



General Certificate of Secondary Education  
2024–2025

Centre Number

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Candidate Number

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# Double Award Science: Biology

Unit B1  
Foundation Tier



[GDW11]

\*GDW11\*

**TUESDAY 13 MAY 2025, AFTERNOON**

## TIME

1 hour.

## INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

**You must answer the questions in the spaces provided.**

**Do not write outside the boxed area on each page or on blank pages.**

Complete questions in black ink and use a dark HB pencil for drawings and graphs.

**Do not write with a gel pen.**

Answer **all eight** questions.

## INFORMATION FOR CANDIDATES

The total mark for this paper is 60.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You may use a scientific calculator.

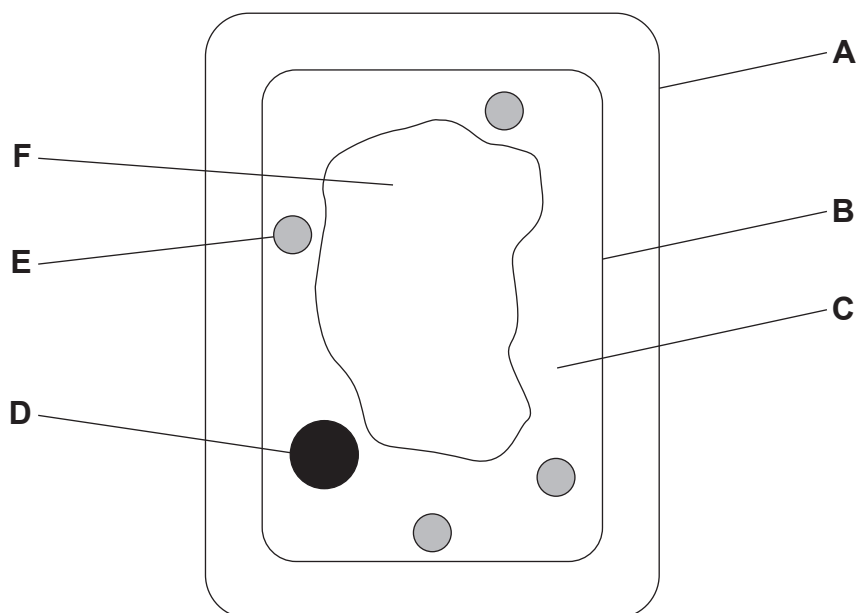
Quality of written communication will be assessed in Question 7.

14858



\*20GDW1101\*

1 The diagram shows a plant cell from a leaf.



(a) (i) Name structures **A**, **B** and **C**.

**A** \_\_\_\_\_

**B** \_\_\_\_\_

**C** \_\_\_\_\_

[3]



(ii) Complete the table to give the function of structures **D**, **E** and **F** in a plant cell from a leaf.

| Letter   | Structure   | Function |
|----------|-------------|----------|
| <b>D</b> | nucleus     |          |
| <b>E</b> | chloroplast |          |
| <b>F</b> | vacuole     |          |

[3]

(b) Name **two** structures present in a plant cell from a leaf that would **not** be present in an animal cell.

1. \_\_\_\_\_

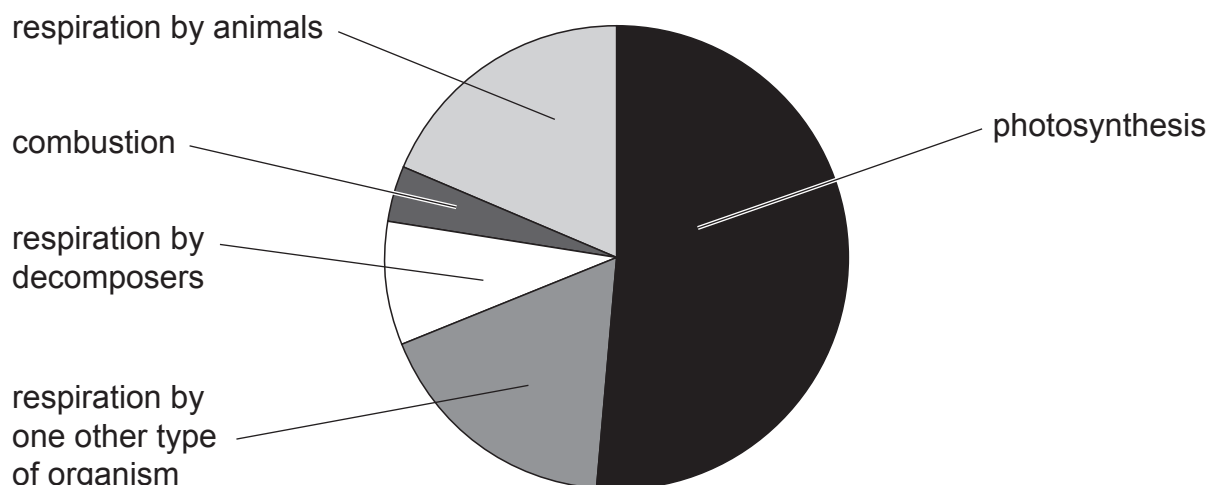
2. \_\_\_\_\_

[2]

[Turn over



2 The pie chart shows the contribution of some processes to the carbon cycle.



- (a) (i) Use the pie chart to name the process that has the smallest effect on the carbon cycle.

\_\_\_\_\_

[1]

- (ii) Respiration is carried out by animals, decomposers and one other type of organism.  
Name this other type of organism.

\_\_\_\_\_

[1]



Some of the processes shown on the pie chart add carbon dioxide to the atmosphere and some remove carbon dioxide from the atmosphere.

(b) Write the name of each process in the correct column in the table.

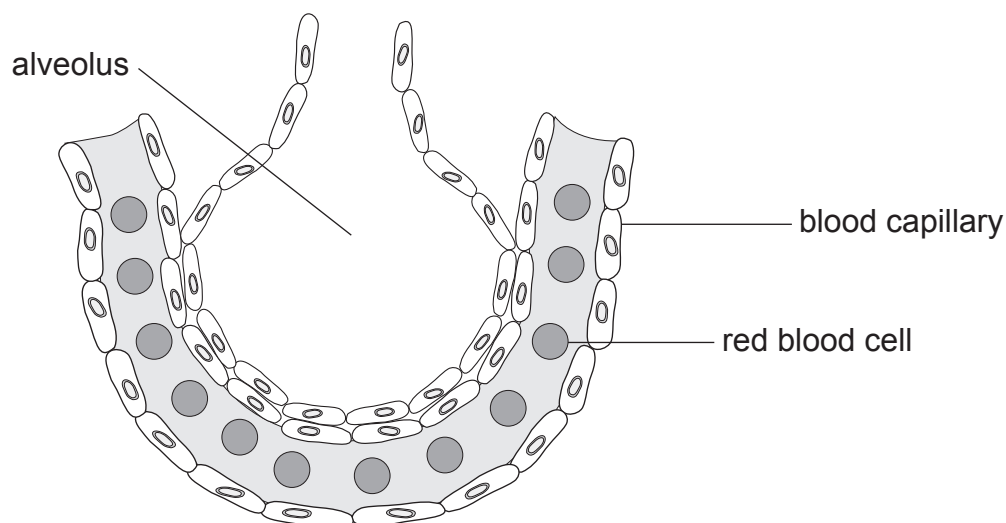
| Process(es) that <b>add</b> carbon dioxide to the atmosphere | Process(es) that <b>remove</b> carbon dioxide from the atmosphere |
|--------------------------------------------------------------|-------------------------------------------------------------------|
|                                                              |                                                                   |

[3]

[Turn over



- 3 The diagram shows the respiratory surface in humans.  
It shows one alveolus (air sac) and a blood capillary in the lungs.



Respiratory surfaces in the lungs have several adaptations to allow maximum gas exchange.

Use a ruler to draw a line from each adaptation to explain how it allows maximum gas exchange.

| Adaptation                   | Explanation                           |
|------------------------------|---------------------------------------|
| moist alveoli                | short diffusion distance              |
| many alveoli                 | allow gases to <b>dissolve</b>        |
| permeable walls of alveoli   | large surface area                    |
| good blood supply to alveoli | allow gases to <b>diffuse through</b> |
| thin walls of alveoli        | maintain the diffusion gradient       |

[4]



4 Plants produce a growth response when stimulated by light.

(a) (i) Name this growth response.

\_\_\_\_\_

[1]

(ii) Name the hormone involved in this growth response.

\_\_\_\_\_

[1]

(iii) Describe what happens to a shoot when light shines on it from the **right-hand side** only.

\_\_\_\_\_

\_\_\_\_\_ [1]

In animals there are two communication systems that respond to external stimuli, the hormonal system and the nervous system.

(b) (i) What difference, if any, is there in the speed of response in the hormonal system compared to the nervous system?

\_\_\_\_\_ [1]

(ii) Name an effector in the nervous system.

\_\_\_\_\_

[1]

[Turn over



5 Enzymes are proteins that act as biological catalysts.

(a) Give **two** factors that affect the action of enzymes.

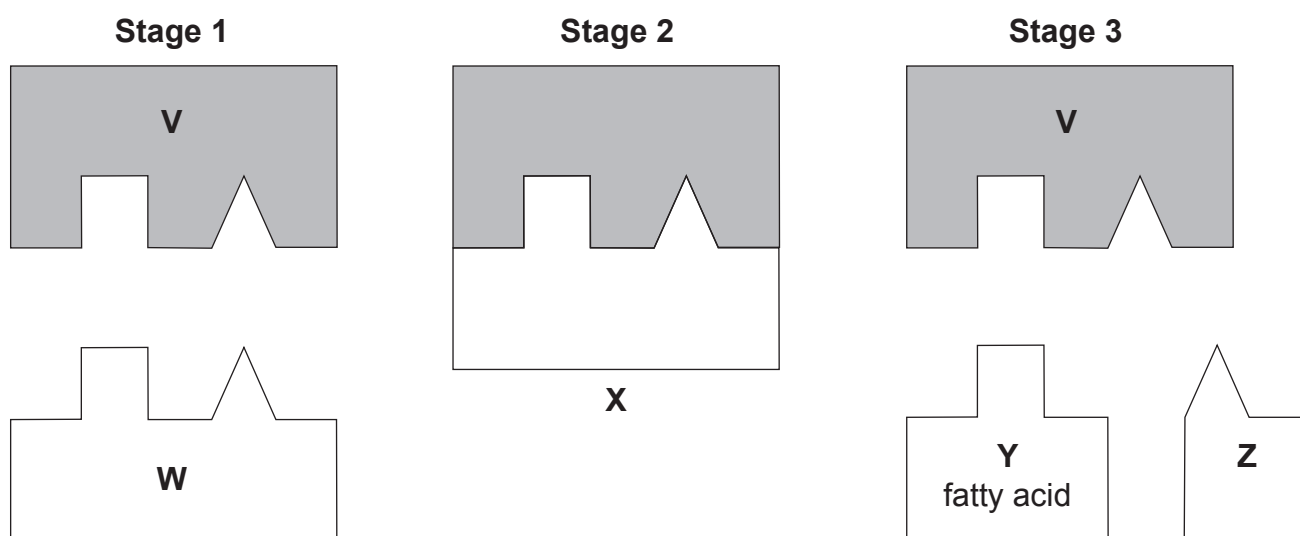
1. \_\_\_\_\_

2. \_\_\_\_\_

[2]

The diagram shows three stages representing the lock and key model of enzyme activity with its substrate.

Molecule **Y** is a fatty acid.



The list gives terms associated with enzymes and their reactions.

|             |                      |            |         |
|-------------|----------------------|------------|---------|
| enzyme      | substrate            | amino acid | product |
| fat (lipid) | complex carbohydrate | glucose    |         |
| amylase     | glycerol             | protease   | lipase  |

(b) Choose **two** terms from the list that apply to each of the molecules, **V**, **W** and **Z**.

**V** \_\_\_\_\_ and \_\_\_\_\_

**W** \_\_\_\_\_ and \_\_\_\_\_

**Z** \_\_\_\_\_ and \_\_\_\_\_ [6]

[Turn over



- 6 Sea otters live in most coastal areas of the Pacific Ocean.

Photograph **A** shows a sea otter feeding on a sea urchin. Photograph **B** shows kelp.



Photograph **A**



Photograph **B**

The statements give information about sea otters and some other organisms in their food web.

Kelp is a large sea plant that carries out photosynthesis.

Sea urchins, mussels and fish feed on kelp.

Starfish feed on mussels.

Gulls feed on fish.

Bald eagles feed on gulls.

Sea otters feed on sea urchins and starfish.



(a) Use the statements to complete the food web.

gulls

sea urchins

mussels

[4]

(b) (i) Name the producer in this food web.

\_\_\_\_\_

[1]

(ii) Name the organism that is both a secondary and tertiary consumer in this food web.

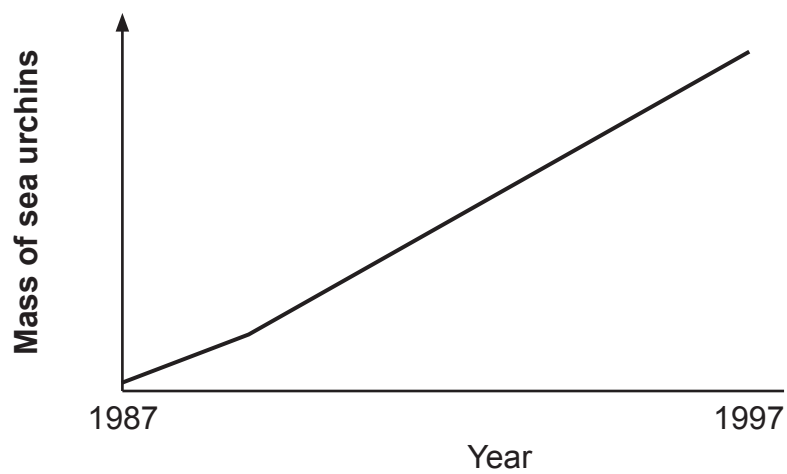
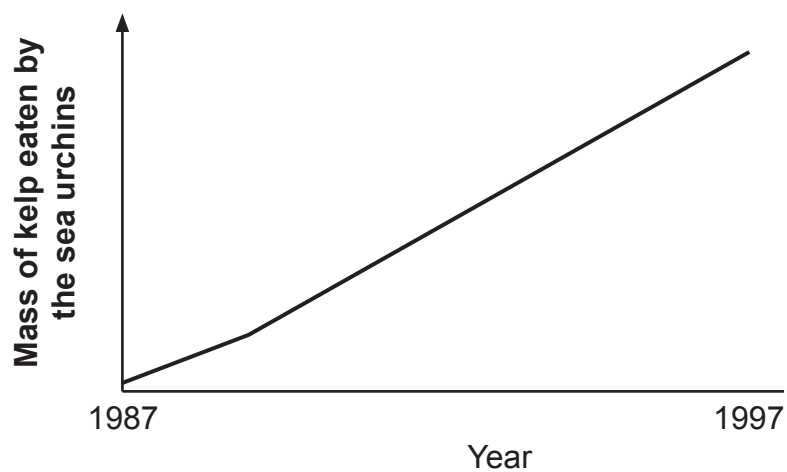
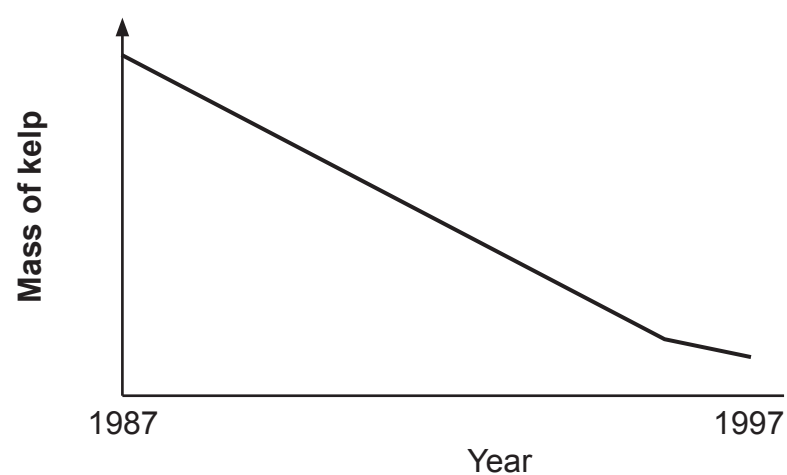
\_\_\_\_\_

[1]

[Turn over



The graphs show the results of some investigations on this food web between 1987 and 1997.



Certain factors caused the population of sea otters to decrease in this area of the Pacific Ocean between 1987 and 1997. This affected the food web.

- (c) Use the graphs and the information provided to describe and explain what happened to the **mass of kelp** as a result of the **decrease** in the population of sea otters.

Description \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Explanation \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

[3]

[Turn over



- (d) In one other area of the Pacific Ocean, there were no sea otters. Scientists introduced some sea otters into this area and monitored their population from 1989 to 2017.

The population of sea otters was:

- 208 in 1989.
- 2058 in 2017.

Calculate the percentage (%) increase in the population of sea otters in this area between 1989 and 2017.

**Show your working out.**

Give your answer to **two** decimal places.

\_\_\_\_\_ % [4]



\*20GDW1115\*

8 The excretory system carries out osmoregulation and produces urine.

(a) Name the organ that produces urine.

[1]

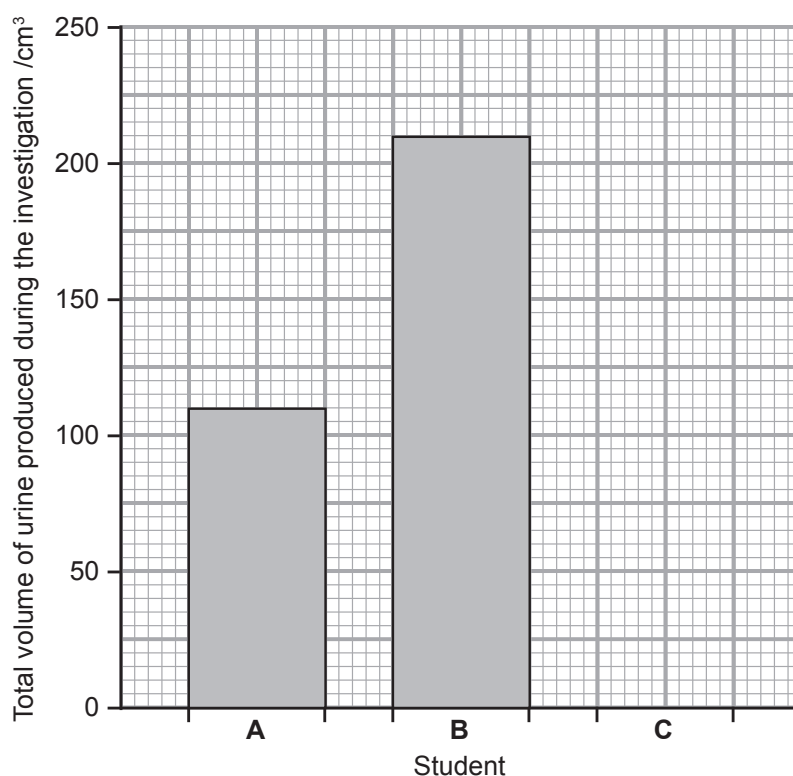
In an investigation, three students, **A**, **B** and **C**, each drank the same volume of water at the same time.

Each student measured the volume of urine they produced at 10, 40, 70 and 100 minutes after drinking the water.

The table shows some of the results for the volume of urine produced by students **A**, **B** and **C** at the different times.

| Student  | Volume of urine produced at each time /cm <sup>3</sup> |        |        |         |
|----------|--------------------------------------------------------|--------|--------|---------|
|          | 10 min                                                 | 40 min | 70 min | 100 min |
| <b>A</b> | 10                                                     | 20     | 30     |         |
| <b>B</b> | 30                                                     | 30     | 70     | 80      |
| <b>C</b> | 30                                                     | 40     | 80     | 100     |

The bar chart shows some of the results for the **total** volume of urine produced by students **A**, **B** and **C** during the investigation.



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\*20GDW1116\*

- (b) Use the table **and** the bar chart to calculate the volume of urine produced by student **A** at 100 minutes.

**Show your working out.**

\_\_\_\_\_ cm<sup>3</sup> [3]

- (c) (i) Use the table to calculate the total volume of urine produced by student **C** during the investigation.

**Show your working out.**

\_\_\_\_\_ cm<sup>3</sup> [2]

- (ii) Complete the bar chart by drawing the bar for the total volume of urine produced by student **C** during the investigation.

Shade the bar you have drawn. [1]

- (d) (i) One student exercised vigorously just before drinking the water. Use the bar chart to identify this student and use data to explain your choice.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_ [2]

**[Turn over**



(ii) Give **two** reasons why exercising vigorously caused a change in the volume of urine produced by this student.

1. \_\_\_\_\_

2. \_\_\_\_\_

[2]

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**THIS IS THE END OF THE QUESTION PAPER**

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\*20GDW1119\*

Sources:

Question 1:.....Principal Examiner

Question 2:.....Principal Examiner

Question 3:.....© Getty Images / Principal Examiner

Question 5(b)..Principal Examiner

Question 6:.....© Getty Images × 2

Question 6(c): Modified from J.A. Estes et al., Killer Whale Predation on Sea Otters Linking Oceanic and Nearshore Ecosystems. *Science* 282,473-476(1998). DOI:10.1126/science.282.5388.473

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|-------------------------|-------|
| Question Number         | Marks |
| 1                       |       |
| 2                       |       |
| 3                       |       |
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| Total Marks |  |
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Examiner Number

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\*20GDW1120\*