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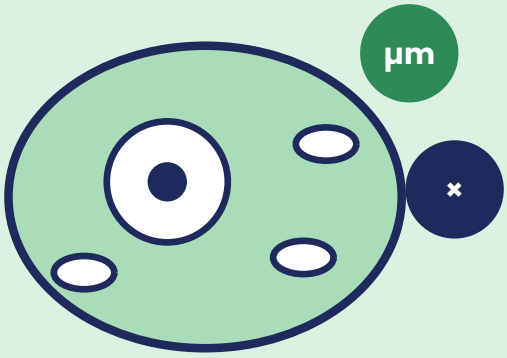
Year 10–11 • GCSE & IGCSE Biology

Cells & Microscopy



Mark Scheme – Teacher Copy

Answers, marking points and guidance for the Cells and Microscopy worksheet.

Cell parts | Bacteria | Specialised | Microscopes | Magnification | Practicals

KEY IDEAS IN THIS WORKSHEET

YEAR 10–11

Name: _____ Class: _____

Date set: _____ Date due: _____

What's inside

Section A	Cell structure	**25 marks**
Section B	Specialised cells	**13 marks**
Section C	Microscopy and calculations	**14 marks**
Section D	Practical skills	**11 marks**

Marking notes

- (1) = one mark for each marking point.
- / separates alternative answers.
- Allow error carried forward in calculations.
- Accept any correct, clearly expressed alternative.

Total marks

63

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Cells and Microscopy Worksheet – Mark Scheme

Total: 63 marks. (1) = one mark. Accept any scientifically correct alternative wording.

Section A – Cell structure

Q	Answer	Mark	Guidance
1	nucleus: contains DNA / controls the cell; Yes, Yes, No. Cell membrane: controls what enters and leaves; Yes, Yes, Yes. Cell wall: strengthens the cell (cellulose in plants); No, Yes, Yes (not cellulose). Chloroplast: photosynthesis; No, Yes, No. Mitochondria: aerobic respiration releases energy; Yes, Yes, No. Ribosome: protein synthesis; Yes, Yes, Yes. Permanent vacuole: contains cell sap and keeps the cell firm; No, Yes, No.	21	1 mark for each correct function (7); 2 marks per row if all three Yes/No are correct, 1 mark if two are correct (14)
2	eukaryotic cells have a nucleus containing the DNA (1); prokaryotic cells have no nucleus and the DNA is a single loop in the cytoplasm (1)	2	
3	any two: plasmids; circular DNA loop; slime capsule; flagellum; cell wall (not made of cellulose)	2	1 mark each
	Section A total	**25**	

Section B – Specialised cells

Q	Answer	Mark	Guidance
4	sperm: tail to swim; many mitochondria for energy; acrosome with enzymes to digest the egg membrane. Nerve: long axon to carry impulses; branched dendrites to connect to other neurones; myelin sheath. Root hair: long extension gives a large surface area; thin wall; many mitochondria for active transport. Xylem: hollow tube with no end walls; walls thickened with lignin for strength.	8	1 mark for each correct adaptation
5	differentiation is when a cell changes to become specialised for its job (1); animal cells mostly differentiate early, plant cells can differentiate throughout life (1); in plants it happens in meristems at the tips of roots and shoots (1)	3	
6	cell, tissue, organ, organ system, organism	2	2 marks all correct; 1 mark if one pair is swapped
	Section B total	**13**	

Section C – Microscopy and calculations

Q	Answer	Mark	Guidance
7	electron microscope has a much higher magnification (1); and higher resolution (1); so it shows sub-cellular structures such as ribosomes and plasmids in detail (1); a light microscope shows only the nucleus, cell wall, chloroplasts (1)	4	
8(a)	real size = 45 ÷ 300 = 0.15 mm (2); 0.15 × 1000 = 150 µm (1)	3	allow 2 marks for method with answer in mm
8(b)	40 mm = 40 000 µm (1); 40 000 ÷ 8 (1); = ×5000 (1)	3	
8(c)	7×10^{-6} m (1); 7 µm (1)	2	
8(d)	1000 µm (1); 1000 nm (1)	2	
	Section C total	**14**	

Section D – Practical skills

Q	Answer	Mark	Guidance
9	peel a thin layer of epidermis from the onion (1); place it on a drop of water or iodine on a slide (1); lower a coverslip at an angle with a mounted needle to avoid air bubbles (1); view at low power then high power, focusing with the fine focus (1)	4	
10	(a) to kill microorganisms / sterilise the loop (1); (b) keeps contaminants out but lets oxygen in so harmful anaerobic bacteria do not grow (1); (c) a lower temperature reduces the growth of pathogens that grow best at body temperature (1)	3	
11	r = 6 mm (1); area = $\pi \times 6^2 = 113$ mm^2 (1)	2	allow 113.1 mm^2
12	advantage: makes structures visible / adds contrast (1); disadvantage: kills the cell / may produce artefacts (1)	2	
	Section D total	**11**	

Worksheet total: 63