

GCSE Combined Science: Trilogy

Worksheet: How materials are cycled

TIME 35 min	TOTAL 32 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: How materials are cycled

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

In the carbon cycle, carbon moves between the air, living organisms and dead material.

0 1 . 1

Complete the sentences. Choose answers from the list.
combustion · decay · digestion · evaporation · photosynthesis · respiration

Plants take in carbon dioxide from the air for

Plants and animals release carbon dioxide into the air by

Microorganisms release carbon dioxide when they cause dead organisms to

Burning fossil fuels, called, also releases carbon dioxide.

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[4 marks]

0 1 . 2

Microorganisms also return substances to the soil that plants need for healthy growth.
Name this type of substance.

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.....
[1 mark]

0 2

Carbon is cycled between living organisms and the atmosphere.

0 2 . 1

Which process removes carbon dioxide from the atmosphere?

Tick (✓) **one** box.

- | | |
|----------------|--------------------------|
| Combustion | ☐ |
| Decay | ☐ |
| Photosynthesis | ☐ |
| Respiration | ☐ |

[1 mark]

0 2 . 2

Which **two** processes return carbon dioxide to the atmosphere?

Tick (✓) **two** boxes.

- | | |
|----------------------------|--------------------------|
| Combustion of fossil fuels | ☐ |
| Feeding | ☐ |
| Photosynthesis | ☐ |
| Respiration | ☐ |
| Transpiration | ☐ |

[2 marks]

0 2 . 3

Name the type of organism that returns carbon from dead plants and animals to the atmosphere.

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[1 mark]

0 2 . 4

Why is it important that materials such as carbon are recycled in the living world?

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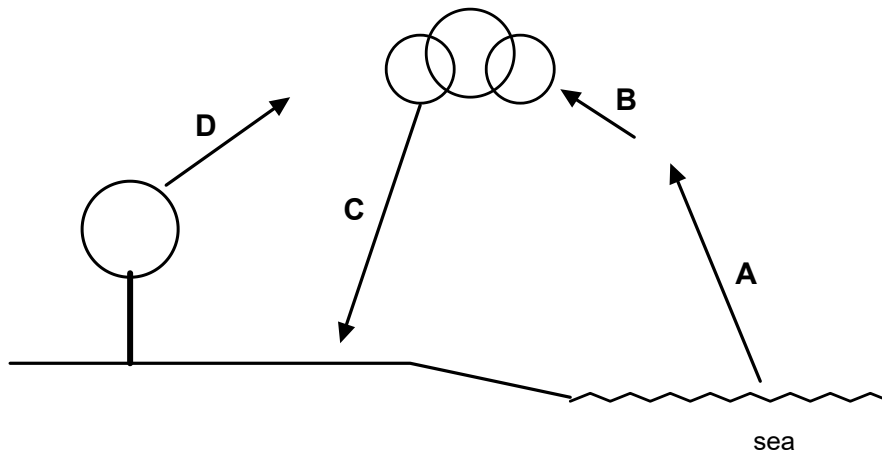
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[1 mark]

.....

Figure 1 shows part of the water cycle.

Figure 1



0 3 . 1

Name the processes shown by arrows A, B, C and D. Choose answers from the list.

condensation · evaporation · precipitation · respiration · transpiration

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[4 marks]

0 3 . 2

Why is the water cycle important to living organisms on land?

Tick (✓) **one** box.

It provides fresh water for plants and animals on land.

☐

It removes carbon dioxide from the air.

☐

It returns mineral ions to the soil.

☐

It produces oxygen for respiration.

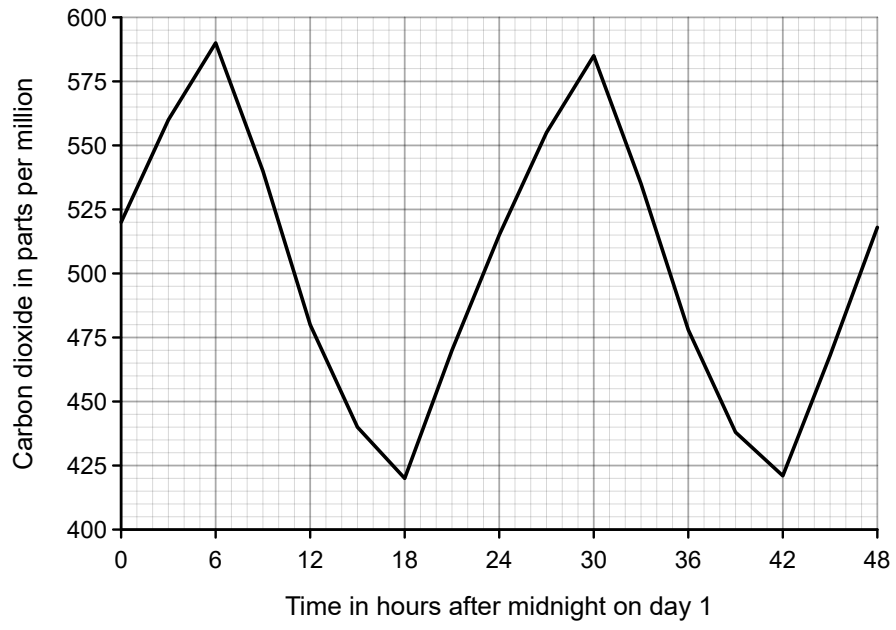
☐

[1 mark]

0 4

A student made a sealed bottle garden containing soil, small plants and a few woodlice, which feed on dead leaves. A lamp was switched on from 06:00 to 18:00 each day. A sensor measured the concentration of carbon dioxide in the air inside the bottle for 48 hours. Figure 2 shows the results.

Figure 2



0 4 . 1

Explain why the concentration of carbon dioxide increased between 18:00 and 06:00.

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[2 marks]

0 4 . 2

Explain why the concentration of carbon dioxide decreased between 06:00 and 18:00.

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[2 marks]

0 4 . 3

Calculate the mean rate of decrease in the carbon dioxide concentration between 06:00 and 18:00 on day 1.

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Mean rate = parts per million per hour

[2 marks]

0 4 . 4

The plants in the bottle have been alive for five years without being watered or given fertiliser.
Explain how the materials that the plants need are recycled inside the bottle.

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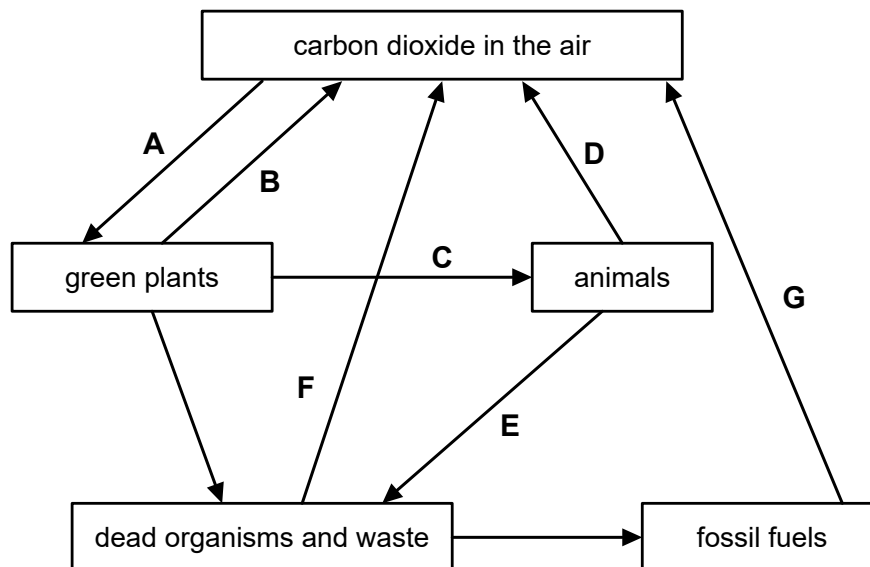
[3 marks]

.....

0 5

Figure 3 shows part of the carbon cycle.

Figure 3



0 5 . 1

Which letter shows photosynthesis?

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[1 mark]

0 5 . 2

Which letter shows combustion?

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[1 mark]

0 5 . 3

Name the process shown by arrow F and the type of organism responsible for it.

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[2 marks]

0 5 . 4

Arrow C shows feeding.
Describe how carbon in a plant becomes part of the body of an animal.

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[2 marks]

0 5 . 5

Explain why the carbon cycle is important to living organisms.

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[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: How materials are cycled · 32 marks

Question 1 (5 marks)

01.1 [4 marks]

Answer: photosynthesis; respiration; decay; combustion

- photosynthesis (1)
 - respiration (1)
 - decay (1)
 - combustion (1)
-

01.2 [1 mark]

Answer: Mineral ions

- mineral ions (1)
-

Question 2 (5 marks)

02.1 [1 mark]

Correct: Photosynthesis

02.2 [2 marks]

Correct: Combustion of fossil fuels; Respiration

02.3 [1 mark]

Answer: Microorganisms (decomposers)

- microorganisms / decomposers (bacteria or fungi) (1)
-

02.4 [1 mark]

- to provide the building blocks for future organisms / so that materials are available for new organisms (1)
-

Question 3 (5 marks)

03.1 [4 marks]

Answer: A evaporation; B condensation; C precipitation; D transpiration

- A: evaporation (1)
- B: condensation (1)
- C: precipitation (1)
- D: transpiration (1)

03.2 [1 mark]

Correct: It provides fresh water for plants and animals on land.

Question 4 (9 marks)

04.1 [2 marks]

- the lamp was off / it was dark, so there was no photosynthesis (1)
- the plants, woodlice and microorganisms released carbon dioxide by respiration (1)

04.2 [2 marks]

- the plants photosynthesised in the light (1)
- the rate of photosynthesis was greater than the total rate of respiration, so more carbon dioxide was taken in than was released (1)

04.3 [2 marks]

Answer: 14.2 parts per million per hour

- $(590 - 420) \div 12$ (1)
- 14.2 (parts per million per hour) (1)

Notes: Allow 14.

04.4 [3 marks]

- water lost from the leaves by transpiration condenses on the glass and returns to the soil (water cycle) (1)
- woodlice and microorganisms feed on dead leaves / decompose dead material (1)
- decomposers release carbon dioxide in respiration, which the plants use for photosynthesis (1)
- decomposers return mineral ions to the soil, which the plants absorb through their roots (1)
- oxygen released by photosynthesis is used by all of the organisms for respiration (1)

Any 3 of the points above.

Question 5 (8 marks)

05.1 [1 mark]

Answer: A

- A (1)

05.2 [1 mark]

Answer: G

- G (1)

05.3 [2 marks]

- decay / respiration (1)
- (by) microorganisms / decomposers (bacteria and fungi) (1)

05.4 [2 marks]

- the animal eats the plant and digests / absorbs the carbon compounds (e.g. carbohydrates, proteins, lipids) (1)
- these are used to make new molecules / tissues / biomass in the animal's body (1)

05.5 [2 marks]

- it returns carbon from organisms to the atmosphere as carbon dioxide (1)
 - which plants use in photosynthesis (to make glucose / biomass, the source of food for other organisms) (1)
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