**Introduction to the Microscope Lab Activity**

**Introduction Adapted from:** **http://www.ekcsk12.org/faculty/jbuckley/lelab/microscopeuselab.htm**

"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.

**Materials**

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

**Procedures**

**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. **Give the name and function of each of the parts** listed on the right side of the diagram.

|  |  |
| --- | --- |
| lightmicroscopediagram2 | 1. eyepiece or ocular
2. body tube
3. fine adjustment knob
4. nosepiece
5. high power objective
6. low power objective
7. diaphragm
8. mirror/ light
9. base
10. coarse adjustment
11. arm
12. stage clip
13. inclination joint
 |

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

*Complete all questions in complete sentence s on a separate sheet of paper*

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**. Example🡪 
4. **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** |
| C:\lelab\stainingtechnique.gif |

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 low power, move the body tube down until the "e" can be seen clearly. *Draw what you see in the assigned location.***

***DRAWING***

1. ***\*\*Describe the relationship between what you see through the eyepiece and what you see on the stage.***
2. ***\*\** Looking through the eyepiece, move the slide to the upper right area of the stage. *What direction does the image move?***
3. **\*\*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.

 DRAWING***

1. ***\*\*Locate the diaphragm under the stage. Move it and record the changes in light intensity as you do so.***

**III. Determining Total Magnification:**

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

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

1. **\*\*Do the same for the high power objective.**

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

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

**IV. DEPTH PERCEPTION Adapted from:** **http://www.biologycorner.com/worksheets/e-lab.html**

Obtain a slide with three different colored threads on it. View the slide under scanning and then low power. You should note that you could only focus on one colored thread at one time. Figure out which thread is on top by lowering your stage all the way, then slowly raising it until the thread comes into focus. The first thread to come into focus is the one on top.

1. \*\* Which color thread is on top? \_\_\_\_\_\_\_\_\_\_\_\_
2. \*\* Which color thread is in the middle? \_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \*\* Which color thread is on the bottom? \_\_\_\_\_\_\_\_\_\_\_\_

4. \*\*Can all the threads be seen at the same time?

5. \*\* What do you have to do to see the three different threads?

**V. True or False**

\_\_\_\_\_\_\_\_\_\_ On high power, you should use the coarse adjustment knob.
\_\_\_\_\_\_\_\_\_\_ The diaphragm determines how much light shines on the specimen.
\_\_\_\_\_\_\_\_\_\_ The low power objective has a greater magnification than the scanning objective.
\_\_\_\_\_\_\_\_\_\_ The fine focus knob visibly moves the stage up and down.
\_\_\_\_\_\_\_\_\_\_ Images viewed in the microscope will appear upside down.
\_\_\_\_\_\_\_\_\_\_ If a slide is thick, only parts of the specimen may come into focus.
\_\_\_\_\_\_\_\_\_\_ The type of microscope you are using is a scanning microscope.
\_\_\_\_\_\_\_\_\_\_ For viewing, microscope slides should be placed on the objective.
\_\_\_\_\_\_\_\_\_\_ In order to switch from low to high power, you must rotate the revolving nosepiece.
\_\_\_\_\_\_\_\_\_\_ The total magnification of a microscope is determined by adding the ocular lens power to the objective lens power.

**VI. Conclusion Questions:**

***1. State 2 procedures which should be used to properly handle a light microscope.

2. Explain why the light microscope is also called the compound microscope.

3. Images observed under the light microscope are reversed and inverted. Explain what this means.

4. Explain why the specimen must be centered in the field of view on low power before going to high power.

5. 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.

6. In three steps using complete sentences, describe how to make a proper wet mount of the letter e.

- 1.*** *(specimen, slide, etc…)*

*- 2. (cover slip, etc…)*

*- 3. (dropper, etc…)*

***7. Describe the changes in the field of view and the amount of available light when going from low to high power using the compound microscope.

8. Explain what the microscope user may have to do to combat the problems incurred in question # 7.

9. How does the procedure for using the microscope differ under high power as opposed to low power?

10. Indicate and describe a major way the stereomicroscope differs from the compound light microscope in terms of its use.***