

Cells and Organisation

Cell structures, plant and animal cells, specialised cells, microscopes and levels of organisation.

Name _____ Date _____ Class _____

Learning objective: I can describe the structure and function of cells and how they are organised in living things.

✓ I can name cell parts ✓ I can compare plant and animal cells ✓ I can calculate magnification

1 Cell structures Match each structure to its job. Write the letter in the box.

1 nucleus	☐	A made of cellulose; strengthens and supports the cell
2 cell membrane	☐	B filled with cell sap; keeps the cell firm
3 cytoplasm	☐	C controls the cell and contains genetic material (DNA)
4 mitochondria	☐	D controls what enters and leaves the cell
5 cell wall	☐	E jelly-like substance where many chemical reactions happen
6 chloroplasts	☐	F where aerobic respiration releases energy
7 permanent vacuole	☐	G contain chlorophyll and absorb light for photosynthesis

2 Animal or plant? Write ✓ if the structure is found in that cell and X if it is not.

Structure	Animal cell	Plant cell
nucleus		
cell membrane		
cytoplasm		
mitochondria		
cell wall		
chloroplasts		
permanent vacuole		

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3 Levels of organisation

 Number the levels from smallest (1) to largest (5).

A organ

B tissue

C organ system

D organism

E cell

Magnification = image size ÷ actual size. Make sure both sizes are in the same units (1 mm = 1000 µm).

4 Microscope maths

 Show your working.

1 image size 6 mm, actual size 0.02 mm. Magnification = ?

2 image size 9 mm, actual size 0.03 mm. Magnification = ?

3 image size 15 mm, actual size 0.05 mm. Magnification = ?

4 magnification × 400, actual size 0.025 mm. Image size = ?

5 magnification × 100, image size 8 mm. Actual size = ?

5 Using a microscope

 Use the word bank.

Word bank:

coarse

stain

mirror

stage

highest

lowest

- 1 Place the slide on the _____ and hold it in place with the clips.
- 2 Always start with the _____-power objective lens.
- 3 Turn the _____ focusing knob to bring the cells into focus, then use the fine knob.
- 4 A _____ such as iodine makes cell structures easier to see.

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6 Specialised cells Match each cell to the way it is adapted to its job.

1 red blood cell	☐	A tiny hairs that sweep mucus and trapped dust out of the airways
2 root hair cell	☐	B no nucleus and a biconcave shape, so it has more room and surface area to carry oxygen
3 sperm cell	☐	C long, thin extension gives a large surface area to absorb water and minerals
4 nerve cell (neurone)	☐	D tail for swimming and many mitochondria to release energy
5 ciliated epithelial cell	☐	E long and thin with branched ends to carry electrical impulses around the body

7 Explain it

1 Why do root hair cells not contain chloroplasts? [2 marks]

2 Give **one** difference between the cell wall and the cell membrane. [2 marks]

3 Describe how a student should prepare a slide of onion cells. [3 marks]

4 Oxygen moves into cells by diffusion. What is diffusion? [2 marks]

Answer Key

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Question	Answers
1 Cell structures	1 C; 2 D; 3 E; 4 F; 5 A; 6 G; 7 B
2 Animal or plant?	nucleus – Animal cell: ✓, Plant cell: ✓ cell membrane – Animal cell: ✓, Plant cell: ✓ cytoplasm – Animal cell: ✓, Plant cell: ✓ mitochondria – Animal cell: ✓, Plant cell: ✓ cell wall – Animal cell: ✗, Plant cell: ✓ chloroplasts – Animal cell: ✗, Plant cell: ✓ permanent vacuole – Animal cell: ✗, Plant cell: ✓
3 Levels of organisation	Correct order: E, B, A, C, D cell → tissue → organ → organ system → organism
4 Microscope maths	1 × 300; 2 × 300; 3 × 300; 4 10 mm; 5 0.08 mm
5 Using a microscope	1 stage; 2 lowest; 3 coarse; 4 stain
6 Specialised cells	1 B; 2 C; 3 D; 4 E; 5 A
7 Explain it	1. They are underground, so they receive no light and cannot photosynthesise – chloroplasts would be no use. 2. The cell wall is made of cellulose and strengthens/supports the cell (plants only); the membrane controls what enters and leaves (all cells). The wall is fully permeable; the membrane is partially permeable. 3. Peel a thin layer of onion skin, place on a slide with a drop of iodine stain, lower a coverslip at an angle to avoid air bubbles, view on the lowest-power objective first, then focus. 4. The net movement of particles from an area of higher concentration to an area of lower concentration.

Teaching note: plant cells have everything animal cells have, plus a cell wall, chloroplasts and a permanent vacuole. Pupils often say plant cells have a cell wall *instead of* a membrane – they have both. Allow ‘mitochondrion’ (singular).