

Name _____
 Per _____ Date _____

Using a Microscope Lab

Purpose: To learn the care, handling, functions and use of the microscope.

Materials:

| | | |
|-----------------|--------------|------------------|
| microscope | metric ruler | lens paper |
| cover slip | cotton ball | microscope slide |
| colored pencils | water | forceps |
| | | eye dropper |

Part 1: Magnification and Light

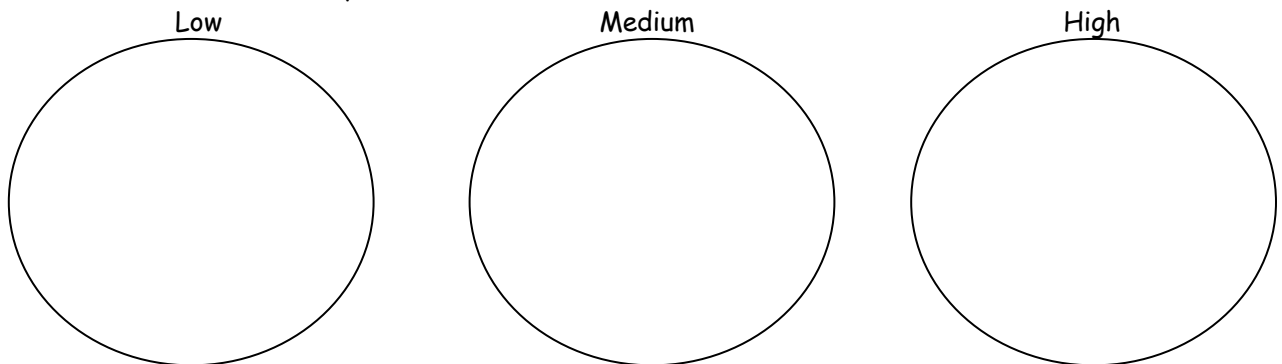
Clean the lenses of your microscope with lens paper. Look at the eyepiece and find a number written on it; this is the magnification power of the eyepiece (note: the magnification is the number before the 'X'). Notice the magnification of each objective lens. To find the total magnification power of your microscope, multiply the power of the eyepiece by the power of the objective lens in use. Fill in the chart below:

| | | | |
|-----------------|-----------------------------------|------------------------------------|------------------------------------|
| | Low Power Objective ____x | Med. Power Objective ____x | High Power Objective ____x |
| Eyepiece _____x | Low Power Magnification _____x | Med. Power Magnification _____x | High Power Magnification _____x |

Examine the diaphragm, what are the numbers written on it? _____
 Which setting makes the specimen the lightest? _____ the darkest? _____

Part 2: Measuring the Field of View (the amount of the microscope slide that you see looking through the microscope)

- Put a clear ruler on the stage of your microscope with the metric side over the round opening in the stage.
- Bring the ruler into sharp focus under low power. The lines that you see are millimeter lines. Move the ruler so that a line is on the very left edge of your field of view and is centered in the field of view. Now count the number of spaces between the lines in the field of view. Draw what you see and record the diameter (distance across) of the field of view in mm. (Remember: you are looking at a ruler!)
- Switch to medium power. Refocus using the coarse fine adjustment knobs. Move the ruler so that a line is on the very edge of your field of view and is centered in the field of view. Now count the number of spaces between the lines in the field of view. Draw what you see and record the diameter of the field of view in mm. Before you switch to high power, make sure that 1 of the lines is directly centered over your field of view.
- Switch to high power. Refocus using only the fine adjustment knob. Now count the number of lines in the field of view. Draw what you see and record the diameter of the field of view in mm.
- Remove the ruler from the microscope and return it.



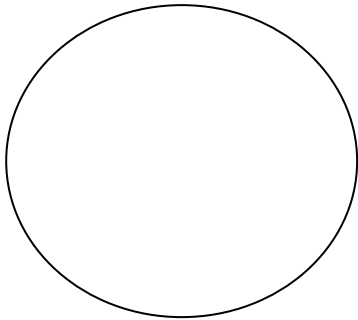
mag: _____X _____X _____X

Diameter: _____ _____ _____

Part 3: Letter 'e'

1. Use the paper strip of "e"s in your lab basket.
2. Secure the paper on the stage using the stage clips. **Make sure that ONE "e" is right side up centered over the hole in the stage. The "e" should be in the readable position on your stage. Do not move the paper!**
3. Adjust to low power; focus with the coarse adjustment. Make sure the 'e' is centered in your field of view. Draw *exactly* what you see.
4. Carefully switch to medium power. Focus what you see using the coarse adjustment. Draw what you see. Make sure the 'e' is centered in your field of view.
5. Carefully switch to high power. Focus what you see using **only the fine adjustment knob.** Draw what you see.
6. Throw away the letter "e" and put the clean slide and cover slip back where you found them. Lower your stage and switch your microscope back to low power.

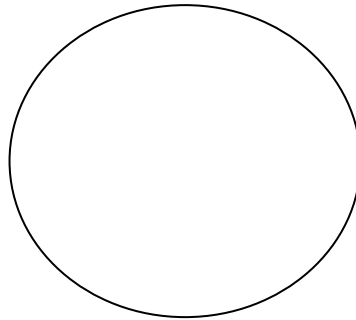
Low



mag:

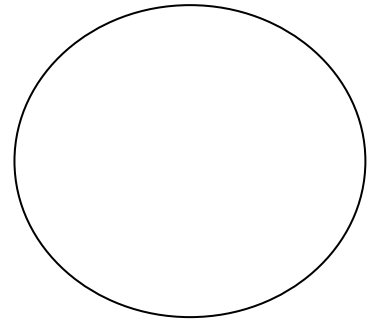
_____X

Medium



_____X

High

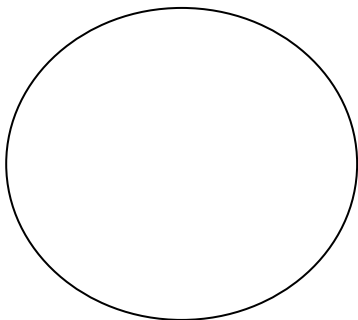


_____X

Part 4: Fabric Swatch

1. Obtain a small piece of fabric from your teacher.
2. Secure the piece of fabric on the stage using the stage clips. Make sure that the fabric is covering the hole in the stage.
3. Adjust to low power; focus with the coarse adjustment. Draw *exactly* what you see. If there are different layers that appear, make sure you draw them the same way.
4. Carefully switch to medium power. Focus what you see using the coarse adjustment. Draw what you see.
5. Carefully switch to high power. Focus what you see using **only the fine adjustment knob.** Draw what you see.
6. Give the piece of fabric back to your teachers. Lower your stage and switch your microscope back to low power.

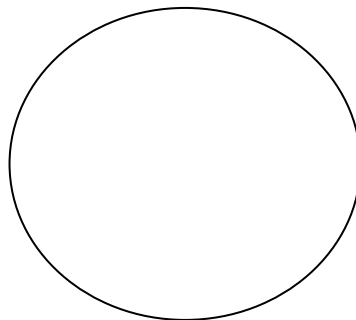
Low



mag:

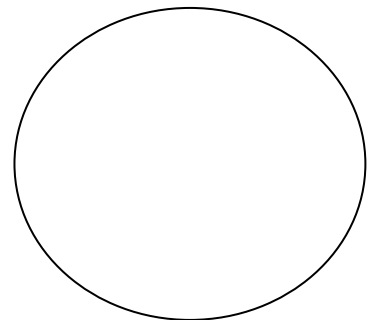
_____X

Medium



_____X

High

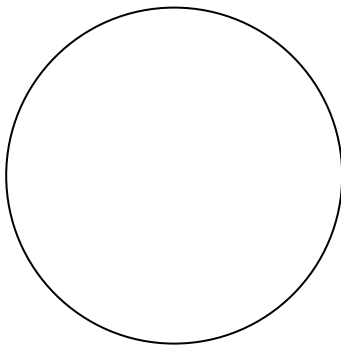


_____X

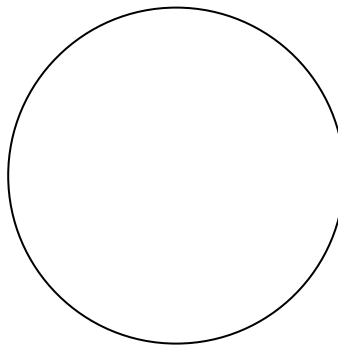
Part 5: Making a Wet Mount Slide

1. Gather a few strands of cotton from a cotton ball using forceps. Carefully place the cotton in the middle of your slide. If your specimen is too thick, then the coverslip will wobble on top of the sample like a seesaw, and you will not be able to view it under High Power.
2. Place ONE drop of water directly over the specimen. If you put too much water, then the coverslip will float on top of the water, making it hard to draw the specimen, because it might actually float away.
3. Place the coverslip at a 45-degree angle over the specimen with one edge touching the water drop and then gently let go. Performed correctly, the coverslip will fall perfectly over the specimen.
4. Draw the specimen as it appears in your viewing field under low, medium and high power. Make sure to use the fine and course adjustment in order to view the sample clearly. Make sure that your drawings truly represent what you are viewing.

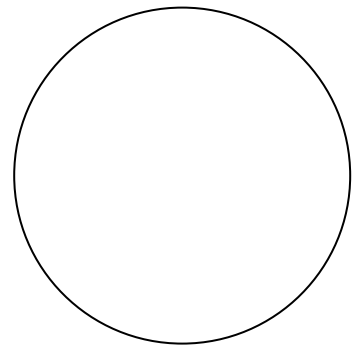
Low



Medium



High



mag:

_____X

_____X

_____X

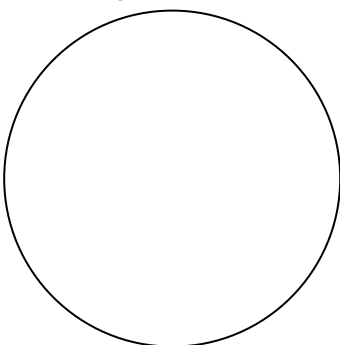
*******DO NOT CLEAN OFF YOUR SLIDE - YOU NEED IT FOR PART 6!*******

Part 6: Staining a Specimen

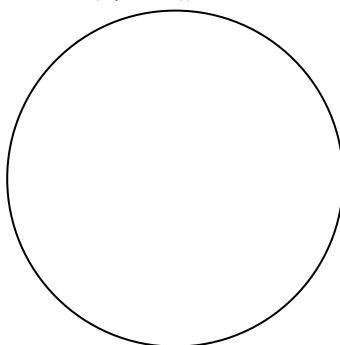
1. Using the same slide that you made with the cotton, place one drop of stain (iodine or methylene blue) on the slide right next to the edge of the coverslip. **Caution: Iodine and Methylene blue will stain clothes and skin.**
2. Place the flat edge of a piece of paper towel on the opposite side of the coverslip. The paper towel will draw the water out from the coverslip, and the cohesion of water will draw the stain under the slide.
3. As soon as the stain has covered the area containing the specimen, you are finished. The stain does not need to be under the entire coverslip, just so that your specimen has been stained. If the stain does not cover as needed, get a new piece of paper towel and add more stain until it does.
4. Be sure to wipe off the excess stain with a paper towel.

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

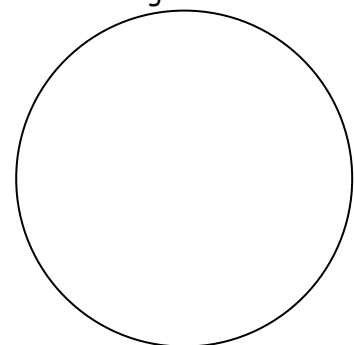
Low Power



Medium Power



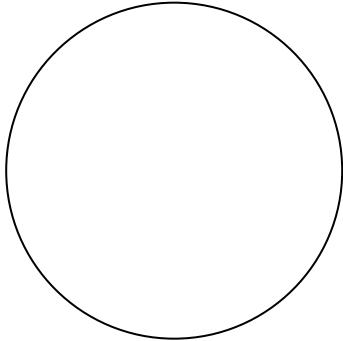
High Power



Part 7: Image from a Magazine

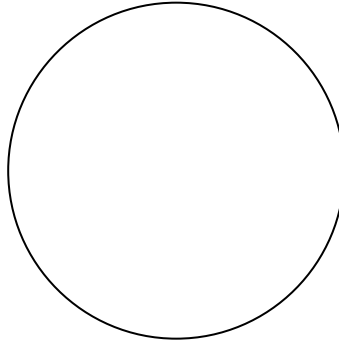
1. Obtain a small sample of an image from a magazine from your teacher and then place it **IMAGE UP** on your clean microscope slide.
2. Create a wet mount slide. If you need help, look at the instructions for Part 5 : Making a Wet Mount Slide.

Low



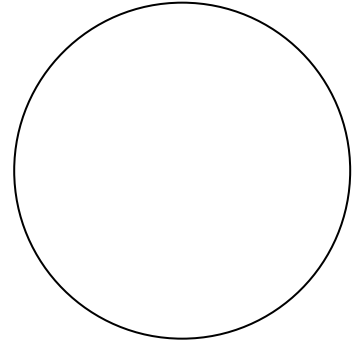
mag: _____X

Medium



_____X

High

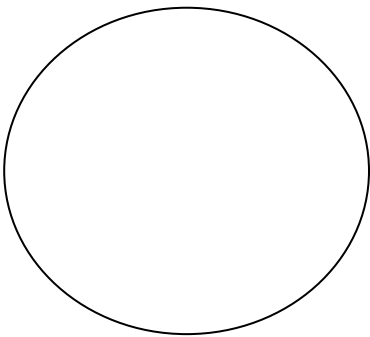


_____X

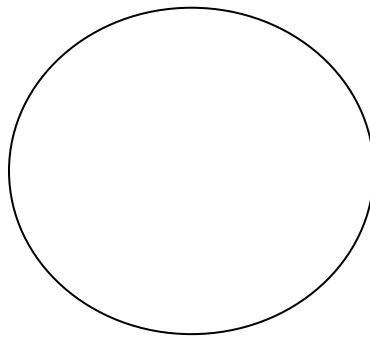
Part 8: Miscellaneous Specimen

View one of the specimens you brought to class. Carefully place your specimen on a glass slide or set up a wet mount slide. Never use any specimens that are greasy, powdery or sticky! Be sure to move the slide around at each power level to view the entire slide. When you find an area you would like to view at a higher magnification, center that area and switch the objective lens.

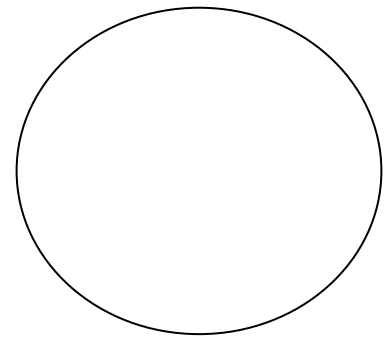
Name of specimen _____



Mag = _____x



Mag = _____x



Mag = _____x

Conclusion Questions:

1. What is the magnification power of the eyepiece?
2. What is the highest total magnification of your microscope?
3. What did you notice about the number of millimeters as you went from low to medium to high power? (Did they increase or decrease?)
4. When you moved from low to medium power to high power how did the vertical distance (distance between the slide and the objective lens) change?
5. What happened to the field of view as you went from low to medium to high power?
6. What happened to the field of view when you moved the diaphragm adjustment?
7. What is the name of the type of slide you prepared using water?
8. Define 'field of view'.
9. What did the microscope do to the position of the letter 'e' when you put it under the microscope?
10. Why was there less of the letter 'e' visible under high power than under low power?