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**Introduction to the Microscope Lab Activity**

*This lab was created by Mr. Buckley from Edward Knox High School. Credit is given for this original activity to Mr. Buckley.*

**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
* Thread (2 pieces different colors, approx. 1cm in length)
* White Paper
* Pencils
* Calculator
* Rulers

**Procedure**

**Part I. Microscope**

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.

**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.

1. **Using your eyedropper, place a drop of water on the edge of the cover slip** where it touches the glass slide. The water should be sucked under the slide if done properly.

|  |
| --- |
| **Technique for Adding a Stain when making a Wet Mount** |
|  |

1. **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 **scanning** power objective, move the body tube down until the "e" can be seen clearly. **Draw what you see** in the space below.

1. Describe the relationship between what you see through the eyepiece and what you see on the stage.
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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? **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

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

9. Re-center the slide and change the scope to high power. 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.

1. Locate the diaphragm under the stage. Move it and record the changes in light intensity as you do so.
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**Part III. Determining Total Magnification:**

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

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| --- | --- | --- | --- | --- |
| **Eyepiece magnification \_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **X** | **Objective magnification \_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **=** | **Total Magnification \_\_\_\_\_\_\_\_\_\_\_\_\_** |

1. Do the same for the high power objective.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Eyepiece magnification \_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **X** | **Objective magnification \_\_\_\_\_\_\_\_\_\_\_\_\_\_** | **=** | **Total Magnification \_\_\_\_\_\_\_\_\_\_\_\_\_** |

1. Re-center the slide and change the scope to low power. 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.
2. Draw a **biological drawing** of the image you see of the letter e (or part of it) on **low** power. Include all calculations and labels necessary following the rules for creating biological drawings in your biological drawing. Make sure to include at least one label.
3. **Remove the slide and clean it up.** Place the low power objective in place and lower the body tube.

**Part IV Resolution**

* 1. Obtain 2 hairs or pieces of thread. Place the hair/thread on a microscope slide so that the 2 pieces form a cross in the centre of the slide and carefully position the cover slip. (This will be a dry mount). Examine the slide with a compound microscope.
	2. Adjust the magnification to 100x .
	3. Examine the full length of the hair. Use the fine adjustment knob to focus in on one of the hairs.
	4. At high magnification note the color, relative diameter.
	5. Now using the fine adjustment knob to focus in on the second piece of hair.
	6. Record what you see. Can both hairs be viewed at the same time with the microscope? Why might we have difficulty seeing both?
	7. **Remove the slide and clean it up.** Turn off the microscope. Place the low power objective in place and lower the body tube. Return cover slip over microscope and carefully carry back to storage shelf and make sure to plug the microscope back into shelf.