AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.7.3.5

Global warming

Past-paper questions

Tier	**Higher**
Question groups	**5**
Available paper years	**2019–2025**

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.

4.7.3.5 Global warming

Question 01

June 2019 | 8464/B/2H | Original Q2

0 2 There has been a rapid increase in the percentage of carbon dioxide in the atmosphere since 1960.

0 2 . 1 Carbon dioxide is a greenhouse gas that contributes to global warming.

Name **one** other greenhouse gas.

[1 mark]

_____

0 2 . 2 Global warming causes climate change.

Give **two** effects of climate change.

[2 marks]

1 _____

_____

2 _____

_____

Question 2 continues on page 10

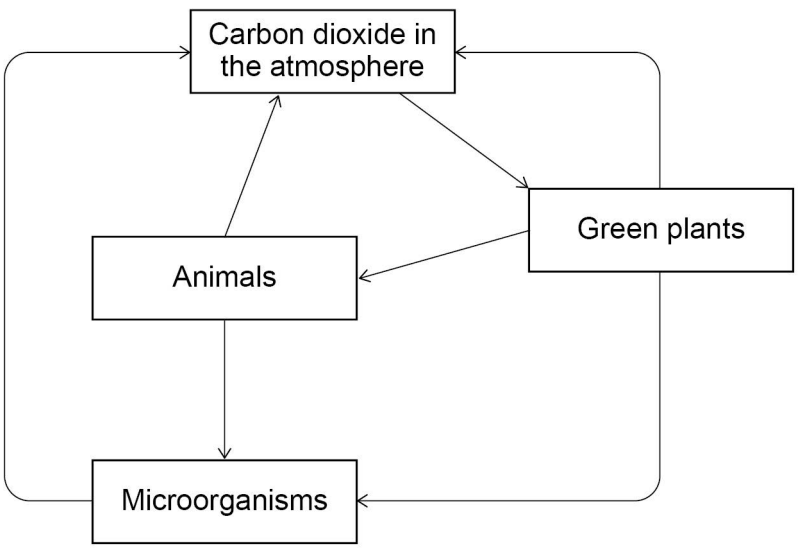
4.7.3.5 Global warming

Question 01 · continued

0 2 . 3 Plants take in carbon dioxide from the atmosphere.

Figure 2 shows part of the carbon cycle.

Figure 2



Describe how carbon from the atmosphere is cycled through living organisms.

[6 marks]

4.7.3.5 Global warming

Question 02

November 2020 | 8464/B/1H | Original Q5

0 5 This question is about photosynthesis and food production.

0 5 . 1 How can oxygen production be used to show the **rate** of photosynthesis?

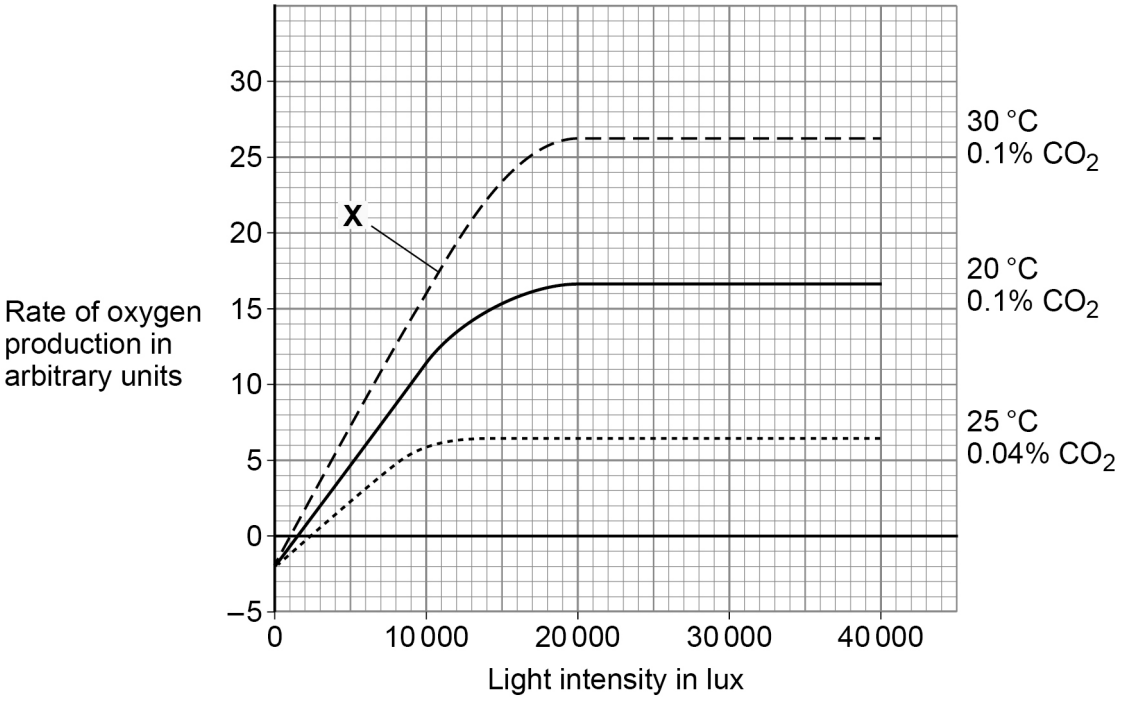
[1 mark]

Scientists investigated factors affecting the rate of photosynthesis in tomato plants.

The tomato plants were growing in a commercial greenhouse in the UK during winter.

Figure 5 shows the results.

Figure 5



The percentage of carbon dioxide in the Earth's atmosphere is 0.04%

0 5 . 2 Name the factor that is limiting the rate of photosynthesis at point **X**.

[1 mark]

4.7.3.5 Global warming

Question 02 · continued

Farmers growing tomatoes commercially try to control the rate of photosynthesis and make maximum profit.

A farmer can control the temperature and carbon dioxide concentration in a greenhouse.

0 5 . 3 What is the **minimum** light intensity a farmer should use to get the maximum rate of photosynthesis shown in **Figure 5**?

[1 mark]

Light intensity = _____ lux

0 5 . 4 The light intensity you gave in Question **05.3** may **not** give the farmer maximum profit.

Explain why.

[3 marks]

0 5 . 5 Explain the results when the light intensity was 0 lux.

Use **Figure 5**.

[4 marks]

10

4.7.3.5 Global warming

Question 03

June 2024 | 8464/B/1H | Original Q4

0 4 This question is about photosynthesis.

0 4 . 1 What is the symbol equation for photosynthesis?

[1 mark]

Tick (✓) **one** box.

$6\,CO_2 + C_6H_{12}O_6 \rightarrow 6\,H_2O + 6\,O_2$ ☐

$C_6H_{12}O_6 + 6\,O_2 \rightarrow 6\,CO_2 + 6\,H_2O$ ☐

$6\,CO_2 + 6\,H_2O \rightarrow C_6H_{12}O_6 + 6\,O_2$ ☐

$6\,O_2 + 6\,H_2O \rightarrow 6\,CO_2 + C_6H_{12}O_6$ ☐

Question 4 continues on the next page

Question 03 · continued

A student investigated the relationship between temperature and the rate of photosynthesis.

The student measured the volume of gas produced by an aquatic plant in 1 hour.

The student collected the gas in a measuring cylinder.

Table 2 shows the results.

Table 2

Temperature in °C	Volume of gas produced in 1 hour in cm^3
10	1
15	2
20	4
25	8
30	16
35	16
40	2
45	0

0 4 . 2 Describe the effect of increasing temperature on the **rate** of photosynthesis.

Use data from **Table 2**.

[3 marks]

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Question 03 · continued

0 4 . 3 Explain why no gas was produced by the plant at 45 °C.

[2 marks]

0 4 . 4 How could the student increase the accuracy of the results?

[1 mark]

Tick (✓) **one** box.

- Repeat the investigation, collecting the gas for 24 hours. ☐
- Repeat the investigation, measuring the volume of gas to 0.5 cm^3. ☐
- Repeat the investigation using a different aquatic plant. ☐
- Repeat the investigation, using temperatures of 5 °C and 50 °C. ☐

Question 4 continues on the next page

Question 03 · continued

A person grows tomatoes in a greenhouse.

0 4 . 5 The mean temperature of the greenhouse is 15 °C.

A heater would keep the temperature of the greenhouse at 25 °C.

Suggest **two** reasons **against** using a heater set at 25 °C in the greenhouse.

Do **not** refer to cost in your answer.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 6 The person cut a stem from one of the tomato plants.

The cut stem was placed in soil to grow new roots.

Which tissue in the cut stem will differentiate into new root cells?

[1 mark]

Tick (✓) **one** box.

- Epidermis ☐
- Meristem ☐
- Mesophyll ☐
- Phloem ☐

10

4.7.3.5 Global warming

Question 04

0 2 Potatoes are a food crop.

0 2 . 1 Potato plants are classified as eukaryota.

What type of classification group is eukaryota?

[1 mark]

Tick (✓) **one** box.

- Class ☐
- Domain ☐
- Kingdom ☐
- Phylum ☐

0 2 . 2 Potato plants can reproduce by asexual reproduction.

Which statement is true for asexual reproduction?

[1 mark]

Tick (✓) **one** box.

- Meiosis occurs. ☐
- Offspring are genetically identical. ☐
- Pollen and egg cells are produced. ☐

Question 2 continues on the next page

4.7.3.5 Global warming

Question 04 · continued

0 2 . 3 Flowers of potato plants contain gametes for sexual reproduction.

How is a gamete different from other cells in a potato plant?

[1 mark]

Tick (✓) **one** box.

A gamete contains one-quarter of the number of chromosomes. ☐

A gamete contains half of the number of chromosomes. ☐

A gamete contains double the number of chromosomes. ☐

0 2 . 4 Plants in the same genus as potatoes have been studied by scientists.

Describe **one** way a new plant species could be identified as being in the same genus as potatoes.

[1 mark]

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Question 04 · continued

0 2 . 5 Scientists have collected and stored seeds from species in the same genus as potatoes.

In the future, these seeds may be used for genetic modification of potato plants.

Genetically modified potato plants could help supply food to the human population as the climate changes.

Explain why genetic modification of crop plants may be important for the human population to survive climate change.

[6 marks]

10

4.7.3.5 Global warming

Question 05

June 2025 | 8464/B/2H | Original Q4

0 4 Farmers can increase crop yield by controlling the conditions the plants grow in.

0 4 . 1 Maize is a crop plant.

A variety of maize has been genetically modified (GM) to be resistant to a herbicide.

Explain how growing GM herbicide-resistant maize can produce a larger yield than growing non-GM maize.

[4 marks]

Extra space

0 4 . 2 Explain how growing a GM herbicide-resistant crop can **decrease** the biodiversity of animals.

[2 marks]

Question 4 continues on the next page

Bees are a type of insect.

The number of insects near a crop can be increased by planting hedgerows.

0 4 . 3 Increasing the number of bees **and** other insects increases crop yield.

Suggest **two** reasons why increasing the number of insects can increase crop yield.
[2 marks]

1 _____

_____

2 _____

_____

0 4 . 4 Hedgerows provide habitats for insects.

Give **one** reason why increasing hedgerow habitats increases insect numbers.
[1 mark]

_____

_____

0 4 . 5 Some farmland contains areas of peat.

When peat is dug up:

- the oxygen levels in the peat increase
- the peat decays quickly.

Explain why increasing the level of oxygen in peat contributes to climate change.
[2 marks]

_____

_____

_____

_____

_____

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