

Please write clearly in block capitals.

Centre number

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Candidate number

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Surname

Forename(s)

Candidate signature

I declare this is my own work.

GCSE COMBINED SCIENCE: TRILOGY

F

Foundation Tier
Biology Paper 1F

Time allowed: 1 hour 15 minutes

Materials

For this paper you must have:

- a ruler
- a scientific calculator.

Instructions

- Use black ink or black ball-point pen.
- Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Do all rough work in this book. Cross through any work you do not want to be marked.
- In all calculations, show clearly how you work out your answer.

Information

- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You are expected to use a calculator where appropriate.
- You are reminded of the need for good English and clear presentation in your answers.

For Examiner's Use	
Question	Mark
1	
2	
3	
4	
5	
6	
TOTAL	

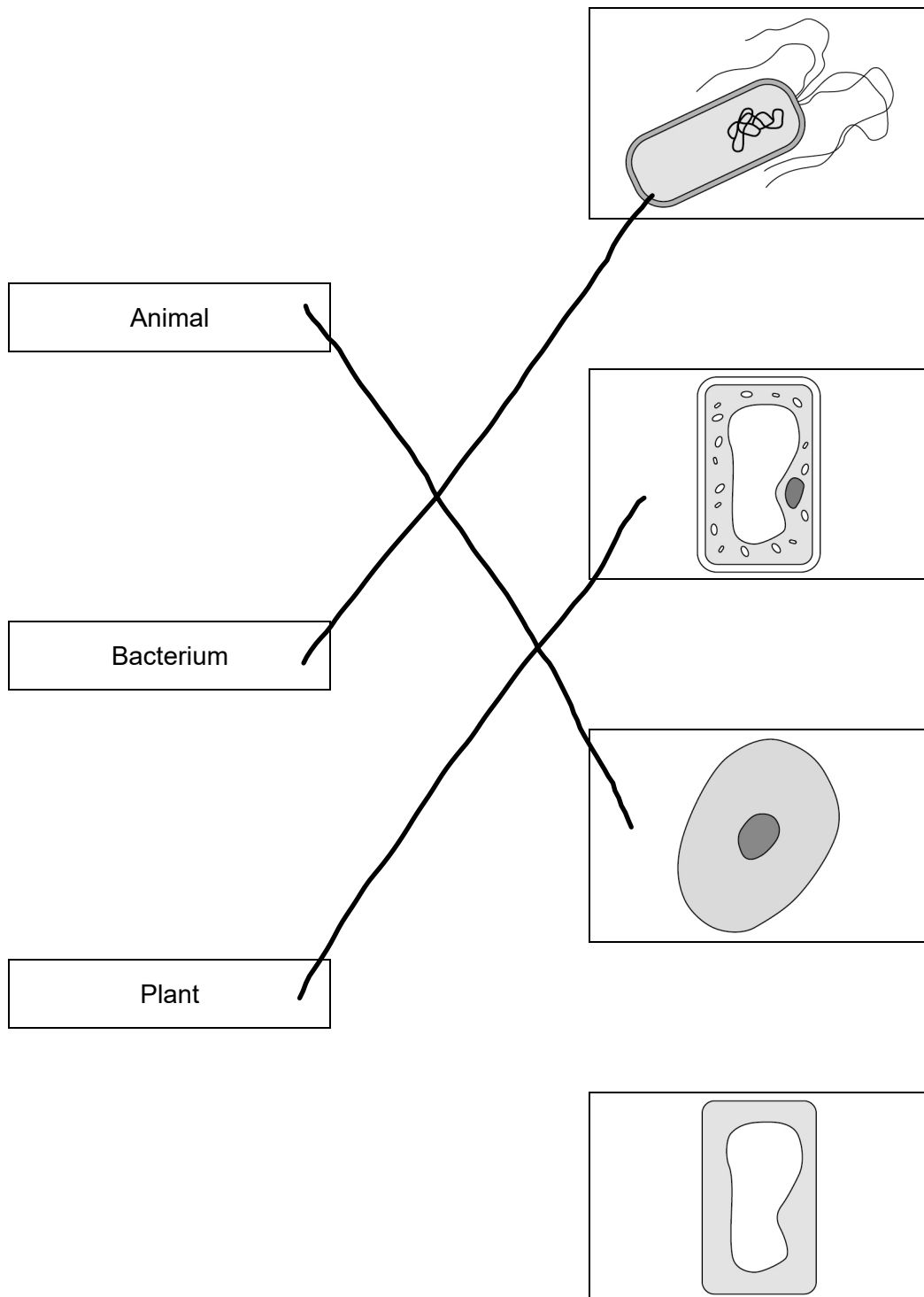


J U N 2 1 8 4 6 4 B 1 F 0 1

0 1

Cells are the building blocks of life.

0 1 . 1

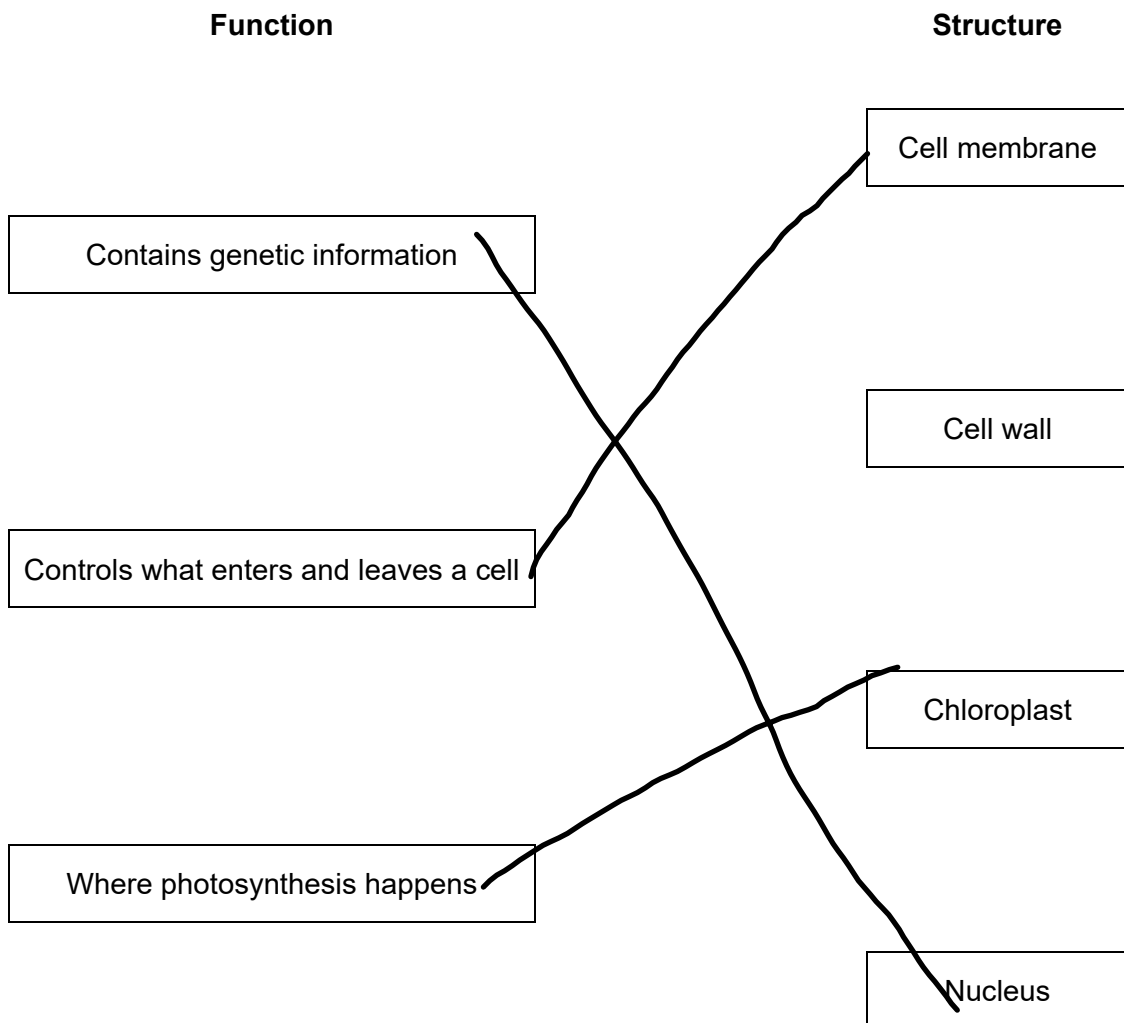
Draw **one** line from each type of organism to the diagram of one of its cells.**[3 marks]****Type of organism****Diagram of one cell**

0 1 . 2

Cells contain structures. These structures have different functions.

Draw **one** line from each function to the correct structure.

[3 marks]



Question 1 continues on the next page

Turn over ►



0 1 . 3 Chemicals are produced in cells.

Complete the sentences.

Choose answers from the box.

[4 marks]

cellulose

DNA

glycogen

starch

urea

A chemical excreted by animals is urea.

A chemical stored in animal cells is glycogen.

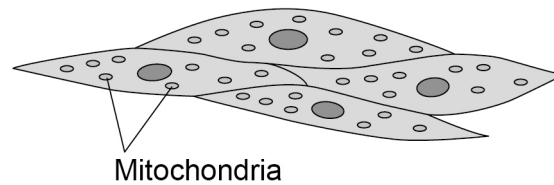
A chemical stored in plant cells is starch.

A chemical that strengthens plant cell walls is cellulose.



Figure 1 shows a diagram of muscle cells.

Figure 1



0 1 . 4

Give **one** function of muscle cells.

[1 mark]

to cause movement

0 1 . 5

Explain how muscle cells are adapted for their function.

Use **Figure 1**.

[2 marks]

mitochondria
to release a lot of energy

Question 1 continues on the next page

Turn over ►



0 1 . 6

One muscle cell was 0.05 mm wide.

When viewed using a microscope the image of the muscle cell was 2 mm wide.

Calculate the magnification used to view the cell.

Use the equation:

$$\text{magnification} = \frac{\text{width of image}}{\text{width of real cell}}$$

[2 marks]

$$\frac{2}{0.05}$$

$$\text{Magnification} = \times 40$$

15



Turn over for the next question

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0 2

Antibiotics are used to treat bacterial infections.

0 2 . 1

Which substance is used as an antibiotic?

[1 mark]Tick (✓) **one** box.

Aspirin

☐

Digitalis

☐

Penicillin

☒

Gonorrhoea and chlamydia are two sexually transmitted infections.

Gonorrhoea and chlamydia infections can be treated with antibiotics.

0 2 . 2Give **one** symptom of gonorrhoea.**[1 mark]**

pain on urinating



A scientist investigated which antibiotics were most effective at treating gonorrhoea and chlamydia.

This is the method used.

1. Grow gonorrhoea bacteria in a Petri dish.
2. Prepare four different antibiotic solutions, **A**, **B**, **C** and **D**, of the same concentration.
3. Cut four filter paper discs to the same size.
4. Soak each paper disc in a different antibiotic solution.
5. Put the four paper discs into the Petri dish.
6. Repeat steps 3 to 5 using a Petri dish with chlamydia bacteria growing in it.
7. Keep both Petri dishes at 25 °C for 3 days.

0 2 . 3

Give **two** control variables used in this investigation.

[2 marks]

1 type of disc

2 size of disc

Question 2 continues on the next page

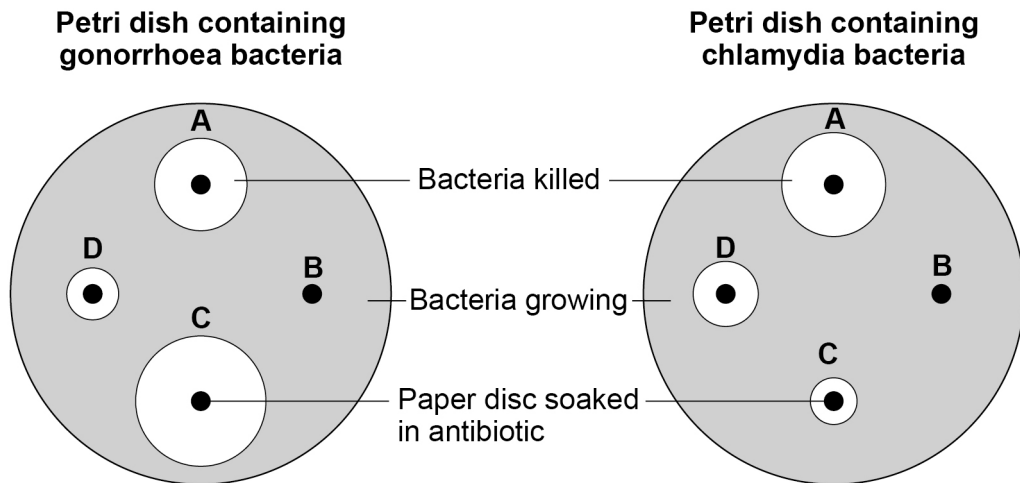
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Figure 2 shows the results.

A clear area around a paper disc is where the antibiotic has killed the bacteria.

Figure 2



0 2 . 4 Which antibiotic did **not** kill either type of bacterium?

[1 mark]

Tick (✓) **one** box.

A ☐ B ☒ C ☐ D ☐

0 2 . 5 Which antibiotic would be the most effective to treat a person with a **gonorrhoea** infection?

[1 mark]

Tick (✓) **one** box.

A ☐ B ☐ C ☒ D ☐



0 2 . 6

Which antibiotic would be the most effective to treat a person who had both gonorrhoea **and** chlamydia infections?

[1 mark]

Tick (✓) **one** box.

A

☐

B

☐

C

☐

D

☐

0 2 . 7

Antibiotics **cannot** be used to treat HIV infections.

Suggest **one** reason why.

[1 mark]

viruses are inside cells

Fungi can cause an infection of the fingernails and toenails.

Fungal nail infections can spread from one person to another person.

0 2 . 8

Some people go to nail salons to have their nails shaped and painted.

Suggest **one** way workers in nail salons can reduce the risk of infections being spread.

[1 mark]

use a new file for each customer

0 2 . 9

Suggest **one** reason why fungal infection of toenails is more common than fungal infection of fingernails.

[1 mark]

feet are washed less

10

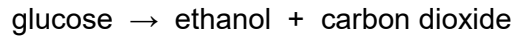
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0 3

Anaerobic respiration in yeast is called fermentation.

The equation for fermentation is:

**0 3 . 1**

How does the equation show that fermentation is an **anaerobic** reaction?

[1 mark]

no oxygen reacting with
glucose

Fermentation in yeast is used in the manufacture of beer, wine and bread.

0 3 . 2

Why is fermentation used when making beer and wine?

[1 mark]

produces ethanol

0 3 . 3

Explain why fermentation is used when making bread.

[2 marks]

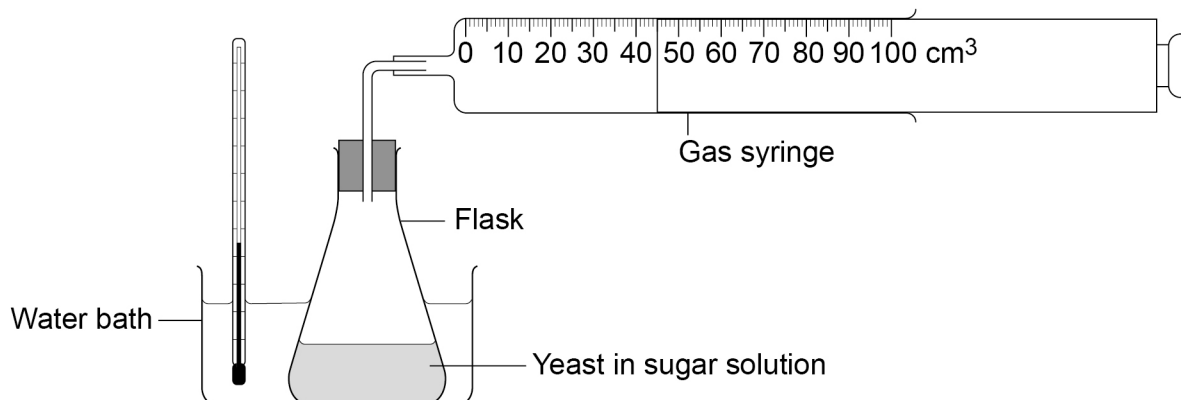
produces carbon dioxide which
makes the dough rise



A student investigated fermentation in yeast.

Figure 3 shows the apparatus.

Figure 3



This is the method used.

1. Mix yeast with sugar solution in a flask.
2. Put the flask in a water bath at 35 °C.
3. After 10 minutes attach a gas syringe to the flask.
4. Record the volume of carbon dioxide collected every 5 minutes for 1 hour.

0 3 . 4

What volume of carbon dioxide has been collected in the gas syringe in **Figure 3**?

[1 mark]

Volume of carbon dioxide = 45 cm³

0 3 . 5

Why did the student wait 10 minutes before attaching the gas syringe?

[1 mark]

Tick (✓) **one** box.

To allow time for the mixture to reach 35 °C

☒

To allow time for the sugar to dissolve

☐

To allow time to draw a results table

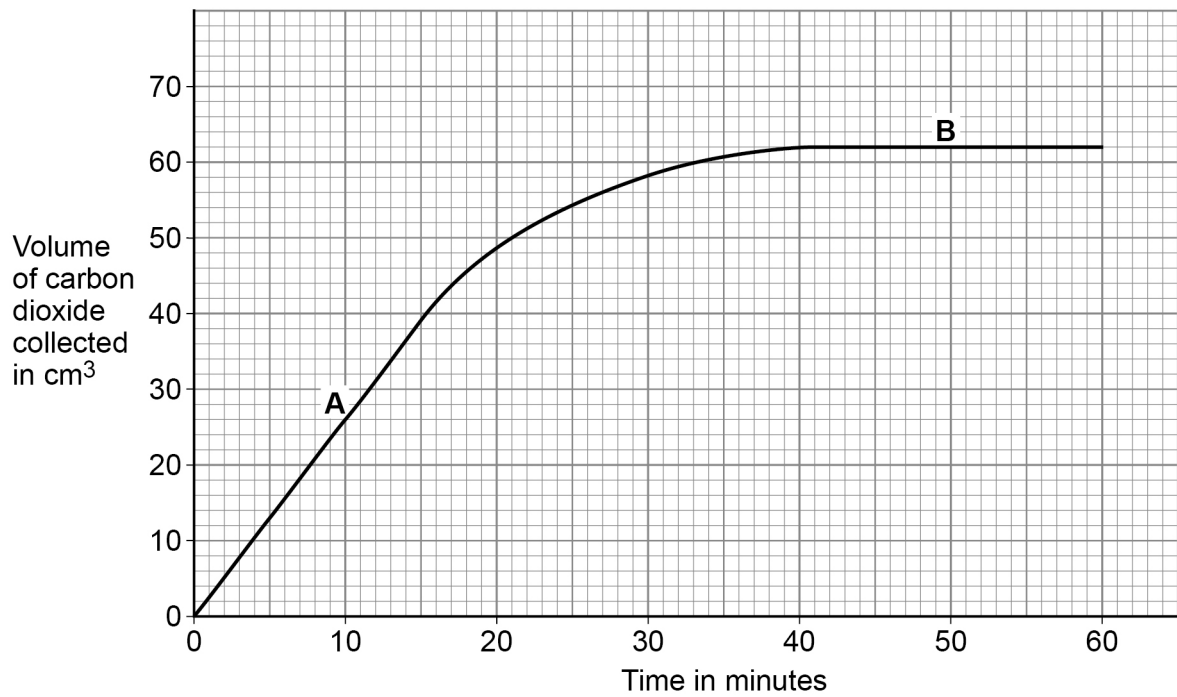
☐

Turn over ►



Figure 4 shows the results.

Figure 4



0 3 . 6

A and **B** are different parts of the graph in **Figure 4**.

Draw **one** line from each part of the graph to the description of the reaction.

[2 marks]

Part of the graph

Description of the reaction

A

B

Carbon dioxide is
not being produced

Carbon dioxide production is
fastest

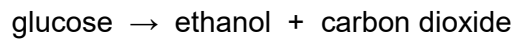
Carbon dioxide production is
slowing down

Question 3 continues on the next page

Turn over ►



The equation for fermentation is repeated here.



0 3 . 7 Suggest **one** reason why fermentation in the flask stopped.

[1 mark]

glucose ran out

0 3 . 8 Fermentation is controlled by enzymes.

The investigation was repeated at 2 °C and at 75 °C.

No carbon dioxide was produced at either of these temperatures.

Suggest why **no** carbon dioxide was produced at 2 °C or at 75 °C.

[2 marks]

Reason at 2 °C to cold for enzymes to work

Reason at 75 °C enzymes denatured

0 3 . 9 Anaerobic respiration also happens in animal cells.

Complete the equation for anaerobic respiration in animal cells.

Choose answers from the box.

[2 marks]

carbon dioxide

ethanol

glucose

lactic acid

water

glucose

→

lactic acid

13



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0	4
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This question is about plant transport systems.

0	4	.	1
---	---	---	---

Which **organ** in a plant absorbs water from the soil?

[1 mark]

root

0	4	.	2
---	---	---	---

The concentration of nitrate ions in the soil is lower than the concentration of nitrate ions inside a plant.

How would the nitrate ions move from the soil into the cells of this plant?

[1 mark]

Tick (✓) **one** box.

By active transport

☒

By diffusion

☐

By osmosis

☐

Dissolved sugars are transported in the phloem.

0 4 . 3

What is the name of the process that moves dissolved sugars through the phloem?

[1 mark]

Tick (✓) **one** box.

Evaporation

☐

Osmosis

☐

Translocation

☒

0 4 . 4

Give **one** use of sugars in a plant.

[1 mark]

respiration used to produce
starch

Question 4 continues on the next page

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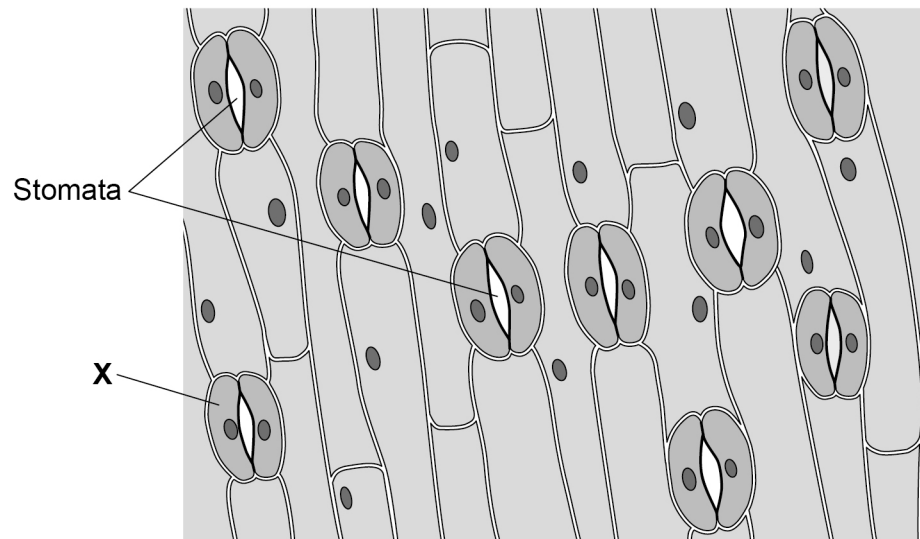


Stomata are openings on the surface of a leaf.

Stomata allow gases to move into and out of a leaf.

Figure 5 shows the surface of a leaf.

Figure 5



0 4 . 5 What is cell **X**?

[1 mark]

Tick (✓) **one** box.

Guard cell

☒

Meristem cell

☐

Palisade cell

☐


0 4 . 6 Why do the stomata open during the day?

[1 mark]

Tick (✓) **one** box.

To allow carbon dioxide in

☒

To allow nitrogen in

☐

To allow oxygen in

☐

0 4 . 7 The area of the leaf shown in **Figure 5** is 0.25 mm².

Calculate the number of stomata per mm² for the leaf in **Figure 5**.

Use the equation:

$$\text{number of stomata per mm}^2 = \frac{\text{number of stomata}}{\text{area in mm}^2}$$

[2 marks]

$$\frac{9}{0.25}$$

$$\text{Number of stomata per mm}^2 = 36$$

Question 4 continues on the next page

Turn over ►



A student investigated the number of stomata per mm^2 on the upper and lower surfaces of leaves.

The leaves were taken from the same plant.

Table 1 shows the results.

Table 1

Leaf	Number of stomata per mm^2	
	Upper surface	Lower surface
1	0	37
2	1	36
3	2	30
4	1	32
5	1	35
Mean	1	X

0 4 . 8

Calculate mean value **X** in **Table 1**.

[2 marks]

$$\frac{37+36+30+32+35}{5}$$

$$x = 34$$



0

4

9

Water vapour is lost through stomata.

Explain the difference in the number of stomata on the upper and lower surfaces of the leaves.

Use Table 1.

[3 marks]

there are fewer stomata on upper
side of leaves

conditions on upper side are
be warmer be drier

13

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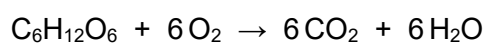
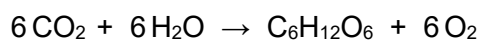
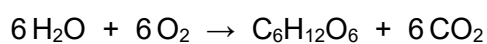
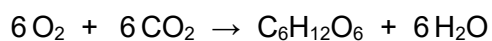
0 5

Plants absorb light for photosynthesis.

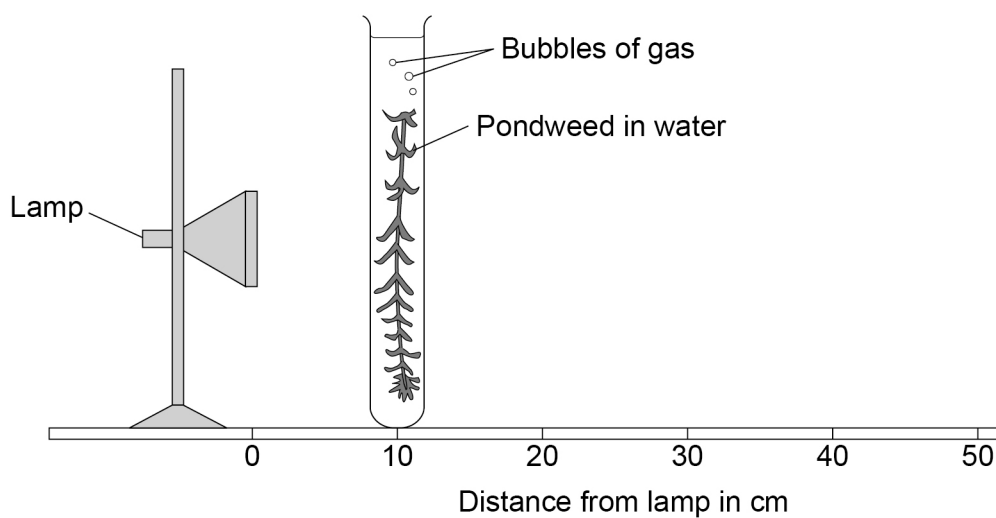
0 5 . 1

Which is the equation for photosynthesis?

[1 mark]

Tick (✓) **one** box.☐☒☐☐

A student investigated the effect of light intensity on the rate of photosynthesis.

Figure 6 shows the apparatus.**Figure 6**

This is the method used.

1. Set up the apparatus as shown in **Figure 6**.
2. Place the pondweed 10 cm away from the lamp.
3. Switch on the lamp.
4. Record the number of bubbles of gas produced in 5 minutes.
5. Repeat steps 2 to 4 with the pondweed at different distances from the lamp.

0 5 . 2

What was the independent variable in this investigation?

[1 mark]

Tick (✓) **one** box.

Distance of the pondweed from the lamp

☒

Length of the piece of pondweed

☐

Number of bubbles of gas produced

☐

Time taken to collect the gas

☐

Question 5 continues on the next page

Turn over ►



The lamp gets warm when it is on. This causes the temperature of the water to increase.

0 5 . 3 Explain how an increase in temperature would affect the results of this investigation.

[2 marks]

bubbles of gas would be produced
faster

enzymes work faster

0 5 . 4 Suggest **one** way the investigation could be improved so the temperature of the water does **not** increase.

[1 mark]

use a LED lamp

0 5 . 5 Suggest **two** improvements to the investigation so the results would be more valid.

Do **not** refer to controlling the temperature of the water.

[2 marks]

1 measure the volume of the
gas produced

2 repeat and calculate a mean



Question 5 continues on the next page

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Table 2 shows the results.

Table 2

Distance of pondweed from the lamp in cm	Number of bubbles of gas produced in 5 minutes
10	120
20	56
30	31
40	16
50	10

0 5 . 6 Calculate the rate of photosynthesis when the pondweed was 40 cm from the lamp.

Give the rate of photosynthesis as the number of bubbles of gas produced per minute.

[1 mark]

Rate = 3 bubbles of gas produced per minute

0 5 . 7 Give **one** conclusion that can be made from **Table 2**.

[1 mark]

as the light intensity decreases
the rate of photosynthesis
decreases

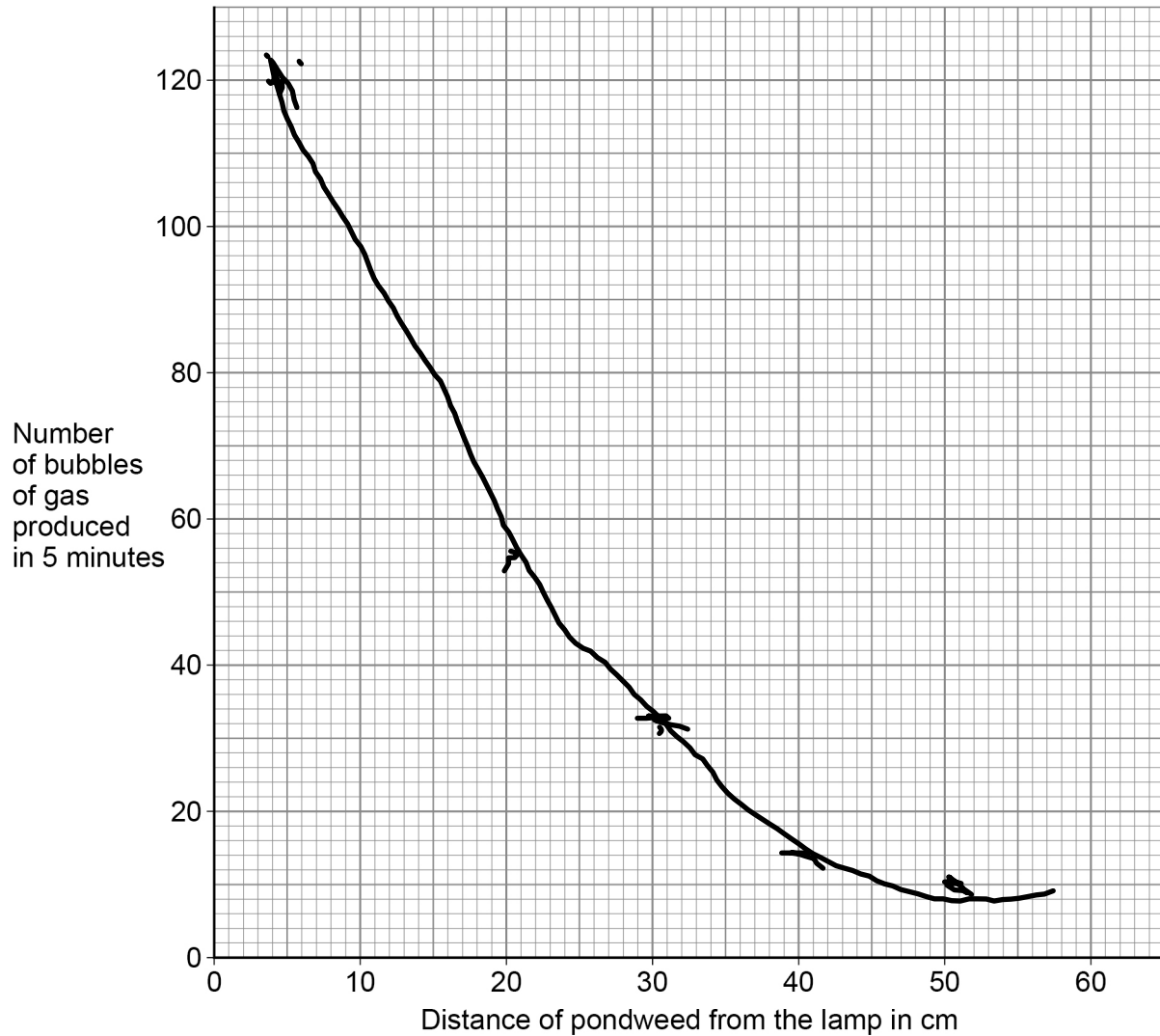


0 5 . 8 Plot the data from **Table 2** on **Figure 7**.

Draw a line of best fit.

[3 marks]

Figure 7



0 5 . 9 Predict the number of bubbles that would be produced in 5 minutes if the pondweed was 60 cm from the lamp.

Use **Figure 7**.

[1 mark]

Number of bubbles produced in 5 minutes = 8

13

Turn over ►



0	6
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Describe how to test a sample of food for protein, starch and sugar.

Give the colours that would be seen if the food sample contained protein, starch and sugar.

[6 marks]

protein

grind up

add Biuret

turns purple

starch

add iodine

turns black

sugar

grind up food

mix with water

add Benedict's

heat mixture

turns orange

6

END OF QUESTIONS



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