

Cell structure & microscopy

THE BIG IDEA

Cells are the building blocks of life: each part has a job, and microscopes let us magnify them, so know your units and equation.

KNOW IT

- Eukaryotes vs prokaryotes**
Eukaryotic cells (animal, plant) have a nucleus. Prokaryotes (bacteria) have no nucleus: DNA is a single loop, plus plasmids.
- Animal cell parts**
Nucleus controls the cell, cytoplasm is where reactions happen, membrane controls entry and exit, mitochondria release energy, ribosomes make protein.
- Extra plant parts**
Cellulose cell wall for strength, chloroplasts for photosynthesis, permanent vacuole filled with cell sap.
- Light vs electron microscopes**
Electron microscopes have higher magnification and resolving power, showing ribosomes and internal mitochondria detail. Light microscopes are cheaper and show living cells.
- Magnification calculations**
Magnification = image size ÷ real size. Convert units first: 1 mm = 1000 µm. Rearrange carefully.

KEY TERMS

Eukaryote

Organism whose cells have a nucleus and other membrane-bound organelles

Prokaryote

Single-celled organism with no nucleus, such as a bacterium

Plasmid

Small ring of DNA found in bacterial cells

Resolving power

Ability to distinguish two close points as separate; the detail visible

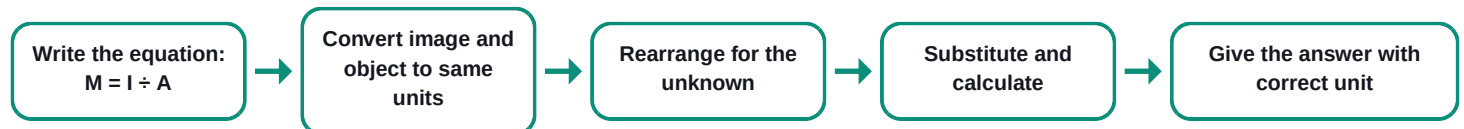
Magnification

How many times larger the image is than the real object

Specialised cell

A cell whose structure is adapted for a particular function

SEE IT: MAGNIFICATION CALCULATION METHOD



ANSWER IT: THE QUESTIONS YOU'LL MEET

Give differences (compare)

2 marks

WHAT THEY'RE DRIVING AT

Clear comparative points between cell types, not two features of just one, unless the comparison is clearly implied.

HOW TO NAIL IT

Use 'whereas' or 'but': 'Prokaryotes have no nucleus, whereas eukaryotes have a nucleus.'

+ Pick distinct features: nucleus, DNA form, size, organelles. Avoid repeating one idea twice.

Calculate (magnification or size)

2–3 marks

WHAT THEY'RE DRIVING AT

Correct rearrangement, unit conversion and a sensible final answer in the requested unit.

HOW TO NAIL IT

Write the equation, convert units, substitute, then state the answer: real size = image ÷ magnification.

+ Show working: an arithmetic slip can still earn marks.

Calculate (bacterial growth)

2 marks

WHAT THEY'RE DRIVING AT

Working out the number of divisions, then applying doubling each time using powers of 2.

HOW TO NAIL IT

Divide total time by division time, then do 2 to the power of that number.

+ Convert hours to minutes first, then use 2 for the number of divisions.

WATCH OUT

- Forgetting to convert mm to µm, so the answer is 1000 times out.
- Saying bacteria have 'no DNA' rather than DNA that is not in a nucleus.
- Writing 'cell wall' for membrane, or confusing the roles of mitochondria and chloroplasts.

MEMORY HOOK

Mitochondria = Muscle power; ribosomes = recipe readers making protein; and 'I over M' gives the real size: image divided by magnification.