

Relationships of organisms with one another and with the environment – 2022 November
O Level 5090

1. Nov/2022/Paper_11/No.30

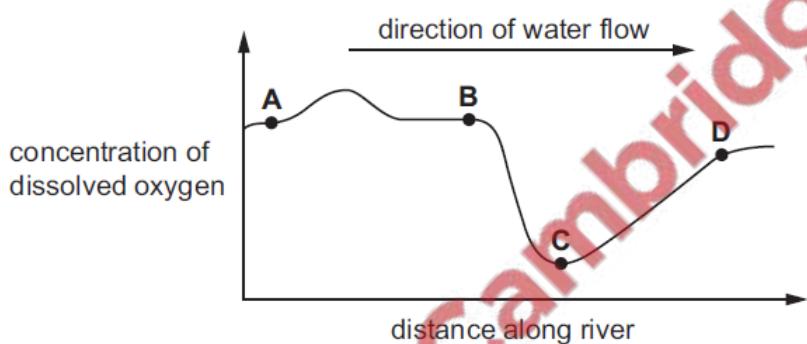
Which types of microorganism carry out decomposition in the nitrogen cycle?

- A bacteria and fungi only
- B bacteria and viruses only
- C fungi and viruses only
- D bacteria, fungi and viruses

2. Nov/2022/Paper_11/No.32

The graph shows the concentration of dissolved oxygen at different points along a river.

At which point is sewage emptied into the river?



3. Nov/2022/Paper_12/No.30

What is the principal source of energy input to biological systems?

- A food chains
- B photosynthesis
- C producers
- D the Sun



4. Nov/2022/Paper_12/No.31

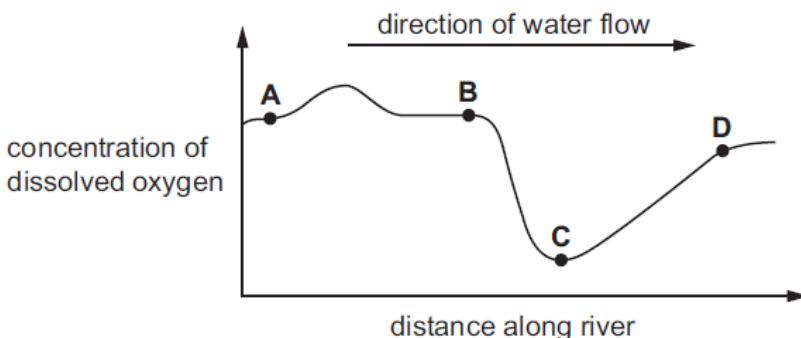
In the carbon cycle, what is one way that carbon can enter the atmosphere?

- A burning
- B feeding
- C fossilisation
- D photosynthesis

5. Nov/2022/Paper_12/No.32

The graph shows the concentration of dissolved oxygen at different points along a river.

At which point is sewage emptied into the river?



6. Nov/2022/Paper_12/No.39

Rising carbon dioxide levels in the atmosphere are causing the Earth's climate to warm up.

In what way might this change of climate affect the process of natural selection?

- A A small rise in temperature may reduce the rate of photosynthesis in plants.
- B Farmers may try to grow different crops in the warmer areas.
- C It may allow some animals and plants to colonise new areas.
- D Some mutations may prove to be an advantage in warmer conditions.

7. Nov/2022/Paper_12/No.40

The gene for insulin production can be transferred from human DNA into bacterial DNA. These bacteria are cultured to produce human insulin.

What is an advantage to patients of using this type of human insulin instead of insulin from other animals?

- A It will allow patients to pass the insulin gene to any offspring.
- B It will cause patients' pancreas glands to start producing insulin again.
- C It will be more readily available as it can be produced on a commercial scale.
- D It will result in the transfer of the insulin gene to patients.

- (c) The farmer sprays insecticide on the grape vines to improve his crop of grapes. Explain how this has an impact on the biodiversity of his fields.

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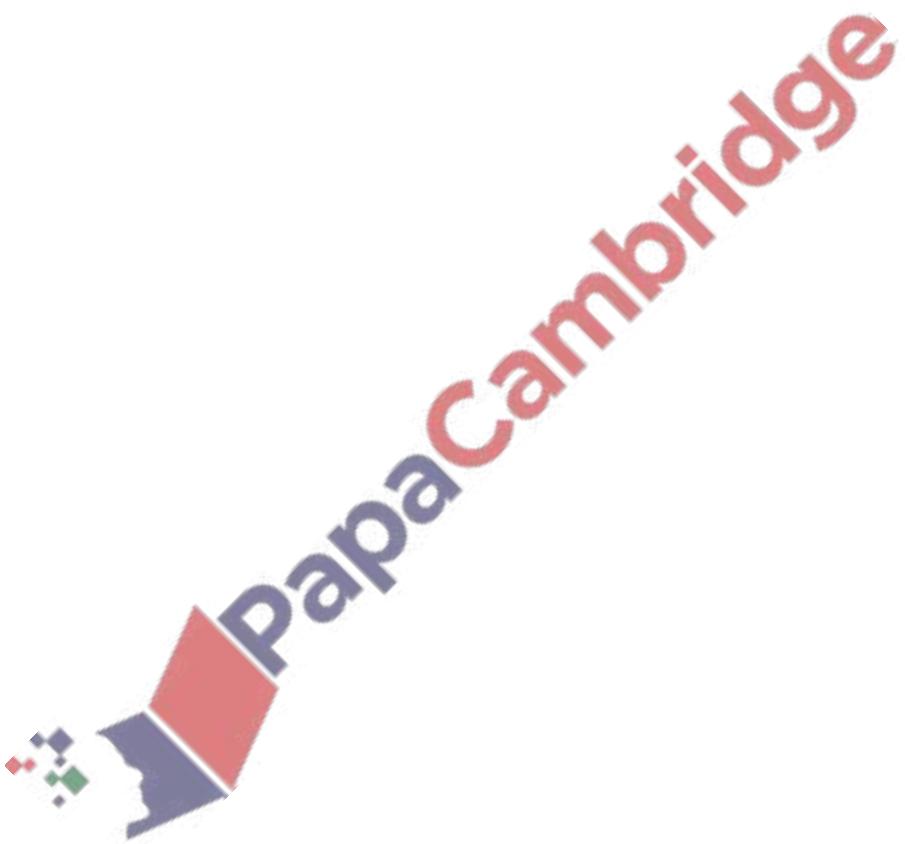
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9. Nov/2022/Paper_22/No.5(a_c)

A group of scientists investigated the total mass of carbon dioxide released when animals and plants are farmed and then used as food for humans.

(a) The total mass of carbon dioxide released for each food in the study included the mass released

- during production of the food by farming
- after the food left the farm and before it was eaten.

Suggest and explain how human activity may result in the release of carbon dioxide **after** food has left the farm on which it was produced.

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[3]

(b) Some of the results of the investigation are shown in the table.

food produced	mass of CO ₂ released per kg of food produced/kg
lamb	39.2
salmon	11.9
chicken	6.9
rice	2.7
beans	2.0
tomatoes	1.1

- (i) A farmer decides to change production from lamb to beans.

Calculate the percentage change in carbon dioxide released per kg of food produced.

Space for working.

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- (ii) An increasing number of people in some countries choose to eat a diet consisting **only** of plants.

Use the results in the table and your scientific knowledge to explain how this choice of diet may benefit the environment.

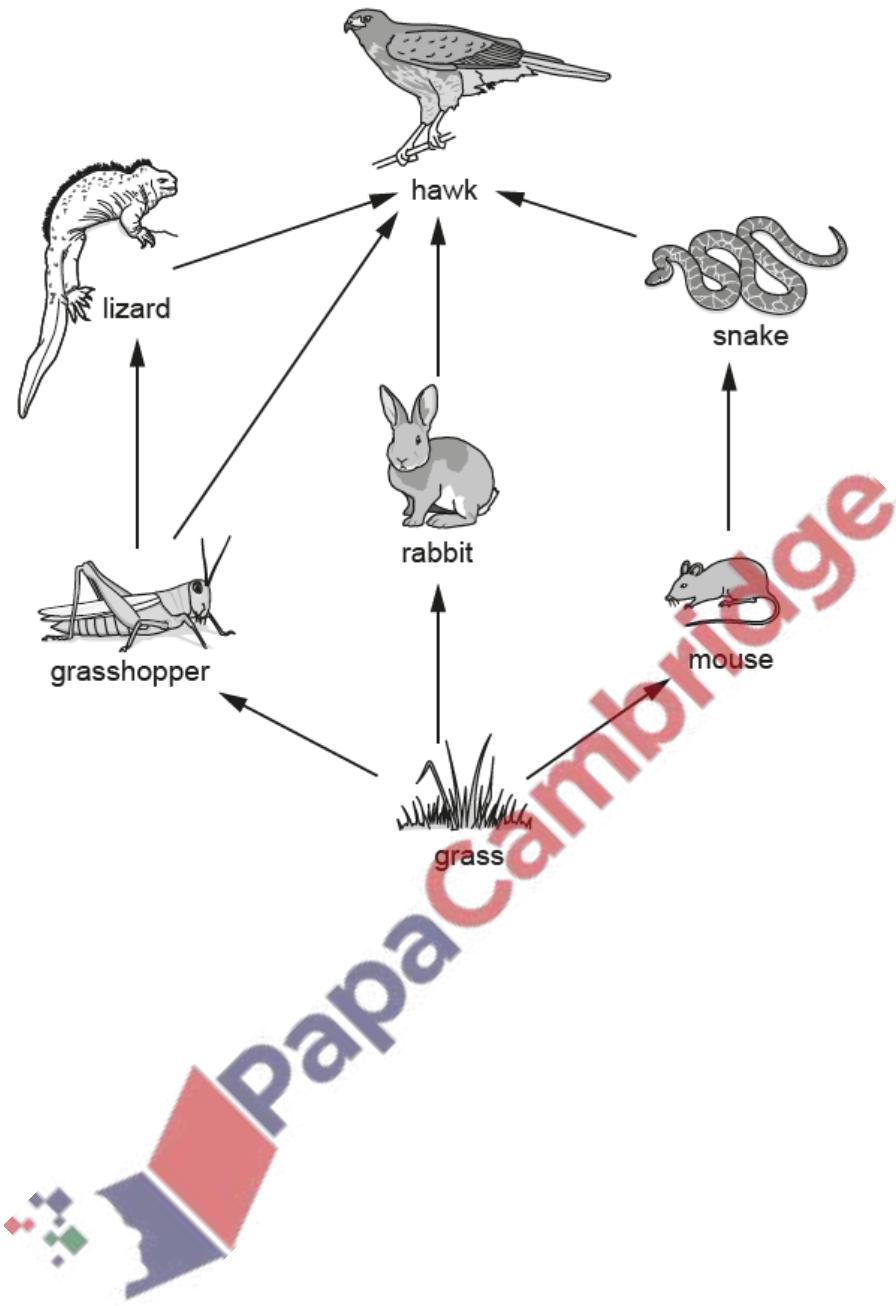
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10. Nov/2022/Paper_22/No.6(a_b)

The diagram shows a food web in an area of grassland.



- (a) Organisms in a food web can be classified into different trophic levels based on their feeding relationships.

Explain the feeding relationships of **named** organisms at different trophic levels in this food web.

(b) Describe how energy flows into and through a food web. Explain how this will determine the biomass of organisms at different trophic levels.

A red and blue stylized logo with a small geometric pattern at the bottom left, followed by the word "Papa" in a large, slanted, grey font.

11. Nov/2022/Paper_22/No.9(a_b)

- (a) Explain the advantages and disadvantages of the use of insecticides in agriculture.

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- (b) Describe the methods used to control the insect vector of malaria **other** than the use of insecticides. Explain the effect of each control method on the vector.

The logo for Papago is displayed diagonally across the page. It features the word "Papago" in a large, bold, sans-serif font. The letters are colored in a gradient: red for 'P', blue for 'a', and green for 'p' and 'ago'. Below the text is a graphic element consisting of a red trapezoid on top of a blue trapezoid, with a small cluster of small, colorful dots (red, green, blue) at the bottom left corner of the blue shape.

[5]