

# Imaging principle of optical microscope

The major **imaging principle of the optical microscope** is that an objective lens with very short focal length is used to form a highly magnified real image of the object.

## Image formation

The **magnified image** of an object is created by an objective lens, and this image is further magnified by a second lens system (the eyepiece) for viewing, forming an air-separated couplet. The final **magnification** can then be calculated as the product of the magnifying power of the objective lens times the magnifying power of the eyepiece.

The virtual image comes to a focus between the 2 lenses of the eyepiece. The first lens will bring the real image into focus, and the second lens will then enable the eye to focus on the virtual image. The image is meant to be viewed at infinity, however, most people may experience headaches and eye pains after using a microscope, which generally means their eyes are being forced to focus on an object at a close distance, rather than at infinity.

One other aspect to keep in mind is the **Numerical Aperture** (N.A.) value of a lens. This is a simple mathematical equation that allows the light-gathering capabilities of the lens to be calculated (the value of the N.A. is usually written in the metal tube). The general rule states that, the higher the N.A., the better the light-gathering properties of the lens, and the better the resolution. However, a higher N.A. also means that the working distances will be shorter. You may see this happening then you increase the magnification of the microscope and the lens gets closer to the slide on the stage.

## Links

### Related articles

### External links

### Bibliography

The University of Maryland. *Principles of Microscopy* (online)

<http://www.life.umd.edu/cbmj/faculty/wolniak/wolniakmicro.html>

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<http://web.utk.edu/~prack/MSE%20300/Lightmicroscopyhandout.pdf>

WIKIPEDIA. *Optical Microscope* (online) [http://en.wikipedia.org/wiki/Optical\\_microscope](http://en.wikipedia.org/wiki/Optical_microscope)