

# Parts of a Microscope

Before the microscope was invented, people thought there was nothing smaller than the smallest things that could be viewed with the human eye. Then early microscope designers like Robert Hooke changed all that. Robert Hooke made a microscope out of two lenses placed at opposite ends of a long tube. The tube was attached to a stand, and an oil lamp provided light. Hooke also added a mirror to focus the light onto the object being examined. He used his microscope to magnify visible things like fleas.

1. Who made the first compound microscope?
2. Describe Hooke's microscope.

Today, most microscopes are called **compound light microscopes**, and use two lenses for greater magnification. The upper lens is called the **ocular lens** or **eyepiece**, and the lower lens (or lenses, as there may be a choice of sizes) is called the **objective lens**. *Label and Color the ocular lens light blue.* Most eyepiece lenses are 10X magnification. The magnification of each objective lens will be marked on the side of the objective. To determine the **total magnification**, multiply the eyepiece power (10X) times the magnification of the objective you are using.

3. Why are today's microscopes called compound scopes?
4. What is the upper lens called? What is its magnification?
5. How is TOTAL magnification determined?

Always begin focusing a microscope on the lowest power and then move to the next higher power and refocus. *Label and color* the low power objective pink and the high power objective red. The eyepiece is at the top of the body tube. *Label* the body tube. The objective lenses are located on a **revolving nosepiece** at the bottom of the body tube. *Label and color* the nosepiece brown and the body tube orange.

6. How should you always begin focusing?
7. Where are the objective lenses located?

When an image is formed, it is actually **magnified twice**. First, the image is formed at the bottom by the objective lens. Then the image is projected through a tube and magnified again by the eyepiece at the top. The image is always upside down, so what you see through a microscope shows up as the opposite of what you are doing. Any movement of the object also shows up in the opposite way. When you move an object to the right, it appears to move to the left, and when you move it up, its image moves down. Use black arrows to show the pathway that light takes through the microscope to your eye.

8. How does the image appear to your eyes?
9. If you want the image to move to the left, how must you move the slide? Explain why.

When setting up a microscope, be sure to carry the scope with two hands. Place one hand under the **base** and the other hand on the **arm**. *Label* the arm and base. Make sure that the microscope is away from the edge of the table and that the electrical cord is on the table so that it can't be accidentally caught and pull off the microscope. Uncover the microscope and turn on the light source.

10. How should a microscope be carried?
11. Where should the scope be placed on the counter and what should be done with the electrical cord?

To use a microscope, you need to place a slide or a specimen on the **stage**. *Label* the stage and *color* it light green. You should make sure that the slide on the specimen is sitting over the hole in the stage. Stage clips hold the slide in place on the stage. The **mirror or light source**, under the stage, will reflect the light source you are using to light up your specimen. *Label and color* the light source or mirror violet. For safety reasons, you should never use a microscope in direct sunlight. This could hurt your eyes. Locate the **diaphragm** directly under the stage. This may be a rotating wheel with different size holes or a lever that moves back and forth. *Label and color* the diaphragm dark purple. While looking through the eyepiece of your microscope at your specimen, adjust the diaphragm to get the right amount of light coming through the microscope.

12. Where are slides placed on a microscope?
13. The \_\_\_\_\_ under the stage is used to adjust the amount of light.



Place a microscope slide with your specimen on the stage under the **stage clips** to hold the slide in place. *Label* the stage clips. Look through the eyepiece to see the specimen. If your microscope has more than one objective lens, start with the low power objective to get the clearest and largest view of the specimen. To focus on low power, raise the stage all the way to the top using the **coarse adjustment knob** (larger). Look through the microscope at your specimen and turn the coarse adjustment knob until the image is clear. Remember that you always need to keep both eyes open while looking into the microscope, because this will help you to avoid a painful condition called eyestrain. After the image is clear on the lowest power, turn the nosepiece to the next highest power and focus the image using the **fine adjustment knob** (smaller). *Label and color* the fine adjustment knob black. *Label* the coarse adjustment knob. Once you are finished with your microscope, remove the slide, return the scope to low power, and turn off the light.

14. What holds the slide on the stage?

15. What object and knob do you start with when focusing your scope?

16. When do you use the fine adjustment?