explain.

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8. Why is it so helpful to center the object you want to exam before moving up to a higher power?

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