

GCSE Combined Science: Trilogy

Worksheet: Animal and plant cells

TIME 35 min	TOTAL 31 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Animal and plant cells

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
 - Answer all questions in the spaces provided.
 - In all calculations, show clearly how you work out your answer.
 - The marks for questions are shown in brackets.
-

0 1

Figure 1 shows four sub-cellular structures and five functions.

Figure 1

Sub-cellular structure	Function
Cell membrane	Strengthens and supports the cell
Mitochondrion	Where proteins are made
Nucleus	Controls the movement of substances into and out of the cell
Ribosome	Contains genetic material that controls the activities of the cell
	Where aerobic respiration takes place

0 1 . 1

Draw **one** line from each sub-cellular structure to its function.

.....

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.....

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.....

[4 marks]

0 1 . 2

Where do most of the chemical reactions in a cell take place?

Tick (✓) **one** box.

Cell membrane

☐

Cytoplasm

☐

Nucleus

☐

Permanent vacuole

☐

[1 mark]

0 1 . 3

Name the liquid that fills the permanent vacuole of a plant cell.

.....

.....

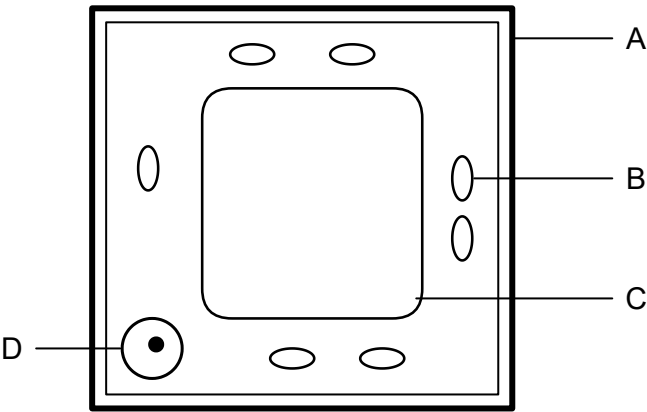
.....

[1 mark]

0 2

Figure 2 shows a plant cell.

Figure 2



0 2 . 1

Name structures **A** and **D**.

.....

.....

.....

.....

[2 marks]

0 2 . 2

Structure **B** contains chlorophyll.
Give the function of structure **B**.

.....

.....

[1 mark]

0 2 . 3

Structure **C** is filled with cell sap.
Name structure **C**.

.....

.....

.....

.....
[1 mark]

0 2 . 4

Give **one** structure shown in Figure 2 that is also found in animal cells.

.....

.....

[1 mark]

0 3

Animal and plant cells contain sub-cellular structures.

0 3 . 1

Which structure controls the movement of substances into and out of a cell?

Tick (✓) **one** box.

Cell membrane

☐

Cell wall

☐

Nucleus

☐

Permanent vacuole

☐

[1 mark]

0 3 . 2

Name the sub-cellular structure where protein synthesis happens.

.....

.....

.....

.....
[1 mark]

0 3 . 3

Name the sub-cellular structure where aerobic respiration happens.

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.....

.....

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[1 mark]

0 3 . 4

Plant cells have a cell wall.

Name the substance that plant cell walls are made of.

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.....

.....

.....

[1 mark]

0 3 . 5

Give the function of the cell wall.

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.....

[1 mark]

0 4

Scientists used electron micrographs to estimate that mitochondria take up 30% of the volume of a heart muscle cell.

The volume of the cell is $16\,000\ \mu\text{m}^3$.

0 4 . 1

Calculate the volume of the cell that is taken up by mitochondria.

.....

.....

.....

.....

Volume = μm^3

[2 marks]

0 4 . 2

One mitochondrion has a volume of about $1.2 \mu\text{m}^3$.
Estimate the number of mitochondria in the cell.

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.....

.....

[1 mark]

0 4 . 3

Suggest why this type of cell contains so many mitochondria.

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.....

[2 marks]

0 4 . 4

Give **one** reason why the scientists estimated the volume instead of measuring it exactly.

.....

.....

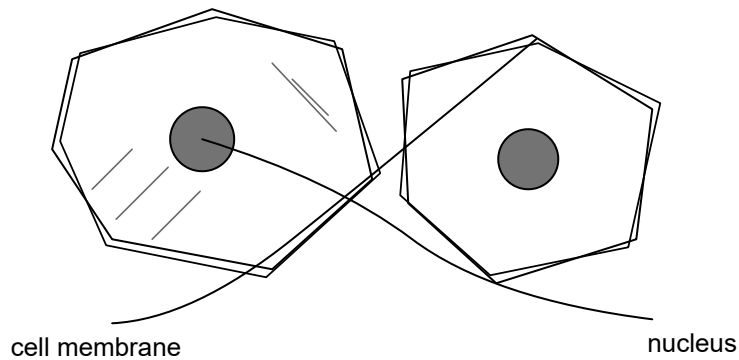
[1 mark]

.....

0 5

A student used a light microscope to look at cheek cells stained with methylene blue. Figure 3 shows the student's drawing of two of the cells.

Figure 3



0 5 . 1

Give **three** ways the student could improve the drawing.

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.....

.....

.....

.....

.....

[3 marks]

0 5 . 2

The student's drawing has a magnification of $\times 800$.
One cell in the drawing is 44 mm wide.
Calculate the real width of the cell in μm .

.....

.....

.....

.....

Real width = μm

[2 marks]

0 5 . 3

The student wants to add a scale bar to the drawing to represent a real length of 10 μm .
Calculate how long the scale bar should be.
Give your answer in mm.

.....

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.....

.....

Length of scale bar = mm

[2 marks]

0 5 . 4

Give **one** safety precaution the student should take when preparing a slide of cheek cells.
Give a reason for the precaution.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Animal and plant cells · 31 marks

Question 1 (6 marks)

01.1 [4 marks]

Answer: cell membrane – controls movement of substances; mitochondrion – aerobic respiration; nucleus – genetic material that controls the cell; ribosome – where proteins are made

- cell membrane – controls the movement of substances into and out of the cell (1)
- mitochondrion – where aerobic respiration takes place (1)
- nucleus – contains genetic material that controls the activities of the cell (1)
- ribosome – where proteins are made (1)

Notes: If more than one line is drawn from a structure, award no mark for that structure.

01.2 [1 mark]

Correct: Cytoplasm

01.3 [1 mark]

Answer: cell sap

- cell sap (1)
-

Question 2 (5 marks)

02.1 [2 marks]

Answer: A: cell wall; D: nucleus

- A – cell wall (1)
 - D – nucleus (1)
-

02.2 [1 mark]

- absorbs light for photosynthesis / where photosynthesis happens (1)

Notes: Allow 'makes glucose / food using light'.

02.3 [1 mark]

Answer: (permanent) vacuole

- (permanent) vacuole (1)
-

02.4 [1 mark]

- nucleus / cell membrane / cytoplasm (1)

Notes: Do not accept cell wall, chloroplast or vacuole.

Question 3 (5 marks)

03.1 [1 mark]

Correct: Cell membrane

03.2 [1 mark]

Answer: ribosome

- ribosome(s) (1)
-

03.3 [1 mark]

Answer: mitochondria

- mitochondria / mitochondrion (1)
-

03.4 [1 mark]

Answer: cellulose

- cellulose (1)
-

03.5 [1 mark]

- strengthens / supports the cell (1)

Notes: Allow 'gives the cell its shape'. Ignore 'protects the cell'. Do not accept 'controls what enters the cell'.

Question 4 (6 marks)

04.1 [2 marks]

Answer: $4800 \mu\text{m}^3$

- $0.3 \times 16\,000$ (1)
 - $4800 (\mu\text{m}^3)$ (1)
-

04.2 [1 mark]

Answer: 4000

- $(4800 \div 1.2 =) 4000$ (1)

Notes: Allow ECF from their volume.

04.3 [2 marks]

- heart muscle cells contract all the time, so they need a lot of energy (1)
- mitochondria are the site of aerobic respiration, which releases energy (1)

Notes: Do not accept 'mitochondria make energy'.

04.4 [1 mark]

- there are too many mitochondria to measure each one / they vary in size and shape / a micrograph shows only a thin slice of the cell (1)
-

Question 5 (9 marks)

05.1 [3 marks]

- use single, continuous / clear lines (no sketching) (1)
- do not shade (the nucleus or cytoplasm) (1)
- draw label lines with a ruler (1)
- label lines should not cross (1)
- add a title (1)
- add the magnification / a scale bar (1)

Any 3 of the points above.

Notes: Allow 'label the cytoplasm'. Ignore 'draw more cells'.

05.2 [2 marks]

Answer: 55 μm

- $44 \div 800 = 0.055$ (mm) (1)
- 55 (μm) (1)

Notes: An answer of 55 scores 2 marks. 0.055 scores 1 mark.

05.3 [2 marks]

Answer: 8 mm

- $10 \mu\text{m} \times 800 = 8000 \mu\text{m}$ (1)
- 8 (mm) (1)

Notes: An answer of 8 scores 2 marks.

05.4 [2 marks]

- precaution, e.g. put used cotton buds / slides into disinfectant (1)
- matching reason, e.g. to kill microorganisms from the mouth / to reduce the risk of infection (1)

Notes: Allow: wear gloves / eye protection because methylene blue is an irritant / stains the skin; handle slides and coverslips carefully because broken glass can cut. The reason must match the precaution.
