

Exercise walk-through

Size of specimens ■ 2.2

eXercise

You must be able to

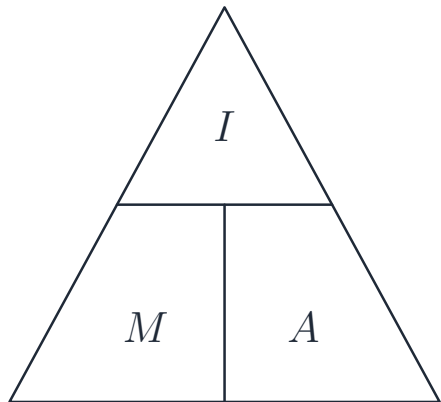
- use magnification = image size $\div$ actual size (and rearrange it)
- convert between mm and μm
- give magnification as a number with no unit

Method — Magnification

Image 5.00 mm at $\times 250$: actual = $\frac{5.00}{250} = 0.02 \text{ mm} = 20 \mu\text{m}$.

Units: 1 mm = 1000 μm . Always use the same unit before dividing.

Method — Magnification



I = image size

M = magnification

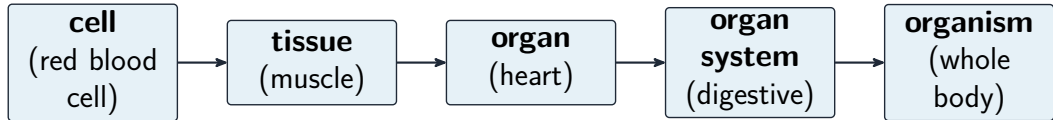
A = actual size

$$M = \frac{I}{A}$$

cover a letter to get its formula

A formula triangle: image size over magnification and actual size

Method — Magnification



Cells make tissues, organs and organ systems

Practice 2.1 ■ 1 mark

Write the formula for magnification.

Solution 2.1

Method: Magnification

Worked steps

$$\text{magnification} = \frac{\text{image size}}{\text{actual size}} \quad \text{B1}.$$

Practice 2.2 ■ 1 mark

Convert 0.05 mm into μm .

Solution 2.2

Worked steps

$$0.05 \times 1000 = 50 \mu\text{m} \text{ (B1)}.$$

Exam-style 3.1 ■ 1 mark

Magnification has the unit:

A mm

B μm

C no unit

D cm

Solution 3.1

A mm

B μm

C no unit



D cm

Worked steps

C. Magnification is just a number — no unit.

Exam-style 3.2 ■ 1 mark

A cell has an actual size of $40\text{ }\mu\text{m}$. It is drawn 20 mm wide.

- (a) Convert the actual size to mm .
- (b) Calculate the magnification of the drawing.

Solution 3.2

Method: Magnification

Worked steps

(a) $40 \mu\text{m} = 0.04 \text{ mm}$ **B1**.

(b) $\text{magnification} = \frac{20}{0.04} = 500$ **M1** **A1**.

Exam-style 3.3 ■ 3 marks

A structure is shown at $\times 400$ and its image size is 8.0 mm. Calculate its actual size in μm .

Solution 3.3

Method: Magnification

Worked steps

$$\text{actual} = \frac{\text{image}}{\text{magnification}} = \frac{8.0}{400} = 0.02 \text{ mm } \text{M1} \text{M1}; = 20 \mu\text{m} \text{A1}.$$