AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.1.4

Adaptations

Past-paper questions

Tier	**Foundation**
Question groups	**47**
Available paper years	**2007–2025**

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.

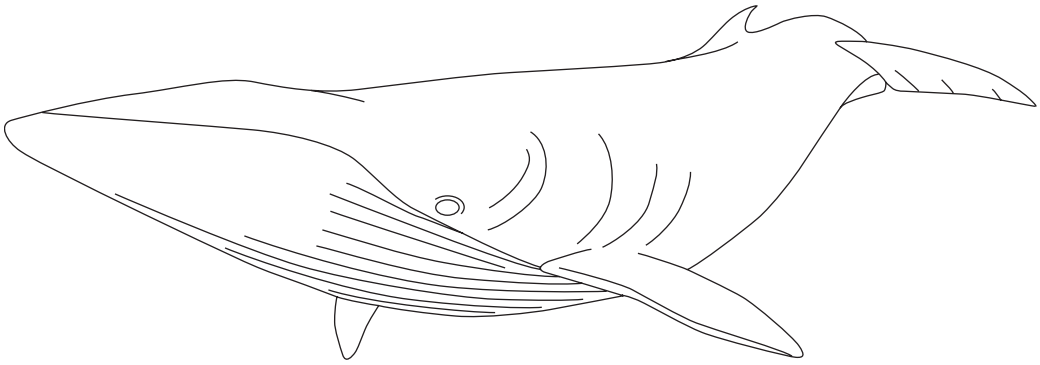
4.7.1.4 Adaptations

Question 01

January 2007 | BLY1F | Original Q1 | Legacy

1 (a) **Figure 1** shows a minke whale. Whales live in the sea.

Figure 1



Write down **two** ways in which the body of the whale is adapted for swimming.

1 .....

.....

2 .....

.....

(2 marks)

(b) **Figure 2** shows the skeleton of a minke whale.

Figure 2

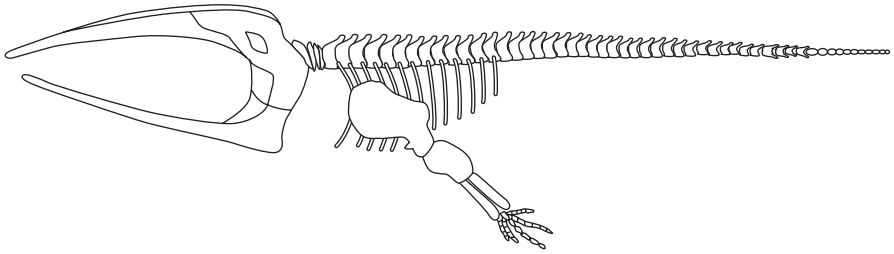
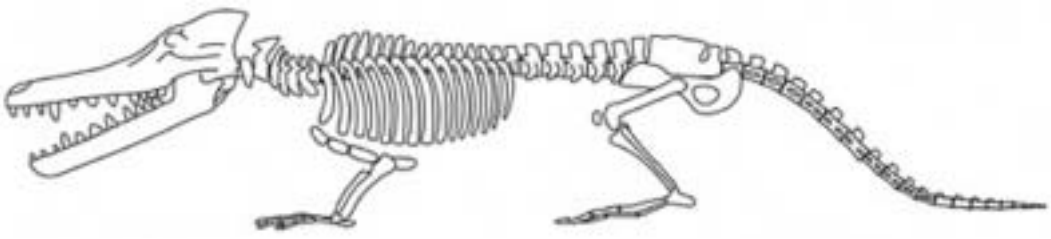


Figure 3 shows the fossil skeleton of an extinct whale.

Figure 3



4.7.1.4 Adaptations

Question 01 · continued

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(i) Apart from size, give **two** differences between the skeleton of the minke whale and the fossil skeleton of the extinct whale.

1 .....

.....

2 .....

.....

(2 marks)

(ii) In each of the sentences below, draw a ring around the correct answer.

Life on Earth first developed more than three [billion / million / thousand] years ago.

Fossils [disprove / give evidence for / prove] the theory of evolution.

(2 marks)

6

4.7.1.4 Adaptations

Question 02

March 2007 | BLY1B | Original Q1 | Legacy

QUESTION ONE

Polar bears are adapted for life in the arctic.



Match adaptations, **A**, **B**, **C** and **D**, with the numbers **1–4** in the sentences.

A black skin

B small ears

C thick fur

D white fur

The polar bear is camouflaged by its . . . **1** . . . .

Its surface area is reduced by having . . . **2** . . . .

The polar bear is insulated by air trapped in its . . . **3** . . . .

Heat from the sun is absorbed by its . . . **4** . . . .

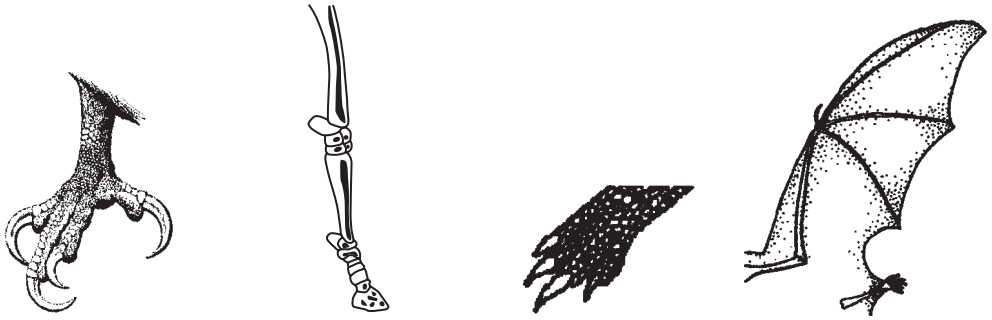
4.7.1.4 Adaptations

Question 03

March 2007 | BLY1B | Original Q2 | Legacy

QUESTION TWO

The drawings show the limbs of four animals. (The drawings are not to scale.)



1 2 3 4

Match words, **A**, **B**, **C** and **D**, with the numbers **1–4** on the drawings.

A limb is adapted for burrowing

B limb is adapted for flying

C limb is adapted for gripping branches

D limb is adapted for running

4.7.1.4 Adaptations

Question 04

June 2007 | BLY1B | Original Q1 | Legacy

QUESTION ONE

Organisms are adapted for survival in many different ways.

Match adaptations, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A leaves are poisonous

B leaves have prickles

C blue skin with yellow spots

D white colour

	How adaptation helps survival
1	camouflages an animal in the Arctic
2	warns birds not to eat it
3	hurts the mouth of animals that try to eat it
4	makes animals that eat it ill

4.7.1.4 Adaptations

Question 05

June 2007 | BLY1F | Original Q1 | Legacy

1 Animals and plants are adapted in different ways in order to survive.

(a) Plants may have to compete with other plants.

(i) Name **two** things for which plants compete.

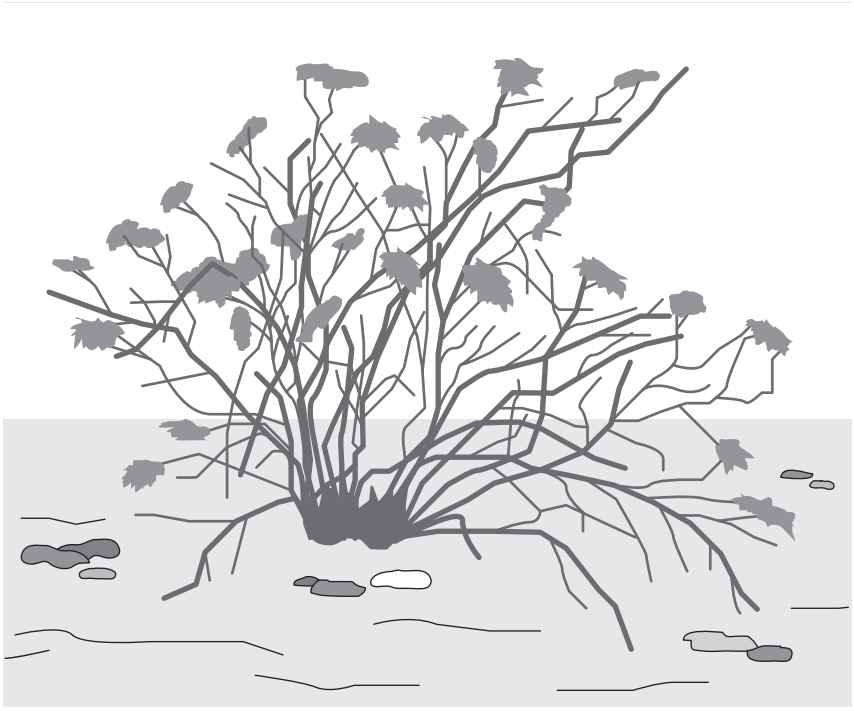
1 .....

2 .....

(2 marks)

(ii) The drawing shows a creosote bush.

This bush lives in a desert.



The creosote bush produces a poison that kills the roots of other plants.

How does this poison help the creosote bush to survive in the desert?

.....

.....

(1 mark)

4.7.1.4 Adaptations

Question 05 · continued

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(b) The photograph shows an insect called a katydid.



The katydid is preyed on by birds.

How does the appearance of the katydid help it to survive?

.....

.....

.....

.....

(1 mark)

4

4.7.1.4 Adaptations

Question 06

November 2007 | BLY1B | Original Q3 | Legacy

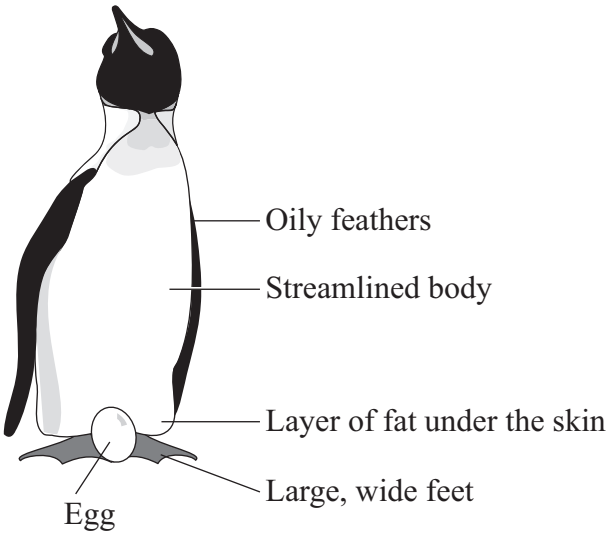
QUESTION THREE

Penguins live in the Antarctic where the land is often frozen and the sea is cold.

Penguins are good swimmers and feed on fish.

They lay their eggs on land and carry them with their feet.

Penguins have adaptations that help them to survive in Antarctic conditions.



Match adaptations, **A**, **B**, **C** and **D**, with the conditions **1–4** in the table.

A oily feathers

B large, wide feet

C thick layer of fat under the skin

D streamlined body

	The adaptation . . .
1	helps the penguins to survive the cold conditions of the land and the sea.
2	prevents the penguins from becoming waterlogged when swimming.
3	helps the penguins to carry their eggs on land.
4	helps to reduce resistance when the penguins are swimming.

4.7.1.4 Adaptations

Question 07

November 2007 | BLY1B | Original Q8 | Legacy

QUESTION EIGHT

Rabbits and hares are closely related species.

They are thought to have descended from a common ancestor that is now extinct.

8A Extinction may be caused by . . .

1 an increase in variation.

2 a lack of new competitors.

3 fossilisation.

4 changes in the environment.

8B The evidence that rabbits and hares have evolved from a common ancestor would be shown by . . .

1 comparing modern rabbits and hares with other related species.

2 studying the fossil record of rabbits and hares.

3 studying the fossils of predators of rabbits and hares.

4 comparing the behaviour of rabbits and hares.

8C Rabbits and hares both feed on plants and have teeth adapted for this.

Which one of the following is **not** a possible factor for the development of the specialised teeth of rabbits and hares?

1 adaptation to the environment

2 changes in the environment

3 evolution of predators

4 natural selection

8D What is a mutation?

1 a change in the physical appearance of an organism

2 a change in a gene

3 a form of natural selection

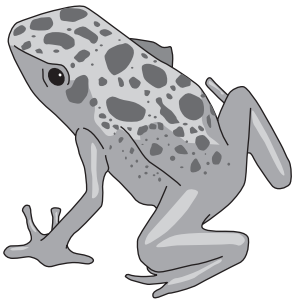
4 a change in the environment

4.7.1.4 Adaptations

Question 08

January 2008 | BLY1F | Original Q2 | Legacy

2 The drawing shows a poison-dart frog.



(a) The poison-dart frog moves mainly by jumping.

Use information from the drawing to suggest **one** way in which this frog is adapted for jumping.

.....

.....

(1 mark)

(b) Use the information below to suggest how the poison-dart frog is adapted for survival.

- This poison-dart frog is bright blue in colour.
- Animals that eat poison-dart frogs become very sick.

.....

.....

(1 mark)

4.7.1.4 Adaptations

Question 08 · continued

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(c) There are over five thousand species of frogs in the world. One third of these species are threatened with extinction.

(i) Suggest **two** reasons why many species of frogs are now threatened with extinction.

1 .....

.....

2 .....

.....

(2 marks)

(ii) It is important that we do not allow species of frogs to become extinct.

Suggest **one** reason why.

.....

.....

(1 mark)

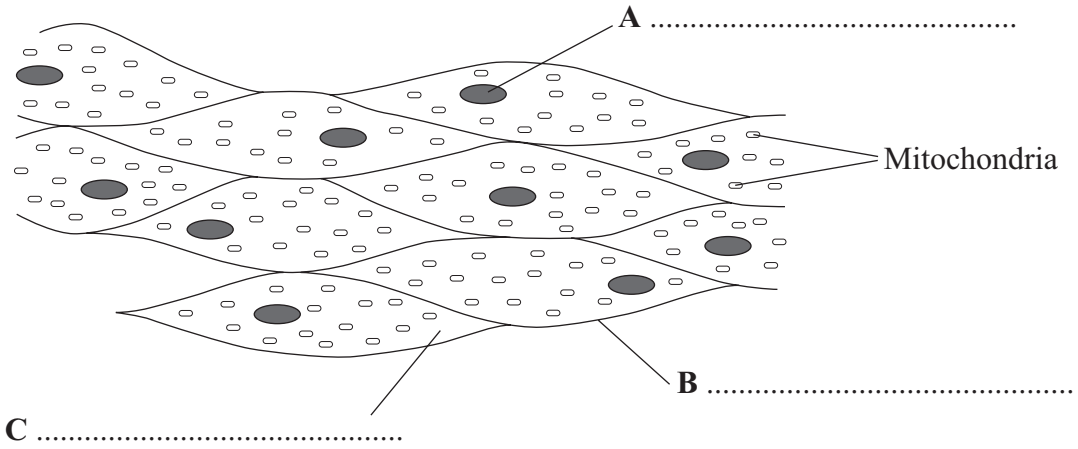
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4.7.1.4 Adaptations

Question 09

January 2008 | BLY2F | Original Q1 | Legacy

1 The diagram shows a group of muscle cells from the wall of the intestine.



(a) On the diagram, use words from the box to name the structures labelled **A**, **B** and **C**.

cell membrane	**cell wall**	**chloroplast**	**cytoplasm**	**nucleus**

(3 marks)

(b) How are these muscle cells adapted to release a lot of energy?

.....

.....

.....

(2 marks)

5

4.7.1.4 Adaptations

Question 10

January 2009 | BLY1F | Original Q4 | Legacy

4 Animals have adaptations that enable them to survive.

4 (a) The photograph shows an echidna.



© Noeline Kelly/Corbis

The echidna has pointed spines on its back.

Explain how these spines might help the echidna to survive.

.....

.....

.....

.....

.....

(2 marks)

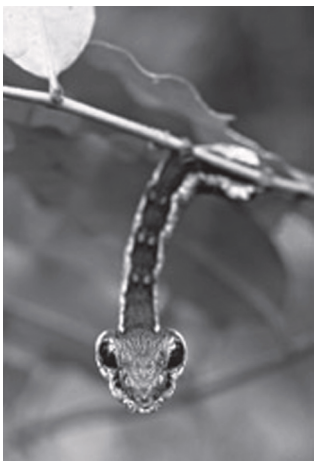
Question 4 continues on the next page

4.7.1.4 Adaptations

Question 10 · continued

for mark

4 (b) The photograph shows a caterpillar.



© S.J. Krasemann / Peter Arnold / Still Pictures

Explain how the caterpillar's appearance might help it to survive.

.....

.....

.....

.....

.....

(2 marks)

4.7.1.4 Adaptations

Question 10 · continued

for mark

4 (c) Draw a ring around the correct answer to complete each sentence.

4 (c) (i) Evolution can be explained by a theory called

genetic engineering
mutation
natural selection

.

(1 mark)

4 (c) (ii) This theory was suggested by a scientist called Charles

Darwin
Lamarck
Semmelweiss

.

(1 mark)

4 (c) (iii) This scientist said that all living things have evolved from

monkeys
dinosaurs
simple life forms

.

(1 mark)

4 (d) Many religious people oppose the theory of evolution.

Give **one** reason why.

.....

.....

(1 mark)

8

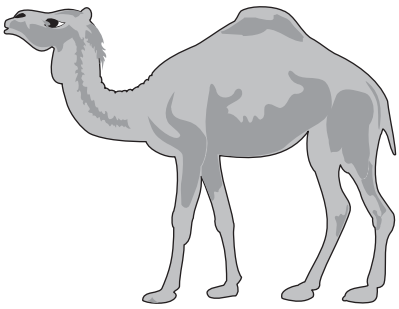
4.7.1.4 Adaptations

Question 11

March 2009 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

Camels are adapted for living in hot, dry conditions.



Match the facts about camels, **A**, **B**, **C** and **D**, with the numbers **1–4** in the table.

A The camel's stomach can hold 200 litres of water.

B The camel produces little urine and does not sweat.

C Camels store fat in a hump.

D Camels can withstand an increase in body temperature of 9 °C without harm.

1	Camels lose very little water each day.
2	It is unlikely for a camel to die from being overheated.
3	Camels can go without drinking water for several days.
4	Camels can go without food for several days.

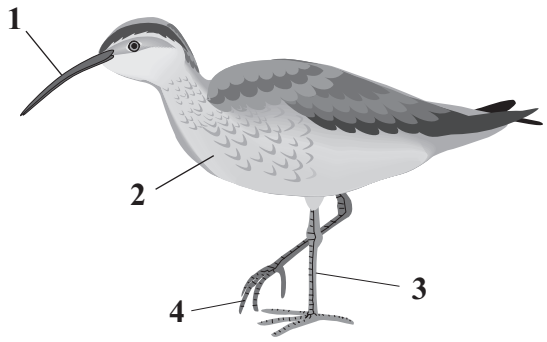
4.7.1.4 Adaptations

Question 12

June 2009 | BLY1BP | Original Q1 | Legacy

QUESTION ONE

The picture shows a bird which lives on sandy beaches. It feeds on animals that burrow into the sand.



Match adaptations, **A**, **B**, **C** and **D**, with the labels **1–4** on the diagram.

A wide, to stop the bird from sinking into the sand

B long, to reach animals buried deep in the sand

C long, to help the bird to see predators approaching

D thick, to provide an insulating layer

4.7.1.4 Adaptations

Question 13

June 2009 | BLY1F | Original Q6 | Legacy

6 Swallows and swifts migrate between Britain and South Africa every year.

6 (a) **Photograph 1** shows a swallow.

Photograph 1



Swallows can fly very quickly.

Use information from the photograph to give **one** way in which the swallow is adapted for flying very quickly.

.....

.....

(1 mark)

6 (b) **Photograph 2** shows swifts.

Photograph 2



Swallows and swifts both feed on flying insects.
They both spend the summer in Britain and then migrate to South Africa in the autumn.

Suggest **one** reason why swallows and swifts do not stay in Britain in the winter.

.....

.....

(1 mark)

4.7.1.4 Adaptations

Question 13 · continued

for mark

6 (c) The table gives data about swallows and swifts.

	Swallows	Swifts
Arrival date in Britain	April	Early May
Leaving date from Britain	October	Early August
Food	Flying insects	Flying insects
Height at which the birds feed	Near ground level	Up to 350m above ground level
Times at which birds feed	Mainly when it is light	Almost 24 hours per day

6 (c) (i) There is very little competition between swallows and swifts for food.

Use information from the table to suggest **two** reasons for this.

1 .....

.....

2 .....

.....

(2 marks)

(Extra space) .....

6 (c) (ii) Swallows and swifts do compete for some factors.

Suggest **one** of these factors.

.....

.....

(1 mark)

5

4.7.1.4 Adaptations

Question 14

November 2009 | BLY1BP | Original Q7 | Legacy

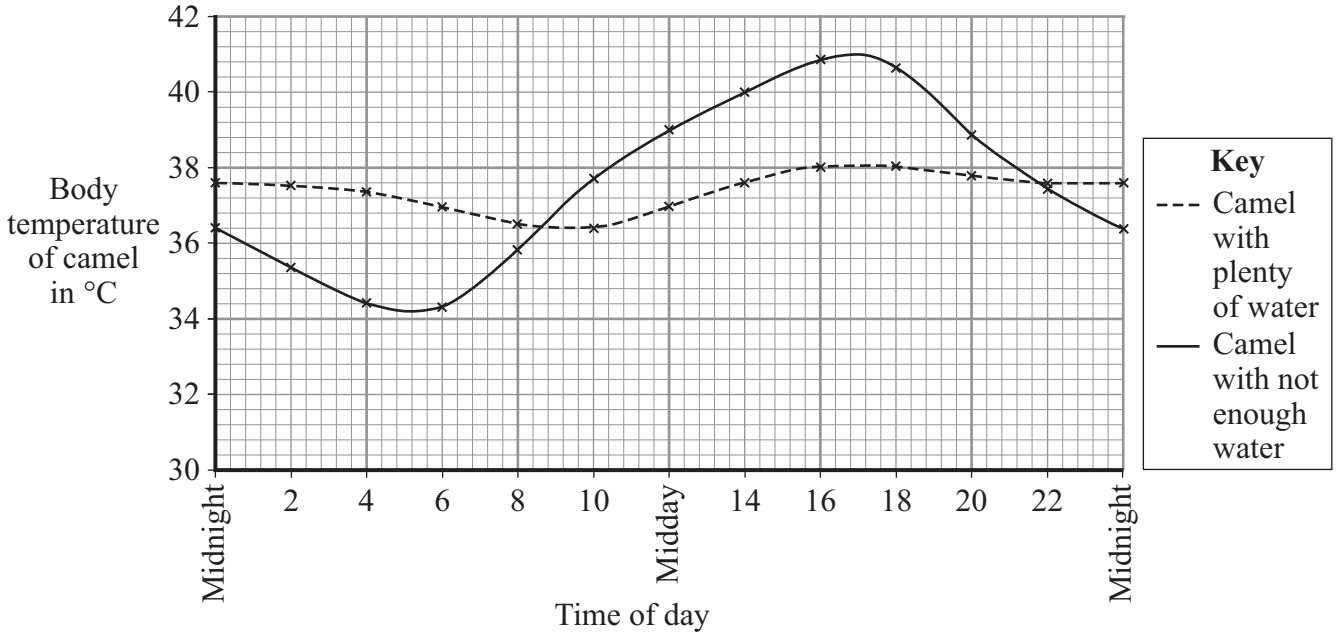
QUESTION SEVEN

Camels live in the desert and are adapted to cope with dry conditions and high temperatures.

A scientist investigated the hypothesis that a camel that drinks lots of water can control its body temperature better than a camel that drinks little water.

- He measured the body temperatures of two camels during the same day.
- One camel did not have enough water to drink and the other had plenty of water available.
- The camels had the same living conditions.

The results are shown in the graph.



7A What was the maximum body temperature of the camel with not enough water?

1 34.2 °C

2 36.5 °C

3 38.2 °C

4 41.0 °C

4.7.1.4 Adaptations

Question 14 · continued

7B In this investigation, the camel with not enough water was a suitable control because . . .

1 water for the camel is essential to life.

2 the comparison shows that camels can keep their body temperature similar in certain conditions.

3 all species of animal can control their body temperatures.

4 the only difference between the two camels was the availability of water.

7C The reliability of the data could be improved by . . .

1 taking more temperature readings during the day.

2 taking more temperature readings from different camels but under the same conditions.

3 using a more accurate thermometer.

4 using a spreadsheet to record and analyse the data.

7D The body temperature of the camel with plenty of water (hydrated) varied less than that of the camel with not enough water (dehydrated) because . . .

1 the dehydrated camel had less water in its body to heat up or cool down.

2 the hydrated camel was able to sweat more to cool it down.

3 the hydrated camel was always in the shade near a water supply.

4 the Sun could not get to the hydrated camel as easily as to the dehydrated camel.

4.7.1.4 Adaptations

Question 15

January 2010 | BLY1F | Original Q2 | Legacy

2 The photograph shows a snowy owl.



- The snowy owl lives in the Arctic.
- It eats small mammals such as mice.

How does each of the following adaptations help the snowy owl to survive?

2 (a) Its feathers are white.

.....

.....

(1 mark)

2 (b) It has a thick covering of feathers.

.....

.....

(1 mark)

4.7.1.4 Adaptations

Question 15 · continued

for mark

2 (c) It makes no sound when it flies.

.....

.....

(1 mark)

2 (d) It has long, sharp claws.

.....

.....

(1 mark)

4

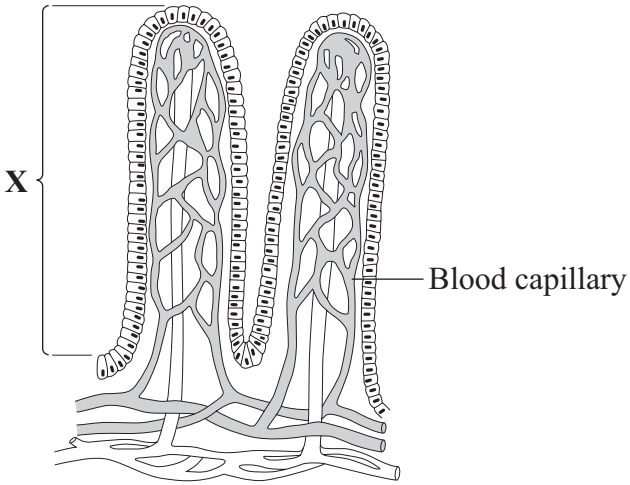
Turn over for the next question

4.7.1.4 Adaptations

Question 16

January 2010 | BLY3F | Original Q1 | Legacy

1 The diagram shows part of the lining of the small intestine.



1 (a) (i) Name structure **X**.

Draw a ring around **one** answer.

alveolus **thorax** **villus**

(1 mark)

4.7.1.4 Adaptations

Question 16 · continued

for mark

1 (a) (ii) Choose **three** ways in which structure **X** is adapted to help the absorption of soluble food.

Tick (✓) **three** boxes.

It is ventilated. ☐

Its outer surface is one cell thick. ☐

It has a large surface area. ☐

It contains a layer of muscle. ☐

It has a good blood supply. ☐

Its cells contain haemoglobin. ☐

(3 marks)

1 (b) Name the process by which soluble food enters the blood.

Draw a ring around **one** answer.

diffusion **fermentation** **transpiration**

(1 mark)

5

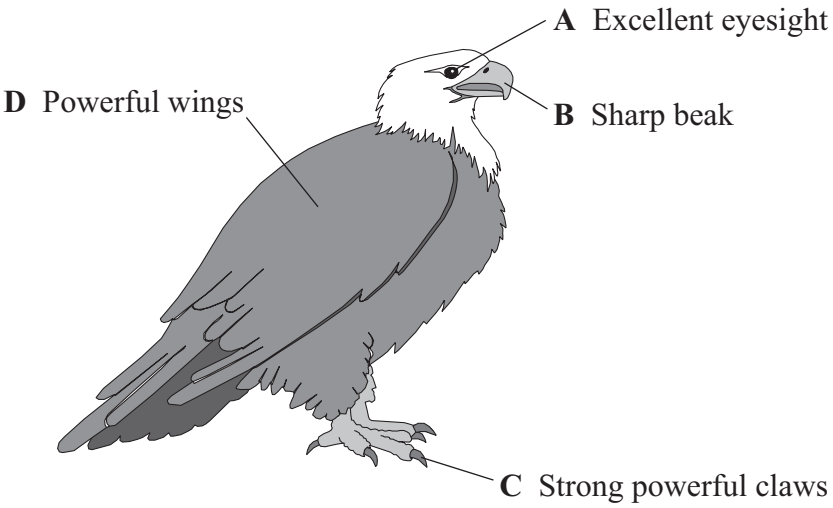
4.7.1.4 Adaptations

Question 17

March 2010 | BLY1BP | Original Q1 | Legacy

QUESTION ONE

The eagle is a predator that swoops on other animals on which it feeds.



Match adaptations, **A**, **B**, **C** and **D**, with the functions **1–4** in the table.

	Function
1	enable the bird to swoop down on prey
2	keep a firm grip on prey to carry it to its nest
3	used to spot prey from a great distance
4	used to peck prey into small pieces

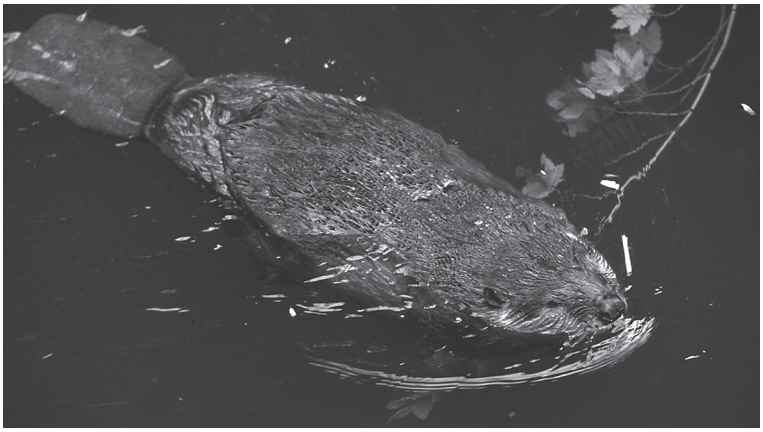
4.7.1.4 Adaptations

Question 18

June 2010 | BLY1BP | Original Q1 | Legacy

QUESTION ONE

Beavers live in slow-moving water and use sticks to build dams.



Match adaptations, **A**, **B**, **C** and **D**, with the statements **1–4** in the table.

A thick fur coat

B large front teeth

C muscular flat tail

D clear coverings over each eye

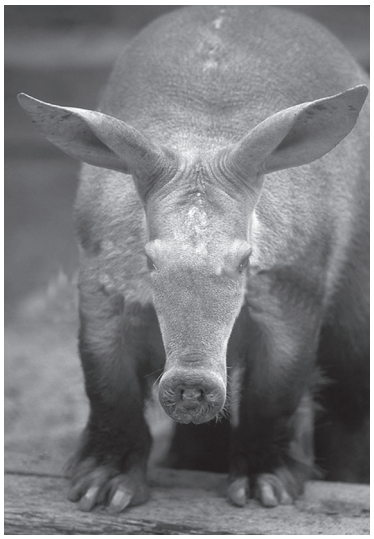
1	used to cut sticks from trees
2	helps the beaver to steer through the water
3	keeps the beaver warm in the cold water
4	allows the beaver to see underwater

4.7.1.4 Adaptations

Question 19

June 2010 | BLY1F | Original Q2 | Legacy

2 The photograph shows an aardvark.



- Aardvarks feed on insects that they dig from the soil.
- Aardvarks hunt for these insects at night.

How does each of these adaptations help the aardvark?

2 (a) It has powerful claws.

.....

.....

(1 mark)

2 (b) It has a long, sticky tongue.

.....

.....

(1 mark)

2 (c) It has very large ears.

.....

.....

(1 mark)

2 (d) It can cover the end of its nose with flaps of skin.

.....

.....

(1 mark)

4

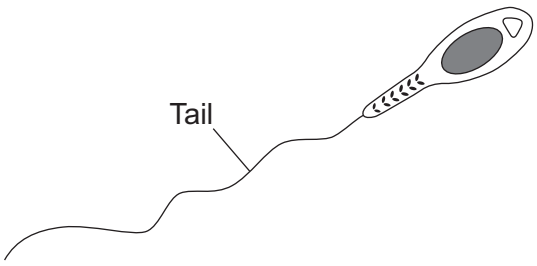
4.7.1.4 Adaptations

Question 20

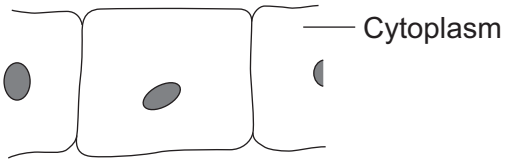
June 2010 | BLY2F | Original Q1 | Legacy

1 The diagrams show four types of cell, **A**, **B**, **C** and **D**.
Two of the cells are plant cells and two are animal cells.

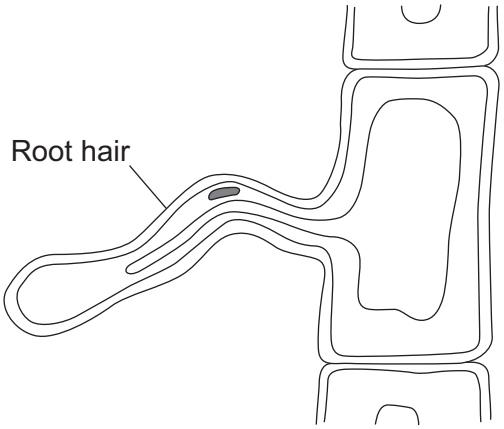
A



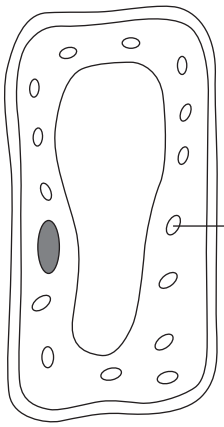
B



C



D



1 (a) (i) Which **two** of the cells are plant cells?

Tick (✓) **one** box.

A and **B** ☐

A and **D** ☐

C and **D** ☐

(1 mark)

4.7.1.4 Adaptations

Question 20 · continued

1 (a) (ii) Which part is found **only** in plant cells?

Draw a ring around **one** answer.

cell membrane **cell wall** **nucleus**

(1 mark)

1 (b) (i) Which cell, **A**, **B**, **C** or **D**, is adapted for swimming? ☐

(1 mark)

1 (b) (ii) Which cell, **A**, **B**, **C** or **D**, can produce glucose by photosynthesis? ☐

(1 mark)

1 (c) Cells **A**, **B**, **C** and **D** all use oxygen.

For what process do cells use oxygen?

Draw a ring around **one** answer.

osmosis **photosynthesis** **respiration**

(1 mark)

5

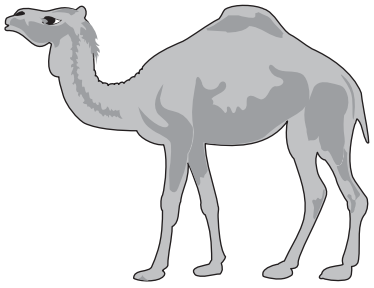
4.7.1.4 Adaptations

Question 21

November 2010 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

Camels live in deserts. Deserts are dry and hot in the day, but can be very cold at night. Camels have adaptations. These adaptations help camels to survive in desert conditions.



Match desert conditions, **A**, **B**, **C** and **D**, with the adaptations **1–4** in the table.

A the wind blows sand around

B very cold nights

C soft ground

D dry conditions

	Adaptation
1	camels produce very little sweat
2	camels have feet with a large surface area
3	camels can shut their nostrils
4	camels have thick fur to trap air

4.7.1.4 Adaptations

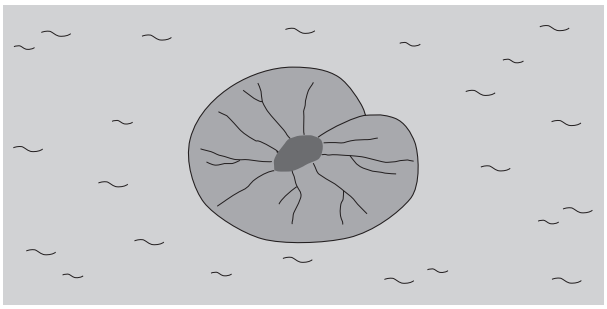
Question 22

January 2011 | BLY1F | Original Q1 | Legacy

1 Plants are adapted for survival in many different ways.

Use information from the drawings to answer each question.

1 (a) This plant lives in ponds. The leaves of the plant float on the surface of the water.



The leaf of this plant is adapted for floating on water.

Suggest how.

.....

.....

(1 mark)

1 (b) This plant lives in areas where a lot of snow falls.



The triangular shape helps the tree to survive in snowy conditions.

Suggest how.

.....

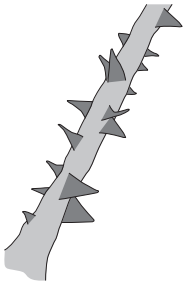
.....

(1 mark)

4.7.1.4 Adaptations

Question 22 · continued

1 (c) This plant has sharp thorns on the stem.



Thorns help this plant survive.

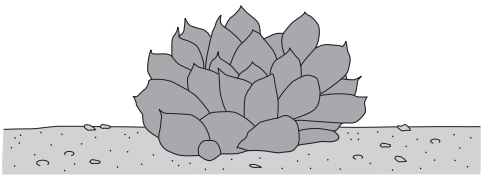
Suggest how.

.....

.....

(1 mark)

1 (d) This plant lives in very dry areas.



The swollen leaves help this plant to survive in very dry places.

Suggest how.

.....

.....

(1 mark)

4

4.7.1.4 Adaptations

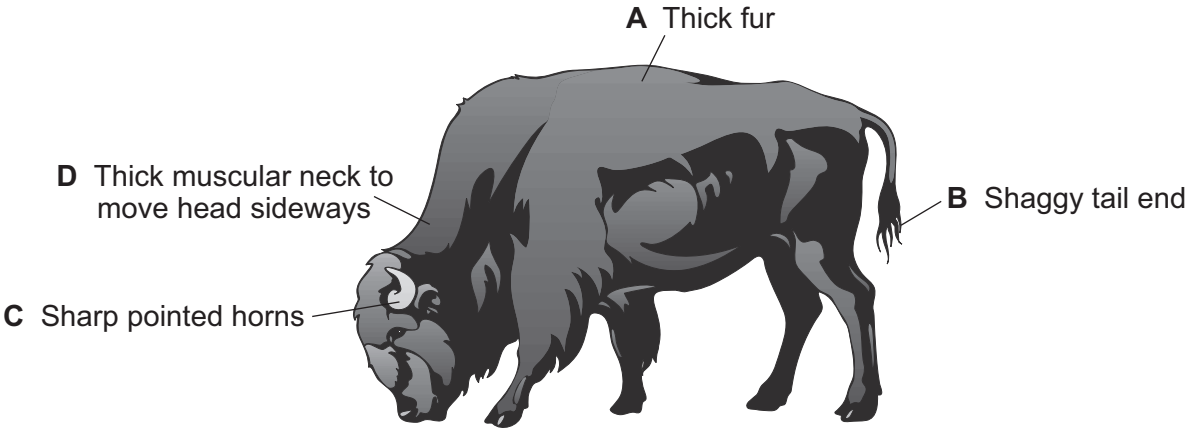
Question 23

June 2011 | BLY1BP | Original Q1 | Legacy

QUESTION ONE

American bison live in places where the summers are hot and the winters are very cold and snowy.

The drawing shows a male bison.



Match adaptations, **A**, **B**, **C** and **D**, with the statements **1**–**4** in the table.

1	to brush away flies in the summer
2	to fight off other males which are competing to mate with the females
3	to keep warm in the snowy conditions
4	to help to clear thick snow from the grass on which it feeds

4.7.1.4 Adaptations

Question 24

June 2011 | BLY1F | Original Q2 | Legacy

2 An animal's feet are adapted to the animal's way of life.

The photographs show the feet of four different animals.

Draw a line from each photograph of feet to the correct adaptation.

Photograph	Adaptation
	Running very fast
	Swimming
	Flying
	Catching and holding prey
	Supporting a very heavy body

(4 marks)

4

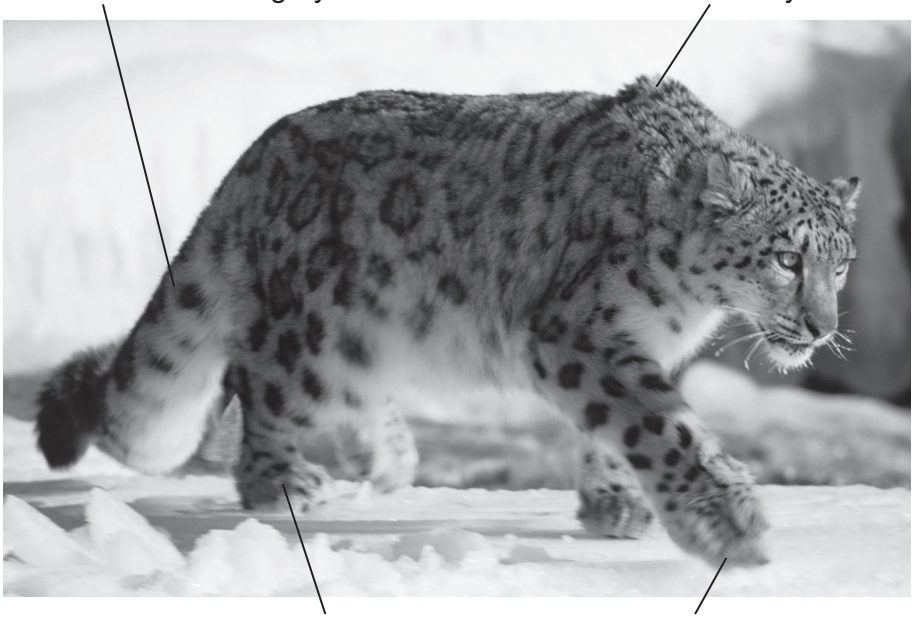
4.7.1.4 Adaptations

Question 25

November 2011 | BLY1BP | Original Q1 | Legacy

QUESTION ONE

The snow leopard lives in rocky areas in mountains.
The winters there are very cold and the ground is covered in snow.
The snow leopard feeds on animals such as deer.



Match labels, **A**, **B**, **C** and **D**, with the adaptations **1**–**4** in the table.

1	camouflages the leopard against the snow and rocks
2	stops the leopard from sinking into snow
3	protects the leopard against very cold air temperatures
4	helps the leopard to move quickly in the mountains

4.7.1.4 Adaptations

Question 26

June 2012 | BL1FP | Original Q8 | Legacy

8 *In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.*

Plants and animals have become adapted in many different ways to reduce the risk of being eaten by predators.

Describe these adaptations.

Give examples of animals and plants adapted in the ways you describe.

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(6 marks)

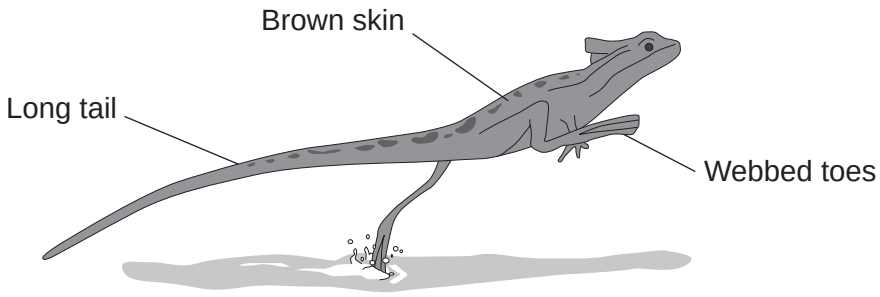
6

4.7.1.4 Adaptations

Question 27

January 2013 | BL1FP | Original Q1 | Legacy

1 The picture shows a basilisk lizard. Some of the adaptations of the lizard are labelled.



Basilisk lizards are often found resting on branches of trees that grow next to water. Basilisk lizards can run across the surface of the water.

1 (a) Draw **one** line from each adaptation of the lizard to the advantage of the adaptation.

Adaptation	Advantage
Toes on the back feet are webbed	For camouflage on branches of trees
Long tail	Helps the lizard to balance when running
Brown skin	Warning colours to deter predators
	Increases surface area in contact with the water

(3 marks)

4.7.1.4 Adaptations

Question 27 · continued

1 (b) Suggest **one** advantage to the basilisk lizard of being able to run across the surface of the water.

.....

.....

(1 mark)

1 (c) Animals, such as lizards, compete with each other.

Give **two** factors that animals compete for.

Tick (✓) **two** boxes.

Oxygen ☐

Food ☐

Territory ☐

Light ☐

(2 marks)

6

4.7.1.4 Adaptations

Question 28

June 2013 | BL1FP | Original Q2 | Legacy

2 Many organisms are adapted to avoid being eaten.

2 (a) The photograph shows a gecko on a leafy branch.



The gecko is adapted to avoid being eaten by predators.

Explain how.

.....

.....

.....

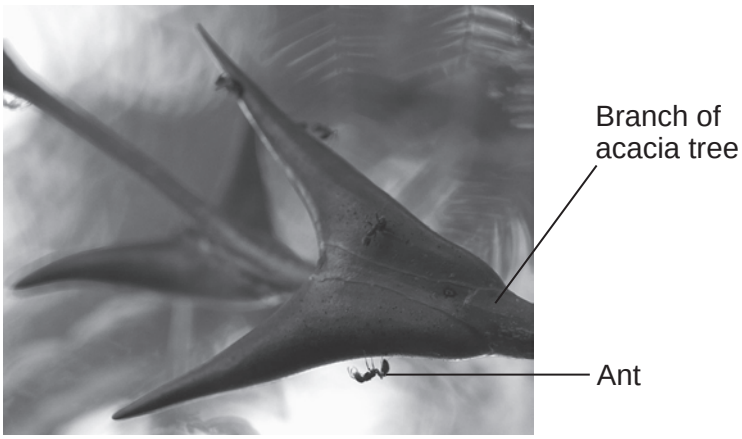
.....

(2 marks)

2 (b) Ants can give a painful bite.

The photograph shows a type of ant living on acacia trees.

Acacia trees have thorns on their branches.



4.7.1.4 Adaptations

Question 28 · continued

2 (b) (i) Predators are less likely to eat ants living on acacia trees than ants living on the ground.

Suggest why.

.....

.....

(1 mark)

2 (b) (ii) Giraffes eat the leaves of acacia trees.

Giraffes do **not** eat the leaves of acacia trees that have ants living on them.

Suggest why.

.....

.....

(1 mark)

2 (c) The photographs show a wasp and a hoverfly.

The wasp and the hoverfly both have black and yellow stripes.

Wasp



Hoverfly



Wasps have stings, but hoverflies do **not**.

The stripes on the hoverfly help the hoverfly to avoid being eaten by predators.

Explain why.

.....

.....

.....

.....

(2 marks)

6

4.7.1.4 Adaptations

Question 29

June 2014 | BL1FP | Original Q9 | Legacy

9 **In this question you will be assessed on using good English, organising information clearly and using specialist terms where appropriate.**

Animals and plants have features (adaptations) that allow them to survive in the conditions in which they normally live.

Describe how animals and plants are adapted to survive in dry conditions such as deserts.

For each adaptation that you give, describe how the adaptation helps the animal or plant to survive in dry conditions.

To obtain full marks you should refer to **both** animals and plants.

[6 marks]

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Extra space .....

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6

4.7.1.4 Adaptations

Question 30

June 2015 | BL1FP | Original Q6 | Legacy

6 (a) Which term describes organisms that can tolerate very hot or very cold places?

Draw a ring around the correct answer.

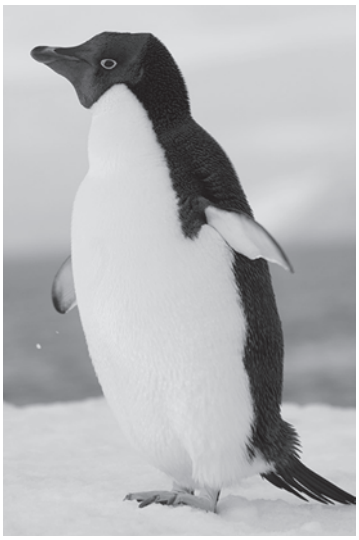
[1 mark]

an environmental species	**an extremophile species**	**an indicator species**

6 (b) **Figure 7** shows photographs of an Adelie penguin and a chinstrap penguin.
Adelie penguins and chinstrap penguins live in the Antarctic at temperatures below 0 °C.

Figure 7

Adelie penguin



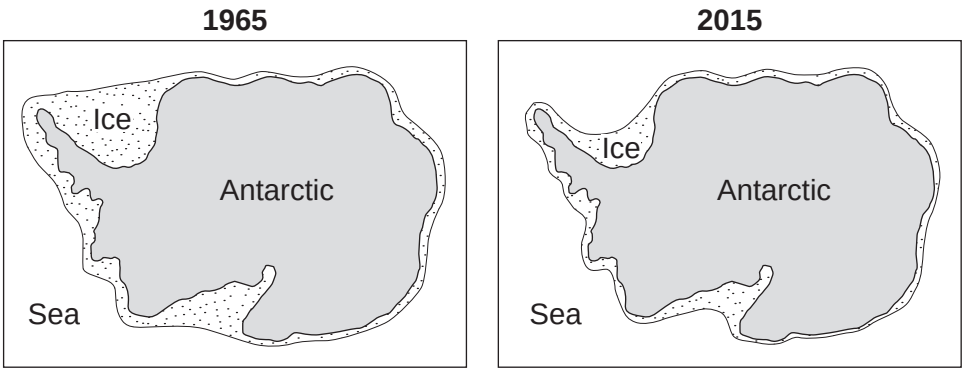
Chinstrap penguin



Adelie penguins spend most of their time on the ice around the Antarctic.
Chinstrap penguins live mainly in the sea around the ice.
Since 1965 the number of Adelie penguins has **decreased** by 6 million.

Figure 8 shows changes to the ice around the Antarctic over the past 50 years.

Figure 8



4.7.1.4 Adaptations

Question 30 · continued

6 (b) (i) Use information from **Figure 8** to explain why the number of Adelie penguins has decreased since 1965.

[2 marks]

.....

.....

.....

.....

.....

.....

6 (b) (ii) Suggest what has happened to the number of chinstrap penguins since 1965.

Draw a ring around your answer. **increase / decrease**

Give a reason for your answer.

[1 mark]

.....

.....

6 (c) The number of penguins can be used to monitor changes in temperature of the environment.

Temperature readings could also be taken using a thermometer.

What is the advantage of using penguins, instead of a thermometer, to monitor changes in temperature of the environment?

Tick (✓) **one** box.

[1 mark]

Living organisms show long-term changes. ☐

Thermometers cannot measure temperatures below 0 °C. ☐

Thermometers do not give accurate readings. ☐

5

4.7.1.4 Adaptations

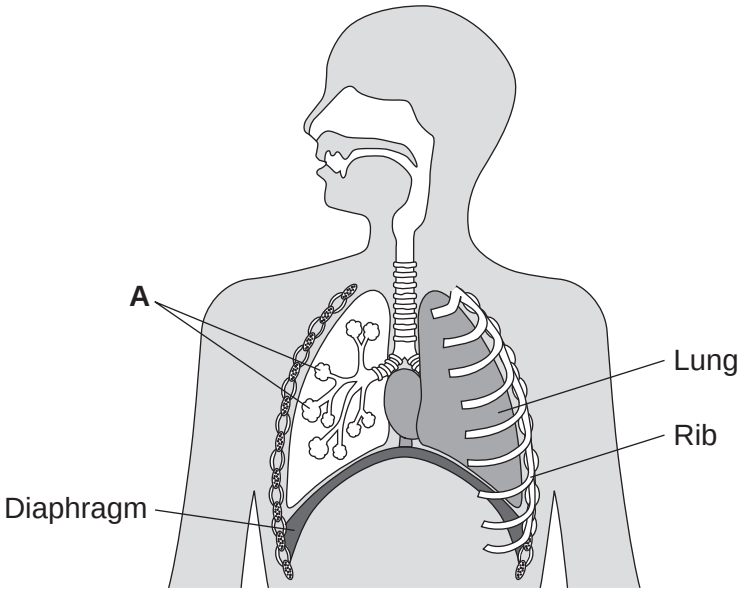
Question 31

June 2015 | BL3FP | Original Q1 | Legacy

1 Our lungs help us to breathe.

Figure 1 shows the human breathing system.

Figure 1



1 (a) (i) Name part **A** in **Figure 1**.

[1 mark]

.....

1 (a) (ii) Give **one** function of the ribs.

[1 mark]

.....

1 (b) (i) Use the correct answer from the box to complete the sentence.

[1 mark]

active transport	**diffusion**	**osmosis**

Oxygen moves from the air inside the lungs into the blood by the process of ..... .

4.7.1.4 Adaptations

Question 31 · continued

1 (b) (ii) Use the correct answer from the box to complete the sentence.

[1 mark]

arteries	capillaries	veins

Oxygen moves from the lungs into the blood through the walls

of the ..... .

1 (b) (iii) Inside the lungs, oxygen is absorbed from the air into the blood.

Give **two** adaptations of the lungs that help the rapid absorption of oxygen into the blood.

[2 marks]

1 .....

.....

2 .....

.....

6

4.7.1.4 Adaptations

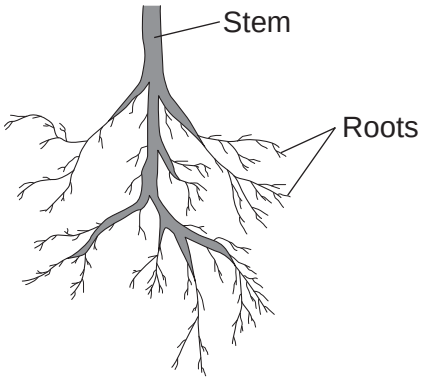
Question 32

June 2015 | BL3FP | Original Q5 | Legacy

5 Plants need different substances to survive.

Figure 4 shows the roots of a plant.

Figure 4



5 (a) (i) Mineral ions are absorbed through the roots.

Name **one** other substance absorbed through the roots.

[1 mark]

.....

5 (a) (ii) The plant in **Figure 4** has a higher concentration of mineral ions in the cells of its roots than the concentration of mineral ions in the soil.

Which **two** statements correctly describe the absorption of mineral ions into the plant's roots?

[2 marks]

Tick (✓) **two** boxes.

The mineral ions are absorbed by active transport. ☐

The mineral ions are absorbed by diffusion. ☐

The mineral ions are absorbed down the concentration gradient. ☐

The absorption of mineral ions needs energy. ☐

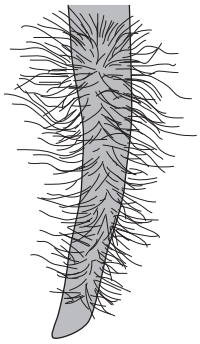
4.7.1.4 Adaptations

Question 32 · continued

5 (a) (iii) The plant in **Figure 4** has roots adapted for absorption.

Figure 5 shows a magnified part of a root from **Figure 4**.

Figure 5



Describe how the root in **Figure 5** is adapted for absorption.

[2 marks]

.....

.....

.....

.....

5 (b) The leaves of plants have stomata.

What is the function of the stomata?

[1 mark]

.....

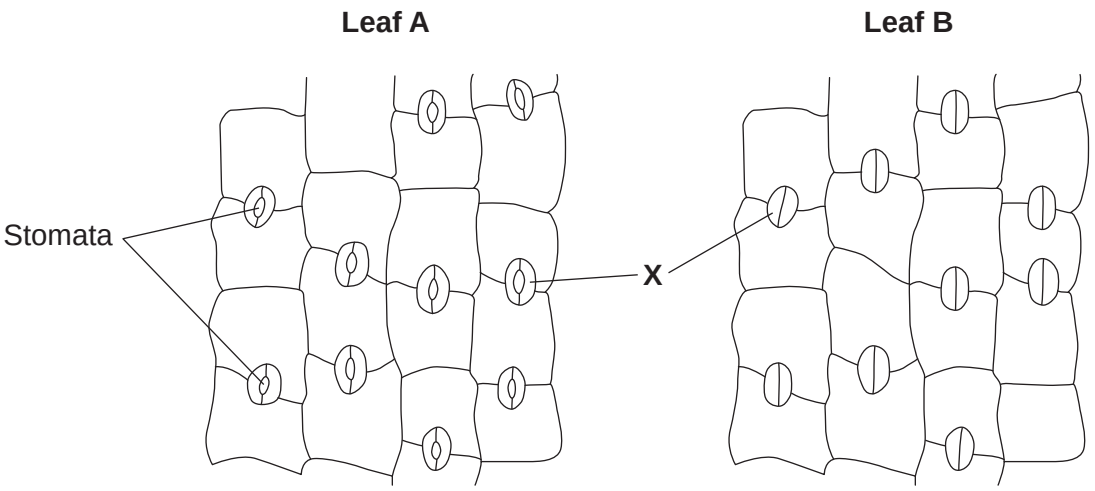
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Question 5 continues on the next page

Question 32 · continued

5 (c) **Figure 6** shows the underside of two leaves, **A** and **B**, taken from a plant in a man's house.

Figure 6



5 (c) (i) In **Figure 6**, the cells labelled **X** control the size of the stomata.

What is the name of the cells labelled **X**?

[1 mark]

Tick (✓) **one** box.

Guard cells ☐

Phloem cells ☐

Xylem cells ☐

5 (c) (ii) Describe how the appearance of the stomata in leaf **B** is different from the appearance of the stomata in leaf **A**.

[1 mark]

.....

.....

5 (c) (iii) The man forgets to water the plant.

What might happen to the plant in the next few days if the stomata stay the same as shown in leaf **A** in **Figure 6**?

[1 mark]

.....

.....

9

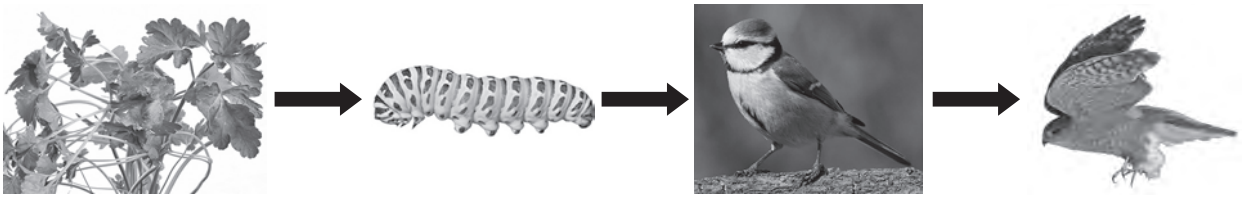
4.7.1.4 Adaptations

Question 33

June 2016 | BL1FP | Original Q3 | Legacy

3 **Figure 3** shows how energy and biomass pass along a food chain.

Figure 3



Parsley → Swallowtail caterpillar → Blue tit → Hawk

3 (a) The parsley shown in **Figure 3** carries out photosynthesis.

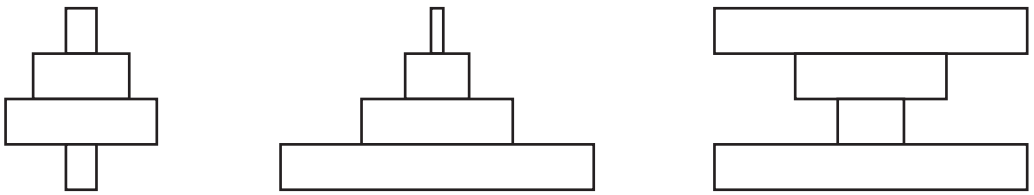
Why is photosynthesis important in the food chain?

[2 marks]

3 (b) Which diagram shows the pyramid of biomass for the food chain in **Figure 3**?

[1 mark]

Tick (✓) **one** box.

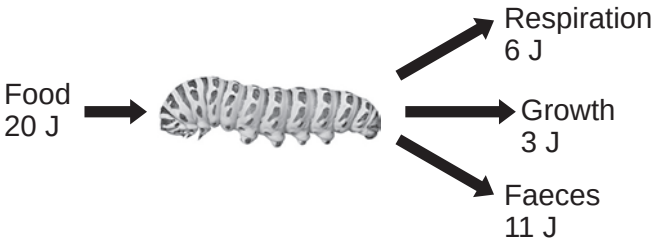


4.7.1.4 Adaptations

Question 33 · continued

3 (c) **Figure 4** shows the ways a swallowtail caterpillar transfers 20 J of energy from food.

Figure 4



What percentage of the energy in the caterpillar's food is used for growth?

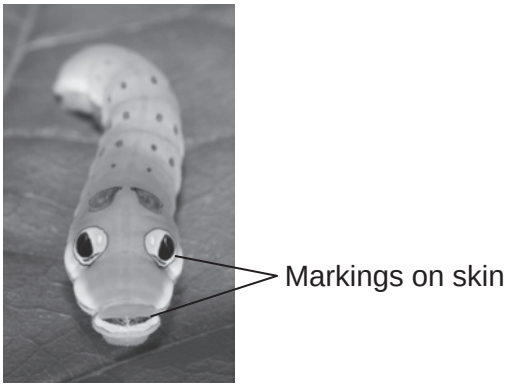
[2 marks]

Percentage = _____

3 (d) The organisms in the food chain are adapted for survival.

3 (d) (i) **Figure 5** shows a swallowtail caterpillar seen from the back.

Figure 5



Suggest how the swallowtail caterpillar shown in **Figure 5** is adapted to reduce the chance of being eaten by blue tits.

[2 marks]

4.7.1.4 Adaptations

Question 33 · continued

3 (d) (ii) **Figure 6** shows a hawk.

Figure 6



Suggest **two** ways that the hawk is adapted to catch and kill blue tits.

[2 marks]

1 _____

_____

2 _____

_____

9

4.7.1.4 Adaptations

Question 34

June 2016 | BL3FP | Original Q7 | Legacy

7 Cells, tissues and organs are adapted to take in different substances and get rid of different substances.

Table 1 shows the concentration of four ions outside cells and inside cells.

Table 1

Ion	Concentration outside cells in mmol per dm^3	Concentration inside cells in mmol per dm^3
Sodium	140	9
Potassium	7	138
Calcium	2	27
Chloride	118	3

7 (a) Use information from **Table 1** to complete the following sentences.

[2 marks]

Sodium ions will move into cells by the process

of _____ .

Potassium ions will move into cells by the process

of _____ .

7 (b) Some students investigated the effect of the different concentrations of sugar in four drinks, **A**, **B**, **C** and **D**, on the movement of water across a partially permeable membrane.

The students:

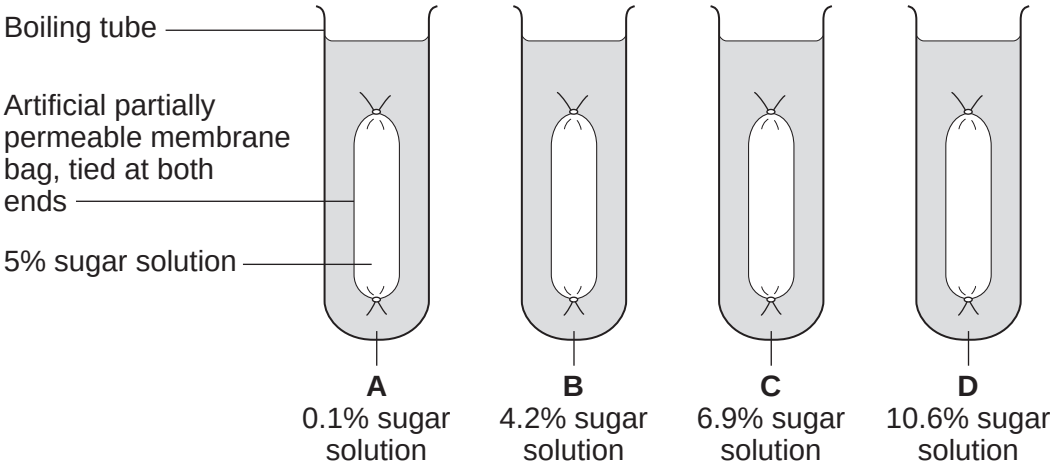
- made four bags from artificial partially permeable membrane
- put equal volumes of 5% sugar solution in each bag
- weighed each bag containing the sugar solution
- placed one bag in each of the drinks, **A**, **B**, **C** and **D**
- after 20 minutes removed the bags containing the sugar solution and weighed them again.

4.7.1.4 Adaptations

Question 34 · continued

Figure 9 shows how they set up the investigation.

Figure 9



7 (b) (i) The bag in drink **A** got heavier after 20 minutes.

Explain why.

[3 marks]

7 (b) (ii) In which drink, **A**, **B**, **C** or **D**, would you expect the bag to show the smallest change in mass?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

7 (b) (iii) Explain why you think the bag you chose in part **(b)(ii)** would show the smallest change.

[2 marks]

8

4.7.1.4 Adaptations

Question 35

June 2017 | BL3FP | Original Q5 | Legacy

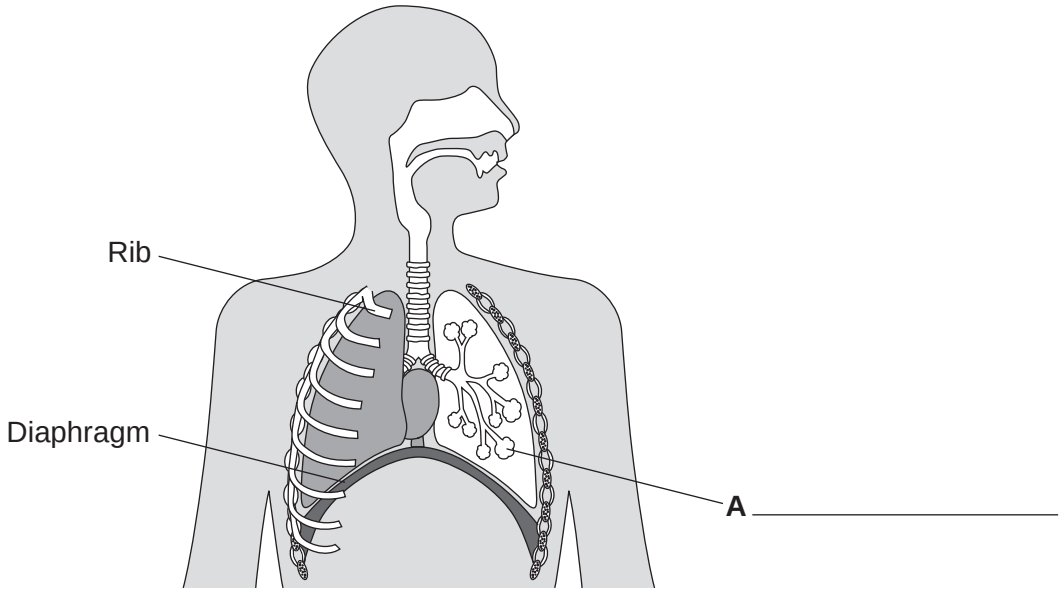
5 Some organs in the human body are adapted to exchange materials.

5 (a) **Figure 6** shows the human breathing system and heart.

5 (a) (i) Label part **A** in **Figure 6**.

[1 mark]

Figure 6



5 (a) (ii) Complete the sentences about breathing in.

[4 marks]

To make air move **into** the lungs the ribs move up and _____

and the diaphragm moves _____ .

These movements are caused when muscles between the ribs and muscles in the diaphragm _____ .

The increase in volume in the thorax causes the pressure in the thorax to _____ .

5 (a) (iii) In the lungs, which type of blood vessel does oxygen pass into?

[1 mark]

_____

Question 5 continues on the next page

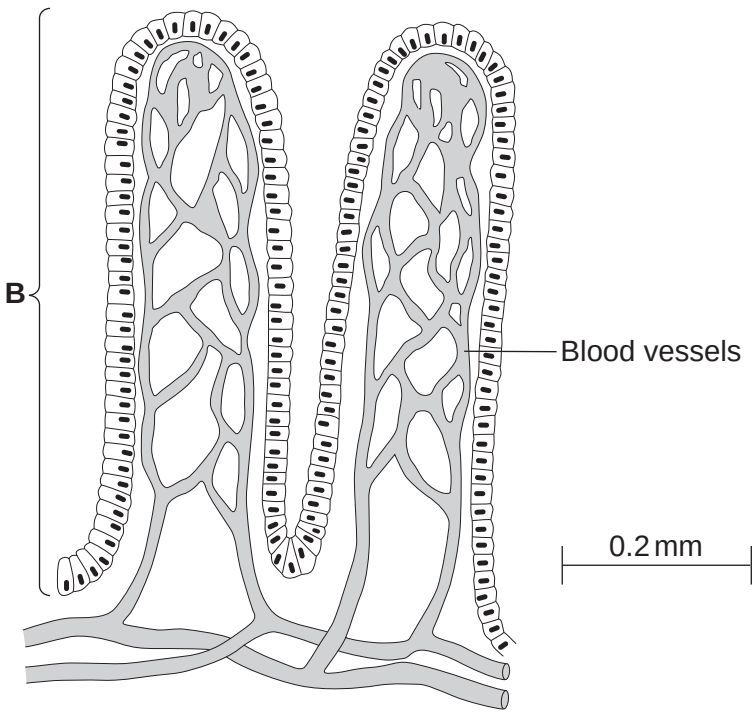
4.7.1.4 Adaptations

Question 35 · continued

5 (b) The small intestine is adapted to absorb digested food.

Figure 7 shows the lining of the small intestine.

Figure 7



5 (b) (i) Name part **B** shown in **Figure 7**.

[1 mark]

_____

5 (b) (ii) Give **two** ways that part **B** in **Figure 7** is adapted to help the small intestine absorb digested food quickly.

[2 marks]

1 _____

_____

2 _____

_____

9

4.7.1.4 Adaptations

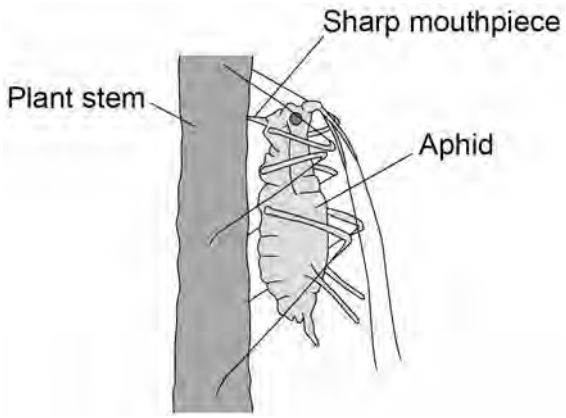
Question 36

June 2018 | 8461/1F | Original Q5

0 5 Aphids are small insects that carry pathogens.

Figure 7 shows an aphid feeding from a plant stem.

Figure 7



0 5 . 1 An aphid feeds by inserting its sharp mouthpiece into the stem of a plant.

After feeding, the mouthpiece of an aphid contains a high concentration of dissolved sugars.

Which part of the plant was the aphid feeding from?

[1 mark]

Tick **one** box.

- Palisade layer ☐
- Phloem ☐
- Stomata ☐
- Xylem ☐

4.7.1.4 Adaptations

Question 36 · continued

0 5 . 2 What is the process that transports dissolved sugars around a plant?

[1 mark]

Tick **one** box.

- Filtration ☐
- Respiration ☐
- Translocation ☐
- Transpiration ☐

0 5 . 3 Plants infected with aphids have stunted growth.

Explain **one** way the removal of dissolved sugars from the stem of the plant causes stunted growth.

[2 marks]

0 5 . 4 Most aphids do not have wings when they hatch. After several generations, some aphids hatch which have wings and can fly.

Explain the advantage to the aphid of being able to fly.

[2 marks]

4.7.1.4 Adaptations

Question 36 · continued

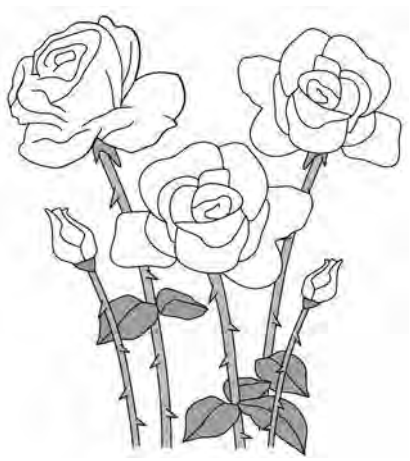
0 5 . 5 The leaves of some plants release oils onto their surface.

Suggest how the production of oil on the surface of a leaf may protect the plant from aphids.

[1 mark]

Figure 8 shows part of a rose plant.

Figure 8



0 5 . 6 Give **one** adaptation shown in **Figure 8** that helps the rose plant defend itself.

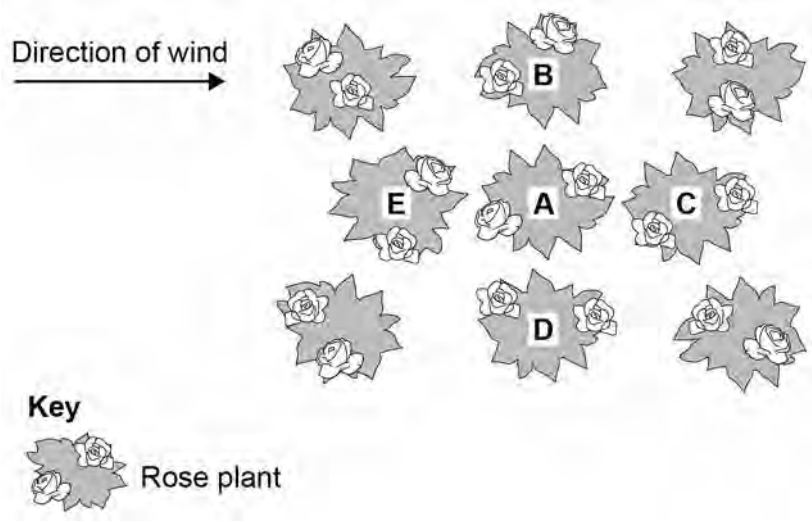
[1 mark]

4.7.1.4 Adaptations

Question 36 · continued

Figure 9 shows a plan of a garden containing rose plants.

Figure 9



0 5 . 7 Plant **A** has the fungal disease rose black spot.

Which plant in **Figure 9** is the fungus likely to spread to first?

Give a reason for your answer.

[2 marks]

Plant _____

Reason _____

0 5 . 8 Suggest **one** way the gardener could reduce the spread of rose black spot to the other plants in the garden.

[1 mark]

11

4.7.1.4 Adaptations

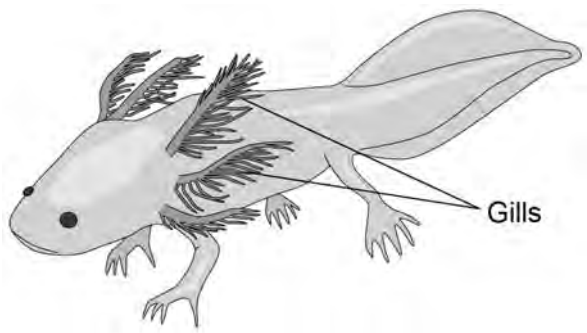
Question 37

June 2019 | 8461/1F | Original Q2

0 2 An animal called an axolotl lives in water.

Figure 3 shows an axolotl.

Figure 3



Oxygen enters the axolotl's bloodstream through the gills by diffusion.

0 2 . 1 What is diffusion?

[1 mark]

Tick (✓) **one** box.

The movement of particles from a high concentration to a low concentration ☐

The movement of particles from a low concentration to a high concentration ☐

The movement of water from a concentrated solution to a more dilute solution ☐

0 2 . 2 Describe how **one** feature of the axolotl's gills increases the rate of diffusion of oxygen.

Use information from **Figure 3**.

[2 marks]

Feature _____

Description _____

_____

_____

4.7.1.4 Adaptations

Question 37 · continued

If a gill of an axolotl is removed, stem cells in the damaged area will divide and a new gill will grow.

0 2 . 3 Complete the sentence.

[1 mark]

Choose the answer from the box.

adaptation	**differentiation**	**evolution**	**variation**

When stem cells specialise to produce gill cells, this process is

known as _____.

0 2 . 4 Complete the sentence.

[1 mark]

Choose the answer from the box.

binary fission	**mitosis**	**mutation**

To grow a new gill the stem cells divide by _____.

0 2 . 5 Which **one** of the following does **not** contain stem cells?

[1 mark]

Tick (✓) **one** box.

- Bone marrow ☐
- Embryos ☐
- Hair ☐
- Meristem tissue ☐

4.7.1.4 Adaptations

Question 37 · continued

0 2 . 6 Axolotls are small animals. Axolotls are used in stem cell research.

What are **two** advantages of using axolotls in stem cell research?

[2 marks]

Tick (✓) **two** boxes.

Axolotls are cheap to feed. ☐

Axolotls are easy to breed. ☐

Axolotls are endangered. ☐

Axolotls live in water. ☐

Axolotl research is cruel. ☐

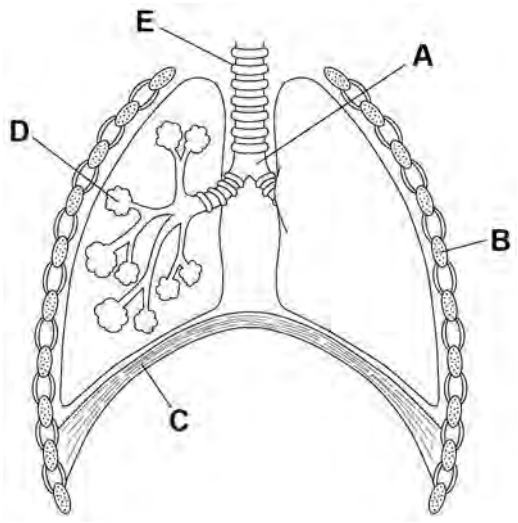
4.7.1.4 Adaptations

Question 37 · continued

Oxygen uptake in humans takes place in the lungs.

Figure 4 shows the human breathing system.

Figure 4



0 2 . 7 Where does oxygen enter the bloodstream?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

0 2 . 8 Name part **E** on **Figure 4**.

[1 mark]

0 2 . 9 Which blood vessel carries blood to the lungs?

[1 mark]

Tick (✓) **one** box.

Aorta ☐

Pulmonary artery ☐

Vena cava ☐

11

4.7.1.4 Adaptations

Question 38

June 2019 | 8461/1F | Original Q3

0 3 This question is about leaves.

0 3 . 1 Complete the sentences.

Choose answers from the box.

[3 marks]

epidermis	**phloem**	**palisade mesophyll**
waxy cuticle	**xylem**	

The layer of cells lining the upper surface and lower surface of a leaf is the _____.

The part of the leaf where most photosynthesis occurs is the _____.

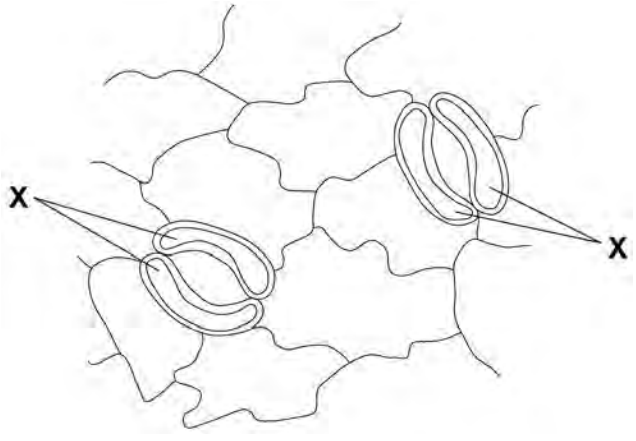
Water is transported to the leaf in the _____.

Water is lost through small openings on the lower surface of plant leaves.

These small openings are called stomata.

Figure 5 shows two stomata on the lower surface of a leaf.

Figure 5



4.7.1.4 Adaptations

Question 38 · continued

June 2019 | 8461/1F | Original Q3

0 3 . 2 The cells labelled **X** control the width of the stomata.

What are the cells labelled **X**?

[1 mark]

Tick (✓) **one** box.

- Guard cells ☐
- Mesophyll cells ☐
- Root hair cells ☐
- Stem cells ☐

0 3 . 3 What is the function of the stomata?

[1 mark]

Tick (✓) **one** box.

- To allow light into the leaf ☐
- To let carbon dioxide into the leaf ☐
- To let sugars out of the leaf ☐
- To protect the leaf from pathogens ☐

0 3 . 4 How is water lost from a leaf?

[1 mark]

Tick (✓) **one** box.

- By evaporation ☐
- By respiration ☐
- By translocation ☐

4.7.1.4 Adaptations

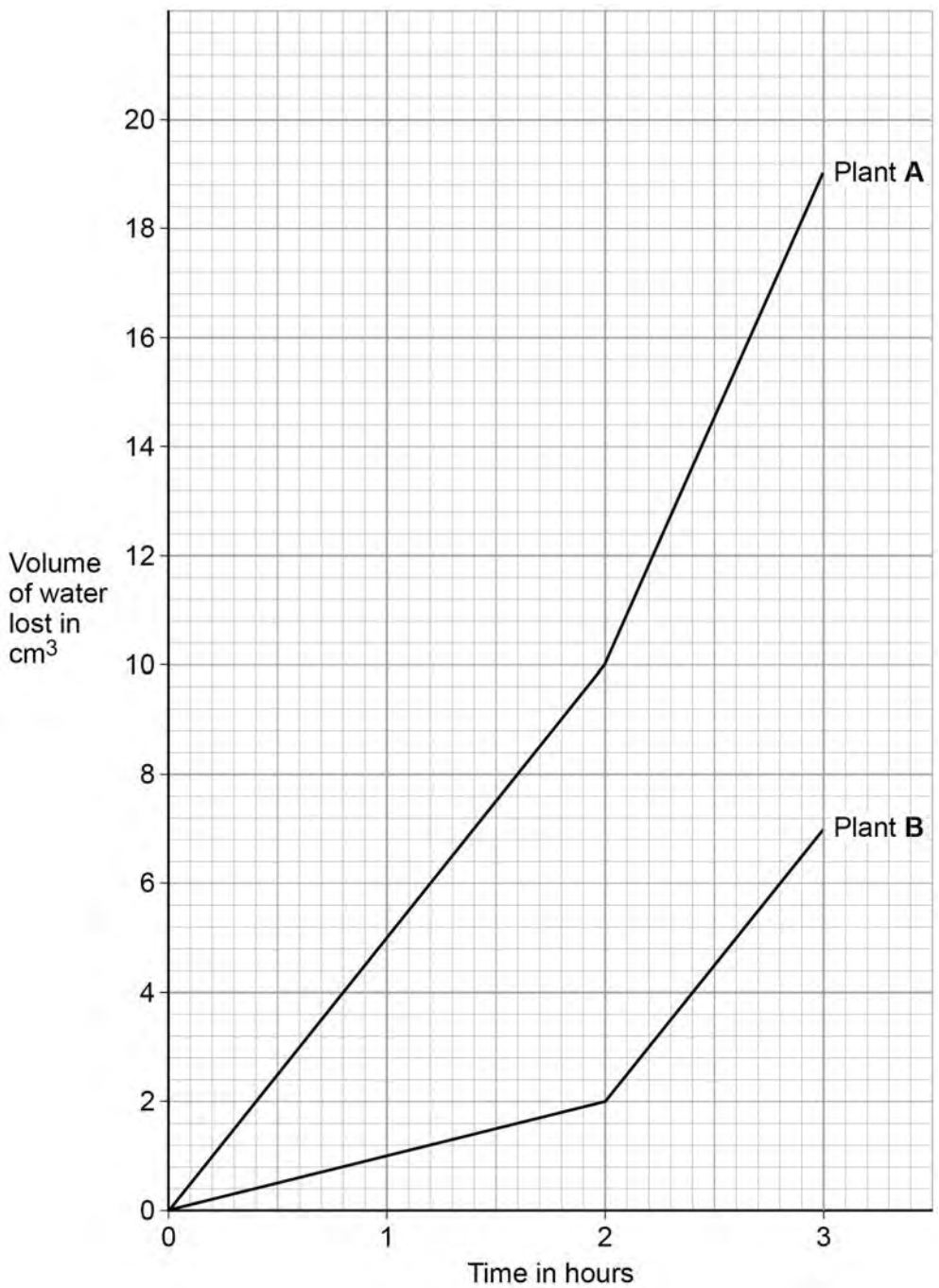
Question 38 · continued

A student investigated the volume of water lost from two plants.

The plants were different species.

Figure 6 shows the student's results.

Figure 6



4.7.1.4 Adaptations

Question 38 · continued

0 3 . 5 Calculate the difference in the volume of water lost by plant **A** compared to plant **B** in the first hour.

[2 marks]

Difference in volume = _____ cm^3

0 3 . 6 What could cause plant **A** to lose water at a faster rate than plant **B**?

[1 mark]

Tick (✓) **one** box.

Plant **A** has fewer stomata per leaf. ☐

Plant **A** is smaller. ☐

Plant **A** has more leaves. ☐

Plant **A** has smaller leaves. ☐

0 3 . 7 After the first 2 hours, both plants were moved to a new room.

Suggest **one** reason why both plants lost water at a faster rate in the new room.

[1 mark]

Question 3 continues on the next page

4.7.1.4 Adaptations

Question 38 · continued

0 3 . 8 Some plants have adaptations to stop them from being eaten by animals.

Figure 7 shows part of a holly plant.

Figure 7



Describe **one** way the holly plant is adapted to stop it being eaten by animals.

[1 mark]

11

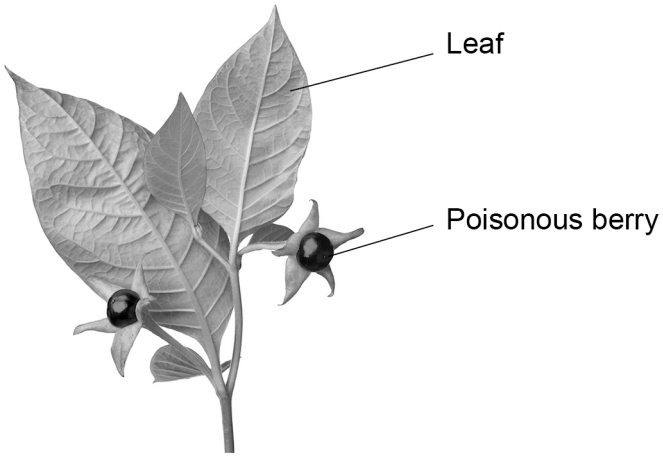
4.7.1.4 Adaptations

Question 39

November 2020 | 8461/1F | Original Q5

0 5 **Figure 7** shows part of a deadly nightshade plant.

Figure 7



0 5 . 1 How will the poisonous berries help the deadly nightshade plant to survive?

[1 mark]

0 5 . 2 Which type of defence mechanism are the berries?

[1 mark]

Tick (✓) **one** box.

Chemical ☐

Mechanical ☐

Physical ☐

4.7.1.4 Adaptations

Question 39 · continued

Figure 8 shows part of a gorse plant.

Figure 8



0 5 . 3 Suggest how the gorse plant is adapted to defend itself.

[1 mark]

0 5 . 4 The green leaves of the gorse plant make glucose for the plant to use.

What are **two** uses of glucose in the gorse plant?

[2 marks]

Tick (✓) **two** boxes.

- For defence ☐
- For respiration ☐
- To absorb water ☐
- To release minerals ☐
- To store as starch ☐

4.7.1.4 Adaptations

Question 39 · continued

0 5 . 5 A student wanted to show that the leaves of a gorse plant contain glucose.

The student crushed the leaves to extract the liquid from the cells.

Describe the method the student could use to test the liquid from the cells for glucose.

Include the result if glucose is present.

[3 marks]

0 5 . 6 The roots of the gorse plant have bacteria that turn nitrogen gas into nitrate ions.

Explain why nitrate ions are needed by the gorse plant.

[2 marks]

0 5 . 7 The roots of gorse plants can be infected by honey fungus.

The honey fungus produces tiny spores underground.

Suggest how the honey fungus spores travel from the roots of an infected gorse plant to the roots of a healthy gorse plant.

[1 mark]

4.7.1.4 Adaptations

Question 39 · continued

A drug can be extracted from gorse seeds.

Doctors want to trial the drug from gorse seeds to see if it can treat diarrhoea.

0 5 . 8 Which **two** factors must the doctors test the drug for in the trial?

[2 marks]

Tick (✓) **two** boxes.

- Appearance ☐
- Dosage ☐
- Solubility ☐
- Taste ☐
- Toxicity ☐

0 5 . 9 In the trial some patients will take tablets made from gorse seeds and some patients will take tablets made from sugar.

What are the tablets made from sugar called?

[1 mark]

Tick (✓) **one** box.

- Antibiotics ☐
- Antibodies ☐
- Painkillers ☐
- Placebos ☐

14

4.7.1.4 Adaptations

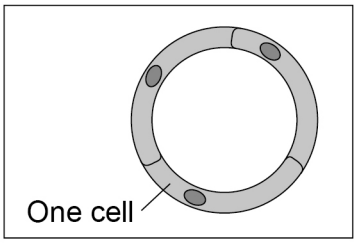
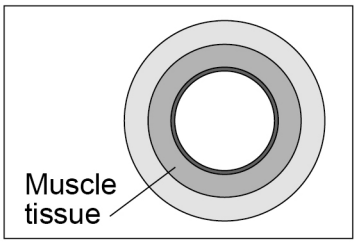
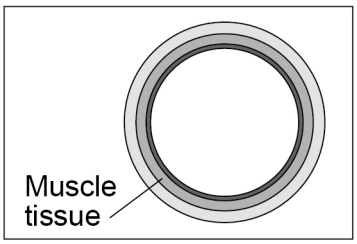
Question 40

November 2020 | 8461/1F | Original Q6

0 6 Blood is transported around the body in blood vessels.

0 6 . 1 Draw **one** line from each type of blood vessel to the structure of the blood vessel.

[2 marks]

Type of blood vessel	Structure of blood vessel
Artery	
Capillary	
Vein	

0 6 . 2 Explain how the structure of an artery is related to its function.

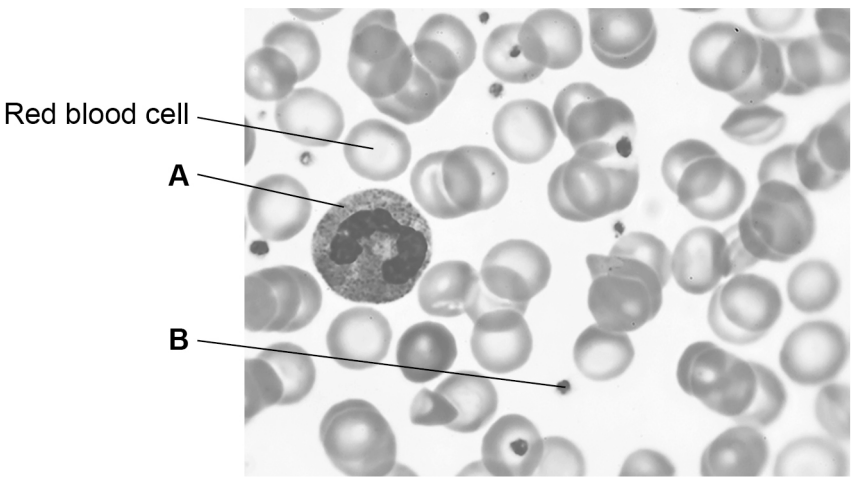
[2 marks]

4.7.1.4 Adaptations

Question 40 · continued

Figure 9 shows blood viewed through a microscope.

Figure 9



0 6 . 3 Name **A** and **B** in **Figure 9**.

[2 marks]

A _____

B _____

0 6 . 4 A red blood cell:

- has no nucleus
- contains a red pigment called haemoglobin.

Suggest how these adaptations help the red blood cell carry out its function.

[2 marks]

No nucleus _____

_____

Haemoglobin _____

_____

4.7.1.4 Adaptations

Question 40 · continued

0 6 . 5 The blood components are carried around the body in the liquid part of the blood.

What is the liquid part of the blood called?

[1 mark]

Tick (✓) **one** box.

Cell sap ☐

Plasma ☐

Saliva ☐

Urine ☐

Table 2 shows the results of a man's blood test.

Table 2

Blood component	Patient results	Normal range
Red blood cells	4.8	4.5 to 6.5
Lymphocytes	2.6	1.0 to 4.0
Neutrophils	5.1	1.8 to 7.5
Platelets	50	140 to 400

0 6 . 6 Which component of the man's blood is **not** within the normal range?

[1 mark]

0 6 . 7 Suggest a symptom the man might show.

[1 mark]

11

4.7.1.4 Adaptations

Question 41

November 2020 | 8461/1F | Original Q8

0 8 Diffusion is an important process in animals and plants.

0 8 . 1 What is meant by the term diffusion?

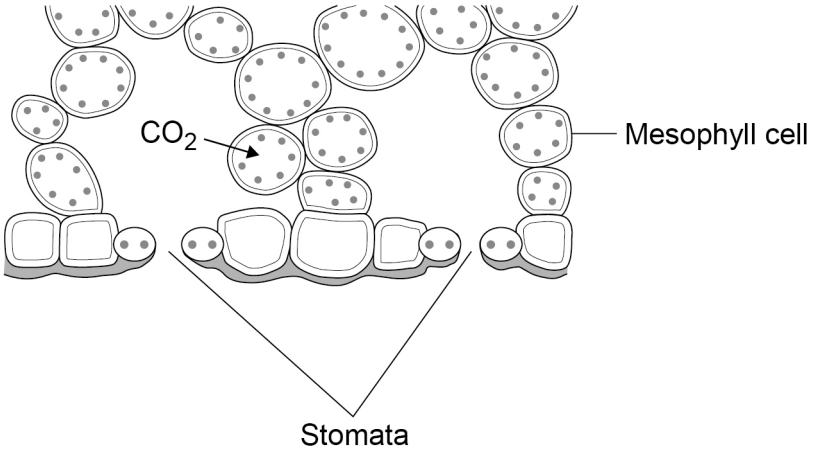
[2 marks]

4.7.1.4 Adaptations

Question 41 · continued

0 8 . 2 **Figure 11** shows part of a leaf.

Figure 11



Molecules of carbon dioxide diffuse from the air into the mesophyll cells.

Which **two** changes will increase the rate at which carbon dioxide diffuses into the mesophyll cells?

[2 marks]

Tick (✓) **two** boxes.

- Decreased number of chloroplasts in the cells ☐
- Decreased surface area of cells in contact with the air ☐
- Increased carbon dioxide concentration in the air ☐
- Increased number of stomata that are open ☐
- Increased oxygen concentration in the air ☐

Question 8 continues on the next page

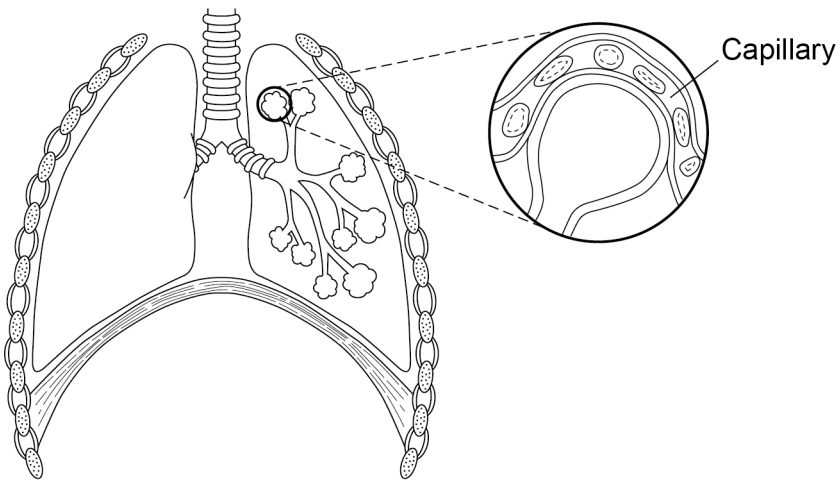
4.7.1.4 Adaptations

Question 41 · continued

0 8 . 3 Diffusion also happens in the human lungs.

Figure 12 shows the human breathing system.

Figure 12



Explain how the human lungs are adapted for efficient exchange of gases by diffusion.

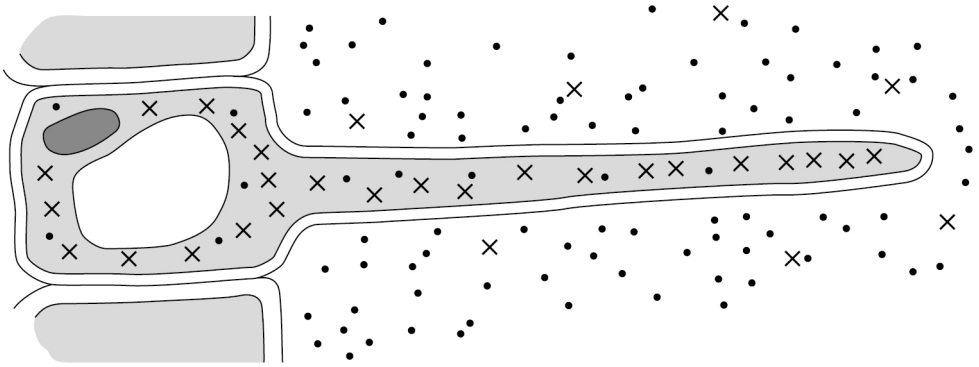
[6 marks]

4.7.1.4 Adaptations

Question 41 · continued

Figure 13 shows a root hair cell.

Figure 13



Key

Water molecules

Nitrate ions

0 8 . 4 Name the process by which water molecules enter the root hair cell.

[1 mark]

0 8 . 5 Nitrate ions need a different method of transport into the root hair cell.

Explain how the nitrate ions in **Figure 13** are transported into the root hair cell.

Use information from **Figure 13** in your answer.

[3 marks]

Name of process _____

Explanation _____

14

4.7.1.4 Adaptations

Question 42

November 2020 | 8461/2F | Original Q6

0 6 **Figure 8** shows what the extinct Siberian rhinoceros (*Elasmotherium sibiricum*) might have looked like.

Figure 8



0 6 . 1 What is the genus of the Siberian rhinoceros?

[1 mark]

Tick (✓) **one** box.

Elasmotherium ☐

Elasmotherium sibiricum ☐

sibiricum ☐

4.7.1.4 Adaptations

Question 42 · continued

The 'three-domain system' of classification places all living organisms in one of three domains.

0 6 . 2 Which domain was the Siberian rhinoceros in?

[1 mark]

Tick (✓) **one** box.

Archaea ☐

Eukaryota ☐

Prokaryota ☐

0 6 . 3 Who developed the 'three-domain system' of classification?

[1 mark]

Tick (✓) **one** box.

Carl Woese ☐

Charles Darwin ☐

Gregor Mendel ☐

0 6 . 4 The horn of the Siberian rhinoceros is estimated to have been 150 cm long.

Suggest **one** advantage of this adaptation to the Siberian rhinoceros.

[1 mark]

Question 6 continues on the next page

4.7.1.4 Adaptations

Question 42 · continued

0 6 . 5 The only parts of the Siberian rhinoceros that have been found are fossilised bones.

Give **one** reason why **only** the bones of the body of the Siberian rhinoceros became fossils.

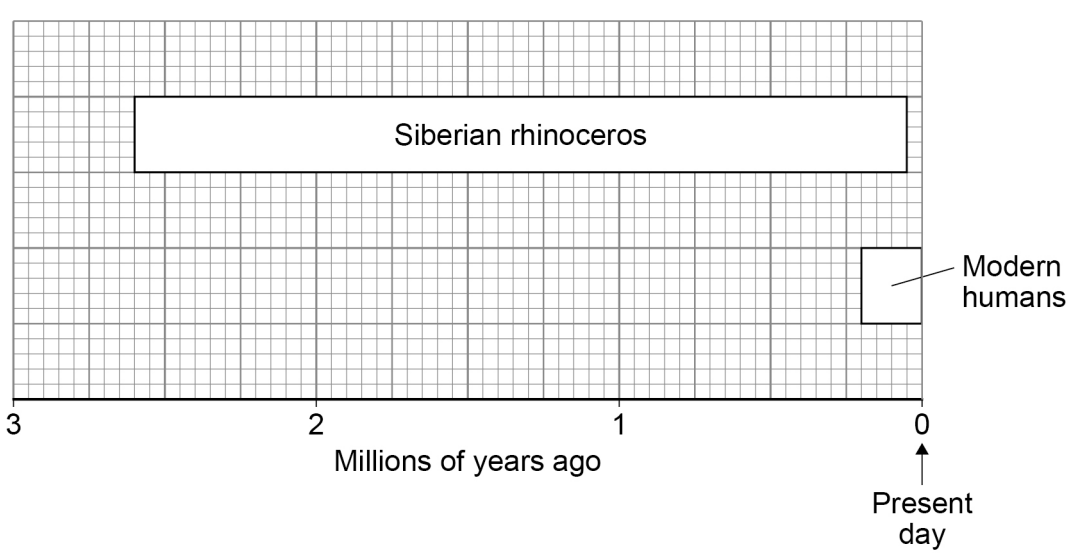
[1 mark]

0 6 . 6 Suggest how scientists can estimate when the Siberian rhinoceros was alive.

[1 mark]

Figure 9 shows when the Siberian rhinoceros existed and when modern humans existed.

Figure 9



4.7.1.4 Adaptations

Question 42 · continued

0 6 . 7 How many million years ago did the Siberian rhinoceros become extinct?

[1 mark]

_____ million years ago

0 6 . 8 Determine the time in years when both the Siberian rhinoceros and modern humans existed together.

Use **Figure 9** and your answer to Question **06.7**.

[3 marks]

_____

_____

_____

_____

Time = _____ years

0 6 . 9 Suggest **two** factors that may have caused the extinction of the Siberian rhinoceros.

[2 marks]

1 _____

_____

2 _____

_____

12

4.7.1.4 Adaptations

Question 43

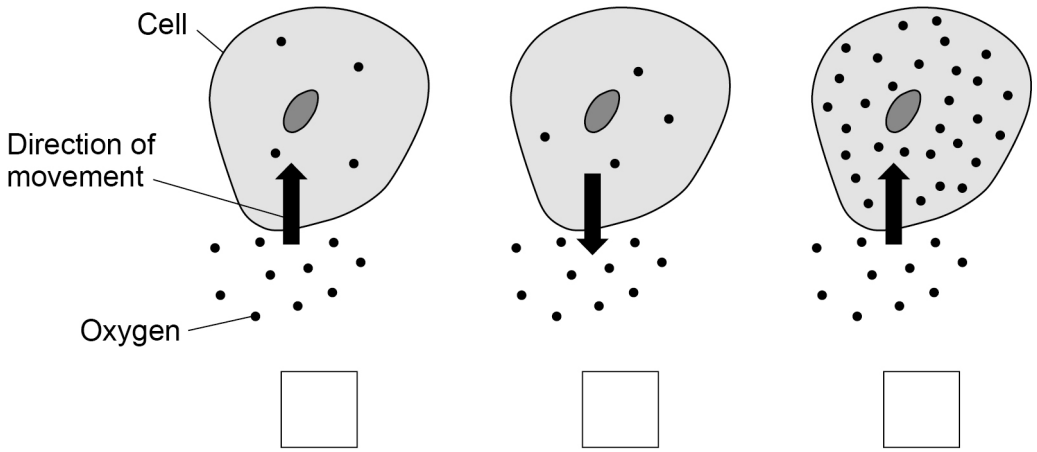
November 2021 | 8461/1F | Original Q1

0 1 This question is about cells.

0 1 . 1 Which diagram shows oxygen moving by diffusion?

[1 mark]

Tick (✓) **one** box.



0 1 . 2 Complete the sentences.

[3 marks]

Choose answers from the box.

carbon dioxide	**chlorophyll**	**energy**
light	**mineral ions**	**water**

Plant cells absorb substances from the soil.

Plant cells use osmosis to absorb _____.

Plant cells use active transport to absorb _____.

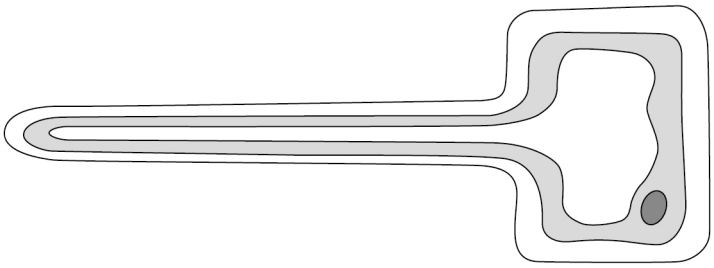
Active transport moves substances against the concentration gradient and needs _____.

4.7.1.4 Adaptations

Question 43 · continued

Figure 1 shows a specialised cell that absorbs substances from the soil.

Figure 1



0 1 . 3 Name the type of specialised cell in **Figure 1**.

[1 mark]

0 1 . 4 Describe how the cell in **Figure 1** is adapted to increase the absorption of substances from the soil.

[1 mark]

Question 1 continues on the next page

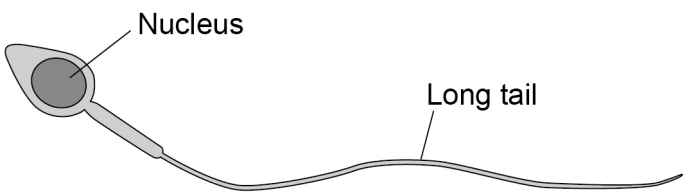
4.7.1.4 Adaptations

Question 43 · continued

A sperm cell is another specialised cell.

Figure 2 shows a sperm cell.

Figure 2



0 1 . 5 Draw **one** line from each feature to how the feature helps the sperm cell carry out its function.

[2 marks]

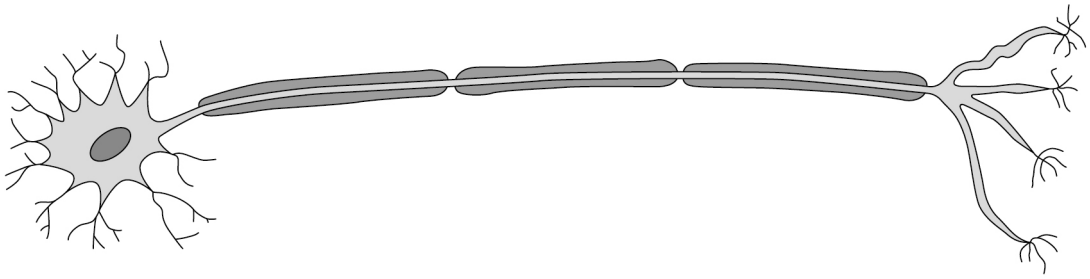
Feature of sperm cell	How the feature helps
Contains a nucleus	To break the outer layer of the egg
	To help the cell to swim to the egg
Has a long tail	To provide the chromosomes for fertilisation
	To release energy

4.7.1.4 Adaptations

Question 43 · continued

Figure 3 shows another specialised cell.

Figure 3



0 1 . 6 Name the type of cell in **Figure 3**.

Describe **one** feature of the cell that helps it to carry out its function.

[2 marks]

Name of the cell _____

Feature of the cell _____

_____

10

4.7.1.4 Adaptations

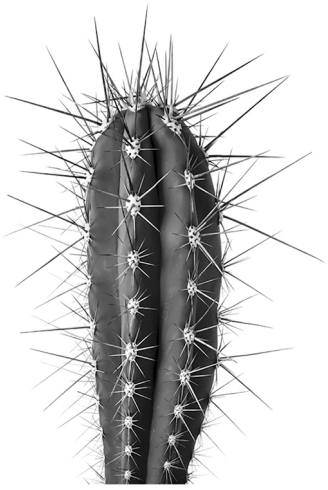
Question 44

November 2021 | 8461/1F | Original Q3

0 3 A cactus is a plant that lives in a dry environment.

Figure 6 shows part of a cactus plant.

Figure 6



0 3 . 1 Give **one** adaptation shown in **Figure 6** that helps to prevent the cactus from being eaten by animals.

[1 mark]

0 3 . 2 A plant may produce poisons that make animals unwell.

What is this type of defence mechanism?

[1 mark]

Tick (✓) **one** box.

Chemical ☐

Mechanical ☐

Physical ☐

4.7.1.4 Adaptations

Question 44 · continued

0 3 . 3 Some desert plants only grow leaves after it has rained.

As soon as the soil dries out, the leaves fall off.

How could the leaves falling off the plant be an advantage to a plant that lives in a dry environment?

[1 mark]

Tick (✓) **one** box.

The plant is less likely to reproduce. ☐

The plant will not lose as much water. ☐

The plant will photosynthesise faster. ☐

The stem of a cactus is green.

0 3 . 4 What causes the green colour in the stem?

[1 mark]

0 3 . 5 What is the advantage to the cactus of having a green stem?

[1 mark]

Question 3 continues on the next page

4.7.1.4 Adaptations

Question 44 · continued

The stem of a cactus contains many different tissues.

0 3 . 6 What name is given to a group of tissues working together?

[1 mark]

Tick (✓) **one** box.

Organ ☐

Organism ☐

Organ system ☐

0 3 . 7 Name **one** substance transported through the xylem in the stem of the cactus.

[1 mark]

_____

0 3 . 8 Name the tissue that transports dissolved sugars through the stem of the cactus.

[1 mark]

_____

8

4.7.1.4 Adaptations

Question 45

June 2022 | 8461/1F | Original Q5

0 5 . 1 Plants take up water from the soil through their roots.

Some of the water is used for photosynthesis.

Complete the word equation for photosynthesis.

Choose answers from the box.

[2 marks]

fat	**glucose**	**nitrogen**	**oxygen**	**protein**

carbon dioxide + water → _____ + _____

0 5 . 2 Water and dissolved substances are transported through a plant.

Complete the sentences.

Choose answers from the box.

[3 marks]

epidermis	**guard cells**	**palisade cells**
phloem	**stomata**	**xylem**

Water moves from the roots to the leaves in the _____.

Water is lost from leaves through pores called _____.

Dissolved sugars are transported in the _____.

Question 5 continues on the next page

4.7.1.4 Adaptations

Question 45 · continued

Table 3 shows the rate of transpiration in four different plant species.

Table 3

Plant species	Rate of transpiration in arbitrary units
A	310
B	254
C	87
D	192

0 5 . 3 Calculate how many times greater the rate of transpiration of species **A** is than the rate of transpiration of species **B**.

Give your answer to 2 significant figures.

[3 marks]

Number of times greater (2 significant figures) = _____

4.7.1.4 Adaptations

Question 45 · continued

0 5 . 4 Which factor could cause species **A** to have a higher rate of transpiration than species **B**?

[1 mark]

Tick (✓) **one** box.

Each flower of species **A** has more petals. ☐

Each leaf of species **A** has more stomata. ☐

Each plant of species **A** has shorter roots. ☐

0 5 . 5 Which environmental change would cause an increase in the rate of transpiration?

[1 mark]

Tick (✓) **one** box.

Decreased light intensity ☐

Decreased wind speed ☐

Increased humidity ☐

Increased temperature ☐

0 5 . 6 Which plant species in **Table 3** is most likely to live in a dry desert?

[1 mark]

Tick (✓) **one** box.

A ☐ **B** ☐ **C** ☐ **D** ☐

Question 5 continues on the next page

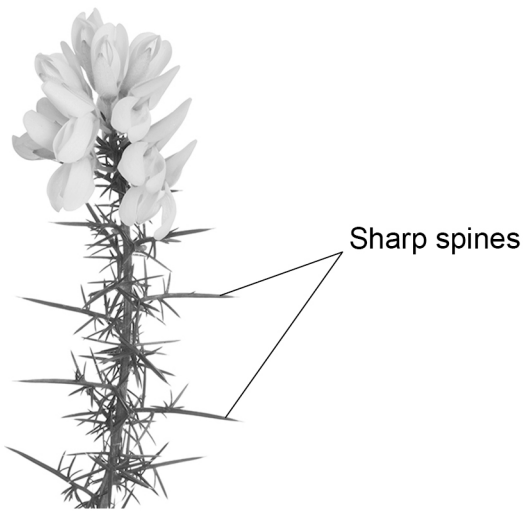
4.7.1.4 Adaptations

Question 45 · continued

0 5 . 7 Some plants have adaptations that help them survive.

Figure 6 shows part of a gorse plant.

Figure 6



How will the sharp spines help the gorse plant survive?

[1 mark]

4.7.1.4 Adaptations

Question 45 · continued

0 5 . 8 Animals also have adaptations to help them survive.

Figure 7 shows two insects.

Figure 7



Hornet **Hornet Moth**

Hornets are insects that sting other animals and cause pain.

Hornet moths do **not** sting other animals.

Explain why animals avoid eating the **hornet moth**.

[2 marks]

14

4.7.1.4 Adaptations

Question 46

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0 6 **Table 4** shows information about four jellyfish.

The jellyfish are listed in order of increasing size.

Table 4

Jellyfish	Size of jellyfish	Surface area in mm^2	Volume in mm^3	Surface area to volume ratio
A	Smallest ↓	3 600	1 200	**X**:1
B		50 000	25 000	2:1
C		1 800 000	6 000 000	0.3:1
D	Largest	7 500 000	125 000 000	0.06:1

0 6 . 1 Calculate value **X** in **Table 4**.

[2 marks]

X = _____

0 6 . 2 Describe the relationship between the size of a jellyfish and its surface area to volume ratio.

Use **Table 4**.

[1 mark]

4.7.1.4 Adaptations

Question 46 · continued

The jellyfish in **Table 4** take oxygen into their cells by diffusion.

0 6 . 3 Name **one** other substance that enters cells by diffusion.

Do **not** refer to oxygen in your answer.

[1 mark]

0 6 . 4 Suggest **two** factors that affect the rate of diffusion of oxygen into a jellyfish.

[2 marks]

1 _____

_____

2 _____

_____

0 6 . 5 Some organisms take in oxygen using a respiratory system.

In humans, gas exchange takes place in the lungs.

Name the organs where gas exchange takes place in **fish**.

[1 mark]

_____

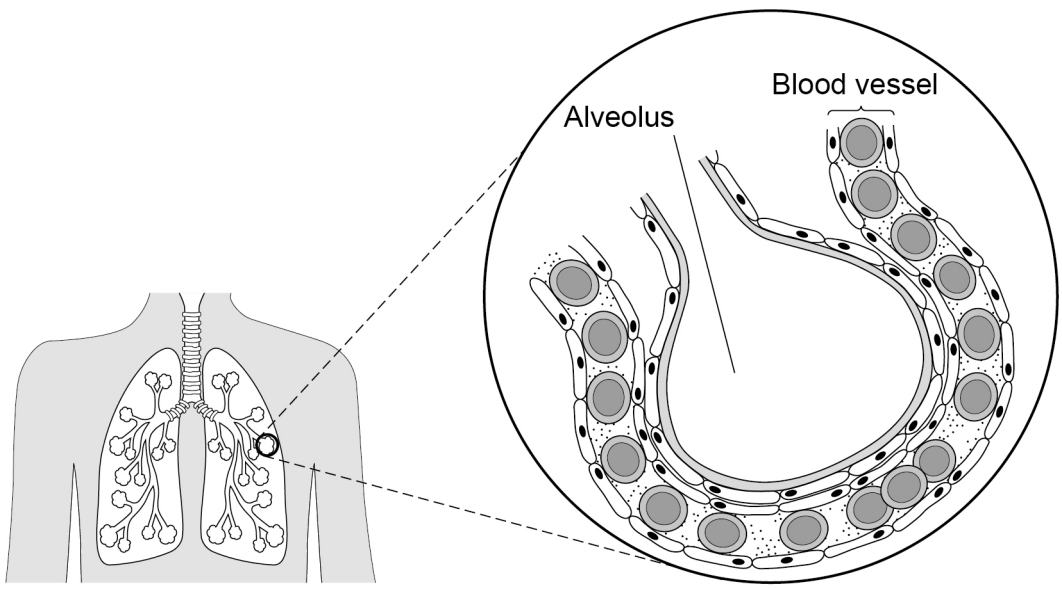
Question 6 continues on the next page

4.7.1.4 Adaptations

Question 46 · continued

0 6 . 6 **Figure 8** shows parts of the human breathing system.

Figure 8



Explain how the human breathing system is adapted to maximise the rate of gas exchange.

[6 marks]

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4.7.1.4 Adaptations

Question 47

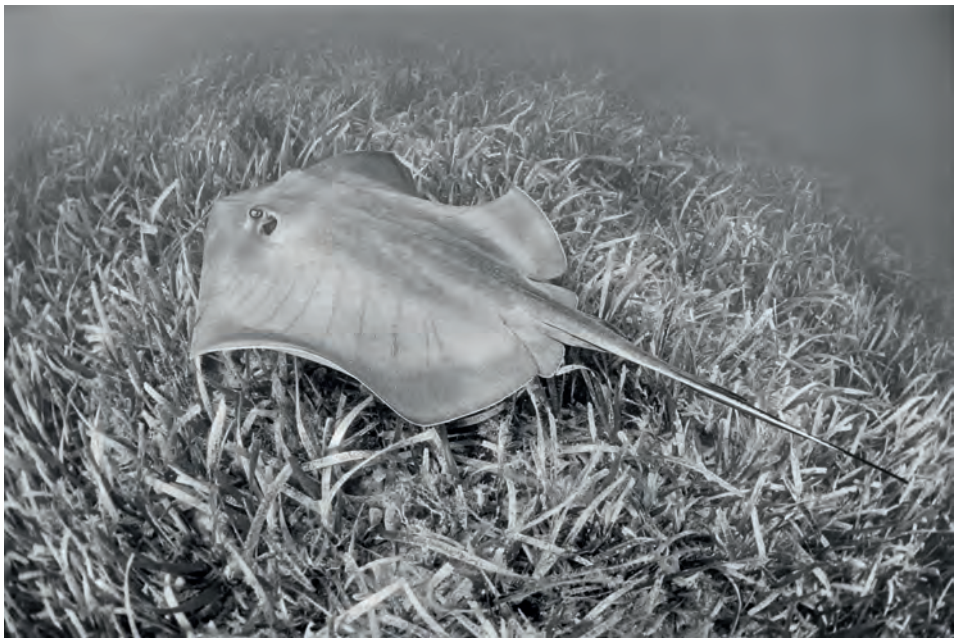
June 2025 | 8461/1F | Original Q5

0 5 Plants and animals have adaptations that help them survive.

A stingray is an animal that lives in the sea.
Seagrass is a plant that grows on the sea floor.

Figure 8 shows a stingray swimming above seagrass.

Figure 8



0 5 . 1 Draw **one** line from each adaptation of **seagrass** to how the adaptation helps the seagrass survive.

[2 marks]

Adaptation of seagrass	How the adaptation helps the seagrass to survive
Flexible leaves	Keep seagrass in one place on the sea floor
Long, deep roots	Poison animals that try to eat the seagrass
	Stop seagrass breaking in strong water currents

4.7.1.4 Adaptations

Question 47 · continued

In the stingray, gas exchange takes place in the gills.

0 5 . 2 Name the organs where gas exchange takes place in humans.

[1 mark]

_____

0 5 . 3 Gills are adapted to maximise gas exchange.

Which **two** features of gills help to maximise gas exchange?

[2 marks]

Tick (✓) **two** boxes.

- Gills are not open at night. ☐
- Gills have a large surface area. ☐
- Gills have a low temperature. ☐
- Gills have thin walls. ☐
- Gills have very few capillaries. ☐

Question 5 continues on the next page

Question 47 · continued

0 5 . 4 Stingrays rest on the sea floor.

Table 4 shows information about the metabolic rate of a stingray.

Table 4

Activity of stingray	Metabolic rate in arbitrary units
Resting	484
Swimming	944

Calculate how many times greater the metabolic rate of the stingray is when swimming compared with when resting.

Give your answer to the nearest whole number.

[3 marks]

0 5 . 5 When the metabolic rate of the stingray increases, the rate of aerobic respiration in the stingray increases.

Complete the word equation for aerobic respiration.

Choose answers from the box.

[3 marks]

carbon dioxide	magnesium	nitrogen	oxygen	water

glucose + _____ ⟶ _____ + _____

4.7.1.4 Adaptations

Question 47 · continued

0 5 . 6 Explain why the rate of respiration in the stingray increases when the stingray starts to swim.

[3 marks]

0 5 . 7 Some plants can use anaerobic respiration.

Which **two** substances are produced during anaerobic respiration in plants?

[2 marks]

Tick (✓) **two** boxes.

- Carbon dioxide ☐
- Ethanol ☐
- Hydrochloric acid ☐
- Oil ☐
- Protein ☐

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