

The Microscope—Improvements Over Time

The discovery of cells would not have been possible without the microscope. Microscopes have been improved in many ways over the last 400 years.

In Your Journal

Choose one of the microscopes. Write an advertisement for it that might appear in a popular science magazine. Be creative. Emphasize the microscope's usefulness or describe the wonders that can be seen with it.

1600

1590

First Compound Microscope

Hans Janssen and his son Zacharias, Dutch eyeglass makers, made one of the first compound microscopes. Their microscope was simply a tube with a lens at each end.

1750

1683

Leeuwenhoek's Simple Microscope

Although Leeuwenhoek's simple microscope used only one tiny lens, it could magnify a specimen up to 266 times. Leeuwenhoek was the first person to see many one-celled organisms, including bacteria.

1900

1886

Modern Compound Light Microscope

German scientists Ernst Abbé and Carl Zeiss made a compound light microscope similar to the ones used today. A horseshoe stand keeps the microscope steady. A mirror at the bottom focuses light up through the specimen. Modern compound light microscopes can magnify a specimen up to 1,000 times.

2050

1965

Scanning Electron Microscope (SEM)

The first commercial SEM is produced. This microscope sends a beam of electrons over the surface of a specimen, rather than through it. The result is a detailed three-dimensional image of the specimen's surface. SEMs can magnify a specimen up to 150,000 times.

1660

Hooke's Compound Microscope

Robert Hooke improved on the compound microscope. A stand held oil for a flame, which shone light on the specimen under the microscope.

1933

Transmission Electron Microscope (TEM)

The German physicist Ernst Ruska created the first electron microscope. TEMs make images by sending electrons through a very thinly sliced specimen. They can only examine dead specimens, but are very useful for viewing internal cell structures. TEMs can magnify a specimen up to 500,000 times.

1981

Scanning Tunneling Microscope (STM)

A STM measures electrons that leak, or "tunnel," from the surface of a specimen. With a STM, scientists can see individual molecules on the outer layer of a cell. STMs can magnify a specimen up to 1,000,000 times.