***OPTIONAL*** *MORE PRACTICE WITH DRAWING MAGNIFICATION PROBLEMS*

*Answers on next page*

1. A student, observing a micro-organism under a magnification of 40X, calculates that it is about 100 micrometers long. If she then draws the microorganism 2 cm long, what is the magnification of her drawing?

1. A cell is observed using an SHS microscope under high power and is estimated to be about half the field of view. A student then draws the cell 25cm in length. What is the magnification of the drawing?

1. A student draws a cell diagram 24mm long, which is 400X larger than life size. How large is the actual cell?

1. A cell is 80 um in length. If drawn 600 times actual size, how long will the drawing be in cm?

ANSWERS

1.

First convert 100 micrometers to mm:

100 um / 1000 = 0.1 mm

Then convert 2 cm to mm:

2 cm \* 10 = 20 mm

Now that we have the same unit, we can calculate drawing magnification

Magnification = drawing size (which is 20 mm) divided by actual specimen size (which is 0.1mm)

Magnification = 20 mm / 0.1 mm = 200X

2.

At SHS, our microscopes have a high power field of view of 0.45 mm.

If the cell is half the field of view, it is 0.23 mm.

Convert 25 cm to mm so we are using a consistent unit.

25 cm \* 10 = 250 mm

Now that we have the same unit, we can calculate drawing magnification

Magnification = drawing size (which is 250 mm) divided by actual specimen size (which is 0.23 mm)

Magnification = 250 mm / 0.23 mm = 1087 X which rounds to 1000X (or 1100X if you follow sig figs)

3.

This problem gives us the magnification as 400x and the drawing size (24mm). So, we rearrange the formula to be:

Actual specimen size = drawing size (which is 24 mm) divided by magnification (which is 400X)

Actual specimen size = 24 / 400 = 0.06 mm

4.

First convert 100 micrometers to mm:

80 um / 1000 = 0.08 mm

This problem gives us the magnification as 600x and the specimen size (0.08mm). So, we rearrange the formula to be:

Drawing size = magnification (which is 600X) times actual specimen size (which is 0.08mm)

Drawing size = 600 times 0.08 = 48 mm

The answer is needed in cm, so convert 48 mm to cm

cm = 48mm/10 = 4.8 cm