

# Magnification of optical microscope

**Magnification** in physical terms is defined as "a measure of the ability of a lens or other optical instruments to magnify, expressed as the ratio of the size of the image to that of the object". This means, that an object of any size is magnified to form an enlarged image.

The magnification required to produce the visible image can be calculated using the formula:

$$\text{Magnification} = \text{Image} \div \text{Object}$$

It is important that the all the units are in unison so that the final answer obtained is correct.

## Optical microscope magnification

An optical microscope (or light microscope) uses visible light and lenses to magnify objects that are not visible to the naked eye. The magnification of a light microscope is formed using a mixture of the powers of the eyepiece and the objective lens. The eyepiece produces a power of  $10x$  and the objective lens can produce various different powers, so if it were to produce a power of  $100x$ , the final magnification would be  $1000x$  ( $10 \times 100$ ). So this would mean that to the naked eye, the image would appear 1000 times larger than it actually is. Light microscopes generally have three different objective lenses to allow the slide to be viewed in three separate manners. Such microscopes are known as compound light microscopes. The objective lenses on a compound light microscope does have powers that start of as  $4x$  on the smallest power,  $10x$  on the middle power setting and  $40x$  on the maximum power setting. This means that the object can be magnified either,  $40x$ ,  $100x$  or  $400x$ .

## Empty magnification

Empty magnification is the phenomenon that shows us that increasing the magnification past a certain point results in no higher increase in resolution. So although the image will be more magnified, the resolution will remain low. This would therefore result in the image being very unclear. In fact, an increase in magnification past the optimum point could result in things such as visual artefacts appearing. These are substances which are not natural to the object and have arisen during the preparation of the slide being viewed.

## Links

### Related articles

### External links

### Bibliography

<http://en.wikipedia.org/wiki/Magnification>  
<http://www.thefreedictionary.com/magnification>  
[http://en.wikipedia.org/wiki/Optical\\_microscope](http://en.wikipedia.org/wiki/Optical_microscope)