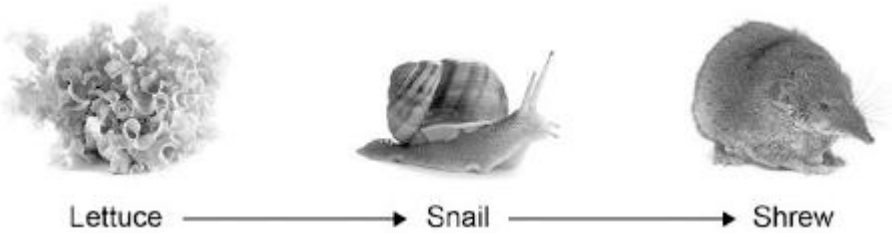
Q1. The diagram below shows a food chain in a garden.



Lettuce © destillat/iStock/Thinkstock; Snail ©Valengilda/iStock/Thinkstock; Shrew © GlobalT/iStock/Thinkstock

(a) Name **one consumer** shown in the diagram above.

.....

(1)

(b) Name **one carnivore** shown in the diagram above.

.....

(1)

(c) A disease kills most of the shrews in the garden.

Suggest why the number of snails in the garden may then increase.

.....

.....

(1)

(d) What is the name given to all the snails in the garden shown in the diagram above?

Tick **one** box.

Community ☐

Ecosystem ☐

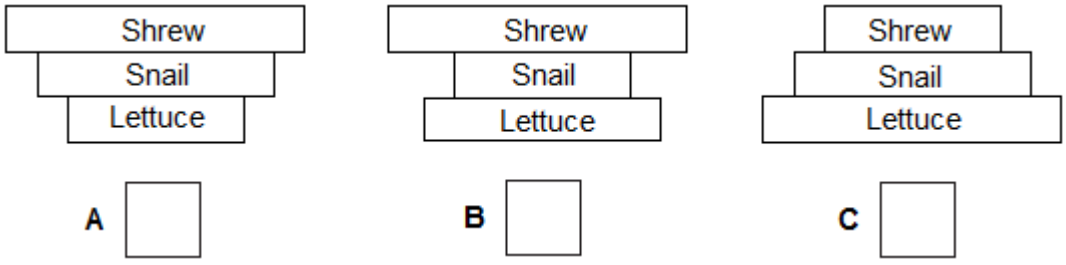
Population ☐

Territory ☐

(1)

(e) Which pyramid of biomass is correct for the food chain shown in the diagram above?

Tick **one** box.



(1)

(f) Some snails ate some lettuces.

The lettuces contained 11 000 kJ of energy.

Only 10% of this energy was transferred to the snails.

Calculate the energy transferred to the snails from the lettuces.

.....

Energy = ... kJ

(1)

(g) Give **one** reason why only 10% of the energy in the lettuces is transferred to the snails.

Tick **one** box.

The lettuces carry out photosynthesis ☐

The snails do not eat the roots of the lettuces ☐

Not all parts of a snail can be eaten ☐

(1)

(h) **Abiotic** factors can affect the food chain.

Wind direction is one abiotic factor.

Name **one other** abiotic factor.

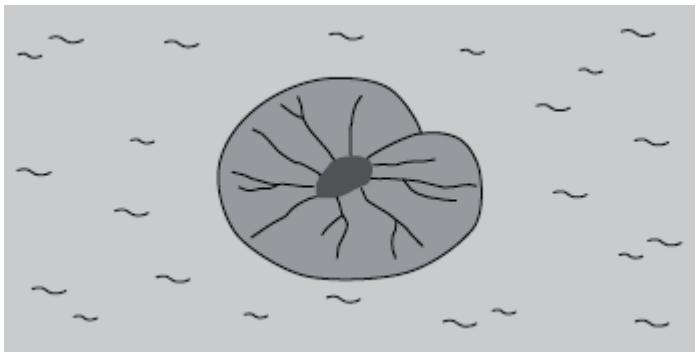
.....

(1)
(Total 8 marks)

Q2. Plants are adapted for survival in many different ways.

Use information from the drawings to answer each question.

(a) This plant lives in ponds. The leaves of the plant float on the surface of the water.



The leaf of this plant is adapted for floating on water.

Suggest how.

.....

.....

(1)

(b) This plant lives in areas where a lot of snow falls.



The triangular shape helps the tree to survive in snowy conditions.

Suggest how.

.....

.....

(1)

(c) This plant has sharp thorns on the stem.



Thorns help this plant survive.

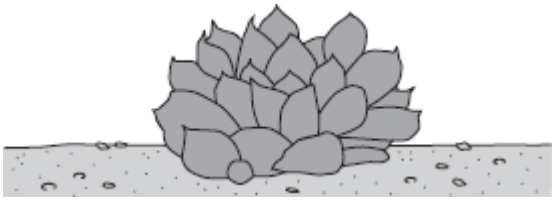
Suggest how.

.....

.....

(1)

(d) This plant lives in very dry areas.



The swollen leaves help this plant to survive in very dry places.

Suggest how.

.....

.....

(1)
(Total 4 marks)

Q3. Many animals and plants are adapted to stop other organisms eating them.

(a) The photograph shows part of a plant stem.



By Forest & Kim Starr [CC BY 3.0], via W kimedia Commons

Suggest how this plant is adapted to stop animals eating it.

Adaptation

.....

Describe how the adaptation helps to stop animals eating the plant.

.....

.....

(2)

(b) The photograph shows an insect on a plant twig.



By Fir0002 [CC BY-SA 3.0], via Wikimedia Commons

Suggest how this insect is adapted to stop animals eating it.

Adaptation

.....

Describe how the adaptation helps to stop animals eating the insect.

.....

.....

(2)

(c) The photograph shows some insects.

These insects are bright red.



By Greg Hume (Greg5030) [CC BY 3.0], via W kimedia Commons

Suggest how these insects are adapted to stop animals eating them.

Adaptation

.....

Describe how the adaptation helps to stop animals eating the insect.

.....

.....

(2)
(Total 6 marks)

Q4. In a woodland, bluebells grow well every year.

Bluebells growing well in woodland



Mick Garratt [CC-BY-SA-2.0], via Wikimedia Commons

Each year the dead flowers and leaves of the bluebells and leaves from the trees fall onto the ground.
The bluebells do not run out of mineral ions.

Explain why the bluebells do **not** run out of mineral ions.

The words in the box may help you.

roots	**dead leaves**	**mineral ions**
	microorganisms	**decay**

.....

.....

.....

.....

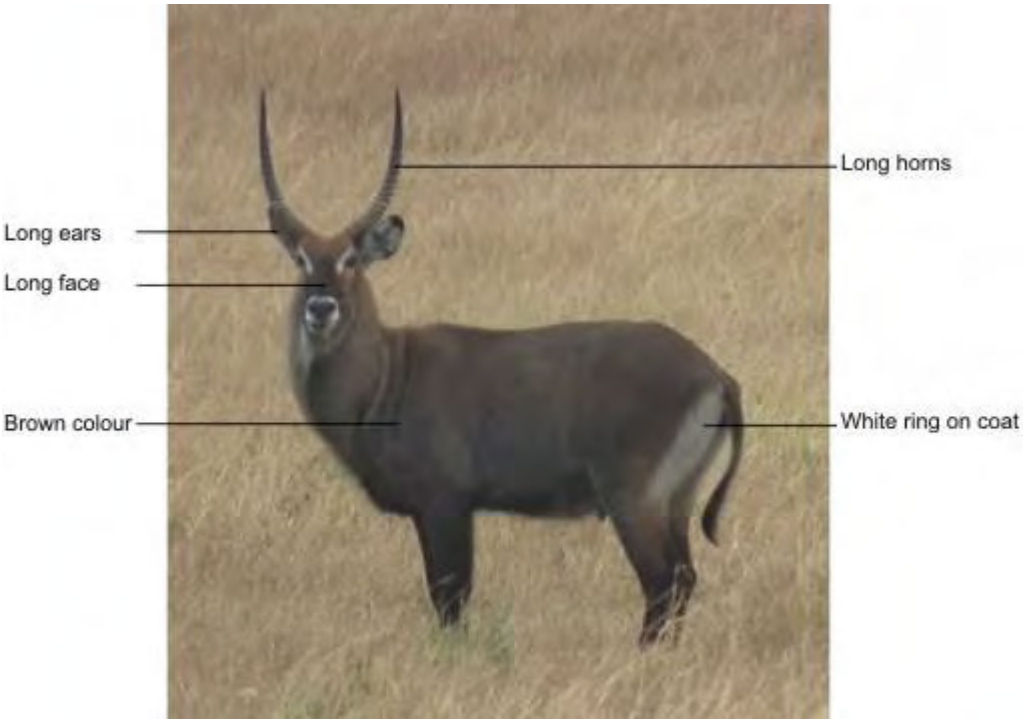
.....

.....

(3)
(Total 3 marks)

Q5. The photograph shows some features of a waterbuck.

Waterbuck live in areas of tall, brown grass.



By Nevit Dilmen (Own work) [CC-BY-SA-3.0], via W kimedia Commons

Choose labels from the photograph to answer these questions.
You should choose a label **once** only.

(a) Which feature helps to camouflage the waterbuck in the grass?

.....

(1)

(b) Which feature helps the waterbuck to detect predators?

.....

(1)

(c) Which feature helps the waterbuck to fight predators?

.....

(1)

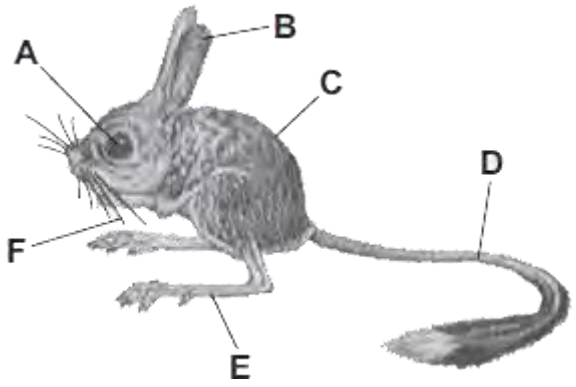
(d) Which feature helps a baby waterbuck to follow a parent through the long grass?

.....

(1)

(Total 4 marks)

Q6. The drawing shows a jerboa. Jerboas live in sandy deserts.



Jerboas sleep in underground holes during the hot day and come out during the cold night.

The jerboa's main food is small insects which run across the surface of the sand.

For each question write the correct letter in the box.

Which structure, **A**, **B**, **C**, **D**, **E** or **F**:

(a) helps to insulate the jerboa ☐

(1)

(b) helps the jerboa to detect insects on a dark night ☐

(1)

(c) helps the jerboa to hop quickly to catch an insect ☐

(1)

(d) helps the jerboa to keep its balance when hopping ☐

(1)

(e) helps the jerboa to know the width of its underground hole in the dark? ☐

(1)
(Total 5 marks)

Q7. Many organisms are adapted to avoid being eaten.

(a) The photograph shows a gecko on a leafy branch.



© Thomas Marent/ardea.com

The gecko is adapted to avoid being eaten by predators.

Explain how.

.....

.....

.....

.....

(2)

(b) Ants can give a painful bite.

The photograph shows a type of ant living on acacia trees.

Acacia trees have thorns on their branches.

Branch of acacia tree.



By Ryan Somma, cropped by Fama Clamosa,20 January 2010 (UTC)
[CC-BY-SA-2.0], via W kimedia Commons

(i) Predators are less likely to eat ants living on acacia trees than ants living on the ground.

Suggest why.

.....

.....

(1)

(ii) Giraffes eat the leaves of acacia trees.

Giraffes do **not** eat the leaves of acacia trees that have ants living on them.

Suggest why.

.....

.....

(1)

(c) The photographs show a wasp and a hoverfly.

The wasp and the hoverfly both have black and yellow stripes.

WaspHoverfly





© Alexandr Pakhnyushchyy/iStock© Richard Majlinder/iStock

Wasps have stings, but hoverflies do **not**.

The stripes on the hoverfly help the hoverfly to avoid being eaten by predators.

Explain why.

.....

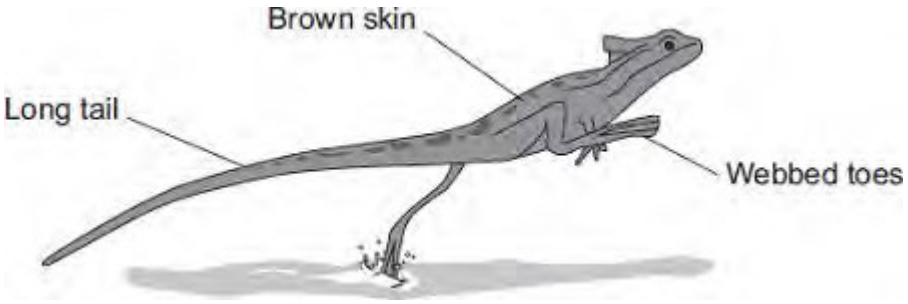
.....

.....

.....

(2)
(Total 6 marks)

Q8. The picture shows a basilisk lizard. Some of the adaptations of the lizard are labelled.



Basilisk lizards are often found resting on branches of trees that grow next to water.
Basilisk lizards can run across the surface of the water.

(a) Draw **one** line from each adaptation of the lizard to the advantage of the adaptation.

Adaptation	**Advantage**
	For camouflage on branches of trees
Toes on the back feet are webbed	
	Helps the lizard to balance when running
Long tail	
	Warning colours to deter predators
Brown skin	
	Increases surface area in contact with the water

(3)

(b) Suggest **one** advantage to the basilisk lizard of being able to run across the surface of the water.

.....

.....

(1)

(c) Animals, such as lizards, compete with each other.

Give **two** factors that animals compete for.

Tick (✓) **two** boxes.

Oxygen ☐

Food ☐

Territory ☐

Light ☐

(2)
(Total 6 marks)

Q9. Animals and plants are adapted in different ways in order to survive.

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

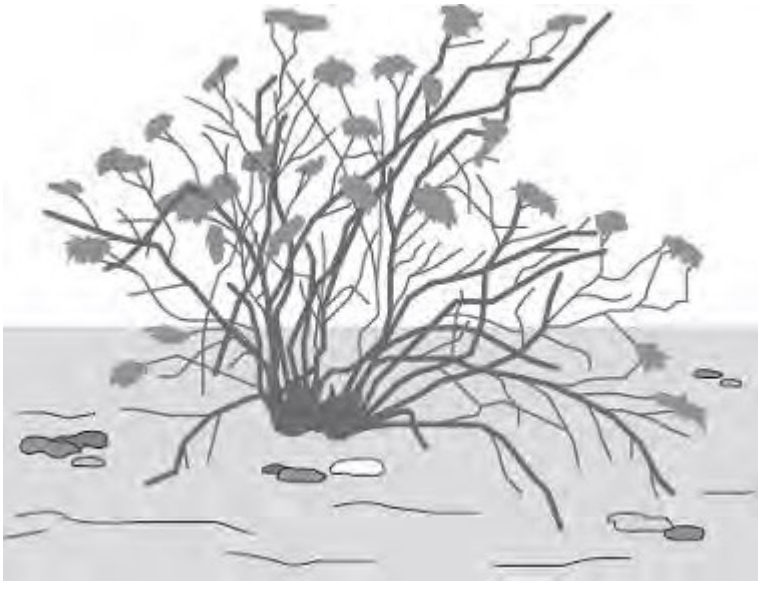
(i) Name **two** things for which plants compete.

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?

.....

.....

(1)

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



By Ltshears (Own work) [Public domain], via Wikimedia Commons

The katydid is preyed on by birds.

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

.....

.....

.....

.....

(1)
(Total 4 marks)

Q10.(a) Which term describes organisms that can tolerate very hot or very cold places?

Draw a ring around the correct answer.

an environmental species	**an extremophile species**	**an indicator species**

(1)

(b) **Figure 1** shows photographs of an Adelie penguin and a chinstrap penguin. Adelie penguins and chinstrap penguins live in the Antarctic at temperatures below 0 °C.

Figure 1

Adelie penguin



© pilipenkoD/iStock/Thinkstock

Chinstrap penguin

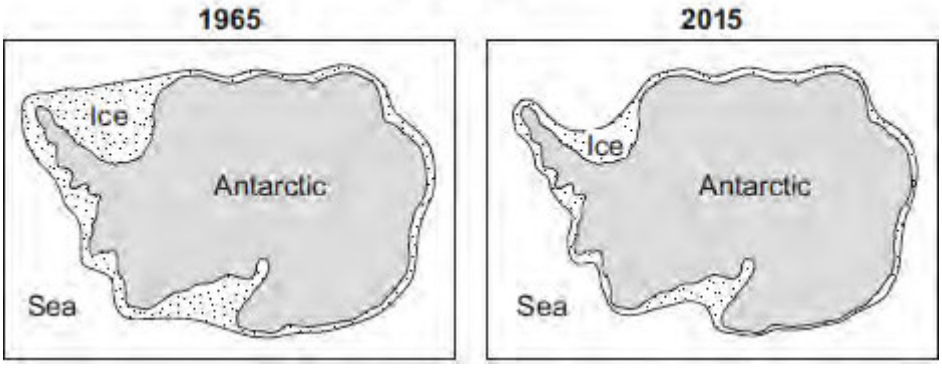


© Jenny Grayson/iStock/Thinkstock

Adelie penguins spend most of their time on the ice around the Antarctic.
Chinstrap penguins live mainly in the sea around the ice.
Since 1965 the number of Adelie penguins has **decreased** by 6 million.

Figure 2 shows changes to the ice around the Antarctic over the past 50 years.

Figure 2



(i) Use information from **Figure 2** to explain why the number of Adelie penguins has decreased since 1965.

.....

.....

.....

.....

.....

.....

(2)

(ii) Suggest what has happened to the number of chinstrap penguins since 1965.

Draw a ring around your answer. **increase / decrease**

Give a reason for your answer.

.....

.....

(1)

(c) The number of penguins can be used to monitor changes in temperature of the environment.

Temperature readings could also be taken using a thermometer.

What is the advantage of using penguins, instead of a thermometer, to monitor changes in temperature of the environment?

Tick (✓) **one** box.

Living organisms show long-term changes. ☐

Thermometers cannot measure temperatures below 0 °C. ☐

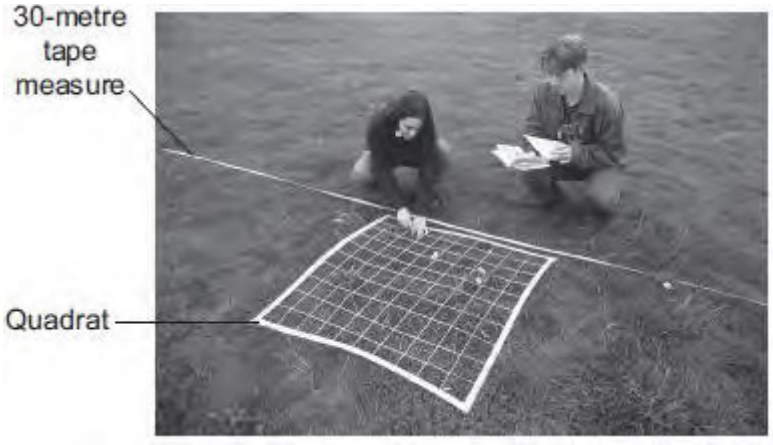
Thermometers do not give accurate readings. ☐

(1)
(Total 5 marks)

Q11. Some students investigated the distribution of dandelion plants in a grassy field. The grassy field was between two areas of woodland.

Figure 1 shows two students recording how many dandelion plants there are in a 1 metre x 1 metre quadrat.

Figure 1



© Science Photo Library

Figure 2 shows a section across the area studied and **Figure 3** shows a bar chart of the students' results.

Figure 2

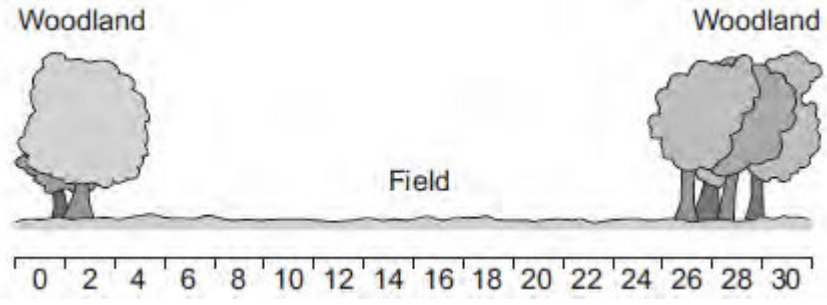
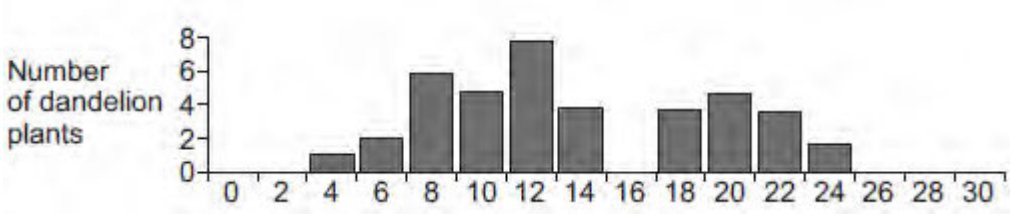


Figure 3



(a) How did the students use the quadrat and the 30-metre tape measure to get the results in **Figure 3**?

Use information from **Figure 1**.

.....

.....

.....

.....

.....

.....

(3)

(b) (i) Suggest **one** reason why the students found no dandelion plants under the trees.

.....

.....

(1)

(ii) Suggest **one** reason why the students found no dandelion plants at 16 metres.

.....

.....

(1)

(c) The teacher suggested that it was **not** possible to make a valid conclusion from these results.

Describe how the students could improve the investigation so that they could make a valid conclusion.

.....

.....

.....

.....

(2)
(Total 7 marks)