Animal and plant cells

Student activity • observation and reasoning

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The question

Which structures support a cell's functions?

Build and compare typical animal and photosynthetic plant-cell models, then test the claim that every plant cell contains chloroplasts.

Equipment

- Student booklet, pencil, ruler and coloured pencils
- Blank paper cards or reusable modelling pieces

Use paper or clean reusable models. No body samples, microbial cultures or unknown biological material are handled.

Course coverage: Shared Biology / Double Award: 2.2–2.4. Cell structures and their functions.

Plan, model or apparatus sketch

Draw a labelled model that explains the evidence; state what the model cannot show.

Method and reasoning

Read the whole sequence before starting

YEAR 10 / LESSON 2 / BIOLOGY + SCIENCE (DOUBLE AWARD)

1. Draw a typical animal cell and label membrane, cytoplasm, nucleus, mitochondria and ribosomes.

2. Draw a photosynthetic plant cell with those structures plus a cellulose cell wall, chloroplasts and a large permanent vacuole.

3. Match each structure to its function using the reference text. Draw the membrane inside the wall.

4. Compare a root hair cell: it is a plant cell but normally has no chloroplasts because it does not photosynthesise.

5. Mark shared structures and explain why plants need mitochondria as well as chloroplasts.

6. State two limitations of your model: scale, number, shape or visibility of structures.

Cleanup

- Return reusable materials and retain your corrected reasoning.

Record your evidence

Blank spaces are for your own work

YEAR 10 / LESSON 2 / BIOLOGY + SCIENCE (DOUBLE AWARD)

Reference and task data

Nucleus: genetic information and control of cell activity. Cytoplasm: many enzyme-controlled reactions. Membrane: controls exchange. Mitochondria: aerobic respiration. Ribosomes: protein synthesis. Cellulose wall: support. Chloroplasts: photosynthesis. Vacuole: cell sap and turgor support. Models are schematic; light microscopes do not resolve every structure shown.

Example / task	Evidence / drawing	Reason / limitation
Animal cell		
Photosynthetic plant cell		
Root hair comparison		

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

YEAR 10 / LESSON 2 / BIOLOGY + SCIENCE (DOUBLE AWARD)

1. Name three structures shared by typical animal and plant cells.

2. Where are proteins made?

3. Distinguish wall and membrane.

4. Why do plant cells need mitochondria?

5. Why is lack of chloroplasts not sufficient to identify an animal cell?

6. Give a limitation of the model.