OCR
RECOGNISING ACHIEVEMENT

H

GENERAL CERTIFICATE OF SECONDARY EDUCATION

GATEWAY SCIENCE

B632/02

BIOLOGY B

Unit 2 Modules B4 B5 B6 (Higher Tier)

OCE/30774

Candidates answer on the Question Paper
A calculator may be used for this paper

OCR Supplied Materials:
None

Other Materials Required:
- Pencil
- Ruler (cm/mm)

Wednesday 9 June 2010
Afternoon

Duration: 1 hour

B6320 2

Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

MODIFIED LANGUAGE

INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your Candidate Number, Centre Number and question number(s).

INFORMATION FOR CANDIDATES

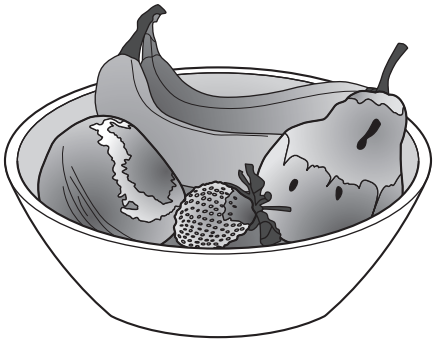
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **60**.
- This document consists of **24** pages. Any blank pages are indicated.

Answer **all** the questions.

Section A – Module B4

1 Alistair leaves some fruit in a bowl for a long time.

The fruit starts to decay.



(a) Look at the statements about decay.

Put a tick (✓) in the box next to the correct statement.

The rate of decay increases at temperatures above 60 °C.	☐
The rate of decay increases in dry conditions.	☐
The rate of decay increases with higher nitrogen levels in the air.	☐
The rate of decay increases if there is a larger surface area for the decomposers to feed on.	☐

[1]

(b) The decomposers feeding on the fruit are **saprophytes**.

Describe how saprophytes feed.

Use ideas about digestion and absorption in your answer.

.....

.....

..... **[2]**

(c) Fruit can be preserved to stop it decaying.

One way is to cook the fruit and then seal it in a metal can.

Explain how sealing fruit in a can stops it decaying.

.....

..... **[1]**

[Total: 4]

2 Elaine uses organic farming methods to keep pigs.

Alison uses intensive farming methods to keep pigs.

Elaine's farm

Alison's farm

(a) Elaine thinks organic farming methods are better than intensive farming methods.

Other than the cost, suggest **one advantage** and **one disadvantage** of using organic farming methods to keep pigs.

advantage .....

.....

.....

disadvantage .....

.....

..... **[2]**

(b) Alison also grows vegetables on her farm.

She adds phosphates to the soil to help the vegetables grow.

Some parts of the vegetables will **not** grow properly without phosphates.

Which parts of the vegetables will be most affected?

Put **one** tick (✓) in the box next to the parts of the vegetables which will be most affected.

flowers and fruits	☐
fruits and roots	☐
leaves and flowers	☐
roots and leaves	☐

[1]

(c) Plants also need the mineral magnesium.

(i) If a plant was lacking magnesium what **colour** would its leaves be?

..... **[1]**

(ii) Write the name of the substance in plants which contains magnesium.

..... **[1]**

[Total: 5]

3 This question is about plants.

(a) Look at the picture of a tree.

The tree is 90 metres high. Water can still reach its leaves.

(i) Write down the name of the vessels that carry water to the leaves.

..... **[1]**

(ii) Describe the structure of these vessels.

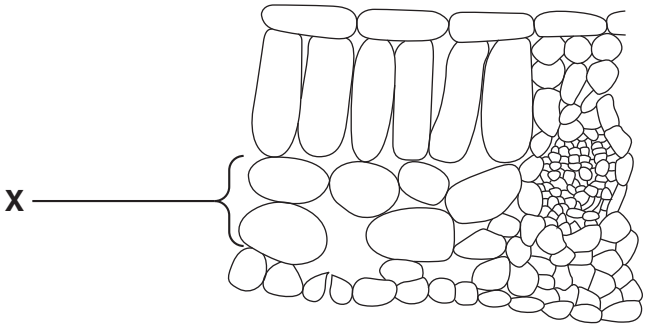
..... **[1]**

(b) Increasing light intensity increases the rate of water movement through a plant.

Write down **one other** environmental change that **increases** the rate of water movement.

..... **[1]**

(c) Look at the diagram. It shows some of the cells in a leaf.



(i) Write down the name of the layer labelled **X**.

..... **[1]**

(ii) This layer is adapted for efficient gas exchange.

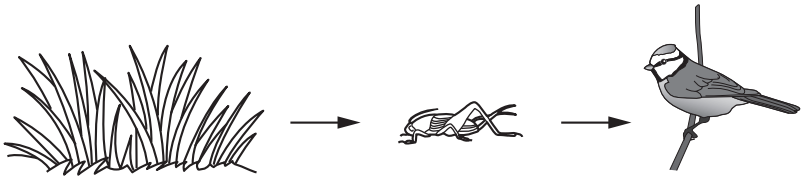
Explain how.

.....

..... **[1]**

[Total: 5]

4 Look at the diagram of a food chain.



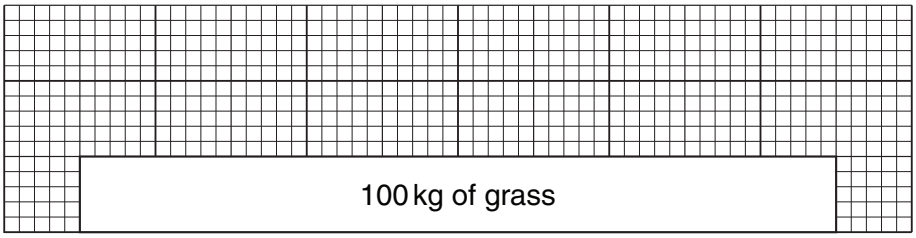
	grass	crickets	birds
total biomass	100 kg	10 kg	1 kg

(a) A pyramid of biomass can be drawn to describe this food chain.

Finish the pyramid of biomass to include the crickets and the birds.

Make sure the bars are drawn to scale and **labelled**.

The bar for the grass has been drawn for you.



[2]

(b) Energy is 'lost' from each stage of the food chain.

Write down **one** way in which energy is lost.

..... **[1]**

(c) The 10 kg of crickets take in 200 kJ of energy.

120 kJ of this energy is lost and the rest is used for growth.

Calculate the efficiency of energy transfer in the crickets.

answer .....% **[1]**

(d) Carbon in food chains is recycled.

(i) Carbon enters food chains because of a chemical process in plants.

Write down the name of this process.

..... **[1]**

(ii) Carbon can become part of the shells of some marine organisms.

The shells can become limestone.

Write down **one** way carbon can be released from limestone.

..... **[1]**

[Total: 6]

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Section B – Module B5

5 Paul's kidneys do not work properly.

He has to use a kidney dialysis machine.

(a) Describe what kidneys do when they are working properly.

.....

.....

.....

.....

.....

..... **[3]**

(b) Paul is waiting for a kidney transplant.

He is hoping to get a kidney from his identical twin brother.

(i) Suggest **two** reasons why it is better for Paul to have a kidney from his identical twin brother than from an unknown donor.

1 .....

.....

2 .....

..... **[2]**

(ii) Some body parts, such as knee and hip joints, can be replaced with mechanical replacements inside the body.

Suggest why a kidney can **not** be replaced with a mechanical replacement **inside** the body.

..... **[1]**

[Total: 6]

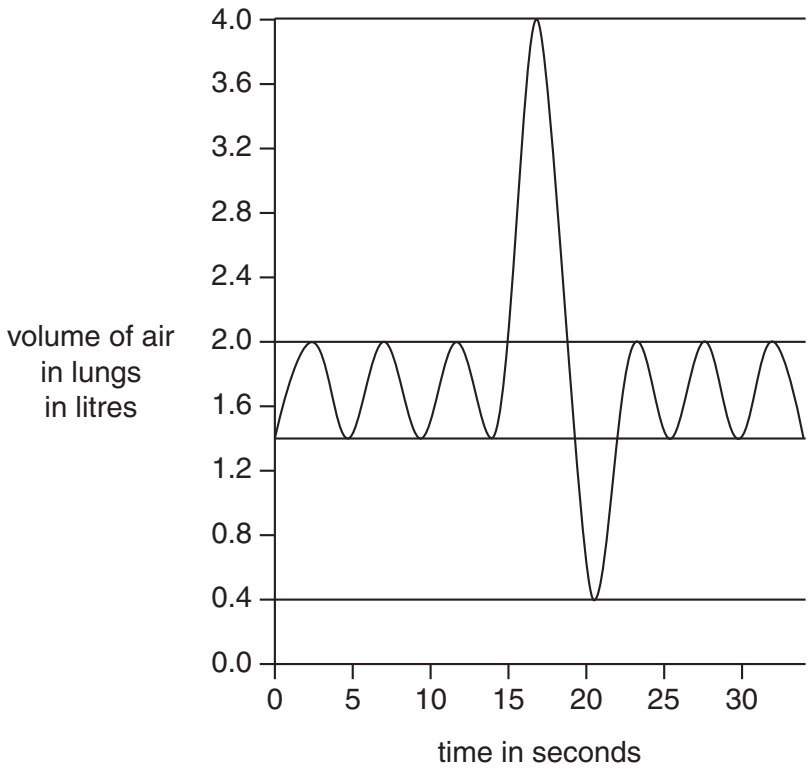
6 Liz is investigating her breathing using a spirometer.

Liz breathes normally for 15 seconds.

Then she breathes in and out as hard as she can.

Then she breathes normally again.

The spirometer trace shows her breathing.



(a) When Liz breathes normally, the volume of air she breathes in and out is her **tidal volume**.

When Liz breathes as hard as she can, the volume of air she breathes in and out is her **vital capacity**.

Look at the spirometer trace.

Work out how many times greater Liz's vital capacity is than her tidal volume.

You should show your working.

answer ..... **[3]**

(b) When Liz breathes, the volume and pressure inside her lungs change.

Put **two** ticks (✓) in the table to show the changes that happen when Liz starts to **breathe in**.

volume		pressure	
increases	decreases	increases	decreases

[1]

(c) When Liz breathes, her ribcage moves.

(i) When Liz was very young, most of her ribcage was made of cartilage.

As she gets older most of it changes to bone.

This is called **ossification**.

Describe how ossification happens.

.....

..... **[1]**

(ii) Describe the advantage of her ribcage changing to bone.

..... **[1]**

(iii) Liz still has some cartilage in her ribcage.

Suggest the advantage of Liz having some cartilage in her ribcage.

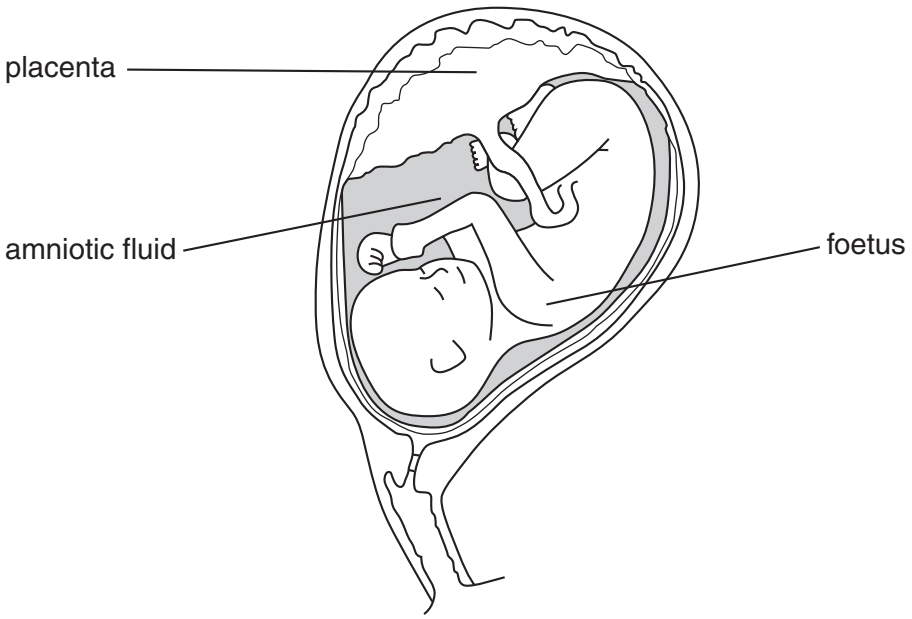
.....

..... **[1]**

[Total: 7]

7 Heidi is pregnant.

The diagram shows the foetus in Heidi's uterus.



(a) Heidi has an amniocentesis test when she has been pregnant for 16 weeks.

The test can identify abnormalities in the foetus.

The test involves collecting some cells from the amniotic fluid.

(i) The cells collected are genetically identical to the cells in the foetus.

Name the process which makes genetically identical cells.

..... **[1]**

(ii) In the amniocentesis test, how is some of the amniotic fluid removed from Heidi's uterus?

..... **[1]**

(iii) Heidi thought very carefully before she had the amniocentesis test.

This was because of the possible consequences of the test.

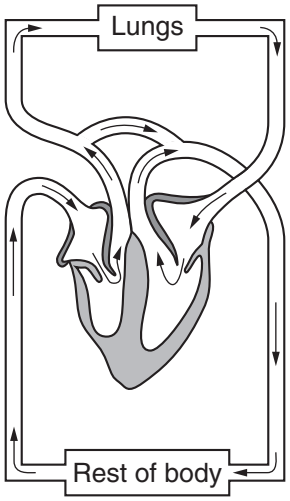
Describe **one** possible consequence.

.....

.....

..... **[1]**

(b) The diagram shows part of the blood circulatory system of the foetus.



The blood circulatory system of the foetus is different from that of a child or adult.

There is a blood vessel carrying blood from the pulmonary artery to the aorta.

This means that **not** all the blood gets pumped through the lungs.

(i) Is the blood system of the foetus a single circulatory system or a double circulatory system?

.....

Explain your answer.

.....

.....

..... **[1]**

(ii) Suggest **one** reason why not all the blood of the foetus needs to be pumped through its lungs.

.....

..... **[1]**

Turn over for the remainder of question 7

(c) The foetus has a different blood group from Heidi.

Heidi has blood group A.

The foetus has blood group B.

(i) Put **four** ticks (✓) in the table to show which antigens and antibodies Heidi and the foetus have.

	antigen A	antigen B	antibody A	antibody B
Heidi				
foetus				

[1]

(ii) In the placenta, Heidi's blood and the blood of the foetus flow very close together. Gases, food and waste can pass between the two blood systems.

However, the two blood systems are separate. It is important that Heidi's blood and the blood of the foetus do **not** mix.

If Heidi's blood and the blood of the foetus did mix, what could happen?

.....

..... **[1]**

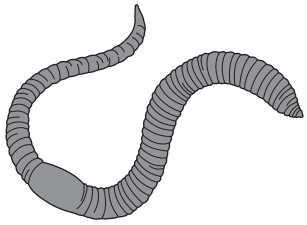
[Total: 7]

Section C – Module B6

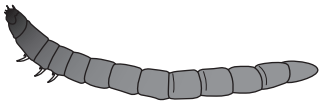
8 Soil is made up from a number of different parts.

(a) Different organisms live in soil.

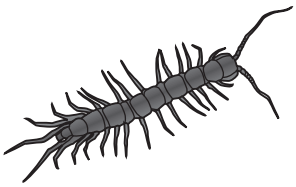
Three of these are shown in the diagram.



earthworm



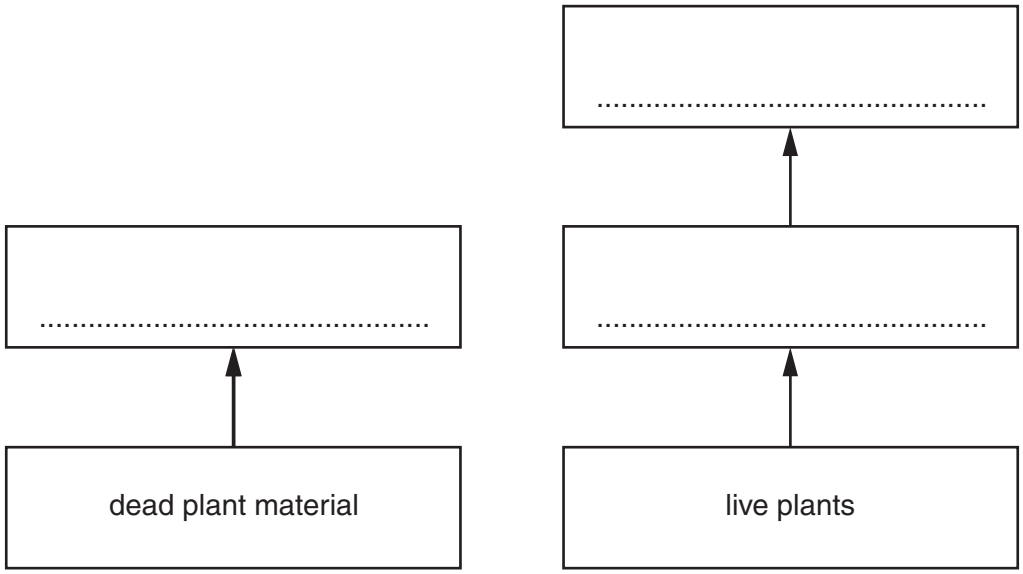
wireworm



centipede

Complete the boxes to show the feeding relationships in soil.

Write the name of each organism from the diagram in the correct box.



[1]

(b) Earthworms are very important for soil fertility.

Put a tick (✓) next to **one** way that earthworms improve soil.

They make alkaline soils more acidic. ☐

They kill pathogenic bacteria in the soil. ☐

They make burrows that let oxygen into the soil. ☐

They ferment any dead organic material. ☐

[1]

Turn over for the remainder of question 8

(c) Charles Darwin was a famous scientist who studied earthworms.

(i) Darwin knew that earthworms dragging leaves underground makes soil more fertile.

How does this make soil more fertile?

.....

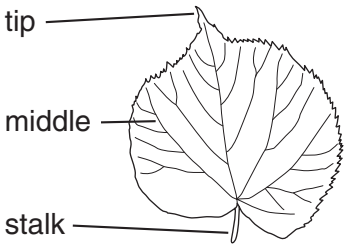
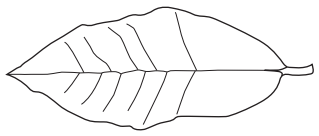
..... **[1]**

(ii) Darwin then investigated how the earthworms dragged the leaves.

He recorded which end of the leaf was dragged into the burrow first.

He recorded results for two different types of leaf.

The table shows his results.

type of leaf	percentage dragged in by the tip first	percentage dragged in by the middle of the leaf	percentage dragged in by the stalk
lime 	79	17	4
rhododendron 	41	0	59

Describe **one** difference between the results for the lime leaves and the rhododendron leaves.

Suggest a reason for this difference.

difference .....

.....

reason .....

.....

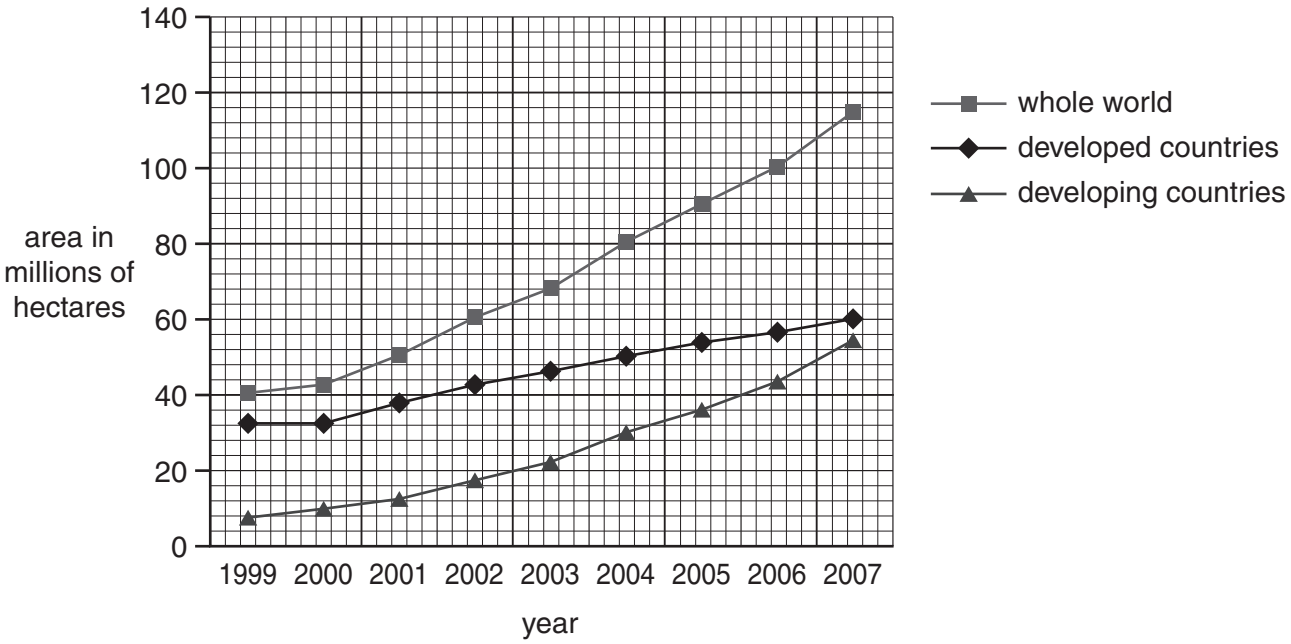
..... **[2]**

[Total: 5]

9 Genetically modified (GM) plants are grown in many countries.

(a) Countries can be described as either developing or developed.

The graph shows the area of land used to grow GM crops in different types of country from 1999 to 2007.



(i) Describe **two** trends shown in the graph.

1 .....

.....

2 .....

..... **[2]**

(ii) In 2007, **58** million hectares of land were used to grow GM crops in the USA.

Describe how the graph shows that the USA must be a developed country.

.....

..... **[1]**

Turn over for the remainder of question 9

(b) One GM plant that is grown in many countries is GM cotton.

The cotton plant now contains a gene from a bacterium.

This gene makes the cotton plant produce a chemical that kills insect pests.

Finish these sentences about the process.

Choose words from this list.

ligase **lipase** **mutated**

plasmid **restriction** **transgenic**

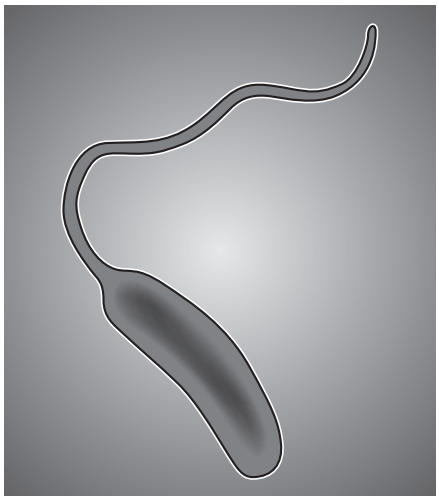
The gene is cut out of the DNA of the bacterium using a ..... enzyme.

The cotton plant is called ..... because it contains a gene from another species. **[2]**

[Total: 5]

10 Some pupils make a factsheet about cholera.

Cholera – A killer disease.



This is the bacterium that causes the disease cholera.

People are most likely to get cholera in areas where there has been a natural disaster.

If people get cholera then they need to take suitable drugs to kill the bacteria.

(a) Write down the name of the bacterium that causes cholera.

..... **[1]**

(b) The bacterium shown on the factsheet moves around.

Write down the name of the part that helps it to move.

..... **[1]**

(c) Natural disasters make diseases like cholera spread more rapidly.

Write down **two** reasons why.

1 .....

.....

2 .....

..... **[2]**

[Total: 4]

11 A town in America has put up signs like the one shown.

It tells dog owners to remove any faeces that their dogs leave on the streets.

The town put up the signs because the faeces were washed into the local lake by heavy rain.

The faeces then caused an algal bloom in the lake.

This led to the death of many animals in the lake.

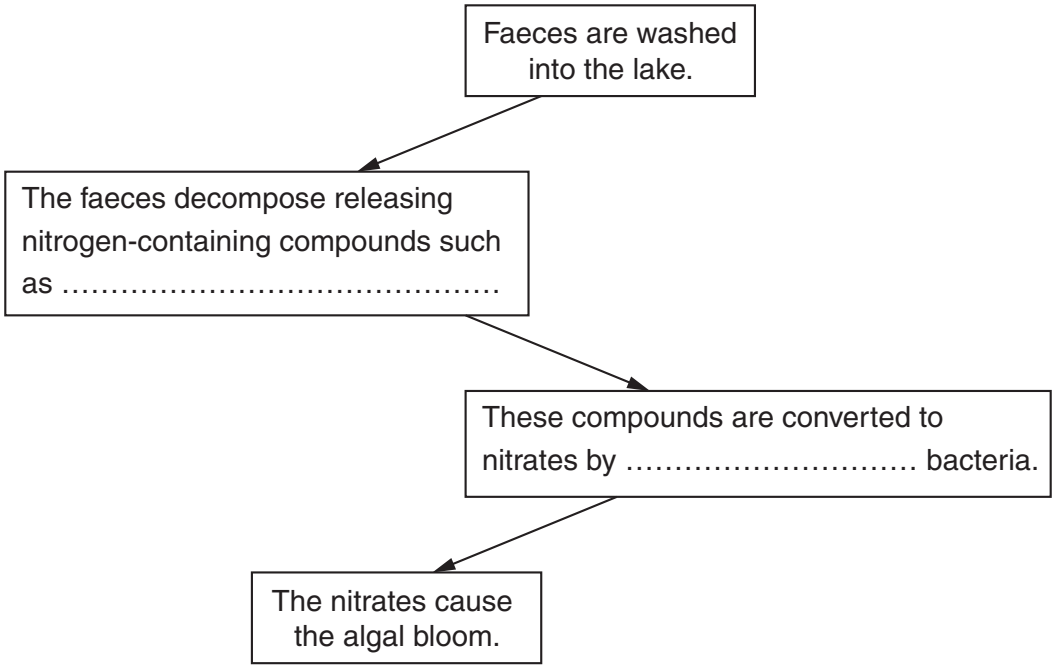
(a) What is an algal bloom?

.....

..... **[1]**

(b) The diagram shows some steps in the formation of the algal bloom.

Complete the diagram by writing in the **two** missing words.



[2]

(c) Explain how an algal bloom could cause the death of animals in the lake.

.....

.....

.....

.....

.....

..... **[3]**

[Total: 6]

END OF QUESTION PAPER

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