AQA GCSE Biology | 8461

SPECIFICATION POINT 4.4.1.3

Uses of glucose from photosynthesis

Past-paper questions

Tier	**Foundation**
Question groups	**7**
Available paper years	**2008–2020**

Using this booklet

1. Answer the questions in order and show your working.
2. Original question numbers and marks are retained.
3. Print at actual size (100%) for measuring questions.
4. Use the companion answer booklet to check your work.

Name: _____ **Date:** _____

Whole questions are retained for context, so some parts assess other specification points. Current and legacy sources are labelled. Continue on extra paper if needed.

4.4.1.3 Uses of glucose from photosynthesis

Question 01

June 2008 | BLY2F | Original Q2 | Legacy

2 Green plants are able to make their own food.

Complete each sentence by drawing a ring around the correct answer in the box.

2 (a) Green plants make their own food during the process of

diffusion
photosynthesis
respiration

.

(1 mark)

2 (b) This process can be summarised by the equation:

carbon dioxide + water → glucose +

mineral salts
light
oxygen

.

(1 mark)

2 (c) The energy needed for this process is trapped for the plant by

chlorophyll
glucose
light

.

(1 mark)

2 (d) Some of the food made by plants is stored as insoluble

chlorophyll
glucose
starch

.

(1 mark)

4

4.4.1.3 Uses of glucose from photosynthesis

Question 02

June 2019 | BLY2F | Original Q6 | Legacy

6 This question is about photosynthesis.

6 (a) Plants make glucose during photosynthesis. Some of the glucose is changed into insoluble starch.

What happens to this starch?

Tick (✓) **one** box.

The starch is converted into oxygen. ☐

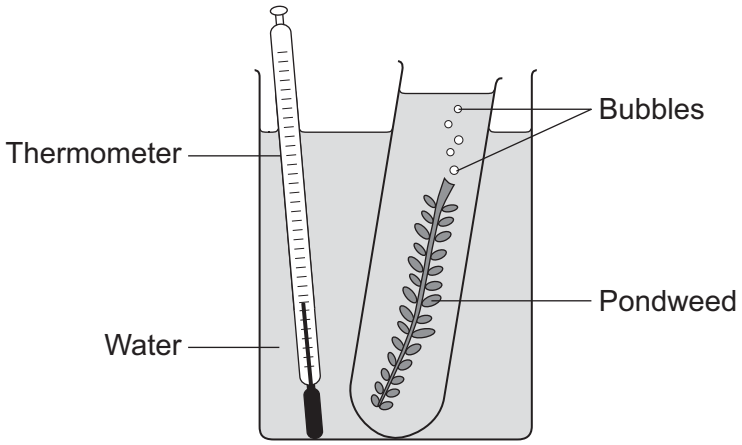
The starch is stored for later use. ☐

The starch is used to make the leaf green. ☐

(1 mark)

6 (b) A student investigated the effect of temperature on the rate of photosynthesis in pondweed.

The diagram shows the way the experiment was set up.



6 (b) (i) The student needed to control some variables to make the investigation fair.

State **two** of these variables.

1 .....

2 .....

(2 marks)

4.4.1.3 Uses of glucose from photosynthesis

Question 02 · continued

6 (b) (ii) The bubbles of gas are produced only while photosynthesis is taking place.

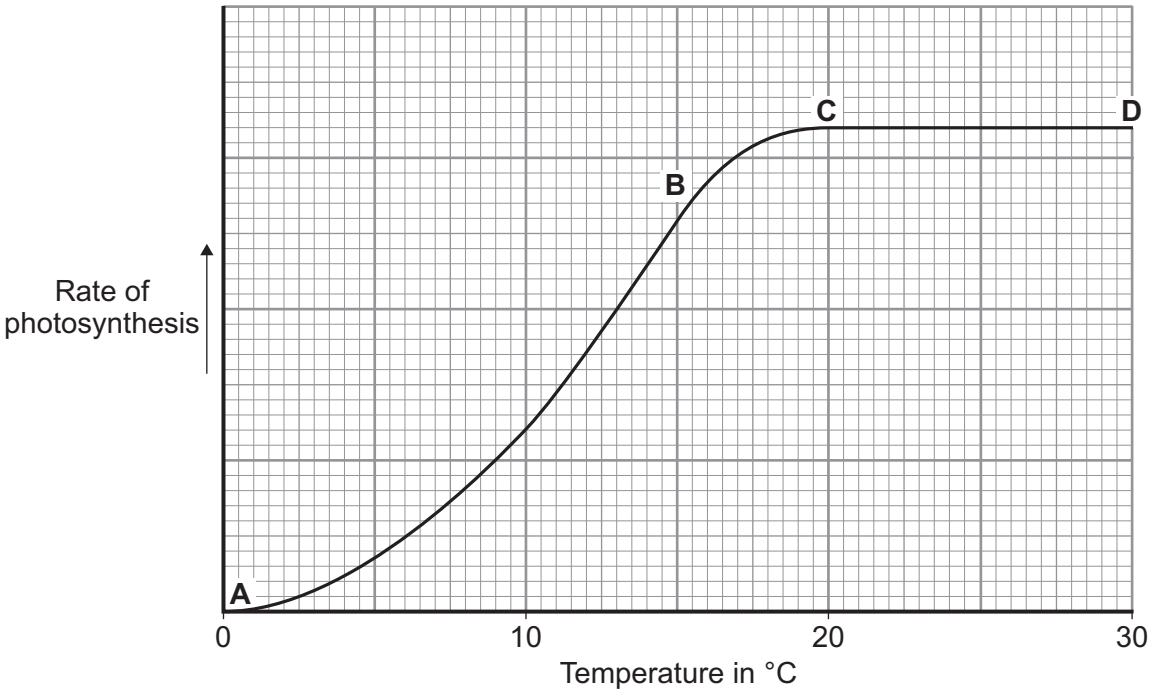
What **two** measurements would the student make to calculate the rate of photosynthesis?

1 .....

2 .....

(2 marks)

6 (c) The graph shows the effect of temperature on the rate of photosynthesis.



6 (c) (i) Name the factor that limits the rate of photosynthesis between the points labelled **A** and **B** on the graph.

.....

(1 mark)

6 (c) (ii) Suggest which factor, carbon dioxide, oxygen or water, might limit the rate of photosynthesis between the points labelled **C** and **D** on the graph.

.....

(1 mark)

7

4.4.1.3 Uses of glucose from photosynthesis

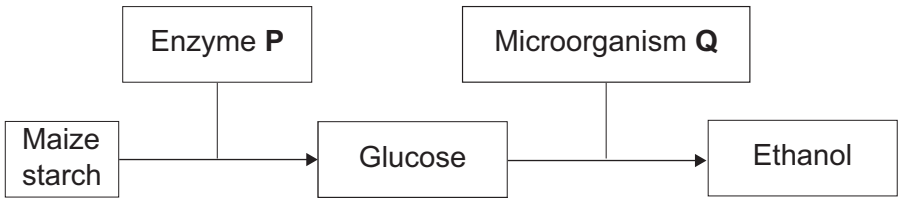
Question 03

June 2019 | BLY3F | Original Q3 | Legacy

3 Ethanol (alcohol) can be mixed with petrol to make gasohol.
The photograph shows three gasohol pumps at a service station.



The flowchart shows one way of manufacturing ethanol.



3 (a) Draw a ring around the correct answer to each question.

3 (a) (i) Enzyme **P** changes starch into glucose.

What type of enzyme is **P**?

carbohydrase **lipase** **protease**

(1 mark)

3 (a) (ii) Microorganism **Q** changes glucose into ethanol.

What type of microorganism is **Q**?

bacterium **mould** **yeast**

(1 mark)

4.4.1.3 Uses of glucose from photosynthesis

Question 03 · continued

3 (a) (iii) The ethanol produced by microorganism **Q** is contaminated with water.

Ethanol is separated from the mixture by

distillation **fermentation** **filtration**

(1 mark)

3 (b) In the long term, it may be better to use ethanol made from maize crops as a fuel for cars rather than petrol.

Explain why.

.....

.....

.....

.....

.....

(2 marks)

5

4.4.1.3 Uses of glucose from photosynthesis

Question 04

June 2014 | BL2FP | Original Q6 | Legacy

6 (a) A student carried out the following investigation using a plant with variegated leaves.
A variegated leaf has green and white stripes.

The student:

- left the plant in the dark for 3 days to remove the starch
- fixed two pieces of card to a leaf on the plant
- left the plant in the light for 2 days
- removed the leaf from the plant
- tested the leaf for starch.

Figure 9 shows how the two pieces of card were attached to the leaf.

Figure 9

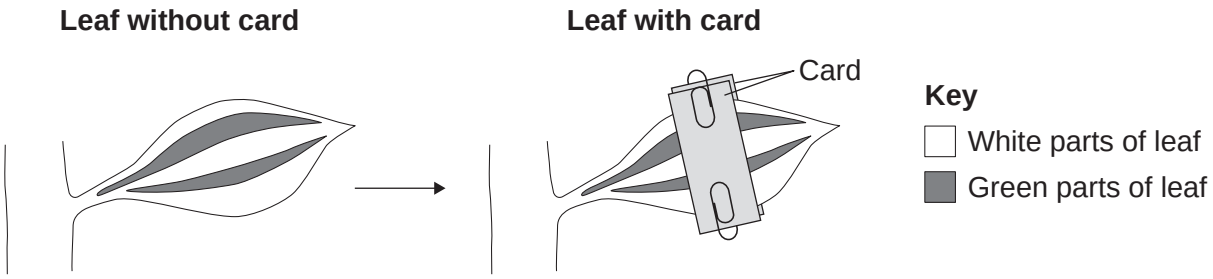
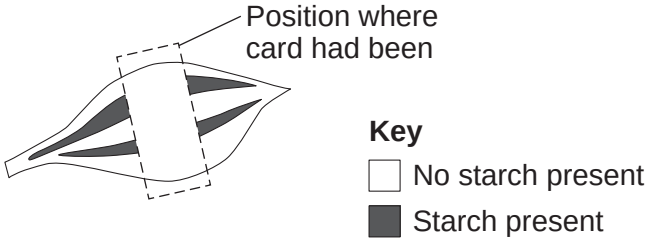


Figure 10 shows the same leaf after 2 days in the light.
The leaf has been tested for starch.

Figure 10



Give **two** conclusions from this investigation.

Tick (✓) **two** boxes.

[2 marks]

Carbon dioxide is needed for photosynthesis. ☐

Chlorophyll is needed for photosynthesis. ☐

Light is needed for photosynthesis. ☐

Water is needed for photosynthesis. ☐

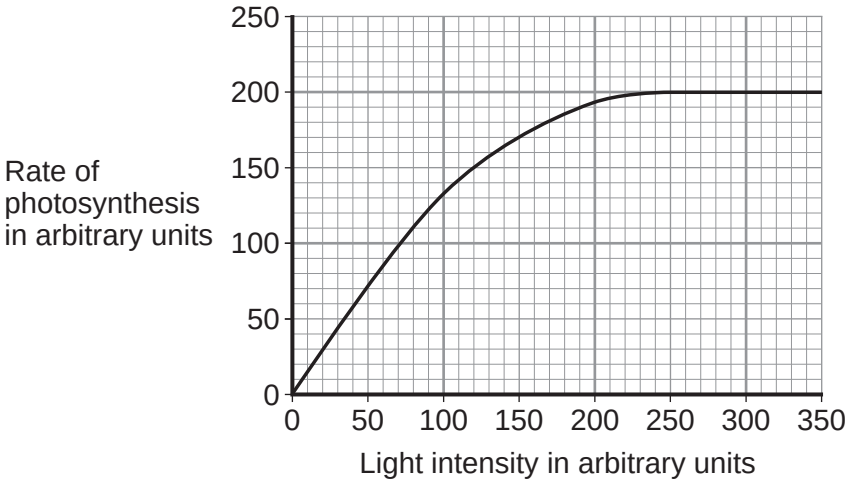
4.4.1.3 Uses of glucose from photosynthesis

Question 04 · continued

6 (b) Scientists investigated the effect of light intensity on the rate of photosynthesis.

Figure 11 shows the scientists' results.

Figure 11



Describe the effect of increasing light intensity on the rate of photosynthesis.
You should include numbers from **Figure 11** in your description.

[3 marks]

.....

.....

.....

.....

.....

.....

6 (c) At a light intensity of 250 arbitrary units, light is **not** a limiting factor of photosynthesis.

6 (c) (i) What is the evidence for this in **Figure 11**?

[1 mark]

.....

.....

6 (c) (ii) Give **two** factors that could be limiting the rate of photosynthesis at a light intensity of 250 arbitrary units.

[2 marks]

1 .....

2 .....

8

4.4.1.3 Uses of glucose from photosynthesis

Question 05

June 2015 | BL2FP | Original Q4 | Legacy

4 Photosynthesis uses carbon dioxide to make glucose.

4 (a) (i) Complete the equation for photosynthesis.

[2 marks]

carbon dioxide + ... $\xrightarrow{\text{energy}}$ glucose + ...

4 (a) (ii) What type of energy does a plant use in photosynthesis?

[1 mark]

.....

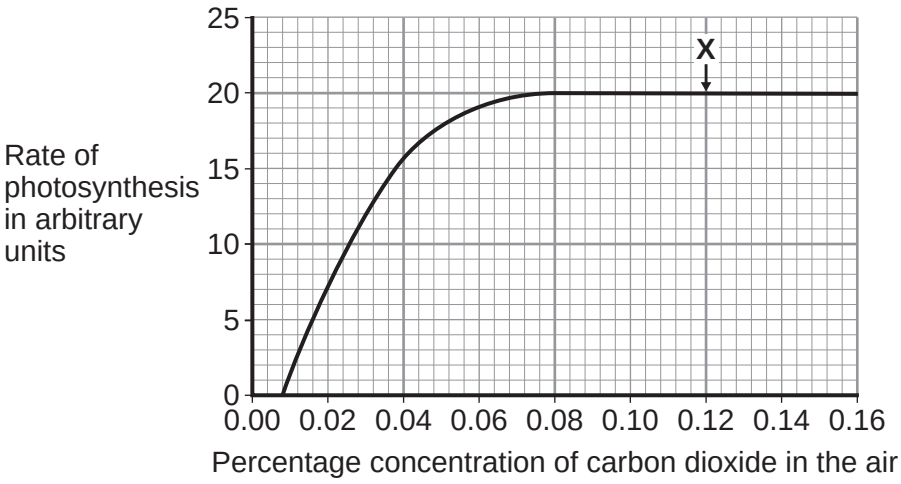
4 (a) (iii) Which part of a plant cell absorbs the energy needed for photosynthesis?

[1 mark]

.....

4 (b) **Figure 3** shows the effect of the concentration of carbon dioxide on the rate of photosynthesis in tomato plants at 20 °C.

Figure 3



4 (b) (i) What is the maximum rate of photosynthesis of the tomato plants shown in **Figure 3**?

[1 mark]

..... arbitrary units

4 (b) (ii) At point **X** on **Figure 3**, carbon dioxide is **not** a limiting factor of photosynthesis.

Suggest **one** factor that is limiting the rate of photosynthesis at point **X**.

[1 mark]

.....

4.4.1.3 Uses of glucose from photosynthesis

Question 05 · continued

4 (c) A farmer plans to grow tomatoes in a large greenhouse.

The concentration of carbon dioxide in the atmosphere is 0.04%.
The farmer adds carbon dioxide to the greenhouse so that its concentration is 0.08%.

4 (c) (i) Why does the farmer use 0.08% carbon dioxide?

[1 mark]

Tick (✓) **one** box.

- To increase the rate of growth of the tomato plants ☐
- To increase the rate of respiration of the tomato plants ☐
- To increase water uptake by the tomato plants ☐

4 (c) (ii) Why does the farmer **not** use a concentration of carbon dioxide higher than 0.08%?

[2 marks]

Tick (✓) **two** boxes.

- Because it would cost more money than using 0.08% ☐
- Because it would decrease the temperature of the greenhouse ☐
- Because it would not increase the rate of photosynthesis of the tomato plants any further ☐
- Because it would increase water loss from the tomato plants ☐

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4.4.1.3 Uses of glucose from photosynthesis

Question 06

June 2017 | BL2FP | Original Q1 | Legacy

1 Green plants make their own food.

1 (a) (i) What is the name of the process that plants use to make food?

[1 mark]

Draw a ring around the correct answer.

digestion **growth** **photosynthesis** **respiration**

1 (a) (ii) Plants need energy to make food.

Where does this energy come from?

[1 mark]

Draw a ring around the correct answer.

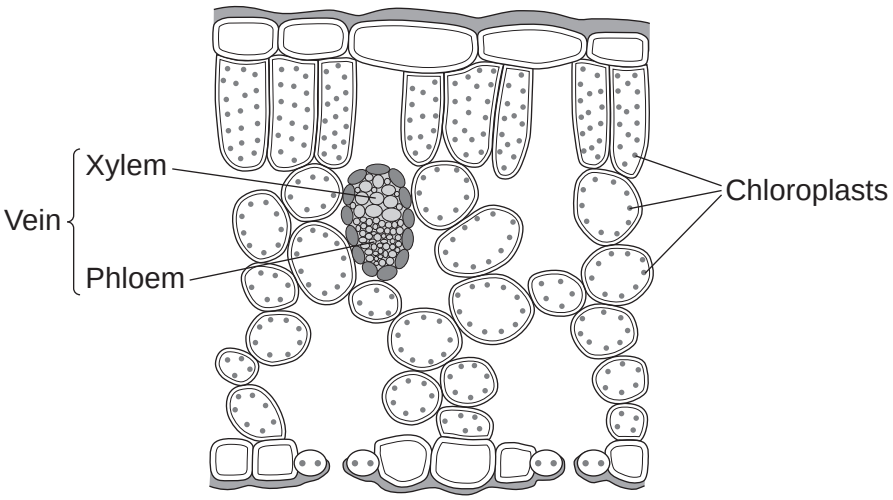
light **oxygen** **soil** **water**

1 (b) In plants, most of the food is made by the leaves.

Figure 1 shows a section through a plant leaf.

In the leaf, many of the cells contain chloroplasts.

Figure 1



1 (b) (i) Chloroplasts contain a green substance.

Name this green substance.

[1 mark]

_____

4.4.1.3 Uses of glucose from photosynthesis

Question 06 · continued

1 (b) (ii) How does this green substance help chloroplasts to make food?

[1 mark]

_____

_____

1 (b) (iii) What is the function of the vein shown in **Figure 1**?

[1 mark]

_____

_____

1 (b) (iv) Plants make glucose.

Name **two** substances a plant must take in to make glucose.

[2 marks]

1 _____

2 _____

7

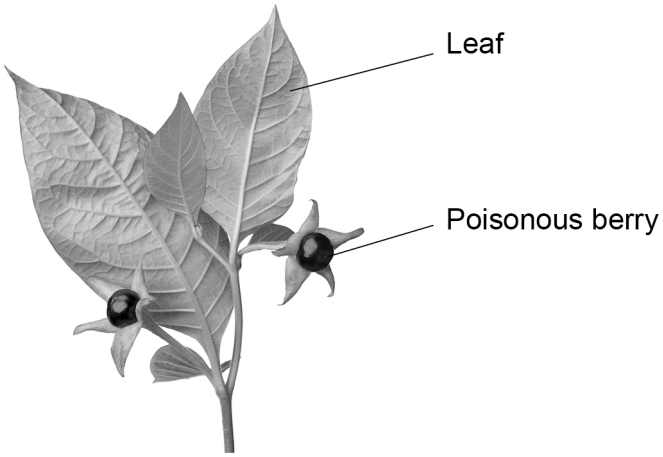
4.4.1.3 Uses of glucose from photosynthesis

Question 07

November 2020 | 8461/1F | Original Q5

0 5 **Figure 7** shows part of a deadly nightshade plant.

Figure 7



0 5 . 1 How will the poisonous berries help the deadly nightshade plant to survive?

[1 mark]

0 5 . 2 Which type of defence mechanism are the berries?

[1 mark]

Tick (✓) **one** box.

Chemical ☐

Mechanical ☐

Physical ☐

4.4.1.3 Uses of glucose from photosynthesis

Question 07 · continued

Figure 8 shows part of a gorse plant.

Figure 8



0 5 . 3 Suggest how the gorse plant is adapted to defend itself.

[1 mark]

0 5 . 4 The green leaves of the gorse plant make glucose for the plant to use.

What are **two** uses of glucose in the gorse plant?

[2 marks]

Tick (✓) **two** boxes.

- For defence ☐
- For respiration ☐
- To absorb water ☐
- To release minerals ☐
- To store as starch ☐

4.4.1.3 Uses of glucose from photosynthesis

Question 07 · continued

0 5 . 5 A student wanted to show that the leaves of a gorse plant contain glucose.

The student crushed the leaves to extract the liquid from the cells.

Describe the method the student could use to test the liquid from the cells for glucose.

Include the result if glucose is present.

[3 marks]

0 5 . 6 The roots of the gorse plant have bacteria that turn nitrogen gas into nitrate ions.

Explain why nitrate ions are needed by the gorse plant.

[2 marks]

0 5 . 7 The roots of gorse plants can be infected by honey fungus.

The honey fungus produces tiny spores underground.

Suggest how the honey fungus spores travel from the roots of an infected gorse plant to the roots of a healthy gorse plant.

[1 mark]

4.4.1.3 Uses of glucose from photosynthesis

Question 07 · continued

A drug can be extracted from gorse seeds.

Doctors want to trial the drug from gorse seeds to see if it can treat diarrhoea.

0 5 . 8 Which **two** factors must the doctors test the drug for in the trial?

[2 marks]

Tick (✓) **two** boxes.

- Appearance ☐
- Dosage ☐
- Solubility ☐
- Taste ☐
- Toxicity ☐

0 5 . 9 In the trial some patients will take tablets made from gorse seeds and some patients will take tablets made from sugar.

What are the tablets made from sugar called?

[1 mark]

Tick (✓) **one** box.

- Antibiotics ☐
- Antibodies ☐
- Painkillers ☐
- Placebos ☐

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