AQA GCSE SCIENCE A (BIOLOGY)

BIOLOGY



EXAM QUESTION PACK

UNIT B1b OBJECTIVE TEST BLY1BP PAPERS

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
November 2012

Science A

Unit Biology B1b (Evolution and Environment)

Biology

Unit Biology B1b (Evolution and Environment)

BLY1BP

F&H

Tuesday 6 November 2012 Afternoon Session

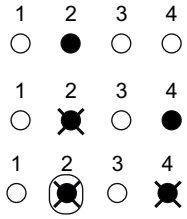
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed
- 30 minutes

Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1b' printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

Section One

Questions **ONE** to **FIVE**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

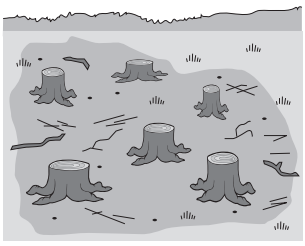
Use **each** answer only **once**.

Mark your choices on the answer sheet.

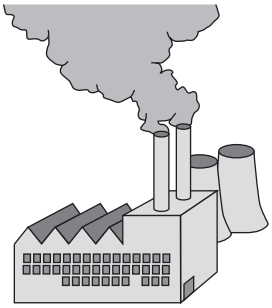
QUESTION ONE

The drawings show four ways our activities affect the environment.

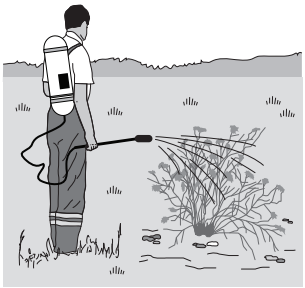
1



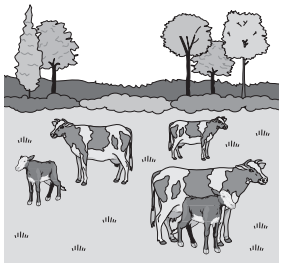
2



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

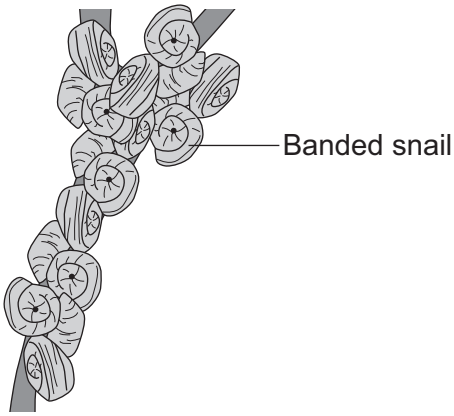
C may pollute farmland with poisonous chemicals

D produces methane

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QUESTION TWO

Banded snails live in woodland and grassland.



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

A evolution

B mutation

C selection

D variation

Banded snails have a wide range of different colours on their shells.

This wide range of colours is an example of . . . **1** . . . .

A change in a gene that produces a different colour is caused by . . . **2** . . . .

Birds only eat certain coloured snails. This is an example of . . . **3** . . . .

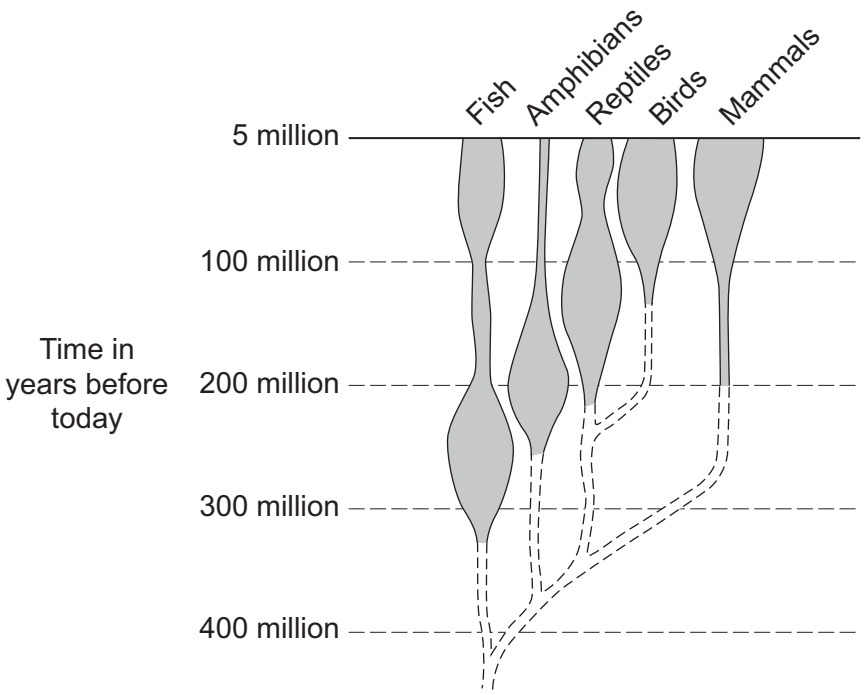
Over a long time, new species of snails develop. This is an example of . . . **4** . . . .

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QUESTION THREE

The diagram shows how the number of species in different groups of vertebrates changed between 400 million years ago and 5 million years ago.

The wider a block is, the more species there are.



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

A fish

B amphibians

C reptiles

D mammals

The group with most species 200 million years ago was . . . **1** . . . .

Birds are most closely related to . . . **2** . . . .

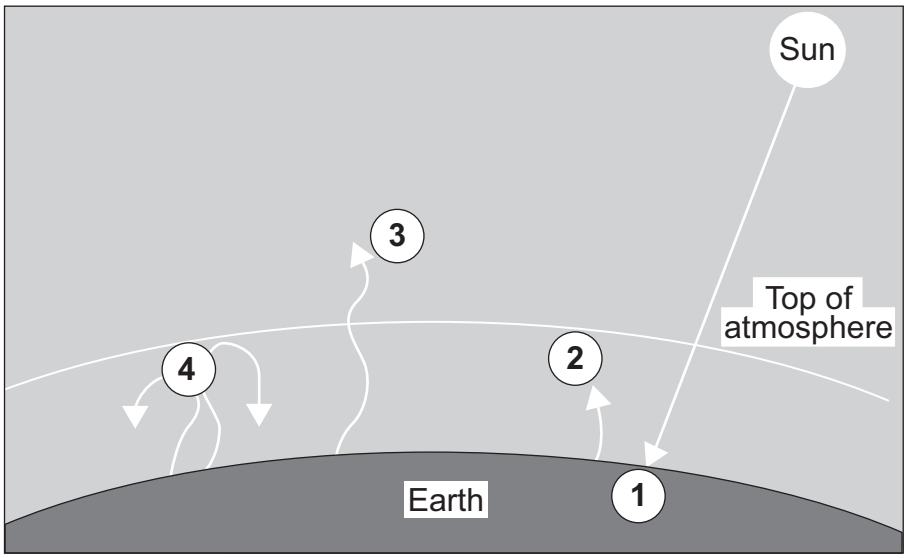
250 million years ago, the vertebrates on Earth were mainly . . . **3** . . . .

The group with most species 5 million years ago was . . . **4** . . . .

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QUESTION FOUR

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.

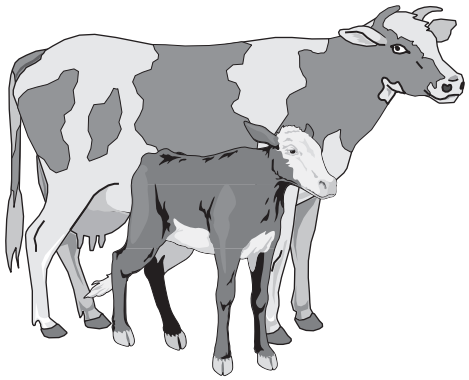
D Solar radiation warms the Earth's surface.

Turn over for the next question

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QUESTION FIVE

The drawing shows a cow and her calf.



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

A genes

B gametes

C embryos

D characteristics

The colour and the pattern of the skin of the calf are known as . . . **1** . . . .

The information for coat colour is stored in parts of chromosomes called . . . **2** . . . .

This information is passed from the cow to the calf in cells called . . . **3** . . . .

Calves can be cloned by splitting apart cells from . . . **4** . . . .

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Turn over for the next question

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Section Two

Questions **SIX** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

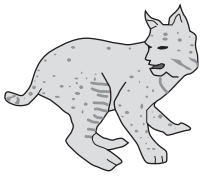
Mark your choices on the answer sheet.

QUESTION SIX

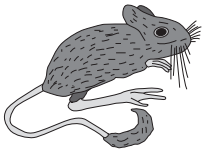
The drawings are of animals and plants. The animals and plants live in a hot, dry environment.



Fennec fox



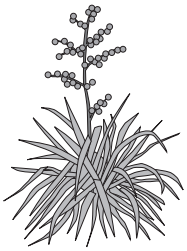
Bobcat



Jerboa



Antelope squirrel



Yucca



Prickly pear cactus

6A Which two of the above organisms might compete for water?

1 fennec fox and yucca

2 jerboa and prickly pear cactus

3 yucca and prickly pear cactus

4 antelope squirrel and yucca

6B All the animals above probably compete for . . .

1 light.

2 oxygen.

3 carbon dioxide.

4 territory.

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6C When the plants grow near to each other, the plants do **not** compete for . . .

1 prey.

2 water.

3 light.

4 space.

6D To help the fennec fox to lose heat, it has . . .

1 forward facing eyes.

2 camouflaged fur.

3 sharp claws.

4 large ears.

Turn over for the next question

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QUESTION SEVEN

The picture shows a crocodile.



7A The crocodile can keep most of its body underwater for a long time.

Which row in the table has ticks for all the features of the crocodile that help it to stay underwater for a long time?

	Nostrils at the tip of the nose	Sharp teeth	Transparent eyelids	Eyes at top of the head	Scaly skin
1	✓	✓	✓		
2				✓	✓
3		✓	✓		
4	✓		✓	✓	

Female crocodiles lay up to 80 eggs in a large nest on land and then cover the nest with vegetation. The vegetation rots and produces heat. The heat incubates the eggs.

Scientists investigated how the temperature at which the eggs are kept affects the sex of the young crocodile. The table below shows their results.

Temperature at which eggs are kept in °C	30.8	31.2	31.6	32.0	32.4
Percentage of eggs that hatch as males	14	48	88	42	16

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7B What pattern does the data show?

1 There is an ideal temperature for the eggs to hatch as males.

2 The lower the temperature of the eggs, the more eggs hatch as males.

3 The higher the temperature of the eggs, the more eggs hatch as males.

4 There is no relationship between temperature and the number of eggs that hatch as males.

7C Which is the best estimate of the percentage of eggs that would hatch as males if the eggs were kept at 31.0 °C?

1 30%

2 58%

3 70%

4 84%

7D Scientists predict that the temperature of the atmosphere will increase by up to 1 °C in the next 50 years.

What effect will a 1 °C increase have on the population of crocodiles?

1 no effect

2 decrease the percentage of eggs hatching as females

3 increase the total number of eggs hatching

4 we cannot tell from the data provided

Turn over for the next question

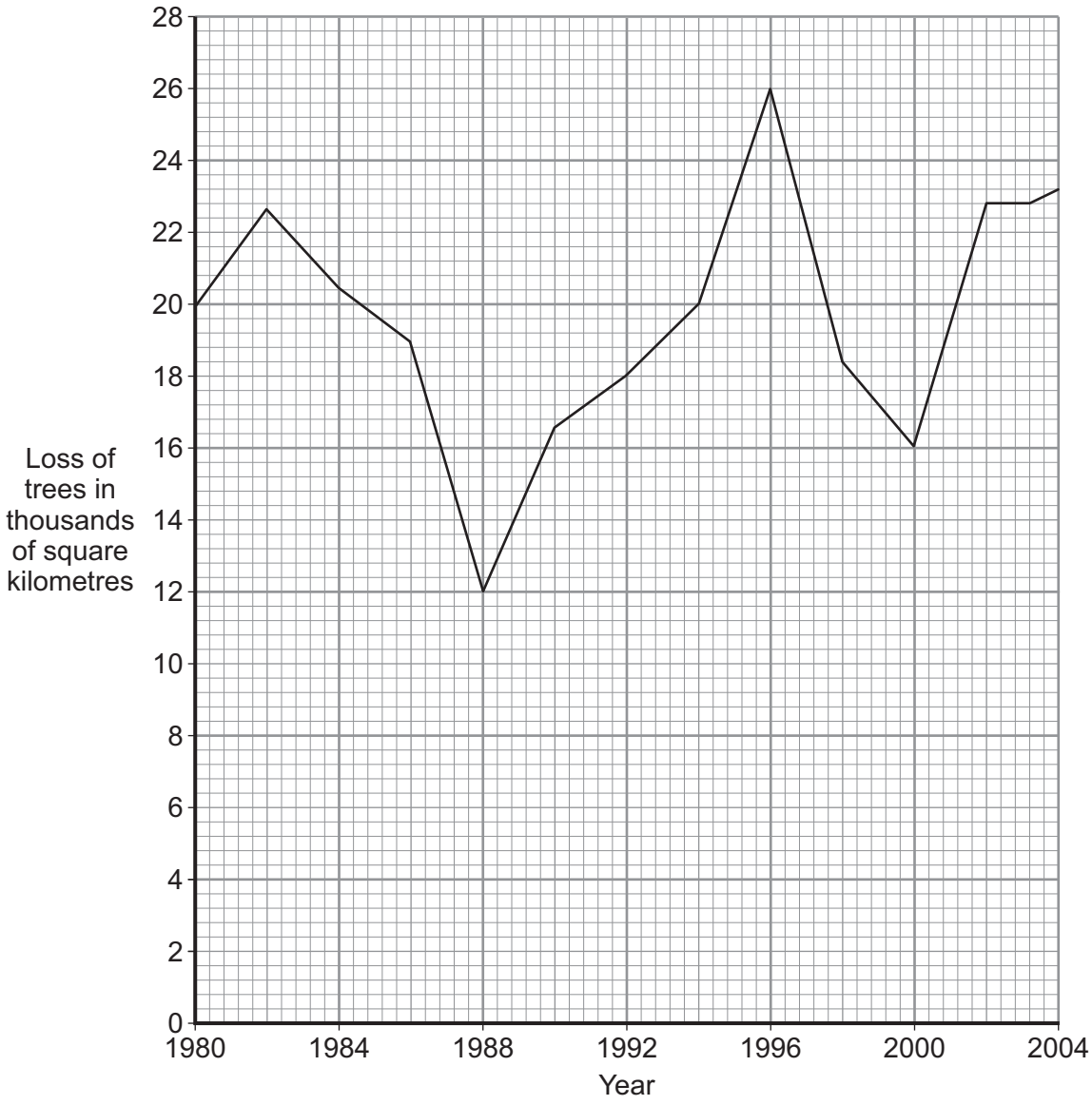
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QUESTION EIGHT

Deforestation is a concern for all of us.

The forests of Brazil are now much smaller than they used to be.

The graph shows the loss of trees from the Amazon rain forest from 1980 to 2004.



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8A In which year were most trees lost?

1 1982

2 1988

3 1996

4 2000

8B What was the loss of trees in 1988?

1 12 km^2

2 120 km^2

3 1 200 km^2

4 12 000 km^2

8C Most of the loss of trees from tropical rain forests has been due to . . .

1 using the land for agriculture.

2 removing the threat from wild animals.

3 opening up the area for tourism.

4 housing the population.

8D Forests are important for our planet because . . .

1 they remove acid rain from the atmosphere.

2 they release carbon dioxide to the atmosphere.

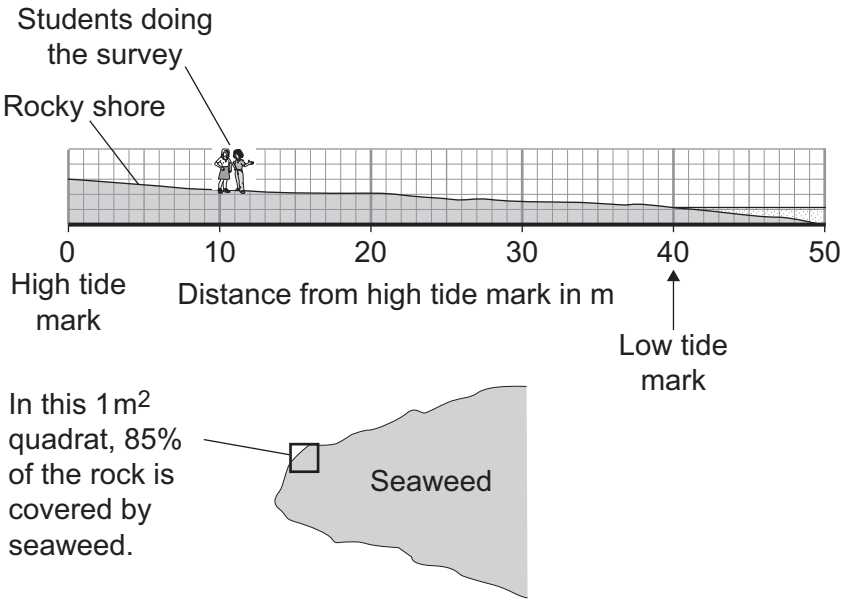
3 they radiate energy back into space.

4 large amounts of carbon are ‘locked-up’ in the trees.

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QUESTION NINE

A group of students did a survey on a rocky sea shore. The students were measuring the distribution of four different seaweeds down the whole shore. They used 1 metre square quadrats.
In each quadrat, they measured the percentage cover of each seaweed.



9A Which of the following sampling methods would provide the most reliable results?

1 sampling every 5 metres from the low tide mark to the high tide mark

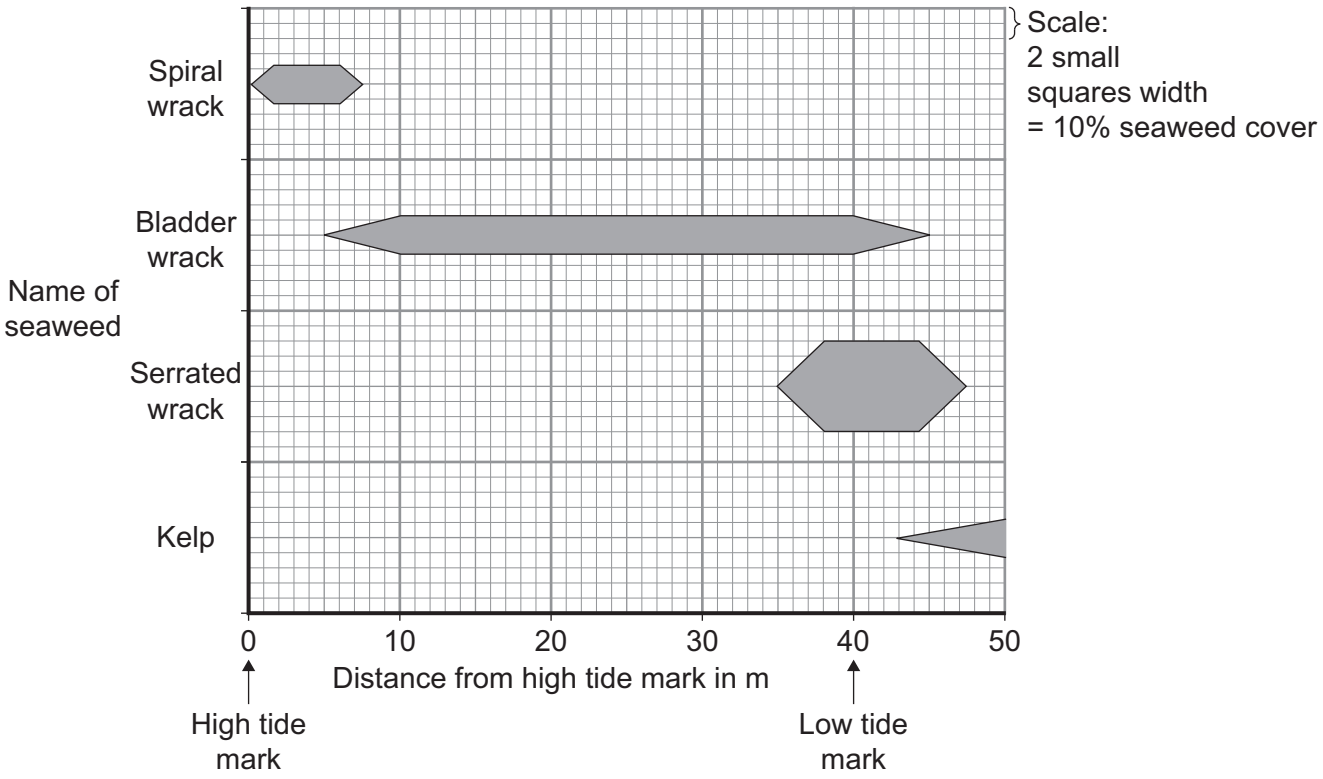
2 sampling every 1 metre from the low tide mark to the high tide mark

3 sampling every 1 metre from the high tide mark for 20 metres down the rocky shore

4 sampling every 5 metres from the low tide mark for 20 metres up the rocky shore

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The diagram shows the students' results.



9B What is the distribution range of bladder wrack on the rocky shore?

1 0 to 8 metres

2 5 to 45 metres

3 35 to 48 metres

4 43 to 50 metres

9C What is the percentage cover of serrated wrack at the low tide mark?

1 20

2 30

3 50

4 60

9D Which seaweed is probably able to survive the driest conditions?

1 Spiral wrack

2 Bladder wrack

3 Serrated wrack

4 Kelp

END OF TEST

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

Section One

Questions **ONE** and **TWO**.

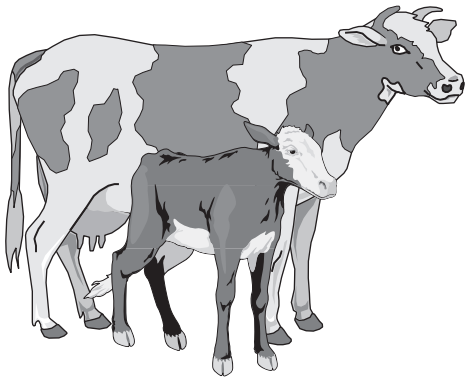
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer only **once**.

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QUESTION ONE

The drawing shows a cow and her calf.



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

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Calves can be cloned by splitting apart cells from . . . **4** . . . .

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QUESTION TWO

This question is about evolution.

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

A mutation

B natural selection

C extinction

D variation

Evolution happens because of . . . **1** . . . .

Evolution is a very slow process.

Individual organisms of a particular species have differences in their genes, so may show a wide . . . **2** . . . .

These organisms breed and pass on their genes to the next generation, and this passes on their useful characteristics.

More rapid change in a species may be because of . . . **3** . . . .

A new disease might cause . . . **4** . . . of the species.

Turn over for the next question

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Section Two

Questions **THREE** to **NINE**.

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In each part choose only **one** answer.

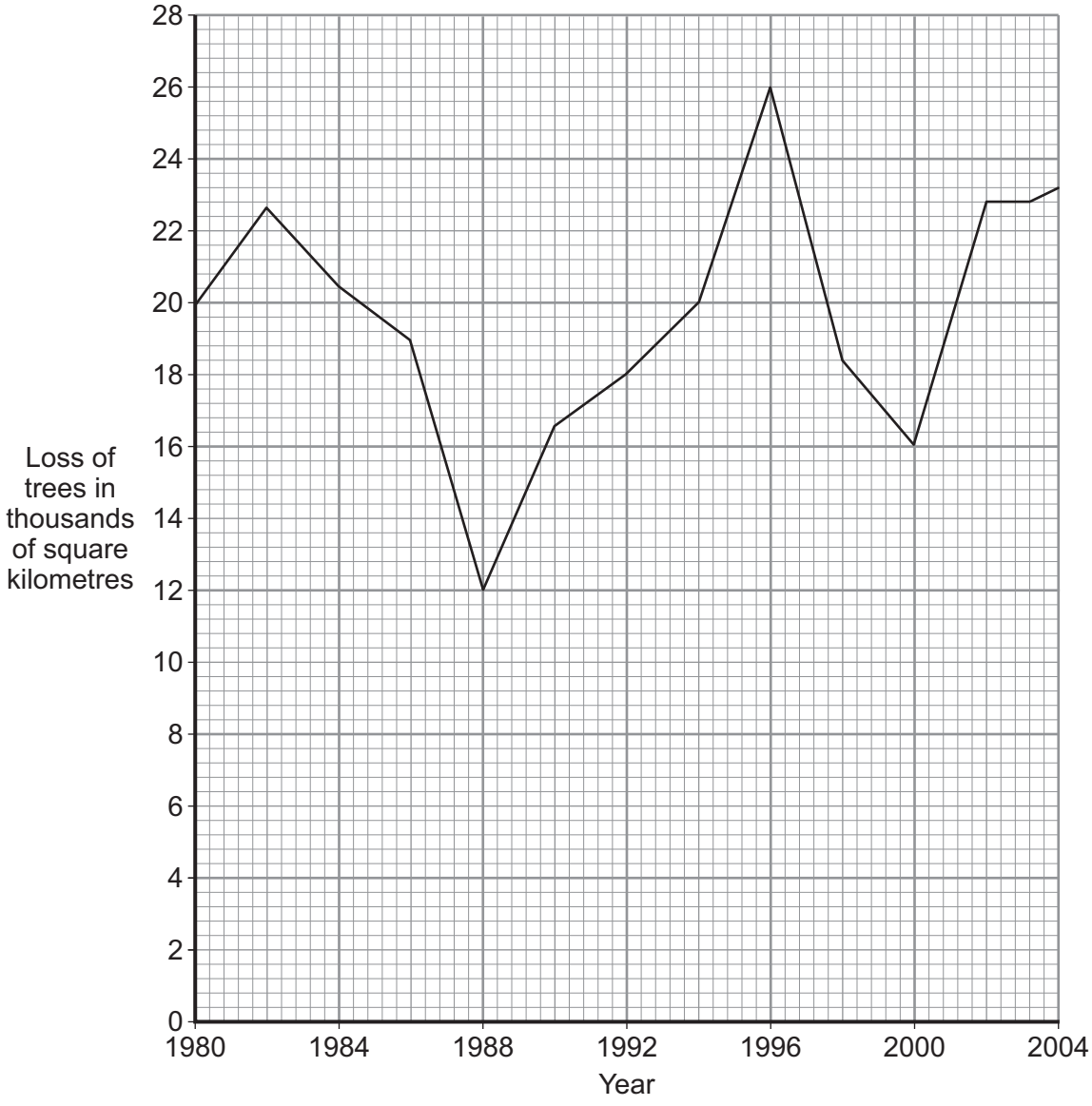
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QUESTION THREE

Deforestation is a concern for all of us.

The forests of Brazil are now much smaller than they used to be.

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3A In which year were most trees lost?

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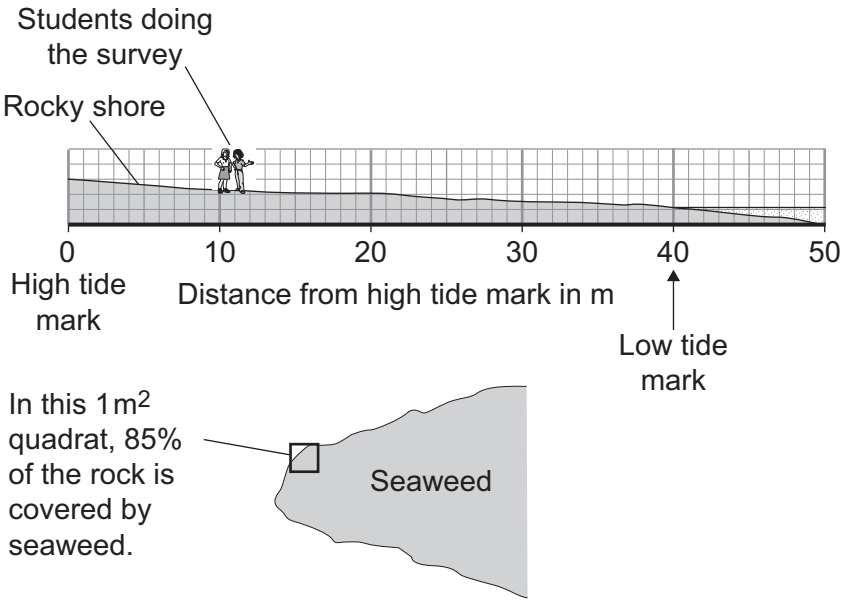
3 they radiate energy back into space.

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QUESTION FOUR

A group of students did a survey on a rocky sea shore. The students were measuring the distribution of four different seaweeds down the whole shore. They used 1 metre square quadrats.
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4A Which of the following sampling methods would provide the most reliable results?

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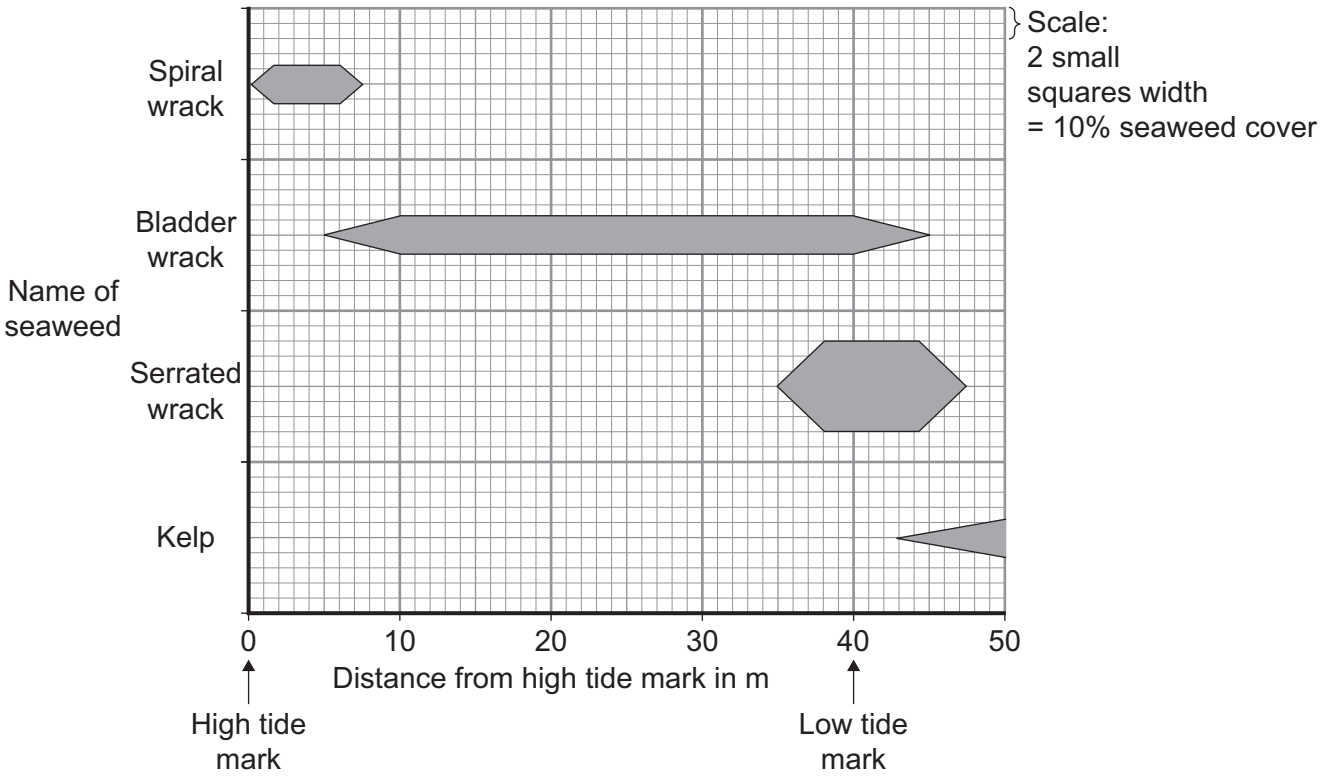
2 sampling every 1 metre from the low tide mark to the high tide mark

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2 30

3 50

4 60

4D Which seaweed is probably able to survive the driest conditions?

1 Spiral wrack

2 Bladder wrack

3 Serrated wrack

4 Kelp

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QUESTION FIVE

Corn borer insects damage corn crops. Genetically modified (GM) corn plants produce a poison. The poison kills the corn borer insects. Scientists say that corn borer insects will develop resistance to the poison in about 3 to 4 years.

5A The first GM corn plant was produced when genes from bacteria were inserted into the cells of an embryo corn plant.

These genes were 'cut out' from the bacteria using . . .

1 enzymes.

2 gametes.

3 hormones.

4 chromosomes.

5B One advantage of using GM corn plants rather than normal corn plants is that . . .

1 insects will become resistant.

2 biodiversity is reduced.

3 less money is spent on pesticides.

4 all the offspring will be identical.

5C One disadvantage of using GM corn plants is that . . .

1 the corn borer will pass the gene on to other insects.

2 all insects that feed on the corn will become resistant.

3 corn borer predators might become extinct.

4 the corn plants cannot be eaten.

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5D Which of the following best describes how the corn borer insects might become resistant to the poison?

1 A mutation in the corn plant allows the corn borer insects to eat the corn and survive to reproduce.

2 An enzyme is produced that breaks down the poison.

3 Resistant corn borer insects only mate with other resistant corn borer insects.

4 Some corn plants become resistant to the predators of the corn borer insect.

Turn over for the next question

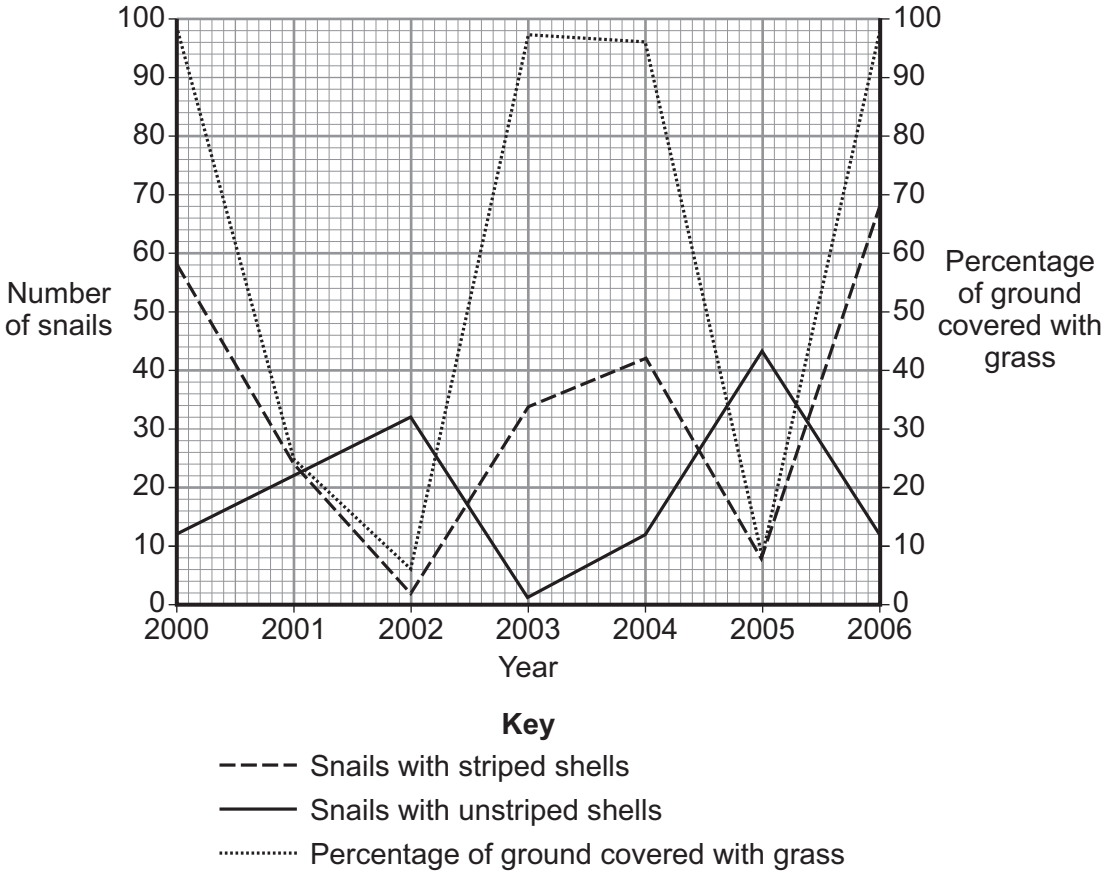
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QUESTION SIX

A scientist studied a population of snails living in grassland. Some of the snails had striped shells, the other snails had unstriped shells. Birds eat both types of snail.

The scientist counted the number of snails in the population in September each year for seven years. At the same time each year, she also estimated the area of ground covered with grass.

Her results are shown in the graph.



6A What was the difference between the numbers of snails with striped shells between 2002 and 2006?

1 20

2 35

3 56

4 66

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6B What percentage of all the snails counted in 2000 had unstriped shells?

1 12.0

2 17.1

3 20.6

4 48.3

6C Which is the best conclusion that can be made from the data?

1 Snails with striped shells are always more common than snails with unstriped shells.

2 When there is plenty of grass there are more snails with unstriped shells.

3 The total number of snails is directly proportional to the percentage of ground covered in grass.

4 There is a higher proportion of snails with striped shells when there is plenty of grass cover.

6D The results for the striped snails most probably depend on . . .

1 camouflage.

2 disease.

3 humidity.

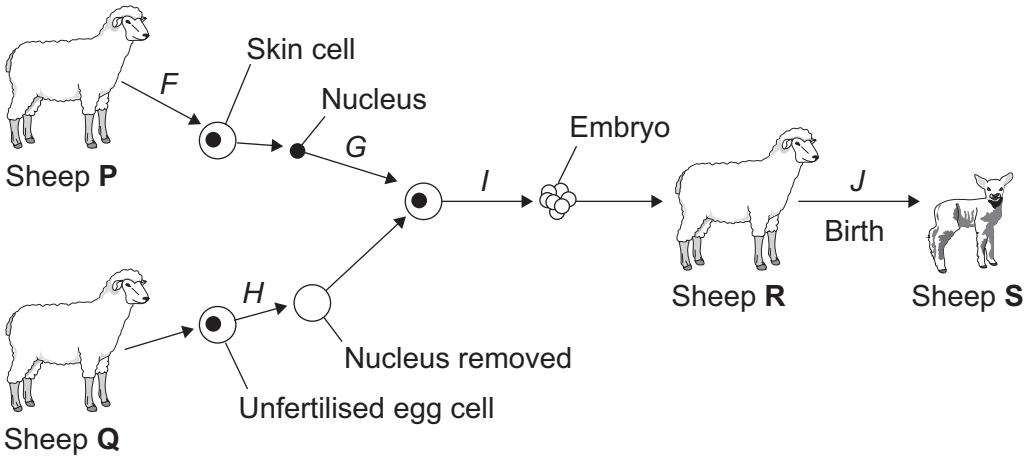
4 temperature.

Turn over for the next question

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QUESTION SEVEN

The diagram shows one way of producing sheep with the characteristics we prefer.



7A During this process, an electric shock is used in . . .

1 stage *F* only.

2 stage *G* and stage *H* only.

3 stage *I* only.

4 stage *I* and stage *J* only.

7B This method of producing sheep involves . . .

1 asexual reproduction.

2 sexual reproduction.

3 genes from two parents.

4 tissue culture.

7C Which sheep are genetically identical?

1 **P** and **R**

2 **Q** and **S**

3 **P** and **S**

4 **Q** and **P**

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7D This process is not carried out on humans because . . .

1 it is unethical to choose the characteristics for a human.

2 it is more expensive than treating women with hormones.

3 it would reduce the number of genes in the human population.

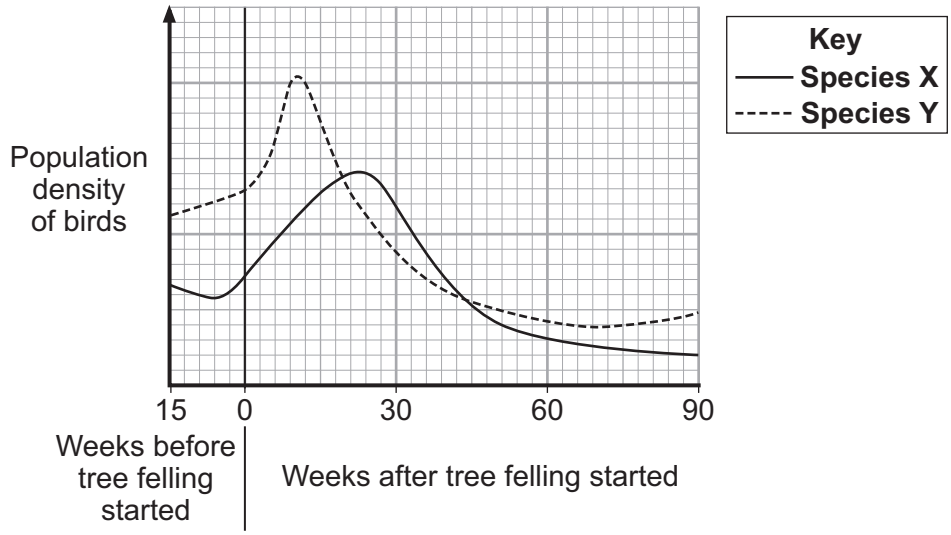
4 humans have more complicated genetic information than sheep.

Turn over for the next question

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QUESTION EIGHT

The graph shows the results of a survey into the effect of tree felling on the population density of two different species of bird, **X** and **Y**.



8A Which one of the following statements suggests that species **X** might be a predator of species **Y**?

1 The population density of species **X** is always lower than that of species **Y**.

2 The maximum population density of species **Y** reaches a peak 20 weeks before the population density of species **X** begins to decrease.

3 The maximum population density of species **X** occurs as the population density of species **Y** is decreasing.

4 A decrease in the population density of species **X** causes an increase in the population density of species **Y**.

8B The survey team concluded that tree felling caused a reduction in the population density of the birds.

What evidence in the graph supports this conclusion?

1 48 weeks after the start of tree felling, the population density of both species of bird was less than before the tree felling started.

2 72 weeks after the start of tree felling, the population density of species **Y** was less than half of its lowest population density before tree felling started.

3 The decrease in the population density of species **Y** occurs before that of species **X**.

4 The decrease in the population density of species **Y** was faster than that of species **X**.

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8C How might the data about the population density of the two species of bird have been collected in the area where the trees were being felled?

1 Every six weeks, count all the birds of both species for 24 hours over all the area where the trees are being felled.

2 Every six weeks, count all the nests of the birds of both species over all the area where the trees are being felled.

3 Put a numbered ring on all the birds of both species and record how many of these birds are caught and released every six weeks.

4 Mark out several smaller areas and count the number of birds of both species that are seen during a 24-hour period every six weeks.

8D What other evidence might be used to confirm the conclusions of the survey?

1 data from other surveys on the effects of tree felling on bird population densities

2 data from other surveys on the effects of tree felling on the plant population where the birds live

3 data from other surveys on the availability of the birds' food resources

4 data from other surveys on the breeding habits of birds

Turn over for the next question

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QUESTION NINE

The use of pesticides by farmers affects the environment.

The table gives the characteristics of some pesticides.

Pesticide	Relative leaching potential	Half-life in days	Relative toxicity to fish (LC_{50})	Toxicity to rats (LD_{50}) in mg per litre
Amdro	high	10	high	128
Cygon	medium	7	medium	6000
Dioxin	low	5	very high	0.0002
Diazinon	high	30	high	1202
Dursban	low	30	very high	230
Malathion	low	1	very high	5500
Orthene	low	3	very low	833
Sevin	low	10	medium	250
Storm	high	6	very high	0.25
Temik	high	12	very high	0.9

- Relative leaching potential is a measure of how quickly the pesticide passes through the soil into rivers.
- Half-life is the time taken for half of the pesticide to be broken down in the soil.
- Relative toxicity to fish (LC_{50}) is the concentration of the pesticide that will kill 50% of the fish tested.

  'Very high' means less than 0.1 mg pesticide per litre of solution.
- Toxicity to rats (LD_{50}) is the dose in mg that will kill 50% of the rats tested.

9A Many small mammals, such as mice, feed on crops grown in the fields.

Which one of the following pesticides, applied in the same concentration, is likely to have the greatest effect on the populations of these small mammals?

1 Cygon

2 Dioxin

3 Sevin

4 Storm

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9B The LD_{50} for Temik is 75 times greater for humans than for rats.

What is the LD_{50} of Temik for humans?

1 67.5

2 150

3 675

4 18750

9C A farmer grows crops close to a river that is popular with fishermen.

Which pesticide should he use on his crops in order to minimise the concentration of pesticides in the river water?

You should assume that all the pesticides are applied in the same concentration.

1 Amdro

2 Cygon

3 Malathion

4 Orthene

9D When using a pesticide, the majority of farmers are **least** likely to consider . . .

1 the cost of the pesticide.

2 the ease of application of the pesticide.

3 how the pesticide kills the pests.

4 the types of pests killed by the pesticide.

END OF TEST

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There are no questions printed on this page

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1BP, BL1BSF & BL1BSH

Mark Scheme

2012 Examination – November Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the students' responses.

Further copies of this Mark Scheme are available to download from aqa.org.uk

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

November 2012

Foundation Tier

Question	Key		
One	**A**	causes acid rain	**2**
	B	causes less carbon dioxide to be taken out of the atmosphere	**1**
	C	may pollute farmland with poisonous chemicals	**3**
	D	produces methane	**4**
Two	**A**	evolution	**4**
	B	mutation	**2**
	C	selection	**3**
	D	variation	**1**
Three	**A**	fish	**3**
	B	amphibians	**1**
	C	reptiles	**2**
	D	mammals	**4**
Four	**A**	Some heat energy escapes into space.	**3**
	B	Heat energy is re-radiated by greenhouse gases.	**4**
	C	Heat energy is radiated into the atmosphere.	**2**
	D	Solar radiation warms the Earth's surface.	**1**
Five	**A**	genes	**2**
	B	gametes	**3**
	C	embryos	**4**
	D	characteristics	**1**

	A	**B**	**C**	**D**
Six	**3**	**4**	**1**	**4**
Seven	**4**	**1**	**1**	**4**
Eight	**3**	**4**	**1**	**4**
Nine	**2**	**2**	**2**	**1**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

November 2012

Higher Tier

Question	Key		
One	**A**	genes	**2**
	B	gametes	**3**
	C	embryos	**4**
	D	characteristics	**1**
Two	**A**	mutation	**3**
	B	natural selection	**1**
	C	extinction	**4**
	D	variation	**2**

	A	B	C	D
Three	**3**	**4**	**1**	**4**
Four	**2**	**2**	**2**	**1**
Five	**1**	**3**	**3**	**2**
Six	**4**	**2**	**4**	**1**
Seven	**3**	**1**	**3**	**1**
Eight	**3**	**1**	**4**	**1**
Nine	**2**	**1**	**4**	**3**

The AQA UMS Conversion Calculator can be found at the following web address:

http://www.aqa.org.uk/umsconversion

GCSE SCIENCE

OTQ3

AQA

Unit : BLY1BP BIOLOGY UNIT 1B

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : BG12

06-NOV-12

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions ONE to NINE Choose one response 1 - 4 for each of the parts A - D

QUESTION ONE		1	2	3	4
1A	genes	○	○	○	○
1B	gametes	○	○	○	○
1C	embryos	○	○	○	○
1D	characteristics	○	○	○	○

QUESTION TWO		1	2	3	4
2A	mutation	○	○	○	○
2B	natural selection	○	○	○	○
2C	extinction	○	○	○	○
2D	variation	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A causes acid rain	○	○	○	○
1B causes less carbon dioxide to be taken out of atmosphere	○	○	○	○
1C may pollute farmland with poisonous chemicals	○	○	○	○
1D produces methane	○	○	○	○

QUESTION TWO	1	2	3	4
2A evolution	○	○	○	○
2B mutation	○	○	○	○
2C selection	○	○	○	○
2D variation	○	○	○	○

QUESTION THREE	1	2	3	4
3A fish	○	○	○	○
3B amphibians	○	○	○	○
3C reptiles	○	○	○	○
3D mammals	○	○	○	○

QUESTION FOUR	1	2	3	4
4A Some heat energy escapes into space.	○	○	○	○
4B Heat energy is re-radiated by greenhouse gases.	○	○	○	○
4C Heat energy is radiated into the atmosphere.	○	○	○	○
4D Solar radiation warms the Earth's surface.	○	○	○	○

QUESTION FIVE	1	2	3	4
5A genes	○	○	○	○
5B gametes	○	○	○	○
5C embryos	○	○	○	○
5D characteristics	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
June 2012

Science A

Unit Biology B1b (Evolution and Environment)

Biology

Unit Biology B1b (Evolution and Environment)

BLY1BP

F&H

Friday 22 June 2012 Afternoon Session

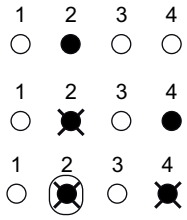
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed
- 30 minutes

Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1b' printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

Section One

Questions **ONE** to **FIVE**.

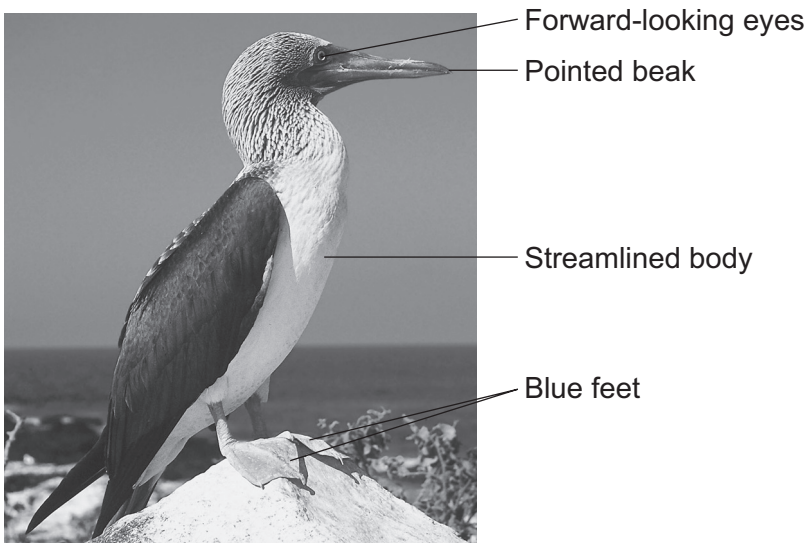
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

The male blue-footed booby dives into the sea to catch fish.



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

A blue feet

B forward-looking eyes

C pointed beak

D streamlined body

	Helps to . . .
1	spear fish
2	allow the bird to enter the sea smoothly
3	judge the distance of fish under the surface of the sea
4	attract females for mating

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QUESTION TWO

Animals and plants sometimes compete for resources.

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

A food

B light

C water

D mates

In order to grow, animals compete for . . . **1** . . . .

Tall plants compete better than short plants for . . . **2** . . . .

In order to grow, plants use their roots to take up . . . **3** . . . .

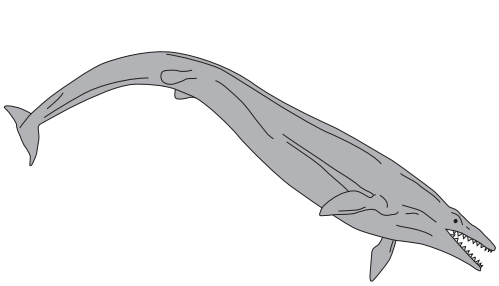
Animals defend their territories so that it is easier to attract . . . **4** . . . .

Turn over for the next question

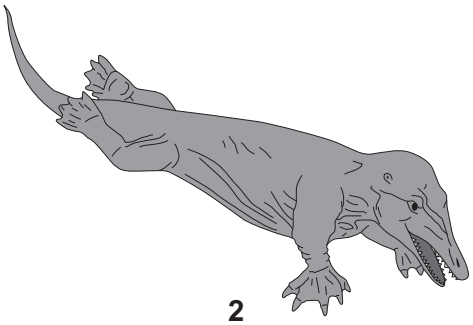
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QUESTION THREE

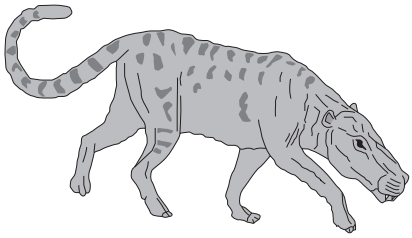
The diagrams show extinct ancestors of the whale.



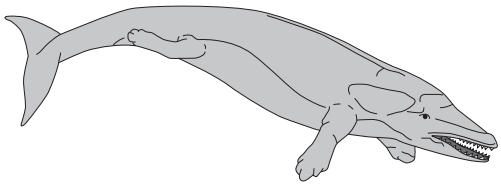
1



2



3



4

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

A the animal that lived only on land

B the animal that lived both on land and in water

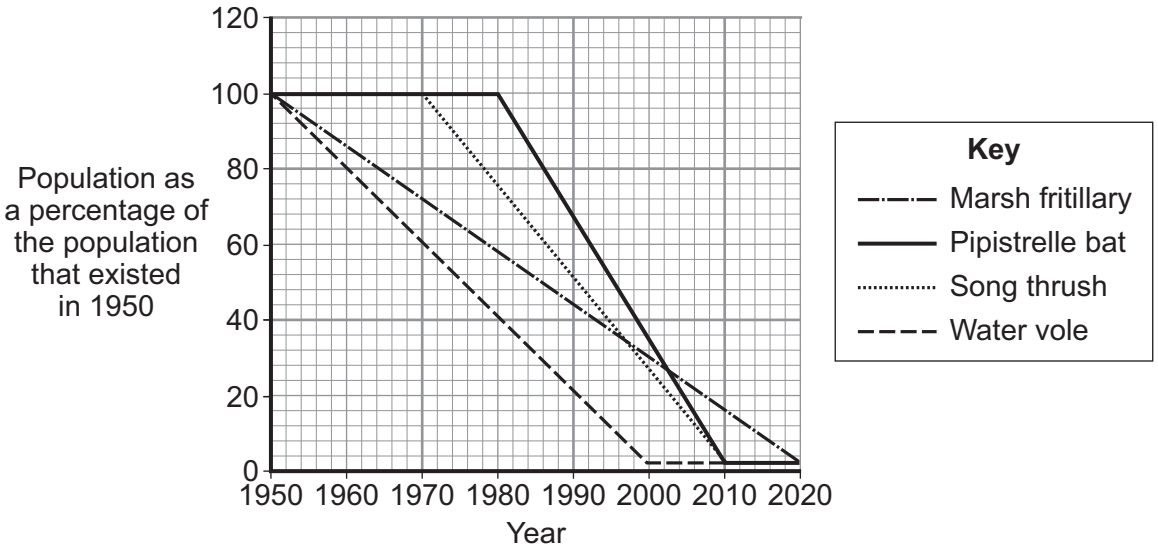
C the animal with the largest tail fin

D the animal whose limbs have almost disappeared

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QUESTION FOUR

The graph shows the changes in the population of four endangered species in the UK.
The graph also shows expected changes in the population of the four endangered species.



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

A Marsh fritillary

B Pipistrelle bat

C Song thrush

D Water vole

1	the first organism to become almost extinct
2	the organism whose population first began to decrease in 1970
3	the organism that is not expected to be almost extinct until 2020
4	the organism whose population decreased at the fastest rate

Turn over for the next question

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QUESTION FIVE

Farms may pollute the environment.

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

A carbon dioxide

B fertiliser

C pesticide

D sewage

	Feature
1	spread on land to help crop growth
2	chemical sprayed on crops to kill insects
3	produced by tractors
4	pollutes river water directly

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Turn over for the next question

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Section Two

Questions **SIX** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION SIX

The picture shows a forest being cleared so that rice can be grown.
The trees are chopped down and then burned.



6A Burning the trees mainly gives off the gas . . .

1 carbon dioxide.

2 oxygen.

3 methane.

4 sulfur dioxide.

6B Which gas in the atmosphere increases in concentration when rice is grown?

1 carbon dioxide

2 carbon monoxide

3 methane

4 sulfur dioxide

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6C Deforestation reduces . . .

1 the temperature of the atmosphere.

2 the amount of acid rain.

3 the amount of non-renewable energy resources.

4 the number of species of animals and plants.

6D We can reduce deforestation by recycling . . .

1 glass.

2 metal.

3 paper.

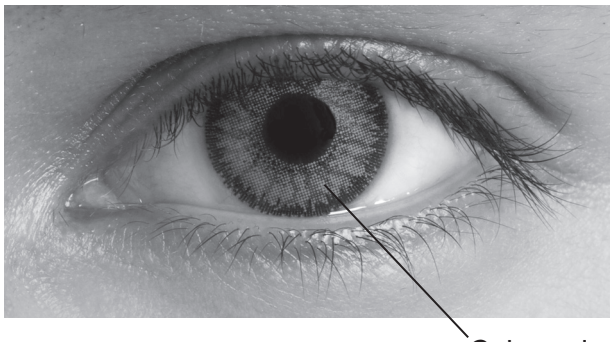
4 plastic.

Turn over for the next question

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QUESTION SEVEN

This question is about how eye colour is inherited in humans.



7A Eye colour in humans is controlled by . . .

1 a cell.

2 a gamete.

3 a gene.

4 a nucleus.

7B The genetic information for eye colour in humans is passed onto offspring during . . .

1 asexual reproduction.

2 cloning.

3 sexual reproduction.

4 tissue culture.

7C The eye colour of a human baby may be different from the eye colour of its parents.

This difference is known as . . .

1 characteristics.

2 cloning.

3 genetic engineering.

4 variation.

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7D Scientists now have the technology to change the eye colour of a human embryo when the embryo is in the early stages of development.

This technology is not allowed in the UK because . . .

1 the technology is too expensive.

2 too many parents would choose to have blue-eyed babies.

3 the technology can be done in other countries for us.

4 there are ethical issues about changing human genes.

Turn over for the next question

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QUESTION EIGHT

There are two varieties of the violet plant: 'shade-loving' violets and 'sun-loving' violets.

The number of each type of violet growing in a wooded area was counted:

- before the trees were removed
- at different times after the trees were removed.

8A The number of violets was surveyed using quadrats.

Which is the best way to use quadrats to estimate the number of violets?

1 place a quadrat carefully once in the area with the most violets

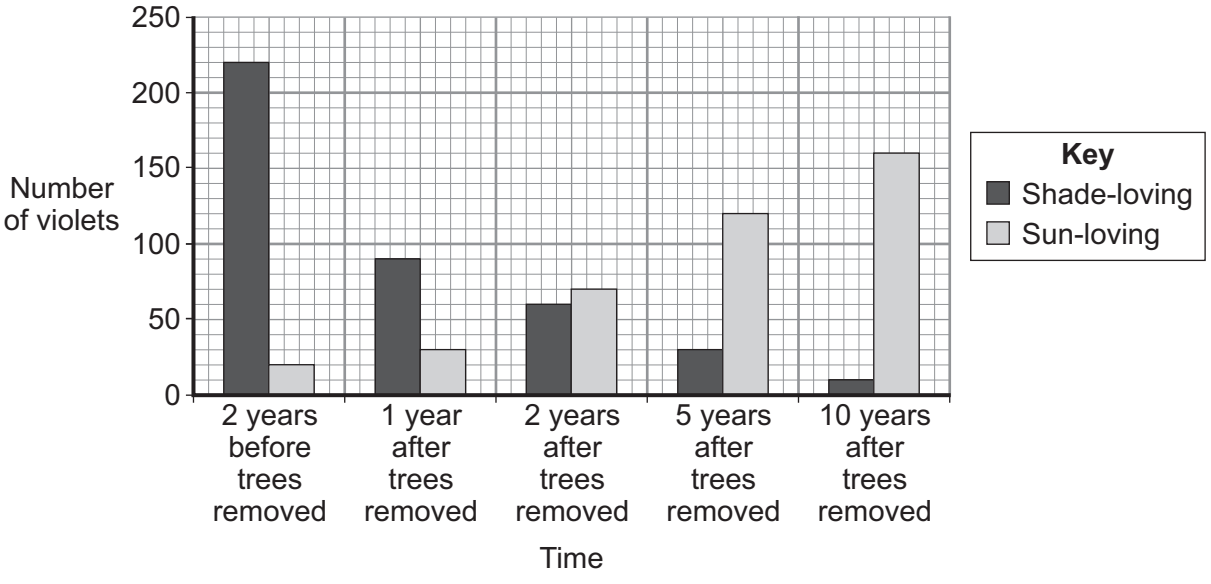
2 place a quadrat carefully in several areas with the most violets

3 place a quadrat randomly once anywhere in the wood

4 place several quadrats randomly anywhere in the wood

The results of the survey are shown in the table and the bar chart.

Type of violet	2 years before trees removed	1 year after trees removed	2 years after trees removed	5 years after trees removed	10 years after trees removed
Shade-loving	220	90	60	30	10
Sun-loving	20	30	70	120	160



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8B How long after the trees were removed was there the smallest **total** number of violets in the wood?

1 1 year

2 2 years

3 5 years

4 10 years

8C Which pattern describes the change in the violet population in the area over the 12 years?

1 an increase in shade-loving violets and an increase in sun-loving violets

2 a decrease in shade-loving violets and an increase in sun-loving violets

3 an increase in the total number of violets

4 an increase, then a decrease in the total number of violets

8D What would be the most likely result if trees were allowed to regrow in the area?

1 an increased proportion of shade-loving violets

2 a decrease in the total number of violets

3 an increased number of sun-loving violets

4 a decreased number of shade-loving violets

Turn over for the next question

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QUESTION NINE

The photograph shows a snake eating a cane toad.



Cane toads were first introduced into Australia in 1935. The toads contain toxins and most species of Australian snake die after eating the toad.

The cane toad toxin does not affect all snakes in the same way. The cane toad toxin has less effect on longer snakes.

Scientists investigated how red-bellied black snakes had changed in the 70 years since cane toads were introduced. The scientists found that red-bellied black snakes had become about 5 % longer.

This increase in length is an example of natural selection.

9A The increase in the length of the red-bellied black snakes over the past 70 years is a result of . . .

1 changes in the temperature of the environment.

2 fewer competitors.

3 more food.

4 mutations.

9B The longer red-bellied black snakes . . .

1 have learned not to eat cane toads.

2 are more likely to survive after eating cane toads.

3 can feed on a wider range of species.

4 have caused an increase in the number of cane toads.

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9C The longer red-bellied black snakes . . .

1 are more likely to become extinct.

2 are less easy for predators to see.

3 are more likely to survive to breed.

4 are less affected by changes in the environment.

9D The offspring of the longer red-bellied black snakes . . .

1 will have the gene responsible for growing longer.

2 will be more affected by the cane toad toxin.

3 will avoid eating cane toads.

4 will mutate to become longer.

END OF TEST

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

Section One

Questions **ONE** and **TWO**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

Farms may pollute the environment.

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

A carbon dioxide

B fertiliser

C pesticide

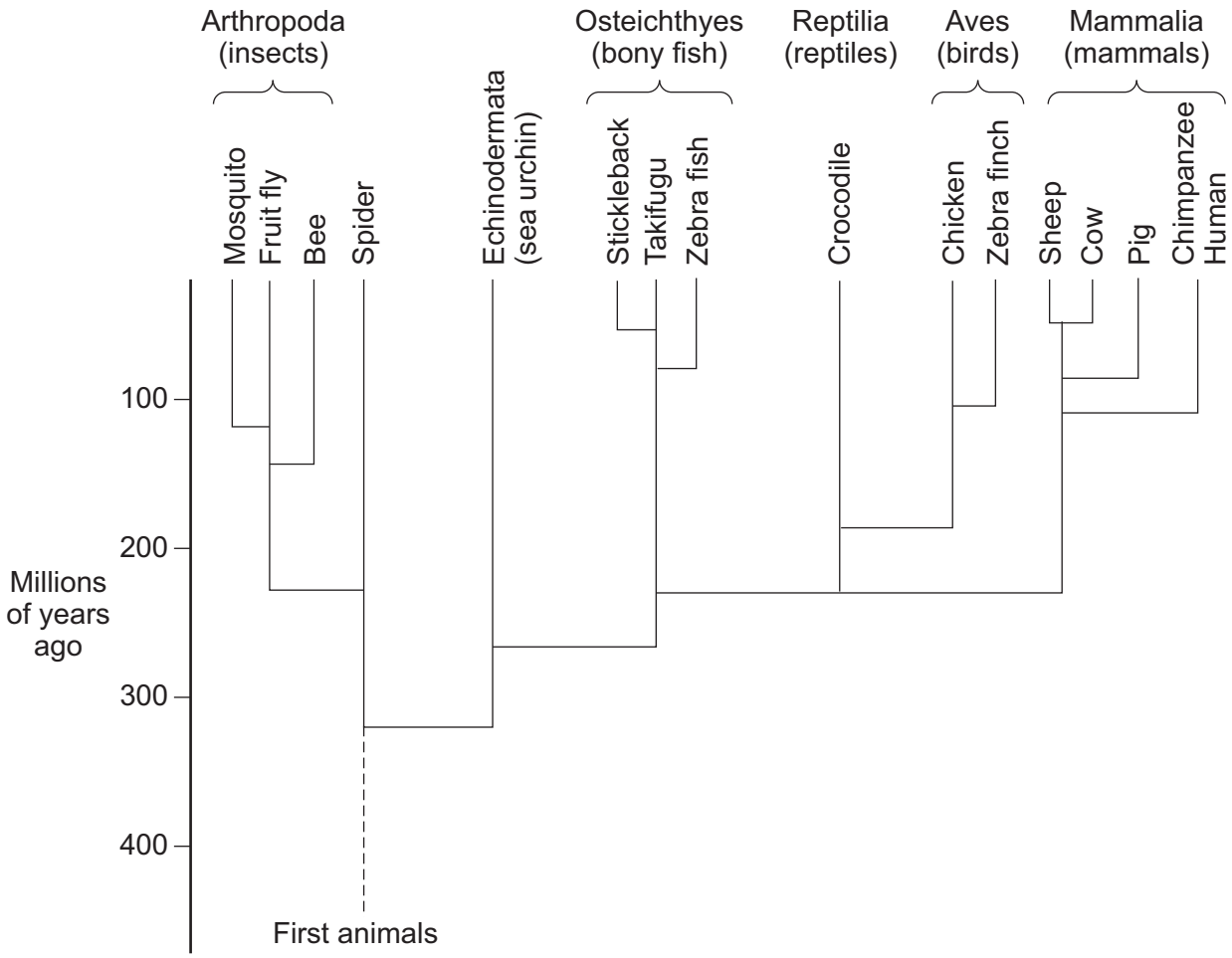
D sewage

	Feature
1	spread on land to help crop growth
2	chemical sprayed on crops to kill insects
3	produced by tractors
4	pollutes river water directly

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QUESTION TWO

The diagram shows an evolutionary tree for some groups of animals.



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

A Mosquito

B Reptilia

C Osteichthyes

D Echinodermata

1	the first group to evolve
2	the group most closely related to Aves
3	the last of the Arthropoda to evolve
4	the group that evolved 265 million years ago

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Section Two

Questions **THREE** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION THREE

There are two varieties of the violet plant: 'shade-loving' violets and 'sun-loving' violets.

The number of each type of violet growing in a wooded area was counted:

- before the trees were removed
- at different times after the trees were removed.

3A The number of violets was surveyed using quadrats.

Which is the best way to use quadrats to estimate the number of violets?

1 place a quadrat carefully once in the area with the most violets

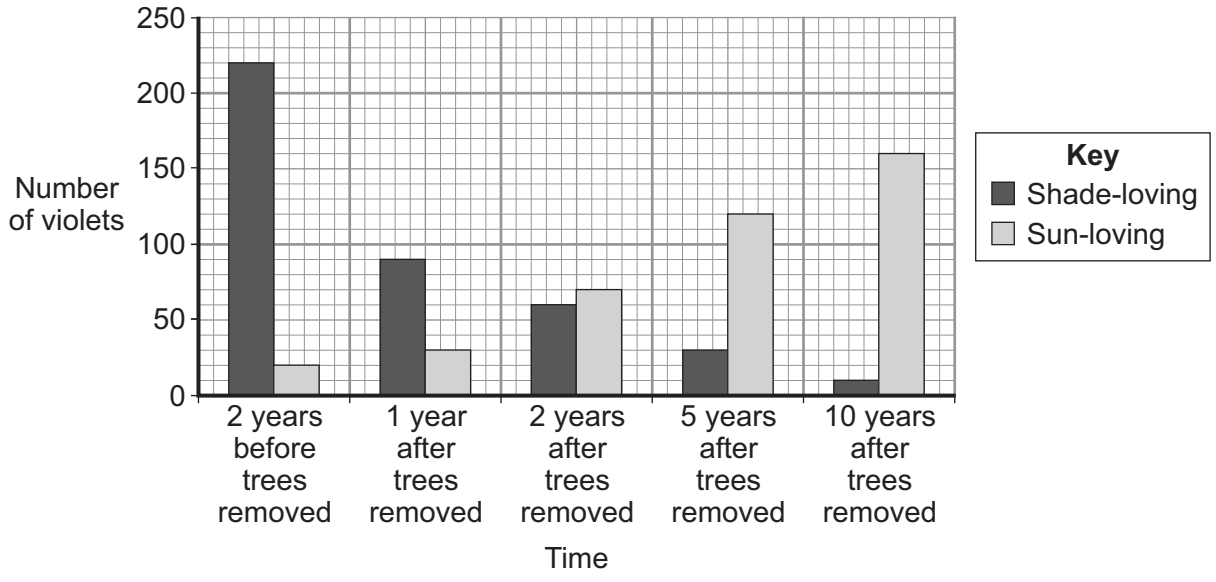
2 place a quadrat carefully in several areas with the most violets

3 place a quadrat randomly once anywhere in the wood

4 place several quadrats randomly anywhere in the wood

The results of the survey are shown in the table and the bar chart.

Type of violet	2 years before trees removed	1 year after trees removed	2 years after trees removed	5 years after trees removed	10 years after trees removed
Shade-loving	220	90	60	30	10
Sun-loving	20	30	70	120	160



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3B How long after the trees were removed was there the smallest **total** number of violets in the wood?

1 1 year

2 2 years

3 5 years

4 10 years

3C Which pattern describes the change in the violet population in the area over the 12 years?

1 an increase in shade-loving violets and an increase in sun-loving violets

2 a decrease in shade-loving violets and an increase in sun-loving violets

3 an increase in the total number of violets

4 an increase, then a decrease in the total number of violets

3D What would be the most likely result if trees were allowed to regrow in the area?

1 an increased proportion of shade-loving violets

2 a decrease in the total number of violets

3 an increased number of sun-loving violets

4 a decreased number of shade-loving violets

Turn over for the next question

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QUESTION FOUR

The photograph shows a snake eating a cane toad.



Cane toads were first introduced into Australia in 1935. The toads contain toxins and most species of Australian snake die after eating the toad.

The cane toad toxin does not affect all snakes in the same way. The cane toad toxin has less effect on longer snakes.

Scientists investigated how red-bellied black snakes had changed in the 70 years since cane toads were introduced. The scientists found that red-bellied black snakes had become about 5 % longer.

This increase in length is an example of natural selection.

4A The increase in the length of the red-bellied black snakes over the past 70 years is a result of . . .

1 changes in the temperature of the environment.

2 fewer competitors.

3 more food.

4 mutations.

4B The longer red-bellied black snakes . . .

1 have learned not to eat cane toads.

2 are more likely to survive after eating cane toads.

3 can feed on a wider range of species.

4 have caused an increase in the number of cane toads.

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4C The longer red-bellied black snakes . . .

1 are more likely to become extinct.

2 are less easy for predators to see.

3 are more likely to survive to breed.

4 are less affected by changes in the environment.

4D The offspring of the longer red-bellied black snakes . . .

1 will have the gene responsible for growing longer.

2 will be more affected by the cane toad toxin.

3 will avoid eating cane toads.

4 will mutate to become longer.

Turn over for the next question

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QUESTION FIVE

Alice ate a very tasty apple from a tree in her garden. She decided to grow some more apple trees from the seeds that she found in the apple.

She planted the seeds in the same part of her garden.

She was very disappointed to find that the apples did not taste like the apple she had eaten.

5A The apple seeds that Alice planted were produced after the fusion of gametes.

This process is known as . . .

1 cloning.

2 asexual reproduction.

3 genetic engineering.

4 sexual reproduction.

5B Why did Alice's apple trees produce apples with a different taste?

1 Her apple trees received different amounts of light.

2 Her apple trees received different combinations of genes.

3 Her apple trees received different amounts of minerals from the soil.

4 Her apple trees were all clones of the original apple tree.

5C What is the advantage to apple trees of producing offspring that are **not** identical to their parents?

1 They may produce apples which will not be eaten.

2 They may produce offspring that will grow well in the same environmental conditions as the parents.

3 They may produce some offspring that are able to survive better in changing environmental conditions.

4 They will produce offspring which will not compete with the parent trees.

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5D What would be the quickest and cheapest way of growing trees that always produce the same types of apple as a parent?

1 breeding the parent tree with a different type of apple tree

2 taking cuttings from the original tree

3 using genetic engineering techniques

4 using tissue culture methods

Turn over for the next question

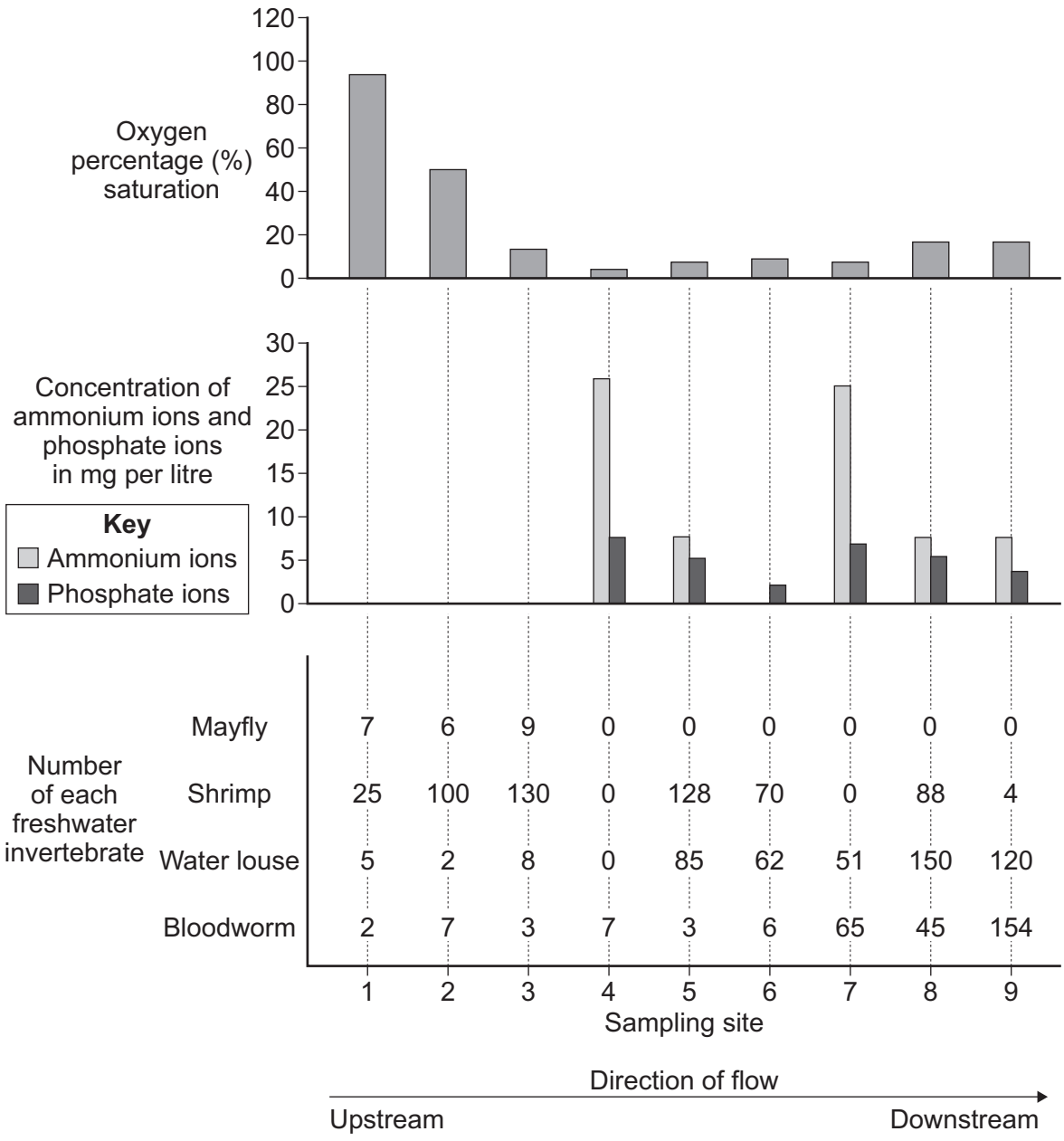
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QUESTION SIX

Scientists investigated the following values at nine sites along a river:

- the percentage saturation of oxygen in the water
- the concentration of ammonium ions and phosphate ions from fertilisers
- the numbers of four different freshwater invertebrate species.

The scientists' results are shown in the charts.



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6A Which freshwater invertebrate can survive in water with the lowest saturation of oxygen?

1 bloodworm

2 mayfly

3 shrimp

4 water louse

6B Which freshwater invertebrate is the best indicator of a high concentration of ammonium ions?

1 mayfly, because only a high ammonium concentration kills mayflies

2 shrimp, because the only place shrimps are not found is in a high concentration of ammonium ions

3 water louse, because there are more water lice in places with a high ammonium ion concentration

4 bloodworm, because there are more bloodworms in a low oxygen saturation

Decomposition causes low oxygen saturation.

6C When sewage enters a river, microorganisms multiply and lower the percentage saturation of oxygen in the water.

What evidence supports the hypothesis that after site 3, sewage pollutes the water?

There is a change, downstream of site 3, in the number of . . .

1 bloodworms.

2 mayflies.

3 shrimps.

4 water lice.

6D No water lice were found at site 4.

This could have been because of . . .

1 a random error.

2 a systematic error.

3 not enough accuracy.

4 not enough sensitivity.

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QUESTION SEVEN

Read the information about co-evolution. Co-evolution happens when two species evolve in response to each other.

In most of the Rocky Mountains, red squirrels eat pine cones. Red squirrels collect pine cones from the trees and store the cones through the winter. Pine trees have evolved a defence method against squirrels. In areas with large numbers of squirrels, pine trees have much wider, heavier cones. Squirrels find it difficult to eat these heavy cones.

In a few isolated areas, there are no red squirrels. Here, crossbill birds feed on pine seeds. In these isolated areas, the pine trees have evolved light, narrow cones. Crossbills have more difficulty getting seeds from these light, narrow cones. However, some crossbills have evolved shorter, less curved beaks. These shorter, less curved beaks are adapted for getting seeds from the light, narrow cones.

The photographs show the two types of pine cone.



Heavy, wide cone



Light, narrow cone

7A Some scientists think that the above data might indicate co-evolution.

What the scientists think is an example of . . .

1 a conclusion.

2 a hypothesis.

3 an observation.

4 a prediction.

7B Evolution might occur when . . .

1 organisms decide to change their characteristics.

2 organisms decide to mutate.

3 organisms mutate in response to the environment.

4 mutations occur spontaneously.

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The scientists surveyed pine tree habitats.

They found that where squirrels are the main feeders on pine cones, the trees have stronger defences against squirrels.

Where crossbills are the main feeders on pine seeds, the trees have stronger defences against crossbills.

7C The results of the survey . . .

1 prove the theory of natural selection.

2 show that acquired characteristics are inherited.

3 provide evidence for co-evolution.

4 show that squirrels have caused crossbills to evolve.

7D From the data in this question, the scientists would expect . . .

1 the differences between the two types of pine cone to become greater.

2 the differences between the two types of pine cone to become fewer.

3 the pine cones to stay the same mass and shape as they are now.

4 evolution of the pine cones to speed up.

Turn over for the next question

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QUESTION EIGHT

Human cloning is not allowed.

8A The process of cloning involves . . .

1 asexual reproduction.

2 fertilisation.

3 fusion of egg and sperm cells.

4 sexual reproduction.

8B Which of the following statements describes a human clone produced by natural processes?

1 two female gametes fertilised at the same time by two different male gametes

2 one female gamete fertilised by one male gamete and the resulting embryo splitting into two separate embryos

3 the nucleus of an egg cell being replaced by the nucleus of an adult cell

4 a developing embryo split into a number of cells and allowed to develop in host mothers

8C By which process might a human male be cloned?

1 The nucleus of an embryo cell is replaced by the nucleus of the human male gamete.

2 The nucleus of a female gamete is replaced by the nucleus of a human male body cell.

3 The nucleus of an egg cell is fused with the nucleus of the human male gamete.

4 The nucleus of a human male body cell is fused with the nucleus of a female gamete.

8D Humans could be cloned in the same ways in which animals are cloned.

Which of the following is an ethical issue concerned with cloning humans?

1 The processes now used in animal cloning can be dangerous for the cloned animals.

2 There is a high risk of injury to host mothers in carrying the cloned embryos.

3 Scientists employed by commercial cloning companies do not publish their research.

4 A human child created by cloning would not be able to give permission for the cloning.

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Turn over for the next question

QUESTION NINE

Read the information about genetic engineering.

> The practice of genetically modifying food plants by adding genes for different characteristics may be a disaster in the making.
>
> Scientists are able to add genes to crop plants. These genes are for herbicide resistance, insecticide production and vitamin A production.
>
> There is some evidence that some varieties of butterflies are disappearing, possibly because of eating pollen from genetically modified (GM) crops. There are also fears that genes may escape from the organisms in which the genes were placed by cross-breeding, creating 'super weeds' that cannot be killed.
>
> The possible danger of eating GM foods is another worry. This could be a danger to animals and humans. The genes in GM foods may react in the body and cause long term effects not known at the moment.

9A Which of the following techniques is used to produce large numbers of identical genetically modified plants?

1 artificial cross-breeding of the plants

2 embryo transplants

3 tissue culture

4 transferring wanted genes to developing plant cells

9B Which of the following genetic modifications is of direct benefit to human health?

1 herbicide resistance

2 insecticide resistance

3 vitamin A production

4 production of different varieties of crop plants

9C Which of the following concerns is supported by scientific evidence?

1 Crops will become weeds and overgrow the environment.

2 Humans will be harmed by eating genetically modified foods.

3 Pesticides will not be able to kill 'super weeds'.

4 Some types of butterfly will disappear.

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9D A scientist wants to find out whether a gene for herbicide resistance has transferred into weed plants.

The best way to investigate this would be to . . .

1 cross-breed GM herbicide resistant crop plants with weeds.

2 collect weeds from a number of different environments and study their genes.

3 measure the height of weeds from where the GM crops are grown.

4 grow the seeds from weeds growing near to GM crops, and spray the plants that grow from the seeds with herbicide.

END OF TEST

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There are no questions printed on this page

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1BP, BL1BSF & BL1BSH

Mark Scheme

2012 Examination – June Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the students' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

June 2012

Foundation Tier

Question	Key		
One	**A**	blue feet	**4**
	B	forward-looking eyes	**3**
	C	pointed beak	**1**
	D	streamlined body	**2**
Two	**A**	food	**1**
	B	light	**2**
	C	water	**3**
	D	mates	**4**
Three	**A**	the animal that lived only on land	**3**
	B	the animal that lived both on land and in water	**2**
	C	the animal with the largest tail fin	**4**
	D	the animal whose limbs have almost disappeared	**1**
Four	**A**	Marsh fritillary	**3**
	B	Pipistrelle bat	**4**
	C	Song thrush	**2**
	D	Water vole	**1**
Five	**A**	carbon dioxide	**3**
	B	fertiliser	**1**
	C	pesticide	**2**
	D	sewage	**4**

	A	**B**	**C**	**D**
Six	**1**	**3**	**4**	**3**
Seven	**3**	**3**	**4**	**4**
Eight	**4**	**1**	**2**	**1**
Nine	**4**	**2**	**3**	**1**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

June 2012

Higher Tier

Question	Key		
One	**A**	carbon dioxide	**3**
	B	fertiliser	**1**
	C	pesticide	**2**
	D	sewage	**4**
Two	**A**	Mosquito	**3**
	B	Reptilia	**2**
	C	Osteichthyes	**4**
	D	Echinodermata	**1**

	A	B	C	D
Three	**4**	**1**	**2**	**1**
Four	**4**	**2**	**3**	**1**
Five	**4**	**2**	**3**	**2**
Six	**1**	**2**	**2**	**1**
Seven	**2**	**4**	**3**	**1**
Eight	**1**	**2**	**2**	**4**
Nine	**3**	**3**	**4**	**4**

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AQA

Unit : BLY1BP BIOLOGY UNIT 1B

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 6M12

22-JUN-12

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	carbon dioxide	○	○	○	○
1B	fertiliser	○	○	○	○
1C	pesticide	○	○	○	○
1D	sewage	○	○	○	○

QUESTION TWO		1	2	3	4
2A	Mosquito	○	○	○	○
2B	Reptilia	○	○	○	○
2C	Osteichthyes	○	○	○	○
2D	Echinodermata	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A blue feet	○	○	○	○
1B forward-looking eyes	○	○	○	○
1C pointed beak	○	○	○	○
1D streamlined body	○	○	○	○

QUESTION TWO	1	2	3	4
2A food	○	○	○	○
2B light	○	○	○	○
2C water	○	○	○	○
2D mates	○	○	○	○

QUESTION THREE	1	2	3	4
3A the animal that lived only on land	○	○	○	○
3B the animal that lived both on land and in water	○	○	○	○
3C the animal with the largest tail fin	○	○	○	○
3D the animal whose limbs have almost disappeared	○	○	○	○

QUESTION FOUR	1	2	3	4
4A Marsh fritillary	○	○	○	○
4B Pipistrelle bat	○	○	○	○
4C Song thrush	○	○	○	○
4D Water vole	○	○	○	○

QUESTION FIVE	1	2	3	4
5A carbon dioxide	○	○	○	○
5B fertiliser	○	○	○	○
5C pesticide	○	○	○	○
5D sewage	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
March 2012

Science A

Unit Biology B1b (Evolution and Environment)

Biology

Unit Biology B1b (Evolution and Environment)

BLY1BP

F&H

Thursday 1 March 2012 Morning Session

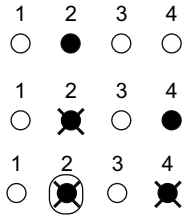
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed
- 30 minutes

Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1b' printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

Section One

Questions **ONE** to **FIVE**.

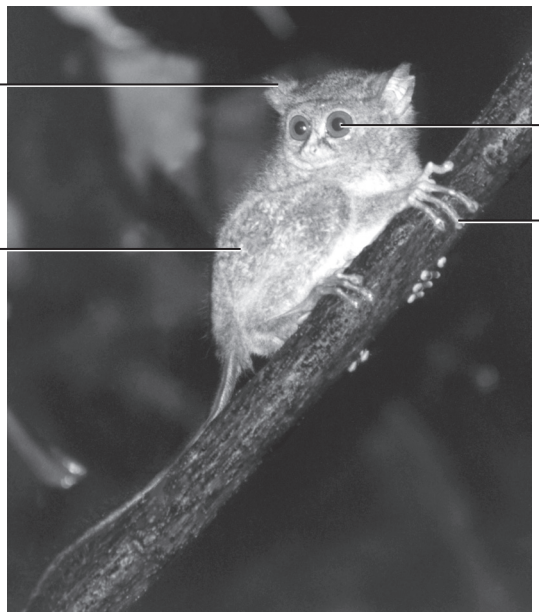
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

The photograph shows a tarsier. Tarsiers eat insects at night.



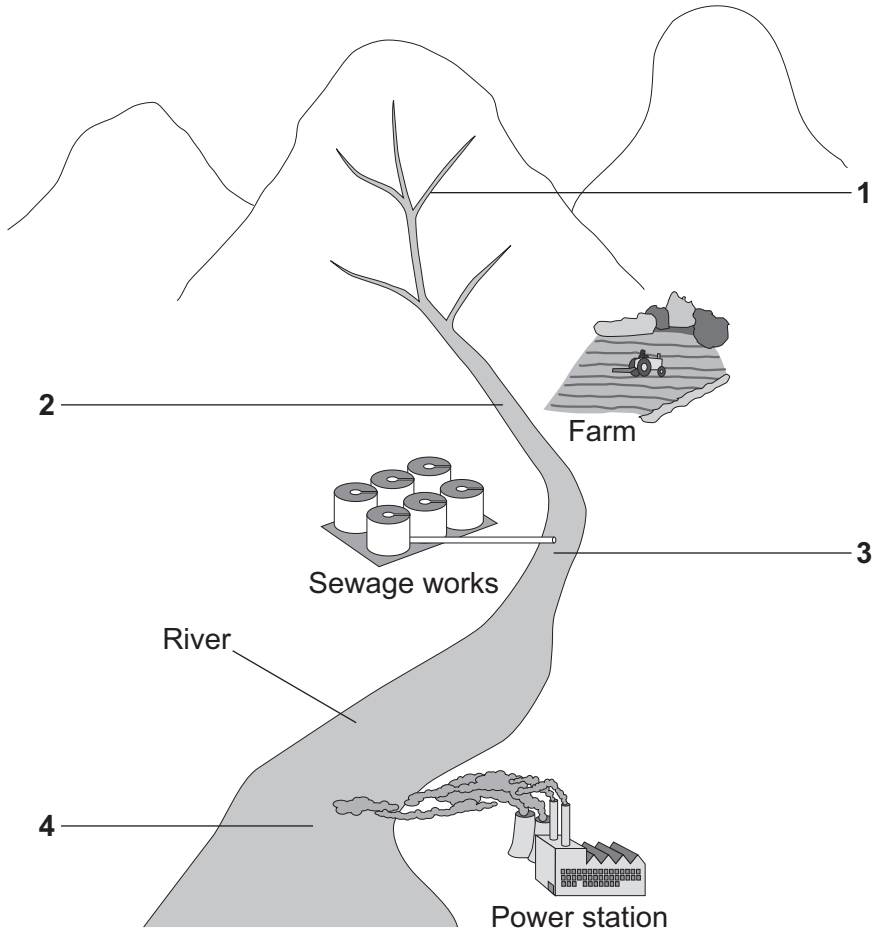
Match labels, **A**, **B**, **C** and **D**, with the adaptations **1**–**4** in the table.

	Adaptation
1	protects the tarsier against low temperatures at night
2	helps the tarsier to see its prey
3	helps to stop the tarsier from falling out of trees
4	helps the tarsier to find insects using the sound which the insects make

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QUESTION TWO

The drawing shows a map of a river.



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

A where water becomes polluted by pesticide

B where water contains very little oxygen

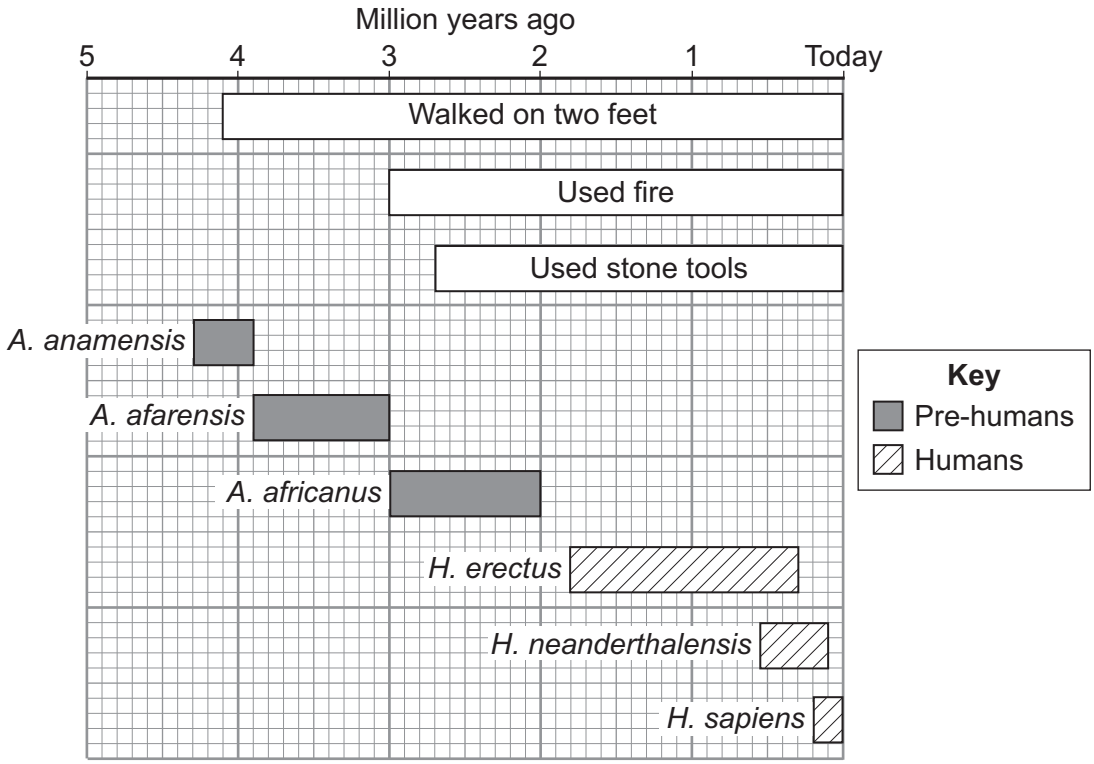
C where there are no lichens growing on trees near the river

D where the water is least polluted

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QUESTION THREE

The diagram shows a timeline for the evolution of humans.



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

A 1.5

B 2.7

C 3.0

D 4.3

The first pre-human appeared . . . **1** . . . million years ago.

A. afarensis became extinct . . . **2** . . . million years ago.

H. erectus was alive on earth for . . . **3** . . . million years.

Stone tools were first used . . . **4** . . . million years ago.

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QUESTION FOUR

Evolution occurs as a result of natural selection.

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

A characteristics

B mutations

C genes

D survival

Individuals in a species show a wide range of . . . **1** . . . .

This range is because of differences in their . . . **2** . . . .

These differences are caused by . . . **3** . . . .

Those individuals most suited to the environment are likely to have a better chance of . . . **4** . . . .

Turn over for the next question

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QUESTION FIVE

There are several methods of reproduction.

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

A asexual reproduction

B adult cell cloning

C genetic engineering

D sexual reproduction

	Description
1	replacing the nucleus of an unfertilised egg with the nucleus from a different cell
2	removing a gene for insulin from human cells and inserting this gene into a bacterium
3	producing offspring naturally with a mixture of genetic information from two parents
4	producing identical offspring from only one parent

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Turn over for the next question

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Section Two

Questions **SIX** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION SIX

Students investigated competition between marigold seedlings and zinnia seedlings.

- They filled four similar plant pots, **W**, **X**, **Y** and **Z**, with the same mass of soil.
- They planted different numbers of seeds in each pot, as shown in **Table 1**.

Table 1

Pot	Number of seeds planted	
	Marigold	**Zinnia**
W	5	5
X	5	50
Y	50	5
Z	50	50

- They left the pots on a window ledge in the laboratory for six weeks.
- On every school day, they gave each pot the same volume of water.
- After six weeks, they removed the seedlings from the pots and weighed the seedlings.

6A One of the independent variables in this investigation was . . .

1 the size of a pot.

2 the mass of the soil.

3 the volume of water.

4 the number of seeds planted.

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Table 2 shows the results of the investigation.

Table 2

Pot	Total mass of seedlings after six weeks in g	
	Marigold	**Zinnia**
W	9.46	13.8
X	5.02	56.76
Y	42.13	4.28
Z	29.06	27.19

6B The greatest mass of seedlings in a pot was the mass of . . .

1 marigold seedlings in pot **Y**.

2 zinnia seedlings in pot **X**.

3 marigold seedlings in pot **Z**.

4 zinnia seedlings in pot **Z**.

6C The smallest total mass of seedlings was in pot **W**.

This was because . . .

1 there was most competition in pot **W**.

2 pot **W** received least light.

3 pot **W** received least water.

4 there were the fewest seeds planted in pot **W**.

6D Which one of the following is the best conclusion from this investigation?

1 The lower the number of seedlings per pot, the bigger each seedling grows.

2 Zinnia seedlings always grow bigger than marigold seedlings.

3 50 seedlings in a pot each grow bigger than 5 seedlings in a pot.

4 Zinnia is always a better competitor than marigold.

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QUESTION SEVEN

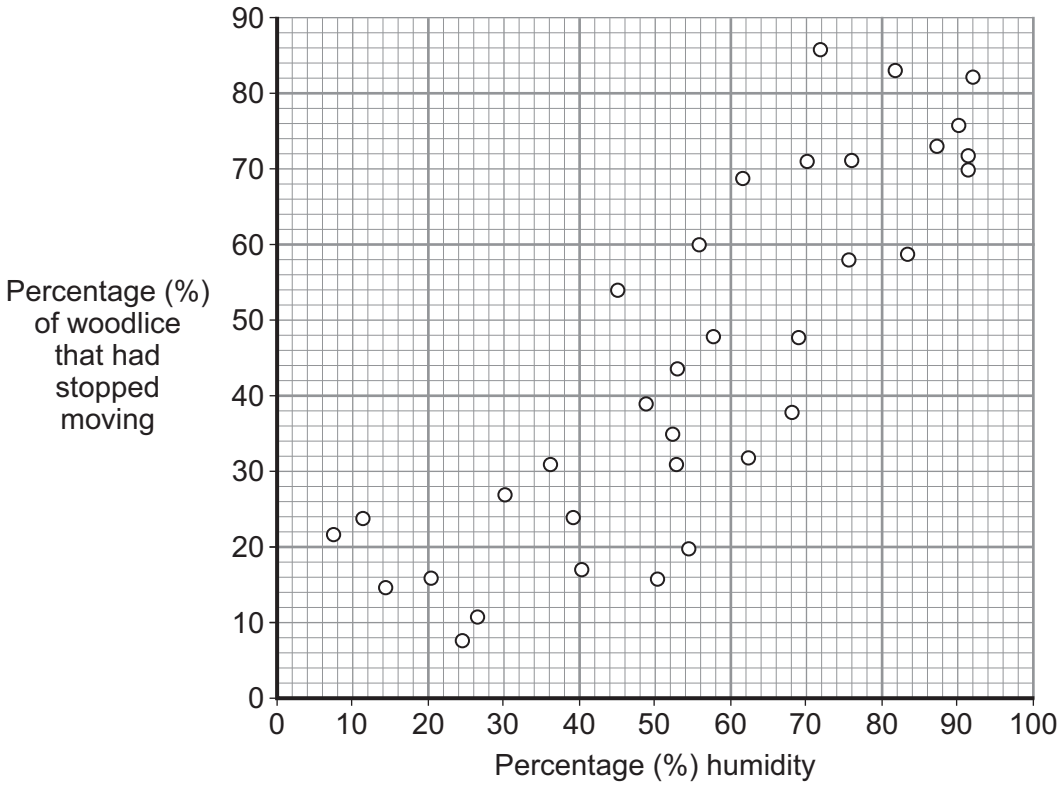
Woodlice are small animals that are usually found under stones.

A scientist investigated the idea that woodlice need a high humidity (large amount of water vapour in the atmosphere) to survive.

The scientist used apparatus in which the humidity could be changed.

- She put 50 woodlice in the apparatus, then placed the apparatus in a dark place.
- She waited for 15 minutes, then counted the number of woodlice that had stopped moving.
- She repeated the above procedure at a range of different humidities.

Her results are shown below.



7A The data is plotted as a . . .

1 bar graph.

2 line graph.

3 pie chart.

4 scattergram.

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7B At what percentage humidity had 60 % of the woodlice stopped moving after 15 minutes?

1 20 %

2 56 %

3 71 %

4 86 %

7C The data shows that . . .

1 there is an association between humidity and movement in the woodlice.

2 there is a direct relationship between humidity and movement in the woodlice.

3 there is no relationship between humidity and movement in the woodlice.

4 the higher the humidity, the faster the woodlice move.

7D Living under stones . . .

1 helps the woodlice to find food.

2 protects the woodlice from predators.

3 helps the woodlice to dry out.

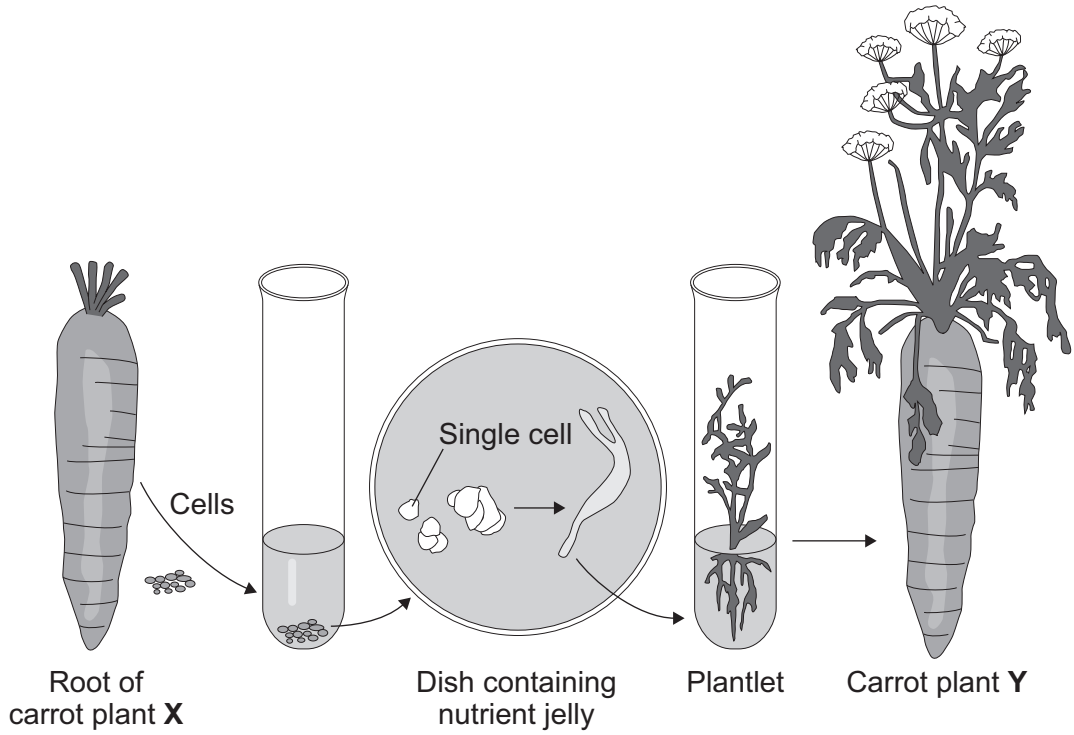
4 helps the woodlice to have a wide territory.

Turn over for the next question

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QUESTION EIGHT

The drawing shows one way in which scientists can produce carrot plants.



8A This method of producing carrot plants involves . . .

1 splitting apart embryos.

2 taking cuttings.

3 tissue culture.

4 fusing gametes.

8B Carrot plants **X** and **Y** are known as . . .

1 chromosomes.

2 clones.

3 embryos.

4 gametes.

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8C The orange colour of a carrot is a . . .

1 characteristic.

2 chromosome.

3 gene.

4 nucleus.

8D A new variety of carrot could be produced by . . .

1 adult cell cloning.

2 asexual reproduction.

3 sexual reproduction.

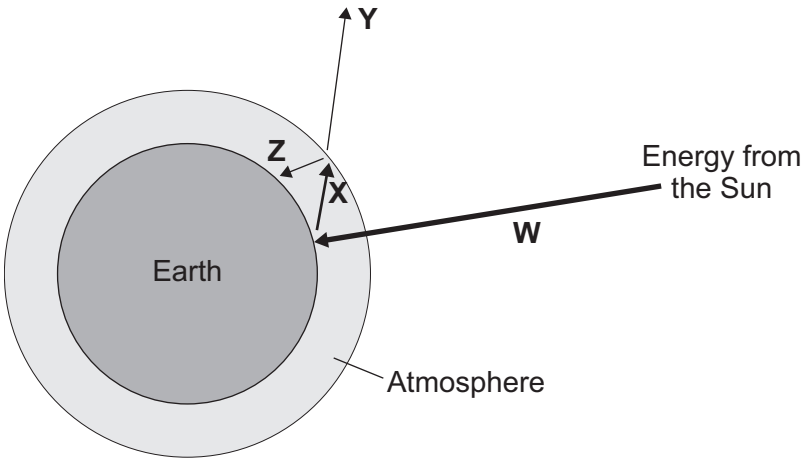
4 taking cuttings.

Turn over for the next question

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QUESTION NINE

This diagram shows what happens to energy from the Sun when the energy reaches the Earth.



9A Which line shows energy re-radiated back to Earth?

1 **W**

2 **X**

3 **Y**

4 **Z**

9B As the amount of greenhouse gases in the atmosphere increases, the amount of energy labelled **Y** . . .

1 increases because less energy is absorbed by the atmosphere.

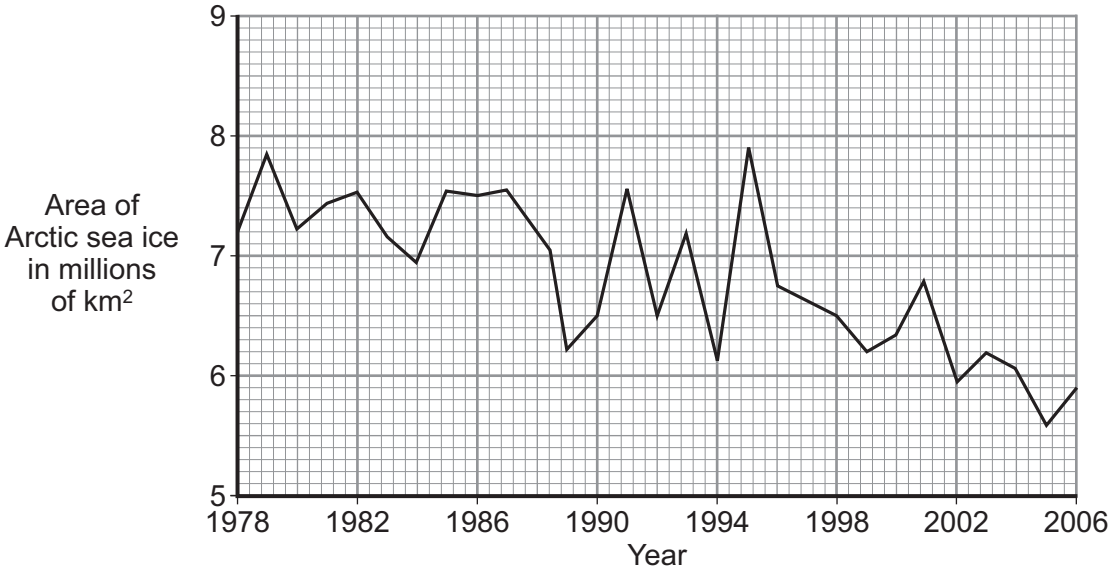
2 decreases because more energy is absorbed by the atmosphere.

3 increases because more energy is absorbed by the atmosphere.

4 decreases because less energy is absorbed by the atmosphere.

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The graph shows changes in the area of Arctic sea ice between 1978 and 2006.



9C The reduction in the area of Arctic sea ice between 1978 and 2006 was . . .

1 1.3 million km^2

2 1.8 million km^2

3 2.1 million km^2

4 2.4 million km^2

9D Loss of Arctic sea ice is directly caused by . . .

1 increasing sea temperatures.

2 increasing levels of carbon dioxide in the atmosphere.

3 changes in the Earth's climate.

4 rising sea level.

END OF TEST

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

Section One

Questions **ONE** and **TWO**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

There are several methods of reproduction.

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

A asexual reproduction

B adult cell cloning

C genetic engineering

D sexual reproduction

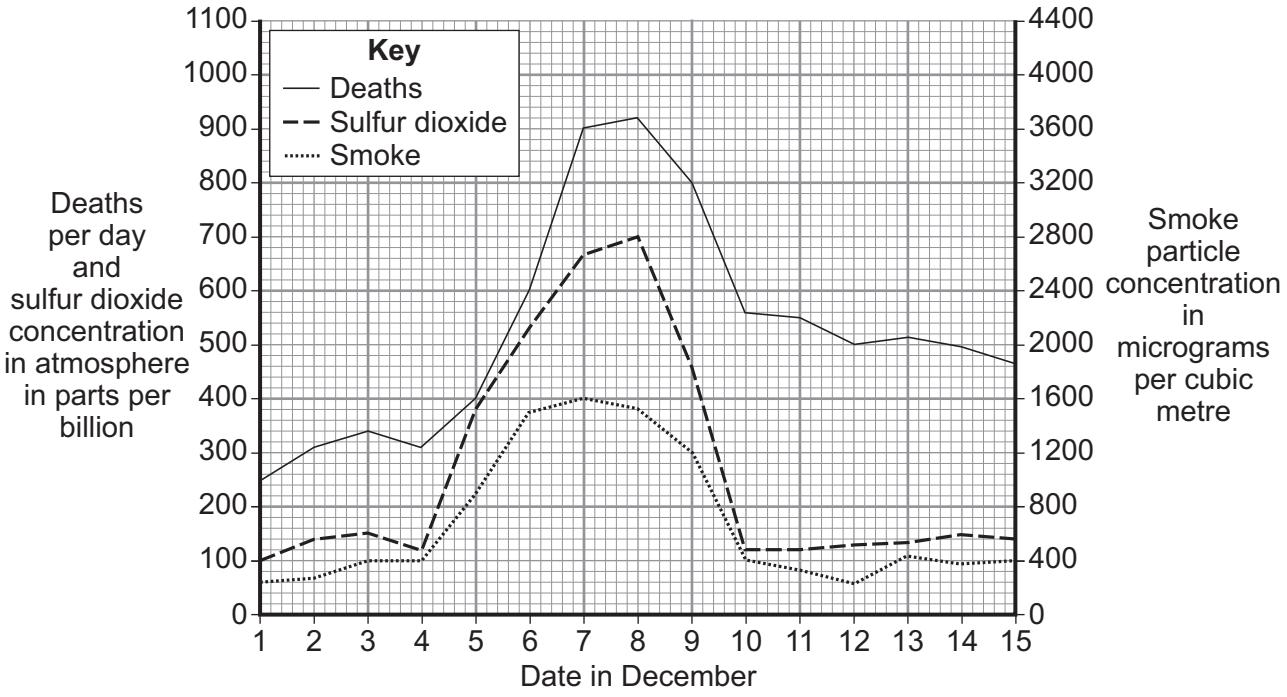
	Description
1	replacing the nucleus of an unfertilised egg with the nucleus from a different cell
2	removing a gene for insulin from human cells and inserting this gene into a bacterium
3	producing offspring naturally with a mixture of genetic information from two parents
4	producing identical offspring from only one parent

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QUESTION TWO

Thick, polluted fog caused many deaths in London in December 1952. The fog lasted from 4 December to 10 December.

The graph shows the relationship between these deaths and the amounts of smoke and sulfur dioxide in the atmosphere.



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

A 300

B 550

C 700

D 1600

1	the concentration of smoke particles on 7 December in micrograms per cubic metre
2	the maximum concentration of sulfur dioxide in parts per billion
3	the increase in the number of deaths per day between 1 December and 9 December
4	the average number of deaths per day on the days before the fog

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Section Two

Questions **THREE** to **NINE**.

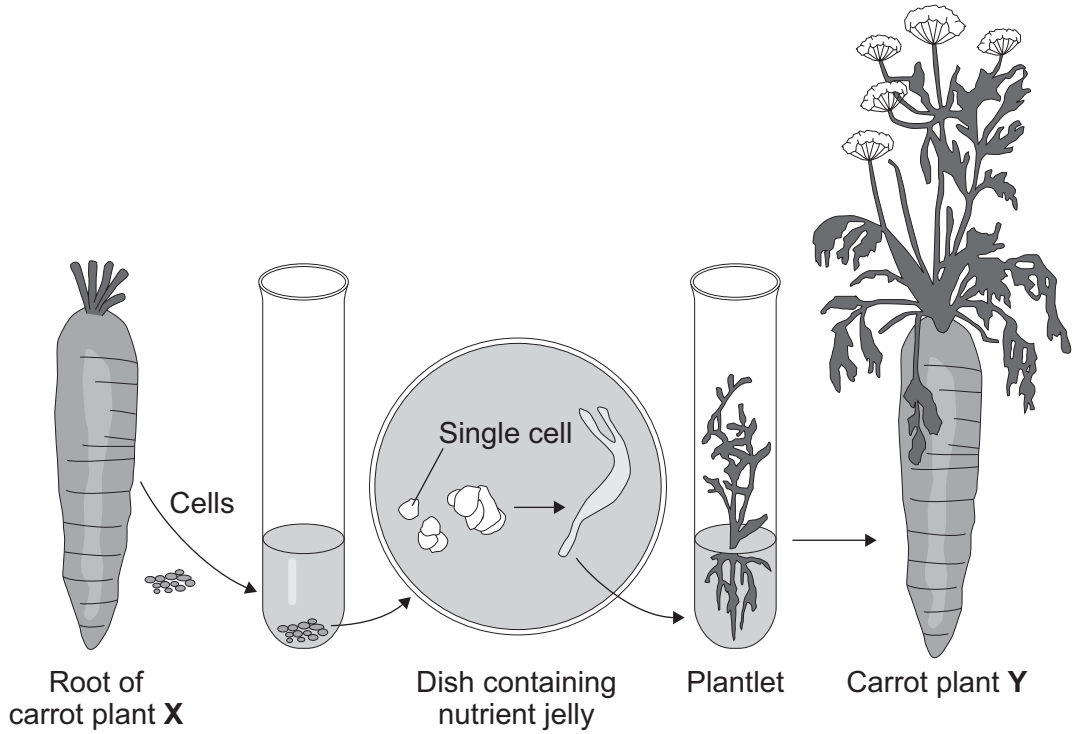
Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION THREE

The drawing shows one way in which scientists can produce carrot plants.



3A This method of producing carrot plants involves . . .

1 splitting apart embryos.

2 taking cuttings.

3 tissue culture.

4 fusing gametes.

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3B Carrot plants **X** and **Y** are known as . . .

1 chromosomes.

2 clones.

3 embryos.

4 gametes.

3C The orange colour of a carrot is a . . .

1 characteristic.

2 chromosome.

3 gene.

4 nucleus.

3D A new variety of carrot could be produced by . . .

1 adult cell cloning.

2 asexual reproduction.

3 sexual reproduction.

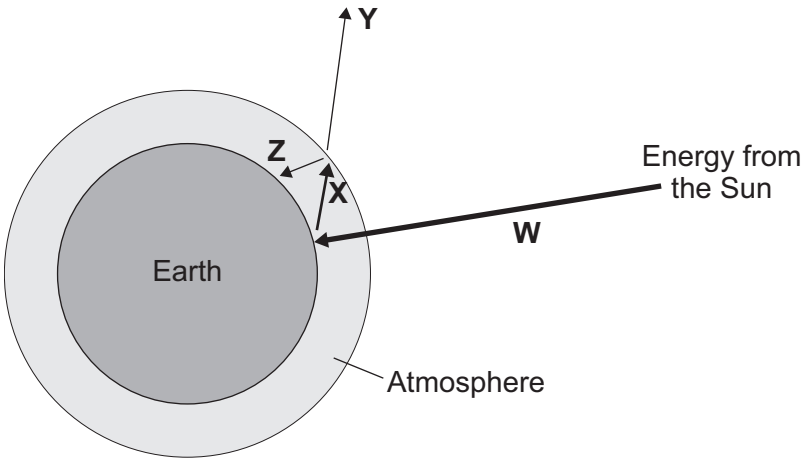
4 taking cuttings.

Turn over for the next question

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QUESTION FOUR

This diagram shows what happens to energy from the Sun when the energy reaches the Earth.



4A Which line shows energy re-radiated back to Earth?

1 **W**

2 **X**

3 **Y**

4 **Z**

4B As the amount of greenhouse gases in the atmosphere increases, the amount of energy labelled **Y** . . .

1 increases because less energy is absorbed by the atmosphere.

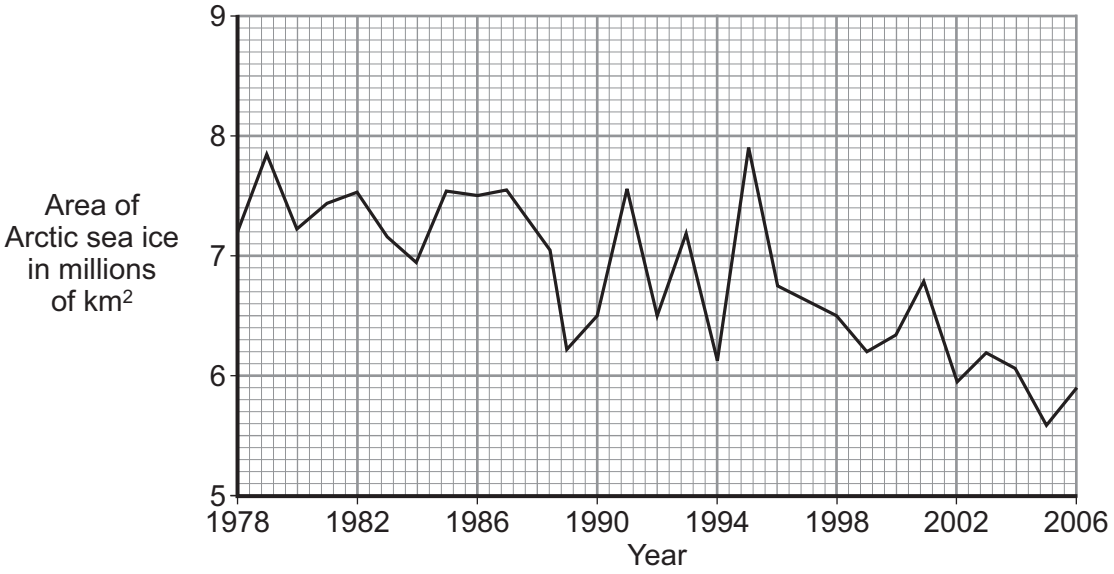
2 decreases because more energy is absorbed by the atmosphere.

3 increases because more energy is absorbed by the atmosphere.

4 decreases because less energy is absorbed by the atmosphere.

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The graph shows changes in the area of Arctic sea ice between 1978 and 2006.



4C The reduction in the area of Arctic sea ice between 1978 and 2006 was . . .

1 1.3 million km^2

2 1.8 million km^2

3 2.1 million km^2

4 2.4 million km^2

4D Loss of Arctic sea ice is directly caused by . . .

1 increasing sea temperatures.

2 increasing levels of carbon dioxide in the atmosphere.

3 changes in the Earth's climate.

4 rising sea level.

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QUESTION FIVE

On a field trip to a rocky seashore, students saw a limestone ledge. No seaweed was growing on the limestone ledge. Seaweed grows well on the rest of the shore. The students were asked to suggest explanations for the lack of seaweed on the limestone ledge.

Their ideas included:

- The seaweed cannot grow on the ledge because of wave action.
- The ledge is slightly higher and drier than the rest of the shore.
- The limpets (snail-like animals) living on the ledge eat the seaweed.
- Seaweed cannot grow on limestone.

5A The students' ideas about the seaweed are examples of . . .

1 conclusions.

2 hypotheses.

3 predictions.

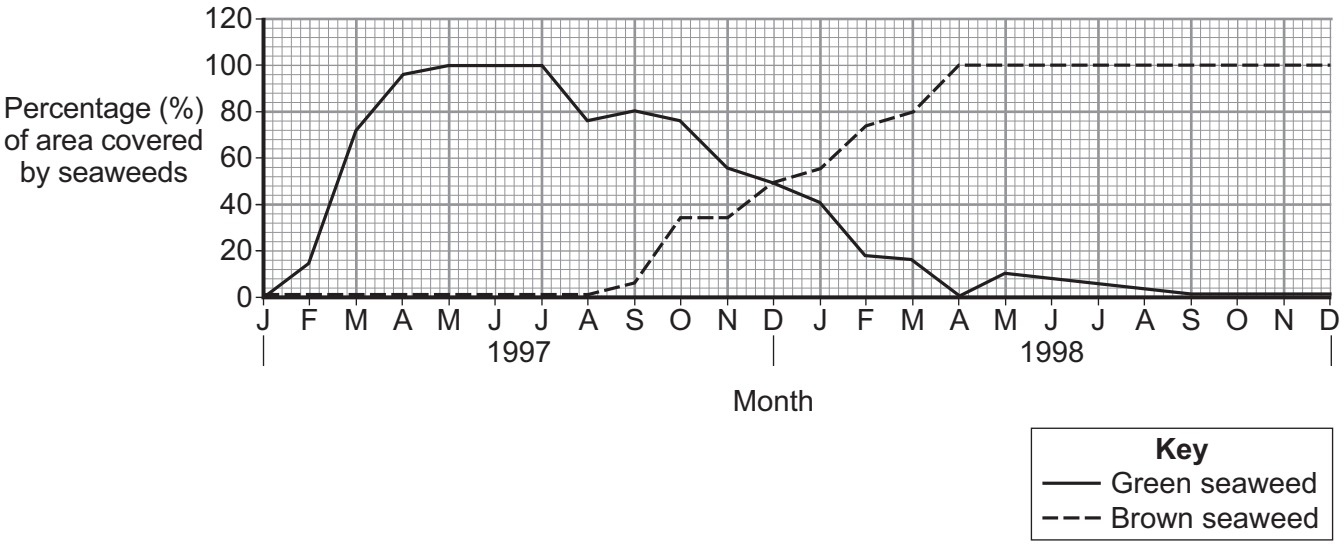
4 theories.

A student investigated one of the ideas.

The student:

- fenced off a 0.25 m^2 area on the limestone ledge in January
- took all the limpets from the fenced-off area
- recorded the area the seaweeds covered each month until December in the following year.

The graph shows the student's results.



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5B Which statement best describes changes in the area covered by the green seaweed?

1 The area covered increased rapidly then decreased slowly.

2 The area covered increased slowly then decreased rapidly.

3 The area covered did not increase for seven months, then increased rapidly.

4 The area covered stayed constant for seven months then decreased.

5C The green seaweed grows flat on the rock.
The brown seaweed grows tall and upright.

From this information and the data in the graph, the brown seaweed is the more successful competitor for . . .

1 light.

2 nutrients.

3 oxygen.

4 water.

5D Which of the students' ideas does the data in the graph support?

1 The seaweed cannot grow on the ledge because of wave action.

2 The ledge is slightly higher and drier than the rest of the shore.

3 The limpets living on the ledge eat the seaweed.

4 Seaweed cannot grow on limestone.

Turn over for the next question

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QUESTION SIX

In horses, coat colour is an inherited characteristic.

6A The inheritance of coat colour in horses is controlled by . . .

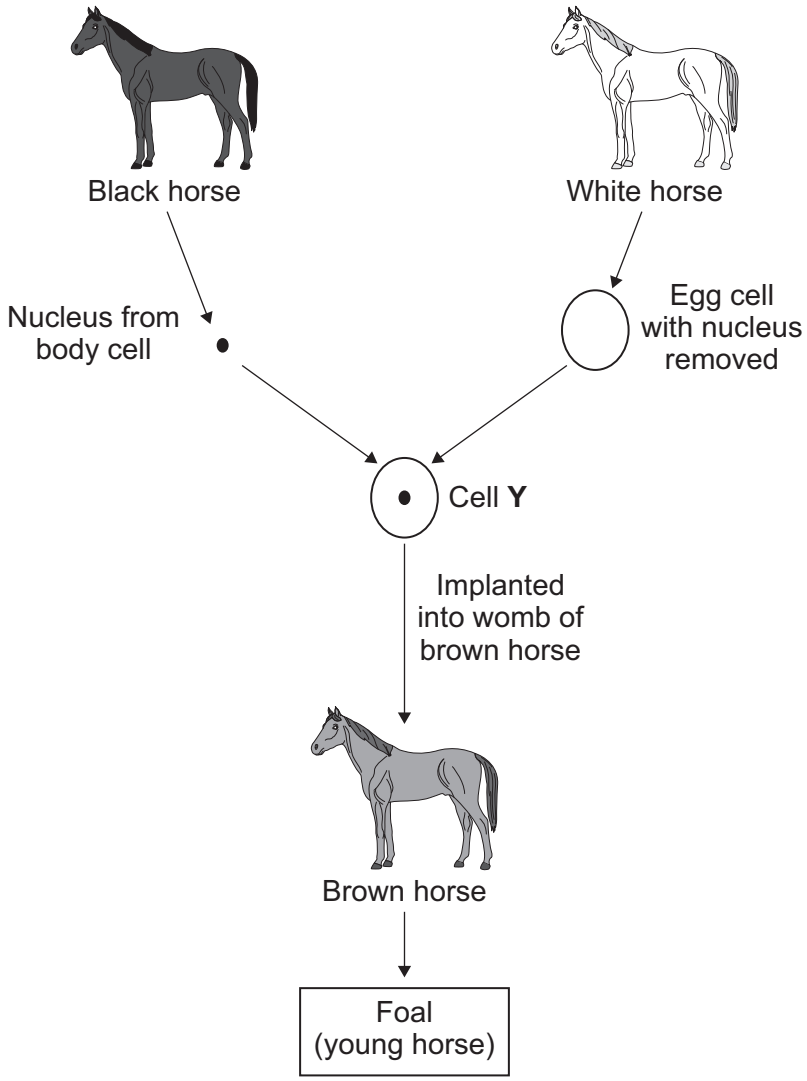
1 enzymes.

2 gametes.

3 genes.

4 hormones.

The diagram shows one way of reproducing horses.



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6B To complete this process, cell **Y** must receive special treatment.

The special treatment involves . . .

1 adding hormones.

2 giving an electric shock.

3 cutting out genes using enzymes.

4 heat.

6C Cell **Y** first divides to form . . .

1 egg cells.

2 embryo cells.

3 nerve cells.

4 skin cells.

6D What colour will the coat of the foal be?

1 black

2 brown

3 white

4 a mixture of black, brown and white

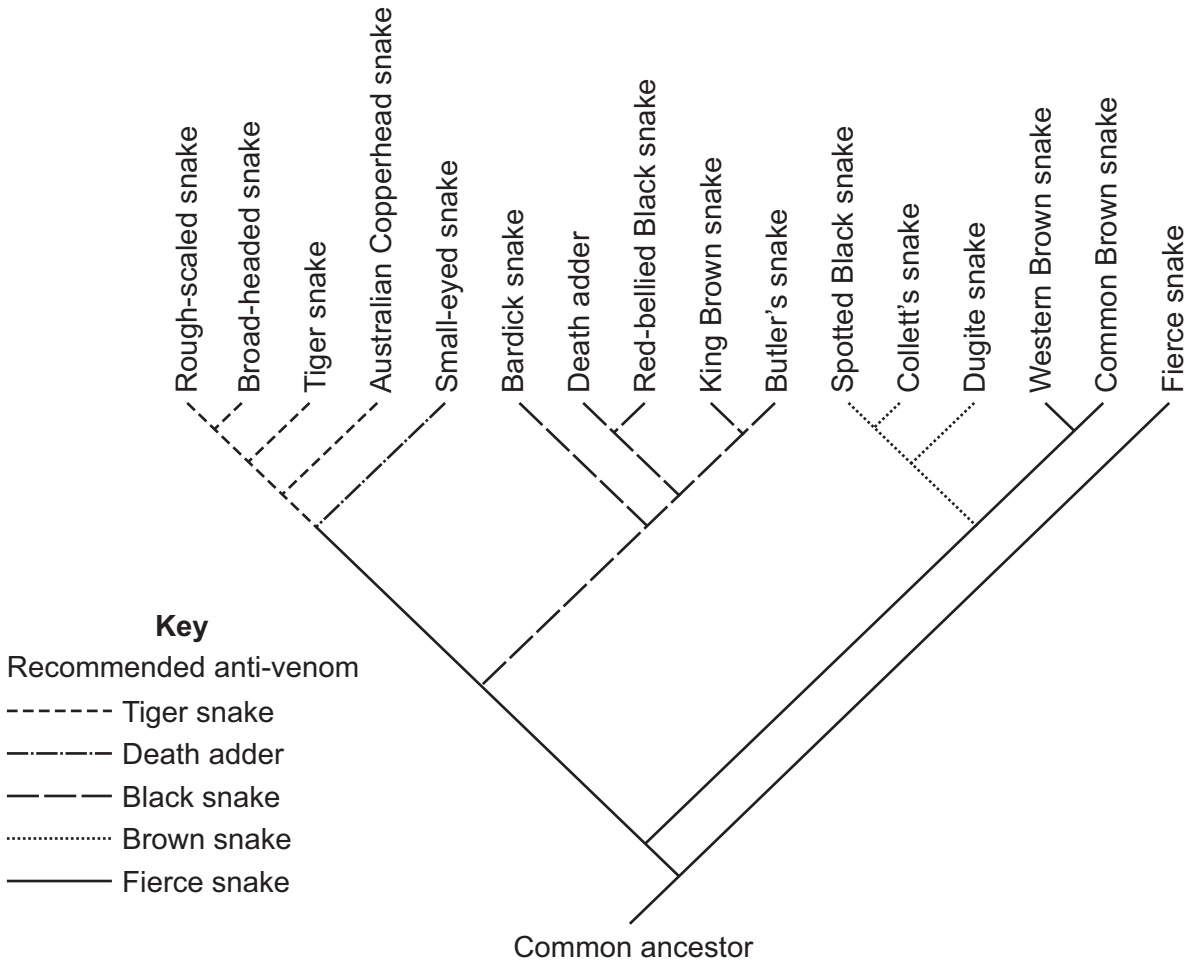
Turn over for the next question

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QUESTION SEVEN

There are many species of poisonous snakes in Australia. The poison a snake produces is called venom. Scientists have found that some anti-venoms are effective against the venoms of several different snake species.

The evolutionary tree below includes information on the anti-venoms recommended for treating bites of different snake species.



7A This evolutionary tree . . .

1 proves that evolution has happened.

2 shows that natural selection is happening.

3 shows the relationships between species.

4 disproves Lamarck's theory.

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7B The most primitive snake species in this evolutionary tree is the . . .

1 Butler's snake.

2 Fierce snake.

3 Rough-scaled snake.

4 Western Brown snake.

7C The data in the evolutionary tree provides evidence for . . .

1 common ancestry amongst snakes.

2 inheritance of acquired characteristics by snakes.

3 rapid changes in snake species.

4 ecological relationships between snakes.

7D The anti-venom that is effective against the venom of the largest number of snake species is produced by . . .

1 Black snakes.

2 Brown snakes.

3 Fierce snakes.

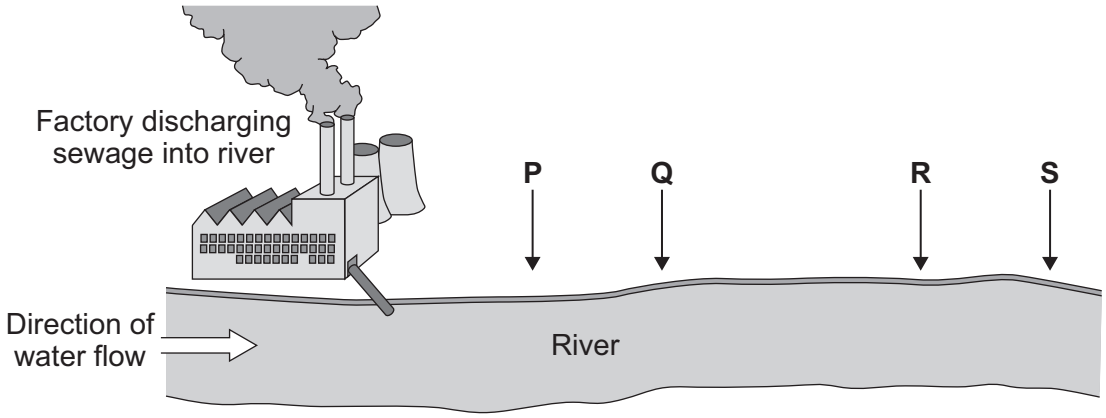
4 Tiger snakes.

Turn over for the next question

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QUESTION EIGHT

The diagram shows a river. At sites **P**, **Q**, **R** and **S**, samples of invertebrates were taken from the river.



The table gives the results.

Number of invertebrates found at different points down the river				
	P	**Q**	**R**	**S**
Tubifex	325	124	0	0
Midge larvae	6	23	16	3
Hog lice	0	2	10	12
Shrimps	0	0	15	35
Stoneflies	0	0	7	15
Mayflies	0	0	0	3

8A Which invertebrate is found only in water with high concentrations of oxygen?

1 mayflies

2 midge larvae

3 shrimps

4 tubifex

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8B Which sample showed the greatest biodiversity?

1 **P**

2 **Q**

3 **R**

4 **S**

8C The evidence from this survey suggests that as the concentration of oxygen increases, . . .

1 the total number of individual invertebrates decreases.

2 the total number of individual invertebrates increases.

3 biodiversity decreases.

4 biodiversity increases.

8D Some invertebrates have a red pigment in their blood. The red pigment helps the blood to pick up and store oxygen.

Which of the invertebrates is most likely to have this red pigment?

1 mayflies

2 stoneflies

3 shrimps

4 tubifex

Turn over for the next question

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QUESTION NINE

Read the passage about the evolution of Europeans.

> A new study of fossilised bone samples states that Europeans were unable to digest cows' milk as recently as 7000 years ago. Today, more than 90 % can digest cows' milk.
>
> A group of scientists suggested that when Europeans became able to digest cows' milk, they were able to take in more nutrients. Nourishment from seasonal crops is not available all the year round, but milk from cows is available all year. Parasites do not contaminate milk so milk is safer to drink than stream water.
>
> Low levels of sunlight in northern Europe during winter months meant that people had lower levels of vitamin D in their bodies. Low vitamin D levels meant that the Europeans had difficulty absorbing calcium. Milk solved this problem because milk provides both calcium and some vitamin D.

9A Scientists believe that humans originated in Africa and then migrated to other parts of the world, including Europe.

From the information in the passage, the first Europeans probably had difficulty in surviving because . . .

1 the land was unsuitable for growing crops.

2 they needed to make houses.

3 there was not enough food.

4 European seasons and African seasons were very different from each other.

9B The scientists' suggested idea is probably based on . . .

1 evidence from crops grown 7000 years ago.

2 parasites in fossil human remains.

3 the amount of calcium in fossil human bones.

4 fossils of domesticated cows.

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9C Humans use enzymes to digest food.

The enzymes that first appeared 7000 years ago to allow Europeans to digest cows' milk were the result of changes in the humans' . . .

1 bones.

2 diet.

3 environment.

4 genes.

9D The high proportion of Europeans able to digest milk today is because of . . .

1 inheritance of acquired characteristics.

2 better agricultural methods.

3 natural selection.

4 pasteurising milk or sterilising milk.

END OF TEST

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There are no questions printed on this page

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1BP, BL1BSF & BL1BSH

Mark Scheme

2012 Examination – March Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the students' responses.

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

March 2012

Foundation Tier

Question	Key		
One	**A**	Large eyes	**2**
	B	Feet with sticky pads	**3**
	C	Thick fur	**1**
	D	Large ears	**4**
Two	**A**	where water becomes polluted by pesticide	**2**
	B	where water contains very little oxygen	**3**
	C	where there are no lichens growing on trees near the river	**4**
	D	where the water is least polluted	**1**
Three	**A**	1.5	**3**
	B	2.7	**4**
	C	3.0	**2**
	D	4.3	**1**
Four	**A**	characteristics	**1**
	B	mutations	**3**
	C	genes	**2**
	D	survival	**4**
Five	**A**	asexual reproduction	**4**
	B	adult cell cloning	**1**
	C	genetic engineering	**2**
	D	sexual reproduction	**3**

	A	**B**	**C**	**D**
Six	**4**	**2**	**4**	**1**
Seven	**4**	**2**	**1**	**2**
Eight	**3**	**2**	**1**	**3**
Nine	**4**	**2**	**1**	**1**

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

March 2012

Higher Tier

Question	Key		
One	**A**	asexual reproduction	**4**
	B	adult cell cloning	**1**
	C	genetic engineering	**2**
	D	sexual reproduction	**3**
Two	**A**	300	**4**
	B	550	**3**
	C	700	**2**
	D	1600	**1**

	A	**B**	**C**	**D**
Three	**3**	**2**	**1**	**3**
Four	**4**	**2**	**1**	**1**
Five	**2**	**1**	**1**	**3**
Six	**3**	**2**	**2**	**1**
Seven	**3**	**2**	**1**	**1**
Eight	**1**	**4**	**4**	**4**
Nine	**4**	**3**	**4**	**3**

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OTQ3

GCSE SCIENCE

AQA

Unit : BLY1BP BIOLOGY UNIT 1B

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 3G12

01-MAR-12

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE

		1	2	3	4
1A	asexual reproduction	○	○	○	○
1B	adult cell cloning	○	○	○	○
1C	genetic engineering	○	○	○	○
1D	sexual reproduction	○	○	○	○

QUESTION TWO

		1	2	3	4
2A	300	○	○	○	○
2B	550	○	○	○	○
2C	700	○	○	○	○
2D	1600	○	○	○	○

QUESTION THREE

	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR

	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE

	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX

	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN

	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT

	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE

	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A Large eyes	○	○	○	○
1B Feet with sticky pads	○	○	○	○
1C Thick fur	○	○	○	○
1D Large ears	○	○	○	○

QUESTION TWO	1	2	3	4
2A where water becomes polluted by pesticide	○	○	○	○
2B where water contains very little oxygen	○	○	○	○
2C where there are no lichens growing on trees near river	○	○	○	○
2D where the water is least polluted	○	○	○	○

QUESTION THREE	1	2	3	4
3A 1.5	○	○	○	○
3B 2.7	○	○	○	○
3C 3.0	○	○	○	○
3D 4.3	○	○	○	○

QUESTION FOUR	1	2	3	4
4A characteristics	○	○	○	○
4B mutations	○	○	○	○
4C genes	○	○	○	○
4D survival	○	○	○	○

QUESTION FIVE	1	2	3	4
5A asexual reproduction	○	○	○	○
5B adult cell cloning	○	○	○	○
5C genetic engineering	○	○	○	○
5D sexual reproduction	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
November 2011

Science A

Unit Biology B1b (Evolution and Environment)

Biology

Unit Biology B1b (Evolution and Environment)

BLY1BP

F&H

Tuesday 15 November 2011 Morning Session

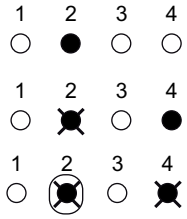
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed
- 30 minutes

Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1b' printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

Section One

Questions **ONE** to **FIVE**.

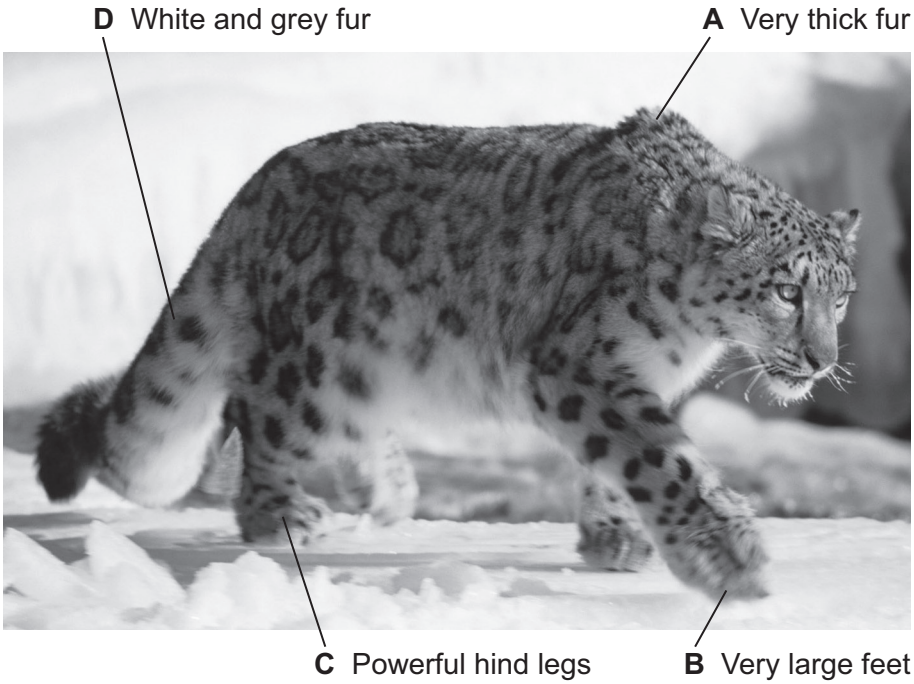
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

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



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

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

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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

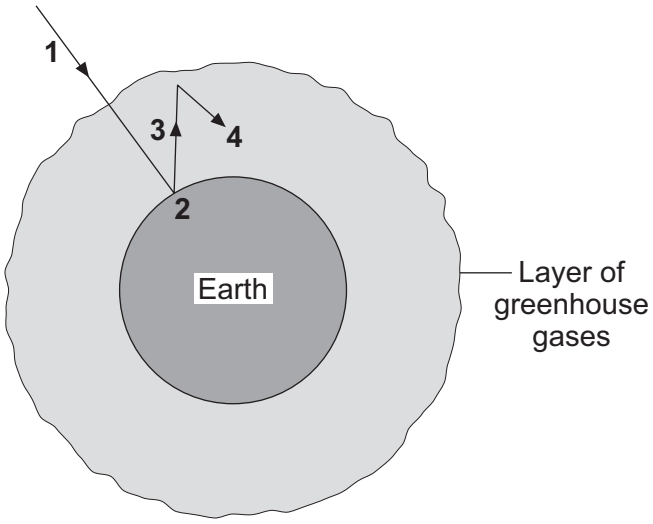
	Effect on the environment
1	reduces river pollution
2	reduces the need for landfill sites
3	reduces biodiversity
4	reduces the production of methane

Turn over for the next question

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QUESTION THREE

The diagram shows how the greenhouse effect works.



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

A greenhouse gases re-radiate heat back to Earth

B energy directly from the Sun

C the Earth warms up

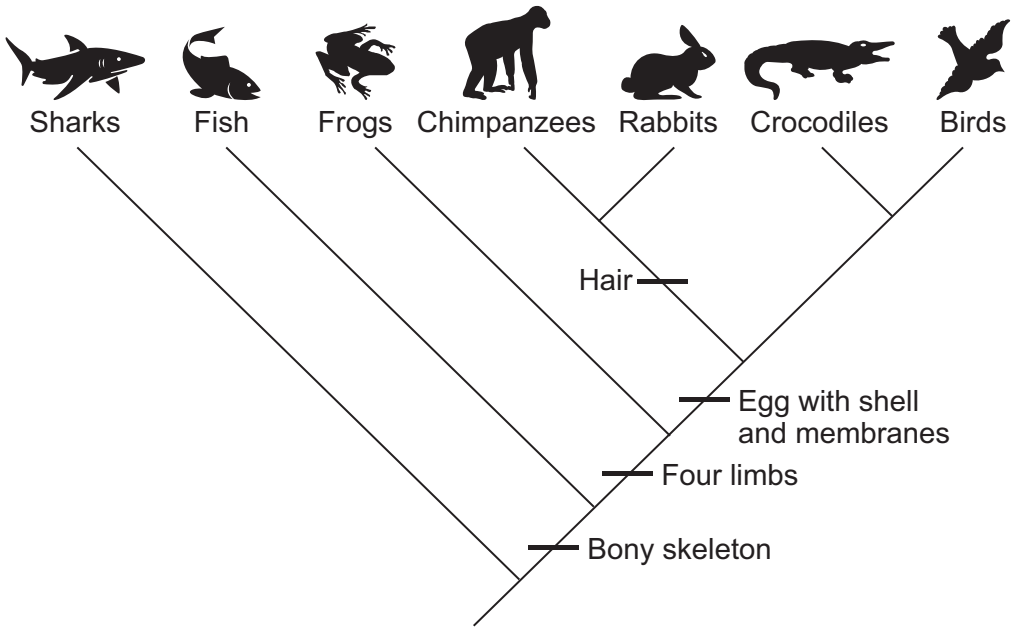
D heat is radiated from the Earth into the atmosphere

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QUESTION FOUR

The diagram shows an evolutionary tree for some groups of animals.

The diagram also shows when some characteristics first evolved.



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

A birds

B chimpanzees

C fish

D sharks

1	the group most closely related to crocodiles
2	the first group to evolve
3	a group with hair
4	the group with a bony skeleton but no limbs

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QUESTION FIVE

We can now produce animals and plants with the characteristics we want.

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

A adult cell cloning

B sexual reproduction

C taking cuttings

D tissue culture

	Information
1	used by gardeners to produce clones of a plant
2	the joining of one egg with one sperm
3	enables hundreds of identical individuals to be produced from a few cells from the parent
4	placing a nucleus from a skin cell into an egg cell with no nucleus

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Turn over for the next question

Section Two

Questions **SIX** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION SIX

Scientists investigated the best number of plants of one crop to grow in trays in a greenhouse.

- Different numbers of plants were grown in trays with an area of 1 m^2.
- The soil in each tray was kept moist.
- The trays were kept in the same greenhouse.

The table shows the scientists' results.

Tray	Number of plants grown in each tray	Mass of all the stems in the tray in g	Mass of all the leaves in the tray in g
U	2	1.1	0.8
V	4	2.6	1.8
W	10	4.7	2.5
X	20	7.8	4.5
Y	40	16.0	8.0
Z	80	22.6	20.8

6A Which was the independent variable in this investigation?

1 mass of leaves grown

2 number of leaves grown

3 mass of plants grown

4 number of plants grown

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6B What was the average (mean) mass of leaves produced per plant in tray **W**?

1 0.20 g

2 0.25 g

3 0.47 g

4 0.72 g

6C The results suggest that the more plants grown per tray, the . . .

1 greater the total mass of stems and leaves.

2 fewer plants survive.

3 shorter the plants.

4 narrower the leaves.

6D A farmer wants to grow this crop plant outside in a field.

What should the scientist do next to give the best advice to the farmer?

1 Do the investigation at different temperatures.

2 Get a different group of scientists to do the investigation.

3 Repeat the investigation, using more plants per tray.

4 Do the investigation in the farmer's field.

Turn over for the next question

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QUESTION SEVEN

Climate change is affecting an American national park.

- Temperatures are rising and winters are becoming less severe (less cold).
- Severe winters normally kill insects which eat pine trees in the national park.
- Many pine trees are now dying.

7A The most likely reason for the increase in the death rate of the pine trees is that . . .

1 more insects are being killed by severe winters.

2 pine trees are being killed by severe winters.

3 more insects are surviving winter.

4 pine trees prefer drier conditions.

7B Pine trees produce lots of pine seeds.

The seeds are food for squirrels and nutcracker birds.

The less severe winters result in . . .

1 less competition between squirrels for mates.

2 more competition between young pine trees.

3 increased numbers of nutcracker birds.

4 increased competition for pine seeds between squirrels and nutcracker birds.

7C When the pine trees die, gaps develop in the forest.

More small plants are now able to grow in the gaps on the forest floor because there is . . .

1 more competition for water.

2 less competition for light.

3 more competition for growing space.

4 less competition for mates.

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7D The long-term result of the less severe winters could be that some species of animal in the forest will become extinct.

Extinction means that . . .

1 there will be a decrease in the number of squirrels in the forest.

2 there will be a decrease in the number of pine trees in the forest.

3 some animal species will die out.

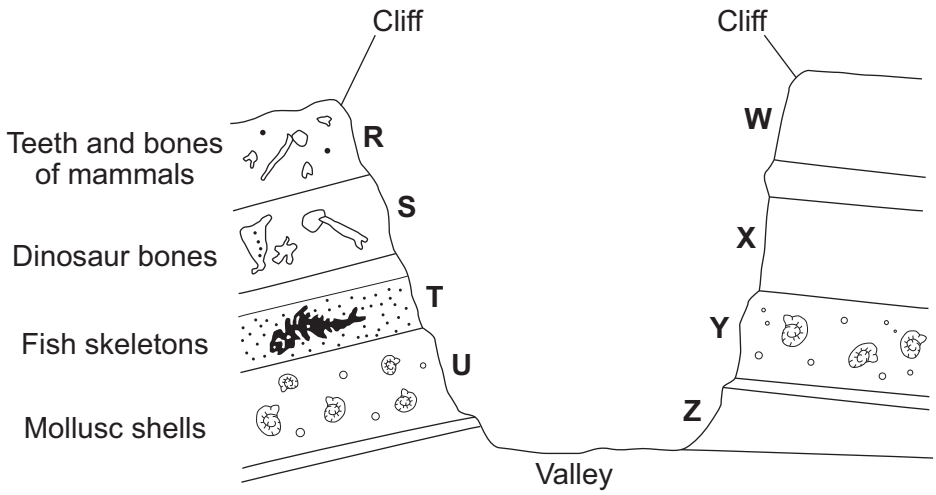
4 no animals will be left in the forest.

Turn over for the next question

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QUESTION EIGHT

The diagram shows a section through rock layers containing fossils.



8A Which layers of rock are probably the same age?

1 **R** and **W**

2 **S** and **X**

3 **T** and **Z**

4 **U** and **Y**

8B Which of these statements about rocks and fossils is true?

1 Older fossils are usually found in deeper rocks.

2 Rocks of the same age in a particular area will contain fossils of totally different life forms.

3 The deeper the rock, the more different types of fossil are found.

4 Fossils are never found in surface layers of rocks.

8C There are few fossils of the earliest organisms on Earth.

This is because . . .

1 fossils last for only a few million years.

2 the organisms had soft bodies.

3 the organisms quickly became extinct.

4 new predators ate the organisms.

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8D The fossils in the rock layers support the theory of evolution because . . .

1 the same fossil organisms are found in different layers of rocks.

2 fossil organisms have features in common with present-day organisms.

3 present-day organisms have evolved from fossil organisms.

4 the environment caused the changes in the fossil organisms.

Turn over for the next question

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QUESTION NINE

Scientists use genetic engineering to produce genetically modified (GM) plants.

9A Which row in the table shows the correct order of sizes of structures involved in genetic engineering?

	Largest →			Smallest
1	chromosome →	cell →	gene →	nucleus
2	nucleus →	cell →	chromosome →	gene
3	cell →	gene →	nucleus →	chromosome
4	cell →	nucleus →	chromosome →	gene

Seeds from crops of oil-seed rape are used to produce biofuels.

Farmers spray their fields with herbicide before planting a crop of oil-seed rape.

GM oil-seed rape was developed to be resistant to the herbicide.

9B The GM oil-seed rape has most probably been developed by . . .

1 spraying herbicide on oil-seed rape plants over several generations.

2 taking cuttings from other species that are resistant to herbicides.

3 transferring genes from other species into oil-seed rape plants.

4 producing mutations in non-GM varieties of oil-seed rape.

9C In trials of the GM crop, four field trials were set up.

Which trial will produce the **smallest** yield of oil-seed rape crop?

1 spraying with herbicide before planting non-GM crops

2 spraying with herbicide during growth of a non-GM crop

3 spraying with herbicide before planting a GM crop

4 spraying with herbicide during growth of a GM crop

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9D The main concern about planting a GM oil-seed rape crop is that the gene for herbicide resistance might spread to . . .

1 wild plants.

2 other oil-seed rape crops.

3 insects.

4 humans.

END OF TEST

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

Section One

Questions **ONE** and **TWO**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

We can now produce animals and plants with the characteristics we want.

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

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	Information
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QUESTION TWO

Some birds have feet adapted to their lifestyle.

Match adaptations, **A**, **B**, **C** and **D**, with the drawings of birds' feet labelled **1**–**4**.

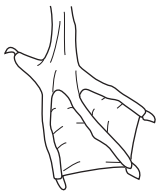
1



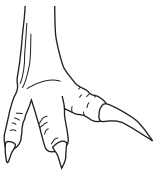
2



3



4



A used for swimming

B holds animal prey strongly and tightly

C used to wade through deep mud in lakes

D used to dig for food in hard soil

Turn over for the next question

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Section Two

Questions **THREE** to **NINE**.

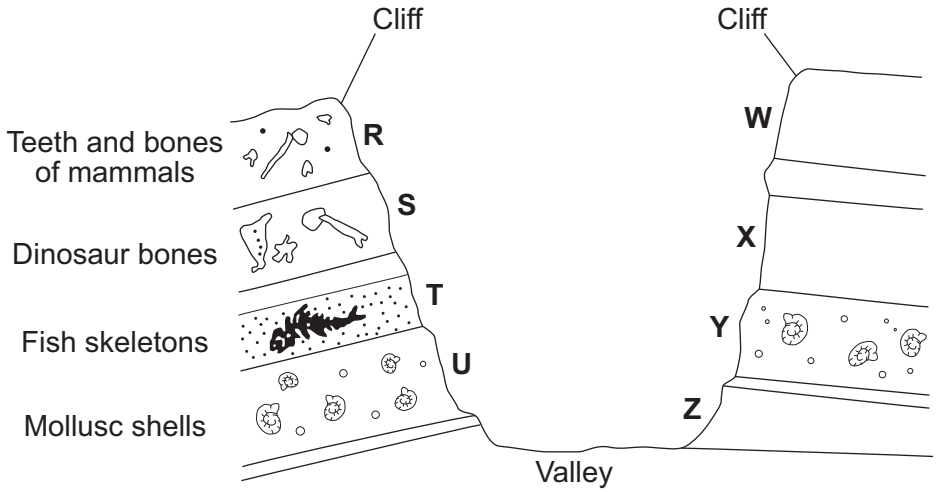
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QUESTION THREE

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3C There are few fossils of the earliest organisms on Earth.

This is because . . .

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3 the organisms quickly became extinct.

4 new predators ate the organisms.

3D The fossils in the rock layers support the theory of evolution because . . .

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3 present-day organisms have evolved from fossil organisms.

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Turn over for the next question

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QUESTION FOUR

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4	cell →	nucleus →	chromosome →	gene

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4 spraying with herbicide during growth of a GM crop

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4D The main concern about planting a GM oil-seed rape crop is that the gene for herbicide resistance might spread to . . .

1 wild plants.

2 other oil-seed rape crops.

3 insects.

4 humans.

Turn over for the next question

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QUESTION FIVE

Scientists investigated populations of grey squirrels and black squirrels in a large park.

The scientists:

- recorded the number of each species of squirrel seen with the naked eye or through binoculars
- walked the same route for each set of observations
- set off at 10.00 am for each set of observations
- made observations on four different days.

The table shows the scientists' results.

Day	Number of grey squirrels	Number of black squirrels
1	10	10
2	20	5
3	16	6
4	10	7

5A What was the dependent variable in this investigation?

1 the route

2 the starting time

3 the number of days

4 the number of squirrels observed

5B What was the ratio of the total number of grey squirrels to the total number of black squirrels?

1 1 : 1

2 1 : 2

3 2 : 1

4 4 : 1

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5C The scientists estimated the total number of squirrels in the park to be 1615 grey squirrels and 807 black squirrels.

The estimate is likely to be too low because . . .

1 the scientists counted squirrels at the same time each day.

2 some of the squirrels were hidden in the trees.

3 the scientists only counted the squirrels 4 times.

4 the scientists only used binoculars if the squirrels were far away.

5D The scientists wanted to find out if the ratio of grey squirrels to black squirrels is changing.

The best way of doing this would be to . . .

1 repeat the investigation in 5 years' time.

2 take six sets of observations instead of four.

3 survey a different part of the park.

4 do surveys later in the day.

Turn over for the next question

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QUESTION SIX

In the past, prize bulls used to be transported around the world to mate with cows.
Cattle embryos can now be transported around the world in test tubes.

There are two methods of doing this.

Method 1

- A cow is given drugs that cause her to produce up to 80 eggs at the same time.
- The eggs are fertilised and the resulting embryos removed from the womb.
- The embryos are frozen and sent to other farms around the world.
- Each embryo can then be put into the womb of a different cow.

Method 2

- After fertilisation, one embryo is removed from a cow.
- The embryo is split into several parts.
- The parts are frozen, then sent to other farms around the world.
- Each part can be put into the womb of a cow.

6A Which row in the table describes the calves produced using the two methods?

	Method 1		**Method 2**	
	Genetically identical	**Genetically different**	**Genetically identical**	**Genetically different**
1	✓		✓	
2		✓		✓
3	✓			✓
4		✓	✓	

6B Which method of reproduction is involved in producing the embryos formed in **Method 1**?

1 embryo splitting

2 genetic modification

3 sexual reproduction

4 tissue culture

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6C One advantage of the new methods of producing calves rather than by mating cows with a bull is that . . .

1 the calves will all be male.

2 there is no need for a bull.

3 there is more variation between calves.

4 greater numbers of offspring of the bull are produced.

6D One advantage of adult cell cloning over **Method 2** is that the characteristics of the calves . . .

1 are known before.

2 will all be different.

3 will all be the same.

4 can be changed.

Turn over for the next question

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QUESTION SEVEN

Darwin and Lamarck both suggested theories of evolution.

7A Darwin's theory was based on . . .

1 experiments.

2 hearsay.

3 observations.

4 guesswork.

7B Which of the following best describes Darwin's theory of evolution?

1 Species survive only if they have similar characteristics to their parents.

2 Only species that can reproduce sexually survive.

3 Individuals with characteristics suited to their environment are more likely to survive and reproduce.

4 Species become extinct if they are not completely adapted to the environment in which they live.

7C Darwin's theory of evolution by natural selection was only gradually accepted.

One reason why Darwin's theory was not fully accepted at that time was that . . .

1 he could not explain how characteristics were inherited.

2 he was not religious.

3 he was not an accepted scientist.

4 he did not produce any scientific evidence to support the theory.

7D One way in which Darwin's and Lamarck's theories are similar is that both theories state that . . .

1 parents change the characteristics of their offspring.

2 evolution depends on changes in the environment.

3 evolution happens very quickly.

4 some characteristics are passed from parent to offspring.

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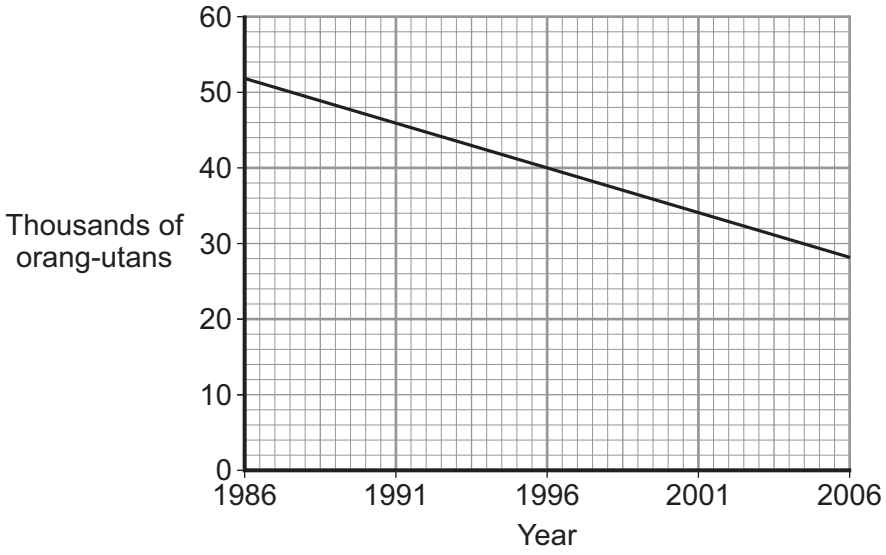
Turn over for the next question

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.

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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.

Turn over for the next question

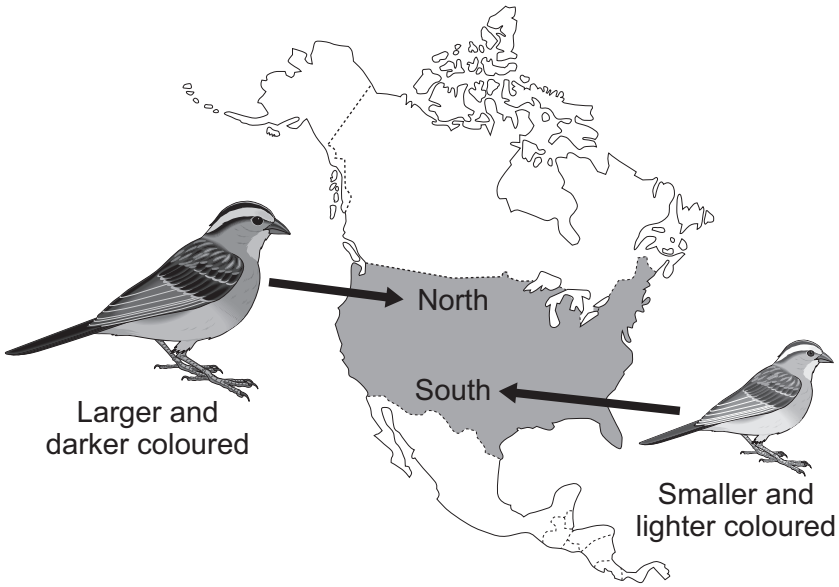
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QUESTION NINE

House sparrows arrived in North America from Europe in the nineteenth century. Since then, sparrows have spread to inhabit most of the continent.

House sparrows in the north of America are larger and darker coloured than house sparrows in the south of America.

The drawing shows where the two types of sparrow live.



9A The differences between the sparrows have been caused directly by changes in . . .

1 the environment.

2 the sparrows' predators.

3 the sparrows' genes.

4 human activities.

9B Being larger than the southern sparrow helps the northern sparrow to . . .

1 see prey from greater distances.

2 be less easily seen by predators.

3 live in a greater range of habitats.

4 conserve more heat.

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9C The two sparrow populations have become distinctly different because they do **not** . . .

1 eat the same prey.

2 have the same predators.

3 interbreed.

4 have the same types of tree to nest in.

9D The information in this question . . .

1 proves that natural selection takes place.

2 shows that some acquired characteristics are inherited.

3 provides evidence for evolution.

4 shows that one of the types of sparrow is likely to become extinct in the near future.

END OF TEST

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There are no questions printed on this page

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1BP, BL1BSF & BL1BSH

Mark Scheme

2011 Examination – November Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the students' responses.

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Human Biology)

November 2011

Foundation Tier

Question	Key		
One	**A**	Very thick fur	**3**
	B	Very large feet	**2**
	C	Powerful hind legs	**4**
	D	White and grey fur	**1**
Two	**A**	deforestation	**3**
	B	recycling waste	**2**
	C	less cattle farming	**4**
	D	treating sewage	**1**
Three	**A**	greenhouse gases re-radiate heat back to Earth	**4**
	B	energy directly from the Sun	**1**
	C	the Earth warms up	**2**
	D	heat is radiated from the Earth into the atmosphere	**3**
Four	**A**	birds	**1**
	B	chimpanzees	**3**
	C	fish	**4**
	D	sharks	**2**
Five	**A**	adult cell cloning	**4**
	B	sexual reproduction	**2**
	C	taking cuttings	**1**
	D	tissue culture	**3**

	A	B	C	D
Six	**4**	**2**	**1**	**4**
Seven	**3**	**4**	**2**	**3**
Eight	**4**	**1**	**2**	**2**
Nine	**4**	**3**	**2**	**1**

GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Human Biology)

November 2011

Higher Tier

Question	Key		
One	**A**	adult cell cloning	**4**
	B	sexual reproduction	**2**
	C	taking cuttings	**1**
	D	tissue culture	**3**
Two	**A**	used for swimming	**3**
	B	holds animal prey strongly and tightly	**1**
	C	used to wade through deep mud in lakes	**2**
	D	used to dig for food in hard soil	**4**

	A	B	C	D
Three	**4**	**1**	**2**	**2**
Four	**4**	**3**	**2**	**1**
Five	**4**	**3**	**2**	**1**
Six	**4**	**3**	**4**	**1**
Seven	**3**	**3**	**1**	**4**
Eight	**1**	**1**	**1**	**2**
Nine	**3**	**4**	**3**	**3**

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http://www.aqa.org.uk/umsconversion

AQA

Unit : BLY1BP BIOLOGY UNIT 1B

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : BG11

15-NOV-11

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	adult cell cloning	○	○	○	○
1B	sexual reproduction	○	○	○	○
1C	taking cuttings	○	○	○	○
1D	tissue culture	○	○	○	○

QUESTION TWO		1	2	3	4
2A	used for swimming	○	○	○	○
2B	holds animal prey strongly and tightly	○	○	○	○
2C	used to wade through deep mud in lakes	○	○	○	○
2D	used to dig for food in hard soil	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A Very thick fur	○	○	○	○
1B Very large feet	○	○	○	○
1C Powerful hind legs	○	○	○	○
1D White and grey fur	○	○	○	○

QUESTION TWO	1	2	3	4
2A deforestation	○	○	○	○
2B recycling waste	○	○	○	○
2C less cattle farming	○	○	○	○
2D treating sewage	○	○	○	○

QUESTION THREE	1	2	3	4
3A greenhouse gases re-radiate heat back to Earth	○	○	○	○
3B energy directly from the Sun	○	○	○	○
3C the Earth warms up	○	○	○	○
3D heat is radiated from the Earth into the atmosphere	○	○	○	○

QUESTION FOUR	1	2	3	4
4A birds	○	○	○	○
4B chimpanzees	○	○	○	○
4C fish	○	○	○	○
4D sharks	○	○	○	○

QUESTION FIVE	1	2	3	4
5A adult cell cloning	○	○	○	○
5B sexual reproduction	○	○	○	○
5C taking cuttings	○	○	○	○
5D tissue culture	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1BP, BL1BSF & BL1BSH

Mark Scheme

2011 Examination – June Series

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

June 11

Foundation Tier

Question	Key		
One	**A**	Thick fur	3
	B	Shaggy tail end	1
	C	Sharp pointed horns	2
	D	Thick muscular neck to move head sideways	4
Two	**A**	burning fuels that release carbon dioxide	3
	B	building new houses	4
	C	spraying crops with pesticides	2
	D	using weedkillers on crops	1
Three	**A**	Alamosaurus	4
	B	Lagosuchus	1
	C	Saturnalia	3
	D	Triceratops	2
Four	**A**	invertebrates	2
	B	lichens	1
	C	rice crops	4
	D	trees	3
Five	**A**	extinction	4
	B	mutation	2
	C	reproduction	3
	D	variation	1

	A	B	C	D
Six	**1**	**2**	**3**	**2**
Seven	**3**	**1**	**4**	**3**
Eight	**3**	**1**	**3**	**4**
Nine	**2**	**4**	**3**	**4**

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GCSE

SCIENCE A (4461)/BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

June 11

Higher Tier

Question	Key		
One	**A**	extinction	4
	B	mutation	2
	C	reproduction	3
	D	variation	1
Two	**A**	each of the four species changes slowly over time	1
	B	none of the four species changes over time and some species die out	4
	C	none of the four species changes over time	3
	D	new species evolve over time	2

	A	B	C	D
Three	**3**	**1**	**3**	**4**
Four	**2**	**4**	**3**	**4**
Five	**3**	**4**	**4**	**3**
Six	**3**	**4**	**4**	**4**
Seven	**4**	**2**	**4**	**1**
Eight	**3**	**3**	**3**	**2**
Nine	**3**	**2**	**1**	**1**

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GCSE SCIENCE

AQA

Unit : BLY1BP BIOLOGY UNIT 1B

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 6M11

28-JUN-11

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HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	extinction	○	○	○	○
1B	mutation	○	○	○	○
1C	reproduction	○	○	○	○
1D	variation	○	○	○	○

QUESTION TWO		1	2	3	4
2A	each of the four species changes slowly over time	○	○	○	○
2B	none of the four species changes over time & some die out	○	○	○	○
2C	none of the four species changes over time	○	○	○	○
2D	new species evolve over time	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A Thick fur	○	○	○	○
1B Shaggy tail end	○	○	○	○
1C Sharp pointed horns	○	○	○	○
1D Thick muscular neck to move head sideways	○	○	○	○

QUESTION TWO	1	2	3	4
2A burning fuels that release carbon dioxide	○	○	○	○
2B building new houses	○	○	○	○
2C spraying crops with pesticides	○	○	○	○
2D using weedkillers on crops	○	○	○	○

QUESTION THREE	1	2	3	4
3A Alamosaurus	○	○	○	○
3B Lagosuchus	○	○	○	○
3C Saturnalia	○	○	○	○
3D Triceratops	○	○	○	○

QUESTION FOUR	1	2	3	4
4A invertebrates	○	○	○	○
4B lichens	○	○	○	○
4C rice crops	○	○	○	○
4D trees	○	○	○	○

QUESTION FIVE	1	2	3	4
5A extinction	○	○	○	○
5B mutation	○	○	○	○
5C reproduction	○	○	○	○
5D variation	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
March 2011

Science A

Unit Biology B1b (Evolution and Environment)

Biology

Unit Biology B1b (Evolution and Environment)

BLY1BP

F&H

Wednesday 2 March 2011 Morning Session

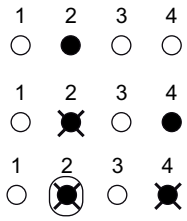
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed
- 30 minutes

Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1b' printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

Section One

Questions **ONE** to **FIVE**.

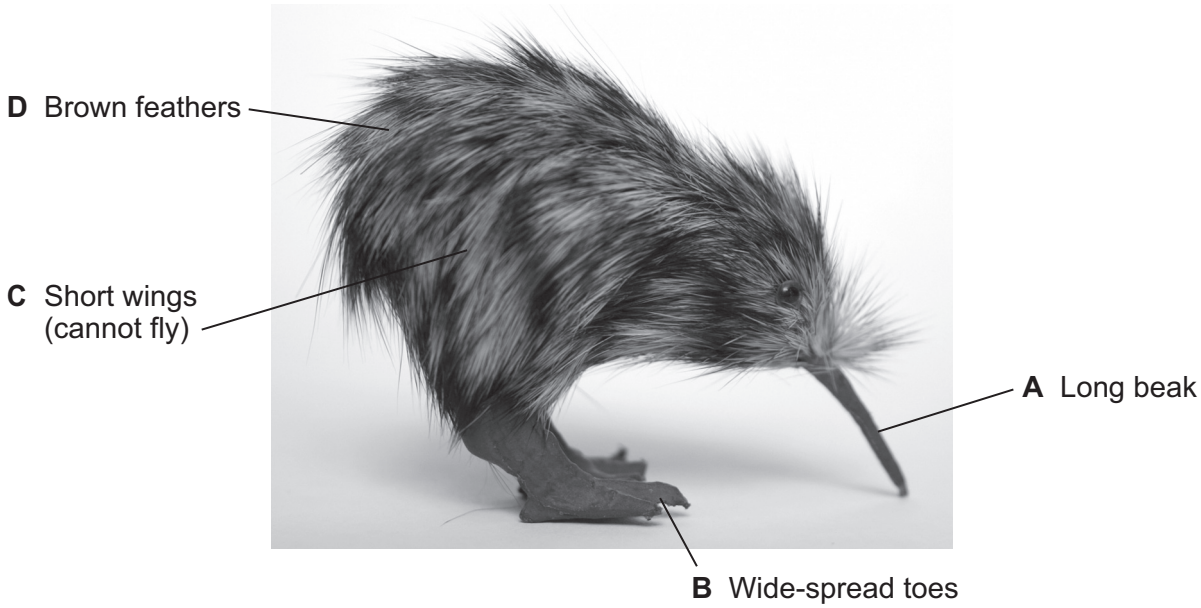
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

The picture shows a kiwi.



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

A long beak

B wide-spread toes

C short wings

D brown feathers

1	stops the kiwi from sinking into soft ground
2	reduces the chance of predators seeing the kiwi
3	helps the kiwi to collect insects from underground
4	makes the kiwi easy for predators to catch

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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

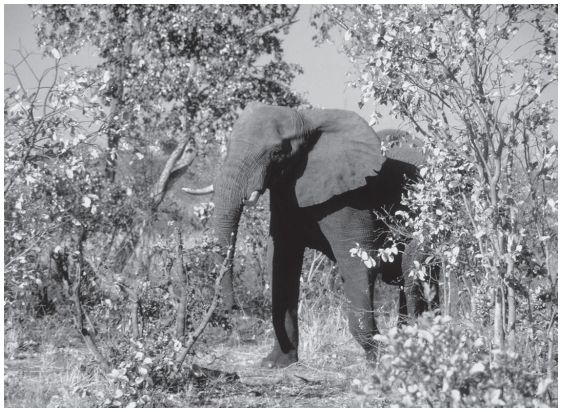
1	the main cause of acid rain
2	a greenhouse gas taken in by plants
3	used by farmers to kill weeds
4	used by farmers to kill insects that eat crops

Turn over for the next question

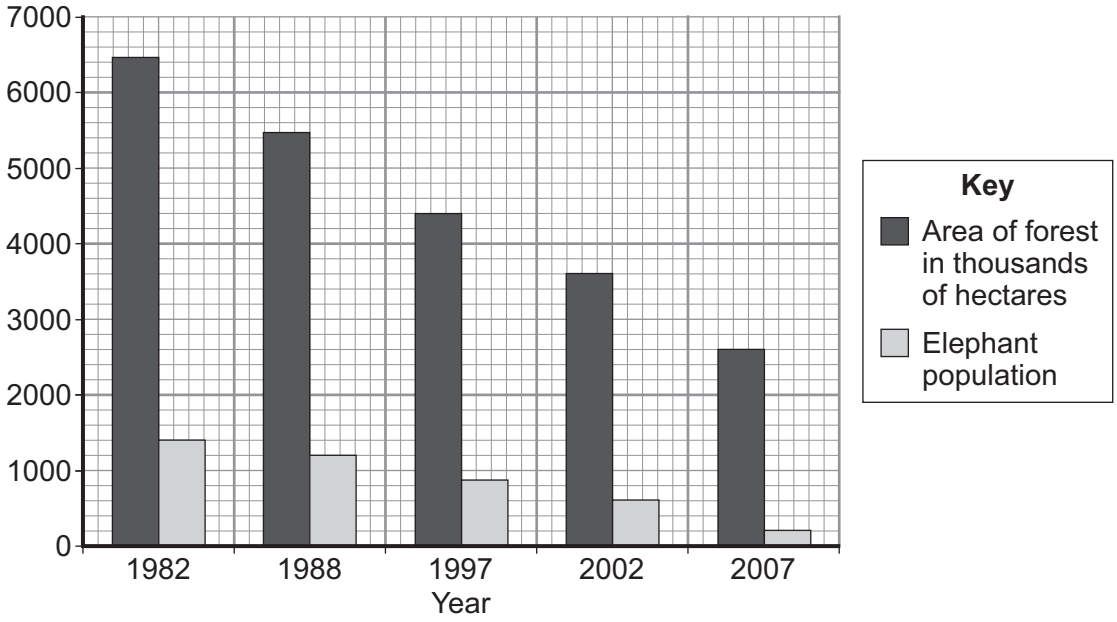
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QUESTION THREE

Asian elephants live mainly in forests.



The graph shows the effect of cutting down forests on elephant numbers in Indonesia.



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

A 160

B 1200

C 1400

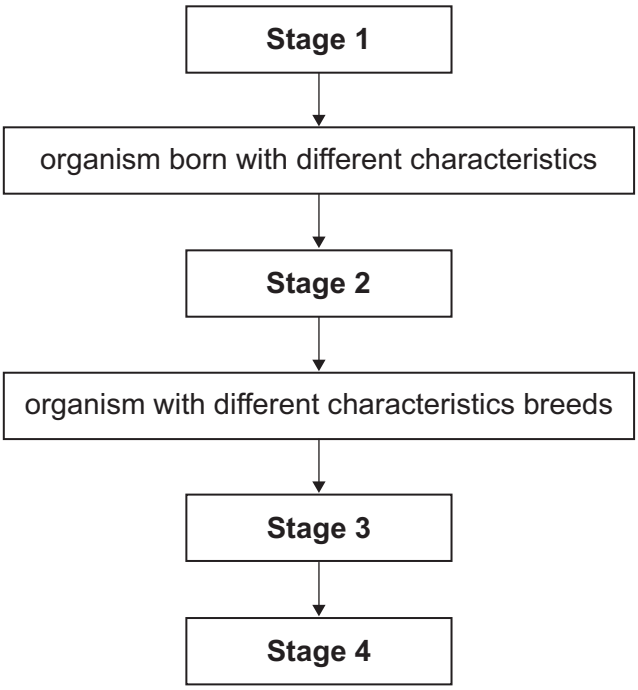
D 2600

1	the area of the forest in 2007 in thousands of hectares
2	the highest number of elephants in any year
3	the reduction in the elephant population between 1982 and 2007
4	the average area of forest lost **each year** between 1997 and 2002 in thousands of hectares

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QUESTION FOUR

The diagram shows a flow chart for evolution.



Match stages of evolution, **A**, **B**, **C** and **D**, with the stages **1**–**4** in the flow chart.

A the organism is now a better competitor

B the mutated gene is passed on to offspring

C a gene mutates

D a new species is produced

Turn over for the next question

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QUESTION FIVE

We can now produce animals and plants with characteristics we prefer.

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

A embryo transplants

B sexual reproduction

C taking cuttings

D tissue culture

1	a quick and cheap way of reproducing a plant
2	produces clones of an animal
3	produces offspring using small groups of cells from a plant
4	produces offspring with a variety of different characteristics

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Turn over for the next question

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Section Two

Questions **SIX** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION SIX

Fishermen catch shellfish from the sea. Some fishermen noticed that the shells of the shellfish were getting thinner. Scientists believe that high levels of carbon dioxide in the sea water cause the sea to become more acidic.

The acidic sea water may dissolve the shells.

6A Which row in the table identifies what the fishermen noticed and what the scientists believe?

	What the fishermen noticed	**What the scientists believe**
1	hypothesis	observation
2	observation	hypothesis
3	hearsay	hypothesis
4	observation	hearsay

A group of students investigated the effect of different strengths of acid on the shells of shellfish.

- The students collected four types of shell from the beach.
- The students weighed each shell.
- The students put the shells into different strengths of the same acid for a week.
- The students then dried the shells and reweighed the shells.

The table shows their results.

Type of shell	**pH of acid** (the lower the number, the stronger the acid)	**Mass at start in g**	**Mass after one week in g**
Mussel	6.8	8.7	7.8
Cockle	6.6	7.4	6.0
Limpet	6.4	5.8	4.8
Oyster	6.2	11.3	8.6

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6B The students could have improved this investigation.

The best way of improving the investigation would be to . . .

1 test more types of shell.

2 use live shellfish, rather than collecting empty shells.

3 use a more precise balance to weigh the shells.

4 test each type of shell with each strength of acid.

6C Which shell lost least mass during the week?

1 mussel

2 cockle

3 limpet

4 oyster

6D The oyster shell lost the most mass during the investigation.

What is the most likely explanation for this?

1 The oyster shell had the smallest surface area.

2 The shells of oysters are the least resistant to acid.

3 The oyster shell started off lighter than the other shells.

4 The oyster shell was placed in the weakest acid.

Turn over for the next question

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QUESTION SEVEN

The picture shows a crocodile.



7A The crocodile can keep most of its body underwater for a long time.

Which row in the table shows all the features of the crocodile that help it to stay underwater for a long time?

	Nostrils at the tip of the nose	Sharp teeth	Transparent eyelid	Eyes at top of the head	Scaly skin
1	✓	✓	✓		
2				✓	✓
3		✓	✓		
4	✓		✓	✓	

Female crocodiles lay up to 80 eggs in a large nest on land and then cover the nest with vegetation. The vegetation rots and produces heat. The heat incubates the eggs.

Scientists investigated how the temperature at which the eggs are kept affects the sex of the young crocodile. The table below shows their results.

Temperature at which eggs are kept in °C	30.8	31.2	31.6	32.0	32.4
Percentage of eggs that hatch as males	14	48	88	42	16

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7B What pattern is shown by the data?

1 There is an ideal temperature for the eggs to hatch as males.

2 The lower the temperature at which the eggs are kept, the more eggs hatch as males.

3 The higher the temperature at which the eggs are kept, the more eggs hatch as males.

4 There is no relationship between temperature and the number of eggs that hatch as males.

7C Which is the best estimate of the percentage of eggs that would hatch as males if the eggs were kept at 31.0 °C?

1 30 %

2 58 %

3 70 %

4 84 %

7D Scientists predict that the temperature of the atmosphere will increase by up to 1 °C in the next 50 years.

What effect will the 1 °C increase have on the population of crocodiles?

1 no effect

2 decrease the percentage of eggs that hatch as females

3 increase the total number of eggs that hatch

4 we cannot tell from the data

Turn over for the next question

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QUESTION EIGHT

The picture shows part of a forest burning in Mexico.



8A The main reason for burning forests like this is to . . .

1 reduce the need for fertilisers.

2 use the land for agriculture.

3 use the land for roads.

4 reduce the 'greenhouse effect'.

8B Many scientists believe that large-scale deforestation has led to an increase in the carbon dioxide concentration in the atmosphere.

Which row in the table shows the effects of deforestation?

	Amount of carbon dioxide locked up in wood	Amount of carbon dioxide released by burning	Amount of carbon dioxide released by microorganisms
1	increases	decreases	increases
2	decreases	increases	increases
3	increases	increases	increases
4	decreases	decreases	decreases

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8C Deforestation affects biodiversity.

What does the biodiversity of a habitat measure?

1 the total number of all living things in the habitat

2 the number of animal and plant species that have become extinct in the habitat

3 the number of different species in the habitat

4 the total number of animals of the most common species in the habitat

8D Sometimes cattle may be kept on areas that have been deforested.

Which gas in the atmosphere is produced in large amounts by cattle but not by humans?

1 carbon dioxide

2 methane

3 oxygen

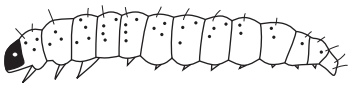
4 sulfur dioxide

Turn over for the next question

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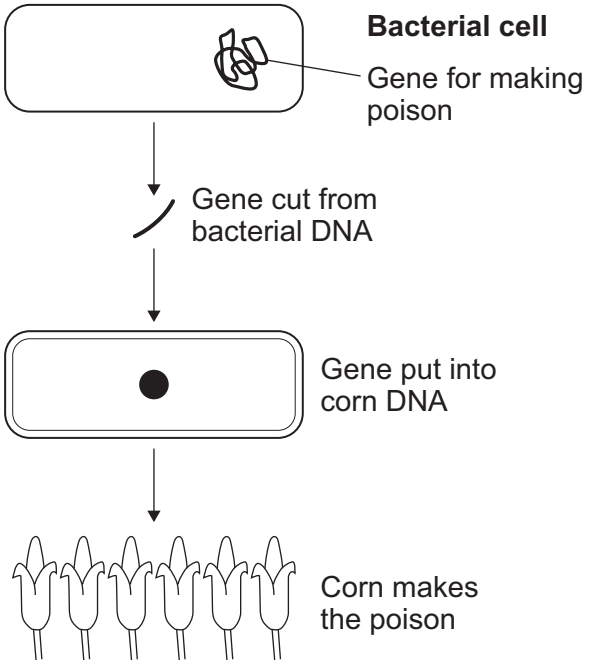
QUESTION NINE

The drawing shows a European corn borer. European corn borers eat and destroy corn stems.



It is possible to produce corn plants that produce a poison which kills the corn borer if it eats any part of the plant.

The gene for making the poison is cut from the genetic material of a bacterial cell. The gene is then inserted into the cells of a corn plant. The corn plant then produces the poison.



9A Transferring genes from one organism to another is called . . .

1 cloning.

2 evolution.

3 genetic engineering.

4 tissue culture.

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9B One economic benefit of producing this type of corn is that . . .

1 more people will want to buy this type of corn.

2 there will be fewer pests.

3 the farmer will need to use less fertiliser.

4 the farmer will produce more corn.

9C An environmental concern about growing this type of corn is that . . .

1 more chemicals will have to be used on the land.

2 it is against some people's religious beliefs.

3 the bacterial gene may get transferred to wild plant species.

4 this type of corn will be much more expensive.

9D Scientists think that this type of corn is not harmful for people to eat.

This is very difficult to prove because . . .

1 people will not volunteer to be part of a trial.

2 the human diet contains a wide variety of foods.

3 scientists are not allowed to carry out experiments on humans.

4 animals that eat this corn appear to be healthy.

END OF TEST

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

Section One

Questions **ONE** and **TWO**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1**–**4**.

Use **each** answer **only** once.

Mark your choices on the answer sheet.

QUESTION ONE

We can now produce animals and plants with characteristics we prefer.

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

A embryo transplants

B sexual reproduction

C taking cuttings

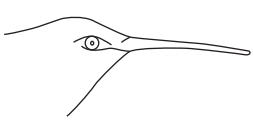
D tissue culture

1	a quick and cheap way of reproducing a plant
2	produces clones of an animal
3	produces offspring using small groups of cells from a plant
4	produces offspring with a variety of different characteristics

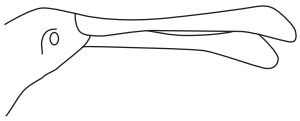
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QUESTION TWO

Birds have beaks which are adapted to the way the birds feed.



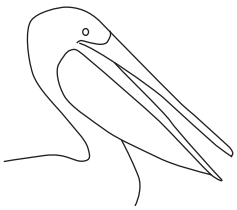
1



2



3



4

Match feeding methods, **A**, **B**, **C** and **D**, with the birds **1**–**4**.

A catches fish and carries them inside its lower beak

B sucks nectar from deep inside a flower

C shovels up the mud at the bottom of water to find food

D rips animal prey to pieces

Turn over for the next question

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Section Two

Questions **THREE** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION THREE

The picture shows part of a forest burning in Mexico.



3A The main reason for burning forests like this is to . . .

1 reduce the need for fertilisers.

2 use the land for agriculture.

3 use the land for roads.

4 reduce the 'greenhouse effect'.

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3B Many scientists believe that large-scale deforestation has led to an increase in the carbon dioxide concentration in the atmosphere.

Which row in the table shows the effects of deforestation?

	Amount of carbon dioxide locked up in wood	Amount of carbon dioxide released by burning	Amount of carbon dioxide released by microorganisms
1	increases	decreases	increases
2	decreases	increases	increases
3	increases	increases	increases
4	decreases	decreases	decreases

3C Deforestation affects biodiversity.

What does the biodiversity of a habitat measure?

1 the total number of all living things in the habitat

2 the number of animal and plant species that have become extinct in the habitat

3 the number of different species in the habitat

4 the total number of animals of the most common species in the habitat

3D Sometimes cattle may be kept on areas that have been deforested.

Which gas in the atmosphere is produced in large amounts by cattle but not by humans?

1 carbon dioxide

2 methane

3 oxygen

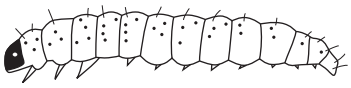
4 sulfur dioxide

Turn over for the next question

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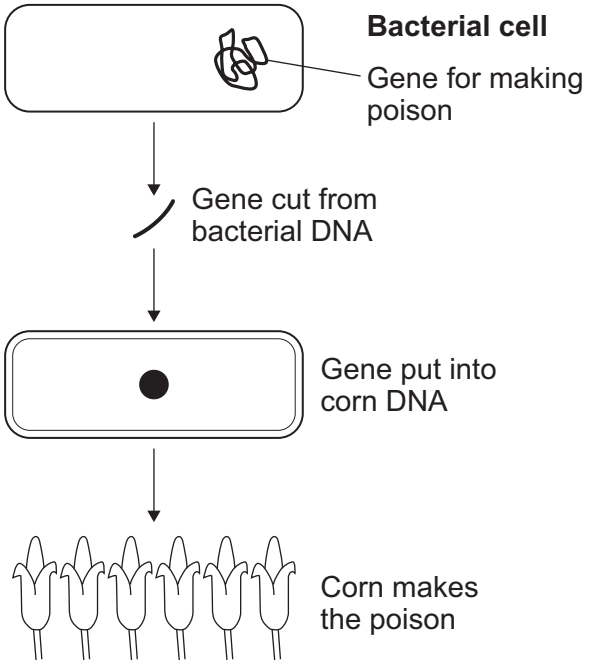
QUESTION FOUR

The drawing shows a European corn borer. European corn borers eat and destroy corn stems.



It is possible to produce corn plants that produce a poison which kills the corn borer if it eats any part of the plant.

The gene for making the poison is cut from the genetic material of a bacterial cell. The gene is then inserted into the cells of a corn plant. The corn plant then produces the poison.



4A Transferring genes from one organism to another is called . . .

1 cloning.

2 evolution.

3 genetic engineering.

4 tissue culture.

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4B One economic benefit of producing this type of corn is that . . .

1 more people will want to buy this type of corn.

2 there will be fewer pests.

3 the farmer will need to use less fertiliser.

4 the farmer will produce more corn.

4C An environmental concern about growing this type of corn is that . . .

1 more chemicals will have to be used on the land.

2 it is against some people's religious beliefs.

3 the bacterial gene may get transferred to wild plant species.

4 this type of corn will be much more expensive.

4D Scientists think that this type of corn is not harmful for people to eat.

This is very difficult to prove because . . .

1 people will not volunteer to be part of a trial.

2 the human diet contains a wide variety of foods.

3 scientists are not allowed to carry out experiments on humans.

4 animals that eat this corn appear to be healthy.

Turn over for the next question

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QUESTION FIVE

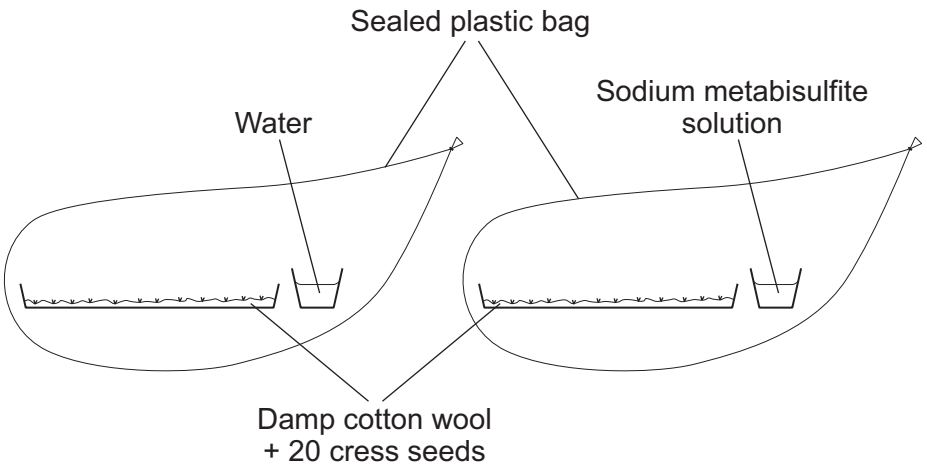
Sulfur dioxide is a pollutant gas.

5A Which row in the table shows activities that can release sulfur dioxide into the atmosphere?

	Burning coal	Planting rice	Farming cattle	Driving cars
1	✓	✓	✓	
2	✓	✓		✓
3	✓		✓	
4	✓			✓

The diagram shows an experiment to investigate the effect of sulfur dioxide gas on the germination of cress seeds.

Sodium metabisulfite solution gives off sulfur dioxide gas.



Both bags were left in the same warm laboratory for several days. Then the number of seeds that germinated was counted.

Five different groups of students did the experiment.

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5B Which row in the table shows the correct variables?

	Number of cress seeds in dish	Number of cress seeds that germinated	Sodium metabisulfite solution
1	dependent	control	independent
2	independent	dependent	control
3	control	dependent	independent
4	control	independent	dependent

The table shows the results for the five groups of students **R**–**V**.

Group	Number of seeds that germinated	
	Bag containing water	Bag containing sodium metabisulfite solution
R	17	5
S	15	8
T	15	5
U	16	8
V	17	9

5C What is the best conclusion that can be drawn from these results?

1 Sodium metabisulfite solution kills cress seeds.

2 Sulfur dioxide stops the germination of cress seeds.

3 Sulfur dioxide has a negative effect on the germination of cress seeds.

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

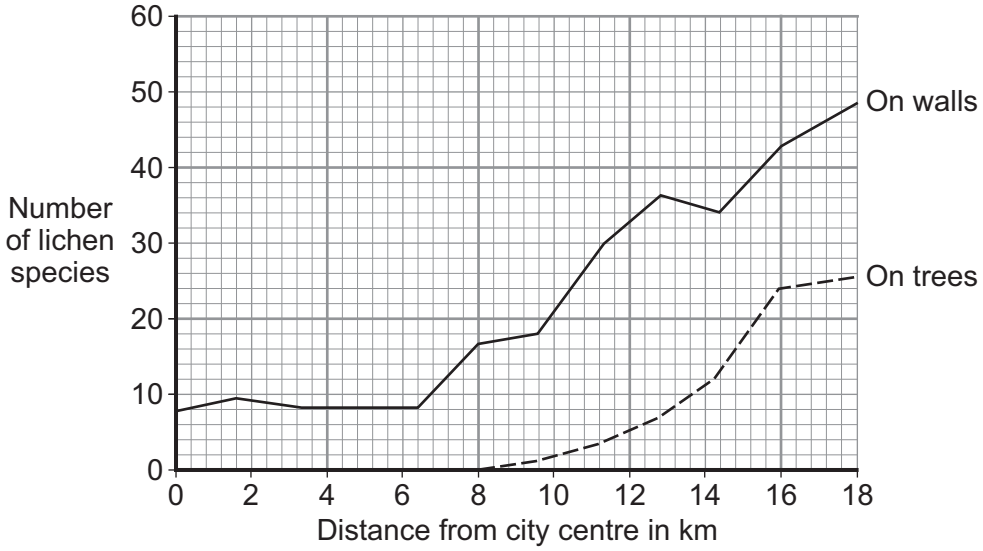
Question 5 continues on the next page

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5D Scientists counted the lichen species found on the walls and the trees in a city.

The table and graph show the effect of sulfur dioxide on the number of lichen.

Distance from city centre in km	Sulfur dioxide concentration in the air in g per m^3
0	200
2.5	160
8	65
90	65



What is the best conclusion that can be drawn from this information?

1 No lichens can survive at concentrations between 160 and 200 g per m^3.

2 Lichens growing on walls are less tolerant of sulfur dioxide than lichens growing on trees.

3 Lichens that grow on trees cannot tolerate sulfur dioxide concentrations above 65 g per m^3.

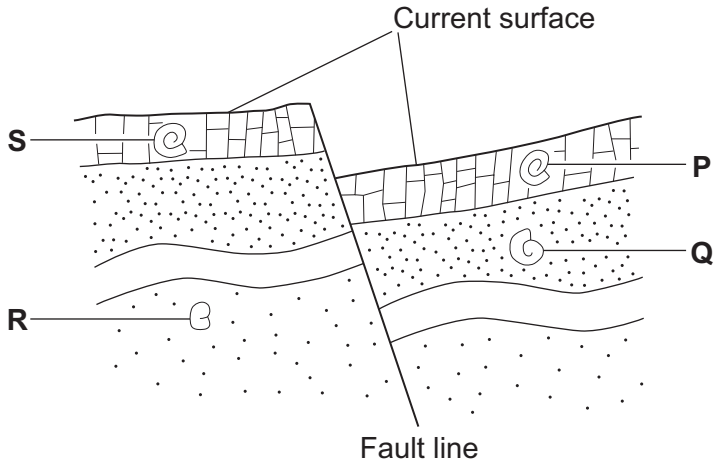
4 Lichens that grow on walls cannot tolerate sulfur dioxide concentrations above 200 g per m^3.

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Turn over for the next question

QUESTION SIX

The diagram shows where fossils have been found in layers of rock.



6A Which fossil in the diagram shows the organism that developed first?

1 **P**

2 **Q**

3 **R**

4 **S**

6B Scientists think that the ancestors of fossil **P** were like fossil **Q** but they cannot be certain.

Which of the following is the most likely reason why the scientists cannot be certain?

1 Other fossils showing the evolutionary sequence have not yet been found.

2 Some scientists do not believe in evolution.

3 Fossils can form only in swamps.

4 Fossil **P** has many different features from fossil **Q**.

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6C The thickness of the shell of each of the fossils discovered in these rocks was measured.

First the scientists would write the hypothesis.

Then the scientists would write . . .

1 a conclusion.

2 an evaluation.

3 a prediction.

4 a theory.

6D What is needed for a new characteristic in an organism to be produced?

1 a constant environment

2 mutations in genes

3 changes in acquired characteristics

4 diseases to kill off some of the species

Turn over for the next question

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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.

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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.

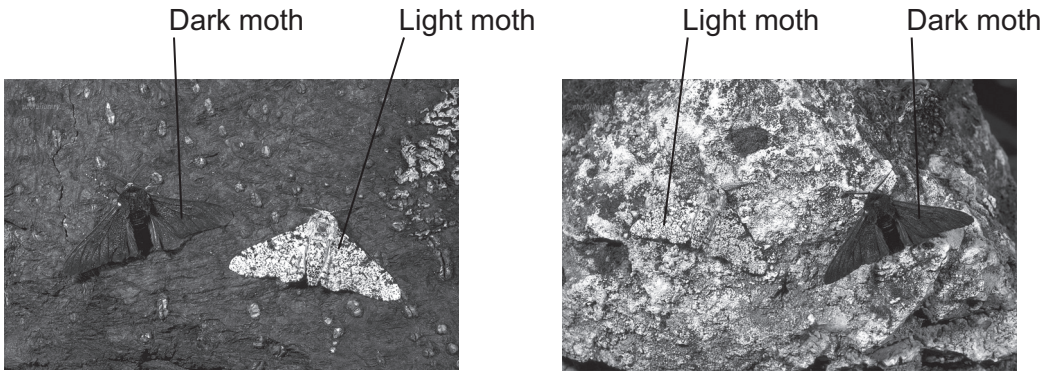
4 reflects heat radiation from the Sun back out to space.

Turn over for the next question

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QUESTION EIGHT

The peppered moth has two colour forms, dark and light. The moths can be camouflaged against a similar coloured background, so a predator is less likely to see the moths.



Dark tree **Light tree**

8A Scientists surveyed the number of light and dark coloured moths in woods in which the trees had either mainly light or mainly dark (polluted) coloured trunks. Their results are shown in **Table 1**.

Table 1

Wood	Percentage of each type of moth found (%)	
	Light moths	Dark moths
Wood with mainly light tree trunks	95	5
Polluted wood with mainly dark tree trunks	10	90

This data provides evidence for . . .

1 artificial selection.

2 extinction.

3 inheritance of acquired characteristics.

4 survival of the fittest.

A scientist investigated the survival rates of the moths that were released in two different types of woodland areas which had trees:

- with the same colour background as the moth colour
- with a different colour background from the moth colour.

The two areas of woodland were enclosed to stop the moths from flying out of them. Birds that are predators of moths were present in both areas.

The moths were released in the morning. The surviving moths were recaptured early the next night, when they normally fly about.

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Table 2 shows the results.

Table 2

	Number of moths released	Moths lost or eaten by birds	% decrease in numbers of moths
Area which had trees with same colour background as moth colour	751	128	17.0
Area which had trees with different colour background from moth colour	53	17	32.1

8B The scientist did not use the same number of moths in each area.

Because of this, . . .

1 the results are not valid.

2 the scientist had to calculate the percentage change in moth numbers.

3 the number of predators cannot be calculated.

4 the survival rate for each moth colour cannot be calculated.

8C Which of the following is the best conclusion from the data in **Table 2**?

1 Moths released into a contrasting coloured background were more likely to be eaten by predators.

2 All the non-recaptured moths were eaten by birds.

3 The colour of the moth did not affect the chance of being eaten by predators.

4 More moths were eaten by birds when released in areas with similar background colours.

Bats eat moths and the bats fly at night. The moths are active at night, but not during the day. A scientist released both colours of moths into areas where the bats were flying at night.

Table 3 shows the results.

Table 3

Colour of moths	Number of moths released	Number of moths eaten by bats
Light coloured	164	53
Dark coloured	157	47

8D Using information from **Tables 1**, **2** and **3**, which of the moth predators chose their prey by colour?

1 bats only

2 birds only

3 bats and birds

4 neither bats nor birds

Turn over ▶

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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

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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

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Version 1.0: 01/04/2011

GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1BP, BL1BSF & BL1BSH

Mark Scheme

2011 Examination – March Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

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GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

March 2011

Foundation Tier

Question	Key		
One	**A**	long beak	**3**
	B	wide-spread toes	**1**
	C	short wings	**4**
	D	brown feathers	**2**
Two	**A**	carbon dioxide	**2**
	B	herbicide	**3**
	C	sulfur dioxide	**1**
	D	pesticide	**4**
Three	**A**	160	**4**
	B	1200	**3**
	C	1400	**2**
	D	2600	**1**
Four	**A**	the organism is now a better competitor	**2**
	B	the mutated gene is passed on to offspring	**3**
	C	a gene mutates	**1**
	D	a new species is produced	**4**
Five	**A**	embryo transplants	**2**
	B	sexual reproduction	**4**
	C	taking cuttings	**1**
	D	tissue culture	**3**

	A	B	C	D
Six	**2**	**4**	**1**	**2**
Seven	**4**	**1**	**1**	**4**
Eight	**2**	**2**	**3**	**2**
Nine	**3**	**4**	**3**	**2**

GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1BP (Evolution and Environment)

March 2011

Higher Tier

Question	Key		
One	**A**	embryo transplants	**2**
	B	sexual reproduction	**4**
	C	taking cuttings	**1**
	D	tissue culture	**3**
Two	**A**	catches fish and carries them inside its lower beak	**4**
	B	sucks nectar from deep inside a flower	**1**
	C	shovels up the mud at the bottom of water to find food	**2**
	D	rips animal prey to pieces	**3**

	A	**B**	**C**	**D**
Three	**2**	**2**	**3**	**2**
Four	**3**	**4**	**3**	**2**
Five	**4**	**3**	**3**	**3**
Six	**3**	**1**	**3**	**2**
Seven	**3**	**4**	**2**	**2**
Eight	**4**	**2**	**1**	**2**
Nine	**1**	**1**	**3**	**3**

OTQ3

GCSE SCIENCE

AQA

Unit : BLY1BP BIOLOGY UNIT 1B

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 3G11

02-MAR-11

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	embryo transplants	○	○	○	○
1B	sexual reproduction	○	○	○	○
1C	taking cuttings	○	○	○	○
1D	tissue culture	○	○	○	○

QUESTION TWO		1	2	3	4
2A	catches fish and carries them inside its lower beak	○	○	○	○
2B	sucks nectar from deep inside a flower	○	○	○	○
2C	shovels up the mud at the bottom of water to find food	○	○	○	○
2D	rips animal prey to pieces	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A long beak	○	○	○	○
1B wide-spread toes	○	○	○	○
1C short wings	○	○	○	○
1D brown feathers	○	○	○	○

QUESTION TWO	1	2	3	4
2A carbon dioxide	○	○	○	○
2B herbicide	○	○	○	○
2C sulfur dioxide	○	○	○	○
2D pesticide	○	○	○	○

QUESTION THREE	1	2	3	4
3A 160	○	○	○	○
3B 1200	○	○	○	○
3C 1400	○	○	○	○
3D 2600	○	○	○	○

QUESTION FOUR	1	2	3	4
4A the organism is now a better competitor	○	○	○	○
4B the mutated gene is passed on to offspring	○	○	○	○
4C a gene mutates	○	○	○	○
4D a new species is produced	○	○	○	○

QUESTION FIVE	1	2	3	4
5A embryo transplants	○	○	○	○
5B sexual reproduction	○	○	○	○
5C taking cuttings	○	○	○	○
5D tissue culture	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
November 2010

Science A

Unit Biology B1b (Evolution and Environment)

Biology

Unit Biology B1b (Evolution and Environment)

BLY1BP

F&H

Thursday 11 November 2010 Afternoon Session

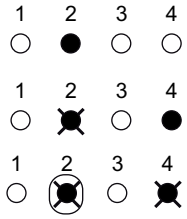
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed
- 30 minutes

Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1b' printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

Section One

Questions **ONE** to **FIVE**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

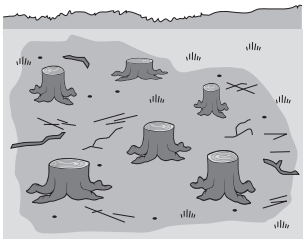
Use **each** answer only **once**.

Mark your choices on the answer sheet.

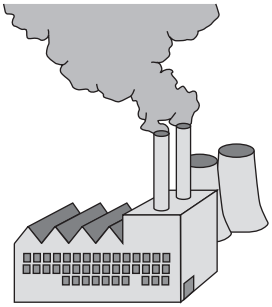
QUESTION ONE

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

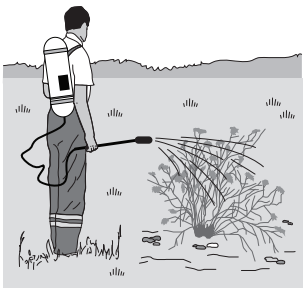
1



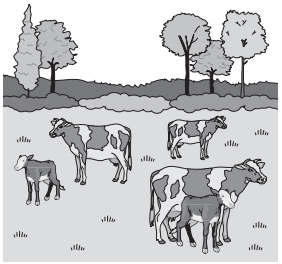
2



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

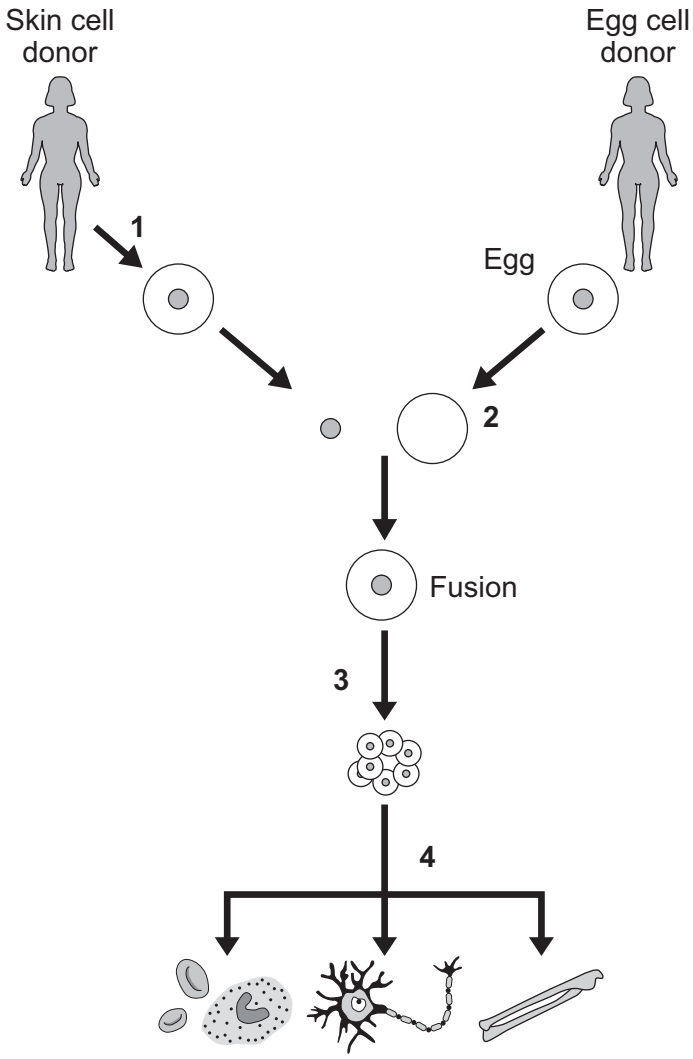
C may pollute farmland with poisonous chemicals

D produces methane

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QUESTION TWO

Fusion cell cloning can make different types of body cell. The diagram shows one way of doing this.



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

A A skin cell is taken from a donor.

B The new cell divides to make a group of similar cells.

C Different types of body cell are produced.

D The nucleus is removed, leaving cytoplasm.

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QUESTION THREE

Living things have evolved on Earth over billions of years.

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

A extinction

B mutation

C natural selection

D variation

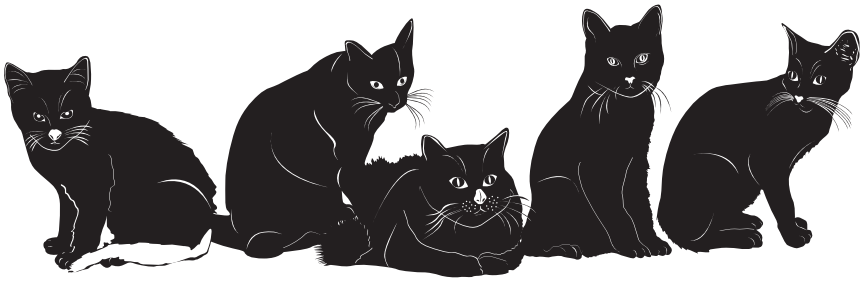
1	a sudden change in a gene or chromosome
2	the range of differences in the characteristics of a species
3	the survival of organisms best suited to the environment
4	the death of all organisms of a species

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QUESTION FOUR

These young kittens look like their parents.

Kittens look like their parents because information is passed from the parents to their young. The information is about characteristics such as fur colour.



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

A chromosomes

B clones

C gametes

D genes

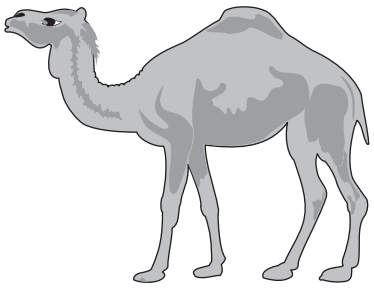
1	are kittens with identical characteristics
2	control one characteristic, eg fur colour
3	are sex cells
4	are thread-like structures carrying the information

Turn over for the next question

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QUESTION FIVE

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



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

A the wind blows sand around

B very cold nights

C soft ground

D dry conditions

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

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Turn over for the next question

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Section Two

Questions **SIX** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION SIX

This question is about evolution.

6A Approximately how long ago did the first simple life-forms appear on Earth?

1 300 000 years

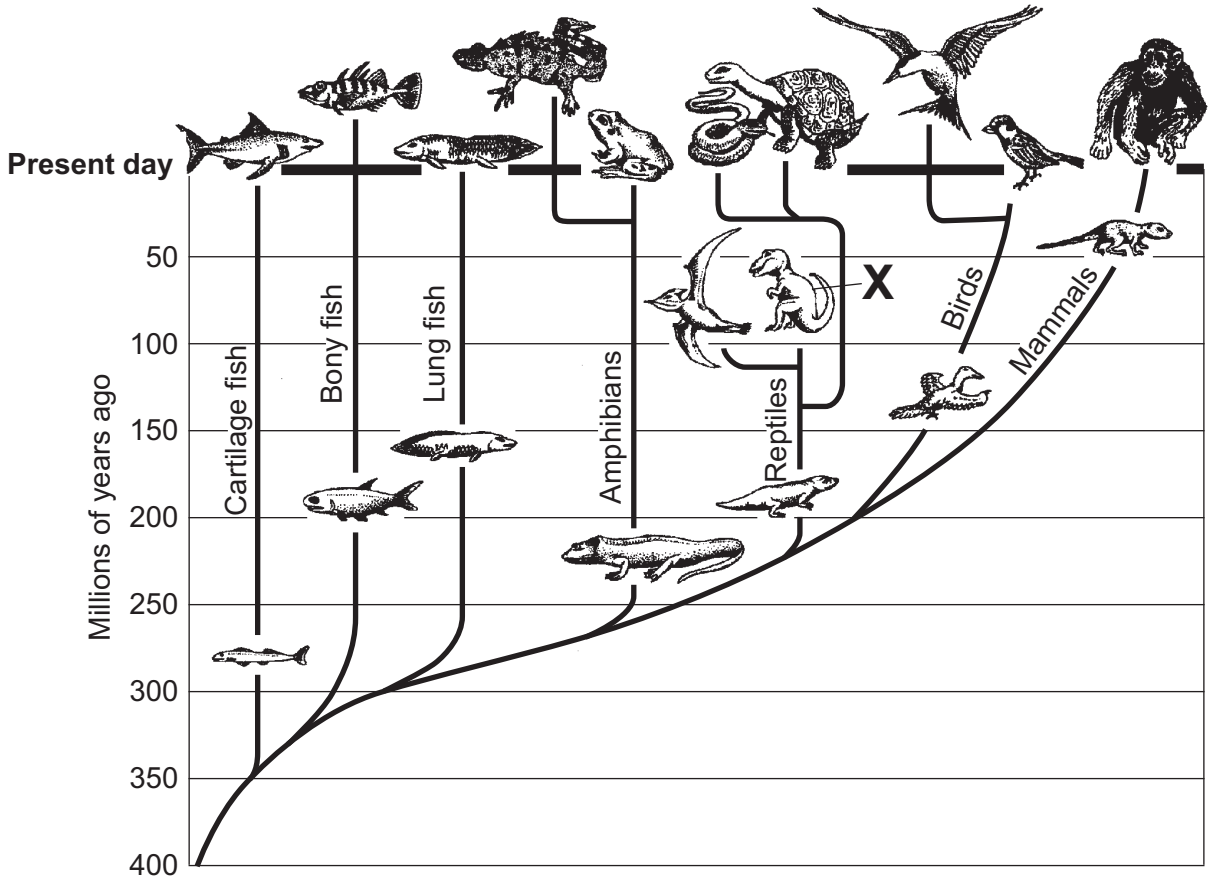
2 3 million years

3 300 million years

4 3 billion years

The diagram shows an evolutionary tree for some groups of animals.

All the species below the line for present day are extinct.



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6B Which group of animals shown on the diagram evolved first?

1 mammals

2 birds

3 reptiles

4 cartilage fish

6C Which two groups of animals evolved at nearly the same time?

1 cartilage fish and bony fish

2 reptiles and birds

3 mammals and birds

4 reptiles and amphibians

6D The animal labelled **X** has been extinct for over 50 million years.

How do we know that animal **X** once lived?

1 Drawings of the animal were made when the animal was alive.

2 Fossils of the animal have been found in rocks.

3 People were alive to see the animal.

4 Reptiles are alive today.

Turn over for the next question

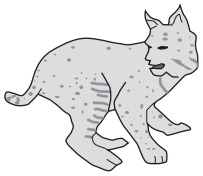
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QUESTION SEVEN

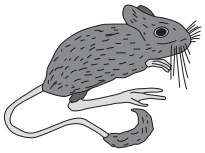
The drawings are of animals and plants that live in a hot, dry environment.



Fennec fox



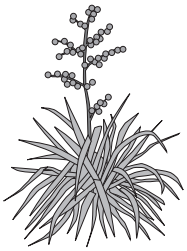
Bobcat



Jerboa



Antelope squirrel



Yucca



Prickly pear cactus

7A Which two of the above organisms might compete for water?

1 fennec fox and yucca

2 jerboa and prickly pear cactus

3 yucca and prickly pear cactus

4 antelope squirrel and yucca

7B All the animals above probably compete for . . .

1 light.

2 oxygen.

3 carbon dioxide.

4 territory.

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7C When the plants grow close together, the plants above do **not** compete for . . .

1 prey.

2 water.

3 light.

4 space.

7D To help it to lose heat, the fennec fox has . . .

1 forward facing eyes.

2 camouflaged fur.

3 sharp claws.

4 large ears.

Turn over for the next question

QUESTION EIGHT

Some foods are produced from genetically modified (GM) crops. Genetic engineering produces GM plants.

8A What is *genetic engineering*?

1 asexual reproduction

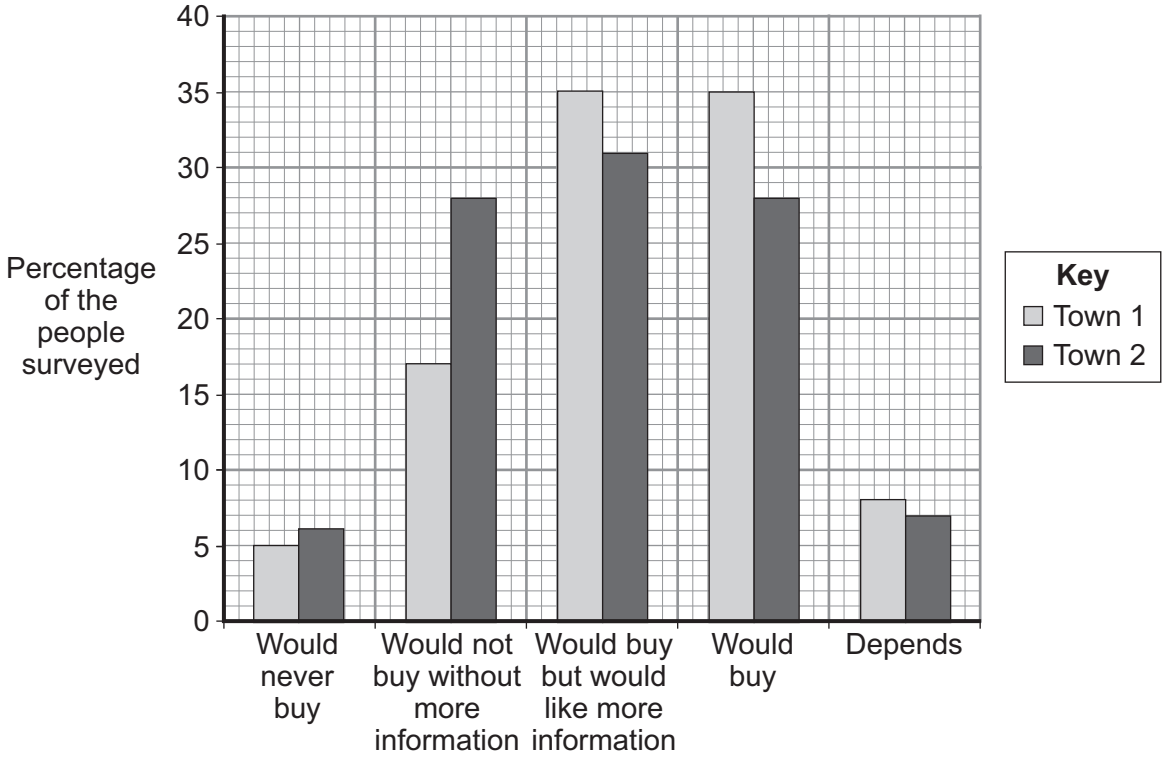
2 transferring new genes to organisms

3 causing mutations in organisms

4 developing disease resistant bacteria

8B **Graph 1** shows what people in **Town 1** and **Town 2** think about GM labelled foods.

Graph 1



In **graph 1**, what percentage of the people surveyed in **Town 1** would buy GM foods, but would like more information about them?

1 28 %

2 31 %

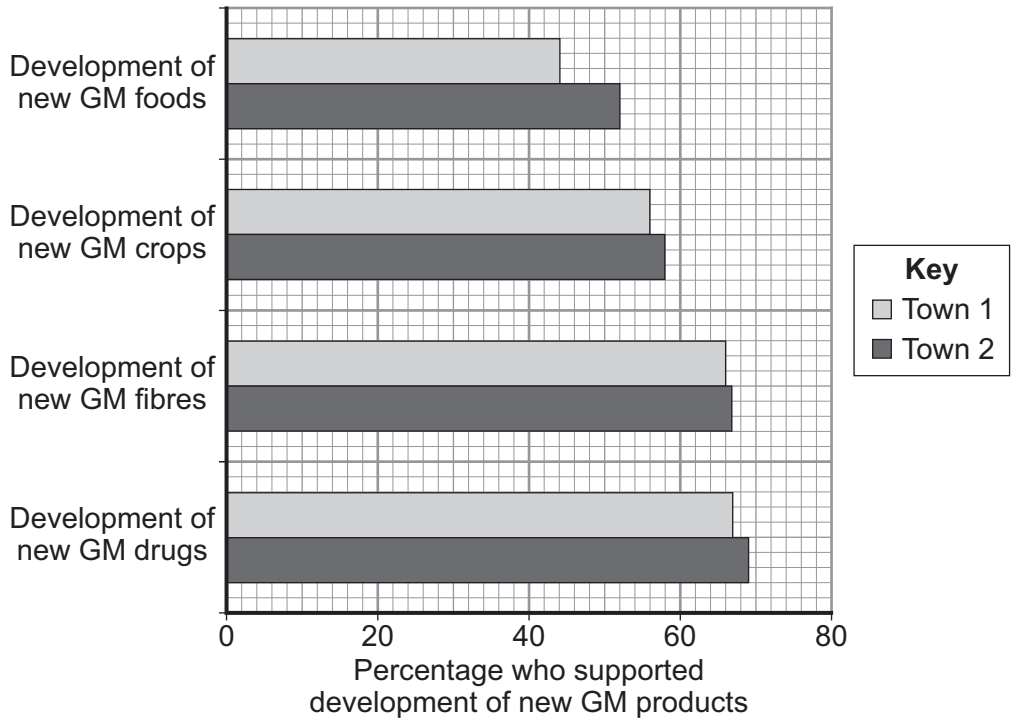
3 35 %

4 66 %

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8C **Graph 2** shows the amount of support among people in the two towns for the development of new GM products.

Graph 2



Graph 2 shows that . . .

1 more people in **Town 1** than in **Town 2** support the development of new GM foods.

2 more people in **Town 2** than in **Town 1** support the development of new GM crops.

3 the same number of people in **Town 1** and in **Town 2** support the development of new GM foods.

4 more people in **Town 1** than in **Town 2** support the development of new GM drugs.

8D Some people in England have protested against GM crops being grown and GM foods being sold in shops.

The most likely reason for the protests is that . . .

1 scientists have increased crop yields.

2 people think that GM crops will damage farmland.

3 farmers do not want to grow crops which are resistant to insect attack.

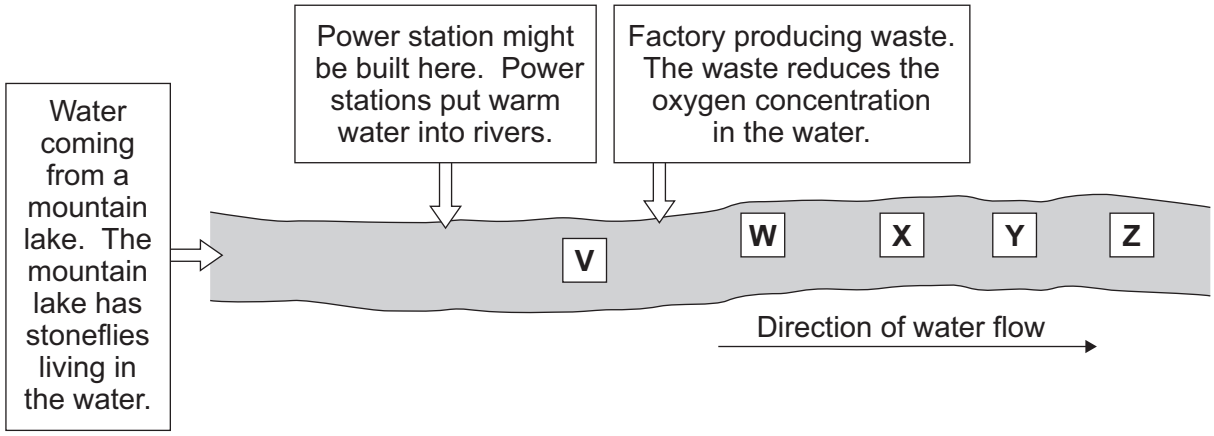
4 people think that GM foods may be a risk to human health.

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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

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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

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

Section One

Questions **ONE** and **TWO**.

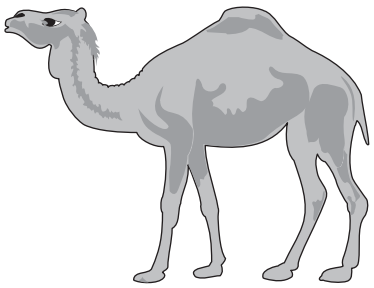
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

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



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

A the wind blows sand around

B very cold nights

C soft ground

D dry conditions

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

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QUESTION TWO

There are several different techniques used to clone plants and animals.

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

A adult cell cloning

B taking cuttings

C embryo transplants

D tissue culture

The type of cloning used by gardeners is usually . . . **1** . . . .

Scientists who want to quickly grow large numbers of plants from one very expensive plant would use . . . **2** . . . .

Scientists who want to produce several identical cows from two parents would use . . . **3** . . . .

Scientists who want to produce a cow identical to the cow that had won a national show would use . . . **4** . . . .

Turn over for the next question

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Section Two

Questions **THREE** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION THREE

Some foods are produced from genetically modified (GM) crops. Genetic engineering produces GM plants.

3A What is *genetic engineering*?

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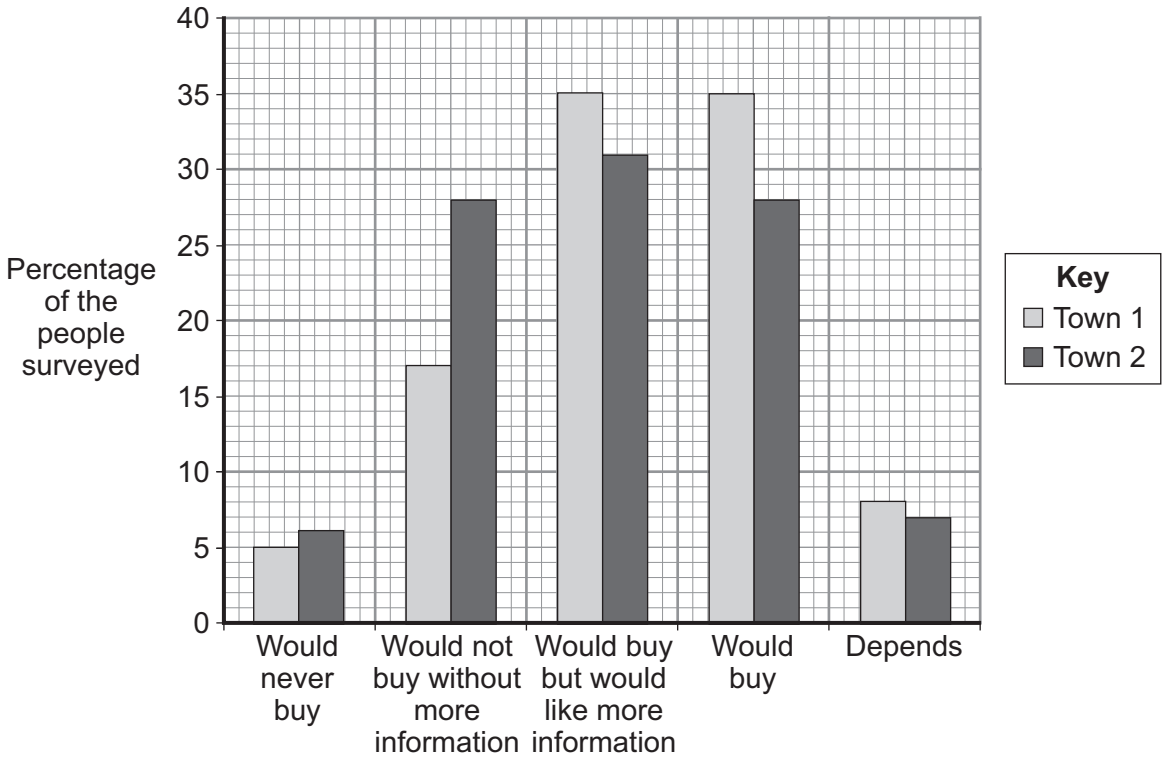
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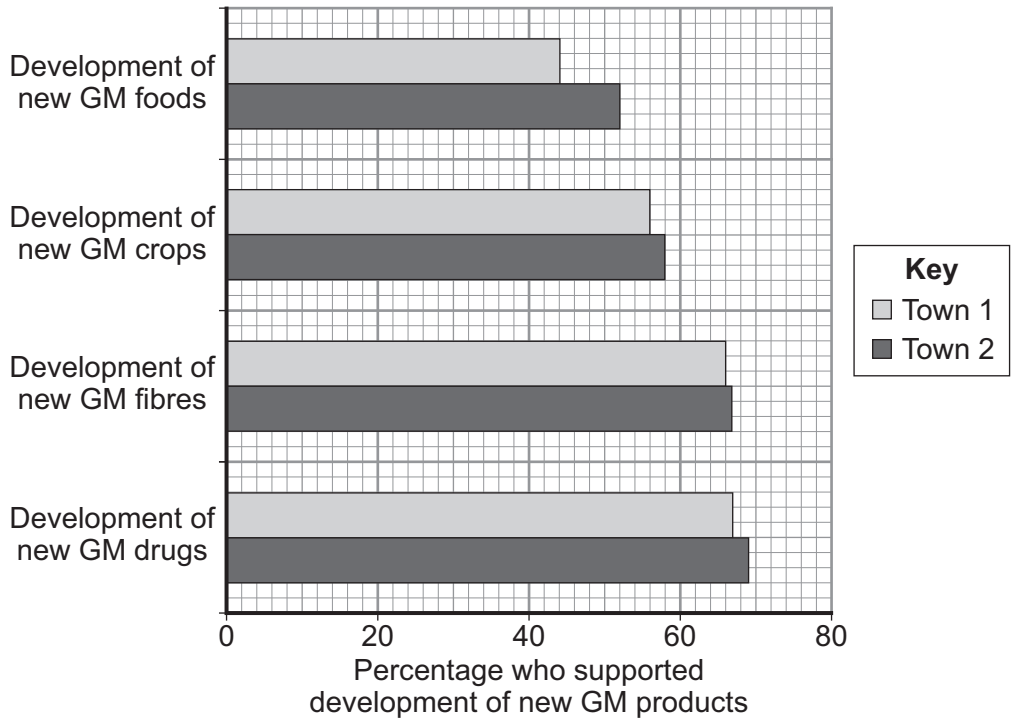
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Graph 2



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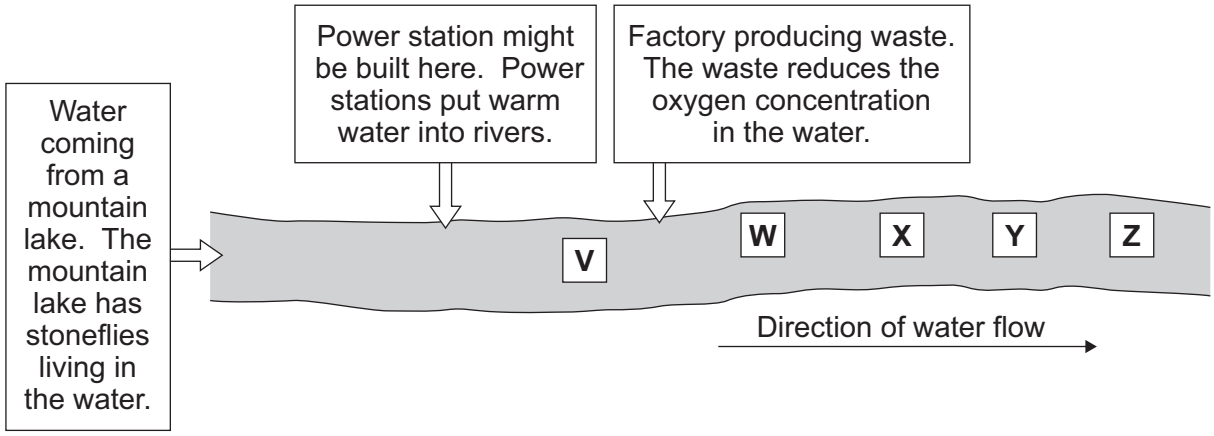
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1 only sampled the water once at each site.

2 are not very accurate.

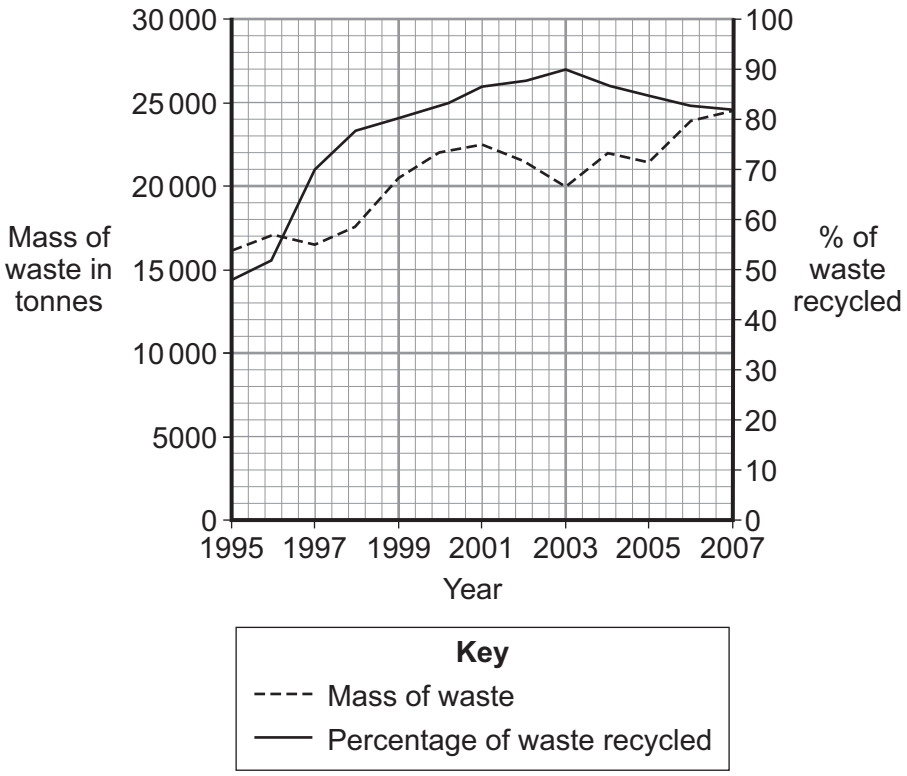
3 are not very reliable.

4 cannot be calibrated.

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QUESTION FIVE

The graph shows how waste is managed at an airport.



5A What mass of waste was **recycled** in 2003?

1 2000 tonnes

2 18000 tonnes

3 20000 tonnes

4 22000 tonnes

5B Which were the most successful years at this airport for waste prevention and recycling?

1 1995 to 1997

2 1998 to 2000

3 2001 to 2003

4 2004 to 2006

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5C Some waste can be burned.

One **disadvantage** of this method is that the sulfur dioxide produced will add to . . .

1 global warming.

2 the greenhouse effect.

3 climate change.

4 acid rain.

5D There are advantages in burning waste.

Burning the waste could . . .

1 reduce the use of fossil fuels.

2 reduce air pollution.

3 increase the amount of carbon dioxide in the air.

4 increase the amount of landfill.

Turn over for the next question

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QUESTION SIX

There are about 1.4 million different animal species and 400 000 different plant species known to be alive today.

About 720 000 of these known plant and animal species are found in tropical rainforests.

The extinction rate of tropical forest species is increasing.

6A What percentage of the world's known species of plants and animals is found in tropical rainforests?

1 29 %

2 40 %

3 51 %

4 70 %

6B What term is used to describe the range of different species in an environment such as a tropical rainforest?

1 selection

2 variation

3 biodiversity

4 evolution

6C What is the most likely cause of the extinction of these species in the tropical rainforests?

1 acid rain

2 the evolution of new predators

3 genetically modified (GM) crops

4 loss of habitat

6D Extinction happens when all the adults die before . . .

1 passing their genes on to the next generation.

2 enough fossil evidence is produced.

3 it is known what use they can be to humans.

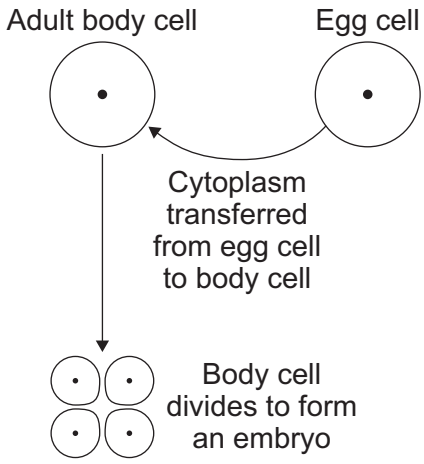
4 their genes have been able to mutate.

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Turn over for the next question

QUESTION SEVEN

The diagram shows one method of cloning animals.



7A This method of cloning is called . . .

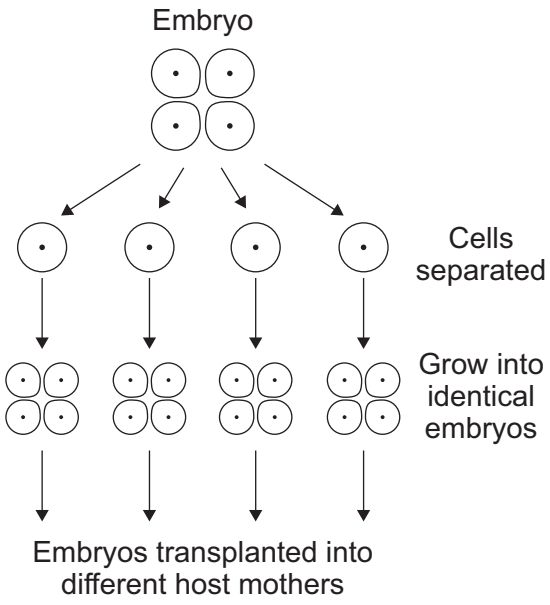
1 sexual reproduction.

2 embryo transplantation.

3 fusion cell cloning.

4 tissue culture.

The cells of the embryo can be separated and allowed to grow into identical embryos.
The embryos are then implanted into different host mothers.



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7B The offspring would . . .

1 all look like the animal from which the egg cell was taken.

2 all look like the animal from which the adult body cell was taken.

3 look like the host mother that they developed inside.

4 not look like any of the other animals.

Scientists are carrying out research on human cell cloning to produce unspecialised embryonic cells. Unspecialised embryonic cells could be used to treat incurable diseases. One incurable disease is Parkinson's disease. Parkinson's disease affects the nervous system.

7C Unspecialised embryonic cells are useful in the search for cures for different diseases.

This is because unspecialised embryonic cells . . .

1 are nerve cells.

2 can grow into human beings.

3 are easy to produce.

4 can be made to grow into many different types of cell.

7D An ethical argument **against** this type of research is that . . .

1 this research will probably not be successful for a long time.

2 the research will help only a small number of people.

3 embryos are made, and then some of these embryos are destroyed.

4 God would not like this research.

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QUESTION EIGHT

The Indian government is encouraging sustainable development.

8A Which is the best definition of *sustainable development*?

1 using energy in the most efficient way

2 bringing modern technology to villages

3 improving the quality of life now, but not affecting future generations

4 using modern technology in a traditional way

Read the following statements about India.

India is . . .

U planning a 30 % increase in electrical power output.

V giving sunlight-powered lamps to people living in villages that do not have electricity.

W changing petrol-driven taxis to battery-operated taxis.

X using coal, gas and oil-fuelled power stations to produce 65 % of India's electricity.

Y producing up to 34 000 barrels of oil per day from a new oil well. This will last for the next 11 years.

Z employing people to ride bicycles around villages buying waste for recycling.

8B Which statements describe ways that would help sustainable development in India?

1 **U**, **X** and **Y**

2 **V**, **X** and **Z**

3 **V**, **W** and **Z**

4 **W**, **X** and **Y**

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8C Which statement gives the greatest opportunity for sustainable development in all of India?

1 **U**

2 **X**

3 **Y**

4 **Z**

8D Which of the following is the best summary of the information in statements **U–Z**?

1 Most developments in India encourage sustainable development.

2 Sustainable development in India is mainly at a local level at the moment.

3 Only poor people will benefit from sustainable development.

4 Sustainable development can be achieved only by using modern technology.

Turn over for the next question

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QUESTION NINE

The drawings show two different species of butterfly.



Amauris



Hypolimnas

Many types of bird can eat both species.

- *Amauris* is poisonous to birds.
- *Hypolimnas* is **not** poisonous to birds.

There are many other examples of 'pairs' of poisonous species and non-poisonous species that look similar.

9A The most likely explanation for the similarity between poisonous and non-poisonous butterflies is that . . .

1 different species interbreed over many generations. This is how different species evolve.

2 the products of asexual reproduction can have slight differences. Environmental variation causes these differences.

3 non-poisonous species look like the poisonous species, and so the non-poisonous butterflies are more likely to survive and breed.

4 poisonous butterflies have evolved a defence mechanism against predators.

9B In the nineteenth century, some people did not accept Darwin's theory of natural selection.

Which of the following was **not** a reason to reject the theory?

1 It undermined the idea that God made all animals and plants.

2 There was insufficient fossil evidence to convince some scientists.

3 The mechanism of inheritance was not known at the time.

4 Lamarck's theory that organisms can inherit acquired characteristics was already well established.

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9C Fossils of early life-forms are not discovered very often because . . .

1 the early life-forms are all now extinct because of evolution.

2 the soft bodies of the early life-forms did not fossilise well.

3 the early life-forms have all evolved into more complex species.

4 the early life-forms are in rocks too deep in the Earth's crust and cannot be found.

9D Which of the following would **not** be a reason for the extinction of a species of butterfly?

1 the evolution of a new predator

2 the evolution of a disease organism

3 mutation in one individual butterfly

4 a 2°C rise in atmospheric temperature

END OF TEST

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There are no questions printed on this page

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ASSESSMENT and QUALIFICATIONS ALLIANCE

GCSE

Science A (4461) / Biology (4411)

Specification A

BLY1BP, BL1BSF & BL1BSH

Mark Scheme

2010 Examination – November Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

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GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1B (Evolution and Environment)

November 2010

Foundation Tier

Question	Key		
One	**A**	causes acid rain	**2**
	B	causes less carbon dioxide to be taken out of the atmosphere	**1**
	C	may pollute farmland with poisonous chemicals	**3**
	D	produces methane	**4**
Two	**A**	A skin cell is taken from a donor.	**1**
	B	The new cell divides to make a group of similar cells.	**3**
	C	Different types of body cell are produced.	**4**
	D	The nucleus is removed, leaving cytoplasm.	**2**
Three	**A**	extinction	**4**
	B	mutation	**1**
	C	natural selection	**3**
	D	variation	**2**
Four	**A**	chromosomes	**4**
	B	clones	**1**
	C	gametes	**3**
	D	genes	**2**
Five	**A**	the wind blows sand around	**3**
	B	very cold nights	**4**
	C	soft ground	**2**
	D	dry conditions	**1**

	A	B	C	D
Six	**4**	**4**	**3**	**2**
Seven	**3**	**4**	**1**	**4**
Eight	**2**	**3**	**2**	**4**
Nine	**1**	**3**	**3**	**1**

GCSE

SCIENCE A (4461) / BIOLOGY (4411)

Objective Test Answer Key

BLY1B (Evolution and Environment)

November 2010

Higher Tier

Question	Key		
One	**A**	the wind blows sand around	**3**
	B	very cold nights	**4**
	C	soft ground	**2**
	D	dry conditions	**1**
Two	**A**	adult cell cloning	**4**
	B	taking cuttings	**1**
	C	embryo transplants	**3**
	D	tissue culture	**2**

	A	B	C	D
Three	**2**	**3**	**2**	**4**
Four	**1**	**3**	**3**	**1**
Five	**2**	**3**	**4**	**1**
Six	**2**	**3**	**4**	**1**
Seven	**3**	**2**	**4**	**3**
Eight	**3**	**3**	**4**	**2**
Nine	**3**	**4**	**2**	**3**

AQA

Unit : BLY1BP **BIOLOGY UNIT 1B**

Centre :

Candidate Number : **UCI :**

Series : BG10

Candidate Name :

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE

		1	2	3	4
1A	the wind blows sand around	○	○	○	○
1B	very cold nights	○	○	○	○
1C	soft ground	○	○	○	○
1D	dry conditions	○	○	○	○

QUESTION TWO

		1	2	3	4
2A	adult cell cloning	○	○	○	○
2B	taking cuttings	○	○	○	○
2C	embryo transplants	○	○	○	○
2D	tissue culture	○	○	○	○

QUESTION THREE

	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR

	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE

	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX

	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN

	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT

	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE

	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE	1	2	3	4
1A causes acid rain	○	○	○	○
1B causes less carbon dioxide to be taken from atmosphere	○	○	○	○
1C may pollute farmland with poisonous chemicals	○	○	○	○
1D produces methane	○	○	○	○

QUESTION TWO	1	2	3	4
2A A skin cell is taken from a donor	○	○	○	○
2B The new cell divides to make a group of similar cells	○	○	○	○
2C Different types of body cell are produced	○	○	○	○
2D The nucleus is removed, leaving cytoplasm	○	○	○	○

QUESTION THREE	1	2	3	4
3A extinction	○	○	○	○
3B mutation	○	○	○	○
3C natural selection	○	○	○	○
3D variation	○	○	○	○

QUESTION FOUR	1	2	3	4
4A chromosomes	○	○	○	○
4B clones	○	○	○	○
4C gametes	○	○	○	○
4D genes	○	○	○	○

QUESTION FIVE	1	2	3	4
5A the wind blows sand around	○	○	○	○
5B very cold nights	○	○	○	○
5C soft ground	○	○	○	○
5D dry conditions	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
June 2010

Science A

Unit Biology B1b (Evolution and Environment)

Biology

Unit Biology B1b (Evolution and Environment)

BLY1BP

F&H

Monday 28 June 2010 Morning Session

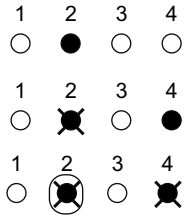
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed
- 30 minutes

Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1b' printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

Section One

Questions **ONE** to **FIVE**.

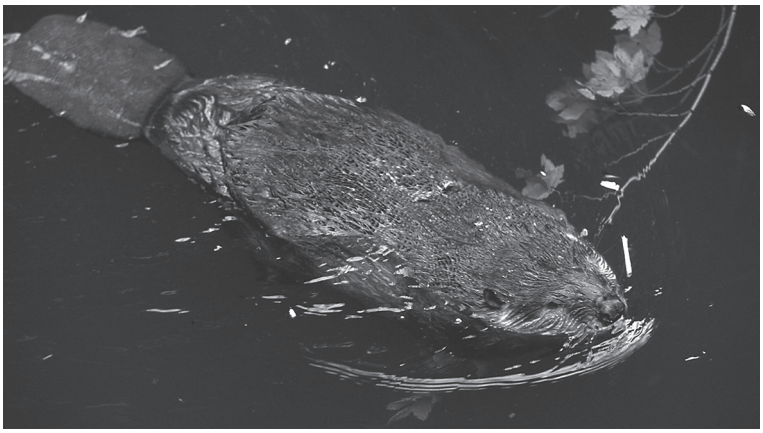
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

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



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

A thick fur coat

B large front teeth

C muscular flat tail

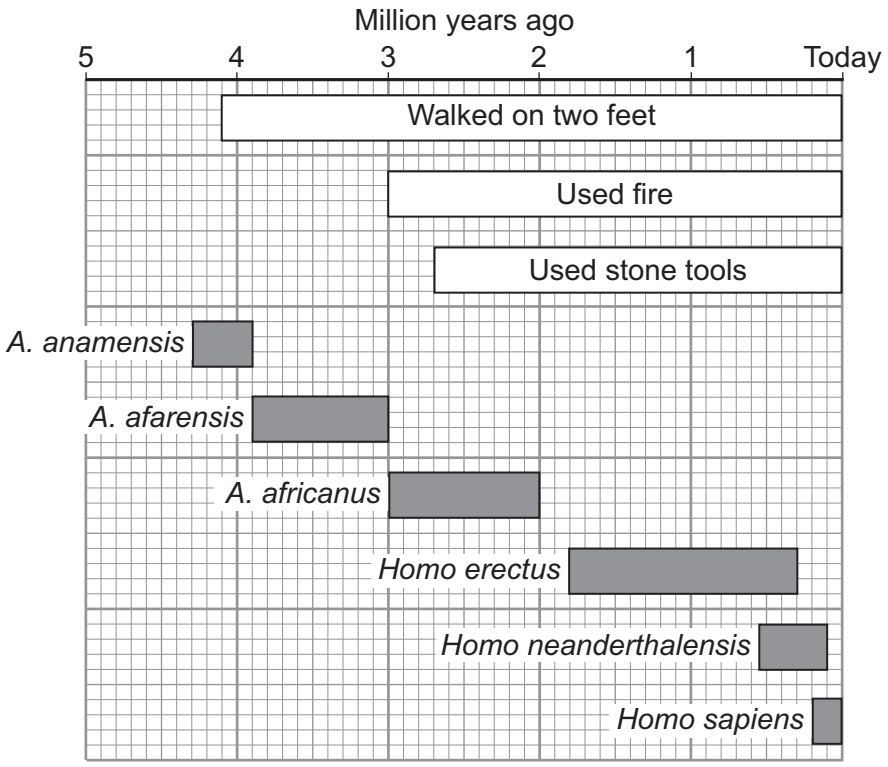
D clear coverings over each eye

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

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QUESTION TWO

The diagram shows a timeline for the evolution of humans.



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

A *A. anamensis*

B *A. africanus*

C *Homo erectus*

D *Homo sapiens*

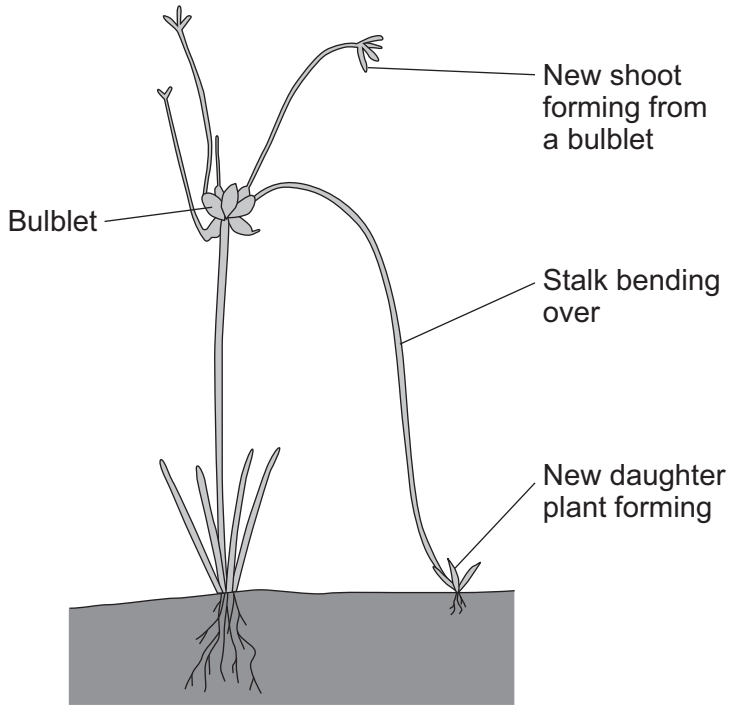
1	is still alive today
2	survived for the longest time
3	first human to walk on two feet
4	first human to walk on two feet, to use fire and to use stone tools

Turn over ▶

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QUESTION THREE

Walking onion plants grow a bunch of bulblets (tiny bulbs).
The bulblets start to grow and the stalks bend over with the weight of the new growth. This makes the onion plant seem to walk across the garden.



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

A bulblet

B clone

C gamete

D parent

Producing plants in this way is called asexual reproduction.

Asexual reproduction needs only one . . . **1** . . . .

Asexual reproduction does **not** involve production of a . . . **2** . . . .

The daughter plant is formed from a . . . **3** . . . .

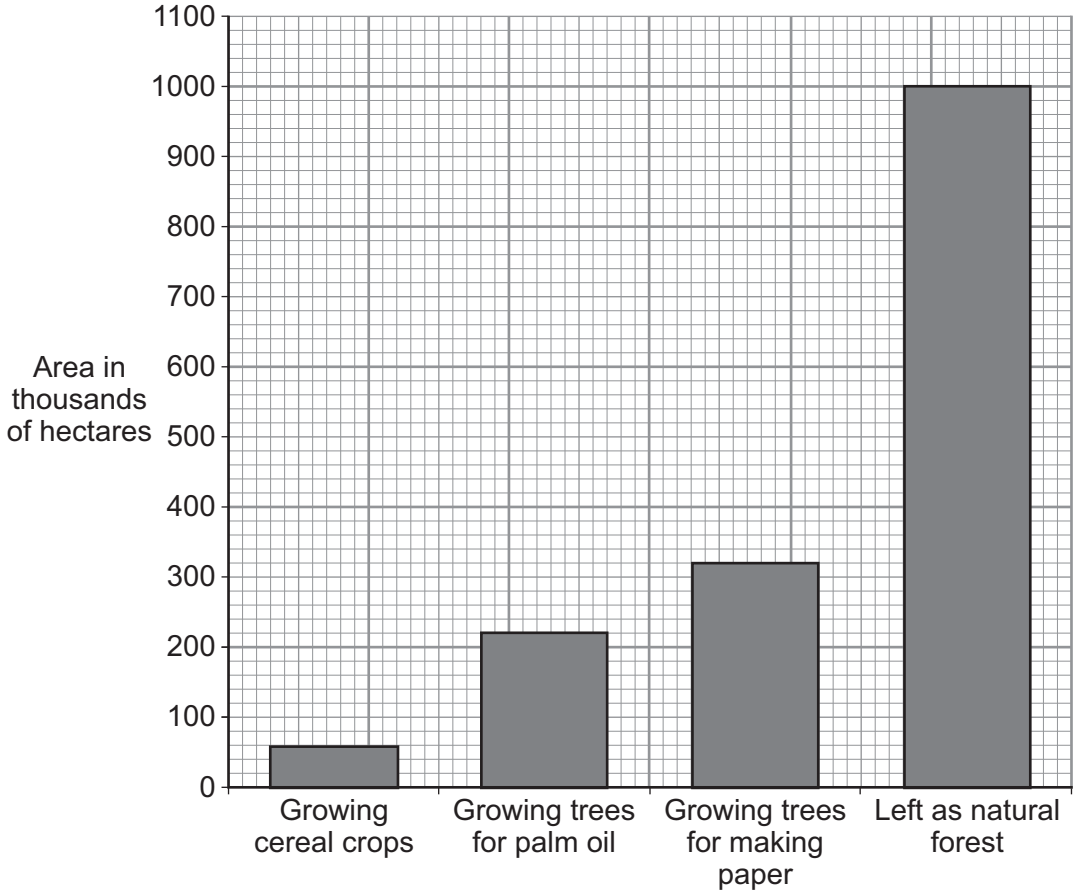
The daughter plant is identical to the parent plant so it is called a . . . **4** . . . .

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QUESTION FOUR

Tropical forests are being cut down and the cleared land used for other purposes.

The bar chart shows how tropical forest areas are now being used in one Asian country.



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

A 60 000 hectares

B 320 000 hectares

C 540 000 hectares

D 1 000 000 hectares

1	area of forest cleared for growing cereals
2	total area planted with trees for palm oil and making paper
3	area with the largest biodiversity
4	area which could be reduced by recycling

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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.

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Turn over for the next question

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Section Two

Questions **SIX** to **NINE**.

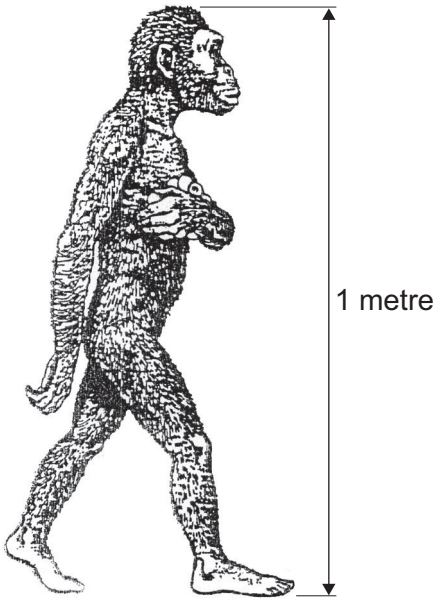
Each of these questions has four parts.

In each part choose only **one** answer.

Mark your choices on the answer sheet.

QUESTION SIX

The drawing shows what we think an extinct human-like animal looked like. The animal has been nicknamed 'Lucy'.



6A There are many differences between Lucy and modern humans.

One difference is that modern humans have . . .

1 shorter legs.

2 a more upright posture.

3 a more protruding jaw.

4 less body hair.

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6B What caused the differences between Lucy and modern humans?

1 temperature increases in the environment

2 mutations in the genes

3 new diseases

4 competition with each other for food

6C Scientists have found evidence for the existence of Lucy by . . .

1 doing genetic engineering.

2 extracting DNA from apes.

3 watching modern apes.

4 studying fossils.

6D Darwin's theory of evolution states that all species of living things have evolved from simple life forms.

It took a long time for Darwin's theory of evolution to be widely accepted because . . .

1 books were expensive.

2 Darwin was not a scientist.

3 Lamarck had a better theory.

4 the causes of variation were not known at that time.

Turn over for the next question

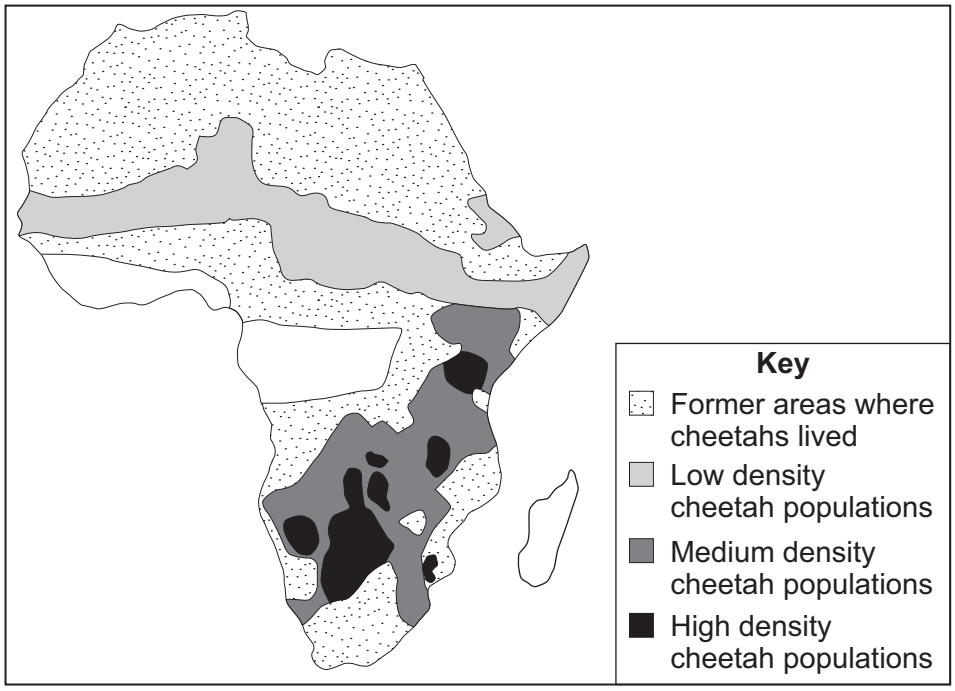
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QUESTION SEVEN

The cheetah is a large carnivore (meat-eating animal).



The map shows the distribution of cheetahs in Africa.



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7A The areas where cheetahs are found have . . .

1 decreased.

2 increased.

3 got further apart.

4 not changed in shape.

7B The change in the cheetah's territory is most probably due to . . .

1 a shortage of predators.

2 a shortage of oxygen.

3 a shortage of prey.

4 a shortage of roads in the area.

7C A high-density cheetah population in an area would result in . . .

1 a rapid decrease in the human population.

2 female cheetahs producing larger families.

3 increased use of pesticides by farmers.

4 increased competition for breeding sites.

7D A large increase in the area of land used for agriculture in Africa could cause . . .

1 new predators to appear.

2 new diseases to appear.

3 mutations to occur in cheetahs.

4 cheetahs to become extinct.

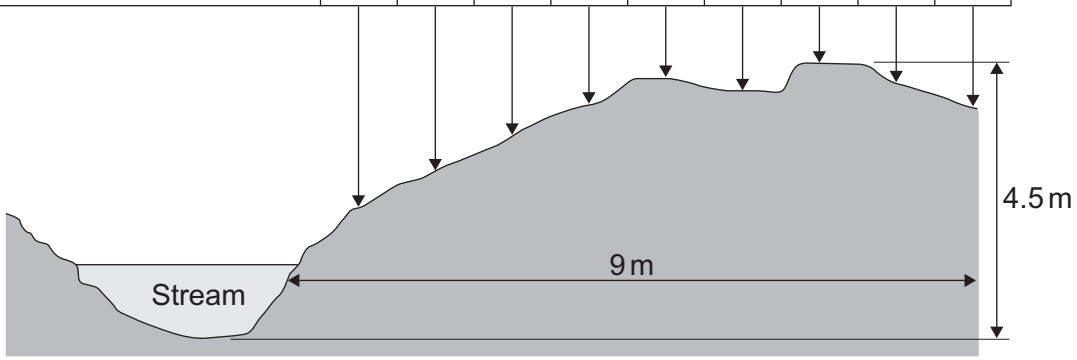
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QUESTION EIGHT

A group of students surveyed an area of land next to a stream.

- Their aim was to find out if the stream affected where dandelion plants could grow.
- They sampled the area at the sites labelled **P–X** on the diagram.
- Their results are shown on the diagram.

Site	**P**	**Q**	**R**	**S**	**T**	**U**	**V**	**W**	**X**
Number of dandelions per m^2	0	2	6	7	7	1	6	5	4



8A Which piece of equipment would the students use to sample the number of dandelions at each site?

1 sensor

2 quadrat

3 pH meter

4 metre rule

8B Which factor is most likely to affect the distribution of dandelions in areas **P–S**?

1 air temperature

2 light intensity

3 moisture content of the soil

4 availability of carbon dioxide

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8C At which site is there most probably an anomalous result?

1 **P**

2 **Q**

3 **U**

4 **X**

8D The survey would have been more valid if . . .

1 only sites **P**, **R**, **T** and **X** had been used.

2 sites **V**, **W** and **X** had not been used.

3 only the area where there were the most dandelions had been surveyed.

4 the other side of the stream had also been surveyed.

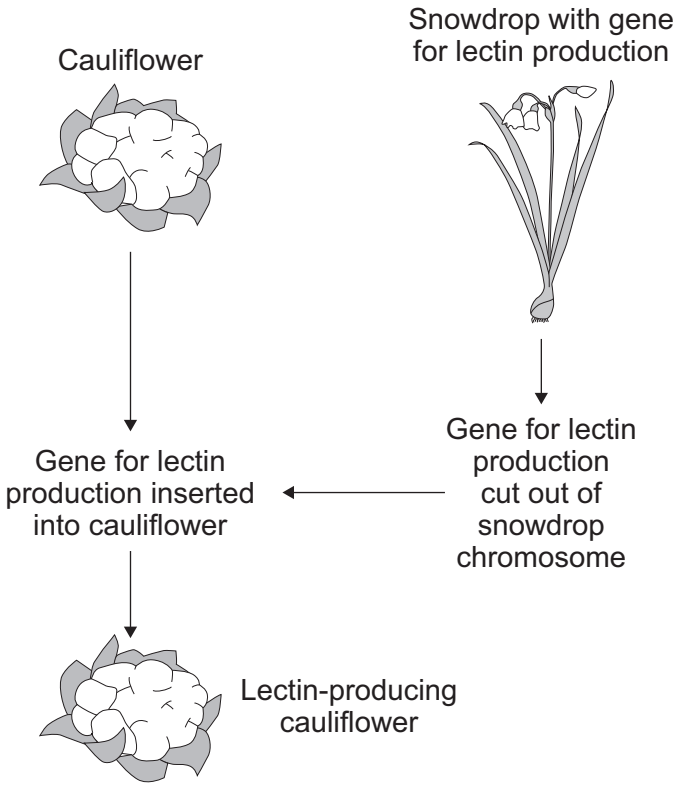
Turn over for the next question

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QUESTION NINE

Up to 40 % of cauliflower crops may be eaten by insects.
Snowdrops can survive attacks by insects because they produce a substance called lectin.
Lectin interferes with the insect's digestive system.

The diagram shows one method of introducing the gene for lectin production into cauliflowers.



9A The gene for lectin production is cut from the snowdrop chromosome using . . .

1 lectin.

2 a herbicide.

3 an enzyme.

4 an electric shock.

9B The technique used to transfer the gene from the snowdrop to the cauliflower is called . . .

1 biodiversity.

2 embryo transplant.

3 cloning.

4 genetic engineering.

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9C What is the main benefit to the environment of farmers growing lectin-producing cauliflowers?

1 More snowdrops will survive.

2 Less pesticide will be used.

3 Insects will eat something else.

4 Less fertiliser will be needed.

9D An ethical concern about this technique is that . . .

1 it will make farmers richer.

2 it will increase biodiversity.

3 it is interfering with nature.

4 it is sustainable.

END OF TEST

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You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Foundation Tier is earlier in this booklet.

HIGHER TIER

Section One

Questions **ONE** and **TWO**.

In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1–4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

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.

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QUESTION TWO

There are several methods of cloning animals and plants.

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

A a common garden plant

B a very rare endangered plant

C a well-loved family cat

D a common farm animal

	Best method of cloning
1	small groups of cells are grown on a special jelly
2	unspecialised embryo cells are separated and put into a host
3	cuttings are taken
4	adult cell cloning

Turn over for the next question

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Section Two

Questions **THREE** to **NINE**.

Each of these questions has four parts.

In each part choose only **one** answer.

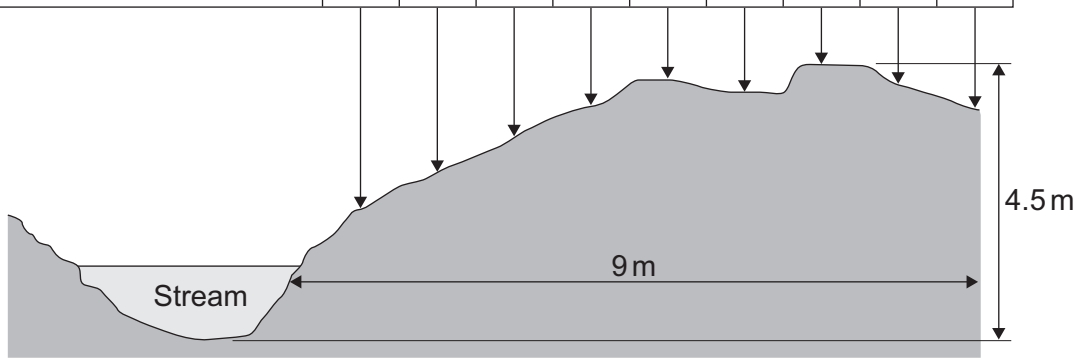
Mark your choices on the answer sheet.

QUESTION THREE

A group of students surveyed an area of land next to a stream.

- Their aim was to find out if the stream affected where dandelion plants could grow.
- They sampled the area at the sites labelled **P–X** on the diagram.
- Their results are shown on the diagram.

Site	P	Q	R	S	T	U	V	W	X
Number of dandelions per m^2	0	2	6	7	7	1	6	5	4



3A Which piece of equipment would the students use to sample the number of dandelions at each site?

1 sensor

2 quadrat

3 pH meter

4 metre rule

3B Which factor is most likely to affect the distribution of dandelions in areas **P–S**?

1 air temperature

2 light intensity

3 moisture content of the soil

4 availability of carbon dioxide

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3C At which site is there most probably an anomalous result?

1 **P**

2 **Q**

3 **U**

4 **X**

3D The survey would have been more valid if . . .

1 only sites **P**, **R**, **T** and **X** had been used.

2 sites **V**, **W** and **X** had not been used.

3 only the area where there were the most dandelions had been surveyed.

4 the other side of the stream had also been surveyed.

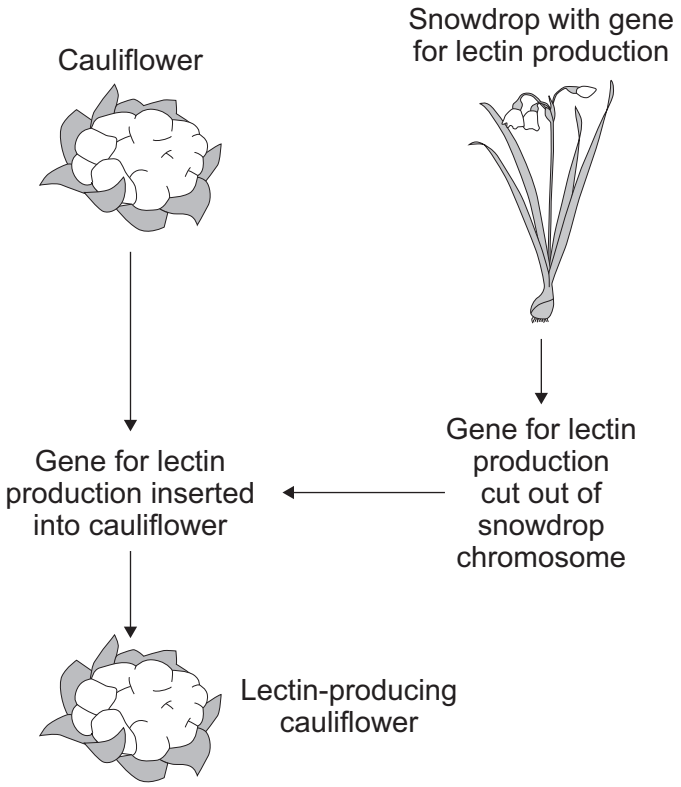
Turn over for the next question

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QUESTION FOUR

Up to 40 % of cauliflower crops may be eaten by insects.
Snowdrops can survive attacks by insects because they produce a substance called lectin.
Lectin interferes with the insect's digestive system.

The diagram shows one method of introducing the gene for lectin production into cauliflowers.



4A The gene for lectin production is cut from the snowdrop chromosome using . . .

1 lectin.

2 a herbicide.

3 an enzyme.

4 an electric shock.

4B The technique used to transfer the gene from the snowdrop to the cauliflower is called . . .

1 biodiversity.

2 embryo transplant.

3 cloning.

4 genetic engineering.

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4C What is the main benefit to the environment of farmers growing lectin-producing cauliflowers?

1 More snowdrops will survive.

2 Less pesticide will be used.

3 Insects will eat something else.

4 Less fertiliser will be needed.

4D An ethical concern about this technique is that . . .

1 it will make farmers richer.

2 it will increase biodiversity.

3 it is interfering with nature.

4 it is sustainable.

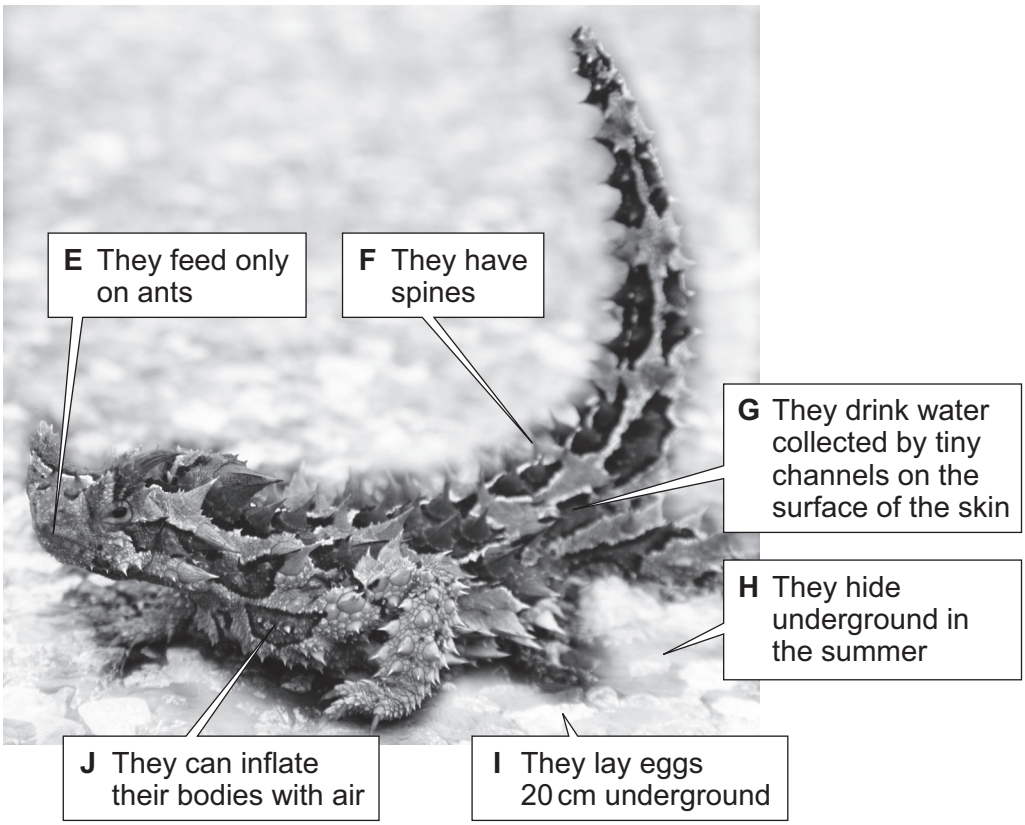
Turn over for the next question

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QUESTION FIVE

The photograph shows an animal that lives only in the Australian desert. It is called a moloch.

Some of its features are labelled **E–J**.



5A Which of the features are adaptations to survival in a dry environment?

1 **G**, **H** and **I**

2 **E**, **F** and **J**

3 **F**, **G** and **H**

4 **E**, **G** and **I**

5B Which of the features are adaptations to protect the moloch from being eaten?

1 **E**, **F** and **H**

2 **F**, **H** and **J**

3 **G**, **H** and **I**

4 **E**, **F** and **G**

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5C Which feature might lead to the moloch becoming extinct if there was a change in the environment?

1 **E**

2 **F**

3 **H**

4 **I**

5D Local people say that the moloch lays its eggs on the cooler side of small hills.

How might scientists test this hearsay?

1 keep equal numbers of molochs captive on each side of a hill

2 watch where females spend most of their time

3 survey each side of hills in areas where molochs live

4 check the internet for opinions from other scientists

Turn over for the next question

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QUESTION SIX

Read the passage about sticklebacks.

> Small fish called sticklebacks originated in the oceans, but began populating freshwater lakes and streams about 20 000 years ago. Sticklebacks that live in freshwater have lost their body 'armour' over the past 20 000 years.
>
> Scientists have identified a mutant gene in sticklebacks that prevents the growth of 'armour'. This mutant gene is very common in freshwater sticklebacks, but is found in only about 1 % of seawater sticklebacks. Sticklebacks with the mutant gene are significantly longer than those without it.
>
> The scientists carried out an investigation in which they moved 200 seawater sticklebacks into freshwater. After a few years the frequency of the mutant gene in the offspring of these fish had increased significantly.

6A The mutant gene that prevents the growth of 'armour' is . . .

1 a strong gene.

2 a weak gene.

3 a changed gene.

4 a stable gene.

6B The change in the frequency of the mutant gene in sticklebacks which live in freshwater is a result of . . .

1 the greenhouse effect.

2 natural selection.

3 new diseases.

4 changes in the composition of freshwater.

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6C Because they do not produce 'armour', the freshwater sticklebacks can . . .

1 produce more muscles and bones.

2 camouflage themselves.

3 move into deeper water.

4 move back into seawater.

6D The evidence from this investigation . . .

1 proves the theory of evolution.

2 supports the theory of evolution.

3 disproves the theory of evolution.

4 leads to an observation about the theory of evolution.

Turn over for the next question

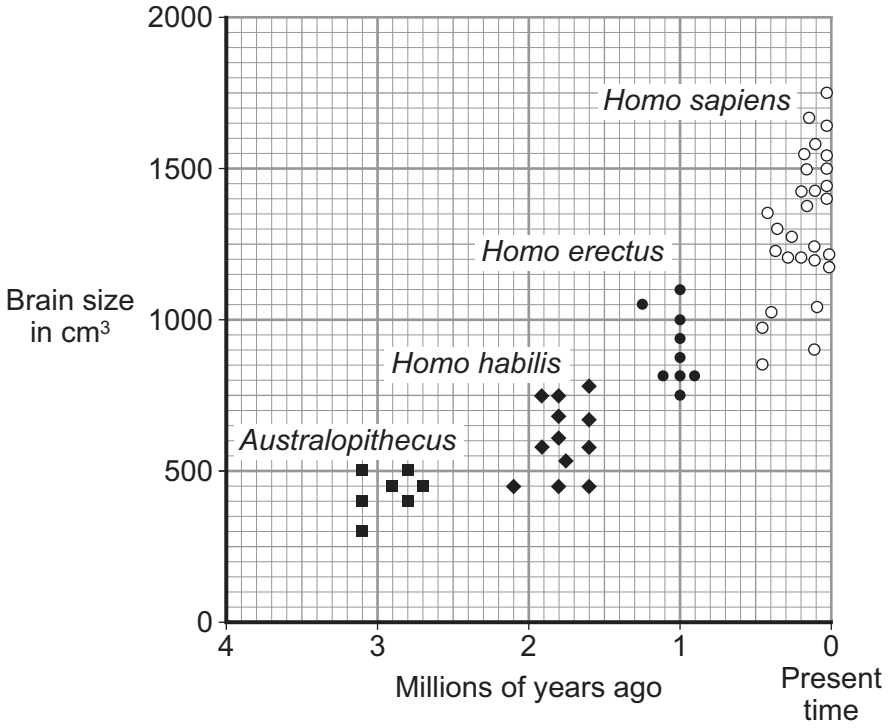
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QUESTION SEVEN

Modern humans belong to the species *Homo sapiens*. Many people think that modern humans evolved from more primitive species. Three of these primitive species were *Australopithecus*, *Homo habilis* and *Homo erectus*. These three species are now extinct.

Scientists investigated the brain size of several specimens from each of the species.

The graph shows their results.



7A The ranges of brain size of *Homo sapiens* and *Homo erectus* overlap by . . .

1 200 cm^3

2 250 cm^3

3 300 cm^3

4 1000 cm^3

7B From this data, the time over which *Australopithecus* existed was . . .

1 0.2 million years.

2 0.4 million years.

3 3.1 million years.

4 3.3 million years.

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7C Which one of the following is correct?

The fossil data for . . .

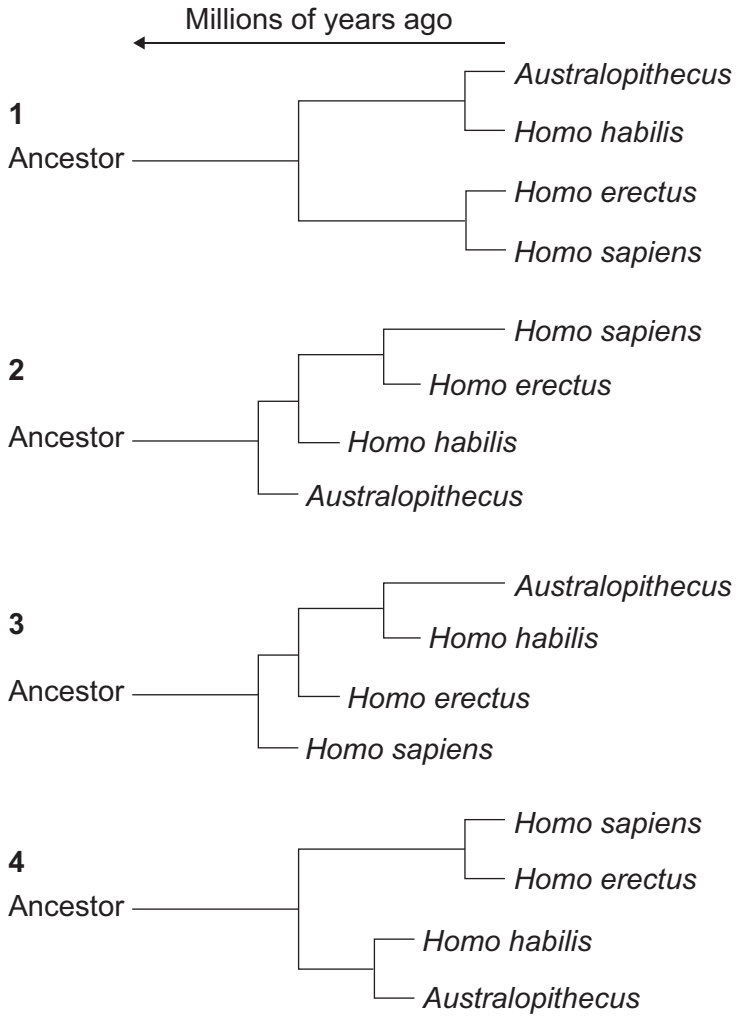
1 *Australopithecus* can be considered least reliable because the fewest number of skulls have been found.

2 *Homo habilis* can be considered to be most reliable because they were fossilised over the longest period of time.

3 *Homo erectus* can be considered most reliable because they were fossilised over the shortest period of time.

4 *Homo sapiens* can be considered least reliable because they were fossilised most recently.

7D Which evolutionary tree is supported by the evidence in the graph?



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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.

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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

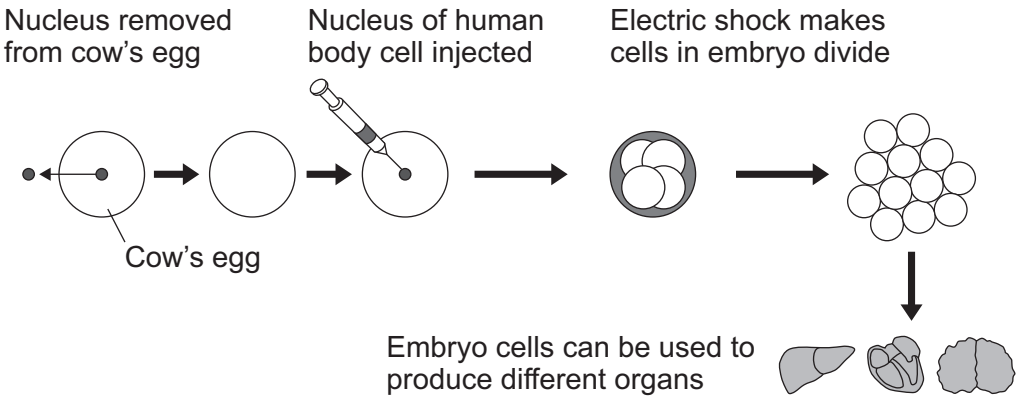
Turn over for the next question

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QUESTION NINE

> **'Human-animal' Embryo Given Green Light**
>
> Regulators have agreed in principle to allow human-animal embryos to be created and used for research.

The diagram shows how a human-animal embryo can be created.



9A The technique shown in the diagram is an example of . . .

1 adult cell cloning.

2 embryo transplanting.

3 taking cuttings.

4 tissue culture.

9B The genetic information in each embryo cell nucleus is . . .

1 identical to that of the cow's egg nucleus.

2 identical to the human cell nucleus.

3 a mixture of genetic information from the nuclei of the cow and the human.

4 different from one embryo cell nucleus to another.

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Scientists want to create hybrid embryos so that they can extract cells which are able to become any tissue. The embryos would then be destroyed within 14 days.

At the moment, scientists have to rely on human eggs left over from fertility treatment. These new cells are in short supply and are not always of good quality.

A scientist said: 'The creation of hybrid embryos is excellent news. It is a positive outcome not just for our work but for the progress of British science in general. We hope that this will lead to new technologies to benefit everyone. It's not our intention to create any bizarre cow–human hybrid.'

9C What was the main motive for the scientists to create the hybrid cells?

1 The embryos can be destroyed within 14 days.

2 The egg cells left over from fertility treatment are in short supply.

3 The creation of the hybrids is a positive outcome for British science.

4 The scientists are interested in the difference between hybrid cells and human cells.

9D Many people are opposed to this technique for ethical reasons.

Which of the following is an ethical reason for opposition to the technique?

1 Humans with some cow features will be produced.

2 The scientists are proud of their work.

3 The embryos created are destroyed.

4 There needs to be an increase in women to supply the eggs.

END OF TEST

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Version 1:0: 26/07/10

ASSESSMENT and QUALIFICATIONS ALLIANCE

GCSE

Science A (4461)

Specification A

BLY1BP, BL1BSF & BL1BSH

Mark Scheme

2010 Examination – June Series

The blank answer sheet for this component can be found at the end of this document.

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This component is an objective test for which the following list indicates the correct answers used in marking the candidates' responses.

Further copies of this Mark Scheme are available to download from the AQA Website: www.aqa.org.uk

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GCSE
SCIENCE A (4461) / BIOLOGY (4411)
Objective Test Answer Key
BLY1BP (Evolution and Environment)
June 2010
Foundation Tier

Question	*Key*		
One	**A**	thick fur coat	3
	B	large front teeth	1
	C	muscular flat tail	2
	D	clear coverings over each eye	4
Two	**A**	A. anamensis	3
	B	A. africanus	4
	C	Homo erectus	2
	D	Homo sapiens	1
Three	**A**	bulblet	3
	B	clone	4
	C	gamete	2
	D	parent	1
Four	**A**	60 000 hectares	1
	B	320 000 hectares	4
	C	540 000 hectares	2
	D	1 000 000 hectares	3
Five	**A**	trees	3
	B	rice plants	4
	C	lichens	1
	D	invertebrates	2

	A	**B**	**C**	**D**
Six	**4**	**2**	**4**	**4**
Seven	**1**	**3**	**4**	**4**
Eight	**2**	**3**	**3**	**4**
Nine	**3**	**4**	**2**	**3**

GCSE
SCIENCE A (4461) / BIOLOGY (4411)
Objective Test Answer Key
BLY1BP (Evolution and Environment)
June 2010
Higher Tier

Question	*Key*		
One	**A**	trees	3
	B	rice plants	4
	C	lichens	1
	D	invertebrates	2
Two	**A**	a common garden plant	3
	B	a very rare endangered plant	1
	C	a well-loved family cat	4
	D	a common farm animal	2

	A	**B**	**C**	**D**
Three	**2**	**3**	**3**	**4**
Four	**3**	**4**	**2**	**3**
Five	**1**	**2**	**1**	**3**
Six	**3**	**2**	**1**	**2**
Seven	**2**	**2**	**1**	**2**
Eight	**1**	**3**	**3**	**4**
Nine	**1**	**2**	**2**	**3**

AQA

Unit : BLY1BP **BIOLOGY UNIT 1B**

Centre :

Candidate Number : **UCI :**

Candidate Name :

Series : 6M10

28-JUN-10

For completion by the Examination Invigilator. **Please fill this circle if the candidate is absent:** ○

HIGHER TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE		1	2	3	4
1A	trees	○	○	○	○
1B	rice plants	○	○	○	○
1C	lichens	○	○	○	○
1D	invertebrates	○	○	○	○

QUESTION TWO		1	2	3	4
2A	a common garden plant	○	○	○	○
2B	a very rare endangered plant	○	○	○	○
2C	a well-loved family cat	○	○	○	○
2D	a common farm animal	○	○	○	○

QUESTION THREE	1	2	3	4
3A	○	○	○	○
3B	○	○	○	○
3C	○	○	○	○
3D	○	○	○	○

QUESTION FOUR	1	2	3	4
4A	○	○	○	○
4B	○	○	○	○
4C	○	○	○	○
4D	○	○	○	○

QUESTION FIVE	1	2	3	4
5A	○	○	○	○
5B	○	○	○	○
5C	○	○	○	○
5D	○	○	○	○

QUESTION SIX	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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FOUNDATION TIER

Instructions on how to complete this answer sheet are given on the question paper. Please make sure you follow them carefully.

Questions **ONE** to **NINE** Choose one response **1 - 4** for each of the parts **A - D**

QUESTION ONE

		1	2	3	4
1A	thick fur coat	○	○	○	○
1B	large front teeth	○	○	○	○
1C	muscular flat tail	○	○	○	○
1D	clear coverings over each eye	○	○	○	○

QUESTION TWO

		1	2	3	4
2A	A. anamensis	○	○	○	○
2B	A. africanus	○	○	○	○
2C	Homo erectus	○	○	○	○
2D	Homo sapiens	○	○	○	○

QUESTION THREE

		1	2	3	4
3A	bulblet	○	○	○	○
3B	clone	○	○	○	○
3C	gamete	○	○	○	○
3D	parent	○	○	○	○

QUESTION FOUR

		1	2	3	4
4A	60 000 hectares	○	○	○	○
4B	320 000 hectares	○	○	○	○
4C	540 000 hectares	○	○	○	○
4D	1 000 000 hectares	○	○	○	○

QUESTION FIVE

		1	2	3	4
5A	trees	○	○	○	○
5B	rice plants	○	○	○	○
5C	lichens	○	○	○	○
5D	invertebrates	○	○	○	○

QUESTION SIX

	1	2	3	4
6A	○	○	○	○
6B	○	○	○	○
6C	○	○	○	○
6D	○	○	○	○

QUESTION SEVEN

	1	2	3	4
7A	○	○	○	○
7B	○	○	○	○
7C	○	○	○	○
7D	○	○	○	○

QUESTION EIGHT

	1	2	3	4
8A	○	○	○	○
8B	○	○	○	○
8C	○	○	○	○
8D	○	○	○	○

QUESTION NINE

	1	2	3	4
9A	○	○	○	○
9B	○	○	○	○
9C	○	○	○	○
9D	○	○	○	○

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Centre Number						Candidate Number				
Surname										
Other Names										
Candidate Signature										

General Certificate of Secondary Education
Foundation Tier and Higher Tier
March 2010

Science A
Unit Biology B1b (Evolution and Environment)

Biology
Unit Biology B1b (Evolution and Environment)

BLY1BP

F&H

Wednesday 3 March 2010 Morning Session

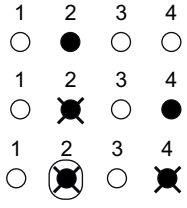
For this paper you must have:
- a black ball-point pen
- an objective test answer sheet.

You may use a calculator.

Time allowed
- 30 minutes

Instructions
- Fill in the boxes at the top of this page.
- Check that your name, candidate number and centre number are printed on the separate answer sheet.
- Check that the separate answer sheet has the title 'Biology Unit 1b' printed on it.
- Attempt **one Tier only**, **either** the Foundation Tier **or** the Higher Tier.
- Make sure that you use the correct side of the separate answer sheet; the Foundation Tier is printed on one side and the Higher Tier on the other.
- Answer **all** the questions for the Tier you are attempting.
- Record your answers on the separate answer sheet only.
- Do all rough work in this book, **not** on your answer sheet.

Instructions for recording answers
- Use a **black ball-point pen**.
- For each answer **completely fill in the circle** as shown.
- Do **not** extend beyond the circles.
- If you want to change your answer, **you must** cross out your original answer, as shown.
- If you change your mind about an answer you have crossed out and now want to choose it, draw a ring around the cross as shown.



Information
- The maximum mark for this paper is 36.

Advice
- Do **not** choose more responses than you are asked to. You will lose marks if you do.
- Make sure that you hand in both your answer sheet and this question paper at the end of the test.
- If you start to answer on the wrong side of the answer sheet by mistake, make sure that you cross out **completely** the work that is not to be marked.

You must do **one Tier** only, **either** the Foundation Tier **or** the Higher Tier.
The Higher Tier starts on page 16 of this booklet.

FOUNDATION TIER

SECTION ONE

Questions **ONE** to **FIVE**.

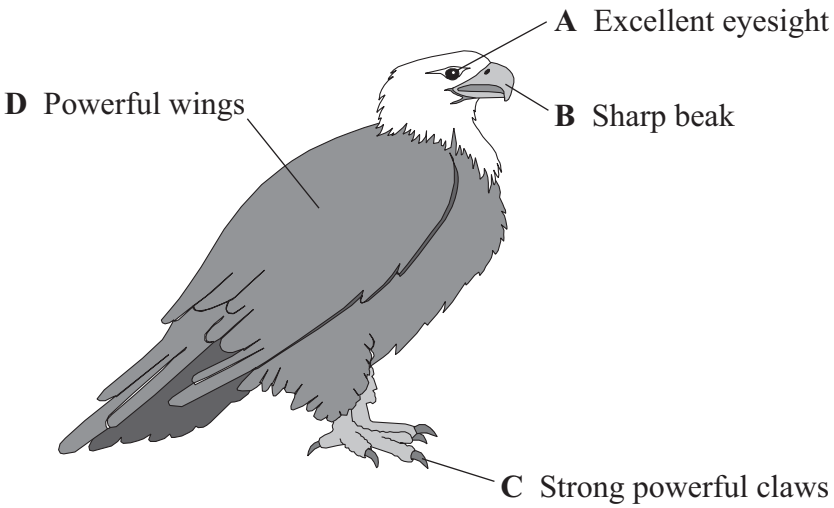
In these questions, match the letters, **A**, **B**, **C** and **D**, with the numbers **1– 4**.

Use **each** answer only **once**.

Mark your choices on the answer sheet.

QUESTION ONE

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



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

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

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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** . . . .

Turn over for the next question

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QUESTION THREE

This question is about reproduction.

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

A genes

B gametes

C characteristics

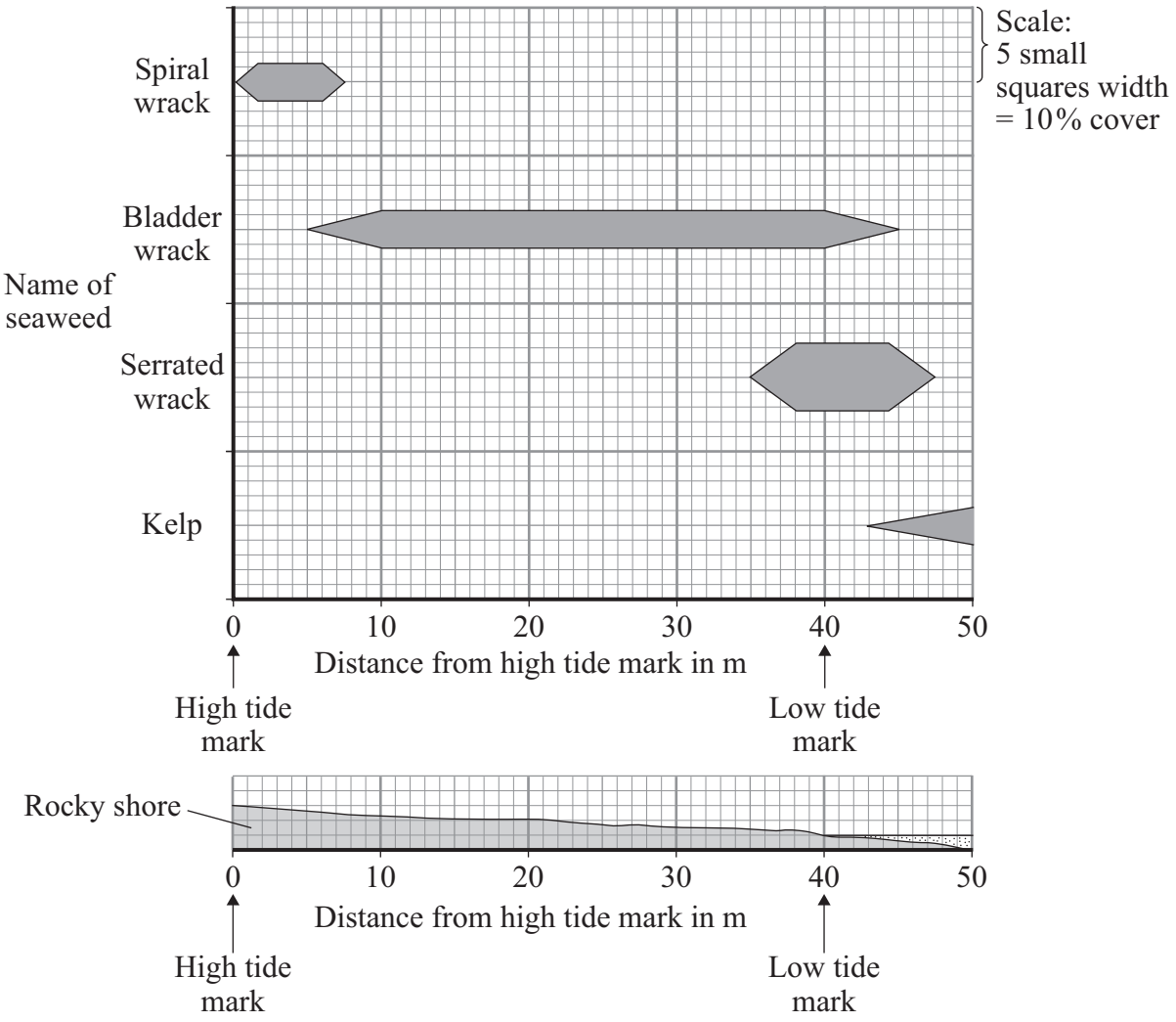
D nucleus

1	cells which fuse to form offspring
2	control the development of features
3	the part of a cell which contains chromosomes
4	features we can see, such as eye colour

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QUESTION FOUR

The diagram shows how much of four different seaweeds are found growing on different parts of a rocky shore.



Use the diagram to match the names of seaweeds, **A**, **B**, **C** and **D**, with the statements **1–4** in the table.

A spiral wrack

B bladder wrack

C serrated wrack

D kelp

1	All of this seaweed is always covered by the sea.
2	This seaweed is found across the widest range of distance on the rocky shore.
3	This seaweed can survive the driest conditions.
4	At 45 metres from the high tide mark there is more of this seaweed than any other.

Turn over ▶

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