

BIOLOGY

FREE SAMPLE

UNIT 1 · TOPIC PRACTICE WORKBOOK

A1.5 — Microscopy Calculations: Magnification and Actual Size

A complete sample section: 6 written questions, answer spaces and worked solutions. The full workbook contains 47 sections.

Try the questions before reading the included solutions.

Extract pages retain their original page numbers.

Independent original practice. Not an official Pearson assessment.

Aligned to Pearson AAQ Applied Science, specification Issue 7 (May 2026).

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Topic marks: 18 My score: _____ Retry date: _____

2 marks

3 marks

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Continue independently; use extra paper if needed.

Q3 Apply**3 marks**

At magnification 8000 times, an organelle image is 24 mm long. Calculate its actual length in μm .

Q4 Apply**3 marks**

A 5 μm scale bar measures 20 mm. A bacterium measures 14 mm on the same image. Find its actual length.

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Continue independently; use extra paper if needed.

Q5 Reason**3 marks**

A drawing of a 7 μm cell must be 56 mm long. Calculate the required magnification.

Q6 Reason**4 marks**

An image is resized to half its width. Explain what happens to a printed magnification label and an embedded scale bar.

Next: A 2.1 - Specialised Plant, Blood, Reproductive and Nerve Cells

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Microscopy Calculations: Magnification and Actual Size

Q1 [2 marks] Write the magnification equation and state the condition on units.

Magnification = image size/actual size [1];
both lengths in the same units [1].

Q2 [3 marks] A cell is 36 mm long in an image and 12 μm long in reality. Calculate magnification.

36 mm = 36000 μm [1];
36000/12 [1];
magnification = 3000 times, dimensionless [1].

Q3 [3 marks] At magnification 8000 times, an organelle image is 24 mm long. Calculate its actual length in μm .

24/8000 = 0.003 mm [1];
multiply by 1000 [1];
3 μm [1].

Q4 [3 marks] A 5 μm scale bar measures 20 mm. A bacterium measures 14 mm on the same image. Find its actual length.

14/20 $\times$ 5 [1];
3.5 [1];
 μm [1].

Q5 [3 marks] A drawing of a 7 μm cell must be 56 mm long. Calculate the required magnification.

56 mm = 56000 μm [1];
56000/7 [1];
8000 times [1].

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Microscopy Calculations: Magnification and Actual Size

Q6 [4 marks] An image is resized to half its width. Explain what happens to a printed magnification label and an embedded scale bar.

Displayed linear magnification halves [1];
old numeric label is no longer correct [1];
scale bar shrinks proportionally with cell [1];
ratio measured against that bar still gives actual size [1].

Common error to avoid: naming a structure without linking it to its function. Accept equivalent scientific wording and alternative valid calculations; award only the stated total. For extended answers, each distinct credited point must answer the context.

Scale-bar method: use a same-image ratio

Object measured on image: 48 mm



10 μm scale bar

If bar measures 20 mm, actual object = $48/20 \times 10 = 24 \mu\text{m}$.

Recovered lesson reference diagram. It illustrates the structure or method; use the question data for numerical answers.