AQA GCSE Biology | 8461

SPECIFICATION POINT 4.7.3.5

Global warming

Past-paper questions

Tier	**Higher**
Question groups	**31**
Available paper years	**2007–2023**

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.

4.7.3.5 Global warming

Question 01

June 2007 | BLY1B | Original Q2 | Legacy

QUESTION TWO

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 cattle

C lichens

D invertebrates

	The 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.
4	release methane into the atmosphere.

4.7.3.5 Global warming

Question 02

June 2007 | BLY1B | Original Q7 | Legacy

QUESTION SEVEN

This question is about global warming.

7A How does an increase in greenhouse gases in the atmosphere lead to an increase in global warming?

1 More of the radiation from the Sun passes into the atmosphere.

2 The atmosphere radiates more energy back to Earth.

3 The Earth radiates more energy back into the atmosphere.

4 The sea absorbs more energy from the Sun.

7B Forests are often cut down to clear land for growing crops.

Keeping forests rather than cutting them down for growing crops helps to reduce global warming because . . .

1 carbon dioxide can be ‘locked-up’ in wood for many years.

2 growing crop plants increases the number of microorganisms in the soil.

3 forests release large amounts of carbon dioxide.

4 some crop plants remove sulfur dioxide from the atmosphere.

4.7.3.5 Global warming

Question 02 · continued

7C Scientists use computer models to predict increases in global temperature.

The table shows the predictions for global temperature increases from 2000 to 2100 produced by different models.

	Predicted temperature increase 2000 to 2100 in °C		
Model	**Total**	**Land**	**Ocean**
P	4.7	7.0	3.8
Q	4.0	5.0	3.6
R	3.9	4.8	3.4
S	3.7	5.5	3.0
T	3.3	4.2	3.0
U	3.0	4.6	2.4
V	2.3	3.1	2.0
W	2.2	2.8	2.0

Which two predictions are in closest agreement?

1 **R** and **S**

2 **S** and **T**

3 **T** and **U**

4 **V** and **W**

7D The predictions made by using the different models vary because . . .

1 the instruments that scientists use are not sensitive enough.

2 scientists do not have sufficient data on how different factors affect global temperatures.

3 some of the scientists do not have appropriate computer programming skills.

4 it is impossible to do experiments connected with global warming.

4.7.3.5 Global warming

Question 03

November 2007 | BLY1B | Original Q4 | Legacy

QUESTION FOUR

This question is about global warming.

4A Methane contributes to global warming.

Which human activity has increased the release of methane into the atmosphere?

1 deforestation

2 growing more rice

3 producing more sewage

4 producing more smoke from industries

4B How does an increase in greenhouse gases in the atmosphere contribute to an increase in global temperature?

1 More of the radiation from the Sun is trapped in the atmosphere.

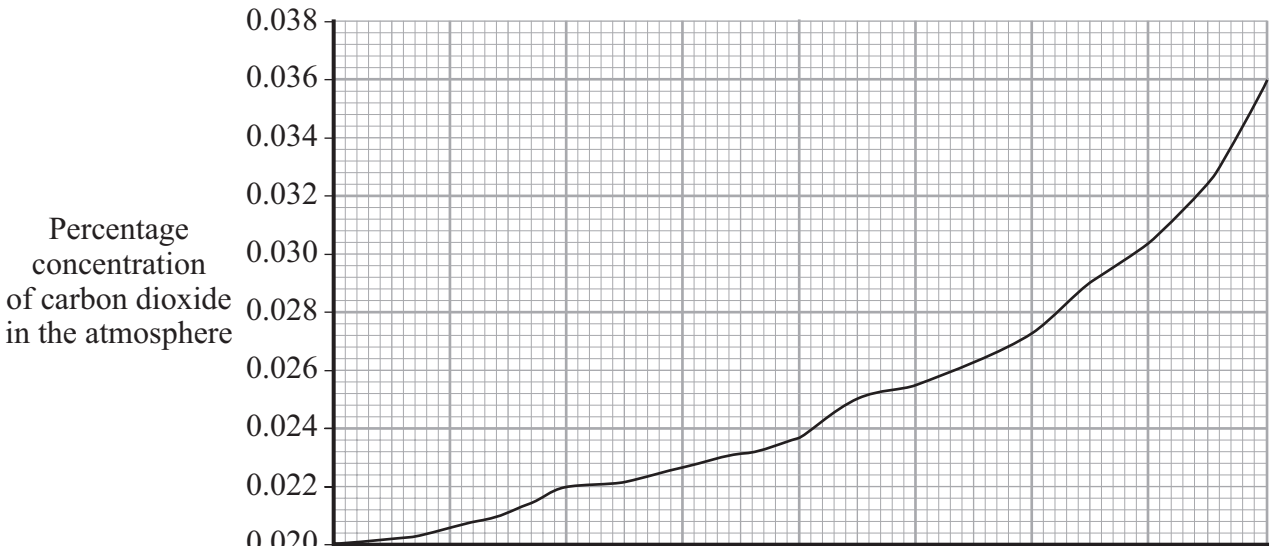
2 The atmosphere radiates more heat back to the Earth.

3 The Earth radiates more heat back into the atmosphere.

4 The Earth absorbs more heat from the Sun.

Graph 1 shows the changes in carbon dioxide concentration in the atmosphere between 1840 and 2000.

Graph 1



4.7.3.5 Global warming

Question 03 · continued

4C The average increase in the percentage concentration of carbon dioxide in the atmosphere between 1880 and 2000 was . . .

1 0.000012% per year

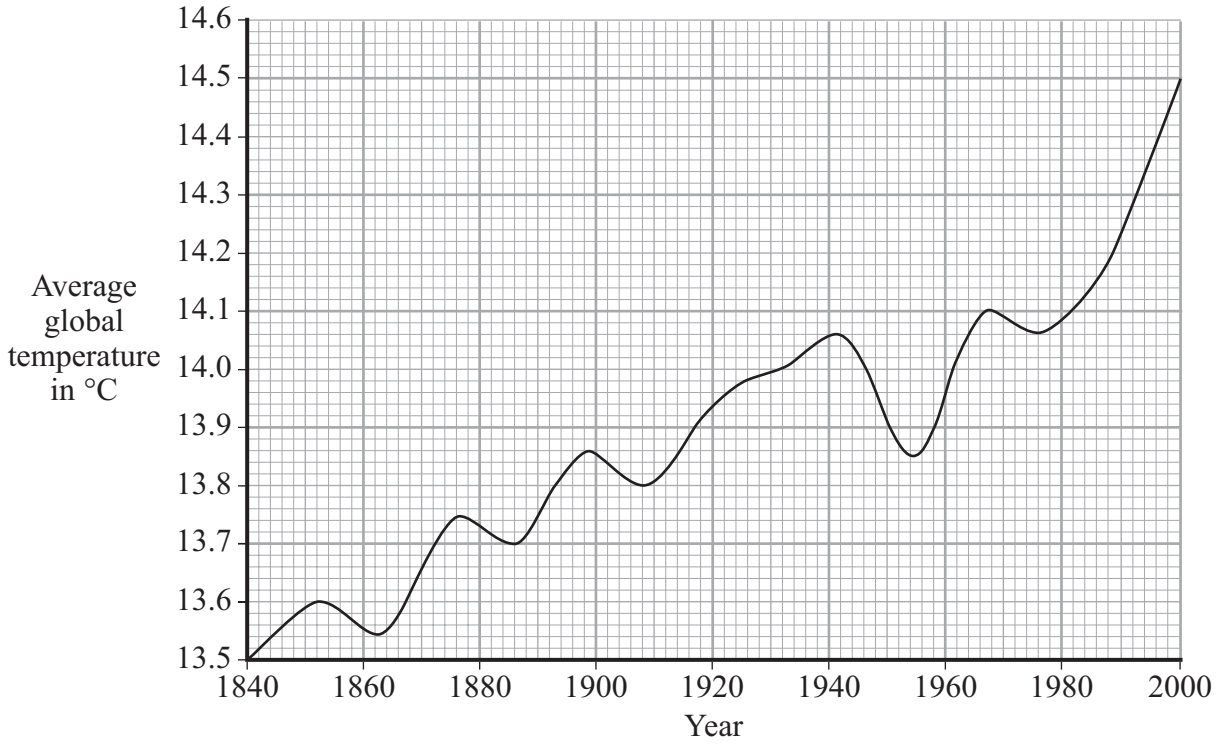
2 0.00013% per year

3 0.00012% per year

4 0.014% per year

Graph 2 shows the changes in the average global temperature between 1840 and 2000.

Graph 2



4D The data from **Graph 1** and **Graph 2** suggests that . . .

1 there is no link between carbon dioxide concentration and global temperature.

2 carbon dioxide causes global warming.

3 there may be an association between carbon dioxide concentration and global temperature.

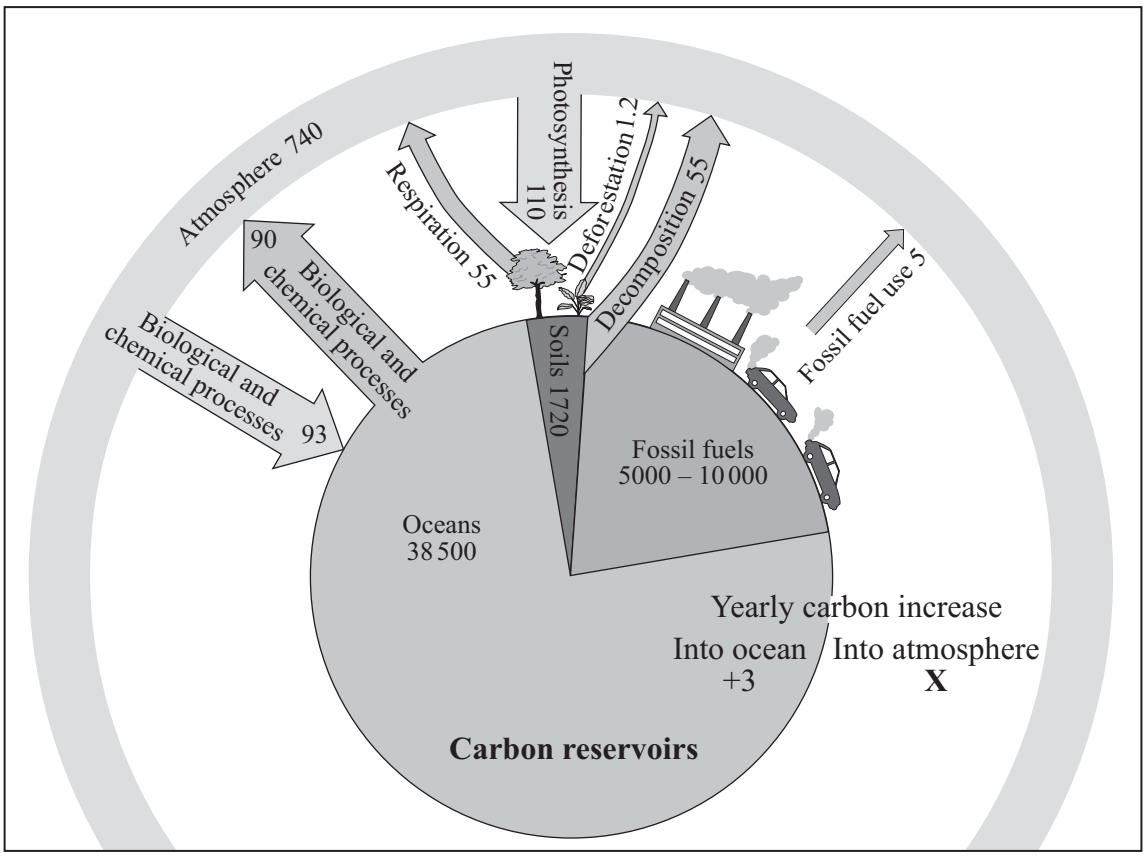
4 global temperature varies too much to draw a conclusion.

4.7.3.5 Global warming

Question 04

January 2008 | BLY1H | Original Q6 | Legacy

6 The diagram shows the mass of carbon exchanged between carbon reservoirs and the atmosphere. The pie chart in the diagram shows the mass of carbon in three reservoirs: oceans, soils and fossil fuels. The figures are in billions of tonnes of carbon per year.



(a) Calculate **X** (the yearly carbon increase into the atmosphere).

Show all your working.

.....

.....

.....

.....

X = ... billion tonnes of carbon
(2 marks)

4.7.3.5 Global warming

Question 04 · continued

BLANK

(b) Give **one** reason why deforestation increases the carbon dioxide concentration of the atmosphere.

.....

.....

(1 mark)

(c) Explain, as fully as you can, why the increasing concentration of carbon dioxide in the atmosphere is causing global warming.

.....

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.....

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(3 marks)

6

4.7.3.5 Global warming

Question 05

March 2008 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

Read the passage:

> Mount Rainier in America is home to some very rare plants. Many of them grow there even though the weather is so cold that trees cannot grow. As global warming continues, the mountain will become warmer. For every one degree Celsius rise in temperature, the trees can grow 75 metres higher up the mountain.

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

A competition

B environmental change

C survival

D extinction

1	allows trees to grow higher up the mountain
2	a possible consequence of global warming for the rare plants
3	a possible consequence of global warming for both the trees and the rare plants
4	a possible consequence of protecting the rare plants

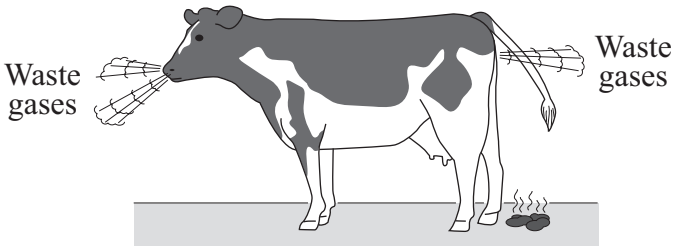
4.7.3.5 Global warming

Question 06

March 2008 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

Rearing cattle affects the environment.



5A In addition to methane, which other greenhouse gas do cattle release into the atmosphere?

1 carbon dioxide

2 carbon monoxide

3 nitrogen dioxide

4 sulfur dioxide

5B Cattle rearing can lead to sewage and farm chemicals entering streams and lakes.

The level of pollution of these water systems can be estimated most reliably by examining the . . .

1 colour of the water.

2 range of lichens living near the water.

3 range of invertebrates living in the water.

4 temperature of the water at regular intervals.

5C Greenhouse gases keep the Earth warm because . . .

1 they are good insulators.

2 they trap energy as it enters the Earth's atmosphere from the Sun.

3 they allow more radiation to pass through.

4 they re-radiate energy back to the Earth.

4.7.3.5 Global warming

5D Forests help to reduce the greenhouse effect mainly by . . .

1 ‘locking-up’ carbon dioxide as wood.

2 giving out oxygen.

3 taking in methane.

4 absorbing radiation from the Sun.

Turn over for the next question

4.7.3.5 Global warming

Question 07

June 2008 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

This question is about pollution.

8A Which one of the following is **not** part of the greenhouse effect?

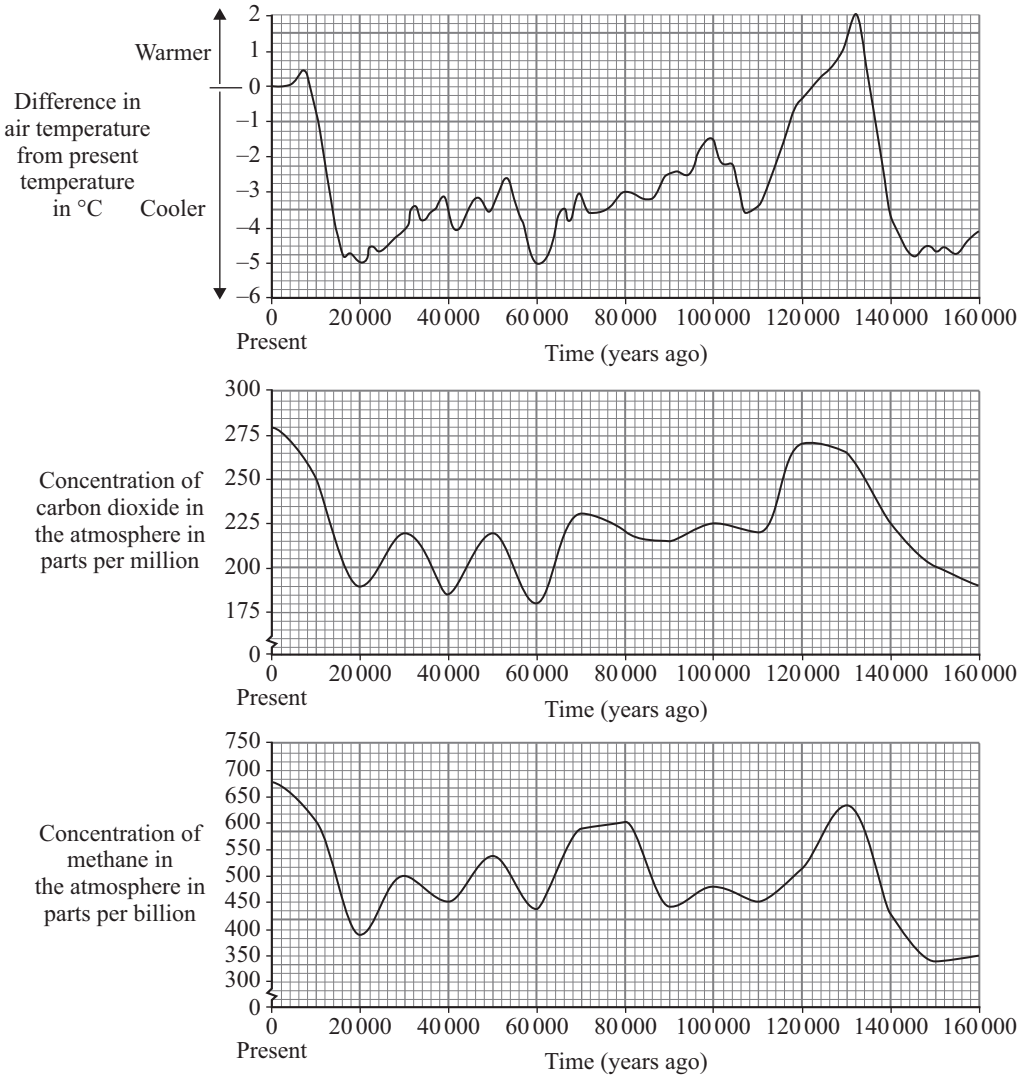
1 Greenhouse gases in the atmosphere trap some of the energy radiated by the Earth.

2 Most of the Sun's energy entering the Earth's atmosphere is trapped by greenhouse gases.

3 Some energy from the Earth's surface is radiated into the atmosphere.

4 Some of the radiation from the Sun is absorbed by the Earth's surface.

The graph shows the changes in the temperature of the Earth's atmosphere and the concentration of carbon dioxide and methane in the atmosphere over the last 160 000 years.



4.7.3.5 Global warming

Question 07 · continued

8B Which of the following is true of this data?

1 Every 20 000 years the concentration of carbon dioxide in the atmosphere increases by more than 50 parts per million.

2 Air temperature changed by 2 °C between 60 000 and 80 000 years ago.

3 The air temperature rose between 0 and 20 000 years ago.

4 Between 120 000 and 130 000 years ago the concentration of methane fell by more than 50 parts per billion.

8C Which of the following conclusions can be drawn from this data?

1 An increase in carbon dioxide concentration causes an increase in the air temperature.

2 An increase in the air temperature causes an increase in the concentration of methane in the atmosphere.

3 There may be a link between air temperature and the concentration of carbon dioxide in the atmosphere.

4 There is no link between air temperature and the concentration of methane in the atmosphere.

8D Some scientists disagree about the causes of global warming.

What is the most likely reason for this?

1 They have not compared their data with that of other scientists.

2 They disagree about where in the world the data has been collected.

3 They have interpreted the data differently.

4 The instruments used to collect the data are not accurate enough.

4.7.3.5 Global warming

Question 08

June 2008 | BLY1H | Original Q2 | Legacy

2 Governments are encouraging businesses to reduce carbon dioxide emissions.

2 (a) (i) Explain the link between carbon dioxide emissions and the greenhouse effect.

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.....

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.....

(2 marks)

2 (a) (ii) Give **one** possible outcome of the greenhouse effect on the environment.

.....

.....

(1 mark)

2 (b) A large supermarket chain is advertising 'our goal is to make our business carbon neutral in the next five years'.

2 (b) (i) Why does the supermarket management think that this will attract more customers?

.....

.....

(1 mark)

4.7.3.5 Global warming

Question 08 · continued

for mark

2 (b) (ii) One step that the supermarket chain intends to take is to obtain as much food as possible from British sources.

Explain how this will help the environment.

.....

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(2 marks)

6

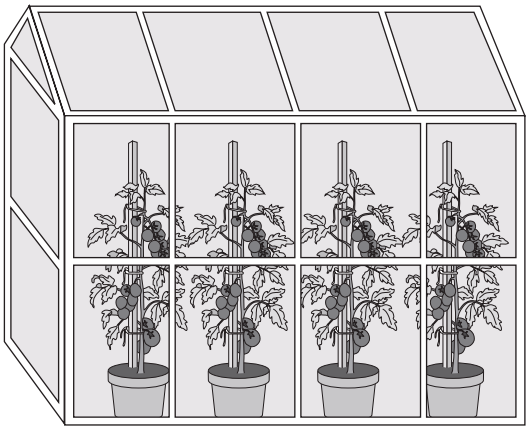
Turn over for the next question

4.7.3.5 Global warming

Question 09

January 2009 | BLY2H | Original Q4 | Legacy

4 In this country most tomatoes are grown in greenhouses.



4 (a) Suggest **one** way in which a grower could increase the yield of tomatoes from plants growing in his greenhouse.

.....

.....

(1 mark)

4 (b) Large supermarkets often import tomatoes from overseas.

4 (b) (i) Suggest **two** reasons why a supermarket might decide to import tomatoes rather than buy them from British growers.

1 .....

.....

2 .....

.....

(2 marks)

4 (b) (ii) Importing tomatoes may be more damaging to the environment than selling tomatoes grown in this country.
Explain why.

.....

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.....

.....

(2 marks)

5

4.7.3.5 Global warming

Question 10

June 2009 | BLY1BP | Original Q6 | Legacy

QUESTION SIX

Read the extract from a newspaper.

Huge chunks of polar ice shelf breaking up

A chunk of ice the size of the Isle of Man has started to break away from Antarctica in what scientists say is further evidence of a warming climate.

6A The British Antarctic Survey (BAS) monitors the Antarctic ice shelves.

In 1993, a scientist predicted that this area of the ice shelf would be lost within 30 years if global temperatures continued to rise. He now says that it is happening more quickly than he expected.

What is the most likely reason for his inaccurate prediction?

1 He was biased.

2 He did not have enough evidence.

3 He made many errors when recording his data.

4 He did not want to alarm the public.

6B Which row in the table correctly indicates the human activities that contribute to global warming?

	Burning fossil fuels	Deforestation	Increasing the number of cattle reared for food	Increased recycling of paper
1	✓		✓	✓
2	✓	✓	✓	
3		✓	✓	✓
4	✓	✓		✓

4.7.3.5 Global warming

Question 10 · continued

6C What is the cause of global warming?

1 The Sun is getting hotter.

2 The hole in the ozone layer is letting more heat in.

3 Gases in the atmosphere absorb heat and radiate it back to Earth.

4 More heat is being released from power stations.

6D An increase in the Earth's temperature by only a few degrees will cause . . .

1 more volcanic eruptions.

2 more earthquakes.

3 more acid rain.

4 widespread flooding.

Turn over for the next question

4.7.3.5 Global warming

Question 11

June 2009 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

Organic foods have become popular in recent years. They are grown without the use of pesticides and artificial fertilisers. But a government report in 2007 showed that the production of some organic foods is more damaging to the environment than their non-organic equivalents. However, supporters of organic farming claim that it is better than non-organic farming in conserving biodiversity and is better for the soil.

9A Biodiversity is . . .

1 the ability of plants and animals to adapt to a wide variety of different environments.

2 the ability of two plants or animals to live alongside each other for their mutual benefit.

3 the existence of a wide variety of plants and animals.

4 the existence of two different environmental adaptations of the same species of plant.

The table compares some of the effects of non-organic and organic food production on the environment.

Environmental effect and units	Amount in kg of production on farm					
	Sheep meat		Chicken		Milk	
	Non-organic	Organic	Non-organic	Organic	Non-organic	Organic
Energy used in MJ	23	18	12	16	2.5	1.6
Global warming potential in grams of CO_2 equivalent	17 400	10 100	4750	6680	1060	1230
Freshwater pollution by fertiliser potential in grams of phosphate equivalent	200	584	49	86	6.3	10.3
Acidification potential in grams of sulfur dioxide equivalent	380	1510	173	264	16.2	26.4
Land use in hectares	0.0014	0.003	0.64	1.4	0.001	0.002

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9B The information in the table indicates that . . .

1 all organic food production uses more energy than non-organic farming methods.

2 changing completely to organic methods will at least double the amount of land used for food production.

3 organic food production improves the environment.

4 organic farming reduces the amount of pollution resulting from sulfur dioxide.

4.7.3.5 Global warming

Question 11 · continued

9C A change from non-organic farming methods to the organic production of chicken and milk may . . .

1 contribute to an increase in acid rain.

2 help to reduce pollution of freshwater.

3 help to reduce global warming.

4 reduce the amount of energy consumed in the production of the food.

9D Which of the foods in the table is responsible for the greatest increase in environmental pollution when it is produced organically rather than non-organically?

1 sheep meat

2 chicken

3 milk

4 it is impossible to tell from this data

END OF TEST

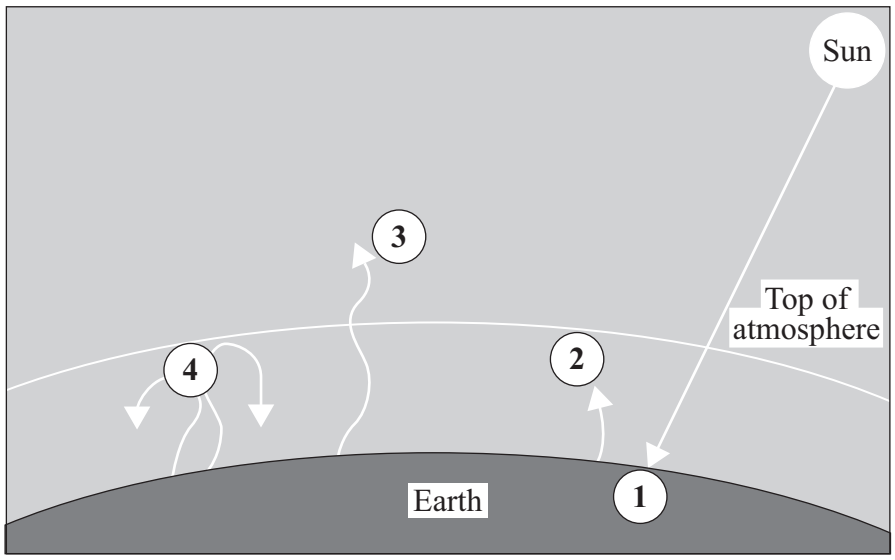
4.7.3.5 Global warming

Question 12

November 2009 | BLY1BP | Original Q2 | Legacy

QUESTION TWO

The diagram represents the greenhouse effect.



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

A Some heat energy escapes into space.

B Heat energy is re-radiated by greenhouse gases.

C Heat energy is radiated into the atmosphere.

D Solar radiation warms the Earth's surface.

4.7.3.5 Global warming

Question 13

November 2009 | BLY1BP | Original Q5 | Legacy

QUESTION FIVE

This question is about the effect that burning fuels has on the environment.

5A Which of the following are greenhouse gases?

1 sulfur dioxide and carbon dioxide

2 methane and oxygen

3 carbon dioxide and methane

4 methane and sulfur dioxide

A company can extract a fuel from single-celled plants, called algae, which grow on ponds. Fuels such as biodiesel are already produced from palm oil plants. Palm trees are grown where other trees have been cut down. A scientist estimates that the algae could produce 120 000 litres of fuel compared with 6000 litres from palm oil plants in the same area of deforested land. Unlike fuel from palm oil, burning fuel from algae does not produce sulfur dioxide.

5B The company claims that the fuel from algae will **not** contribute to global warming.

This is because . . .

1 algae take in as much carbon dioxide when growing as the fuel releases when burned.

2 burning the fuel releases carbon dioxide.

3 the plant takes in more sulfur when it is growing than is released, as sulfur dioxide, when the fuel burns.

4 the plants remove methane from the atmosphere when growing.

5C What area of land would be needed to make a pond that would produce the same amount of fuel as a 10 000 m^2 field of palm oil plants?

1 20 m^2

2 50 m^2

3 200 m^2

4 500 m^2

4.7.3.5 Global warming

Question 13 · continued

5D Using the information given, why might it be an advantage to use algae rather than palm oil to produce fuels?

1 Burning the fuel from algae results in less acid rain.

2 Producing fuel from algae does **not** require deforestation.

3 Algae grow more quickly than palm oil plants.

4 The fuel produced from algae burns more efficiently than that from palm oil plants.

Turn over for the next question

4.7.3.5 Global warming

Question 14

March 2010 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

The Lua tribe of the Philippines rely on 'slash and burn' agriculture. They cut down and burn an area of forest big enough to grow their crops. After about two years they move on to use another area of the forest. The Lua tribe has survived in the same region for many years. Their agriculture has to be managed very carefully.

8A The population of the tribe increased, so they burned a bigger area of the forest in which they lived.

What would be the most likely effect on the species that normally live in the region?

1 The animals would live at a higher population density in the remaining forest.

2 The animals would move away from the farmed area but die in the remaining forest because there would be too much competition.

3 There would be more types of native species because new areas of forest had been cleared.

4 There would be no effect on the native species.

The agricultural methods used by the Lua tribe had little effect on the carbon dioxide concentration in the air.

8B The most likely reason for this is that . . .

1 their population was not growing fast enough.

2 when the Lua tribe burns the forest, oxygen is taken in and carbon dioxide is released.

3 the Lua tribe did not plant rice on the cleared land.

4 the amount of carbon dioxide released by burning was the same as the amount of carbon dioxide reabsorbed by the crops.

4.7.3.5 Global warming

Question 14 · continued

March 2010 | BLY1BP | Original Q8 | Legacy

8C A forestry company was given the right to harvest the mature trees in the area, but also burned other areas.

Why was the company accused of increasing the chance of climate change?

1 Cutting down trees causes an increase in the temperature of the atmosphere.

2 Burning trees releases the 'locked up' carbon as carbon dioxide into the atmosphere, which then traps heat.

3 Using the trees for timber releases carbon dioxide into the atmosphere more quickly than photosynthesis can absorb it.

4 Fewer trees in the area allows more space for microorganisms to respire and release carbon dioxide.

8D Deforestation by the forestry company led to a reduction in biodiversity.

Why should society be concerned about this decrease?

1 A greater biodiversity reduces the chance of climate change.

2 The forest food chains would be shorter.

3 Some of the organisms that were lost may have been of future use.

4 There may be an increased use of herbicides in the area.

4.7.3.5 Global warming

Question 15

June 2010 | BLY1BP | Original Q1 | Legacy

QUESTION ONE

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.

4.7.3.5 Global warming

Question 16

June 2010 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

Many scientists are concerned about global warming.

One way to reduce global warming is to replace fossil fuels with biofuels, such as ethanol.
Forests are being cut down to grow crops that are used to produce ethanol.

8A When biofuels are burned, . . .

1 the volume of carbon dioxide they give off is about equal to the volume of carbon dioxide the plants take in.

2 the volume of carbon dioxide they give off is larger than the volume of carbon dioxide the plants take in.

3 the volume of methane they give off is equal to the volume of carbon dioxide the plants take in.

4 the volume of carbon dioxide they give off is equal to the volume of methane the plants take in.

8B One effect of cutting down forests is that . . .

1 more paper is recycled.

2 less renewable energy is used.

3 there may be a reduction in biodiversity.

4 less land is available for food production.

4.7.3.5 Global warming

Question 16 · continued

The table shows the yield of ethanol from four biofuel crops.

Plant material	Volume of ethanol produced in litres per kg of plant material	Volume of ethanol produced in litres per m^2 of land
Cassava	0.18	0.4
Maize	0.36	0.2
Sugar cane	0.07	1.2
Sweet potato	0.12	0.5

8C Which of the plant materials would result in the least amount of deforestation to produce 1000 litres of fuel?

1 Cassava

2 Maize

3 Sugar cane

4 Sweet potato

8D Global warming means that the average temperature of the Earth's atmosphere is gradually increasing.

What causes this increase in temperature?

1 more energy from the Sun entering the Earth's atmosphere

2 more energy being produced by human activity

3 more energy being radiated by the Earth

4 more energy being re-radiated back to Earth

4.7.3.5 Global warming

Question 17

January 2011 | BLY1H | Original Q8 | Legacy

8 Scientists have brought an extinct species of mountain goat, the Pyrenean ibex, 'back to life'. These scientists used skin cells from preserved Pyrenean ibex in cloning experiments.

The Scientists:
- removed the nuclei from domestic goat egg cells
- transferred cell nuclei from the skin cells of the Pyrenean ibex into domestic goat egg cells
- used the domestic goats as surrogate mothers for the embryos that developed.

The scientists made 439 cloned embryos, but only 57 were suitable for transfer into the surrogate goat mothers. Only seven of the goats got pregnant and only one live offspring was born.

Some biologists are very worried about using cloning to preserve endangered animals, because cloned animals often have developmental problems. Some endangered animals are difficult to breed in captivity. For these animals cloning is another way to continue the genetic line.

The biggest threats to endangered animals today are habitat loss, illegal hunting, pollution and climate change. Many scientists say that cloning is not as important as trying to preserve the wild places on Earth. The wild places are being lost very quickly and the animals and plants living in the wild places are dying out.

8 (a) The Pyrenean ibex was 'brought back to life'.

How is this process different from using adult cell cloning to clone a pet animal?

.....

.....

(1 mark)

4.7.3.5 Global warming

Question 17 · continued

8 (b) Evaluate the use of adult cell cloning to conserve endangered species.

Use the information given and your own knowledge and understanding.

Remember to give a conclusion to your evaluation.

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(4 marks)

5

4.7.3.5 Global warming

Question 18

March 2011 | BLY1BP | Original Q7 | Legacy

QUESTION SEVEN

Algae are small plants that live in water. Algae photosynthesise to gain energy to grow. An alga that grows off the coast of Hawaii makes a high proportion of vegetable oils in its cells.

A fuel company is planning to farm this alga to produce biodiesel fuel from the vegetable oils. The company says that the plans will result in sustainable development.

7A What does the company mean by *sustainable development* (for producing biodiesel)?

1 The algae will always grow in the sea around Hawaii.

2 The biodiesel will be produced using fossil fuels.

3 The biodiesel will be produced without affecting future generations.

4 The company can keep making the biodiesel for a long time.

7B Which of the following statements is the most important reason for promoting the algae as a sustainable source of biodiesel?

1 The trial growth project is in the sea around Hawaii where conditions are best for the algae farming.

2 The cost of the biodiesel produced is 8 times greater than diesel produced from fossil fuels.

3 The algae absorb carbon dioxide from the atmosphere, which increases the 'greenhouse effect'.

4 Using food crops to produce biodiesel may lead to starvation in some poor countries.

7C Some people say that burning fossil fuels adds to global warming.

Why does burning fossil fuels add to global warming?

1 Burning fossil fuels releases heat.

2 Burning fossil fuels releases carbon dioxide.

3 Fossil fuels are easily available.

4 Carbon in fossil fuels did not come from plants.

4.7.3.5 Global warming

Question 18 · continued

March 2011 | BLY1BP | Original Q7 | Legacy

7D Methane contributes to global warming because methane . . .

1 traps heat radiation from the Earth and re-radiates it out to space.

2 traps heat radiation from the Earth and re-radiates it back to the Earth.

3 traps heat radiation directly from the Sun and re-radiates it back to the Earth.

4 reflects heat radiation from the Sun back out to space.

Turn over for the next question

4.7.3.5 Global warming

Question 19

March 2011 | BLY1BP | Original Q9 | Legacy

QUESTION NINE

Read the information about rice growing.

- Rice growing can contribute to global warming.
- Most rice is grown in wetland areas, where other crops cannot grow.
- Methane is produced by bacteria which live in soil water that has very little oxygen in it.
- Rice can be grown on drier land, but yields are reduced.
- Other crops are more profitable in these drier areas.
- Allowing the soil to dry out for a short time increases the amount of oxygen in the soil and increases rice yields.

9A In wetland areas, rice is a very important crop for people's diet and for the economy of these areas.

For people who live in these wetland areas, the best way of reducing methane in the atmosphere is . . .

1 to invest money in new drainage systems.

2 to stop producing rice in wetland areas.

3 to grow more rice in drier areas.

4 to grow other crops in wetland areas.

9B Over its growing period, a rice crop will . . .

1 reduce the amount of carbon dioxide in the atmosphere.

2 reduce the amount of oxygen in the atmosphere.

3 reduce the amount of methane in the atmosphere.

4 have no effect on the composition of the atmosphere.

9C Some varieties of rice plant cause 30 % less methane to be released into the atmosphere. However, these rice plants produce less rice.

Which of the following might produce a high yielding rice plant **and** release less methane?

1 cloning

2 embryo transplantation

3 sexual reproduction

4 tissue culture

4.7.3.5 Global warming

Question 19 · continued

9D A new strain of rice has been genetically modified to produce extra vitamins.

The final decision whether to allow this strain of rice to be grown on a large scale should be taken by . . .

1 farmers.

2 industrialists.

3 politicians.

4 scientists.

END OF TEST

4.7.3.5 Global warming

Question 20

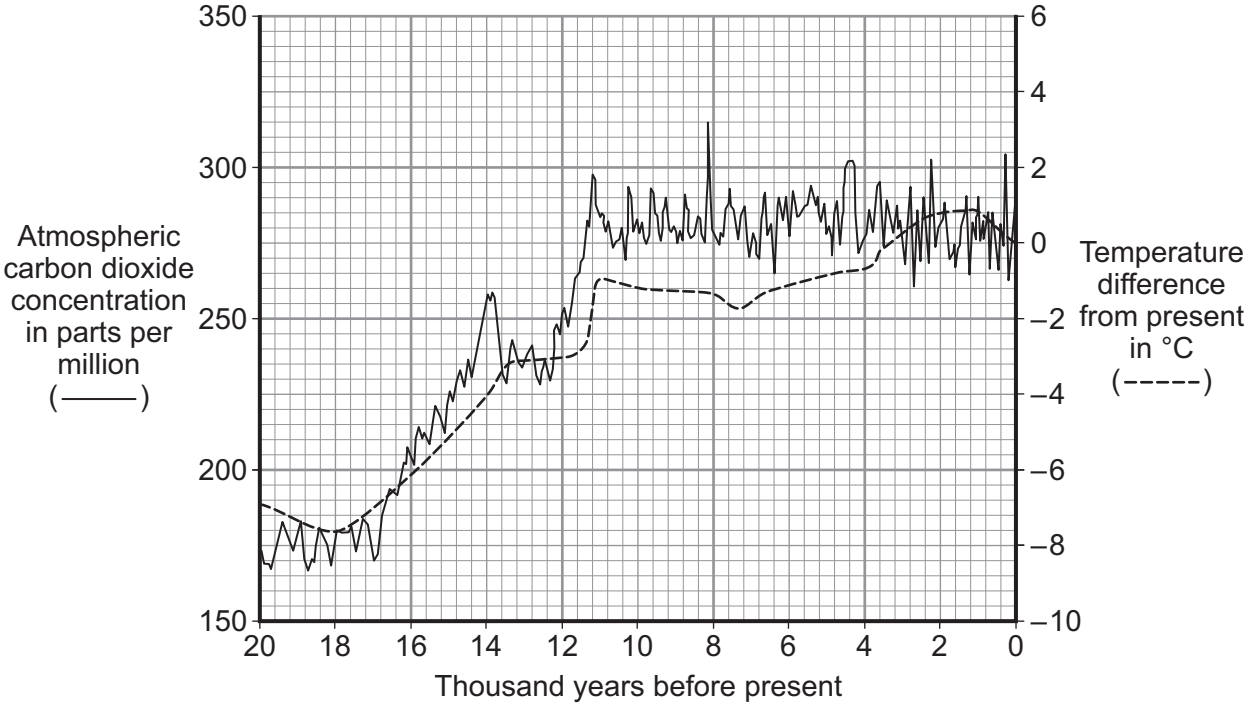
June 2011 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

Scientists have analysed the carbon dioxide concentration in air bubbles trapped in deep ice in Antarctica.

The scientists have used the air bubbles to help to calculate the probable air temperature in the past.

The graph shows their results.



8A The mean temperature in Antarctica today is –20 °C.

What was the mean temperature in Antarctica 14 000 years ago?

1 0 °C

2 –16 °C

3 –24 °C

4 –26 °C

8B Over the past 20 000 years, the temperature of the atmosphere has . . .

1 decreased steadily.

2 fluctuated, but shown an overall decrease.

3 fluctuated, but shown an overall increase.

4 increased steadily.

4.7.3.5 Global warming

Question 20 · continued

8C The data . . .

1 proves that carbon dioxide causes the greenhouse effect.

2 shows an exact correlation between carbon dioxide concentration and the air temperature.

3 shows partial correlation between carbon dioxide concentration and the air temperature.

4 shows that air temperature depends only on carbon dioxide concentration.

8D How does an increase in the carbon dioxide concentration in the atmosphere lead to an increase in atmospheric temperature?

1 More of the radiation of the Sun passes into the atmosphere.

2 The atmosphere radiates more energy back to Earth.

3 The Earth absorbs energy from the atmosphere.

4 The sea absorbs more energy from the Sun.

Turn over for the next question

4.7.3.5 Global warming

Question 21

June 2011 | BLY1H | Original Q6 | Legacy

6 Soay sheep live wild on an island off the north coast of Scotland. No people live on the island.



Over the last 25 years, the average height and mass of the wild Soay sheep have decreased.

The scientists think that climate change might have affected the size of the sheep.

Suggest an explanation for the evolution of the wild Soay sheep over the last 25 years.

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(4 marks)

4

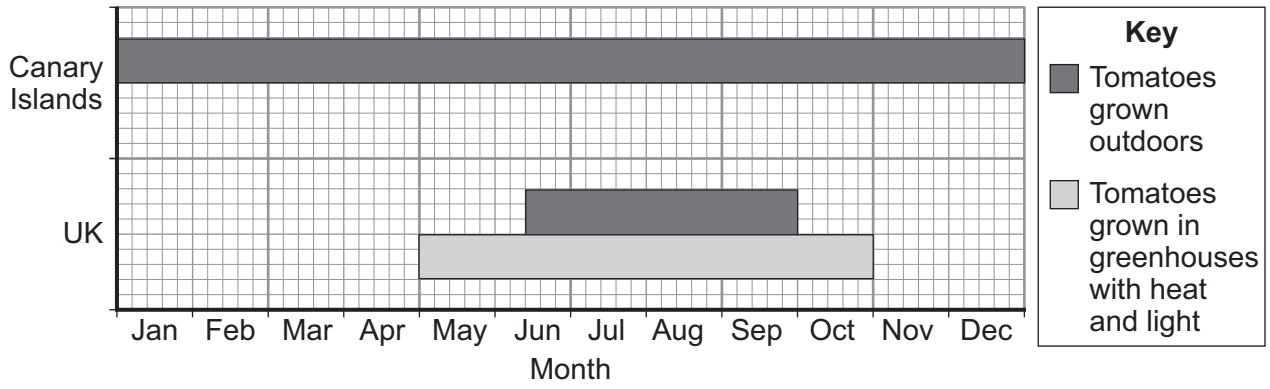
4.7.3.5 Global warming

Question 22

June 2011 | BLY2H | Original Q2 | Legacy

2 Tomatoes are grown in greenhouses in the UK and outdoors in the UK and the Canary Islands.

The chart shows in which months these tomatoes can be bought in shops in the UK.



The Canary Islands are about 3000 km from the UK.

Some people prefer to buy tomatoes grown in the UK.

What are the **advantages** and **disadvantages** of buying tomatoes grown in the UK, instead of buying tomatoes grown in the Canary Islands?

Advantages of buying tomatoes grown in the UK

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Disadvantages of buying tomatoes grown in the UK

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(3 marks)

3

4.7.3.5 Global warming

Question 23

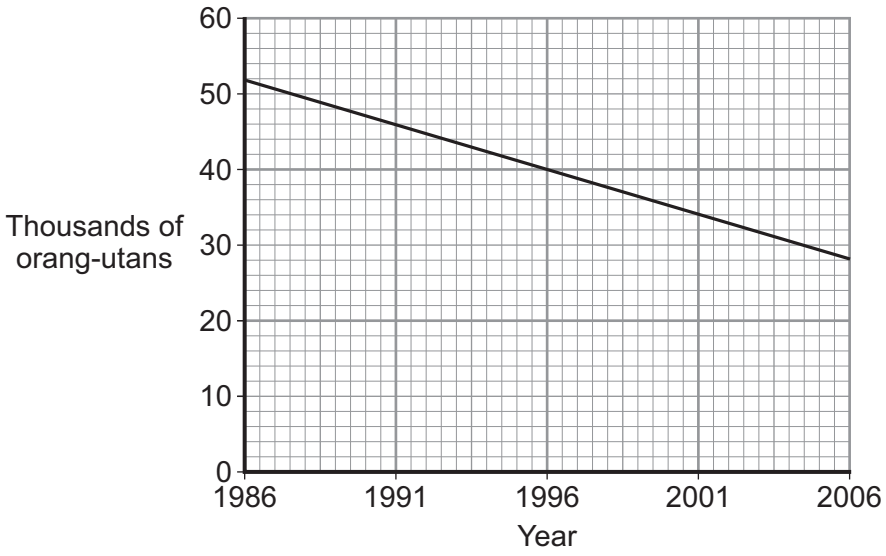
November 2011 | BLY1BP | Original Q8 | Legacy

QUESTION EIGHT

The decrease in the total area of tropical rainforest on Earth is reducing biodiversity and affecting the climate.

Scientists surveyed the numbers of orang-utans in Borneo.

Their results are shown in the graph.



8A What was the annual rate of decrease in orang-utan numbers between 1986 and 2006?

1 1200 per year

2 2400 per year

3 2800 per year

4 5200 per year

8B Biodiversity is . . .

1 the number of different species living in a habitat.

2 the number of individuals living in a habitat.

3 the maintenance of tropical rainforests.

4 the number of endangered species in a habitat.

4.7.3.5 Global warming

Question 23 · continued

8C Forests in Borneo are being cut down to clear land for growing crops.

Keeping forests rather than cutting them down for growing crops helps to reduce global warming because . . .

1 carbon dioxide can be 'locked-up' in wood for many years.

2 growing crop plants increases the number of microorganisms in the soil.

3 forests release large amounts of carbon dioxide.

4 some crop plants remove sulfur dioxide from the atmosphere.

8D How does an increase in the amount of greenhouse gases in the atmosphere lead to an increase in global warming?

1 More of the radiation from the Sun passes into the atmosphere.

2 The atmosphere radiates more energy back to Earth.

3 The Earth radiates more energy back into the atmosphere.

4 The sea absorbs more energy from the Sun.

4.7.3.5 Global warming

Question 24

June 2012 | BL2HP | Original Q5 | Legacy

5 (a) Complete the equation for photosynthesis.

..... + ... $\xrightarrow{\text{light energy}}$ ..... + oxygen

(2 marks)

5 (b) Scientists investigated how temperature affects the rate of photosynthesis.
The scientists grew some orange trees in a greenhouse.
They used discs cut from the leaves of the young orange trees.

The scientists used the rate of oxygen production by the leaf discs to show the rate of photosynthesis.

5 (b) (i) The leaf discs did not produce any oxygen in the dark.

Why?

.....

.....

(1 mark)

5 (b) (ii) The leaf discs took in oxygen in the dark.

Explain why.

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(2 marks)

Question 5 continues on the next page

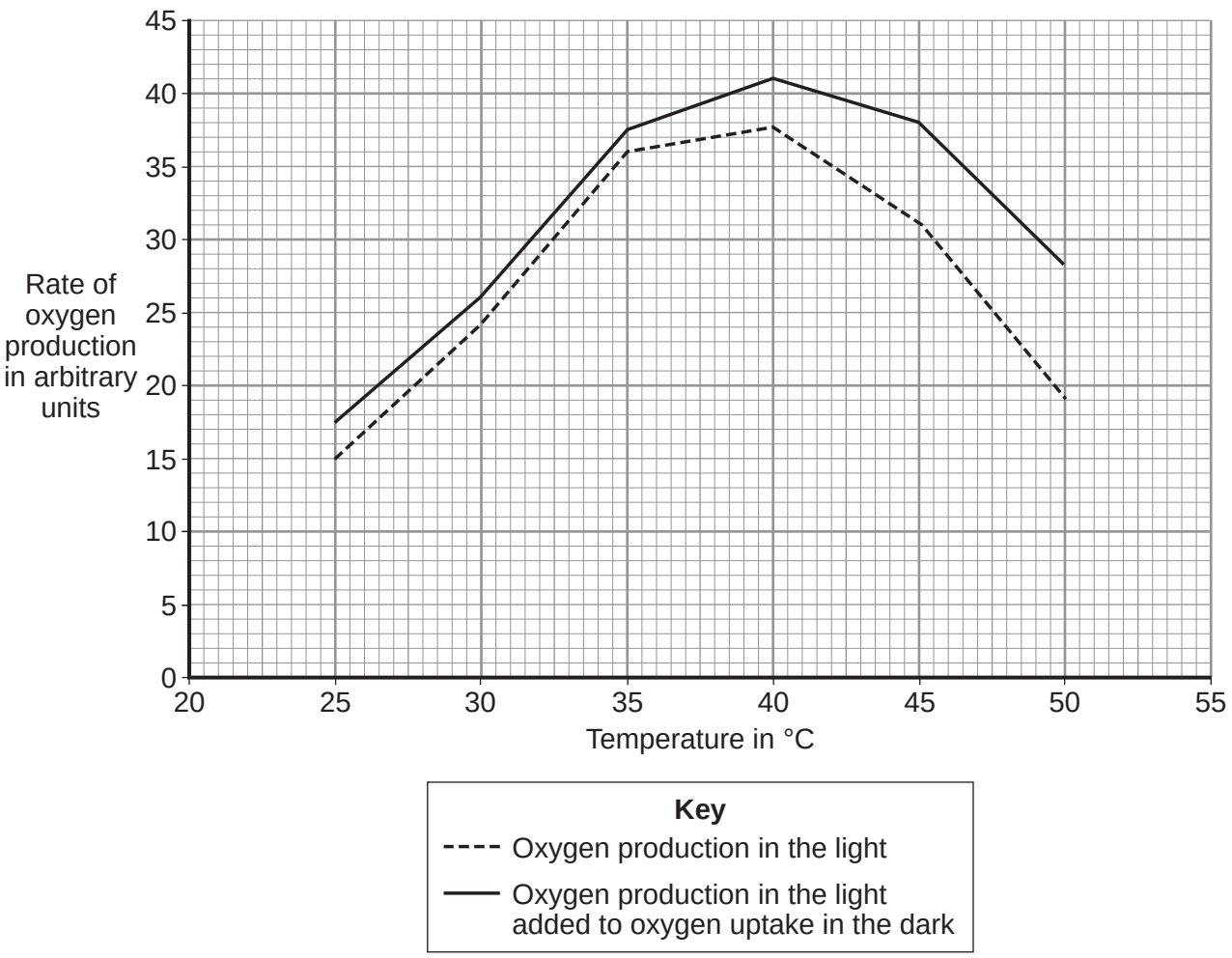
4.7.3.5 Global warming

Question 24 · continued

5 (c) In their investigation, the scientists measured the rate of oxygen release by the leaf discs in the light. The scientists then measured the rate of oxygen uptake by the leaf discs in the dark.

The graph shows the effect of temperature on

- oxygen production in the light
- oxygen production in the light added to oxygen uptake in the dark.



Use the information from the graph to answer each of the following questions.

5 (c) (i) Describe the effect of temperature on oxygen production in the light.

.....

.....

.....

.....

(2 marks)

4.7.3.5 Global warming

Question 24 · continued

5 (c) (ii) Explain the effect of temperature on oxygen production in the light when the temperature is increased:

from 25 °C to 35 °C

.....

.....

.....

from 40 °C to 50 °C.

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.....

(2 marks)

5 (d) A farmer in the UK wants to grow orange trees in a greenhouse. He wants to sell the oranges he produces at a local market.
He decides to heat the greenhouse to 35 °C.

Explain why he should **not** heat the greenhouse to a temperature higher than 35 °C.
Use information from the graph in your answer.

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(3 marks)

12

4.7.3.5 Global warming

Question 25

June 2014 | BL3HP | Original Q2 | Legacy

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

Deforestation affects the environment.

Deforestation is causing a change in the amounts of different gases in the atmosphere. This change causes global warming and climate change.

Figure 2 shows an area of deforestation.

Figure 2



Give the reasons why deforestation is taking place.

Describe how deforestation is causing the change in the amounts of different gases in the atmosphere.

[6 marks]

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4.7.3.5 Global warming

Question 26

June 2015 | BL3HP | Original Q4 | Legacy

4 In many areas of the world the mass of household waste produced each year is increasing.

4 (a) Give **two** reasons why the mass of household waste is increasing each year.

[2 marks]

1 .....

.....

2 .....

.....

4 (b) **Table 1** shows how the mass of household waste in the UK has changed from 2004 to 2012.

Table 1

Year	Total mass of household waste in thousands of tonnes (including total household recycling)	Total mass of household recycling in thousands of tonnes	Percentage of household waste recycled
2004	25 658	5785	22.5
2006	25 775	7976	30.9
2008	24 334	9398	38.6
2010	23 454	9733	
2012	22 643	9782	43.2

4 (b) (i) Calculate the percentage of household waste recycled in 2010.

[2 marks]

.....

.....

.....

.....

..... %

4.7.3.5 Global warming

Question 26 · continued

4 (b) (ii) The UK government has been encouraging a 'zero waste economy'.

In a 'zero waste economy', we reduce, reuse and recycle as much waste as possible.

A newspaper concluded that: **'The government's 'zero waste economy' has been successful.'**

Use information from **Table 1** to describe the reasons for and against the newspaper's conclusion.

[4 marks]

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4 (c) (i) Some waste releases carbon dioxide and methane into the atmosphere.
An increase in carbon dioxide and methane contributes to global warming.

Global warming can cause sea levels to rise.

Describe **two** other possible effects of global warming on our environment.

[2 marks]

1 .....

.....

2 .....

.....

4 (c) (ii) Storing the carbon dioxide helps to prevent more global warming.
Carbon dioxide can be stored (sequestered) in trees when they photosynthesise.

Give **one** different way in which carbon dioxide is sequestered in our environment.

[1 mark]

.....

.....

11

4.7.3.5 Global warming

Question 27

June 2016 | BL3HP | Original Q9 | Legacy

9 **Figure 8** shows some information about 'stem cell burgers'.

Figure 8

The first laboratory burger has now been cooked

In July 2013 the first burger grown from cow stem cells was cooked.

Muscle stem cells from cows were grown into strands of beef in a laboratory. About 20 000 strands of beef were then made into a burger. The burger can be cooked and eaten by humans. This type of meat is called cultured meat.

The cultured meat is exactly the same as normal cow muscle tissue and the cells are not genetically modified.

9 (a) (i) Some scientists think using cultured meat instead of traditionally-produced meat will help reduce global warming.

Suggest **two** reasons why using cultured meat may slow down the rate of global warming.

[2 marks]

1 _____

_____

2 _____

_____

9 (a) (ii) Suggest **two** other possible advantages of producing cultured meat instead of farmed meat.

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

[2 marks]

1 _____

_____

2 _____

_____

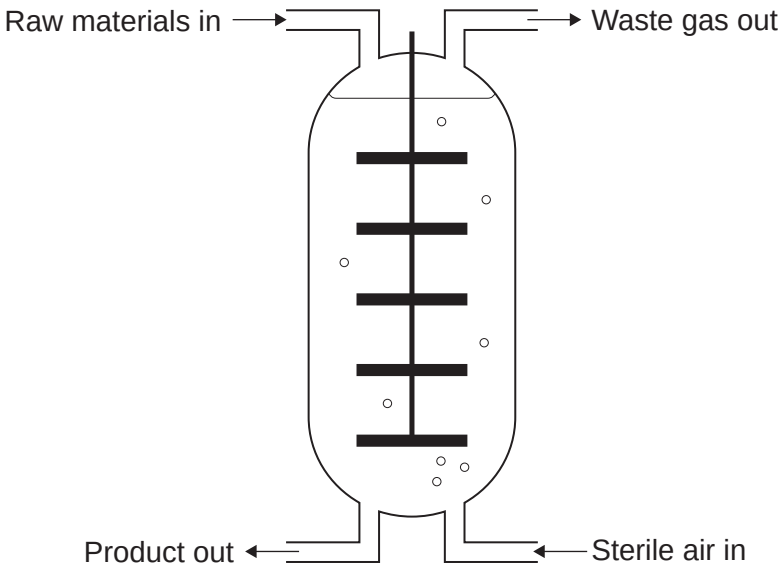
4.7.3.5 Global warming

Question 27 · continued

9 (b) Mycoprotein is one type of food that is mass-produced.

Figure 9 shows a fermenter used to produce mycoprotein.

Figure 9



Describe how mycoprotein is produced.

[4 marks]

8

4.7.3.5 Global warming

Question 28

June 2017 | BL2HP | Original Q4 | Legacy

4 Plants use carbon dioxide from the air in photosynthesis.

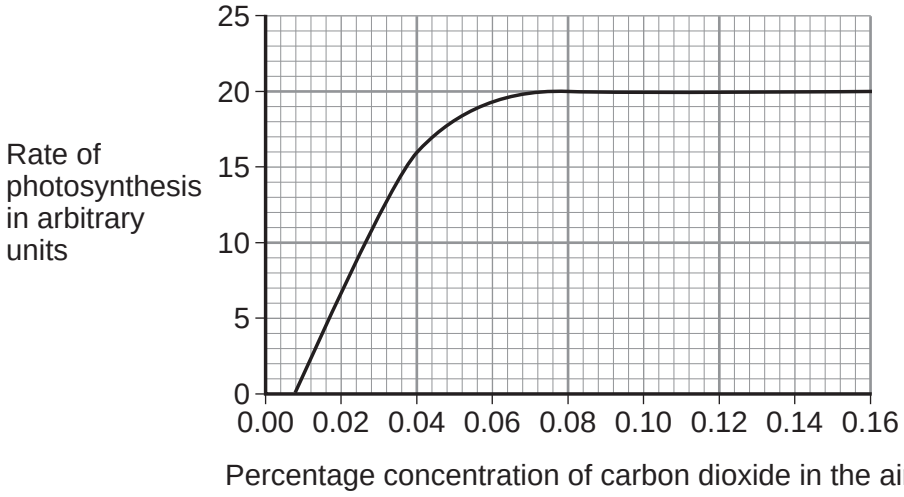
4 (a) Write the word equation for the process of photosynthesis.

[2 marks]

_____

4 (b) **Figure 5** shows the effect of the concentration of carbon dioxide on the rate of photosynthesis in tomato plants at 20 °C.

Figure 5



4 (b) (i) The concentration of carbon dioxide in the air is normally 0.04%.

What is the rate of photosynthesis in the tomato plants at 0.04% carbon dioxide?

[1 mark]

Rate = _____ arbitrary units

4 (b) (ii) A farmer grows tomato plants in a large greenhouse.

He plans to increase the carbon dioxide concentration in the air in his greenhouse to 0.08%.

Calculate the **percentage** increase in the rate of photosynthesis of the tomato plants when the carbon dioxide concentration is increased from 0.04% to 0.08%.

[1 mark]

Use information from **Figure 5**.

_____

_____

Percentage increase = _____ %

4.7.3.5 Global warming

Question 28 · continued

4 (b) (iii) Explain why the farmer would **not** use a concentration of carbon dioxide higher than 0.08%.

[2 marks]

4 (b) (iv) The farmer increases the concentration of carbon dioxide in the air.

Give **two** other ways that the farmer could increase the rate of photosynthesis of the tomato plants.

[2 marks]

1 _____

_____

2 _____

_____

8

4.7.3.5 Global warming

Question 29

June 2017 | BL3HP | Original Q1 | Legacy

1 Large areas of forest are cut down each year. This is called deforestation.

1 (a) Apart from decay, describe how the removal of trees from forests can lead to global warming.

[1 mark]

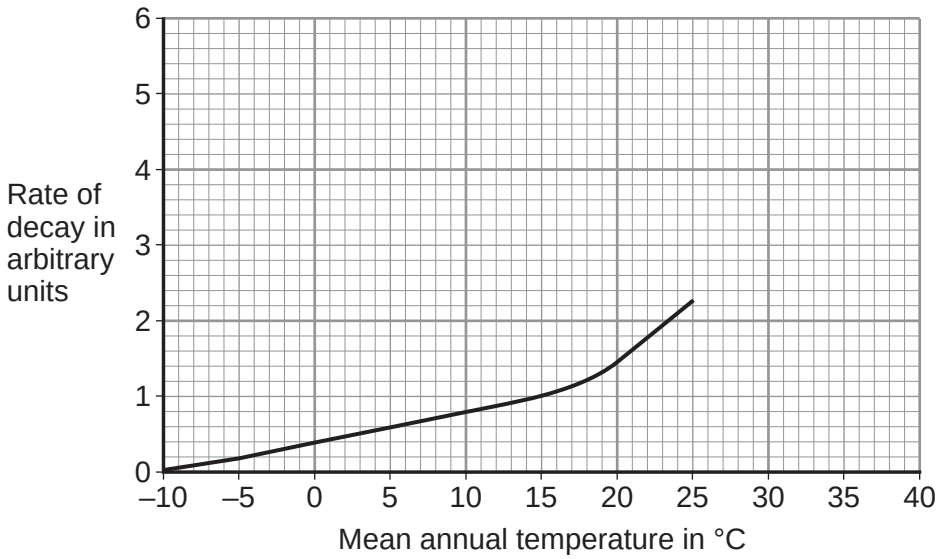
_____

_____

1 (b) After trees have been cut down, branches and leaves are left on the ground to decay.

Figure 1 shows how the rate of decay changes with the mean annual temperature in different environments.

Figure 1



1 (b) (i) The mean annual temperature in forest **A** is 10 °C.

What is the rate of decay in forest **A**?

[1 mark]

Rate of decay = _____ arbitrary units

1 (b) (ii) Forest **B** has a mean annual temperature of 30 °C.

Use information from **Figure 1** to predict the rate of decay in forest **B**.

[1 mark]

Rate of decay = _____ arbitrary units

4.7.3.5 Global warming

Question 29 · continued

1 (c) Describe how decay in forests contributes to global warming.

[2 marks]

5

Turn over for the next question

4.7.3.5 Global warming

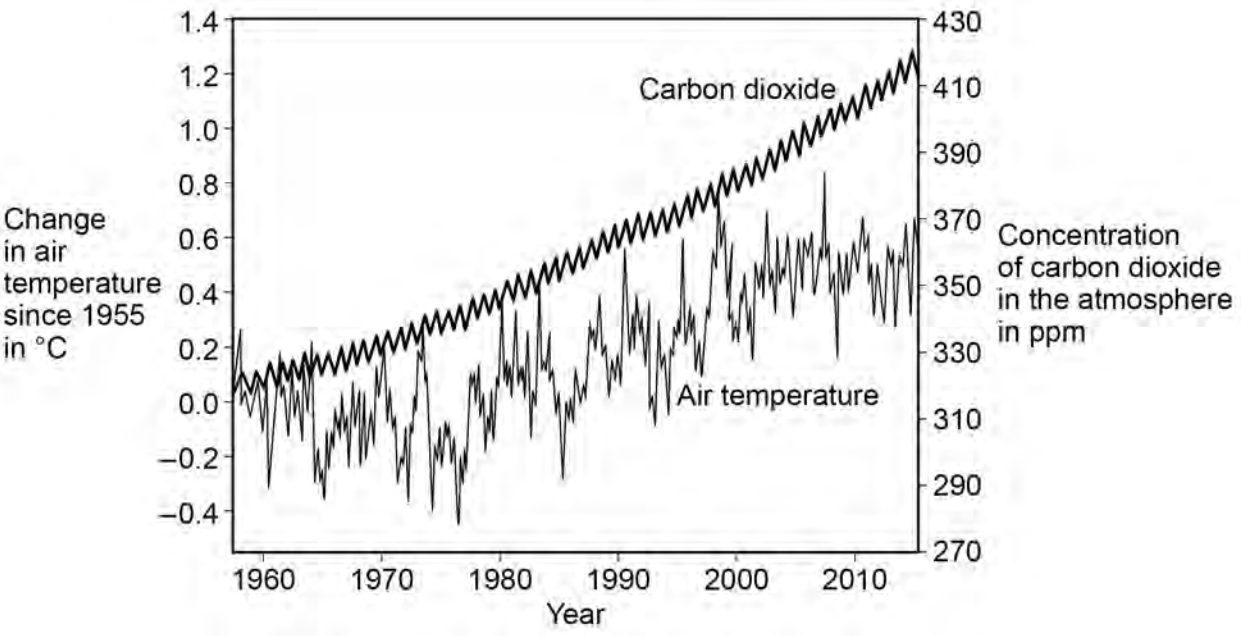
Question 30

June 2018 | 8461/2H | Original Q2

0 2 Many scientists think that global air temperature is related to the concentration of carbon dioxide in the atmosphere.

Figure 3 shows changes in global air temperature and changes in the concentration of carbon dioxide in the atmosphere.

Figure 3



0 2 . 1 Complete **Table 1**.

Use information from **Figure 3**.

[2 marks]

Choose answers from the box.

You may use each answer once, more than once or not at all.

constant	**decreasing**	**increasing**

Table 1

	1960 – 1977	1977 – 2003	2003 – 2015
Trend in carbon dioxide concentration	Increasing		
Trend in air temperature			

4.7.3.5 Global warming

Question 30 · continued

Many scientists think that an increase in carbon dioxide concentration in the atmosphere causes an increase in air temperature.

0 2 . 2 How would an increase in the concentration of carbon dioxide in the atmosphere cause an increase in air temperature?

[1 mark]

0 2 . 3 Evaluate evidence for and against the theory that an increase in the concentration of carbon dioxide in the atmosphere causes an increase in air temperature.

Use data from **Figure 3** and your own knowledge.

[4 marks]

4.7.3.5 Global warming

Question 30 · continued

In each year, the concentration of carbon dioxide in the atmosphere is higher in the winter than in the summer.

0 2 . 4 Give **one** human activity that could cause the higher concentration of carbon dioxide in the winter.

[1 mark]

0 2 . 5 Give **one** biological process that could cause the lower concentration of carbon dioxide in the summer.

[1 mark]

0 2 . 6 Give **two** possible effects of an increase in global air temperature on living organisms.

[2 marks]

1

2

11

4.7.3.5 Global warming

Question 31

June 2023 | 8461/2H | Original Q3

0 3 Reproduction can produce offspring which are:

- genetically different

  or

- genetically identical.

Farmers grow tomato plants in greenhouses.

The tomatoes are sold in supermarkets.

0 3 . 1 Suggest **one** advantage of growing tomato plants that are genetically different.

[1 mark]

0 3 . 2 Suggest **one** advantage of growing tomato plants that are genetically identical.

[1 mark]

0 3 . 3 Scientists can grow genetically identical tomato plants using tissue culture.

What is tissue culture?

[1 mark]

0 3 . 4 Genetically identical tomato plants growing in the same garden do **not** all grow to the same height.

Give **one** reason why.

[1 mark]

4.7.3.5 Global warming

Question 31 · continued

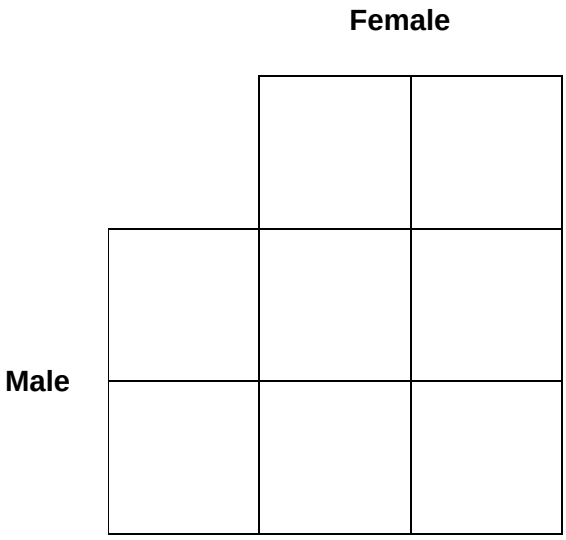
The sex of dogs is determined by **X** and **Y** chromosomes in the same way as in humans.

0 3 . 5 Complete the Punnett square diagram in **Figure 4** to show the inheritance of sex in dogs.

Use the symbols **X** and **Y**.

[3 marks]

Figure 4



0 3 . 6 A female dog gave birth to six offspring.

Why would you expect there to be three male offspring and three female offspring?

Use your answer to Question **03.5**.

[1 mark]

Question 3 continues on the next page

Question 31 · continued

Farmers keep chickens for:

- meat production
- egg production.

Some varieties of chicken grow more quickly and are more suitable for meat production.

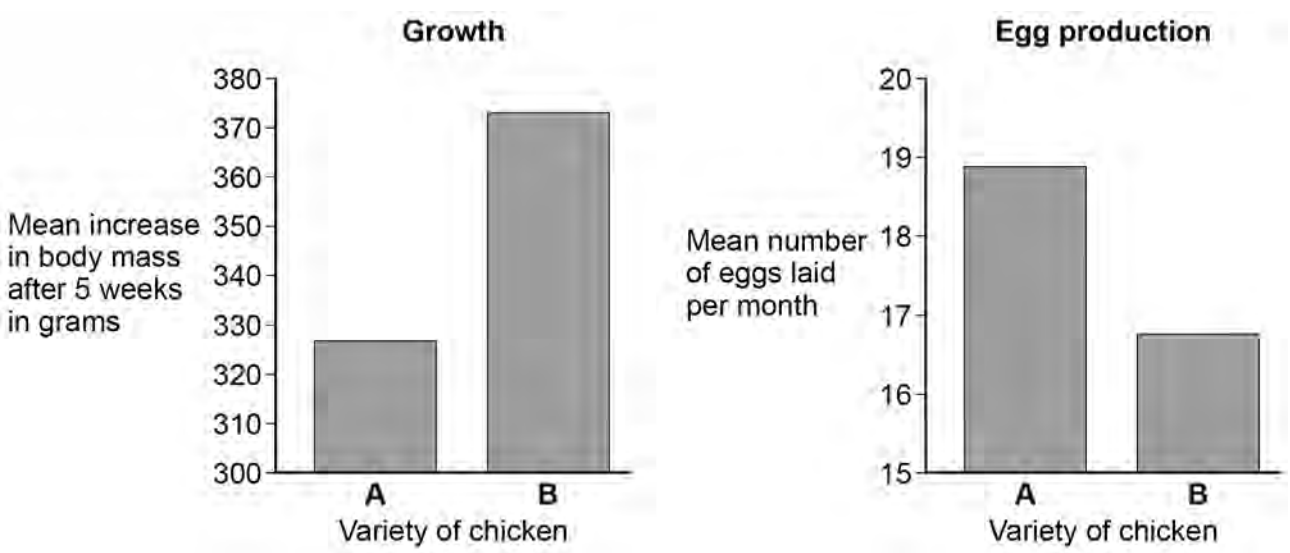
Other varieties of chicken produce more eggs.

A farmer keeps two varieties of chicken, **A** and **B**.

The farmer investigated the growth rates and egg-production rates of both varieties.

Figure 5 shows the results.

Figure 5



0 3 . 7 Suggest **two** control variables the farmer should have used in this investigation.

[2 marks]

1 _____

_____

2 _____

_____

4.7.3.5 Global warming

Question 31 · continued

0 3 . 8 **Figure 5** shows mean values from 500 chickens of each variety.

Give the reason the farmer used a large number of chickens.

[1 mark]

0 3 . 9 The farmer wants to produce a new variety of chicken that is good for **both** meat production **and** egg production.

Describe how selective breeding of chicken varieties **A** and **B** can produce the new variety of chicken.

[4 marks]

15