

# Introduction to the Microscope Lab

## Introduction

"Micro" refers to **tiny**, "scope" refers to **view or look** at. Microscopes are tools used to enlarge images of small objects so as they can be studied. The compound light microscope is an instrument containing **two lenses**, which magnifies, and a variety of **knobs to resolve (focus)** the picture. Because it uses more than one lens, it is sometimes called the compound microscope in addition to being referred to as being a light microscope. In this lab, we will learn about the proper use and handling of the microscope.

## Instructional Objectives

- Demonstrate the proper procedures used in correctly using the compound light microscope.
- Prepare and use a wet mount.
- Determine the total magnification of the microscope.
- Explain how to properly handle the microscope.
- Describe changes in the field of view and available light when going from low to high power using the compound light microscope
- Explain why objects must be centered in the field of view before going from low to high power using the compound light microscope.
- Explain how to increase the amount of light when going from low to high power using the compound light microscope.
- Explain the proper procedure for focusing under low and high power using the compound light microscope.

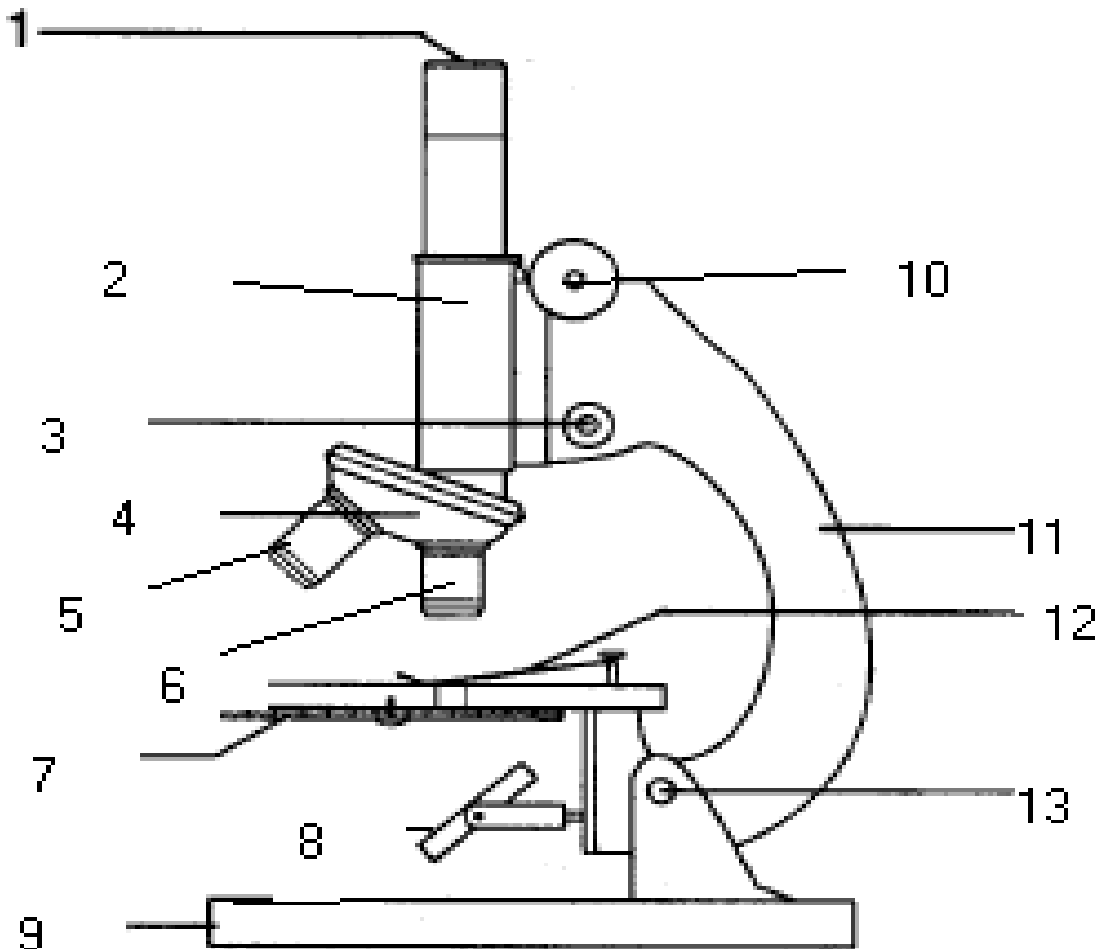
## Materials

- Compound microscope
- Glass slides
- Cover slips
- Eye dropper
- Beaker of water
- The letter "e" cut from newsprint
- Scissors

## Procedure

### Part I. Microscope Handling

1. **Carry the microscope with both hands** --- one on the arm and the other under the base of the microscope.
2. One person from each group will now go over to the microscope storage area and properly **transport one microscope to your working area.**
3. The other person in the group will **pick up a pair of scissors, newsprint, a slide, and a cover slip.**
4. **Remove the dust cover** and store it properly. Plug in the scope. Do not turn it on until told to do so.
5. **Examine the microscope, identify, and state the function of each of the numbered parts** on the diagram below. The chart for this is located on the next page.



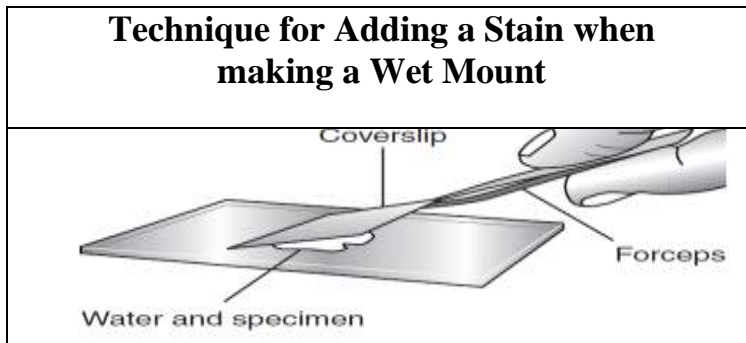
| <b>Name of Microscope Part</b> | <b>Function of Part</b> |
|--------------------------------|-------------------------|
| <b>1.</b>                      |                         |
| <b>2.</b>                      |                         |
| <b>3.</b>                      |                         |
| <b>4.</b>                      |                         |
| <b>5.</b>                      |                         |
| <b>6.</b>                      |                         |
| <b>7.</b>                      |                         |
| <b>8.</b>                      |                         |
| <b>9.</b>                      |                         |
| <b>10.</b>                     |                         |
| <b>11.</b>                     |                         |
| <b>12.</b>                     |                         |
| <b>13.</b>                     |                         |

## Part II. Preparing a wet mount of the letter "e".

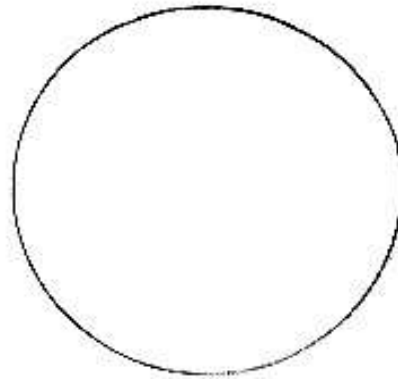
1. With your scissors **cut out the letter "e" from the newspaper.**
2. Place it on the **glass slide** so as to look like (e).
3. **Cover it with a clean cover slip.** See the figure below.



4. **Using your eyedropper, place a drop of water on the edge of the cover slip** where it touches the glass slide.



**5. Turn on the microscope and place the slide on the stage; making sure the "e" is facing the normal reading position** (see the figure above). Using the course focus and low power, move the body tube down until the "e" can be seen clearly. **Draw what you see** in the space at the right.



6. Describe how the image viewed on the stage compares with that viewed through the eyepiece.

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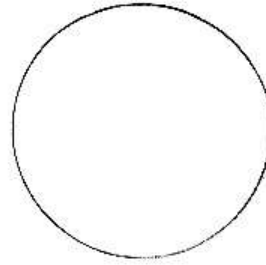
7. Looking through the eyepiece, move the slide to the upper right area of the stage. **What direction does the image move?**

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8. Now, move it to the lower left side of the stage. **What direction does the image move?**

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9. Re-center the letter e in the field of view and change from the low power to the high power objective. You will notice the "e" is out of focus. **Do Not** touch the coarse focus knob, instead use the fine focus to resolve the picture. Draw the image you see of the letter e (or part of it) on high power in the space at the right.



10. **Locate the diaphragm under the stage.** How does adjusting the diaphragm influence the amount of light the specimen receives?.

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### III. Determining Total Magnification:

1. Locate the numbers on the eyepiece and the low power objective and fill in the blanks below.

|  |            |   |          |  |
|--|------------|---|----------|--|
| <b>Eyepiece magnification</b><br>_____ | <b>(X)</b> | <b>Objective magnification</b><br>_____ | <b>=</b> | <b>Total Magnification</b><br>_____ <b>X</b> |
|--|------------|---|----------|--|

2. Do the same for the high power objective.

|  |            |   |          |  |
|--|------------|---|----------|--|
| <b>Eyepiece magnification</b><br>_____ | <b>(X)</b> | <b>Objective magnification</b><br>_____ | <b>=</b> | <b>Total Magnification</b><br>_____ <b>X</b> |
|--|------------|---|----------|--|

3. Write out the **rule for determining total magnification of a compound microscope.**

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4. **Remove the slide and clean it up.** Turn off the microscope and wind up the cord. position. Place the low power objective in place and lower the body tube. Cover the scope with the dust cover. Place the scope back in its original space in the cabinet.

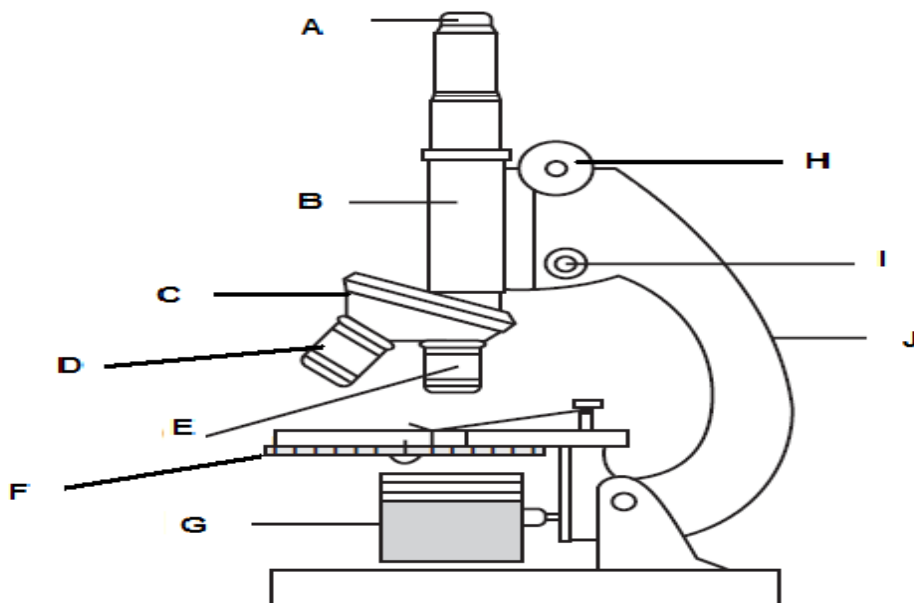
## Conclusion Questions:

1. State 2 procedures which should be used to properly handle a light microscope.
2. Images observed under the light microscope are reversed and inverted. Explain!!
3. Explain why the specimen must be centered in the field of view on low power before going to high power.
4. A microscope has a 20 X ocular (eyepiece) and two objectives of 10 X and 43 X respectively:
  - a.) Calculate the low power magnification of this microscope. Show your formula and all work.
  - b.) Calculate the high power magnification of this microscope. Show your formula and all work.
5. In three steps using complete sentences, describe how to make a proper wet mount of the letter e.
6. Describe the change in the amount of available light when going from low to high power using the compound microscope.
7. Explain what the microscope user may have to do to combat the problems incurred in question # 6.

Choose the answer which best completes the following statement or answers the following question.

- \_\_\_\_\_ 8. The technique of lowering the coverslip at an angle is used to  
(1) make organelles more visible    (2) reduce the formation of air bubbles  
(3) make the specimen transparent    (4) reduce the size of the specimen

Base your answers to questions 9 through 13 on the diagram of a microscope below and on your knowledge of biology.



9. Information about which *two* lettered parts is needed in order to determine the total magnification of an object viewed with the microscope in the position shown?  
\_\_\_\_\_ and \_\_\_\_\_
10. Which lettered part should be used to focus the image while using high power? \_\_\_\_\_
11. Which part of the microscope would you turn to go from low to high power? \_\_\_\_\_
12. Which part of the microscope would you adjust to regulate the amount of light reaching the specimen? \_\_\_\_\_
13. State *two* ways the image seen through the microscope differs from the actual specimen being observed.  
\_\_\_\_\_ and \_\_\_\_\_
14. Which part of the microscope allows light to pass from the objective to the eyepiece? \_\_\_\_\_