AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.3.2

Waste management

Past-paper questions

Tier	**Foundation**
Question groups	**43**
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.

4.7.3.2 Waste management

Question 01

June 2007 | BLY1B | Original Q4 | Legacy

QUESTION FOUR

Human activities affect the environment.

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

A burning fuels that release sulfur dioxide

B digging a new quarry

C sewage disposal

D using pesticides on crops

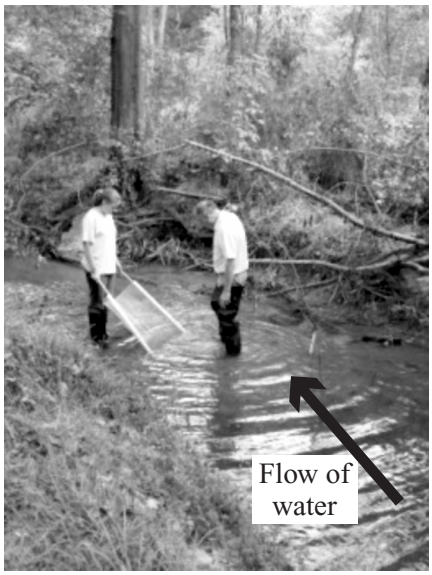
	Effect on the environment
1	pollutes hedges that surround fields
2	pollutes river water directly
3	produces acid rain
4	reduces the land available for wild plants

4.7.3.2 Waste management

Question 02

June 2007 | BLY1F | Original Q8 | Legacy

8 Invertebrate animals are used to monitor pollution in streams. The photograph shows scientists collecting a sample of invertebrates from a stream.



This is the method that they use.

- A 1 m^2 area of the bed of the stream is marked out.
- A net 1 m wide is held by one person on the downstream side of the marked-out area.
- The other person uses their boots to gently move stones in this area of the stream bed. They do this for three minutes. This dislodges invertebrates which are then caught in the net.
- The invertebrates are then identified and counted.

(a) Name **two** control variables (variables which must be kept the same) in this investigation.

1 .....

2 .....

(2 marks)

Question 8 continues on the next page

Question 02 · continued

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(b) Suggest **two** reasons why the results from a sample might not be accurate.

1 .....

.....

2 .....

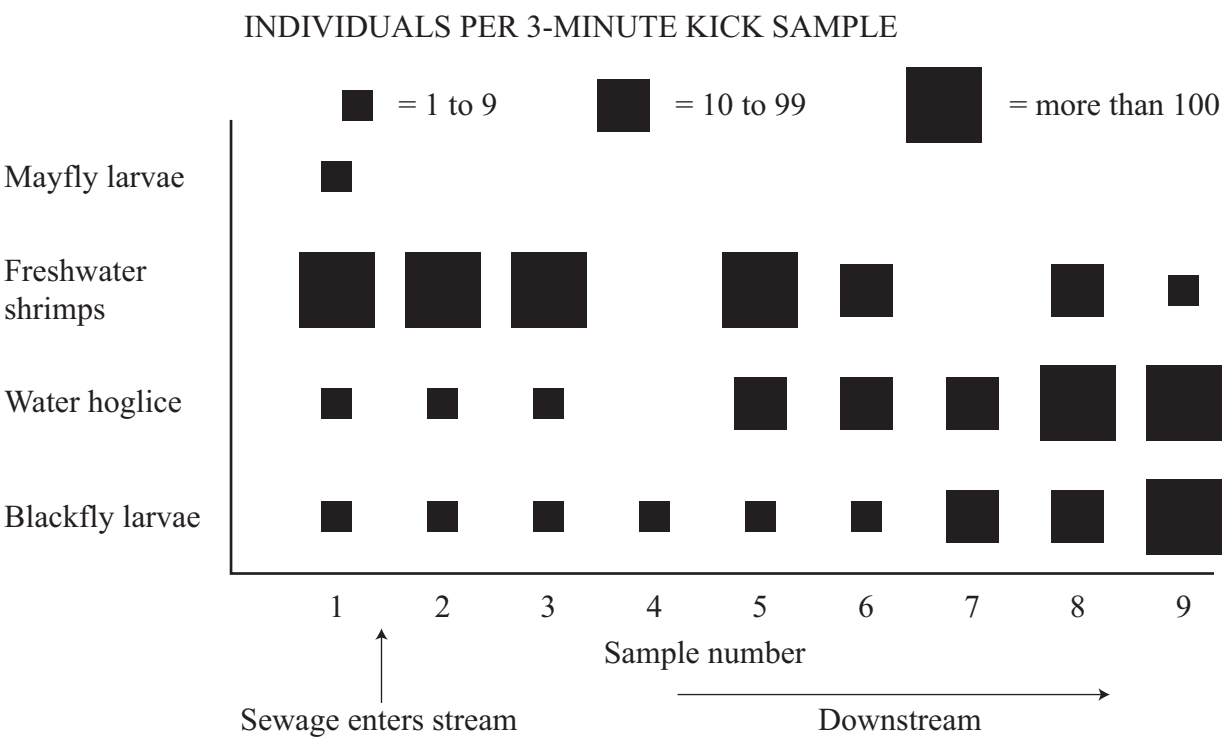
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(2 marks)

The technique described on the previous page was used to investigate the effect of sewage on stream invertebrates.

- Sample 1 was taken upstream of the point where the sewage entered the stream.
- Samples 2–9 were taken at regular intervals downstream of the sewage inflow.

The graph shows the results.



(c) What was the range of the number of blackfly larvae that could be found in sample 7?

.....

(1 mark)

4.7.3.2 Waste management

Question 02 · continued

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(d) Describe, as fully as you can, how the number of water hoglice changed downstream from where sewage entered the stream.

.....

.....

.....

.....

(2 marks)

(e) Which of the four invertebrates is the best indicator species for water which is **not** polluted by sewage?

.....

Give the reason for your answer.

.....

.....

(2 marks)

9

4.7.3.2 Waste management

Question 03

November 2007 | BLY1B | Original Q1 | Legacy

QUESTION ONE

This question is about pollution.

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

A carbon dioxide

B sewage

C pesticide

D sulfur dioxide

	Information
1	used in farming to kill insects
2	large quantities are released by some cities into the sea
3	dissolves in rainwater to form acid rain
4	a greenhouse gas released by burning timber

4.7.3.2 Waste management

Question 04

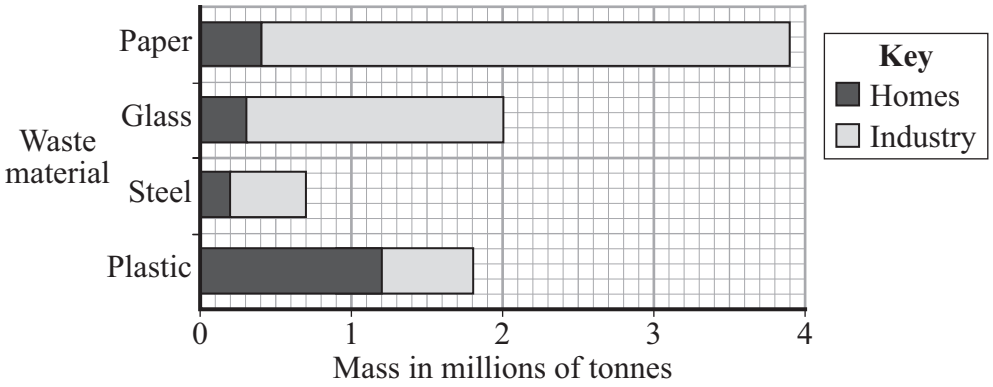
November 2007 | BLY1B | Original Q4 | Legacy

QUESTION FOUR

The human population is increasing rapidly.

This increases the amount of waste produced.

The bar chart shows the mass of waste produced by homes and industry in the UK in 2005.



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

A glass

B paper

C plastic

D steel

	Information
1	recycling of this material means fewer forests are cut down
2	industry produced 1.7 million tonnes of waste of this material
3	the material that formed the smallest mass of waste from homes
4	one third of this waste material came from industry

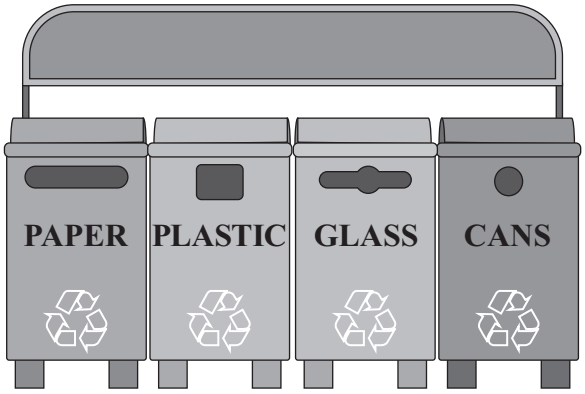
4.7.3.2 Waste management

Question 05

January 2008 | BLY1F | Original Q1 | Legacy

1 There are many ways in which we can help to protect the environment.

The drawing shows recycling bins.



(a) (i) Give **one** way in which recycling paper helps to protect the environment.

.....

.....

(1 mark)

(ii) Give **one** way in which recycling cans helps to protect the environment.

.....

.....

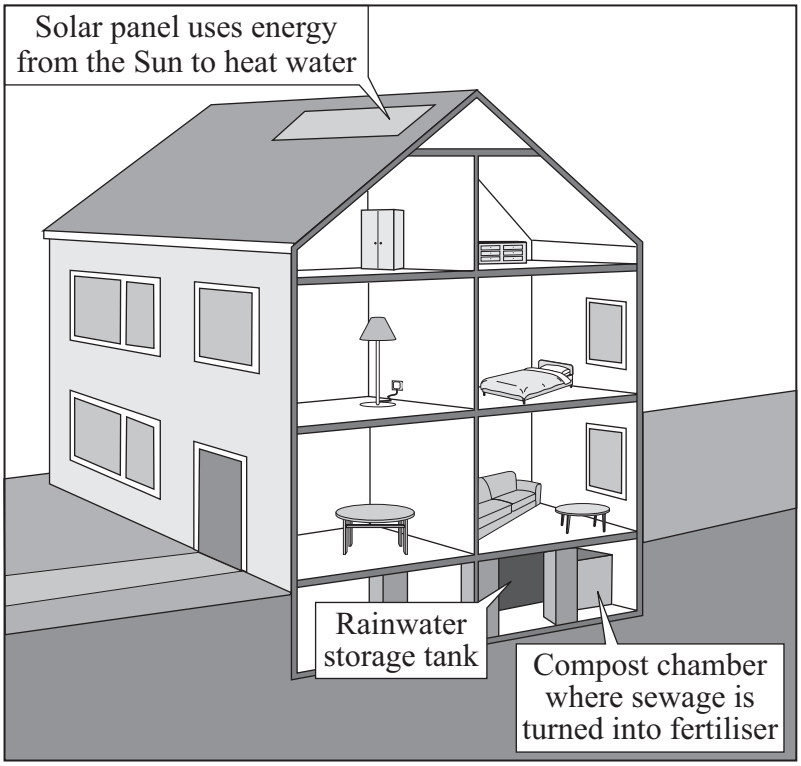
(1 mark)

4.7.3.2 Waste management

Question 05 · continued

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(b) The drawing shows an 'ecohouse'. This house has been designed to help to protect the environment.



How do the following features of the 'ecohouse' help to protect the environment?

(i) The solar panel

.....

.....

(1 mark)

(ii) The rainwater storage tank

.....

.....

(1 mark)

(iii) The compost chamber

.....

.....

(1 mark)

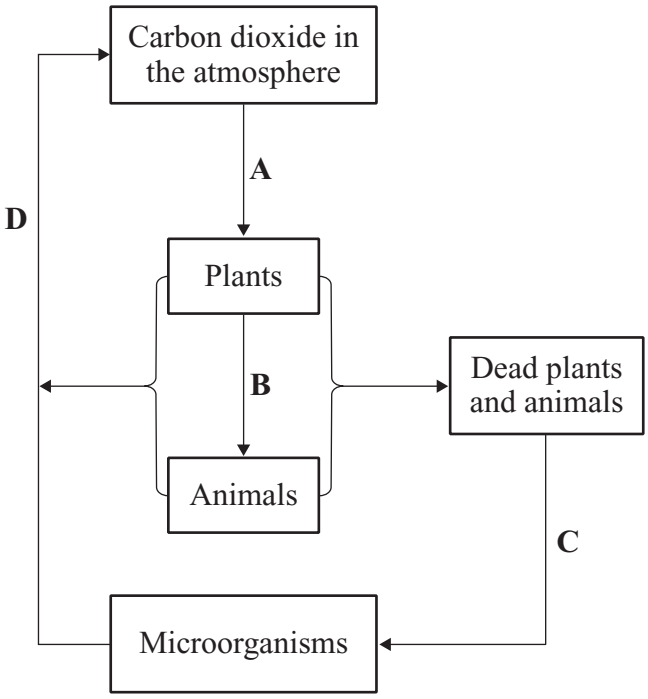
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4.7.3.2 Waste management

Question 06

January 2008 | BLY2F | Original Q7 | Legacy

7 The diagram shows part of the carbon cycle.



(a) Which letter, **A**, **B**, **C** or **D**, represents:

(i) respiration .....

(1 mark)

(ii) photosynthesis? .....

(1 mark)

4.7.3.2 Waste management

Question 06 · continued

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(b) Local authorities are encouraging people to recycle vegetable waste by converting it into compost.

Compost is made by mixing the vegetable waste with soil in a large container.

(i) Decay occurs more quickly if the container has holes in the sides.

Explain why.

.....

.....

.....

.....

(2 marks)

(ii) Spreading compost on the soil between plants leads to better growth of the plants.

Explain why.

.....

.....

(1 mark)

5

4.7.3.2 Waste management

Question 07

March 2008 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

Farms may pollute the environment in several ways.

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

A carbon dioxide

B pesticide

C fertiliser

D sewage

	Feature
1	chemical spread on land to help crop growth
2	solid and liquid waste produced by cows
3	produced by tractors
4	chemical sprayed on crops to kill insects

4.7.3.2 Waste management

Question 08

June 2008 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

This question is about pollutants.

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

A acid rain

B pesticide

C methane

D sulfur dioxide

1	produced by growing rice
2	given off by factories burning coal
3	results from chemicals dissolving in water
4	sprayed on crops by farmers

4.7.3.2 Waste management

Question 09

November 2008 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

This question is about pollutants.

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

A herbicide

B methane

C sulfur dioxide

D carbon dioxide

1	can cause acid rain
2	a greenhouse gas produced mainly by rice and cattle
3	used by farmers to kill weeds
4	a greenhouse gas taken in by plants

4.7.3.2 Waste management

Question 10

November 2008 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

Lichens are indicators of pollution.

9A Lichens are sensitive to . . .

1 carbon dioxide.

2 methane.

3 oxygen.

4 sulfur dioxide.

The table shows the heights of different types of lichen.

Type of lichen	Height in mm
crusty	1
scaly	3
leafy	10
fluffy	10–50

A survey of lichens found at various distances from a city centre gave the results in the table below.

Distance from city centre (km)	Main type of lichen found
0.3	none found
0.4	crusty
1.2	crusty
2.7	scaly
3.2	crusty
4.0	scaly
6.0	leafy
6.9	leafy

Question 10 · continued

9B Which of the following best describes the relationship between the type of lichen found and the distance from the city centre?

1 Only crusty lichens are found within 3 km of the city centre.

2 The further away from the city centre, the taller the lichens.

3 Leafy lichens are found over the greatest range of distances.

4 Scaly lichens are found over the smallest range of distances.

9C The survey was carried out by two students who travelled by bus. They got off at each stop to check the lichens growing nearby.

Which of the following might explain why there were no fluffy lichens?

1 The survey sites were all near the road.

2 The survey sites were not chosen at random.

3 The bus stops were not at equal distances from the city centre.

4 The students were not expecting to find fluffy lichens.

9D The students also used a meter to measure the level of pollutants in the air near to each bus stop.

Their lichen survey could be a better indicator of pollution than the meter survey because . . .

1 the lichens were not affected by the pollution they had absorbed.

2 the lichens had sampled the air over a long period of time.

3 meters are difficult to read.

4 meters cannot detect low levels of pollutants.

END OF TEST

4.7.3.2 Waste management

Question 11

January 2009 | BLY2F | Original Q4 | Legacy

4 Waste products, such as carbon dioxide and urea, have to be removed from the body.

Draw a ring around the correct answer to complete each sentence.

4 (a) Carbon dioxide is produced by [breathing / diffusion / respiration].

(1 mark)

4 (b) Most carbon dioxide leaves the body through the [kidneys / lungs / skin].

(1 mark)

4 (c) Urea is produced in the [kidneys / liver / lungs].

(1 mark)

4 (d) Urea is produced from the breakdown of [amino acids / glucose / urine].

(1 mark)

4

4.7.3.2 Waste management

Question 12

March 2009 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

Sulfur dioxide is a pollutant gas.

8A Which environmental problem is caused by sulfur dioxide?

1 global warming

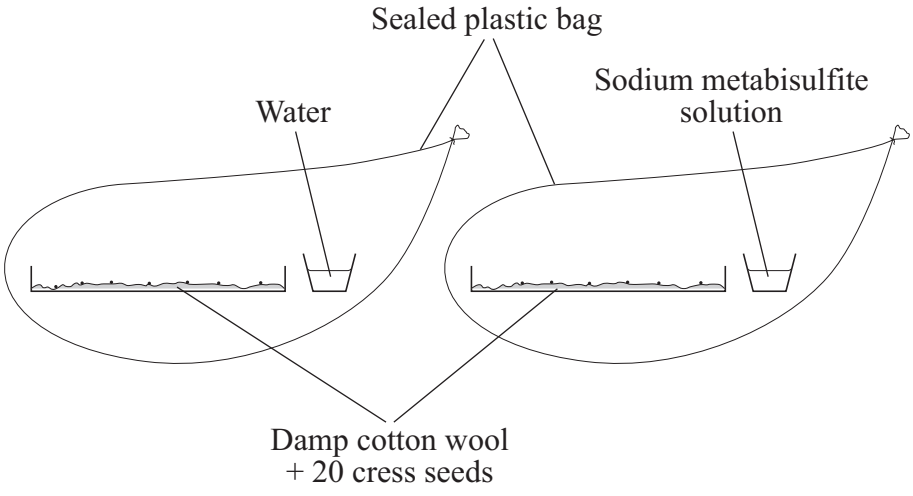
2 acid rain

3 deforestation

4 traffic congestion

A student investigated the effect of sulfur dioxide on the germination of cress seeds.

The diagram shows her apparatus.



- Sodium metabisulfite solution gives off sulfur dioxide.
- Both bags were left in a warm laboratory for 5 days.
- The student then counted the number of seeds that had germinated.

8B The independent variable in this investigation was . . .

1 the number of seeds that germinated.

2 the number of seeds put into each bag.

3 the presence of water or sodium metabisulfite.

4 the temperature in the laboratory.

4.7.3.2 Waste management

Question 12 · continued

8C The main reason for using the plastic bags was . . .

1 to keep the seeds warm.

2 to keep the seeds dry.

3 to keep gases inside.

4 to let light in.

8D The student carried out the investigation five times. The table shows the student's results.

Number of seeds that germinated	
Bag containing water	**Bag containing sodium metabisulfite solution**
17	5
15	8
15	5
16	8
17	9

What conclusion can be drawn from these results?

1 Sodium metabisulfite poisons cress seeds.

2 Sulfur dioxide affects the germination of cress seeds.

3 There is 100% germination of cress seeds when sulfur dioxide is **not** present.

4 Water is toxic to a small number of cress seeds.

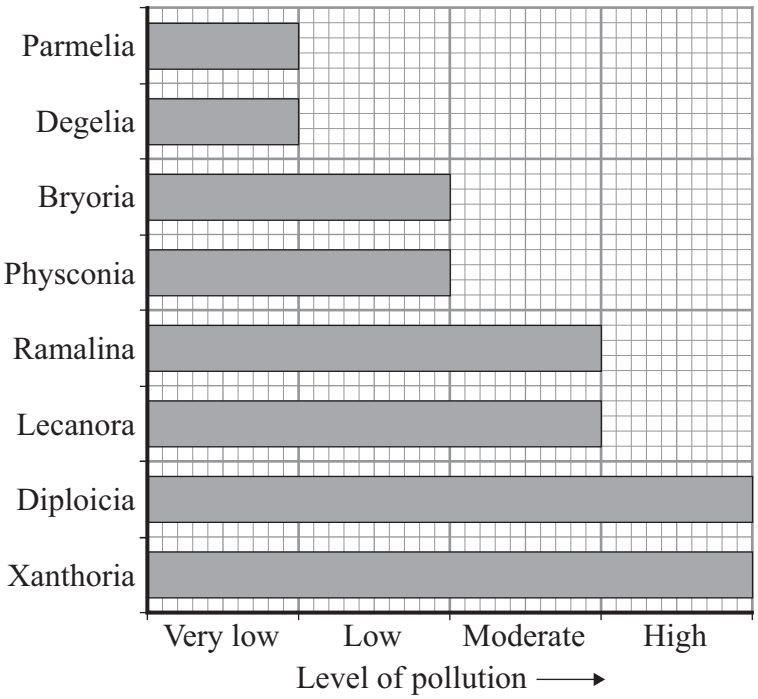
4.7.3.2 Waste management

Question 13

June 2009 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

The chart shows how much pollution different lichens can tolerate.



6A Which of the following lichens is most sensitive to pollution?

1 Degelia

2 Diploicia

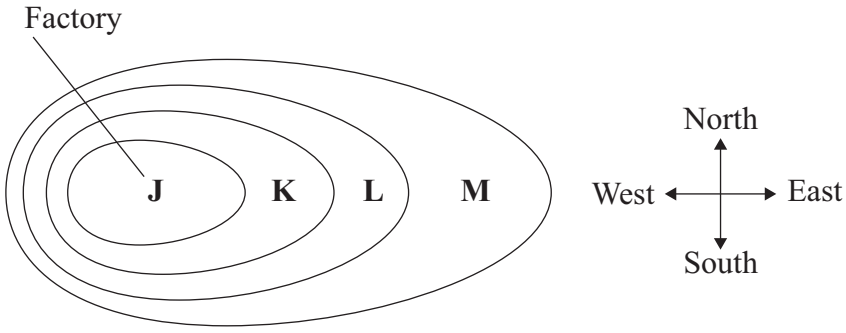
3 Physconia

4 Ramalina

4.7.3.2 Waste management

Question 13 · continued June 2009 | BLY1BP | Original Q6 | Legacy

The diagram shows the distribution of lichens around a factory which burns coal.



6B In which direction does the wind blow the pollution?

1 towards the north

2 towards the east

3 towards the south

4 towards the west

6C Which row in the table shows a correct distribution of lichens?

	Lichen in area J	Lichen in area K	Lichen in area L	Lichen in area M
1	Xanthoria	Diploicia	Parmelia	Ramalina
2	Ramalina	Degelia	Bryoria	Physconia
3	Degelia	Bryoria	Lecanora	Xanthoria
4	Xanthoria	Lecanora	Bryoria	Parmelia

6D Lichens can be used to estimate levels of pollution from . . .

1 carbon dioxide.

2 methane.

3 pesticides.

4 sulfur dioxide.

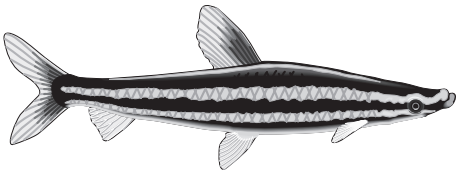
4.7.3.2 Waste management

Question 14

June 2009 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

Zebra fish are small freshwater fish that can tolerate a wide range of environmental conditions. Scientists want to use zebra fish as an indicator species for different types of water pollution.



9A Scientists have extracted 'glow' genes from a jellyfish and transferred them into the eggs of a zebra fish.

What term describes this process?

1 cloning

2 genetic engineering

3 tissue culture

4 embryo transplant

9B Genes from jellyfish are transferred into zebra fish eggs by . . .

1 using a small pair of sharp scissors.

2 using enzymes.

3 mixing the gametes of jellyfish and zebra fish.

4 taking cytoplasm from a jellyfish egg and placing it into a zebra fish egg.

Question 14 · continued

Zebra fish created by this process would glow with different colours, depending on the type of chemical pollution in the water. The table shows how this would work.

Colour	Type of chemical pollution			
	Pesticides	Fertilisers	Acidity	Herbicides
Red	✓			
Green			✓	
Yellow		✓		
Orange				✓

9C Zebra fish would glow green because of . . .

1 an increase in the sulfur dioxide content of the atmosphere.

2 a reduction in the carbon dioxide content of the atmosphere.

3 an increase in the methane content of the atmosphere.

4 an increase in the amount of chemicals used in agriculture.

9D In one river, different zebra fish glow red and orange.

This indicates that the river is polluted by . . .

1 chemicals released from industry.

2 smoke released from power stations.

3 chemicals washed off farmland.

4 sewage leaking from drains.

END OF TEST

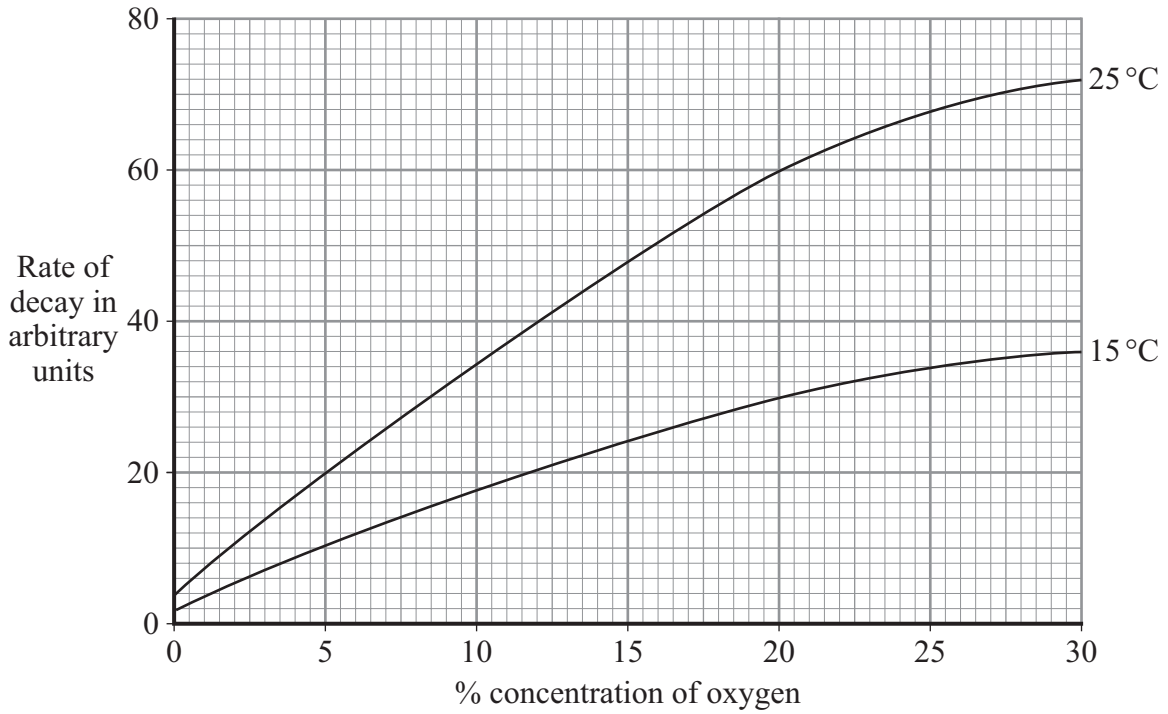
4.7.3.2 Waste management

Question 15

June 2009 | BLY2F | Original Q8 | Legacy

8 Gardeners often put waste materials onto compost heaps.

The graph shows how the conditions in a compost heap affect how quickly waste materials in the heap decay.



8 (a) (i) Describe the effect of increasing the temperature from 15 °C to 25 °C on the rate of decay at 20 % oxygen concentration.

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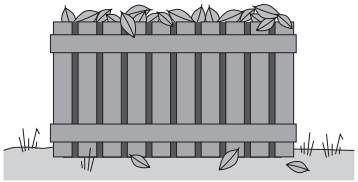
(2 marks)

4.7.3.2 Waste management

Question 15 · continued

for mark

8 (a) (ii) Gardeners are advised to put waste materials into special compost bins.
These bins have holes in their sides.



Holes in the sides of the compost bin help the waste materials to decay faster.

Explain why.

.....

.....

.....

.....

.....

(2 marks)

8 (b) A gardener noticed that some of his plants were growing poorly.

He put some decayed compost onto the soil, around the plants.
Six months later the plants were growing well.

Explain why.

.....

.....

(1 mark)

5

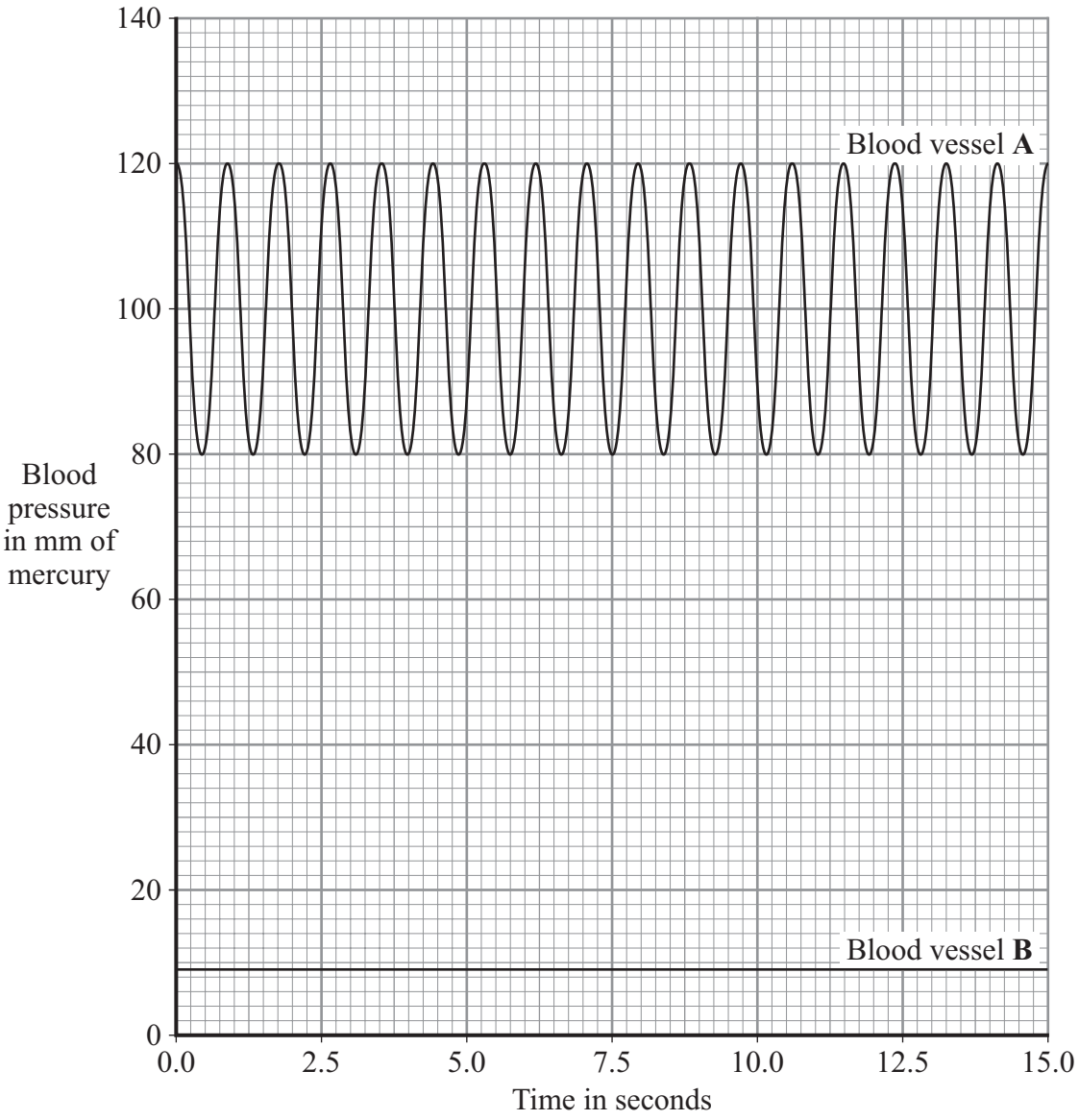
4.7.3.2 Waste management

Question 16

June 2009 | BLY3F | Original Q6 | Legacy

6 The heart pumps blood around the body. This causes blood to leave the heart at high pressure.

The graph shows blood pressure measurements for a person at rest.
The blood pressure was measured in an artery and in a vein.



4.7.3.2 Waste management

Question 16 · continued June 2009 | BLY3F | Original Q6 | Legacy

for mark

6 (a) Which blood vessel, **A** or **B**, is the artery?

Blood vessel .....

Give **two** reasons for your answer.

Reason 1 .....

.....

Reason 2 .....

.....

(2 marks)

6 (b) Use information from the graph to answer these questions.

6 (b) (i) How many times did the heart beat in 15 seconds? .....

(1 mark)

6 (b) (ii) Use your answer from part (b)(i) to calculate the person's heart rate per minute.

.....

.....

Heart rate = ... beats per minute

(1 mark)

6 (c) During exercise, the heart rate increases. This supplies useful substances to the muscles and removes waste materials from the muscles at a faster rate.

6 (c) (i) Name **two** useful substances that must be supplied to the muscles at a faster rate during exercise.

1 .....

2 .....

(2 marks)

6 (c) (ii) Name **one** waste substance that must be removed from the muscles at a faster rate during exercise.

.....

(1 mark)

7

4.7.3.2 Waste management

Question 17

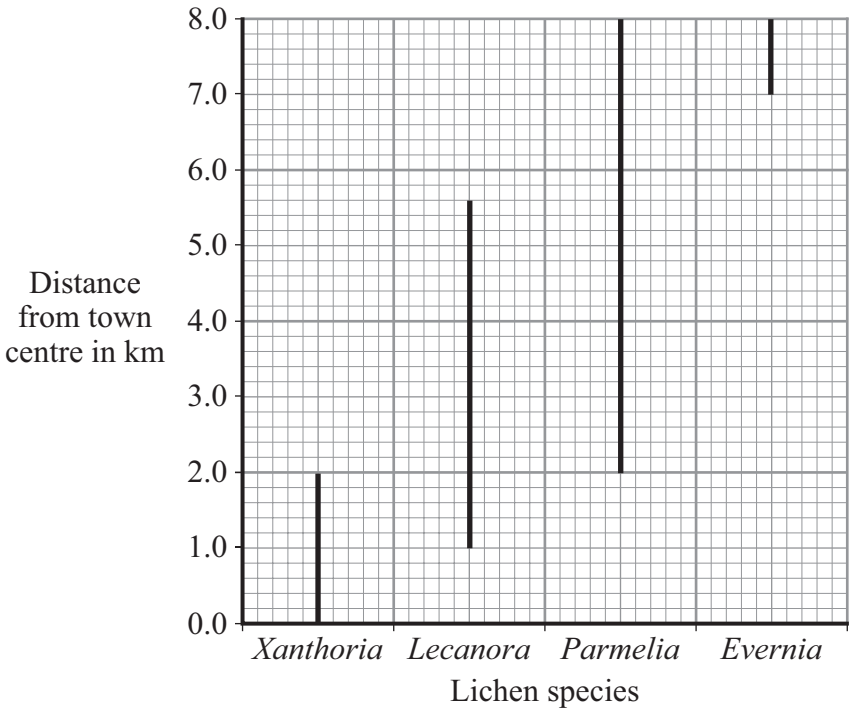
January 2010 | BLY1F | Original Q7 | Legacy

7 Lichens are sensitive to the amount of sulfur dioxide in the atmosphere. They are used as indicator species for the amount of air pollution. Air pollution is generally higher in town centres than in the countryside.

Students investigated the relationship between lichen species and distance from a town centre.

- On a map, they drew a transect (line) from the centre of the town to the countryside.
- They examined sites every 200 metres along the transect (line).
- At each site, they recorded the lichen species growing on trees and walls up to a height of 2 metres.

The graph shows their results.
The lines on the graph indicate the range of each lichen species.



7 (a) Give **one** way in which the students could have obtained more accurate results.

.....

.....

(1 mark)

4.7.3.2 Waste management

Question 17 · continued

for mark

7 (b) (i) Which lichen species was found over the greatest range?

.....

(1 mark)

7 (b) (ii) Which lichen species grows only in the least polluted air?

.....

(1 mark)

7 (c) One student concluded 'You can tell how much sulfur dioxide there is in the air by the amount of *Lecanora* growing'.

Give **two** reasons why this is **not** a valid conclusion.

1 .....

.....

2 .....

.....

(2 marks)

5

4.7.3.2 Waste management

Question 18

March 2010 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

The drawing shows trees being cleared to make more land for farming.



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

A biodiversity

B pollution

C global warming

D deforestation

The removal of vast areas of trees is called . . . **1** . . . .

This can reduce . . . **2** . . . .

The trees no longer remove carbon dioxide from the atmosphere. This results in increased . . . **3** . . . .

The lorries used to move the trees cause air . . . **4** . . . .

4.7.3.2 Waste management

Question 19

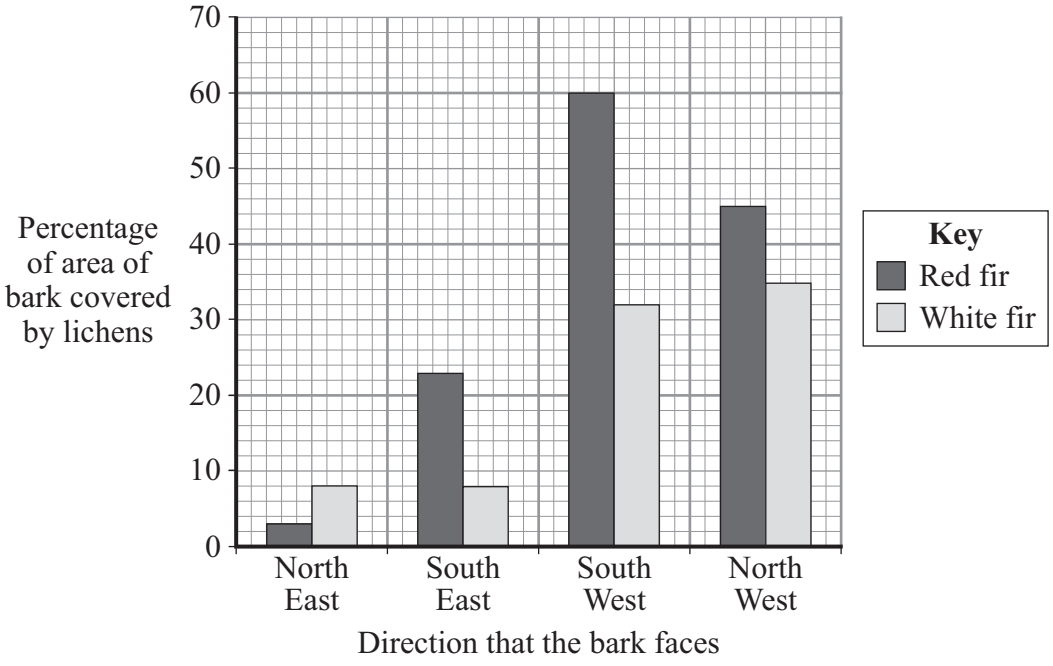
March 2010 | BLY1BP | Original Q7 | Legacy

QUESTION SEVEN

Lichens are indicators of sulfur dioxide pollution.

Scientists investigated the area of bark covered by lichens on two species of fir tree in a forest.

The bar chart shows their results.



7A Which piece of apparatus could the scientists use to estimate the area of bark covered by lichen?

1 compass

2 protractor

3 quadrat

4 thermometer

7B The side of the trees with the greatest percentage of the bark covered by lichens faced . . .

1 North East.

2 South East.

3 South West.

4 North West.

4.7.3.2 Waste management

Question 19 · continued

7C The wind blows air polluted by sulfur dioxide from factories into the forest.

What is the main direction from which the polluted air blows?

1 North East

2 South East

3 South West

4 North West

7D From the data on the bar chart, which would be the best indicator of sulfur dioxide pollution?

1 lichen on red fir because it is most affected by sulfur dioxide

2 lichen on white fir because it is most affected by sulfur dioxide

3 lichen on red fir because it is least affected by sulfur dioxide

4 lichen on white fir because it is least affected by sulfur dioxide

4.7.3.2 Waste management

Question 20

June 2010 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

This question is about pollution and greenhouse gases.

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

A trees

B rice plants

C lichens

D invertebrates

	These organisms can . . .
1	be used as an indicator of air pollution.
2	be used as an indicator of water pollution.
3	'lock up' carbon dioxide for many years.
4	release methane into the atmosphere.

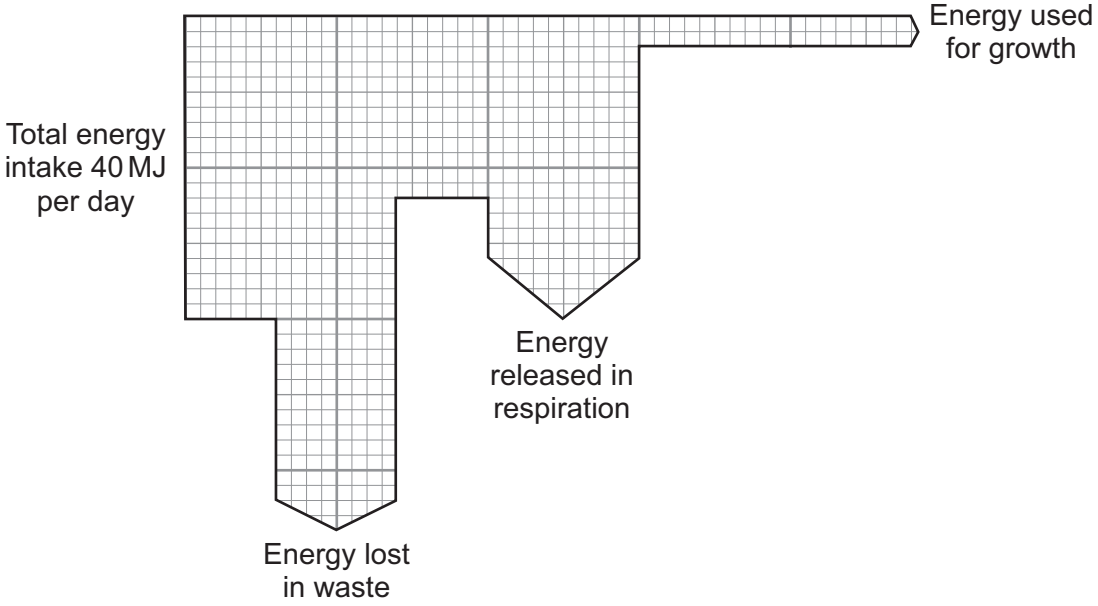
4.7.3.2 Waste management

Question 21

June 2010 | BLY2F | Original Q7 | Legacy

7 (a) **Diagram 1** represents what happens to the energy in the food eaten by a herbivore (an animal that eats plants).

Diagram 1



7 (a) (i) How much energy is released in respiration by the herbivore?

.....

.....

Answer ..... MJ per day
(1 mark)

7 (a) (ii) What proportion of the total energy intake of the herbivore is used for growth?

Show clearly how you work out your answer.

.....

.....

.....

Proportion .....
(2 marks)

7 (b) Give **two** ways in which the energy, released in respiration, is used by a herbivore.

1 .....

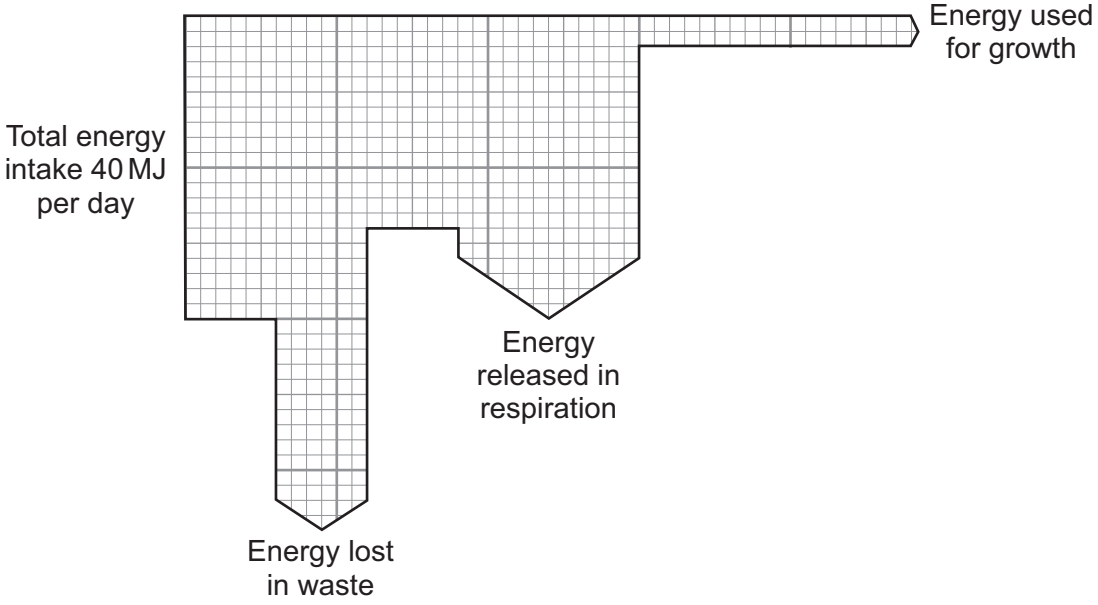
2 .....
(2 marks)

4.7.3.2 Waste management

Question 21 · continued

7 (c) **Diagram 2** represents what happens to the energy in the food eaten by a carnivore (an animal that eats other animals).

Diagram 2



The carnivore releases a greater proportion of energy in respiration than the herbivore.

Suggest **one** reason for this.

.....

.....

(1 mark)

7 (d) Some farmers keep their animals outdoors. Other farmers keep their animals indoors.

Keeping farm animals indoors increases the proportion of energy in their food that is converted into growth.

Give **two** reasons why.

1 .....

.....

2 .....

.....

(2 marks)

8

4.7.3.2 Waste management

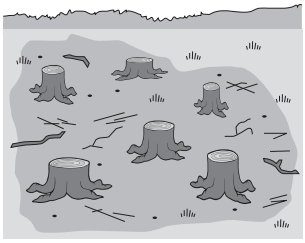
Question 22

November 2010 | BLY1BP | Original Q1 | Legacy

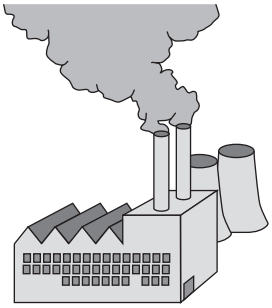
QUESTION ONE

The drawings show four ways in which our activities affect the environment.

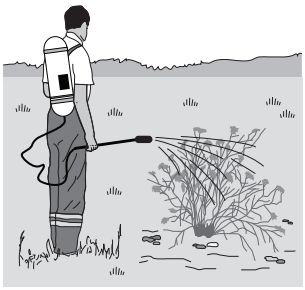
1



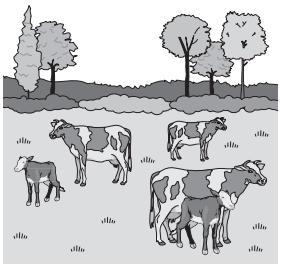
2



3



4



Match statements, **A**, **B**, **C** and **D**, with the drawings **1–4**.

A causes acid rain

B causes less carbon dioxide to be taken out of the atmosphere

C may pollute farmland with poisonous chemicals

D produces methane

4.7.3.2 Waste management

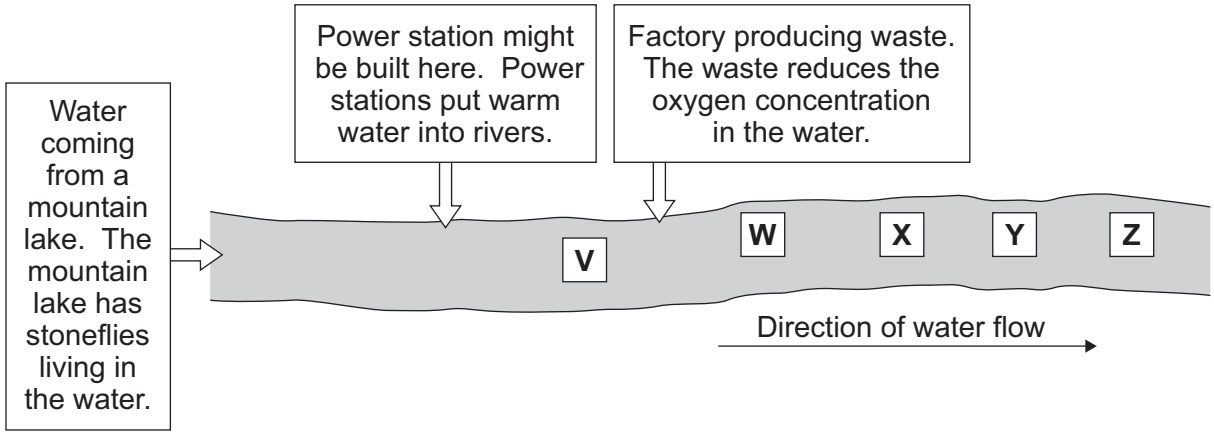
Question 23

November 2010 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

Scientists surveyed the invertebrate species found downstream from the place where a power station might be built.

They took samples from five sites, **V–Z**.



This table shows the species surveyed and the oxygen concentration which the species need to survive.

Oxygen concentration needed	Invertebrate indicator species
Low ↓ High	blood worms
	midge larvae
	hoglice
	shrimps
	stoneflies
	mayflies

9A Which row in the table shows the species most commonly found at each of the sites.

	V	W	X	Y	Z
1	stoneflies	blood worms	midge larvae	hoglice	shrimps
2	stoneflies	midge larvae	hoglice	shrimps	blood worms
3	stoneflies	hoglice	blood worms	midge larvae	shrimps
4	stoneflies	shrimps	hoglice	midge larvae	blood worms

4.7.3.2 Waste management

Question 23 · continued

A student used a thermometer and an oxygen meter to analyse four samples of river water.

Temperature of water in °C	23	15	6	15
Oxygen dissolved in water in mg per dm^3	1.9	6.5	8.0	6.1

9B Which of the following best describes the relationship between the temperature of the water and the amount of oxygen dissolved in the water?

1 The higher the temperature, the more oxygen is dissolved.

2 Oxygen concentration is directly proportional to temperature.

3 The higher the temperature, the less oxygen is dissolved.

4 There is no relationship between temperature and the oxygen dissolved in the water.

9C The new power station will release water into the river at a temperature of 23 °C.

If the new power station is built, stoneflies near to this warm water would probably. . .

1 increase in numbers.

2 be replaced by mayflies.

3 be replaced by shrimps.

4 not be affected.

9D The survey carried out using indicator species was more useful than the survey carried out using oxygen meters.

This is because the meters . . .

1 only sampled the water once at each site.

2 are not very accurate.

3 are not very reliable.

4 cannot be calibrated.

END OF TEST

4.7.3.2 Waste management

Question 24

January 2011 | BLY1F | Original Q6 | Legacy

6 The photograph shows water buffalo.
The water buffalo are being used to get a field ready for growing rice.



Draw a ring around the correct answer to complete each sentence.

6 (a) Rice crops add to global warming because rice produces

methane.
oxygen.
sulfur dioxide.

(1 mark)

6 (b) Waste from the buffalo is spread on the rice fields.

This means that the farmer needs to use less

fertiliser.
herbicide.
pesticide.

(1 mark)

6 (c) Using buffalo instead of a tractor helps to save

biodiversity.
fuel.
trees.

(1 mark)

6 (d) Global warming is caused by

acid rain.
the greenhouse effect.
toxic chemicals.

(1 mark)

4

4.7.3.2 Waste management

Question 25

March 2011 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

Humans pollute the environment.

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

A carbon dioxide

B herbicide

C sulfur dioxide

D pesticide

1	the main cause of acid rain
2	a greenhouse gas taken in by plants
3	used by farmers to kill weeds
4	used by farmers to kill insects that eat crops

4.7.3.2 Waste management

Question 26

June 2011 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

Human activities affect the environment.

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

A burning fuels that release carbon dioxide

B building new houses

C spraying crops with pesticides

D using weedkillers on crops

	Effect on the environment
1	may damage hedges that surround fields
2	may kill useful insects such as bees
3	may cause global warming
4	may reduce the land available for wild plants

4.7.3.2 Waste management

Question 27

June 2011 | BLY1BP | Original Q4 | Legacy

QUESTION FOUR

Living organisms affect the environment.

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

A invertebrates

B lichens

C rice crops

D trees

1	are used as an indicator of air pollution
2	are used as an indicator of water pollution
3	'lock up' carbon dioxide for many years
4	release methane into the atmosphere

4.7.3.2 Waste management

Question 28

November 2011 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

Human activities affect the environment.

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

A deforestation

B recycling waste

C less cattle farming

D treating sewage

	Effect on the environment
1	reduces river pollution
2	reduces the need for landfill sites
3	reduces biodiversity
4	reduces the production of methane

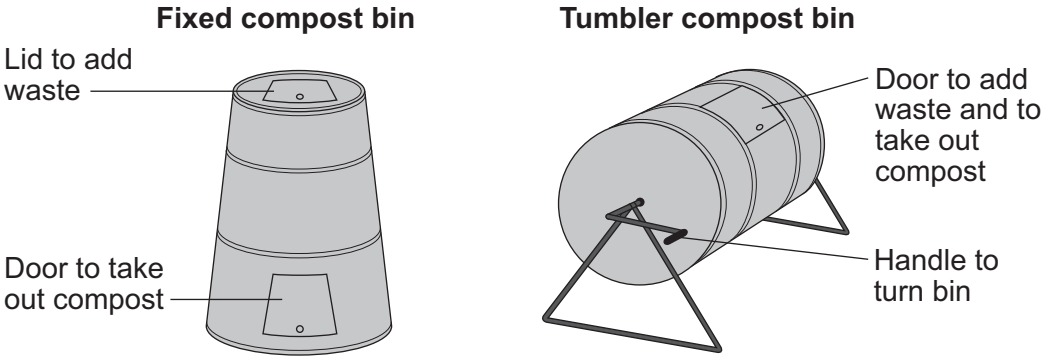
4.7.3.2 Waste management

Question 29

January 2012 | BL1FP | Original Q5 | Legacy

5 Garden waste can be recycled.
One way of recycling garden waste is to use a compost bin.

The diagram shows two types of compost bin.
Each bin can contain the same amount of waste.



Information about the compost bins is given below.

Fixed compost bin

- Compost can be taken out after two years.
- The bin costs about £40.
- The bin takes up an area of 1 m^2.

Tumbler compost bin

- The bin is turned twice a day using the handle.
- Six weeks later compost can be taken out.
- The bin costs about £80.
- The bin takes up an area of 2 m^2.

5 (a) A gardener is buying a compost bin.

5 (a) (i) Give **one** advantage to the gardener of buying a tumbler compost bin and not a fixed compost bin.

.....

.....

(1 mark)

5 (a) (ii) Give **two** advantages to the gardener of buying a fixed compost bin and not a tumbler compost bin.

1 .....

2 .....

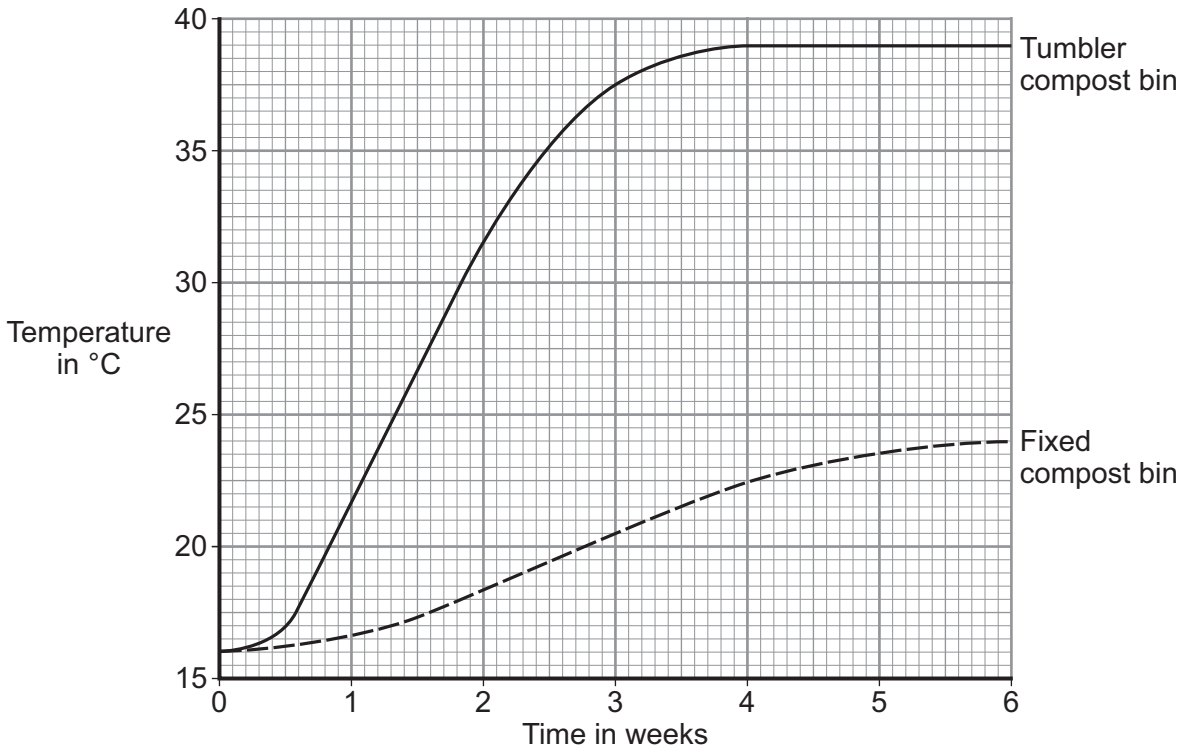
(2 marks)

Question 5 continues on the next page

4.7.3.2 Waste management

Question 29 · continued

5 (b) The same amounts of waste were added to the two types of bin.
The graph shows the temperature in the bins in the first six weeks after the waste was added.



5 (b) (i) Give **two** differences between the results for the tumbler compost bin and the fixed compost bin.

1 .....

.....

2 .....

.....

(2 marks)

4.7.3.2 Waste management

Question 29 · continued

5 (b) (ii) Complete the sentences.

The waste is converted into compost by organisms

called ..... .

The conversion of waste into compost works best in warm, moist

and ..... conditions.

(2 marks)

5 (b) (iii) There was a big difference in the final temperatures in the two bins.

Suggest an explanation for this temperature difference.

.....

.....

.....

.....

(2 marks)

9

4.7.3.2 Waste management

Question 30

January 2013 | BL2FP | Original Q6 | Legacy

6 Scientists investigated how exercise affects blood flow to different organs in the body.

The scientists made measurements of blood flow to different organs of:

- a person resting in a room at 20 °C
- the same person, in the same room, doing vigorous exercise at constant speed on an exercise cycle.

The table shows the scientists' results.

Organ	Blood flow in cm^3 per minute whilst …	
	resting	doing vigorous exercise
Brain	750	750
Heart	250	1000
Muscles	1200	22 000
Skin	500	600
Other	3100	650

6 (a) In this investigation, it was better to do the exercise indoors on an exercise cycle than to go cycling outdoors on the road.

Suggest **two** reasons why.

Do **not** include safety reasons.

1 .....

.....

.....

2 .....

.....

.....

(2 marks)

6 (b) Blood flow to **one** organ did **not** change between resting and vigorous exercise.

Which organ? .....

(1 mark)

4.7.3.2 Waste management

Question 30 · continued

6 (c) (i) How much more blood flowed to the muscles during vigorous exercise than when resting?

.....

.....

Answer = ... cm^3 per minute

(2 marks)

6 (c) (ii) Name **two** substances needed in larger amounts by the muscles during vigorous exercise than when resting.

1 .....

2 .....

(2 marks)

6 (c) (iii) Tick (✓) **one** box to complete the sentence.

The substances you named in part **(c)(ii)** helped the muscles to

make more lactic acid. ☐

respire aerobically. ☐

make more glycogen. ☐

(1 mark)

Question 6 continues on the next page

4.7.3.2 Waste management

Question 30 · continued

6 (c) (iv) The higher rate of blood flow to the muscles during exercise removed larger amounts of waste products made by the muscles.

Which **two** substances need to be removed from the muscles in larger amounts during vigorous exercise?

Tick (✓) **two** boxes.

Amino acids ☐

Carbon dioxide ☐

Glycogen ☐

Lactic acid ☐

(2 marks)

6 (d) The total blood flow was much higher during exercise than when resting.

One way to increase the total blood flow is for the heart to pump out a larger volume of blood each beat.

Give **one** other way to increase the blood flow.

.....

.....

(1 mark)

11

4.7.3.2 Waste management

Question 31

June 2013 | BL1FP | Original Q4 | Legacy

4 There are two forms of peppered moth, dark and pale.
Birds eat the moths when the moths are resting on tree bark.

Pollution in the atmosphere may:
- kill lichens living on tree bark
- make the bark of trees go black.

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

Lichens are very sensitive to air pollution caused by

carbon dioxide.

nitrogen.

sulfur dioxide.

(1 mark)

4 (b) The photographs show the two forms of peppered moth, on tree bark.



Tree bark covered with lichens

Tree bark made black by pollution

4.7.3.2 Waste management

Question 31 · continued

4 (b) (i) The dark form of the peppered moth was produced by a change in the genetic material of a pale moth.

Use **one** word from the box to complete the sentence.

characteristic	**clone**	**mutation**

A change in genetic material is called a ..... .

(1 mark)

4 (b) (ii) In the 19th century, pollution made the bark of many trees go black.

Explain why:

- the population of the pale form of the moth in forests decreased
- the population of the dark form of the moth in forests increased.

.....

.....

.....

.....

.....

.....

.....

.....

(3 marks)

Question 4 continues on the next page

4.7.3.2 Waste management

Question 31 · continued

4 (c) (i) The larvae (young) of the peppered moths eat the leaves of birch trees.

The diagram shows the food chain:

birch trees → peppered moth larvae → birds

Draw a pyramid of biomass for this food chain.

Label the pyramid.

(2 marks)

4 (c) (ii) Which **two** reasons explain the shape of the pyramid you drew in part **(c)(i)**?

Tick (✓) **two** boxes.

Some material is lost in waste from the birds ☐

The trees are much larger than peppered moth larvae ☐

Peppered moth larvae do not eat all the leaves from the trees ☐

The trees do not use all of the Sun's energy ☐

(2 marks)

9

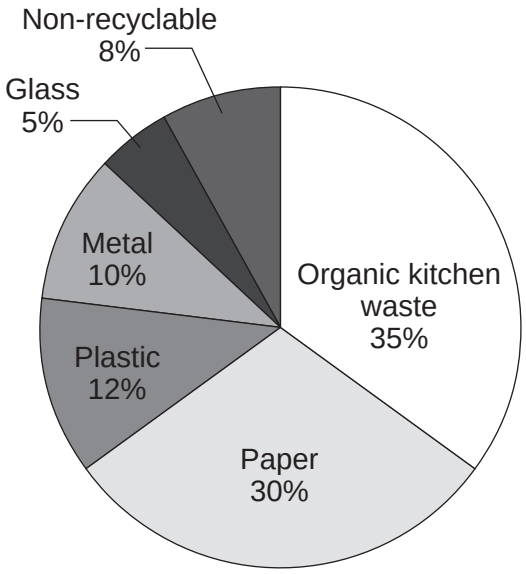
4.7.3.2 Waste management

Question 32

June 2013 | BL1FP | Original Q5 | Legacy

5 This question is about recycling.

The pie chart shows the different types of waste from an average household in England.



5 (a) In 2010, councils in England collected 23 million tonnes of waste from households.
Most of the waste was put into landfill sites.
Councils pay to use landfill sites.

Organic kitchen waste can be put onto compost heaps.

Calculate the mass of organic kitchen waste from households that could have been put onto compost heaps in 2010.

.....

.....

Answer = ... million tonnes
(2 marks)

5 (b) Some householders put organic kitchen waste onto their compost heaps.

5 (b) (i) Suggest **one** advantage of this to the council.

.....

.....
(1 mark)

5 (b) (ii) Suggest **one** advantage of this to the householder.

.....

.....
(1 mark)

4

4.7.3.2 Waste management

Question 33

June 2013 | BL3FP | Original Q1 | Legacy

1 Human activities affect the environment.

1 (a) **List A** gives four human activities.

List B gives the effect of the activities on the environment.

Draw **one** line from each human activity in **List A** to its effect on the environment in **List B**.

List A **Human activity**	**List B** **Effect on the environment**
	Adds methane to the atmosphere
Digging a new quarry	
	Pollutes hedges around fields
Spraying pesticides on crops	
	Reduces the land available for wild animals
Growing rice	
	Produces lots of litter
Driving cars that release sulfur dioxide	
	Produces acid rain

(4 marks)

4.7.3.2 Waste management

Question 33 · continued

1 (b) Human activities are increasing *global warming*.

Give **two** effects of *global warming* on the environment.

1 .....

.....

2 .....

.....

(2 marks)

6

Turn over for the next question

4.7.3.2 Waste management

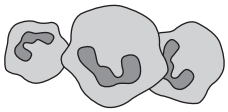
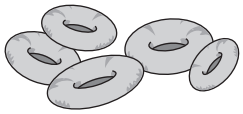
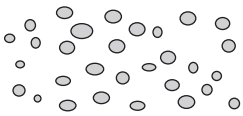
Question 34

June 2014 | BL3FP | Original Q1 | Legacy

1 (a) (i) Blood is part of the circulatory system.

Draw **one** line from each part of the blood to its correct function.

[3 marks]

Part of the blood	Function
 White blood cells	carry glucose around the body
 Red blood cells	carry oxygen around the body
 Platelets	help the blood to clot
	destroy microorganisms

1 (a) (ii) Name **one** waste product that is transported by the blood plasma.

[1 mark]

.....

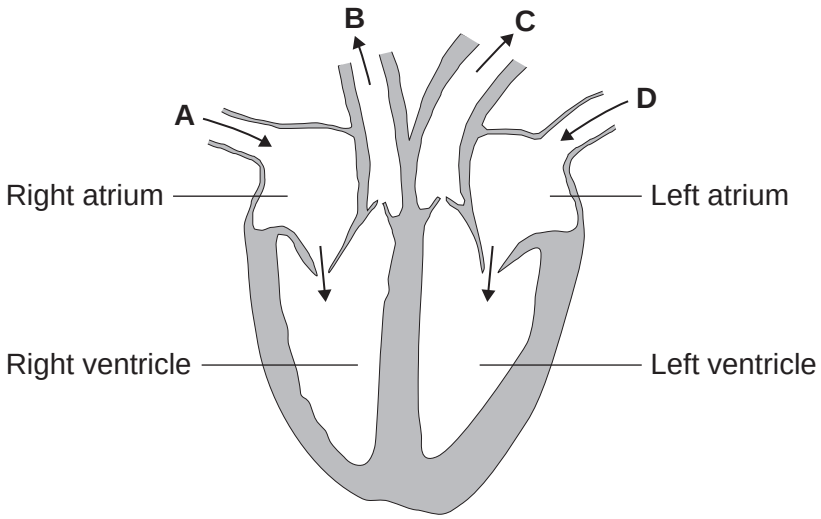
4.7.3.2 Waste management

Question 34 · continued

1 (b) The heart is also part of the circulatory system.

Figure 1 shows a section through the human heart.

Figure 1



1 (b) (i) Which arrow, **A**, **B**, **C** or **D**, shows blood leaving the heart in the pulmonary artery to go to the lungs? ☐

[1 mark]

1 (b) (ii) Which arrow, **A**, **B**, **C** or **D**, shows blood from the lungs entering the heart in the pulmonary vein? ☐

[1 mark]

1 (b) (iii) Valves in the circulatory system make sure blood only travels in one direction.

Name the type of blood vessel that has valves.

[1 mark]

.....

Question 1 continues on the next page

4.7.3.2 Waste management

Question 34 · continued

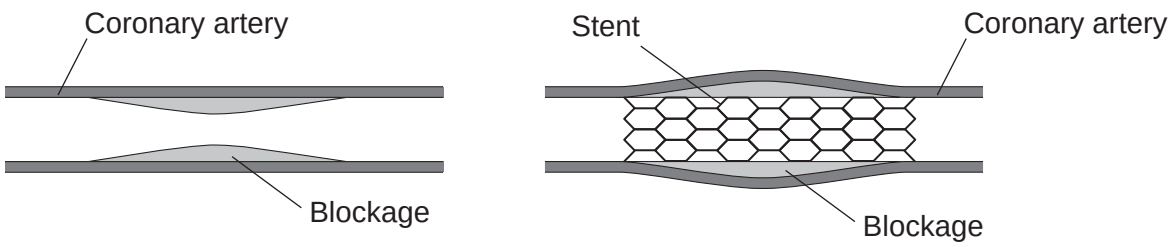
1 (c) A person's coronary artery has become narrower.

The person has a heart attack.

A doctor puts a stent into the person's coronary artery.

Figure 2 shows a stent inside a coronary artery.

Figure 2



1 (c) (i) How does the stent help to prevent another heart attack?

Give **one** way.

[1 mark]

.....

.....

4.7.3.2 Waste management

Question 34 · continued

1 (c) (ii) **Figure 3** shows a surgeon putting a stent into a patient.

Figure 3



The surgeon puts the stent into an artery in the leg. He moves the stent through the artery to the coronary artery.

Suggest **two** possible risks of this operation.

[2 marks]

1 .....

.....

2 .....

.....

10

4.7.3.2 Waste management

Question 35

June 2015 | BL1FP | Original Q5 | Legacy

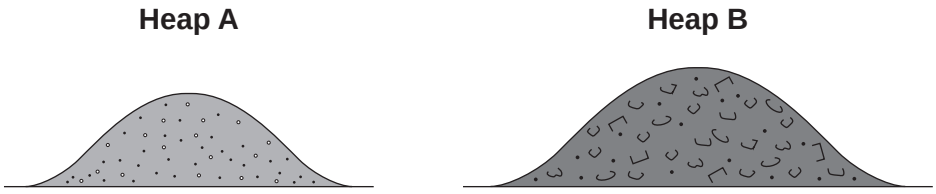
5 A gardener investigates if turning over the waste in a compost heap makes the waste decay more quickly.

The gardener:

- makes two separate heaps of garden waste, heap **A** and heap **B**
- turns over the material in heap **A** every 2 weeks
- does **not** turn over the material in heap **B**
- estimates the amount of decay in the two heaps after 6 months.

Figure 6 shows the two heaps of garden waste at the beginning of the investigation.

Figure 6



5 (a) Suggest **two** factors, other than time, the gardener should control to make the investigation fair.

[2 marks]

1 .....

.....

2 .....

.....

5 (b) Name **one** type of living thing that causes decay.

[1 mark]

.....

4.7.3.2 Waste management

Question 35 · continued

5 (c) **Table 3** shows the gardener's results.

Table 3

Compost heap	Estimated amount of decay
A	A lot
B	Very little

5 (c) (i) Why does turning over the material in heap **A** make the material decay more quickly?

[1 mark]

.....

.....

5 (c) (ii) The gardener puts decayed material around his plants to help them grow.

Suggest why the plants in a woodland grow well each year **without** material from compost heaps being added.

[2 marks]

.....

.....

.....

.....

6

4.7.3.2 Waste management

Question 36

June 2015 | BL3FP | Original Q2 | Legacy

2 The human population is increasing and more household waste is being produced.

2 (a) Give **one** way in which an increase in household waste affects our environment.

[1 mark]

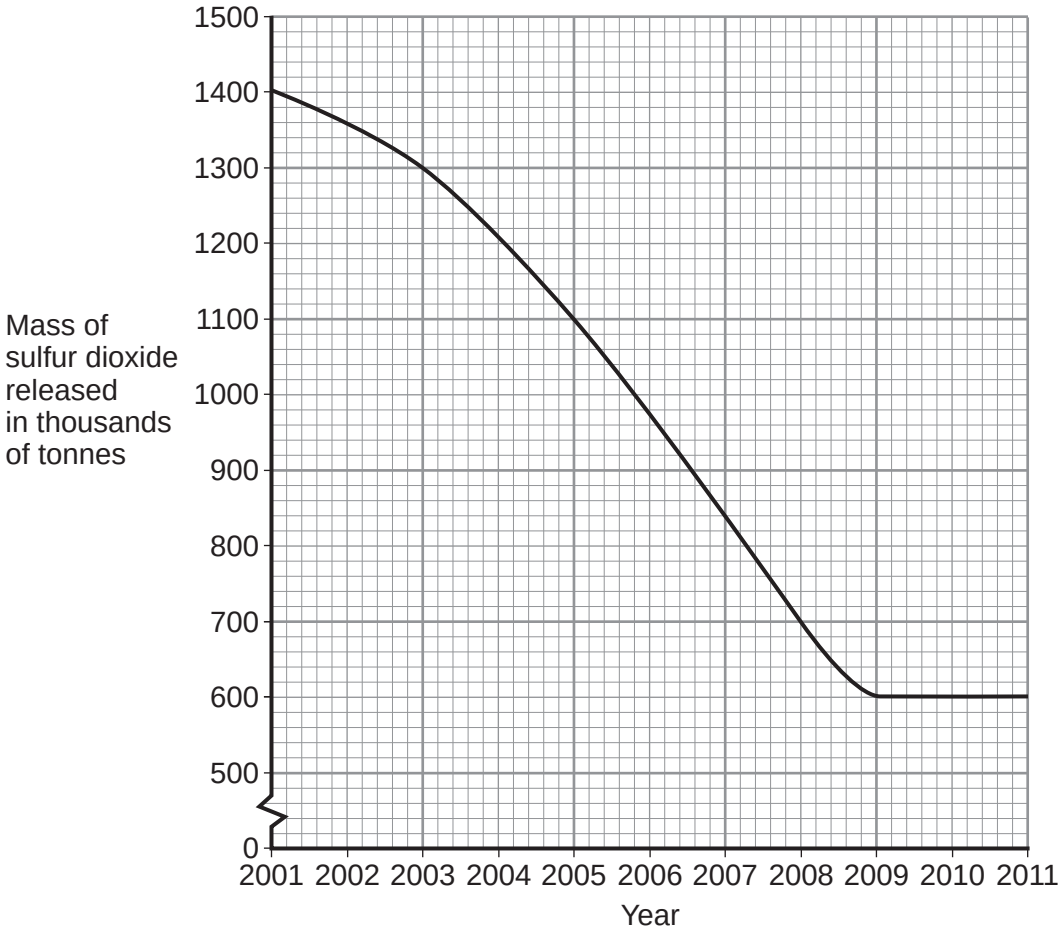
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.....

2 (b) The release of sulfur dioxide affects our environment.

Figure 2 shows how the mass of sulfur dioxide released in the UK has changed from 2001 to 2011.

Figure 2



2 (b) (i) Describe the pattern shown in **Figure 2**.

[2 marks]

.....

.....

.....

.....

4.7.3.2 Waste management

Question 36 · continued

2 (b) (ii) In 2001, 1400 thousand tonnes of sulfur dioxide were released.

By which year had the amount of sulfur dioxide released reduced to half of this amount?

[2 marks]

.....

.....

.....

Year = ...

2 (b) (iii) Give **one** problem caused when sulfur dioxide gas is in the air.

[1 mark]

.....

.....

2 (c) Carbon dioxide is another gas that affects the environment.

Which **two** of the following help to reduce the levels of carbon dioxide in the atmosphere by storing carbon dioxide?

[2 marks]

Tick (✓) **two** boxes.

Animals respiring ☐

Carbon dioxide being absorbed in oceans and lakes ☐

Photosynthesis by trees ☐

The production of biogas ☐

8

4.7.3.2 Waste management

Question 37

June 2015 | BL3FP | Original Q3 | Legacy

3 (a) Humans need to remove waste products from their bodies.

Which organ removes waste carbon dioxide from the body?

[1 mark]

Tick (✓) **one** box.

Liver ☐

Lung ☐

Skin ☐

3 (b) Kidneys make urine. Urine is stored in the bladder.

Which **one** of the following stages is involved in making urine in a healthy kidney?

[1 mark]

Tick (✓) **one** box.

Filtering the blood ☐

Reabsorbing **all** of the ions ☐

Reabsorbing **all** of the water ☐

3 (c) A healthy kidney keeps the correct amount of water in the blood.

If there is too much water in the blood, what might happen to the blood cells?

[1 mark]

Tick (✓) **one** box.

They will take in water and burst. ☐

There will be no change. ☐

They will lose water and shrink. ☐

Question 3 continues on the next page

4.7.3.2 Waste management

Question 37 · continued

3 (d) A child has kidney failure.

A doctor recommends dialysis to treat the kidney failure.

Before dialysis starts, the doctor measures the concentration of glucose and of urea in the child's blood.

The concentration of glucose in the dialysis fluid is 6 mmol per dm^3.

The results are shown in **Table 1**.

Table 1

	Concentration in the blood before dialysis starts in mmol per dm^3
Glucose	6
Urea	28

3 (d) (i) Suggest what the concentration of glucose in the blood will be **after** the dialysis treatment.

Draw a ring around the correct answer.

[1 mark]

less than 6 **6** **more than 6**

3 (d) (ii) Suggest what the concentration of urea in the blood will be **after** the dialysis treatment.

Draw a ring around the correct answer.

[1 mark]

less than 28 **28** **more than 28**

3 (d) (iii) Give a reason for your answer to part **(d)(ii)**.

[1 mark]

.....

.....

4.7.3.2 Waste management

Question 37 · continued

3 (e) (i) Some patients have kidney transplants. Transplanted kidneys may be rejected by the body.

Use the correct answer from the box to complete the sentence.

[1 mark]

antibodies	**hormones**	**tissues**

Transplanted kidneys have proteins on the surface of the cells. These proteins may be attacked by the patient's ..... .

3 (e) (ii) It is important to prevent rejection of a new kidney.

Which **one** of the following helps to prevent the kidney from being rejected?

[1 mark]

Tick (✓) **one** box.

Giving the patient antibodies ☐

Giving the patient painkillers ☐

Tissue typing the donor kidney ☐

8

4.7.3.2 Waste management

Question 38

June 2015 | BL3FP | Original Q7 | Legacy

7 The world population is increasing and the need for food is increasing.

Mycoprotein is a high-protein food made in fermenters using the organism *Fusarium*.

The process takes only a few weeks to produce a large amount of food.

7 (a) (i) What type of organism is *Fusarium*?

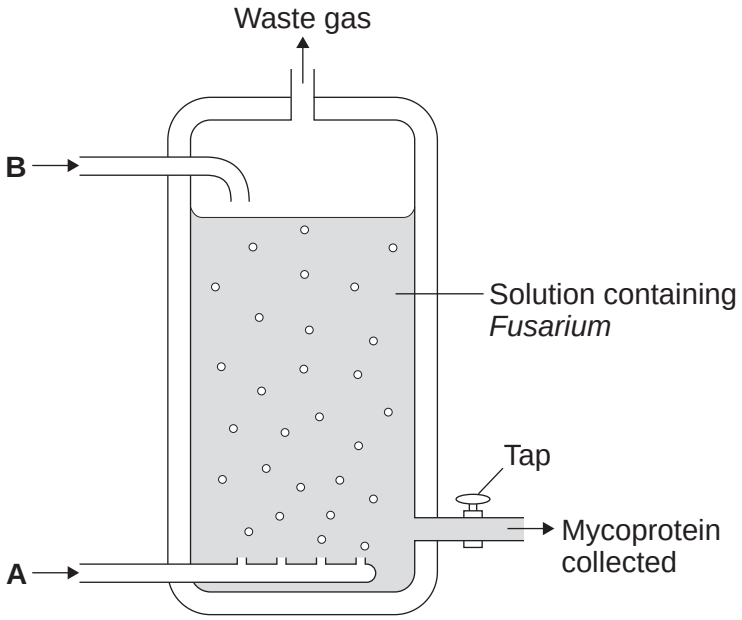
Draw a ring around the correct answer.

[1 mark]

bacterium **fungus** **virus**

Figure 8 shows a fermenter used in mycoprotein production.

Figure 8



7 (a) (ii) *Fusarium* makes mycoprotein. *Fusarium* respires aerobically.

Suggest which gas is added to the fermenter at point **A**.

[1 mark]

.....

7 (a) (iii) Another substance is added to the fermenter at point **B**. This substance is used in aerobic respiration.

Name this substance.

[1 mark]

.....

4.7.3.2 Waste management

Question 38 · continued

7 (b) People need to eat protein to grow and to be healthy.

Some people think that it would be an advantage to get more food from mycoprotein and less from farming animals.

Suggest **two** possible advantages of getting more food from mycoprotein.

[2 marks]

1 .....

.....

2 .....

.....

5

Turn over for the next question

4.7.3.2 Waste management

Question 39

June 2017 | BL3FP | Original Q7 | Legacy

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

Humans need to remove (excrete) waste products from the bloodstream.

Describe the processes that produce waste products **and** how the products are removed from the body.

In your answer you should include the names of the organs involved in producing waste products and those involved in removing the waste products.

You should **not** refer to faeces in your answer.

[6 marks]

Extra space

6

4.7.3.2 Waste management

Question 40

June 2017 | BL3FP | Original Q8 | Legacy

8 Human activities pollute the air with smoke and gases.

One of these gases is sulfur dioxide.

8 (a) What effect does sulfur dioxide have on our environment?

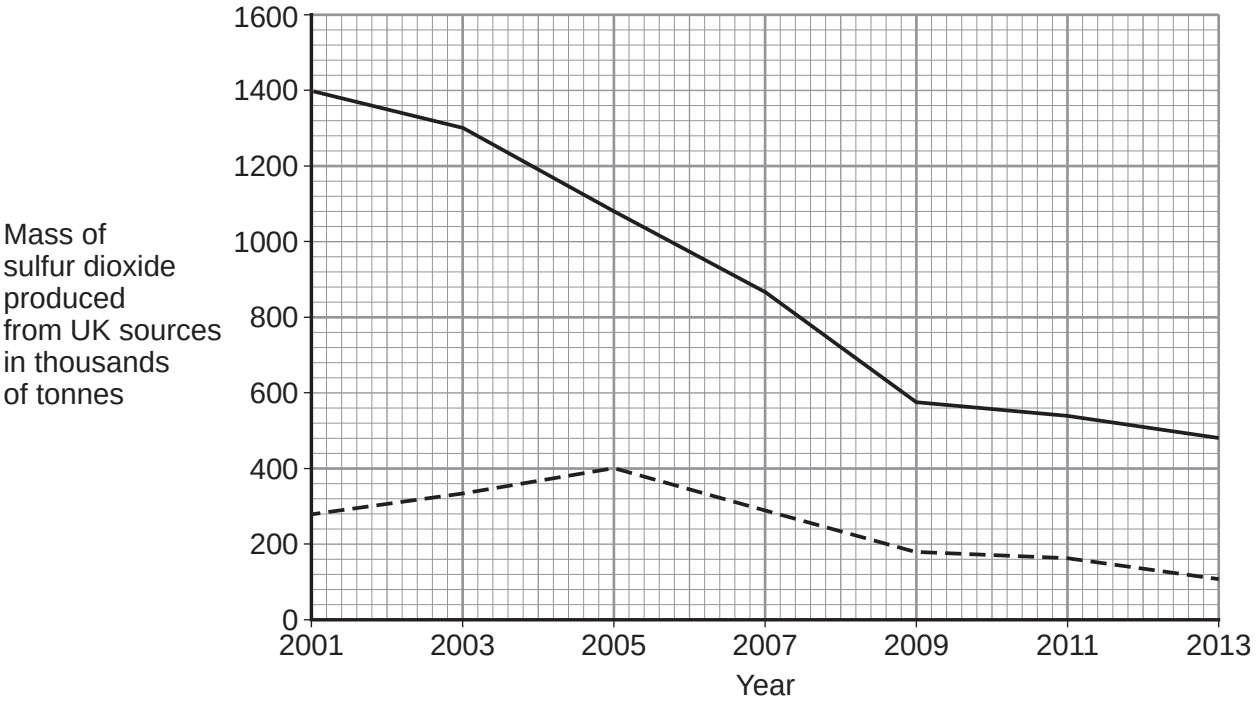
[1 mark]

Tick (✓) **one** box.

- Causes acid rain ☐
- Causes global warming ☐
- Causes more carbon sequestering ☐
- Causes sea levels to rise ☐

8 (b) **Figure 9** shows how the mass of sulfur dioxide produced from UK sources changed from 2001 to 2013.

Figure 9



4.7.3.2 Waste management

Question 40 · continued

8 (b) (i) The mass of sulfur dioxide produced from all UK sources has decreased.

Use information from **Figure 9** to complete the following calculation of the percentage decrease in the mass of sulfur dioxide produced.

[2 marks]

Total mass of sulfur dioxide produced in 2001 = _____ thousand tonnes

Total mass of sulfur dioxide produced in 2013 = 480 thousand tonnes

Decrease in mass of sulfur dioxide produced = _____ thousand tonnes

Percentage decrease working out: _____

_____

_____

Percentage decrease = _____

8 (b) (ii) Use data from **Figure 9** to describe the pattern in the mass of sulfur dioxide produced from the UK transport industry from 2001 to 2013.

[2 marks]

_____

_____

_____

_____

5

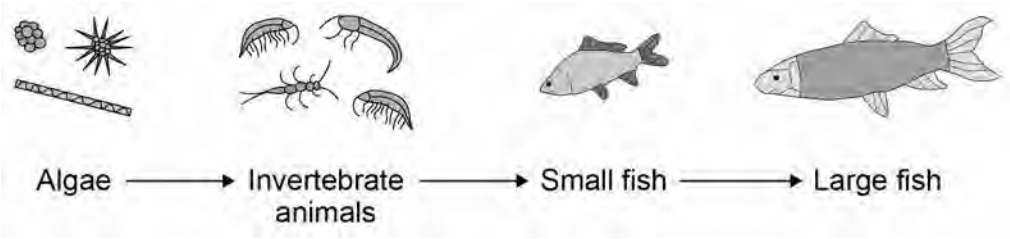
4.7.3.2 Waste management

Question 41

June 2018 | 8461/2F | Original Q1

0 1 **Figure 1** shows a food chain in a river.

Figure 1



0 1 . 1 Draw **one** line from each scientific term to the correct organism in the food chain.

[3 marks]

Scientific term	Organism in the food chain
	Algae
Apex predator	Invertebrate animals
Primary consumer	Large fish
Producer	Small fish

4.7.3.2 Waste management

Question 41 · continued

0 1 . 2 **Table 1** shows the biomass of the organisms at each stage in the food chain.

Table 1

Organism	Biomass in arbitrary units
Algae	840
Invertebrate animals	200
Small fish	40
Large fish	10

Calculate the percentage of the biomass of the invertebrate animals that is transferred to the large fish.

[2 marks]

Use the equation:

$$\text{percentage} = \frac{\text{biomass of large fish}}{\text{biomass of invertebrate animals}} \times 100$$

Percentage = _____

Question 1 continues on the next page

4.7.3.2 Waste management

Question 41 · continued

0 1 . 3 A large amount of biomass is lost from the food chain.

Complete the sentences.

Choose answers from the box.

[3 marks]

coordination	**digestion**	**excretion**
filtration	**ingestion**	**respiration**

When the small fish eat the invertebrate animals, not all of this material is broken down during _____ .

Materials absorbed from the gut may enter the body cells of the small fish. These materials are broken down into carbon dioxide and water by _____ .

The carbon dioxide and other waste materials from the body cells are removed from the small fish by _____ .

0 1 . 4 A disease kills many of the small fish.

Why does the number of invertebrate animals increase?

[1 mark]

_____

_____

9

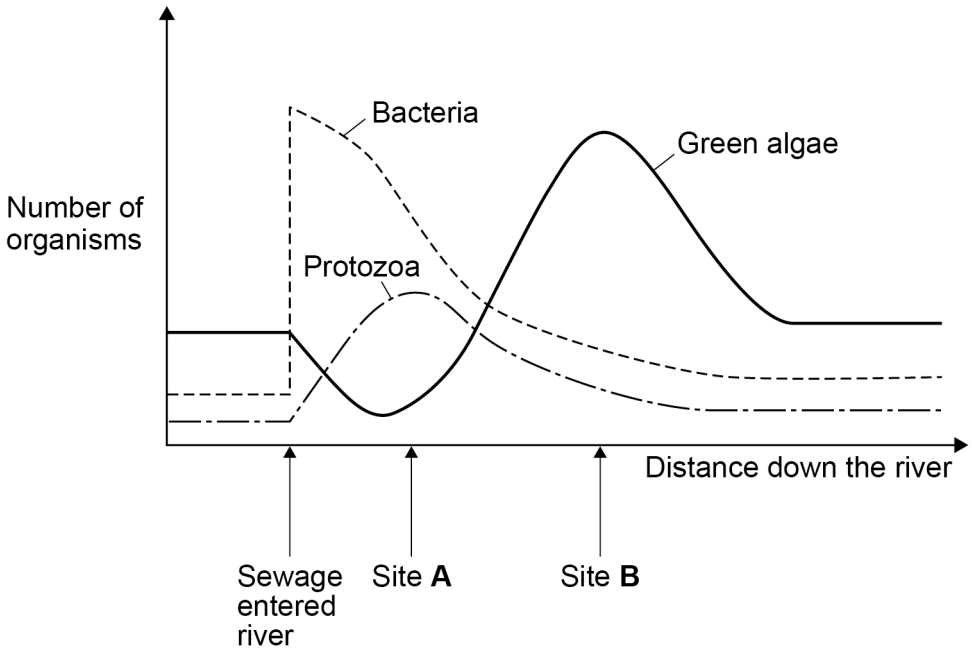
4.7.3.2 Waste management

Question 42

0 4 Rivers are sometimes polluted with untreated sewage.

Figure 6 shows some changes that occurred when untreated sewage entered a river.

Figure 6



0 4 . 1 Which type of organism had the most rapid increase in numbers when sewage entered the river?

[1 mark]

Tick (✓) **one** box.

- Bacteria ☐
- Green algae ☐
- Protozoa ☐

4.7.3.2 Waste management

Question 42 · continued

0 4 . 2 Protozoa are single-celled organisms.

Describe **two** ways **Figure 6** shows that the protozoa in the river feed on bacteria.

[2 marks]

1 _____

_____

2 _____

_____

0 4 . 3 When sewage enters a river, the concentration of dissolved oxygen decreases.

The decrease in oxygen concentration is caused by organisms in the water.

What process in living organisms uses oxygen?

[1 mark]

_____

0 4 . 4 As the numbers of green algae in the river increase, the concentration of dissolved oxygen increases.

Explain why the concentration of dissolved oxygen increases.

[2 marks]

_____

_____

_____

_____

Question 4 continues on the next page

Question 42 · continued

Scientists counted the numbers of five different animals in the river at sites **A** and **B**, shown in **Figure 6** on page 14.

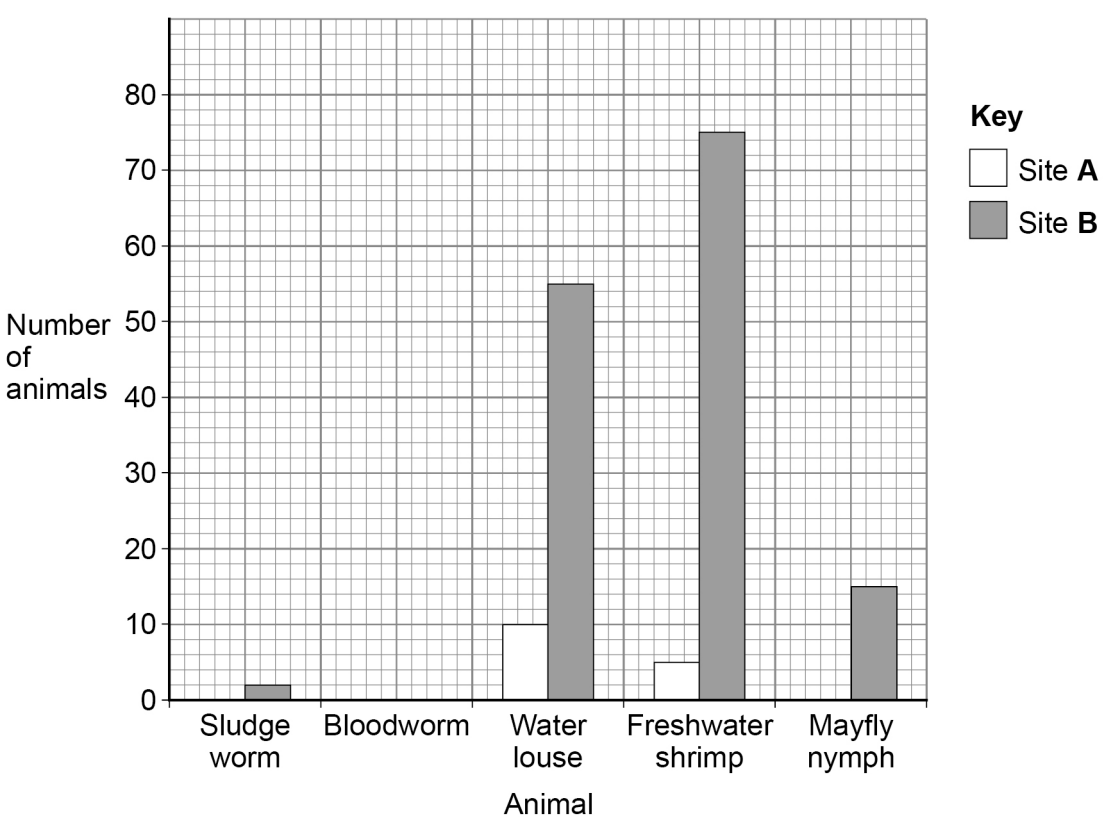
Table 2 shows the results.

Table 2

Animal	Number of animals	
	Site A	Site B
Sludge worm	80	2
Bloodworm	36	8
Water louse	10	55
Freshwater shrimp	5	75
Mayfly nymph	0	15

Figure 7 shows some of the data from **Table 2**.

Figure 7



4.7.3.2 Waste management

Question 42 · continued

0 4 . 5 Complete **Figure 7**.

You should use data from **Table 2** for the sludge worm and the bloodworm.

[2 marks]

0 4 . 6 The concentration of oxygen in the water at site **A** is much lower than at site **B**.

- Sludge worms live in places which have a low concentration of oxygen.
- Mayfly nymphs need a high concentration of oxygen.

Give evidence from **Table 2** for the difference in oxygen concentration at sites **A** and **B**.

Refer to sludge worms and to mayfly nymphs in your answer.

[2 marks]

10

4.7.3.2 Waste management

Question 43

June 2025 | 8461/2F | Original Q7

0 7 Many farmers keep animals such as cows and chickens.

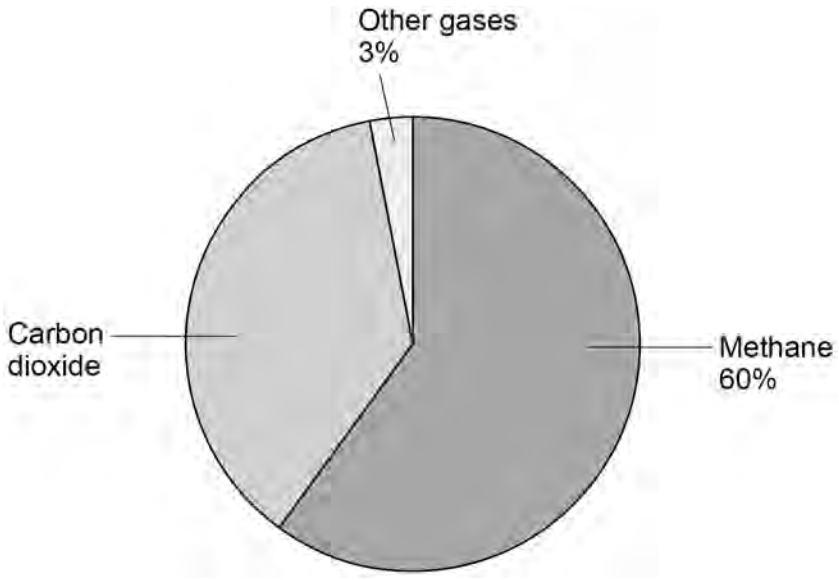
The animals produce a lot of manure (faeces).

The farmer can put the manure into a biogas generator.

In the biogas generator, microorganisms produce biogas.

0 7 . 1 **Figure 11** shows the percentages of the gases found in a sample of biogas.

Figure 11



Calculate the percentage of carbon dioxide in the biogas in **Figure 11**.

[2 marks]

Percentage of carbon dioxide = _____ %

Question 7 continues on the next page

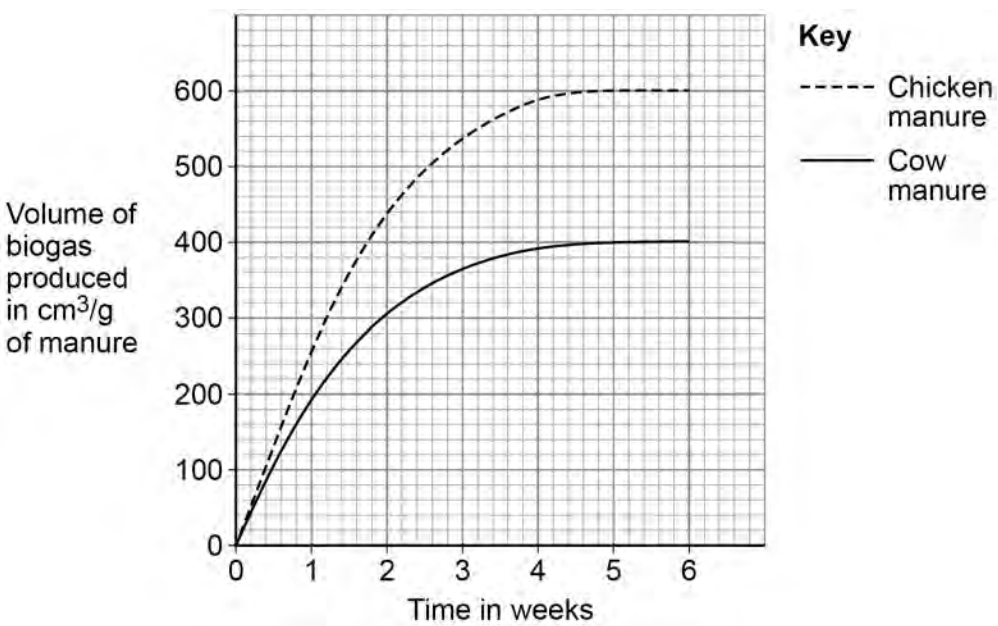
Question 43 · continued

0 7 . 2 Scientists investigated biogas production from manure produced by cows and by chickens.

The scientists measured the production of biogas for 6 weeks.

Figure 12 shows the results.

Figure 12



The scientists made **three** conclusions from the results.

Give evidence from **Figure 12** to support each conclusion.

[3 marks]

Conclusion 1: 'It is better to use chicken manure than cow manure for making biogas.'

Evidence _____

_____

Conclusion 2: 'Biogas production is fastest in the first week.'

Evidence _____

_____

Conclusion 3: 'After 4 weeks it is a waste of money to run the biogas generator.'

Evidence _____

_____

Question 43 · continued

Another group of scientists investigated the effect of adding fish fat to the manure used for biogas production.

Fish fat is a waste product from the sea fishing industry.

Table 4 shows the results.

Table 4

	Volume of biogas produced in cm^3/g	Volume of methane produced in cm^3/g	Percentage (%) of methane in the biogas
No fish fat	426	256	60
Fish fat added	999	599	60

0 7 . 3 Complete the sentences.

[3 marks]

Choose answers from the box.

decreases	stays the same	increases

Each answer may be used once, more than once or not at all.

When fish fat is added, the volume of biogas produced _____.

When fish fat is added, the volume of methane produced _____.

When fish fat is added, the percentage of methane in the biogas _____.

Question 7 continues on the next page

4.7.3.2 Waste management

Question 43 · continued

A farmer has a farm 250 kilometres from the sea.

The farmer has a biogas generator on the farm.

The farmer adds manure to the biogas generator.

0 7 . 4 The farmer decided **not** to add fish fat to the manure in the biogas generator.

Suggest **one** reason why.

[1 mark]

0 7 . 5 There is some manure left in the biogas generator.

Explain why the farmer spreads the manure on fields where crops will be grown.

[2 marks]

11