

Cell structure · supported focus

Supported focus · HL

Supported scope

- Supported HL focus. First assessment 2025; current subject brief acquired; full Biology guide not acquired. Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

Cells · 1.1

Reasoning

A cell can look larger on a screen without changing its real size. Two photographs at different zoom settings cannot be compared by eye alone. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

Cells · 2.1

Reasoning

Eukaryotic cells contain a nucleus. Prokaryotic cells have genetic material but no membrane-bound nucleus. A bacterial cell is a living cell; a virus depends on a host cell to reproduce.

magnification : Image length divided by actual length;
resolution : Ability to distinguish two close points.

Cells · 3.1

Reasoning

A scale bar provides a known real distance in the same image. Convert the image length and real length to the same unit before dividing. Magnification is a ratio and has no unit. Focus a prepared slide at low power first. Move to a higher power and use fine focus. Make a clear line drawing, label structures with straight lines, and record the scale rather than shading the image.

Cells · 4.1

Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: a cell image is 30 mm long and represents a 50 micrometre cell. Use $\text{magnification} = \text{image size} / \text{actual size}$. Convert 30 mm to 30,000 micrometres. $\text{Magnification} = 30,000 / 50 = 600$. A 10 mm scale bar representing 20 micrometres gives the same ratio of 500 for every object in that image.

Cells · 4.2

Reasoning

An image is 12 mm long; the cell is 40 micrometres long. Calculate magnification. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

Cells · 5.1

Reasoning

A nucleus is not the only cell structure. Do not claim bacteria have no DNA, or that more magnification always means better resolution. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Cells · 5.2

Reasoning

Every bacterial cell has a membrane-bound nucleus. This claim is false: A nucleus is not the only cell structure. Do not claim bacteria have no DNA, or that more magnification always means better resolution.

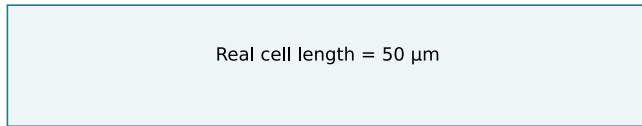
Cells · 5.3

Reasoning

Cell measurements and scale: A scale bar provides a known real distance in the same image. Convert the image length and real length to the same unit before dividing. Magnification is a ratio and has no unit.

Cells · diagram

Measured image length = 30 mm




Scale must be stated

- Original teaching diagram: Cell measurements and scale
- Use the labels and the stated model together.

Cells · original transfer

Your turn

A displayed cell is 18 mm long and its scale bar is 6 mm for 20 micrometres. Find cell length. The display is enlarged by 50%; does the real length change?

Cells · transfer reasoning

Method and interpretation

Length = $18/6 \times 20 = 60$ micrometres. Both image and bar enlarge together; their ratio and inferred real length stay unchanged. An isolated image length without its scale would be insufficient.

Check yourself

- Explain magnification using the stated model.
- Explain resolution using the stated model.
- Change one value in the original transfer; explain which assumption still matters.