AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.7.3.5

Global warming

Past-paper questions

Tier	**Foundation**
Question groups	**9**
Available paper years	**2018–2025**

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 2018 | 8464/B/2F | Original Q1

0 1 Every year scientists have recorded the date when migrating birds arrived at summer breeding grounds in the UK.

The records show that for every 1 °C increase in mean global temperature, the birds arrived one day earlier.

0 1 . 1 What will the birds be competing for when they arrive at their UK breeding grounds?

[2 marks]

Tick **two** boxes.

- Eggs ☐
- Food ☐
- Light ☐
- Mates ☐
- Oxygen ☐

0 1 . 2 Birds that arrive early might survive better than birds that arrive later.

Suggest **one** reason why.

[1 mark]

0 1 . 3 Global temperatures are increasing every year.

This is because of an increase of greenhouse gases in the atmosphere.

Name **one** greenhouse gas.

[1 mark]

4.7.3.5 Global warming

Question 01 · continued

0 1 . 4 Global warming affects the migration of animals.

Give **one** other effect of global warming.

[1 mark]

0 1 . 5 Which **two** human activities cause global warming?

[2 marks]

Tick **two** boxes.

- Burning fossil fuels ☐
- Eating vegetables ☐
- Farming cows ☐
- Turning off lights ☐
- Using too much water ☐

0 1 . 6 Which gas in the atmosphere causes acid rain?

[1 mark]

Tick **one** box.

- Carbon monoxide ☐
- Oxygen ☐
- Ozone ☐
- Sulfur dioxide ☐

8

4.7.3.5 Global warming

Question 02

June 2018 | 8464/B/2F | Original Q4

0 4 A class of eight students measured the population of water fleas living at the edge of a large pond.

This is the method each student used.

1. Put some pond water in a white tray.
2. Take a pond net and scoop at the edge of the pond a few times.
3. Empty the pond net into the water in the tray.
4. Count the number of water fleas in the tray.

Figure 6 shows a student working.

Figure 6



0 4 . 1 The students did **not** control some variables.

Give **two** variables the students should have controlled to make this a valid method.

[2 marks]

1 _____

_____

2 _____

_____

Question 02 · continued

The eight students then used a different method to obtain valid results.

Table 2 shows their results.

Table 2

Student	Number of water fleas per 1000 cm^3 pond water
A	66
B	37
C	51
D	102
E	40
F	122
G	75
H	19

0 4 . 2 Calculate the students' mean value for the population of water fleas at the edge of the pond.

[1 mark]

Mean population = _____ water fleas per 1000 cm^3 pond water

0 4 . 3 What was the range of the students' results?

[1 mark]

Range = _____

0 4 . 4 Suggest **one** reason why such a wide range of results was found.

[1 mark]

Question 02 · continued

0 4 . 5 The teacher then sampled the centre of the pond eight times.

His mean value was 12 water fleas per 1000 cm^3 pond water.

What conclusion can you make about the distribution of water fleas in the pond?

Use the students' mean value from question **04.2** to compare with the teacher's mean value.

[1 mark]

Scientists counted some different invertebrates living in a pond in 2014 and in 2016

Table 3 shows the results.

Table 3

Invertebrate species	Number of invertebrates	
	2014	2016
Bloodworms	13	48
Freshwater shrimps	24	9
Mayfly nymphs	32	0
Water snails	19	24

0 4 . 6 Calculate the change in the number of bloodworms between 2014 and 2016

[1 mark]

Change = _____ bloodworms

0 4 . 7 Calculate the number of shrimps in the pond in 2016 as a percentage of the number of shrimps in the pond in 2014

[1 mark]

Percentage = _____ %

Question 02 · continued

0 4 . 8 Invertebrate species found in a pond can be used as an indicator of the pollution level.

Table 4 shows which species can survive in different levels of pollution.

Table 4

Invertebrate species	Pollution level		
	Low	Medium	High
Bloodworms	✓	✓	✓
Freshwater shrimps	✓	✓	✗
Mayfly nymphs	✓	✗	✗
Water snails	✓	✓	✓

Key
✓ = Can survive
✗ = Cannot survive

What conclusion can you make about the change in the level of pollution in the pond between 2014 and 2016?

Give **one** reason for your conclusion.

Use the data in **Table 3** and **Table 4**

[2 marks]

0 4 . 9 Water pollution and global warming are two problems that have been caused by the rapid increase of the human population.

Suggest **two** other problems caused by the rapid increase of the human population.

[2 marks]

1

2

12

4.7.3.5 Global warming

Question 03

June 2019 | 8464/B/2F | Original Q7

0 7 There has been a rapid increase in the percentage of carbon dioxide in the atmosphere since 1960.

0 7 . 1 Carbon dioxide is a greenhouse gas that contributes to global warming.

Name **one** other greenhouse gas.

[1 mark]

_____

0 7 . 2 Global warming causes climate change.

Give **two** effects of climate change.

[2 marks]

1 _____

_____

2 _____

_____

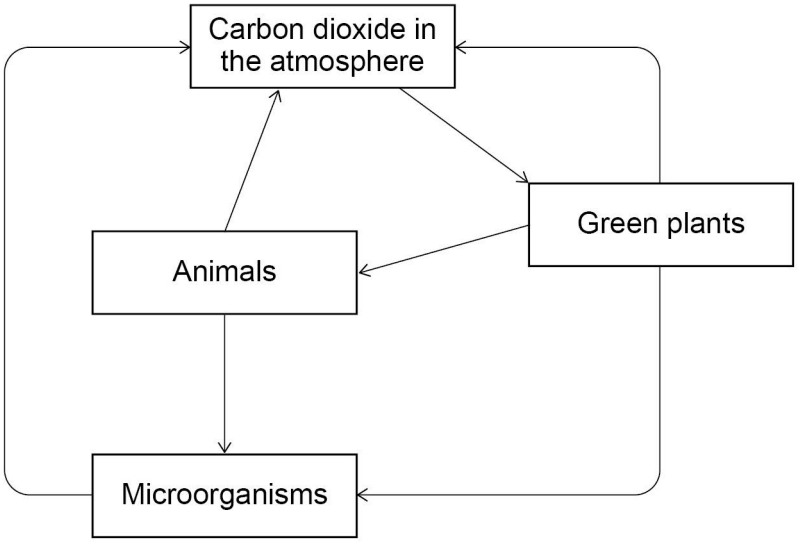
4.7.3.5 Global warming

Question 03 · continued

0 7 . 3 Plants take in carbon dioxide from the atmosphere.

Figure 7 shows part of the carbon cycle.

Figure 7



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

[6 marks]

4.7.3.5 Global warming

Question 04

November 2021 | 8464/B/2F | Original Q5

0 5 Increased carbon dioxide levels in the atmosphere contribute to climate change.

0 5 . 1 Give **one** way deforestation can increase carbon dioxide levels in the atmosphere.

[1 mark]

0 5 . 2 Name **one** other gas that contributes to climate change.

Do **not** refer to carbon dioxide in your answer.

[1 mark]

0 5 . 3 Meat is produced for humans to eat.

Give **two** ways the production of meat releases carbon dioxide.

[2 marks]

1

2

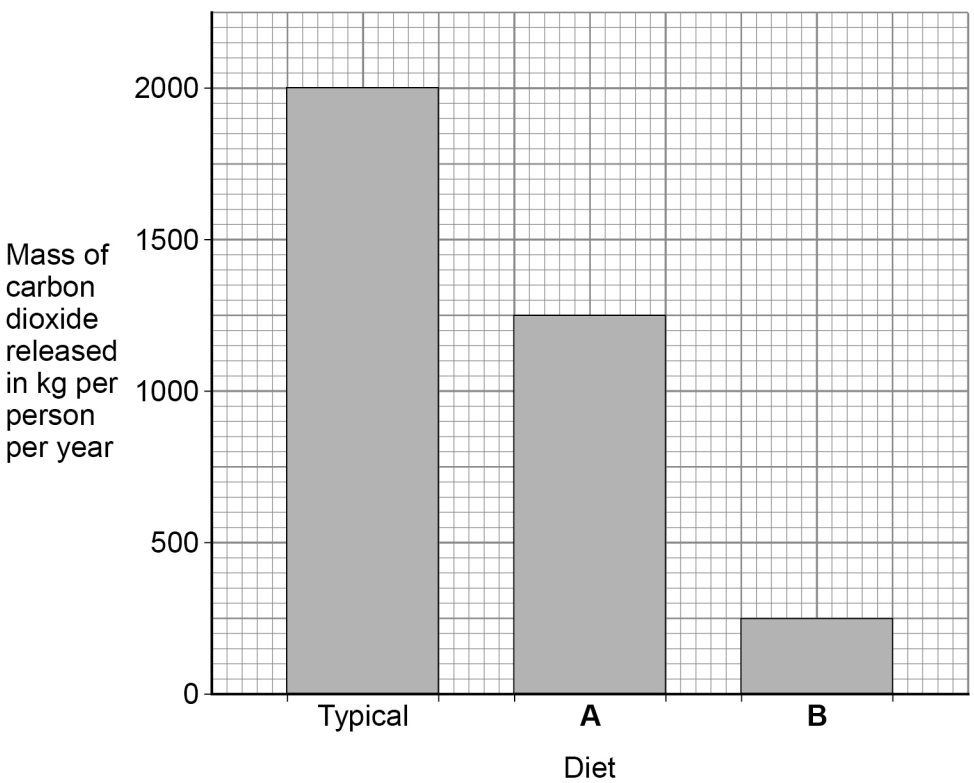
Question 5 continues on the next page

Question 04 · continued

0 5 . 4 The mass of carbon dioxide released during the production of food varies depending on the type of food.

Figure 4 shows the mass of carbon dioxide released as a result of three different diets.

Figure 4



4.7.3.5 Global warming

Question 04 · continued

Compare the mass of carbon dioxide released as a result of the three diets shown in **Figure 4**.

Use data from **Figure 4** in your answer.

[4 marks]

8

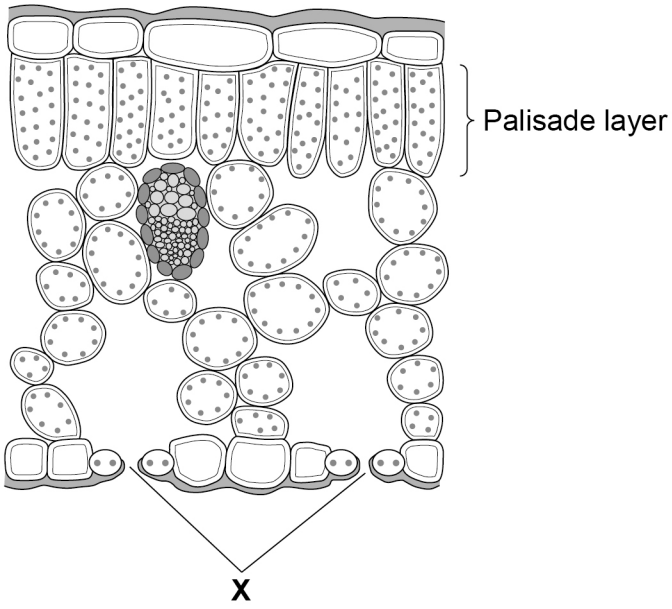
4.7.3.5 Global warming

Question 05

June 2022 | 8464/B/1F | Original Q2

0 2 **Figure 2** shows a section through a leaf.

Figure 2



0 2 . 1 Give **one** way that the palisade layer is adapted for photosynthesis.

[1 mark]

0 2 . 2 Gases pass into and out of the leaf through small pores in the surface of the leaf.

What are the small pores labelled **X** called?

[1 mark]

Tick (✓) **one** box.

- Guard cells ☐
- Stomata ☐
- Xylem vessels ☐

Question 05 · continued

0 2 . 3 A student viewed a section of a leaf using a microscope.

The student measured the length of one of the palisade cells.

The cell image measured 28 mm in length when viewed at a magnification of ×400

Calculate the real length of the palisade cell in millimetres (mm).

Use the equation:

$$\text{real length} = \frac{\text{image length}}{\text{magnification}}$$

[3 marks]

Real length = _____ mm

Convert the real length of the cell from millimetres to micrometres (μm).

1 mm = 1000 μm

Real length = _____ μm

0 2 . 4 Carbon dioxide can move into and out of cells.

What is the process by which carbon dioxide can move into and out of cells?

[1 mark]

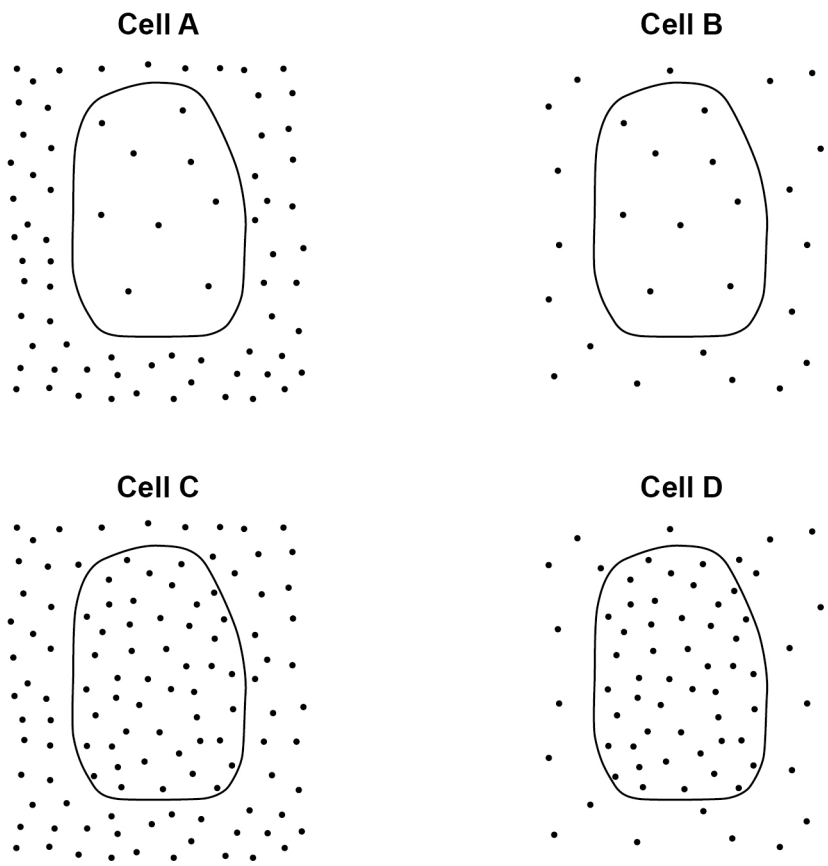
Tick (✓) **one** box.

- Active transport ☐
- Diffusion ☐
- Osmosis ☐

Figure 3 shows a diagram of four cells.

Each cell is surrounded by carbon dioxide molecules.

Figure 3



Key

• Carbon dioxide molecule

0 2 . 5 Which cell will carbon dioxide move into at the fastest rate?

Give a reason for your answer.

[2 marks]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

Reason _____

_____

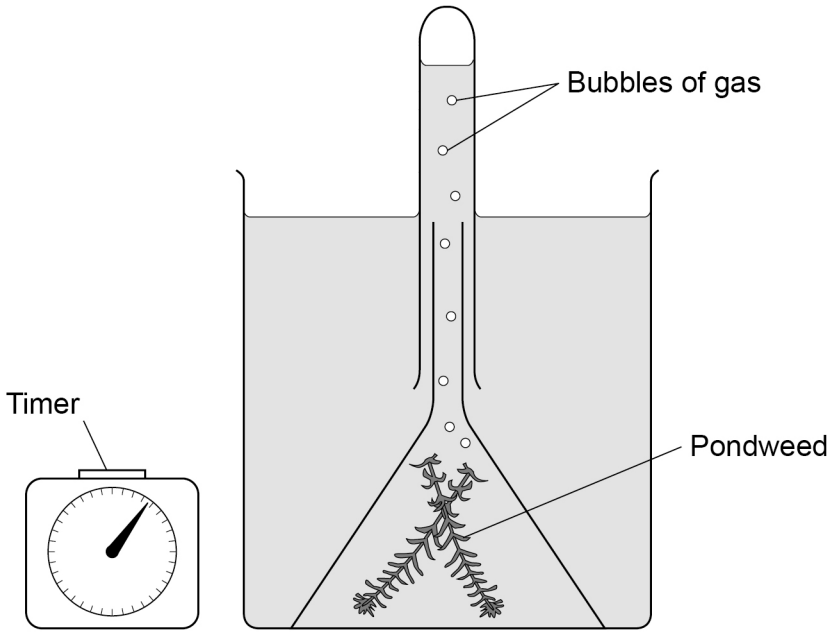
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Question 05 · continued

A student investigated the effect of different colours of light on the rate of photosynthesis.

Figure 4 shows some of the apparatus the student used.

Figure 4



The student placed the apparatus in blue light, then in green light and then in red light.

The student measured the rate of photosynthesis in each colour of light.

0 2 . 6 What **two** measurements should the student make to calculate the **rate** of photosynthesis?

[2 marks]

1 _____

2 _____

Question 2 continues on the next page

4.7.3.5 Global warming

Question 05 · continued

0 2 . 7 Give **two** variables the student should keep the same in this investigation.

[2 marks]

1 _____

_____

2 _____

_____

Table 2 shows the results.

Table 2

Colour of light	Rate of photosynthesis in arbitrary units
Blue	9
Green	1
Red	8

Question 05 · continued

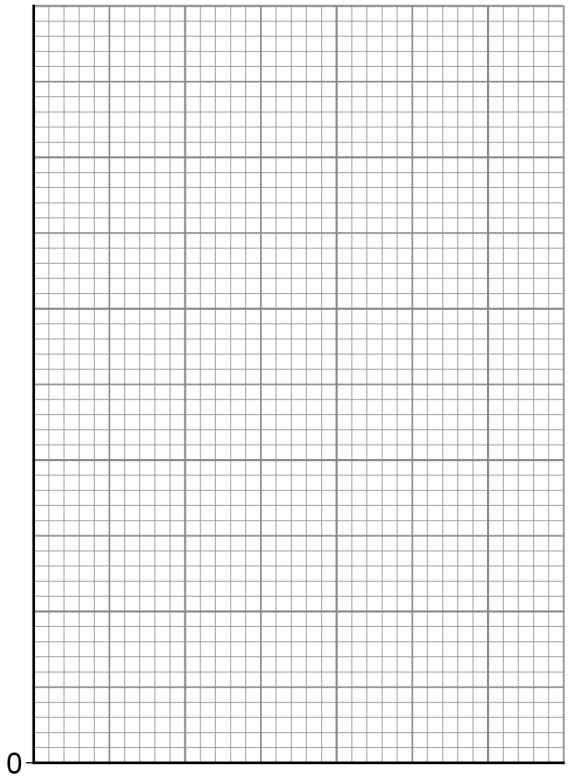
0 2 . 8 Complete **Figure 5**.

You should:

- label the y-axis
- use a suitable scale
- plot the data from **Table 2** as a bar chart
- label each bar.

[4 marks]

Figure 5



0 2 . 9 Look at **Table 2**.

What colour of light should be used to grow plants in a greenhouse?

[1 mark]

Tick (✓) **one** box.

Blue ☐ Green ☐ Red ☐

17

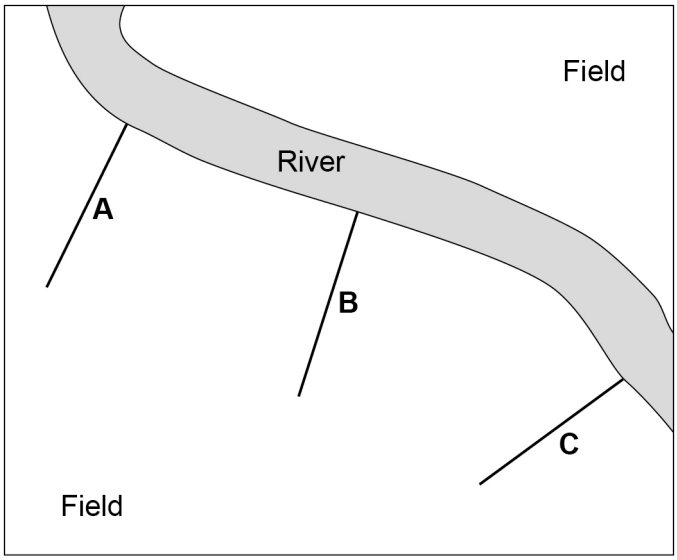
4.7.3.5 Global warming

Question 06

0 3 A student investigated how the distance from a river affects the number of different plant species.

Figure 3 shows a river between two fields.

Figure 3



0 3 . 1 **A**, **B** and **C** show the positions of three transects.

Where should the student position another transect for this investigation?

Draw the extra transect line on **Figure 3**.

[1 mark]

4.7.3.5 Global warming

Question 06 · continued

0 3 . 2 The student recorded the number of different plant species at 1 m intervals along each transect.

Which piece of equipment should be used at 1 m intervals along the transect?

[1 mark]

Tick (✓) **one** box.

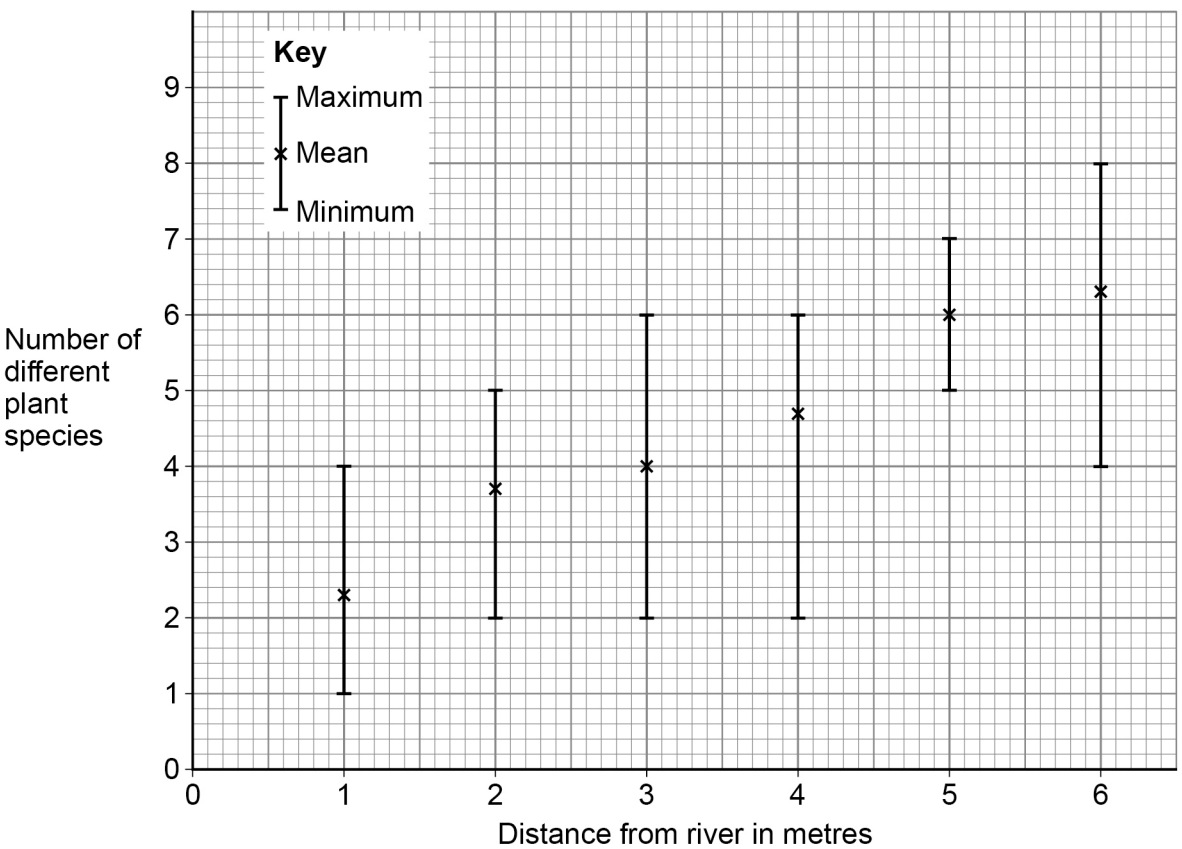
- Microscope ☐
- Quadrat ☐
- Timer ☐

Question 3 continues on the next page

Question 06 · continued

Figure 4 shows the results.

Figure 4



0 3 . 3 What was the mean number of different plant species 5 m from the river?

[1 mark]

Mean = _____

0 3 . 4 What is the effect of increasing distance from the river on the mean number of different plant species?

[1 mark]

_____

_____

Question 06 · continued

0 3 . 5 The minimum and maximum values on **Figure 4** show the range of results at each distance from the river.

Why is it useful to know the range of results?

[1 mark]

Tick (✓) **one** box.

- To calculate the mean result ☐
- To know the uncertainty of the mean ☐
- To show the mode of the results ☐

0 3 . 6 Cows are kept in the fields.

Fewer plants are found where the cows often walk on the ground.

The number of cows is one **biotic** factor that affects the number of plants.

Which **two** factors are **abiotic** factors?

[2 marks]

Tick (✓) **two** boxes.

- Consumers ☐
- Light intensity ☐
- Moisture levels ☐
- Pathogens ☐
- Predators ☐

Question 3 continues on the next page

4.7.3.5 Global warming

Question 06 · continued

0 3 . 7 Explain why a decrease in the number of plants across the world increases global warming.

[2 marks]

9

4.7.3.5 Global warming

Question 07

June 2024 | 8464/B/1F | Original Q5

0 5 This question is about photosynthesis.

0 5 . 1 Complete the equation for photosynthesis.

Choose answers from the box.

[2 marks]

nitrogen	**oxygen**	**ethanol**	**water**

carbon dioxide + _____ $\xrightarrow{\text{light}}$ glucose + _____

0 5 . 2 What is the chemical formula for glucose?

[1 mark]

Tick (✓) **one** box.

CO_2 ☐ $C_6H_{12}O_6$ ☐ H_2O ☐ O_2 ☐

0 5 . 3 Give **two** ways plants use the glucose produced by photosynthesis.

[2 marks]

1 _____

_____

2 _____

_____

Question 07 · continued

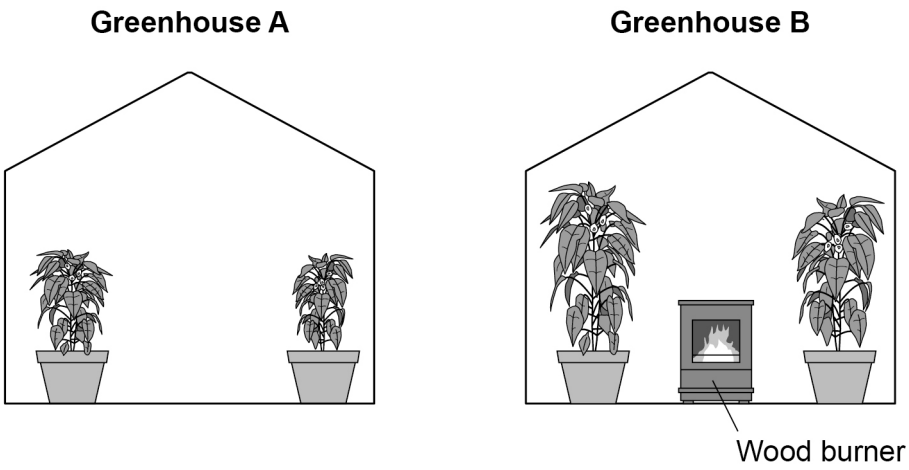
0 5 . 4 A person has two greenhouses.

In each greenhouse, the plants:

- are all the same type
- receive the same intensity of light and the same volume of water
- grow in the same type of soil.

Figure 7 shows the greenhouses.

Figure 7



The person burns logs in the wood burner in greenhouse **B**.

Explain why the plants in greenhouse **B** grow faster than the plants in greenhouse **A**.

[4 marks]

9

4.7.3.5 Global warming

Question 08

June 2024 | 8464/B/2F | Original Q6

0 6 Potatoes are a food crop.

0 6 . 1 Potato plants are classified as eukaryota.

What type of classification group is eukaryota?

[1 mark]

Tick (✓) **one** box.

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

0 6 . 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 6 continues on the next page

4.7.3.5 Global warming

Question 08 · continued

0 6 . 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 6 . 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]

4.7.3.5 Global warming

Question 08 · continued

0 6 . 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 09

0 2 Farmers can increase crop yield by controlling the conditions that plants grow in.

0 2 . 1 Draw **one** line from each substance to how the substance increases crop yield.

[2 marks]

Substance	How the substance increases crop yield
Fertiliser	Adds mineral ions to the soil
Herbicide	Decreases carbon dioxide concentration in the soil
	Increases oxygen concentration in the air
	Kills weeds that compete with crops

0 2 . 2 **Figure 1** shows a food chain for a farmer's field.

Figure 1

Seeds → Mice → Owls

Which is the secondary consumer in the food chain?

[1 mark]

Tick (✓) **one** box.

- Seeds ☐
- Mice ☐
- Owls ☐

0 2 . 3 Bees are insects that live in hives.

The bees fly in and out of the hives.

Figure 2 shows a crop growing in a field.

The farmer has added bee hives to increase the number of bees in the field.

Figure 2



Increasing the number of bees and other insects increases crop yield.

Which are **two** ways that increasing the number of insects in an area will increase crop yield?

[2 marks]

Tick (✓) **two** boxes.

- Insects change the soil pH around the crop. ☐
- Insects eat leaves from the crop. ☐
- Insects eat pests on the crop. ☐
- Insects pollinate the crop. ☐
- Insects shelter in the crop. ☐

0 2 . 4 Some farmers increase the size of hedgerows between fields where crops grow.

Suggest **one** reason why.

[1 mark]

Peat comes from peat bogs.

0 2 . 5 Peat can be used to produce garden compost.

Table 1 compares peat compost with a sample of soil.

Table 1

	Mineral ion concentration	Speed at which water drains through
Peat compost	Low	Slow
Soil	High	Fast

Young plants have short roots.

Explain **one** advantage of growing young plants in peat compost instead of in soil.

[2 marks]

Question 2 continues on the next page

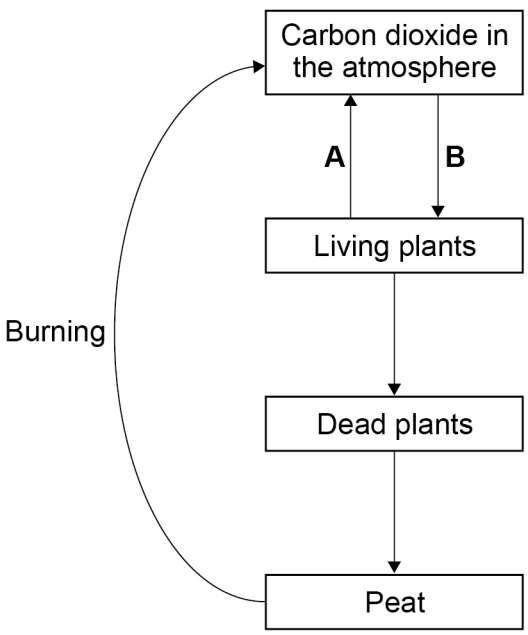
4.7.3.5 Global warming

Question 09 · continued

Peat can also be burnt as fuel.

Figure 3 shows part of the carbon cycle.

Figure 3



0 2 . 6 Name process **A** and process **B**.

Choose answers from the box.

[2 marks]

condensation	**photosynthesis**	**respiration**	**transpiration**

Process **A** _____

Process **B** _____

0 2 . 7 Peat contains carbon compounds.

Explain why burning peat contributes to climate change.

[2 marks]

0 2 . 8 Decay is an important process in the carbon cycle.

Which **two** types of organism cause decay?

[2 marks]

Tick (✓) **two** boxes.

- Algae ☐
- Animals ☐
- Bacteria ☐
- Fungi ☐
- Plants ☐

0 2 . 9 Deforestation affects the carbon cycle.

Give **one** use of the land after the land has been cleared by deforestation.

[1 mark]

15