AQA GCSE Combined Science - Trilogy | 8464

SPECIFICATION POINT 4.7.2.2

How materials are cycled

Past-paper questions

Tier	**Foundation**
Question groups	**4**
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.

4.7.2.2 How materials are cycled

Question 01

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 _____

_____

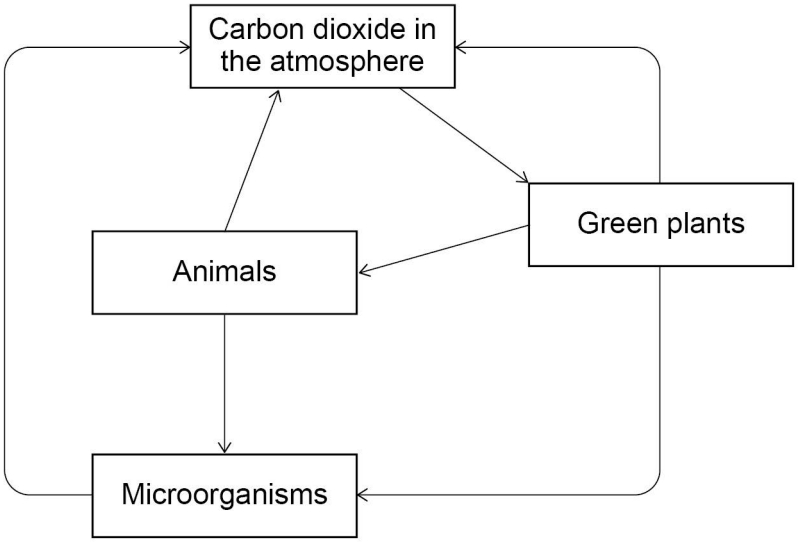
4.7.2.2 How materials are cycled

Question 01 · 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]

4.7.2.2 How materials are cycled

Question 02

November 2020 | 8464/B/2F | Original Q3

0 3 Mineral ions are important chemicals in an ecosystem.

0 3 . 1 Plants take in nitrate ions dissolved in water.

Which part of a plant takes in nitrate ions?

[1 mark]

_____

0 3 . 2 Name **two** chemicals that are cycled between plants, the soil and the air.

Do **not** refer to nitrogen or nitrates in your answer.

[2 marks]

1 _____

2 _____

4.7.2.2 How materials are cycled

Question 02 · continued

0 3 . 3 All the chemicals in a plant are recycled when the plant dies.

Describe how:

- microorganisms recycle chemicals
- the chemicals are used again by new plants.

[6 marks]

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4.7.2.2 How materials are cycled

Question 03

June 2022 | 8464/B/2F | Original Q5

0 5 This question is about the cycling of water and carbon in ecosystems.

0 5 . 1 Which reaction produces water?

[1 mark]

Tick (✓) **one** box.

Aerobic respiration ☐

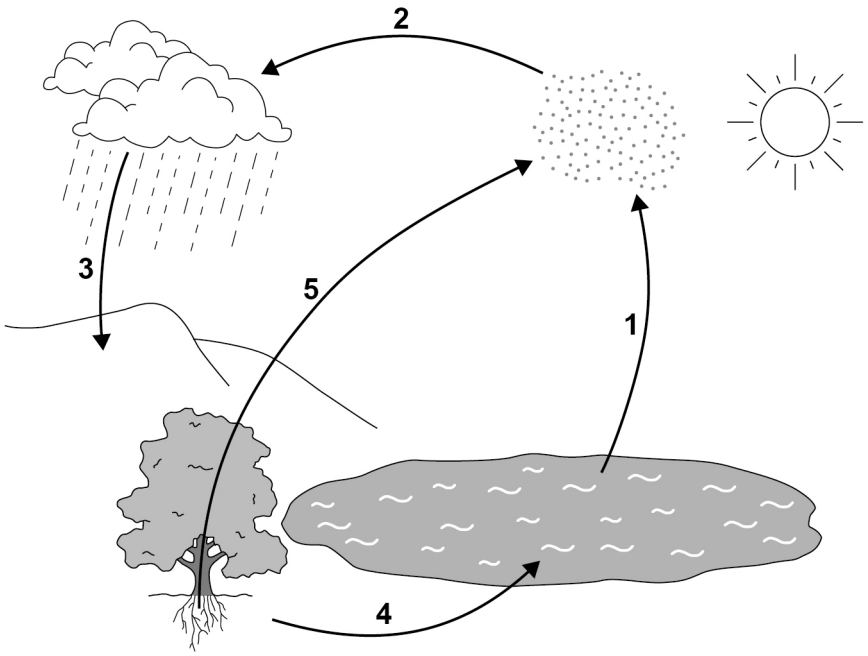
Anaerobic respiration ☐

Photosynthesis ☐

The water cycle provides water for plants and animals on land before the water goes into lakes and seas.

Figure 7 represents the water cycle.

Figure 7



4.7.2.2 How materials are cycled

Question 03 · continued

0 5 . 2 Name the processes **1** to **5** shown on **Figure 7**.

[5 marks]

1 _____

2 _____

3 _____

4 _____

5 _____

0 5 . 3 In 2007 the population of the world was 6 000 000 000

A study found that 4.5% of the population had severe water shortage.

Calculate how many people had severe water shortage.

Give your answer in standard form.

[3 marks]

_____

_____

_____

_____

_____

Number of people (in standard form) = _____

Question 5 continues on the next page

4.7.2.2 How materials are cycled

Question 03 · continued

0 5 . 4 Why do more people have severe water shortage now than in 2007?

[2 marks]

Tick (✓) **two** boxes.

- Climate change has increased the area of deserts. ☐
- Each person drinks less water. ☐
- More water is used to grow crops. ☐
- Sea levels have risen because the ice caps are melting. ☐
- Some countries have built de-salting factories for seawater. ☐

Leaves on a tree contain carbon compounds.

In autumn the leaves fall to the ground.

0 5 . 5 Microorganisms in the soil recycle carbon from the leaves so that the carbon is used for new plant growth.

Explain how.

[4 marks]

4.7.2.2 How materials are cycled

Question 03 · continued

0 5 . 6 What is **one** benefit of fallen leaves for living plants?

[1 mark]

Tick (✓) **one** box.

- Energy is released for living plants. ☐
- Insect pests in the soil are killed. ☐
- Nitrates are released into the soil. ☐
- Oxygen is supplied to root cells. ☐

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Turn over for the next question

4.7.2.2 How materials are cycled

Question 04

June 2025 | 8464/B/2F | Original Q2

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

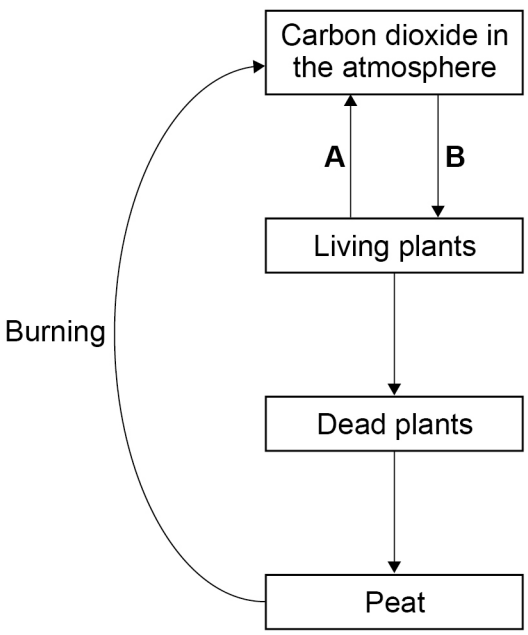
4.7.2.2 How materials are cycled

Question 04 · 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** _____

4.7.2.2 How materials are cycled

Question 04 · continued

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]

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