

LAB 1 **LABORATORY INVESTIGATION**

How to Use a Microscope

◆ Pre-Lab Discussion

As you explore the natural world in science labs, you will be doing something you do every day—making observations. You use your senses to make observations, but sometimes your senses need help. For several labs in this book, you will be using a microscope to examine organisms and objects that are too small to be seen with the unaided eye. Refer to Figure 1 throughout this lab and other labs that use a microscope.

When you view an object through a microscope, you place the object on a glass slide. The slide may be either a dry-mount slide, the object to be examined is placed on the slide and covered with a small square of plastic called a coverslip. In a wet-mount slide, a drop of liquid is placed over the object before being covered with a coverslip. In this investigation, you will learn how to correctly prepare a wet-mount slide and how to observe an object under the microscope.

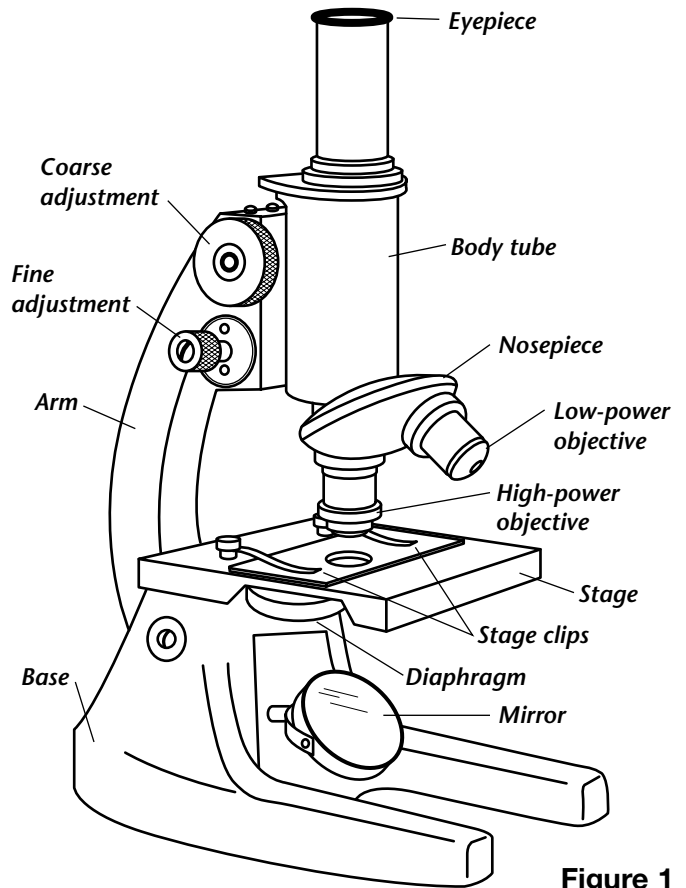


Figure 1

1. When you carry a microscope, why should you carry it with one hand on the arm of the microscope and the other hand under the base?

2. Why should you hold a microscope slide by its edges?


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HOW TO USE A MICROSCOPE *(continued)***◆ Problem**

How do you prepare an object to be viewed under the microscope, and how do you use the microscope to observe the object?

◆ Materials *(per group)*

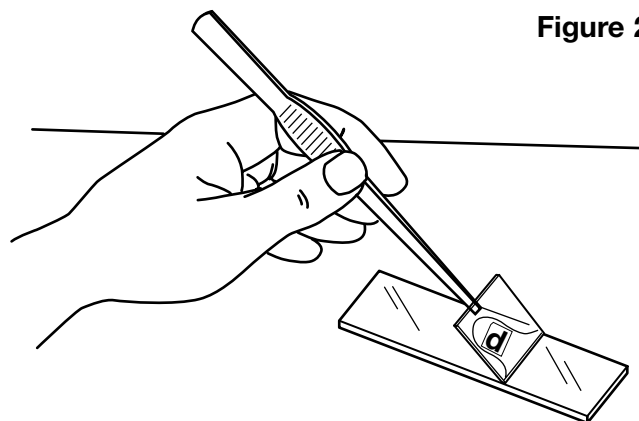
microscope
microscope slide
coverslip
newspaper
scissors
plastic dropper
water
forceps
paper towel

◆ Safety  *Review the safety guidelines in front of your lab book.*

Wipe up any spills immediately. Handle slides with care to avoid breakage. Tell the teacher if a slide breaks. If your microscope has a mirror, do not tilt it directly toward the sun. Eye damage can occur if direct sunlight is used as a light source.

◆ Procedure

1. Cut a small letter “d” from the newspaper and place it in the center of a clean microscope slide so that it is in the normal reading position.
2. Using the plastic dropper, carefully place a small drop of water over the letter.
3. Place one side of a clean coverslip at the end of the drop of water at a 45° angle. See Figure 2. Use forceps to carefully lower the coverslip over the letter “d” and the drop of water. Do not press on the coverslip. It should rest on top of the water. Try not to trap any air bubbles under the coverslip because these will interfere with your view of the specimen. If you have trapped air bubbles, make a new wet-mount slide.
4. Absorb excess water by touching a folded piece of paper towel to the water that comes out around the edges of the coverslip.

**Figure 2**

HOW TO USE A MICROSCOPE *(continued)*

5. In Observations, draw a picture of the letter “d” just as you see it on the slide, without the aid of the microscope.
6. Place the slide under the clips on the stage of the microscope. Position the slide so that the letter “d” is directly over the center of the stage opening.
7. Turn the nosepiece so that the low-power objective is facing downward, toward the slide. Use the coarse-adjustment knob to slowly lower the low-power objective until it almost touches the slide. **CAUTION:** *To prevent damage to the microscope and the slide, do not let the lens actually touch the slide.*
8. Tilt the mirror and adjust the diaphragm until you get the best light for viewing the specimen. **CAUTION:** *Do not aim the mirror at direct sunlight.*
9. Looking through the eyepiece, use the coarse-adjustment knob to slowly raise the lens until the letter comes into view. **CAUTION:** *To prevent damage, do not lower the coarse adjustment while looking through the eyepiece.*
10. Use the fine-adjustment knob to focus the letter clearly. You should only need to turn the knob one-quarter of a turn or less.
11. Look at the objectives and the eyepiece of your microscope. Then answer question 1 in Observations.
12. Find the total magnification power of your microscope by multiplying the magnification of the eyepiece lens by the magnification of the objective lens you are using. Then answer questions 2 and 3 in Observations.
13. In Observations, draw a picture of the letter “d” as viewed through the microscope. Record the magnification you are using.
14. While looking through the eyepiece, move the slide to the left. Notice which way the letter seems to move. Now move the slide to the right. Again notice which way the letter seems to move.
15. Switch to the high-power objective lens by revolving the nosepiece so that the high-power lens clicks into place. **CAUTION:** *The high-power objective is longer than the low-power objective; it may easily touch and damage the slide. Look at the side of the microscope when switching to the high-power objective to make sure it clears the slide.* Using the fine-adjustment knob only, bring the specimen into focus.
16. In Observations, draw a picture of the letter “d” as seen with the high-power objective lens. Record the magnification you are using.

HOW TO USE A MICROSCOPE *(continued)*

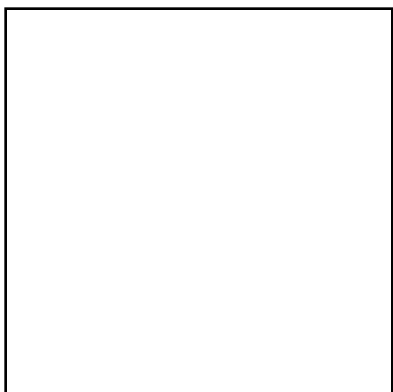
◆ Observations

1. What is the magnification of each objective of your microscope? What is the magnification of your eyepiece?

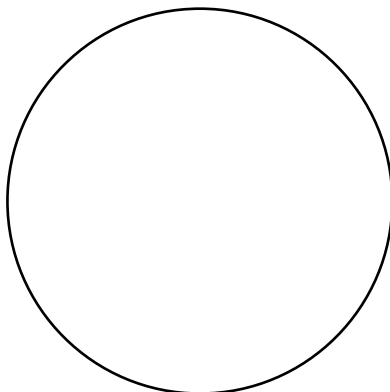
2. What is the total magnification power using the low-power objective?

3. What is the highest magnification of your microscope?

Letter “d” Without Microscope

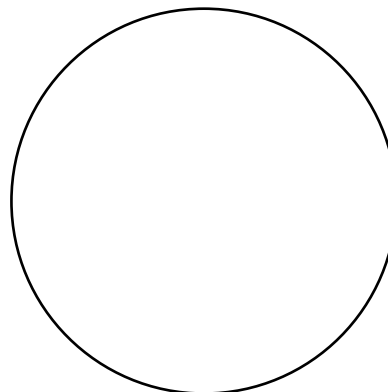


Low-Power Objective



Magnification: _____

High-Power Objective



Magnification: _____

◆ Analyze and Conclude

1. How does the letter “d” as seen through the microscope differ from the way a “d” normally appears?

2. When you move the slide to the left, in what direction does the letter “d” appear to move?

HOW TO USE A MICROSCOPE *(continued)*

3. When you move the slide to the right, in what direction does the letter “d” appear to move?

4. How does the ink that was used to print the letter differ in appearance when you see it with the unaided eye compared with the way it appears under the microscope?

5. Briefly explain how to make a wet-mount slide.

◆ Critical Thinking and Applications

1. Why should you always use the low-power objective lens to locate objects mounted on the slide first, even if you want to observe them with the high-power objective lens?

2. Suppose you were observing an organism through the microscope and noticed that it moved toward the top of the slide and then it moved right. In what directions did the organism actually move?

HOW TO USE A MICROSCOPE *(continued)*

◆ More to Explore

New Problem What do other objects look like under a microscope?

Possible Materials Small, common objects or thin pieces of material to observe. Consider which materials you should use from the previous part of this lab.

Safety Follow the safety guidelines in the lab.

Procedure Write your procedure on a separate sheet of paper. Have the teacher approve of your procedure and your list of objects to observe.

Observations Draw what you see when using the microscope. Record the magnifications you used.

Analyze and Conclude Evaluate the objects you observed. What objects worked well? What other kinds of objects would you choose?
