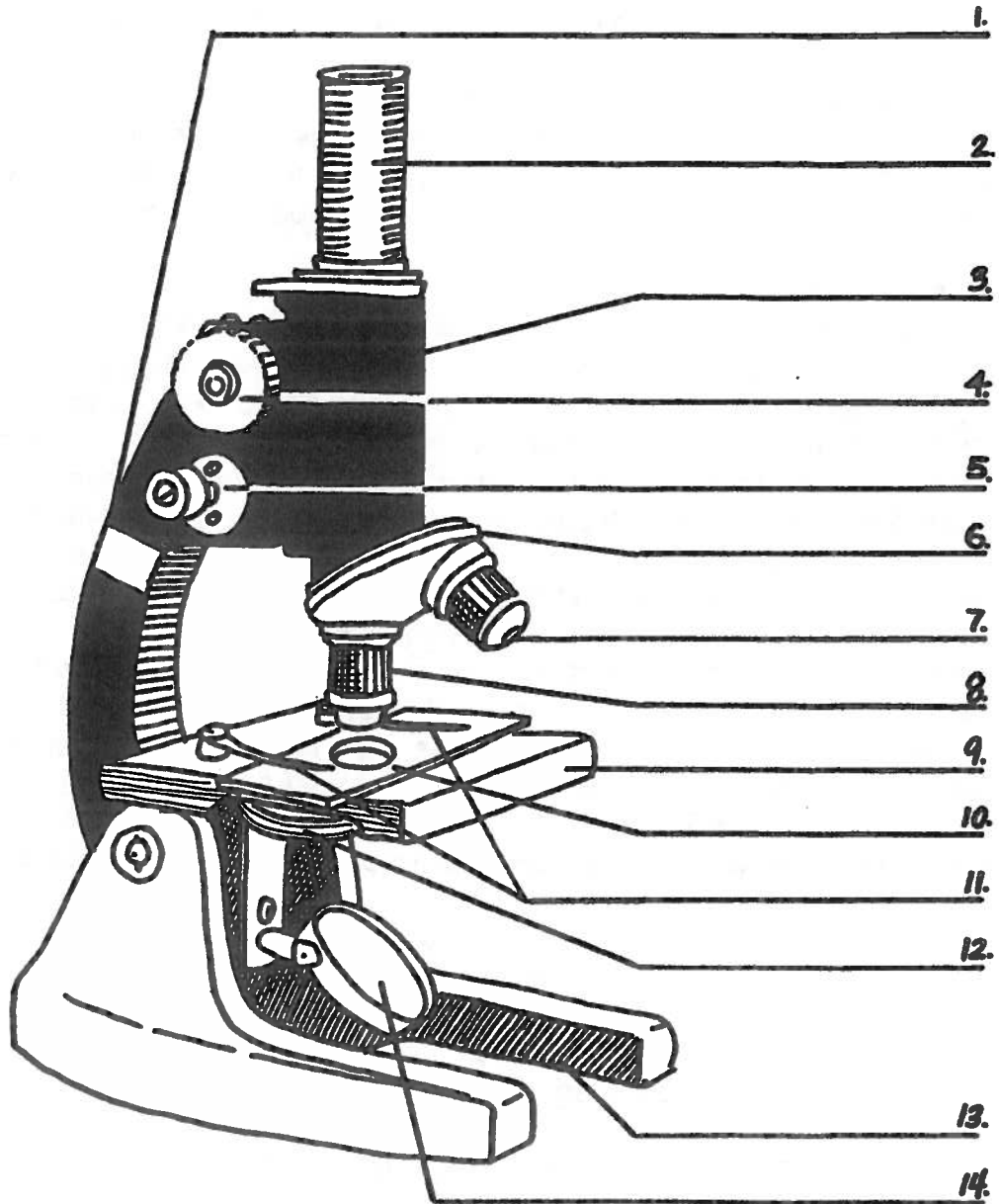


UNDER THE MICROSCOPE

You never know what you'll find under the microscope! But to find anything, you need to know how to use one. Label the parts of this light microscope and answer the questions about how it works.

- eyepiece
- body tube
- arm
- nosepiece
- high power objective
- low power objective
- coarse adjustment
- fine adjustment
- stage clips
- stage
- diaphragm
- mirror
- base
- slide



15. What provides slight focusing to sharpen the image? _____
16. What provides the least magnification? _____
17. What reflects light upwards? _____
18. What regulates the amount of light that enters the body tube? _____
19. What moves the body tube in large movements up and down? _____
20. What holds the microscope slide in place? _____

Name _____

Learning About Microscopes

Before we can observe and study cells, we must learn to use a very important scientific tool, the microscope. *Micro* means “very small,” while *scope* means “to look at.” Over time, scientists developed a tool to make things look larger than their actual size. Microscopes use **lenses** (curved pieces of glass) to bend light rays in order to make an enlarged image. The first compound microscope was invented around 1590 by two Dutch eyeglass makers, Hans and Zacharias Janssen. Their microscope had two lenses, one at each end of a tube, but the lenses were poor; as a result, the images produced were blurred and distorted. It wasn’t until 1670 that the quality of the lenses had improved enough to produce a clear image.

Kinds of Microscopes

There are many different kinds of microscopes. Microscopes are either **simple** (containing one lens) or **compound** (containing two or more lenses). A simple microscope is like a magnifying glass. Have you ever used a hand lens before? If you have, you have used a simple microscope. **Light microscopes** use light and lenses to **magnify** (enlarge) things. The microscopes you use in your classroom are **compound light microscopes**. They let light pass through the object and then through two or more lenses. Convex lenses are used as magnifying lenses and bend the light toward your eye. They usually have an eyepiece lens with the power to magnify something ten times. The objective lenses vary in power. Using the different objective lenses changes the magnification of the microscope. The **low-power** objective is usually a 10X magnification lens. It shows more of the object but less detail. The **high-power** objective contains the lens with the greatest amount of magnification. It shows less of the object you are viewing but shows it in greater detail. The magnification power of a microscope is the product of the magnifying power of the lenses: take the magnification of the eyepiece and multiply it by the magnification of the objective (nosepiece) lens to determine the total magnification of the microscope. A standard microscope can make objects appear 50 to 500 times larger than their actual size.

Magnification of a Microscope

Eyepiece lens =	10X (magnification)
Objective lens =	43X (magnification)
Total magnification =	<u>430X (the product of 10 x 43)</u>

Electron microscopes use electrons to magnify objects; this type of microscope does not use light. Electrons are the particles that light up your television screen. Scientists use electron microscopes to look at things too small to be seen with a light compound microscope. The **transmission electron microscope (TEM)** is used to study parts inside a living cell. The **scanning electron microscope (SEM)** is used to view dead cells and tissue. It is also used to see the surfaces of the whole object. These microscopes are very expensive and are not likely to be found in your classroom. They are used in research centers, hospitals, and doctors’ offices. Electron microscopes can magnify objects 300,000 times their actual size.

Your classroom may have a **light stereoscope microscope**; this type of microscope is used to see three-dimensional views of objects too thick to let light pass through. For example, if you wanted to see a worm up close, you would use one of these microscopes.