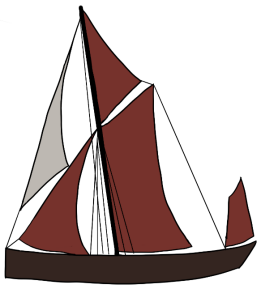
AQA
MICROSCOPY AND MAGNIFCATION NOTES

Science Exams Sorted



2021

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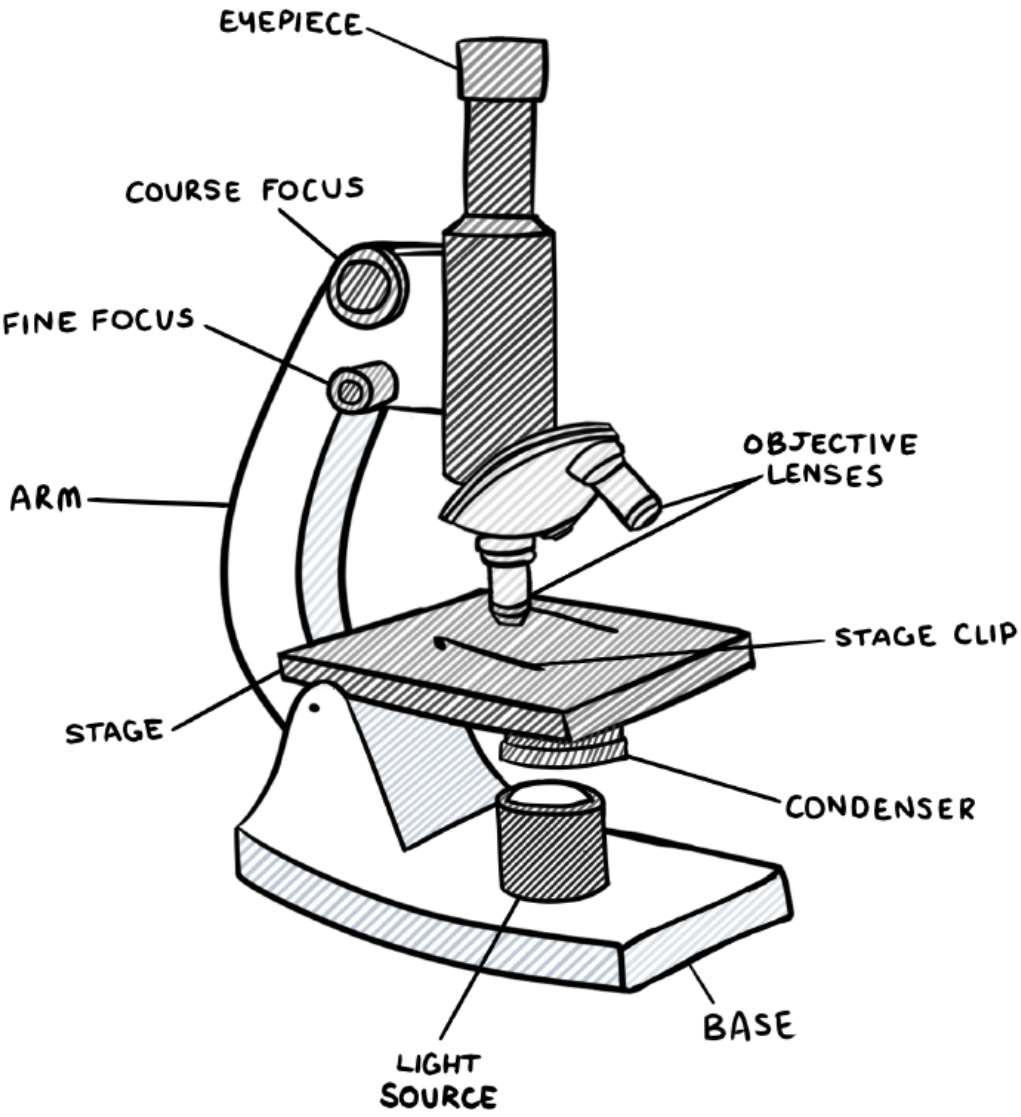
A microscope: an instrument that allows a person to magnify an object. The object can be magnified tens, hundreds, thousands, tens of thousands even hundreds of thousands of times.

Exam note:

You may be asked to label a light microscope. Please do learn the following labels.



Microscopes allow us to see microorganisms, by being able to see them we can determine how their structures relate to their function.

Of all the techniques used in biology, microscopy is quite possibly the most important.

The vast majority of living organisms are far too small to be seen in any detail with the naked eye, and cells and their organelles can only be seen with the aid of a microscope. Microscopes have two properties: **magnification** and **resolution**.

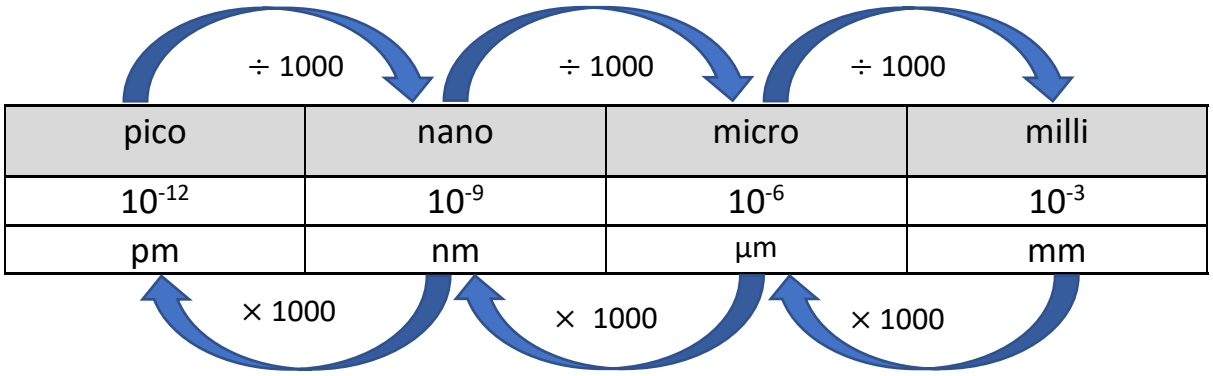
Magnification: a dimensionless number, usually written as a magnification factor, e.g. x100. It is simply indicating how much bigger the image is than the original object.

Resolution: a distance, usually measured in nm. It is the smallest separation at which two separate objects can be distinguished.

This table shows the effect of magnification and resolution on the appearance of two small objects.

	Low resolution (a large distance)	High resolution (a small distance)
Low magnification		
High magnification		

We do need to be able to demonstrate an understanding of the relationship between quantitative units in relation to cells. When teaching this I use this handy table. I hope it helps you 😊.



Calculating the Magnification of Light Microscopes

If the magnification of the eyepiece and the compound lens are known we can multiply them both to get the full magnification.

E.g. Find the magnification of a microscope. The eyepiece is x10, the compound lens is x40.

$$\text{Magnification} = 10 \times 40$$

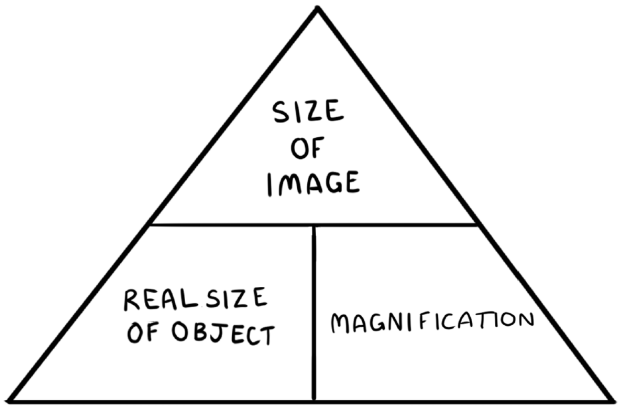
$$\text{Magnification} = \times 400$$

Calculating the Magnification of an Image

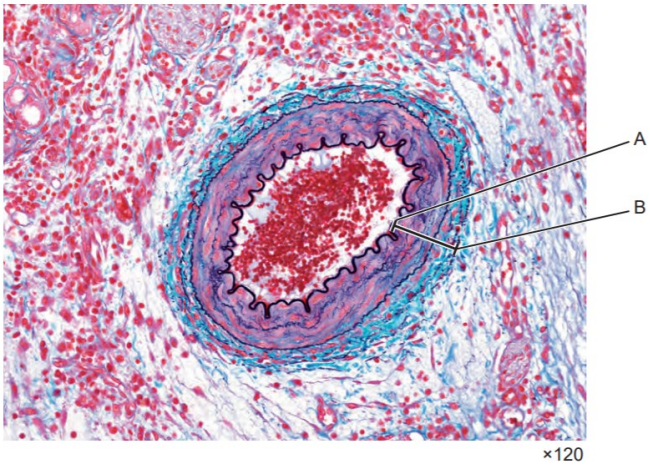
The formula to calculate magnification is:

$$\text{Magnification} = \frac{Size\ of\ the\ image}{Real\ size\ of\ the\ object}$$

I often recommend using the triangle for this calculation. I find it makes rearranging the equation quicker.



Take the following example.



Q. Calculate the thickness of the wall of the artery between the points marked A and B.

$$\text{Real size} = \frac{Size\ of\ the\ image}{Magnification}$$

$$\text{Real size} = \frac{9000}{120}$$

$$\text{Real size} = 75\ \mu m$$