

2.2 Size of specimens

Name: _____ Class: _____ Date: _____ **Total: 9 marks**

KEY WORDS magnification 放大倍数 • specimen 标本 • size of specimens 标本大小 • cells 细胞
• tissue 组织

Objective

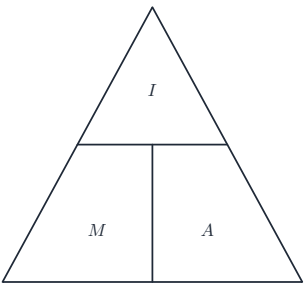
Build the skills to answer exam questions on the **size of specimens** 标本大小 — the **magnification** 放大倍数 formula and converting units.

You must be able to:

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

1 Worked examples

■ Magnification

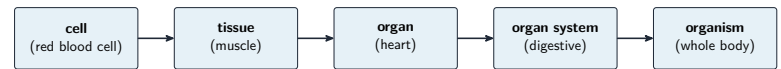


I = image size
 M = magnification
 A = actual size

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

cover a letter to get its formula

Cover the quantity you want: $\text{magnification} = \text{image} \div \text{actual}$; $\text{actual} = \text{image} \div \text{magnification}$



Cells make tissues, organs and organ systems

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

Units: $1 \text{ mm} = 1000 \mu\text{m}$. Always use the same unit before dividing.

2 Practice

2.1 Write the formula for magnification. [1]

2.2 Convert 0.05 mm into μm . [1]

3 Exam-style questions

3.1 Magnification has the unit: [1]

- **A** mm
- **B** μm
- **C** no unit
- **D** cm

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

(a) Convert the actual size to mm. [1]

(b) Calculate the magnification of the drawing. [2]

3.3 A structure is shown at $\times 400$ and its image size is 8.0 mm . Calculate its actual size in μm . [3]

Solutions

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

2.2 $0.05 \times 1000 = 50 \text{ } \mu\text{m}$.

3.1 C. Magnification is just a number — no unit.

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

(b) magnification = $\frac{20}{0.04} = 500$.

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