

# [The compound light microscope](https://assignbuster.com/the-compound-light-microscope/)

The familiar compound light microscope is a series of lenses (hence “ compound”) that focus visible light in such a way as to produce a magnified image. A single lens, often called a magnifying glass, cannot generally magnify images as much as a series of lenses although Antony van Leeuwenhoek, the first microbiologist, used a simple, albeit exquisitely crafted, lens to discover single-celled “ animalcules,” as he called them. Advantages: Basic compound light microscopes are inexpensive and relatively easy to use. Since they work in visible light, the images are in full color.

The images are also in real time: You can watch the animalcules wiggle right there on the slide. Disadvantages: Preparing slides for viewing can be tricky for some people. As well, visible light has wavelengths ranging from 400 to 700 nm, placing a lower limit on the size of objects that can be resolved. Dissecting Microscope A variation on the compound light microscope, a dissecting microscope is designed to be used while dissecting a specimen. It is also sometimes called a stereoscope because there are two eyepieces and lens assemblies, affording the user a binocular image of the specimen and thus a sense of depth.

Advantages: Like the basic compound light microscope, dissecting microscopes are inexpensive and even a little easier to use since one does not need to prepare a slide. They also provide full-color, real-time images in three dimensions. Disadvantages: Since they are designed to be used on fairly large specimens that are being directly manipulated by the user, dissecting microscopes do not magnify images as much as other microscopes. Scanning Electron Microscope Instead of photons of visible light, a scanning electron microscope scans a beam of electrons across a target and then constructs an image from the way the electrons bounce off it.

Since electrons have a much smaller wavelength than visible light, the electron microscope is capable of resolving much smaller objects. Advantages: The electron microscope can create finely detailed perspectives of extremely tiny objects. Disadvantages: Electrons do not bounce off all materials, so the target in an electron microscope must be carefully prepared by coating it with a layer of gold, making it impossible to take micrographs of living creatures. As well, the process can only produce still images in black and white.