

1 The photograph shows an aardvark.



By Beige Alert [CC BY 2.0], via Flickr

- Aardvarks feed on insects that they dig from the soil.
- Aardvarks hunt for these insects at night.

How does each of these adaptations help the aardvark?

(a) It has powerful claws.

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(1)

(b) It has a long, sticky tongue.

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(1)

(c) It has very large ears.

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(1)

(d) It can cover the end of its nose with flaps of skin.

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(1)  
(Total 4 marks)

2

The table compares some features of a polar bear and the Malayan sun bear. The polar bear lives in the Arctic where the climate is cold. The Malayan sun bear lives in warm tropical forests.

	<b>Polar bear</b>	<b>Malayan sun bear</b>
Colour of fur	White	Black
Thickness of fur in cm	5	2
Thickness of fat layer under skin in cm	11	1
Surface area compared to body size	Low	High

Use information from the table to explain how the polar bear is better adapted than the Malayan sun bear for survival in arctic conditions.

*To gain full marks in this question you should write your ideas in good English. Put them into a sensible order and use the correct scientific words.*

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(Total 5 marks)

3

The drawing shows a poison-dart frog.



(a) The poison-dart frog moves mainly by jumping.

Use information from the drawing to suggest **one** way in which this frog is adapted for jumping.

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(1)

(b) Use the information below to suggest how the poison-dart frog is adapted for survival.

- This poison-dart frog is bright blue in colour.
- Animals that eat poison-dart frogs become very sick.

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(1)

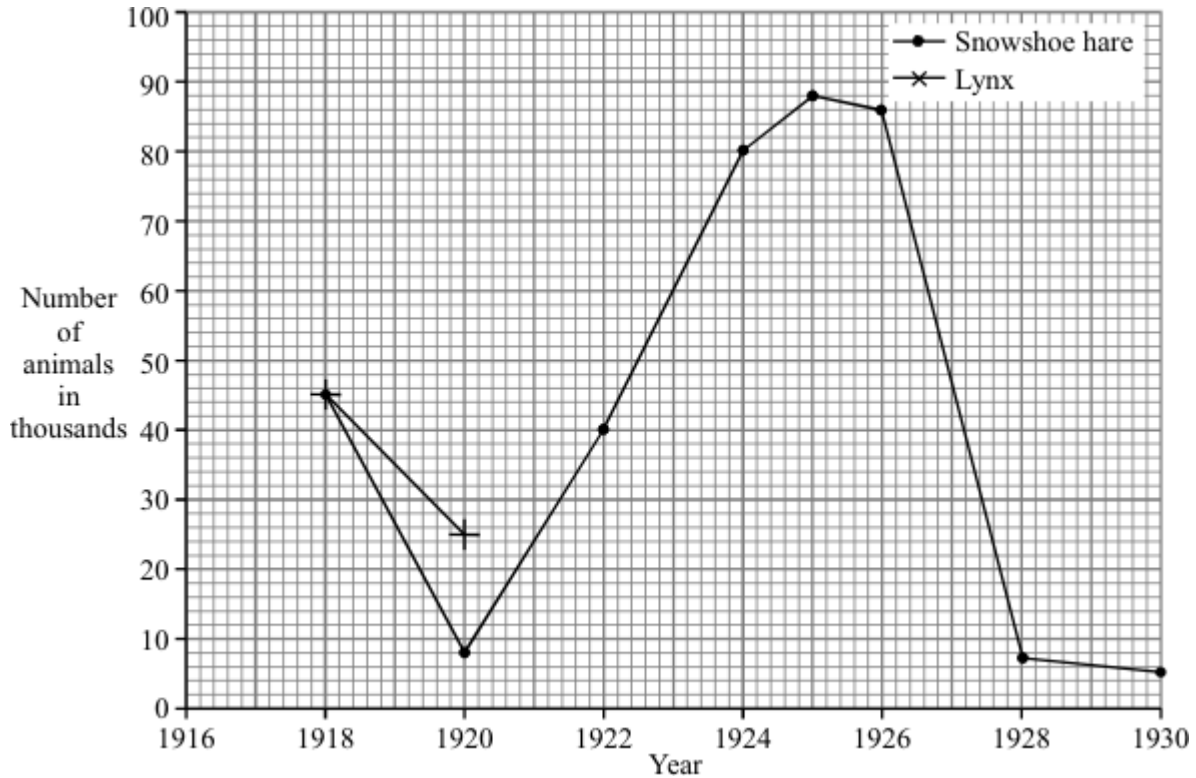
(Total 2 marks)

4

The lynx is a wild cat which lives in Canada. The table shows the number of lynx trapped in a part of Canada in certain years.

Year	Number of lynx in thousands
1918	45
1920	25
1922	10
1924	20
1926	40
1928	50

The snowshoe hare is another wild animal found in Canada. The graph shows the number of snowshoe hares trapped in the same years. The lynx eats the snowshoe hare.



(a) Draw a graph of the data in the table. The first two points have been plotted for you. (2)

(b) From your graph, predict how many lynx were trapped in 1925.  
 \_\_\_\_\_ thousand (1)

(c) Use the information to answer the following.

(i) What would you expect to happen to the number of lynx trapped in 1930? Draw a ring around your answer.

**rise                      fall                      stay the same**

(1)

(ii) Give a reason for your answer to part (c)(i).  
 \_\_\_\_\_  
 \_\_\_\_\_ (1)

(d) The lynx is a predator. What is a predator?

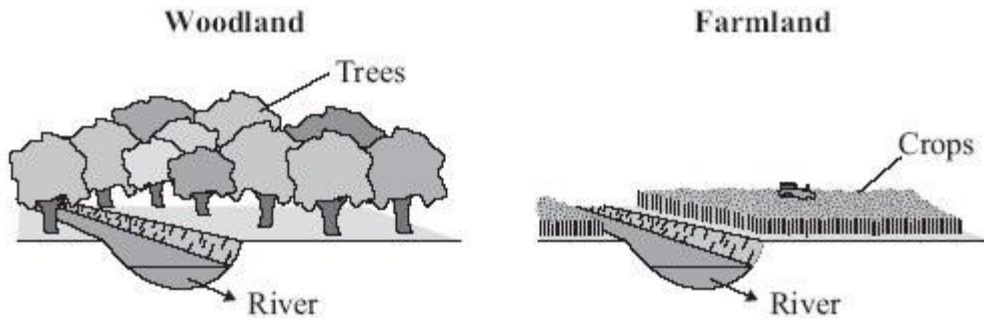
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(1)  
(Total 6 marks)

5

The drawings show some woodland and some farmland. Both have a river flowing through.



(a) (i) There is a wider variety of wildlife in the woodland than in the farmland.

Give **one** reason why.

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(1)

(ii) Farmers remove woodland to provide space for growing crops.

Give **two** other reasons why humans remove woodland.

Do **not** include the uses of wood in your answers.

1. \_\_\_\_\_

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2. \_\_\_\_\_

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(2)

(b) Many farmers spray chemicals on their fields.

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

(i) To make crops grow larger, farmers use

fertilisers
herbicides
pesticides

(1)

(ii) To kill insects that feed on the crop, farmers use

fertilisers
herbicides
pesticides

(1)

(iii) There is a wider variety of wildlife in the river flowing through the woodland than in the river flowing through the farmland.

Give **one** reason why.

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(1)

(c) The population of the UK has increased over the last two hundred years. This increase in population has resulted in damage to the environment.

Apart from farming methods, give **two** ways in which humans damage the environment.

1. \_\_\_\_\_

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2. \_\_\_\_\_

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(2)

(Total 8 marks)

## 6

Animals and plants are adapted in different ways in order to survive.

(a) Plants may have to compete with other plants.

(i) Name **two** things for which plants compete.

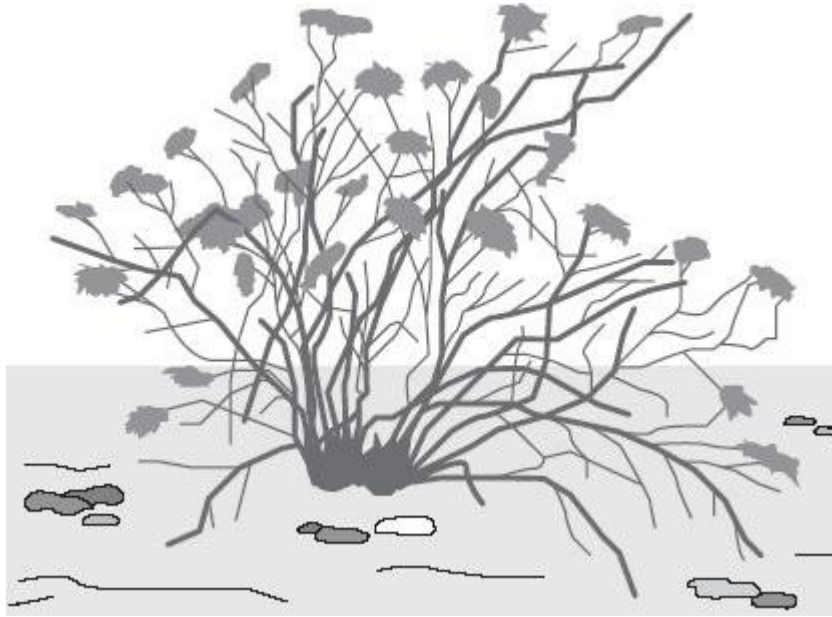
1. \_\_\_\_\_

2. \_\_\_\_\_

(2)

(ii) The drawing shows a creosote bush.

This bush lives in a desert.



The creosote bush produces a poison that kills the roots of other plants.

How does this poison help the creosote bush to survive in the desert?

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(1)

(b) The photograph shows an insect called a katydid.



The katydid is preyed on by birds.

How does the appearance of the katydid help it to survive?

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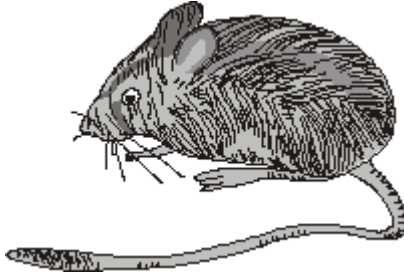
(1)  
(Total 4 marks)



7

The drawing shows a kangaroo rat.

This rat lives in hot, dry deserts.



(a) Explain how each of the following features helps the kangaroo rat to survive in a hot, dry desert.

(i) It does not produce urine.

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(1)

(ii) It lives in a burrow during the day, but comes out at night to search for food.

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(1)

(iii) Its feet and its tail each have a large surface area.

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(1)

(b) The kangaroo rat does **not** sweat.

Explain why **not** sweating could be dangerous for the animal.

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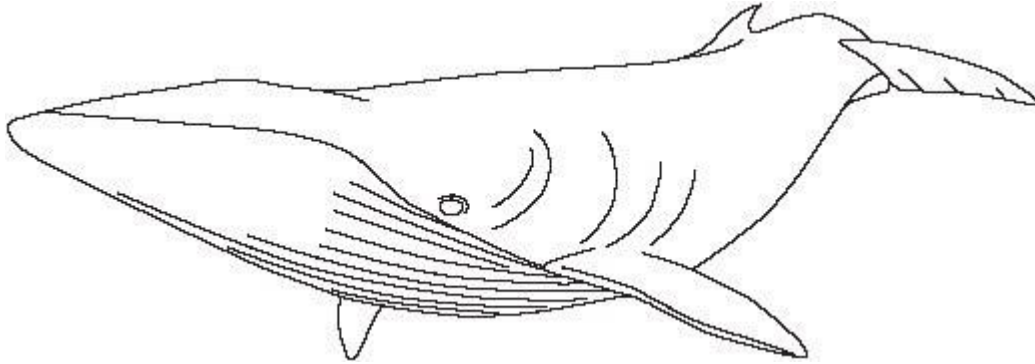
(1)

(Total 4 marks)

8

(a) **Figure 1** shows a minke whale. Whales live in the sea.

**Figure 1**



Write down **two** ways in which the body of the whale is adapted for swimming.

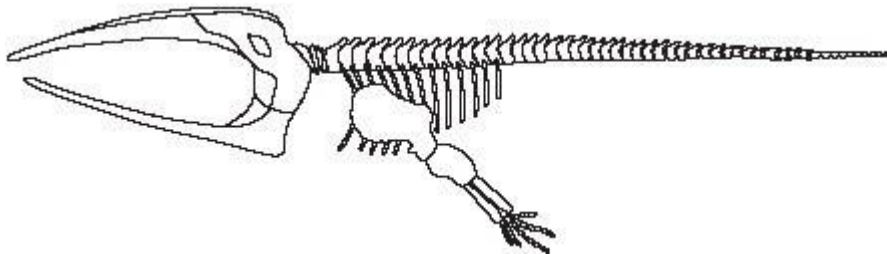
1. \_\_\_\_\_

2. \_\_\_\_\_

(2)

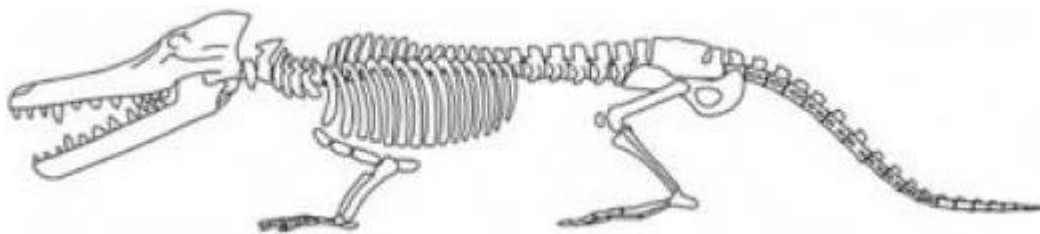
(b) **Figure 2** shows the skeleton of a minke whale.

**Figure 2**



**Figure 3** shows the fossil skeleton of an extinct whale.

**Figure 3**



*Hans G Thewissen/ The Thewissen Lab*

(i) Apart from size, give **two** differences between the skeleton of the minke whale and the fossil skeleton of the extinct whale.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

(2)

(ii) In each of the sentences below, draw a ring around the correct answer.

Life on Earth first developed more than three

billion

million

thousand

years ago.

Fossils

disprove

give evidence for

prove

the theory of evolution.

(2)

(Total 6 marks)

9

Animals have adaptations that enable them to survive.

(a) The photograph shows an echidna.



The echidna has pointed spines on its back.

Explain how these spines might help the echidna to survive.

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(2)

(b) The photograph shows a caterpillar.



© S.J. Krasemann / Peter Arnold / Still Pictures

Explain how the caterpillar's appearance might help it to survive.

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(2)

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

(i) Evolution can be explained by a theory called

- genetic engineering
- mutation
- natural selection

(1)

(ii) This theory was suggested by a scientist called Charles

- Darwin
- Lamarck
- Semmelweiss

(1)

(iii) This scientist said that all living things have evolved from

- monkeys
- dinosaurs
- simple life forms

(1)

(d) Many religious people oppose the theory of evolution.

Give **one** reason why.

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(1)

(Total 8 marks)

10

The photograph shows an area where a tropical forest is being cleared.



(a) Complete the sentences.

People could use timber from the forest for \_\_\_\_\_.

The cleared land can be used for \_\_\_\_\_.

Clearing forests increases the concentration of \_\_\_\_\_ in the atmosphere.

This increase causes global \_\_\_\_\_.

(4)

(b) Clearing forests causes some species to become *extinct*.

(i) What is meant by *extinct*?

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(1)

(ii) It is important to prevent species from becoming extinct.

Give **one** reason why.

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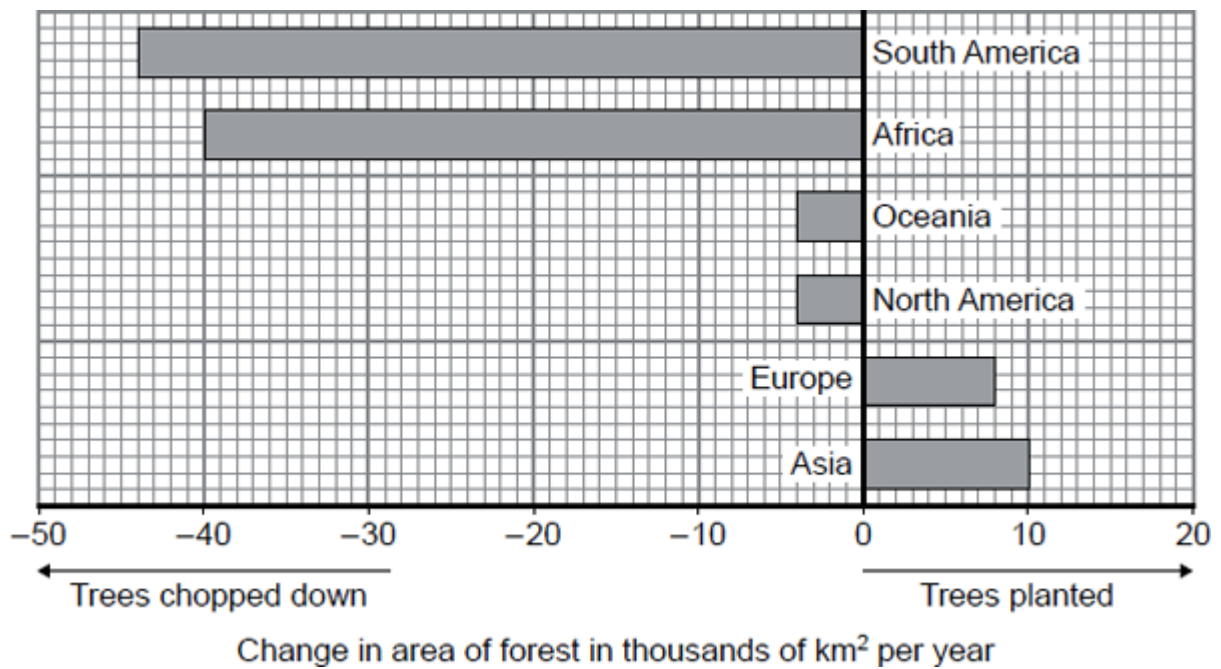
(1)

(Total 6 marks)

11

In many parts of the world, forests are being chopped down (deforestation) so that the land can be used to grow food crops. In other parts, trees are planted to produce new forests.

The graph shows how the area of forest in each of the continents is changing each year.



(a) (i) What area of forest is being lost in Africa each year?

Area = \_\_\_\_\_ thousand km<sup>2</sup>

(1)

(ii) Use **Steps 1, 2** and **3** to calculate the total change to the area of forest each year.

**Step 1** Calculate the total area of trees chopped down.

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Total area chopped down = \_\_\_\_\_ thousand km<sup>2</sup>

**Step 2** Calculate the total area of trees planted.

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Total area planted = \_\_\_\_\_ thousand km<sup>2</sup>

**Step 3** Use your answers from **Steps 1** and **2** to calculate the total change in the area of forest.

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Total change in area of forest \_\_\_\_\_ thousand km<sup>2</sup>

**(3)**

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

(i) Large scale deforestation reduces the number of

species of

plants only.
animals only.
both animals and plants.

**(1)**

(ii) The remains of the trees are broken down into carbon dioxide by

lichens.
microorganisms.
plants.

**(1)**

(iii) The gas released into the atmosphere when trees are burned is

carbon dioxide.
methane.
oxygen.

**(1)**

**(Total 7 marks)**



## Mark schemes

- 1 (a) digging /getting to insects 1
- (b) catching insects / food / insects  
stick to the tongue 1
- (c) hear insects / predators 1
- (d) stop soil / dust / insects getting in 1

[4]

- 2 *The answer to this question requires good English in a sensible order with correct use of scientific terms. Quality of written communication should be considered in crediting points in the mark scheme.*

*maximum of 4 marks if ideas not well expressed*

Polar bear has

white fur - camouflage **or** not seen by prey  
*accept converse points re sun bear* 1

thick(er) fur - insulation **or** keeps heat in  
*number must be comparative*  
*numbers given must be explained*  
*do **not** accept keeps warm / keeps out the cold* 1

thicker fat - insulation **or** keeps heat in 1

energy reserve **or** can release heat 1

lower S.A - slower / less heat loss 1  
(re body size)

[5]

- 3 (a) long hind legs / muscular hind legs / bent hind legs  
*accept powerful hind legs*  
*accept back legs act as spring* 1
- (b) colour / markings warns predators not to eat it  
*allow animals learn not to eat them*  
*ignore camouflage* 1

[2]

4

(a) points plotted accurately

$$+\frac{1}{2} \text{ square}$$

*deduct 1 mark per error*

*ignore the line*

2

(b) 30 **or** correct from candidate's graph

*accept 30 000 lynx*

*do **not** accept 30 000*

1

(c) (i) fall

*mark (i) and (ii) separately*

1

(ii) fewer hares **or** lack of food

*do **not** accept no hares or food*

1

(d) kills / preys / preys on / hunts / catches

**and** eats / for food (other) animals

*must have the eat **and** kill for the point*

1

[6]

5

(a) (i) (more) habitats / (greater) variety of habitats / range of food

*allow (more) places / trees for homes **or** different places to live*

*allow no pesticides / herbicides / chemicals sprayed*

*allow more food*

*allow safer / can hide*

*allow effects of machinery*

1

(ii) any **two** from:

• building / houses / factories / etc

*ignore timber / uses of wood*

• roads

• quarrying

• waste dumps / landfill

• grazing

2

- (b) (i) fertilisers 1
- (ii) pesticides 1
- (iii) pesticide / herbicide / chemicals / sprays  
*allow river (through farmland) polluted*  
*allow correct effect of fertilisers on river organisms* 1
- (c) any **two** from
- pollution / named pollutant / combustion / cars
  - dumping waste / litter  
*allow 'not recycling'*
  - raw materials used up **or** reference to quarries / mines
  - chopping down trees
  - building / houses / etc
  - global warming 2

[8]

- 6** (a) (i) any **two** from:  
*list principle*
- light  
*ignore oxygen / food / sun*
  - water
  - space
  - nutrients / ions / minerals / named
  - carbon dioxide / CO<sub>2</sub> 2
- (ii) less competition for water  
*ignore space / light / food*
- or**
- more water / nutrients / minerals available 1

- (b) camouflage / same shape as leaf / looks like a leaf  
*allow 'blends in'*  
*ignore colour*

1

[4]

7

- (a) (i) conserves water owtte

1

- (ii) prevents overheating / keeps cool  
*allow cooler at night*  
*allow safety from predators*

1

- (iii) increases heat loss / cooling  
*allow prevents sinking into sand*

1

- (b) animal could overheat owtte

1

[4]

8

- (a) any **two** from:

- streamlined / shape reduces friction / long and thin / smooth surface  
OWTTE
- fins / flippers / tail / paddle  
*do not accept 'arms' or 'legs'*
- structures that push against water

2

- (b) (i) any **two** from:

fossil has hind limb / legs / feet  
*it = minke*  
*accept any valid comparison*

fossil has more ribs / bones

fossil has teeth

fossil has curved spine

2

- (ii) billion

1

give evidence for

1

[6]

- 9** (a) protection / defence  
*ignore insulation or rolls into a ball*  
*ignore camouflage* 1
- from predators / from being attacked / from being eaten 1
- (b) looks like snake / looks scary 1
- deters predators **or** has large eyes to spot predator **or**  
camouflage **or** warning colouration from predator or prey  
*allow two separate adaptations for 2 marks* 1
- (c) (i) natural selection 1
- (ii) Darwin 1
- (iii) simple life forms 1
- (d) believe that God created all organisms **or** humans there from the beginning 1

[8]

- 10** (a) fuel / houses / paper  
*allow any object made from wood* 1
- farming / agriculture / replanting  
*allow roads / homes / factories* 1
- carbon dioxide / greenhouse gas / pollution **or** relative named pollutant 1
- warming / temperature increase 1
- (b) (i) none of species left / died out 1
- (ii) may have products useful to humans / examples  
*allow preserve for future generations or 'still there to look at'*  
*allow affect food chains / cycles or extinction of other species*  
*allow non human reasons eg loss of habitat*  
*ignore environmental effects* 1

[6]

<b>11</b>	(a)	(i)	40 <i>accept -40 or +40</i>	1
		(ii)	<b>Step 1</b> 92	1
			<b>Step 2</b> 18	1
			<b>Step 3</b> 74 <i>correct subtraction of answer in <b>step 2</b> from answer in <b>step 1</b> gains 1 mark correct answer 74 with no working gains 3 marks ignore sign</i>	1
	(b)	(i)	both animals and plants	1
		(ii)	microorganisms	1
		(iii)	carbon dioxide	1

**[7]**