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mock papers 7-foundation

1 Jack is going skiing in the snow.

He is worried about getting too cold.

(a) Put a (ring) around Jack's normal body temperature.

27 °C **37 °C** **47 °C** **57 °C** **67 °C**

[1]

(b) Jack puts on special clothes to keep him warm whilst he is skiing.

There are other ways that Jack's body may change to keep warm when he is out in the cold.

Put ticks (✔) in **two** boxes to show how Jack's body might change to keep him warm.

his respiration becomes faster	☐
more blood flows close to his skin	☐
he shivers more	☐
he sweats more	☐

[2]

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(c) When Jack starts skiing, he needs more energy.

Finish the following sentences about Jack's skiing.

Use words from this list.

carbon dioxide

glucose

heart

lactic acid

lung

liver

oxygen

When Jack starts skiing, his muscles work harder.

This means that his muscles need to receive ..... and

..... more quickly.

To do this, Jack's ..... beats faster.

[3]

[Total: 6]

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2 Prasana likes gardening.

He has a plant that has very pretty flowers.

He wants to grow many identical copies of the plant so that they all have the same colour flowers.

(a) Finish the following sentences about Prasana's plants.

Use words from the list.

asexual **clones** **cytoplasm** **genes**

gametes **nucleus** **sexual**

The characteristics of Prasana's plant are controlled by coded instructions called

..... .

These instructions are found in the ..... of each cell of the plant.

So that all the plants have identical flowers, Prasana uses ..... reproduction to make more identical plants.

The individuals produced by this type of reproduction are called ..... .

[4]

(b) Prasana finds that one new plant has a shoot with different coloured flowers.
He thinks that this has been caused by a mistake in copying the genetic instructions.
Look at the list.

breeding **fertilisation** **mutation** **variation**

Put a (ring) around the name given to this type of mistake.

[1]

[Total: 5]

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3 Steve eats a beef burger in a roll and drinks a glass of beer.

(a) Which part of the meal helps to prevent the disease scurvy?
Choose from **A**, **B**, **C** or **D**.

..... [1]

(b) **(i)** Steve is 18 years old.

His body mass is 80 kilograms.
This meal contains 20 g of protein.

How many of these meals would supply Steve with his RDA for protein?
Use this formula:

RDA in grams = 0.75 × body mass in kilograms

number of meals ..... [1]

(ii) The beef burger contains protein.

Why is protein important for a teenager?

..... [1]

[Turn over for the remainder of question 3

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(iii) Explain why the proteins in the beef burger are called 'first class proteins'.

.....

..... [2]

(iv) Drinking too much alcohol over a long period of time can damage some organs in the body.

Write down the name of **one** of these organs.

..... [1]

[Total: 6]

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4 Many diseases in the body are caused by microorganisms.

These microorganisms are called pathogens.

(a) Some of these pathogens are bacteria.

Write down the name of **one other** type of pathogen.

..... [1]

(b) When a pathogen enters a human body, the pathogen is attacked by the immune system.

A number of chemicals are important in this response.

Draw a line from each **chemical** to its correct **meaning**.

chemical	meaning
antibody	a chemical on the surface of pathogens
antigen	a chemical released by white blood cells
toxin	a poisonous chemical that is produced by pathogens

[2]

[Total: 3]

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5 The picture shows a branch on a pine tree.

(a) (i) Trees make their own food.

What name is given to the process trees use to make their own food?

Put a (ring) around the correct answer.

digestion **photosynthesis** **respiration**

[1]

(ii) Trees make the sugar glucose.

Glucose is then used in different ways.

Write down **two** ways that trees use glucose.

1 .....

2 ..... [2]

(b) The wood from pine trees is a sustainable resource.

Put a tick (✔) in the box next to **another** sustainable resource.

coal	☐
copper	☐
fish	☐
natural gas	☐

[1]

[Total: 4]

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6 The picture shows a polar bear.

(a) Look at the list.

amphibians

fish

mammals

reptiles

Finish the sentence by choosing the best word from the list.

The polar bear belongs to the vertebrate group called ..... . [1]

(b) The polar bear hunts seals for food.

(i) What word describes an animal that **hunts** for food?

..... [1]

(ii) What word describes an animal that is **hunted** for food?

..... [1]

(c) Polar bears are adapted to hunt.

They have eyes in the front of their heads.

Write down **two other** ways that polar bears are adapted to hunt.

1 .....

.....

2 .....

..... [2]

[Total: 5]

[Turn over

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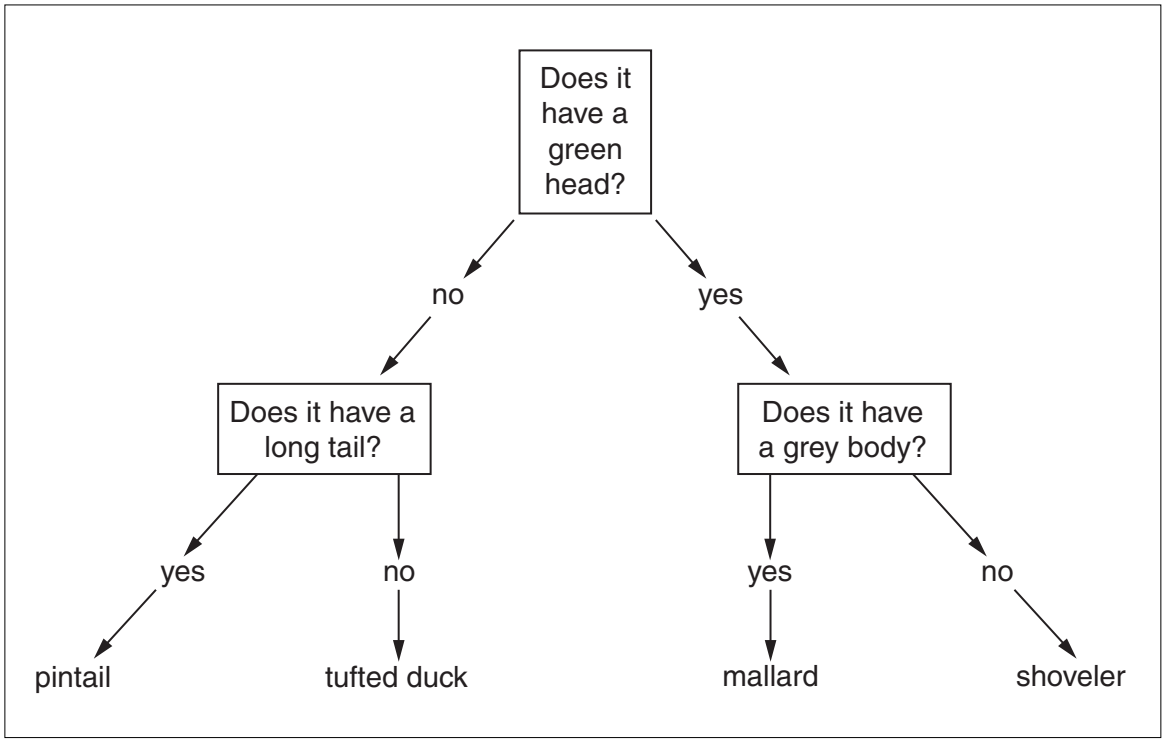
7 The diagram shows a key used to name four different ducks.



(a) Write down **two** characteristics of a mallard duck.

Use the key.

1 .....

2 ..... [2]

(b) All of the ducks live in the same habitat.

The ducks compete for space.

Suggest **one other** thing the ducks may compete for.

..... [1]

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(c) Look at the picture.
It is an American duck called the ruddy duck.

© Mike Yip, www.vancouverislandbirds.com

The ruddy duck belongs to the class of vertebrates called birds.

Write down **one** characteristic that **only** birds have.

..... [1]

[Turn over for the remainder of question 7

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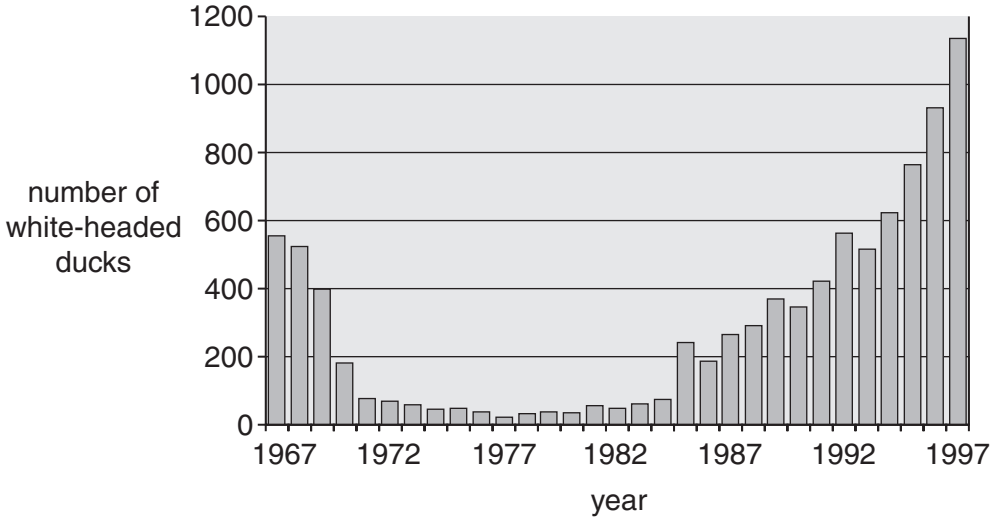
(d) Some ruddy ducks escaped from captivity and settled in Spain in the 1940s.

They competed with the Spanish white-headed duck.

The graph shows the number of white-headed ducks in Spain between 1967 and 1997.



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(i) Look at the graph.

Describe the change in population of the white-headed duck between 1967 and 1997.

.....

..... [2]

(ii) In 1977, there were only 22 white-headed ducks left in Spain.

To prevent the extinction of the white-headed duck, ruddy ducks were killed.

Describe **one other** way the white-headed duck might have been helped.

.....

..... [1]

[Total: 7]

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8 The picture shows a fossil of a pterodactyl.

© Heather Angel / Natural Visions

(a) Pterodactyls no longer exist on Earth.

What name is used to describe a species that no longer exists?

..... [1]

(b) There are many other species that no longer exist.

Look at the list of species.

dodo **gorilla** **osprey** **panda**

Put a (ring) around the species that no longer exists. [1]

(c) Describe how the pterodactyl became fossilised.

.....

.....

..... [2]

[Total: 4]

[Turn over

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mock papers 8-higher

1 Many diseases in the body are caused by microorganisms.

These microorganisms are called pathogens.

(a) If a pathogen enters a human body, the pathogen is attacked by the immune system.

A number of chemicals are important in this response.

Draw a line from each **chemical** to its correct **meaning**.

chemical	meaning
antibody	a chemical on the surface of pathogens
antigen	a chemical released by white blood cells
toxin	a poisonous chemical that is produced by pathogens

[2]

(b) A person can take drugs containing antibiotics to destroy certain pathogens.

Write down **one** reason why an antibiotic may not be able to destroy a particular pathogen.

.....

..... [1]

(c) It is important that doctors only give patients antibiotics if they really need them.

Explain how the overuse of antibiotics can produce problems.

.....

.....

..... [2]

[Total: 5]

[Turn over

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2 Steve eats a beef burger in a roll and drinks a glass of beer.

(a) Which part of the meal helps to prevent the disease scurvy?
Choose from **A**, **B**, **C** or **D**.

..... [1]

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(b) **(i)** Steve is 18 years old.

His body mass is 80 kilograms.
This meal contains 20 g of protein.

How many of these meals would supply Steve with his RDA for protein?
Use this formula:

RDA in grams = 0.75 × body mass in kilograms

number of meals ..... [1]

(ii) Explain why the proteins in the beef burger are called 'first class proteins'.

.....

..... [2]

(iii) Although beef burgers are high in protein, vegetarians do not eat meat.

Suggest **one** reason why a person may decide to be a vegetarian.

.....

..... [1]

(c) Drinking large quantities of beer over a long period of time can lead to liver damage.

Why is the liver, in particular, damaged by drinking alcohol?

.....

..... [1]

[Total: 6]

[Turn over

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3 Jack is going skiing in the snow.

He is worried about getting too cold.

(a) What is the name given to the condition in which the body gets too cold?

..... [1]

(b) Jack is in a warm room, waiting to go skiing.

He has put on special clothes to keep him warm.

His face starts to look red.

Explain why.

.....

.....

.....

..... [3]

[Total: 4]

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4 This article appeared in a recent newspaper.

Scientists find first step to a new life

British scientists have found a gene that controls the first stage in making a new life.

They have found a gene called HIRA.

This gene codes for a chemical.

This chemical is needed to allow the DNA of two parents to join.

Sometimes this gene undergoes a mutation.

This explains why some eggs do not form embryos even after the egg and the sperm seem to have joined.

(a) What name is given to the joining of the DNA from an egg and a sperm?

..... [1]

(b) The gene called HIRA codes for the production of a chemical.

What type of chemical do genes code for?

..... [1]

(c) A mutation in the HIRA gene stops the joining of the DNA from the two parents.

Write about mutations.

Your answer should include

- what a mutation is
- why a mutation can alter the functioning of a cell.

.....

.....

.....

……..

..... [3]

[Total: 5]

[Turn over

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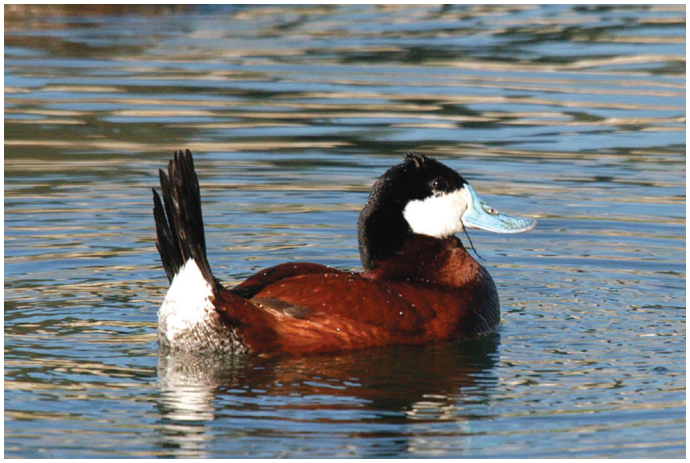
5 Look at the picture.
It is an American duck called the ruddy duck.



(a) The ruddy duck belongs to the class of vertebrates called birds.

Write down **one** characteristic **only** birds have.

..... [1]

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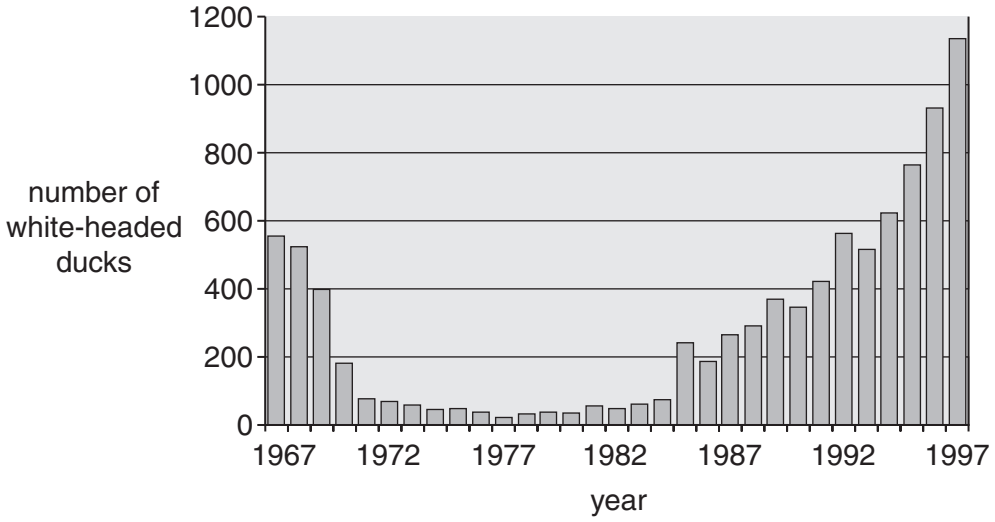
(b) The ruddy ducks escaped from captivity and settled in Spain in the 1940s.

They competed with the Spanish white-headed duck.

The graph shows the number of white-headed ducks in Spain between 1967 and 1997.



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(i) Look at the graph.

Describe the change in population of the white-headed duck between 1967 and 1997.

.....

..... [2]

(ii) In 1977, there were only 22 white-headed ducks left in Spain.

To prevent the extinction of the white-headed duck, ruddy ducks were killed.

Describe **one other** way the white-headed duck might have been helped.

.....

..... [1]

[Total: 4]

[Turn over

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6 The picture shows a fossil of a pterodactyl.

© Heather Angel / Natural Visions

(a) Describe how the pterodactyl became fossilised.

.....

.....

..... [2]

(b) The pterodactyl fossil is part of the fossil record.

The fossil record shows how organisms have changed over time.

Suggest **two** reasons why the fossil record is incomplete.

1 .....

2 ..... [2]

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(c) Charles Darwin introduced a theory to explain how organisms change over time.

He called his theory natural selection.

Darwin based this theory on the idea that within a species there is variation and those best adapted will survive and reproduce.

Jean Baptiste de Lamarck had a different theory about evolution.

(i) Describe how Lamarck's theory was **different** from Darwin's.

.....

.....

..... [1]

(ii) Describe how Lamarck's theory was **similar** to Darwin's.

.....

.....

..... [1]

[Total: 6]

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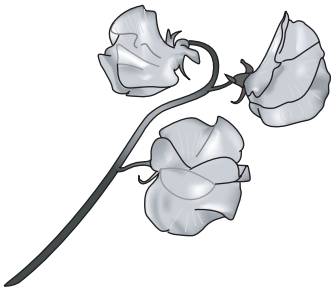
7 The diagram shows the flowers of a sweet pea plant.



(a) Look at the diagram.

Pea plants are pollinated by insects.

Write down **two** adaptations of insect pollinated flowers.

1 .....

2 ..... [2]

(b) **(i)** Pea plants photosynthesise.

Complete the word equation for photosynthesis.

$$\text{.....} + \text{water} \xrightarrow[\text{(chlorophyll)}]{\text{(light energy)}} \text{glucose} + \text{.....}$$

[1]

(ii) Write down **two** factors that can **increase** the rate of photosynthesis.

1 .....

2 ..... [2]

(c) Pea plants are legumes.

They have nitrogen-fixing bacteria in their roots.

Explain how the bacteria and the pea plant **benefit** from their relationship.

Bacteria gain ..... .

Peas gain ..... . [2]

[Total: 7]

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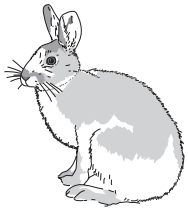
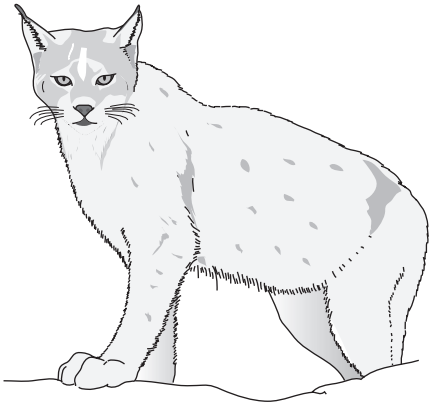
8 In Canada, lynx hunt hares.



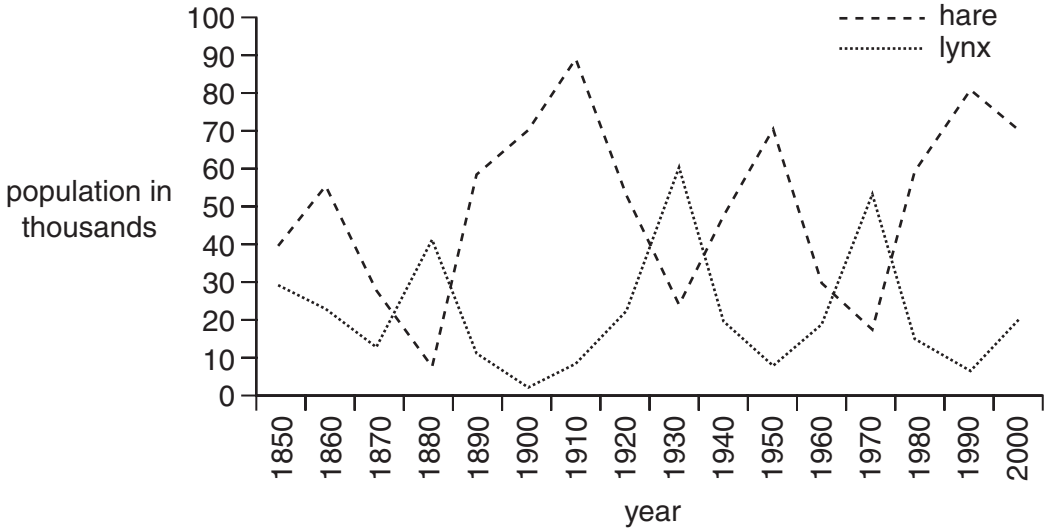
hare



lynx

Look at the graph.

It shows the change in population of the lynx and the hare.



Explain how the population of lynx and hare regulate one another.

.....

.....

.....

.....

..... [3]

[Total: 3]

[Turn over

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mock papers 9-foundation

1 Matt is thirteen. He plays in a football team.

(a) Matt's football coach tells him that it is important that he eats a balanced diet.

Look at the list of some of the types of food found in a balanced diet.

carbohydrate

fibre

minerals

protein

vitamins

water

Write down the type of food found in a balanced diet that is missing from the list.

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

(b) Matt has a 10-year-old younger brother who does **not** play much sport.

Matt needs to eat more carbohydrate and protein than his younger brother.

One reason he needs to eat more is because he is bigger.

(i) Suggest **one other** reason why Matt needs to eat more **carbohydrate** than his younger brother.

.....

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

(ii) Suggest **one other** reason why Matt needs to eat more **protein** than his younger brother.

.....

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

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(c) When Matt plays football, his breathing and pulse rates increase.

Finish these sentences to explain why.

One reason his breathing rate increases is .....

.....

One reason his pulse rate increases is .....

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

(d) When Matt plays football his muscles produce a lot of heat.

Describe **one** way he loses this extra heat.

.....

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

(e) Matt falls over while playing football.

He gets a small cut on his leg.

His football coach cleans the cut.

After a few minutes the bleeding stops.

(i) Why is it important to clean the cut?

.....

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

(ii) What happens to Matt's blood to stop the cut bleeding?

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

[Total: 8]

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2 Nick and Phil are at a party.

(a) Nick accidentally knocks an empty glass off a table.

Phil reacts quickly. He sees the glass falling and catches it in his hand.

In Phil's reaction

(i) what is the stimulus? ..... **[1]**

(ii) what is the receptor? ..... **[1]**

(iii) what is the effector? ..... **[1]**

(b) The table shows how many units of alcohol there are in different drinks.

drink	units of alcohol
1 glass of sherry	1
1 glass of wine	1
1 pint of beer	2
1 pint of cider	2
1 single whisky	1

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Nick drinks 3 glasses of wine and 2 single whiskies.

Phil drinks 2 pints of beer and a single whisky.

(i) Nick and Phil have had different drinks.

However, they both had the **same** number of units of alcohol.

How many units have they each had?

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

(ii) Phil has drunk a greater volume of liquid than Nick.

However, they have both had the same number of units of alcohol.

Explain why.

.....

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

(c) Alcohol is a depressant drug.

The list below shows other drugs.

Put a tick (✓) in the box next to the **one** drug that is also a depressant.

aspirin	☐
cannabis	☐
ecstasy	☐
LSD	☐
nicotine	☐
temazepan	☐

[1]

[Total: 6]

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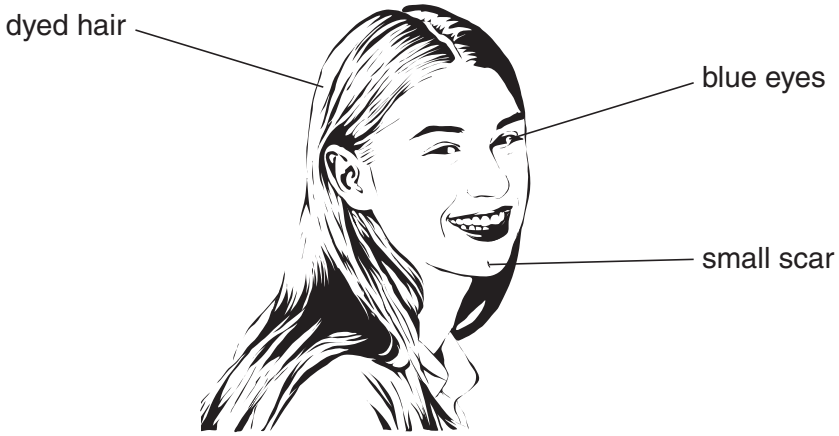
3 Cathy is a teenager.



(a) Some of Cathy's features are controlled by her genes, some by her environment and some by both.

Put ticks (✓) in the boxes to show how each of her features is controlled.

feature	controlled by genes	controlled by environment	controlled by genes and environment
blue eyes			
dyed hair			
small scar			

[3]

(b) Write about genes.

In your answer, include

- what genes do
- what genes are made from
- where genes are found.

.....

.....

.....

.....

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

[Total: 6]

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4 Look at the picture of a zebra.

(a) The zebra is a mammal. Mammals belong to a larger group of animals.

What name is given to this group?

Put a (ring) around the correct answer.

amphibians **invertebrates** **reptiles** **vertebrates**

[1]

(b) Zebra are prey to lions.

They are adapted to avoid being caught.

Look at the list.

short mane

eyes at side of head

stripes for camouflage

sharp teeth

two eyes

Write down **two** ways that zebra are adapted to avoid being caught.

Choose your answers from the list.

1 .....

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

Turn over for the remainder of question 4

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(c) Lions are predators. They are adapted to catch the zebra.

Suggest **one** way predators are adapted to catch their prey.

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

(d) Plants are adapted to live in different environments.

Which environment are cacti adapted for?

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

[Total: 5]

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5 Look at the picture of a sperm whale.

(a) Sperm whales are normally found far out to sea.

However, sperm whales are often seen near the coast of New Zealand.

(i) Suggest **one** reason why these whales need to come closer to land.

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

(ii) Finding them close to land has also become important to the people living nearby.

Suggest **one** reason why.

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

(b) Many whale species are endangered.

(i) What is meant by the term **endangered**?

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

(ii) Put a tick (✓) in the box next to a bird which is endangered in Britain.

blue tit	☐
blackbird	☐
goldfinch	☐
osprey	☐
robin	☐

[1]

(c) Whales produce milk for their young.

Write down the **class** of animals that feed their young on milk.

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

[Total: 5]

Turn over

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6 Rose works for the council.

(a) She needs to find out how many rats are living in one area of town.

Rose set traps to catch the rats. The traps did not harm the rats.

Rats were collected from the traps, marked with harmless paint and released.

Rose then set the traps again a week later.

The results are shown in the table.

	number of rats
number caught first time	30
number caught second time	28
number of marked rats caught the second time	2

An estimate for the population of rats can be calculated using the formula:

$$\text{population} = \frac{\text{number caught first time} \times \text{number caught second time}}{\text{number of marked rats caught the second time}}$$

Use the formula to estimate the population of rats.

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

(b) People are concerned that the rat population is increasing because of household waste. There is now more household waste compared with 100 years ago.

Suggest **one** reason why there is now more waste.

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

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(c) Rose tries to kill the rats using food containing the rat poison warfarin.

All of the rats eat the food.

Most rats die but some survive and breed.

Most of their offspring can also survive eating the poisoned food.

Explain why some rats survive.

.....

.....

.....

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

[Total: 5]

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7 Read the report about rhododendron plants.

The rhododendron plant is responsible for the destruction of many habitats in Britain.

The reason for this is simple. Where conditions are suitable, it will out compete most other plants.

The rhododendrons become very large, allowing very little light to reach the ground.

(a) The rhododendrons compete with other plants for light.

Write down **one** other thing that plants compete for.

Choose from the list.

cellulose **minerals** **vitamins** **protein**

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

(b) The plants need light for photosynthesis.

Write down the names of **two** chemicals that plants need for photosynthesis.

1 .....

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

(c) Dormice are small animals that feed on plants.

However, they cannot eat rhododendrons.

The increase in the number of rhododendrons means there are fewer dormice.

Explain why.

.....

.....

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

[Total: 5]

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mock papers 10-higher

1 Nick and Phil are at a party.

(a) Nick accidentally knocks an empty glass off a table.

Phil reacts quickly. He sees the glass falling and catches it in his hand.

In Phil's reaction

(i) what is the stimulus? ..... **[1]**

(ii) what is the receptor? ..... **[1]**

(iii) what is the effector? ..... **[1]**

(b) The table shows how many units of alcohol there are in different drinks.

drink	units of alcohol
1 glass of sherry	1
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1 pint of cider	2
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(i) Nick and Phil have had different drinks.

However, they both had the **same** number of units of alcohol.

How many units have they each had?

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

(ii) Phil has drunk a greater volume of liquid than Nick.

However, they have both had the same number of units of alcohol.

Explain why.

.....

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

(c) Alcohol is a depressant drug.

The list below shows other drugs.

Put a tick (✓) in the box next to the **one** drug that is also a depressant.

aspirin	☐
cannabis	☐
ecstasy	☐
LSD	☐
nicotine	☐
temazepan	☐

[1]

[Total: 6]

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2 Matt is playing in a football match.

(a) As he runs, his breathing and pulse rates increase to supply extra oxygen to his muscles.

The oxygen is used in aerobic respiration.

Complete the word equation for aerobic respiration.

oxygen + …… → carbon dioxide + water + energy

[1]

(b) Matt suddenly sprints to get to the ball.

Now his muscles use anaerobic respiration to supply the extra energy they need.

(i) Why must Matt's muscles use anaerobic respiration to supply the extra energy?

.....

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

(ii) If muscles use anaerobic respiration for too long they have to stop working.

Explain why.

.....

.....

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

(c) As Matt plays football **more** blood flows near the surface of his skin.

Explain why this happens.

.....

.....

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

(d) After the football match, Matt is very thirsty.

He drinks a lot of water.

Why is it important that he drinks a lot of water?

.....

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

[Total: 7]

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3 Fred has cystic fibrosis.

He finds it difficult to breathe because there is too much mucus in his lungs.

Cystic fibrosis is an inherited condition.

It is caused by a recessive allele.

(a) Neither of Fred's parents has cystic fibrosis.

Fred's parents would like to have more children but are worried about them also having the condition.

If they have another child, what is the probability that the child will have cystic fibrosis?

- Use a labelled genetic diagram to work out your answer.
- Use the symbol **f** for the allele causing cystic fibrosis.
- Use the symbol **F** for the normal allele.

probability of another child having cystic fibrosis ..... **[4]**

(b) The allele causing cystic fibrosis is made from DNA.

(i) Write down the letters of the 4 bases found in DNA.

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

(ii) How are the bases in one allele different from the bases in another allele?

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

Turn over for the remainder of question 3

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(c) Fred gets a lot of chest infections.

When he gets a bacterial infection, his doctor gives him antibiotics.

Fred's doctor could just give him antibiotics all the time as a precaution.

However, doctors are careful not to use antibiotics more than is necessary.

One reason for this is not to waste money.

Write down **one other** reason.

.....

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

[Total: 7]

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4 Look at the picture of a zebra.

(a) The zebra is classified in the animal kingdom, not the plant kingdom.

Put a tick (✓) in the box next to **one** reason why it is classified in the animal kingdom.

it cannot make its own food	☐
it needs to respire	☐
its cells divide by mitosis and meiosis	☐
its cells are specialised for different jobs	☐

[1]

(b) The term zorse is used to describe the offspring of a male zebra and a female horse.

(i) A cross between a zebra and a horse does **not** produce fertile offspring.

Explain why.

.....

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

(ii) Explain why it is difficult to classify the zorse.

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

[Total: 3]

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5 Look at the picture of a sperm whale.

(a) Sperm whales are normally found far out to sea.

However, sperm whales are often seen near the coast of New Zealand.

Finding them close to land has become important to the people living nearby.

Suggest **one** reason why.

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

(b) Some whale species are endangered partly because they are hunted.

(i) Describe **two other** reasons why the whales have become endangered.

1 .....

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

(ii) Hunting for whales in the sea around New Zealand is now banned.

Describe **one other** way man can help prevent the extinction of whales.

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

(c) Whales produce milk for their young.

Write down the **class** of animals that feed their young on milk.

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

(d) Some areas of whale biology, such as the way they communicate are still not understood.

Write down **one other** area of whale biology scientists still do not fully understand.

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

[Total: 6]

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6 Rose works for the council.

(a) She needs to find out how many rats are living in one area of town.

Rose set traps to catch the rats. The traps did not harm the rats.

Rats were collected from the traps, marked with harmless paint and released.

Rose then set the traps again a week later.

The results are shown in the table.

	number of rats
number caught first time	30
number caught second time	28
number of marked rats caught the second time	2

An estimate for the population of rats can be calculated using the formula:

$$\text{population} = \frac{\text{number caught first time} \times \text{number caught second time}}{\text{number of marked rats caught the second time}}$$

Use the formula to estimate the population of rats.

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

Turn over for the remainder of question 6

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(b) Rose tries to kill the rats using food containing the rat poison warfarin.

All of the rats eat the food.

Most rats die but some survive and breed.

Most of their offspring can also survive eating the poisoned food.

(i) Explain why some rats survive.

.....

.....

.....

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

(ii) Two scientists, Darwin and Lamarck would have explained the survival of the rats in different ways.

Darwin's ideas are still accepted by most scientists but Lamarck's are not.

Explain why Lamarck's ideas are no longer accepted by scientists.

.....

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

[Total: 5]

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7 Read the report about rhododendron plants.

The rhododendron plant is responsible for the destruction of many habitats in Britain.

The reason for this is simple. Where conditions are suitable, it will out compete most other plants.

The rhododendrons become very large, allowing very little light to reach the ground.

(a) Plants need light for photosynthesis to make glucose ($C_6H_{12}O_6$).

Finish the balanced symbol equation for photosynthesis.

$$\text{.....} + \text{.....} \xrightarrow[\text{chlorophyll}]{\text{light}} C_6H_{12}O_6 + \text{.....}$$

[2]

(b) Plants then convert some of the glucose to starch for storage.

Explain why plants store energy in the form of starch instead of glucose.

.....

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

(c) Rhododendron flowers are adapted for insect pollination.

Describe **one** adaptation for insect pollination.

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

(d) Rhododendrons remove large amounts of nitrates from the soil.

Legumes are plants that can survive in low nitrate soil.

This is because they gain nitrates from bacteria in their root nodules.

What do the bacteria get from the legumes?

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

[Total: 6]

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mock papers 11-foundation

1 Look at Matthew.

(a) His body gathers information from the sense organs.

Receptors in the sense organs detect a certain type of stimulus.

Draw straight lines to connect each **sense organ** to its correct **stimulus**.

One line has been drawn for you.

sense organ	stimulus
skin	vibrations in the air
tongue	light
ear	chemicals in food
eyes	pressure

[2]

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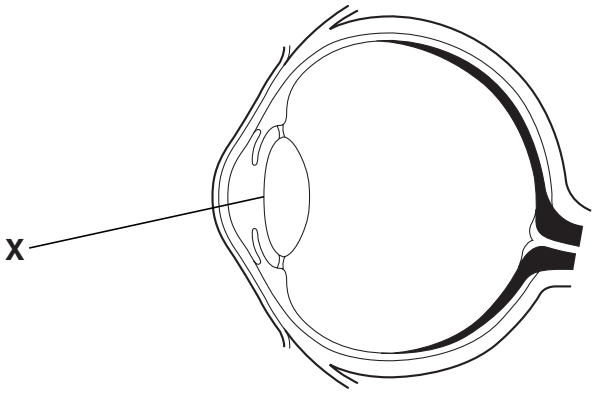
(b) Look at the diagram of the eye.



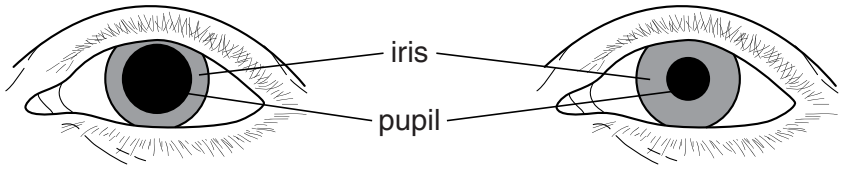
Write down the name of the part labelled **X**.

Part **X** ..... **[1]**

(c) Matthew moves from a dark room into a brightly lit room.

His pupils automatically change in size as shown in the diagram.

This happens quickly.



Write down the name of this type of response.

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

(d) The iris is the coloured part of the eye.

What controls the colour of the iris?

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

(e) Matthew cannot tell the difference in colour between red and green objects.

This is a condition called red-green colour blindness.

How has he got the condition of red-green colour blindness?

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

[Total: 6]

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2 Look at the picture of a new born baby.

(a) The midwife checks the health of the baby.

As part of these checks the midwife uses a thermometer to measure the temperature of the baby's body.

Where would the midwife put the thermometer to get the baby's body temperature?

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

(b) The baby is wrapped in a blanket to prevent loss of heat from the body.

Write down **one** way the body loses heat.

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

(c) The midwife will also make sure that the baby is immunised.

(i) How does immunisation help the child?

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

(ii) The baby's white blood cells are important in immunisation against certain pathogens.

Write down **two** ways the baby's white blood cells can help to destroy pathogens.

.....

.....

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

[Total: 5]

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3 Look at the three diets below.

Diet A

Food group	%
carbohydrate	55
protein	20
fat	15
vitamins	trace
minerals	trace
fibre	10

Diet B

Food group	%
carbohydrate	55
protein	15
fat	20
vitamins	trace
minerals	trace
fibre	10

Diet C

Food group	%
carbohydrate	70
protein	5
fat	10
vitamins	trace
minerals	trace
fibre	15

Health professionals recommend that 10 to 15 per cent of a healthy **adult** diet is made up of protein.

Some developing countries have diets which are low in protein.

(a) Which diet is most likely to be from a developing country?

Choose from **A**, **B** or **C**.

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

(b) Which **one** of these diets would be suitable for a **growing** teenager?

Choose from **A**, **B** or **C**.

Diet .....

Write down one reason for your answer.

.....

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

[Total: 3]

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4 Neil is starting a new job.

His new company asks him to get a medical check up.

The doctor measures Neil's blood pressure and tells him it is too high.

(a) Different lifestyle factors can affect a person's blood pressure.

Look at the statements below.

Which **two** lifestyle factors could cause Neil to have **high** blood pressure?

Put ticks (✓) in the **two** correct boxes.

eating a low fat diet	☐
exercising regularly	☐
high amount of salt in diet	☐
relaxation classes	☐
excessive alcohol consumption	☐

[1]

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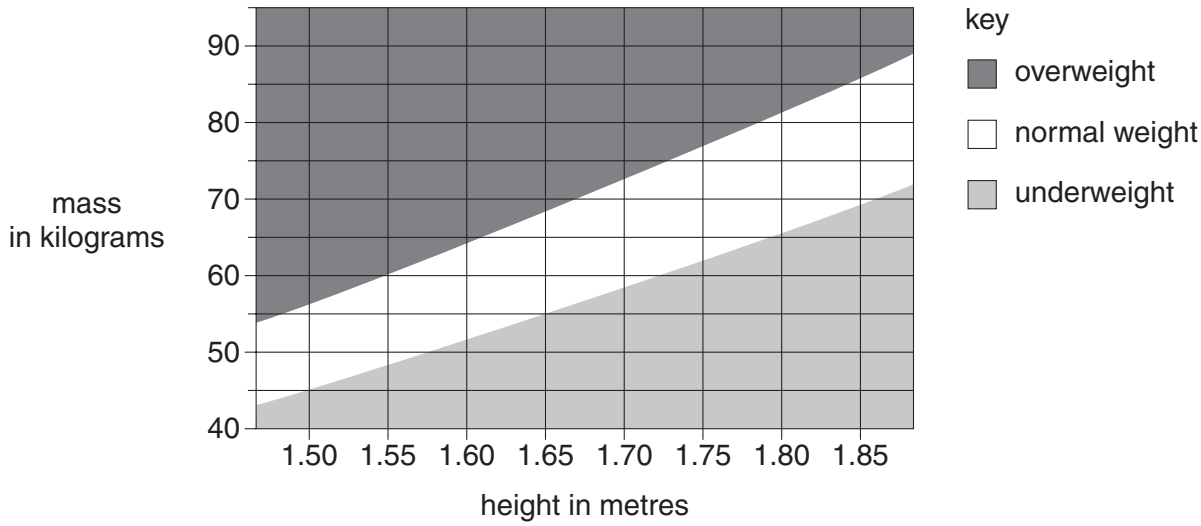
(b) The doctor measures Neil's height and weighs him.

Neil is **1.80 m** tall and has a mass of **91.0 kg**.

(i) The doctor uses a chart to decide how to describe Neil's weight.

Look at the chart below.



Use the chart to describe Neil's weight.

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

(ii) The doctor can also use Neil's height and mass to calculate his body mass index (BMI).

Calculate Neil's body mass index (BMI) using the formula

$$\text{BMI} = \frac{\text{mass in kg}}{(\text{height in m})^2}$$

Show your working.

Neil's BMI = ... **[2]**

(c) The doctor has to record if Neil is fit and healthy.

Explain the difference between fitness and health.

.....

.....

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

[Total: 6]

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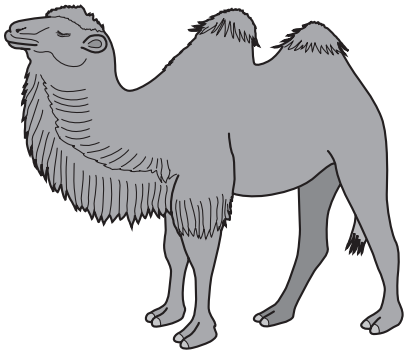
5 Camels live in deserts which are hot and dry.



(a) What type of animal is the camel?

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

an invertebrate and a mammal	☐
a vertebrate and a reptile	☐
a vertebrate and a mammal	☐
an invertebrate and an amphibian	☐

[1]

(b) Camels can survive body temperatures of up to 41 °C without sweating.

Not sweating is an advantage to the camel in the desert.

Write down why.

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

(c) Camels eat mainly grass.

Grass is difficult to digest.

Camels have microorganisms in their gut that help them digest the grass.

The microorganisms have somewhere warm to live with plenty of food.

What name is given to this type of relationship where both species benefit?

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

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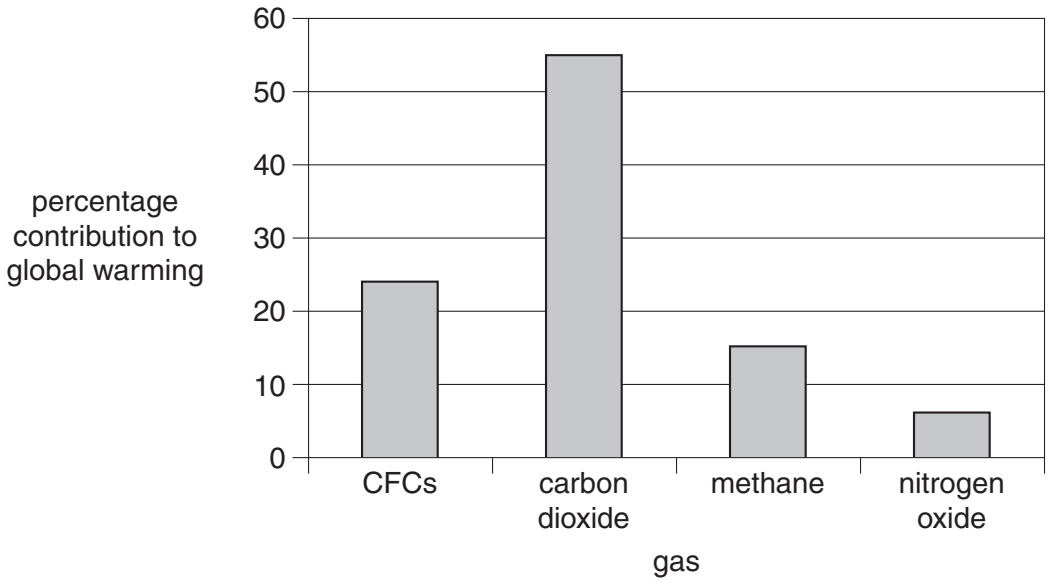
(d) The microorganisms give off a lot of methane gas which is released from the camel.

Methane is one of the gases that cause global warming.

The bar chart shows how much each gas contributes to global warming.



(i) Write down the gases in order of how much they contribute to global warming.

Start with the largest contributor first.

One has been done for you.

…… …… methane ……

(largest) (smallest)

[1]

(ii) Carbon dioxide levels in the air are increasing.

Why is this?

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

[Total: 5]

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6 Read the article.

Operation Bumblebee

Bumblebees are large insects that live on plants like clover.

Scientists are worried because the number of bumblebees has dropped by 70% in the last 30 years.

This is because the areas where they live are being destroyed.

The scientists are now asking farmers to grow clover by the side of their fields to try to save bumblebees.

(a) Why do the scientists think that bumblebee numbers are dropping?

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

There is too much competition from larger insects. ☐

Their habitat is disappearing. ☐

They are being poisoned by clover. ☐

They are being killed by farmers. ☐

[1]

(b) Scientists are worried that bumblebees might become **extinct**.

Write down what is meant by the term extinct.

.....

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

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(c) The scientists are trying to save bumblebees by protecting where they live.

Write down **one other** way that endangered species can be helped.

.....

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

(d) Some animals are endangered and some are extinct.

Put **one** tick (✓) next to each animal to show if it is endangered or extinct.

animal	endangered	extinct
gorilla		
mammoth		
panda		

[2]

[Total: 5]

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7 The photograph shows a type of wolf that lives on an island in Canada.

(a) The wolf is a predator.

Describe **one** feature shown in the photograph that helps it to be a predator.

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

(b) The wolves on the island compete with each other.

Write down **one** resource that they might compete for.

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

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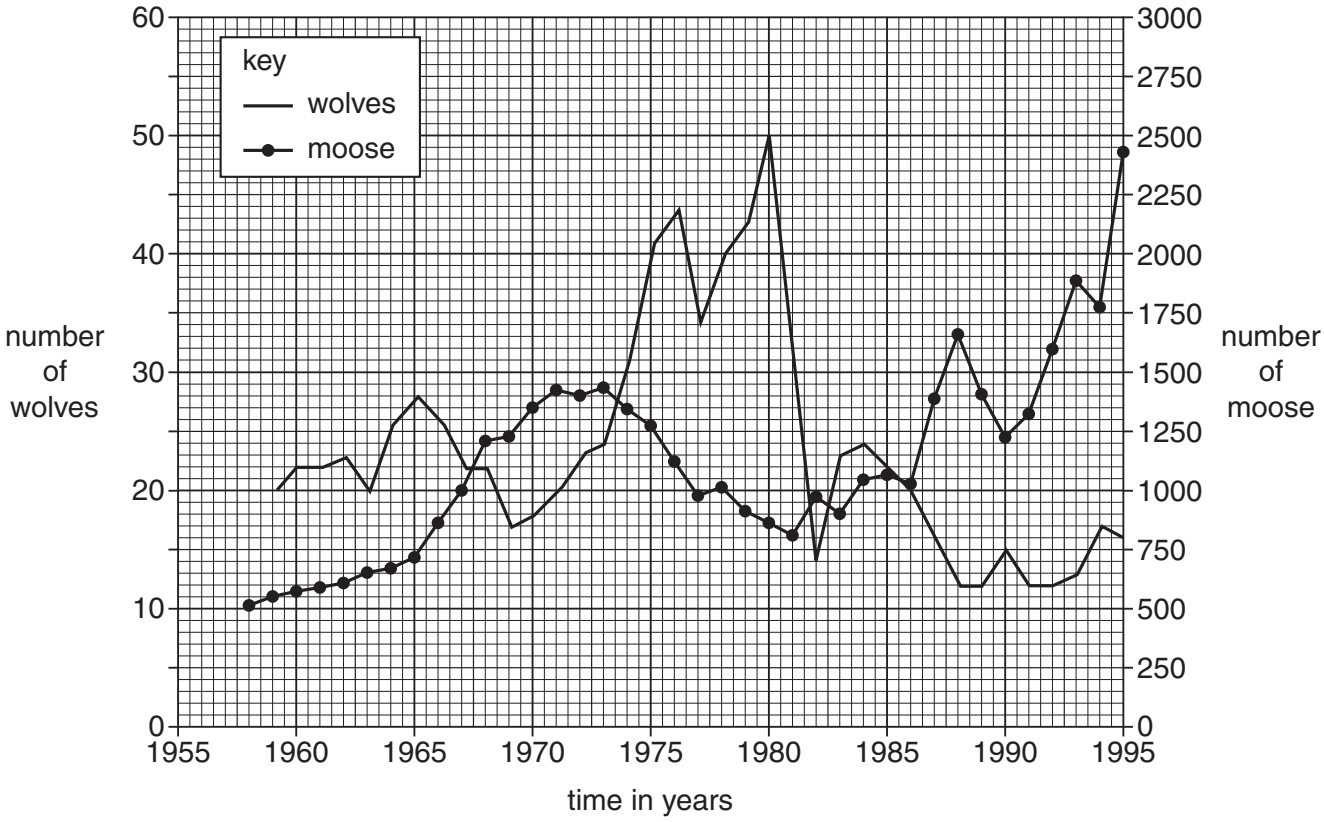
(c) There are also animals called moose living on the island.

The wolves prey on the moose.

The graph shows the numbers of wolves and moose on the island between 1958 and 1995.



(i) What is the **highest** number of wolves that have lived on the island between 1958 and 1995?

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

(ii) Visitors to the island are thought to have brought a disease onto the island.

Over the next two years this disease killed most of the wolves.

In which year did this disease reach the island?

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

(iii) What effect did this disease have on the number of moose?

Explain why it had this effect.

effect .....

explanation .....

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

[Total: 6]

Turn over

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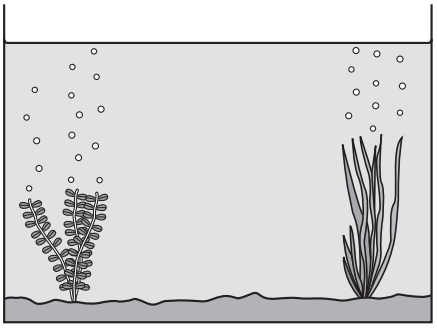
8 Gary is looking at some pondweed in a tank of water.

The pondweed is photosynthesising.



(a) The pondweed is making bubbles of a gas.

What gas is made by photosynthesis?

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

(b) What else is the pondweed making during photosynthesis?

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

(c) Plants like pondweed grow faster in the summer than in the winter.

Explain why.

.....

.....

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

[Total: 4]

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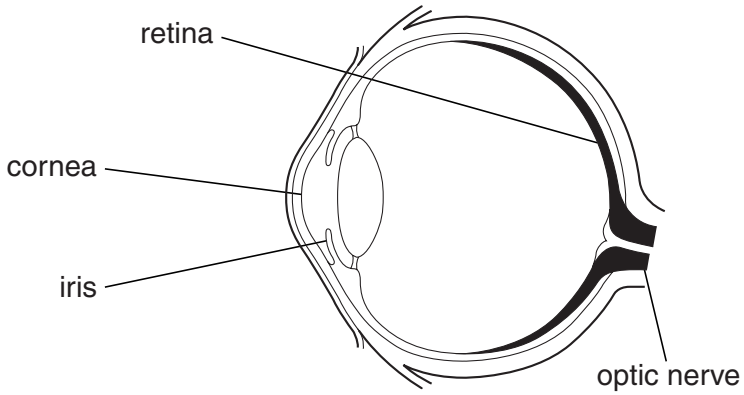
mock papers 12-higher

1 This question is about how the eye works.



(a) The diagram shows the main parts of the eye.

Each part does a different job.

Draw a line to join each **part of the eye** with its correct **job**.

One line has been drawn for you.

part of the eye	job
optic nerve	refracts light
iris	contains light receptors
retina	controls how much light enters the pupil
cornea	carries impulses to the brain

[2]

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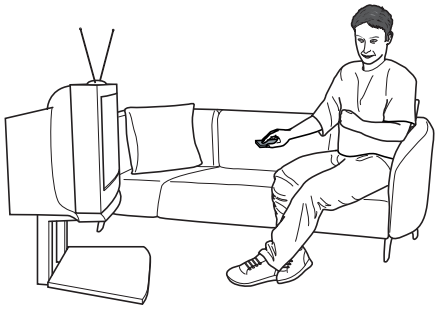
(b) (i) The eye focuses light by changing the shape of the lens.

This is called **accommodation**.



Joe focusing on a distant television

Joe focusing on a close-up newspaper

Joe watches television.

He then reads his newspaper.

His lens changes shape when he looks at his newspaper.

Explain what happens in Joe's eye to change the shape of his lens.

.....

.....

.....

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

Turn over for the remainder of question 1

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(ii) Kevin wears glasses for correcting short-sight.

Write down the name of the type of lens needed to correct short-sight.

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

[Total: 6]

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2 Neil is starting a new job.

His new company asks him to get a medical check up.

The doctor measures Neil's blood pressure and tells him it is too high.

(a) Different lifestyle factors can affect a person's blood pressure.

Look at the statements below.

Which **two** lifestyle factors could cause Neil to have **high** blood pressure?

Put ticks (✓) in the **two** correct boxes.

eating a low fat diet	☐
exercising regularly	☐
high amount of salt in diet	☐
relaxation classes	☐
excessive alcohol consumption	☐

[1]

Turn over for the remainder of question 2

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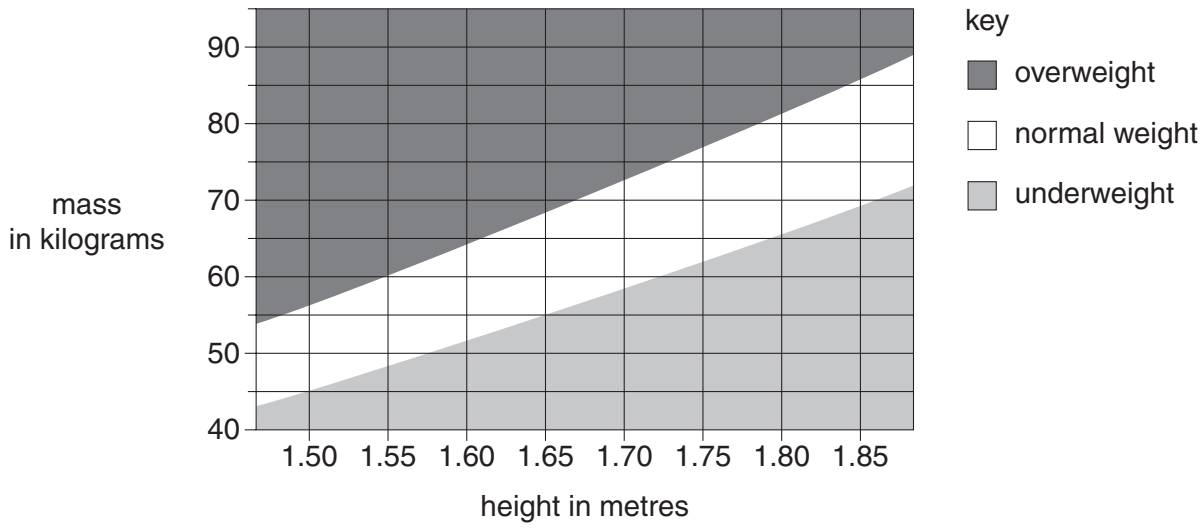
(b) The doctor measures Neil's height and weighs him.

Neil is **1.80 m** tall and has a mass of **91.0 kg**.

(i) The doctor uses a chart to decide how to describe Neil's weight.

Look at the chart below.



Use the chart to describe Neil's weight.

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

(ii) The doctor can also use Neil's height and mass to calculate his body mass index (BMI).

Calculate Neil's body mass index (BMI) using the formula

$$\text{BMI} = \frac{\text{mass in kg}}{(\text{height in m})^2}$$

Show your working.

Neil's BMI = ... **[2]**

(c) The doctor has to record if Neil is fit and healthy.

Explain the difference between fitness and health.

.....

.....

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

[Total: 6]

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3 This question is about how the body stays in balance.

Look at the new born baby.

(a) The baby must maintain a constant internal environment to stay healthy.

Write down the word which best describes maintaining a constant internal environment.

Choose from the list.

evaporation

homeostasis

homozygous

hypothermia

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

(b) To stay healthy the baby must have a constant body temperature of about 37 °C.

The midwife notices the baby's skin becoming pale.

This is due to **vasoconstriction**.

Explain what happens during vasoconstriction to make the skin look pale.

.....

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

[Total: 3]

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4 This question is about diabetes.

Jessica has diabetes.

She cannot make insulin to control her blood sugar level.

To help control her blood sugar level she must inject herself with insulin every day.

(a) Jessica can also control her blood sugar level in other ways.

Write down **one other** way that she can control her blood sugar level.

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

(b) **(i)** Scientists know the genetic code for insulin.

The genetic code uses chemicals called **bases** found in DNA.

How many different **types** of base make up the genetic code for insulin?

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

(ii) Insulin is made in the pancreas.

The gene for insulin is in all the cells of the body.

Explain why all other body cells cannot make insulin.

.....

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

[Total: 3]

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5 During pregnancy, tests can be done to find out if an unborn baby has an inherited disorder.

Write down **one** advantage and **one** disadvantage of parents knowing that their unborn baby has an inherited disorder.

advantage .....

.....

disadvantage .....

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

[Total: 2]

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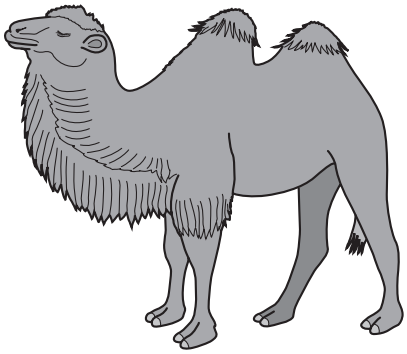
6 Camels live in deserts which are hot and dry.



(a) The camel is a mammal.

Write down **one** characteristic of mammals that is **shown in the picture**.

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

(b) Camels can survive body temperatures of up to 41 °C without sweating.

Not sweating is an advantage to the camel in the desert.

Write down why.

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

(c) Camels eat mainly grass.

Grass is difficult to digest.

Camels have microorganisms in their gut that help them digest the grass.

The microorganisms have somewhere warm to live with plenty of food.

What name is given to this type of relationship where both species benefit?

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

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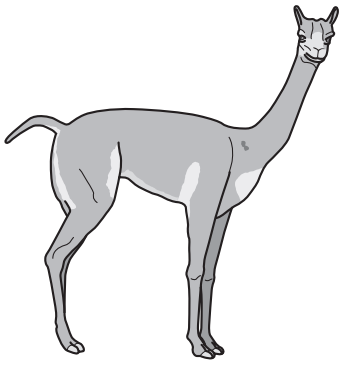
(d) Camels are related to llamas that live in dry areas in South America.

The drawing shows a llama.



An animal similar to the llama and camel lived in North America about 11 million years ago.

One group of these animals moved into South America and evolved into llamas. Another group of these animals moved into Asia and evolved into camels.

There are some similarities between the appearance of a camel and a llama.

Write down **two** possible reasons why there are similarities.

1 .....

.....

2 .....

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

(e) The scientific name of a camel is *Camelus bactrianus*.

The llama is *Lama glama*.

(i) What do these scientific names tell you about the classification of the two animals?

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

(ii) The llama and camel have been interbred to produce a hybrid.

Why is it difficult to classify hybrids?

.....

.....

.....

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

[Total: 8]

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7 Read the article.

Operation Bumblebee

Bumblebees are large insects that live on plants like clover.

Scientists are worried because the number of bumblebees has dropped by 70% in the last 30 years.

This is because the areas where they live are being destroyed.

The scientists are now asking farmers to grow clover by the side of their fields to try to save bumblebees.

(a) (i) Bumblebees are endangered because there is more demand for land to grow crops.

Why is this demand increasing?

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

(ii) The scientists are trying to save bumblebees by protecting where they live.

Write down **one other** way that endangered species can be helped.

.....

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

(b) Farmers might benefit from insects such as bumblebees moving from flower to flower to feed.

(i) Suggest **one** reason why.

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

(ii) Clover has colourful petals to attract bumblebees.

Suggest **one other** way clover is adapted to attract insects.

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

(c) Clover contains nitrogen-fixing bacteria in nodules on its roots.

What does the clover plant gain from these bacteria?

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

[Total: 5]

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8 Isle Royale is an island in Canada.

In 1949 the water around the island froze over and allowed a group of wolves to move onto the island.

The ice then melted, trapping the group of wolves on the island.

(a) What name is given to a group of animals like these wolves that live in the same habitat?

Put a (ring) around the word in this list.

community **ecosystem** **hybrid** **niche** **population**

[1]

Turn over for the remainder of question 8

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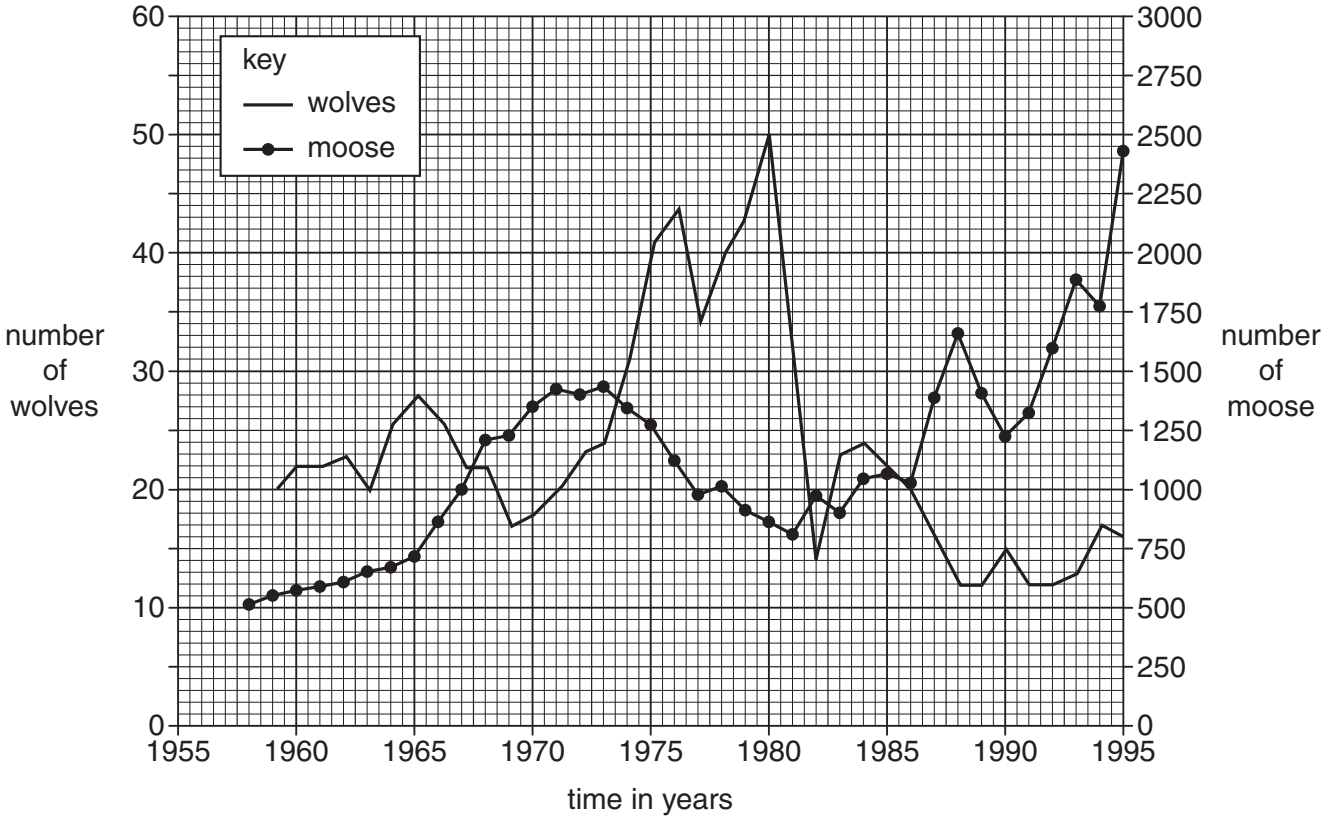
(b) There are also animals called moose living on the island.

The wolves prey on the moose.

The graph shows the numbers of wolves and moose on the island between 1958 and 1995.



(i) What is the **highest** number of wolves that have lived on the island between 1958 and 1995?

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

(ii) In 1980, visitors to the island are thought to have brought a disease onto the island.

Over the next two years this disease killed most of the wolves.

What effect did this disease have on the number of moose?

Explain why it had this effect.

effect .....

explanation .....

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

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(c) If this group of wolves stayed trapped on the island for thousands of years they could evolve into a new species.

Explain how this might happen.

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.....

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.....

.....

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

[Total: 7]

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