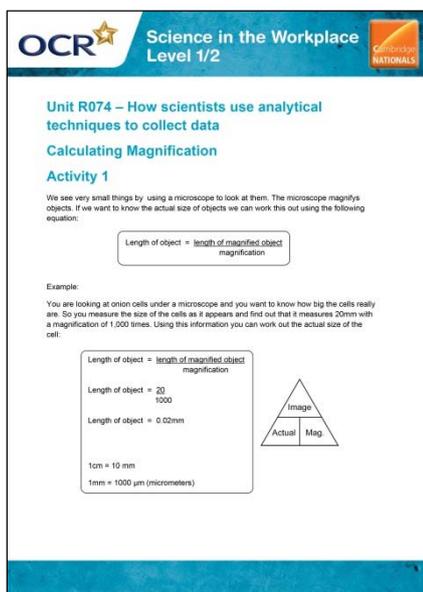


Unit R074 – How scientists use analytical techniques to collect data

Calculating Magnification

Instructions and answers for teachers

The activity below covers LO3: Be able to examine and record features of samples



OCR  Science in the Workplace
Level 1/2 

Unit R074 – How scientists use analytical techniques to collect data

Calculating Magnification

Activity 1

We see very small things by using a microscope to look at them. The microscope magnifies objects. If we want to know the actual size of objects we can work this out using the following equation:

$$\text{Length of object} = \frac{\text{length of magnified object}}{\text{magnification}}$$

Example:

You are looking at onion cells under a microscope and you want to know how big the cells really are. So you measure the size of the cells as it appears and find out that it measures 20mm with a magnification of 1,000 times. Using this information you can work out the actual size of the cell.

$$\text{Length of object} = \frac{\text{length of magnified object}}{\text{magnification}}$$

Length of object = 20
1000

Length of object = 0.02mm

1cm = 10 mm
1mm = 1000 μm (micrometers)



Associated files:

Reporting Findings (activity)

Activity 1 – approx. 30 mins
– 1 hour



This activity offers an opportunity for maths skills development.

This activity helps to teach learners to calculate actual size and magnification of cells. Learners have the opportunity to test their understanding in this area. As an extension to this activity learners could use a graticule on a microscope to work out the size of pre-prepared slides.

Activity 1

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You are looking at onion cells under a microscope and you want to know how big the cells really are. So you measure the size of the cells as it appears and find out that it measures 20mm with a magnification of 1,000 times. Using this information you can work out the actual size of the cell:

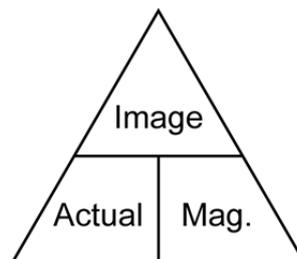
$$\text{Length of object} = \frac{\text{length of magnified object}}{\text{magnification}}$$

$$\text{Length of object} = \frac{20}{1000}$$

$$\text{Length of object} = 0.02\text{mm}$$

$$1\text{cm} = 10\text{ mm}$$

$$1\text{mm} = 1000\ \mu\text{m (micrometers)}$$



1) Using the same method work out the actual size:

Image size (mm)	Magnification (x)	Actual size (mm)
5	40	0.05
10	10	1
12	1000	0.012
20	100	0.2
15	40	0.375

2) Using the same method work out the magnification:

Image size (mm)	Magnification (x)	Actual size
5	12.5	0.4
8	80	0.1
10	10000	0.01
6	60	1
5	25	0.4

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