

Adaptations - Interdependence - Competition

Question Paper 1

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.7 Ecology
Sub-Topic	Adaptations – Interdependence - Competition
Difficulty Level	Bronze Level
Booklet	Question Paper 1

Time Allowed: 58 minutes

Score: / 58

Percentage: /100

Grade Boundaries:

Q1. Moose are animals that eat grass.

Figure 1 shows a moose.

Figure 1



© Wildnerdpix/iStock/Thinkstock

Figure 2 shows a food chain.

Figure 2

Grass → Moose → Wolves

(a) What word describes the grass in **Figure 2**?

Tick **one** box.

Consumer

☐

Predator

☐

Prey

☐

Producer

☐

(1)

(b) What word describes the wolves in **Figure 2**?

Tick **one** box.

Communities

☐

Predators

☐

Prey

☐

Producers

☐

(1)

- (c) **Figure 3** and **Figure 4** show how the moose population and the wolf population changed in one area.

Figure 3

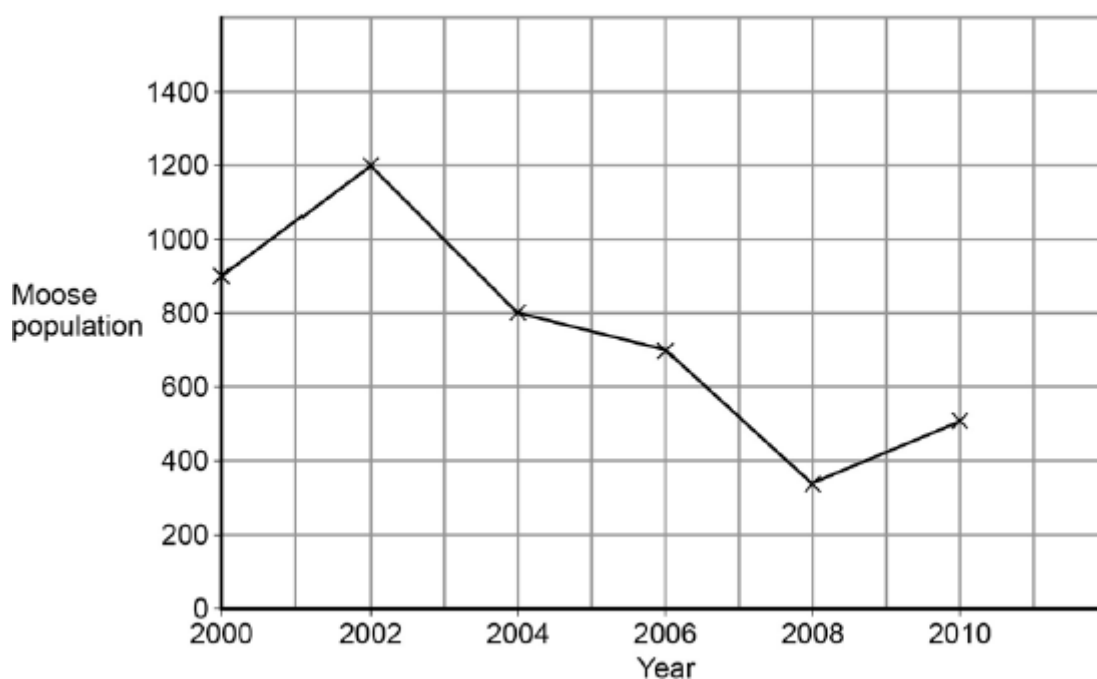
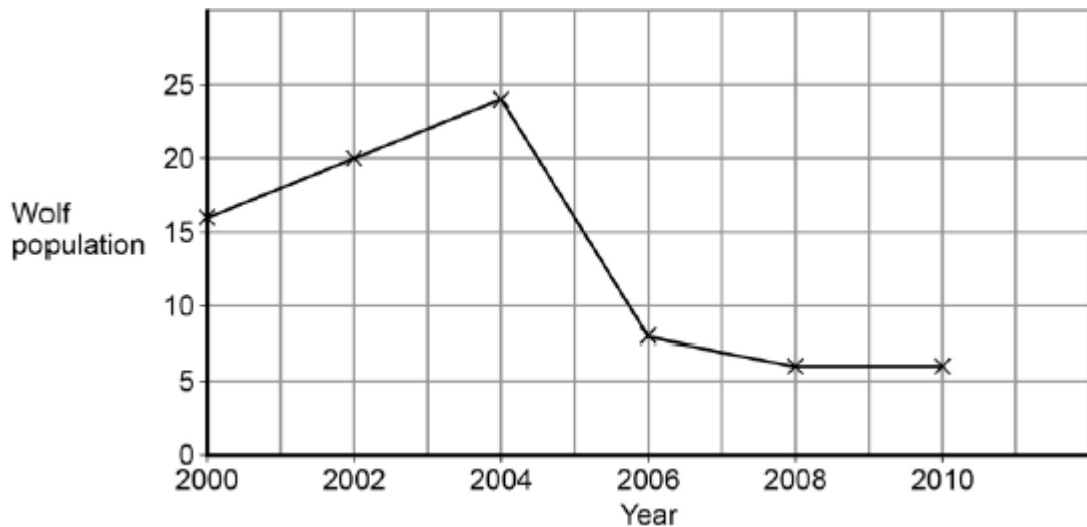


Figure 4



Look at **Figure 3**.

In this area the moose population reached its peak in 2002.

What was the size of the moose population in 2002?

.....

(1)

(d) Look at **Figure 4**.

How long after the moose population peak did the wolf population peak occur?

..... years

(1)

(e) When the moose population increases, the wolf population increases soon after.

Why does the wolf population increase?

Tick **one** box.

There is more competition for moose

☐

There is more food for wolves

☐

Other animals prey on moose

☐

There are more predators of
wolves

☐

(1)

- (f) Abiotic factors and biotic factors can affect the size of the wolf population.

Which of these are **biotic** factors?

Tick **two** boxes.

Carbon dioxide levels

☐

Humans hunting

☐

Light intensity

☐

Soil type

☐

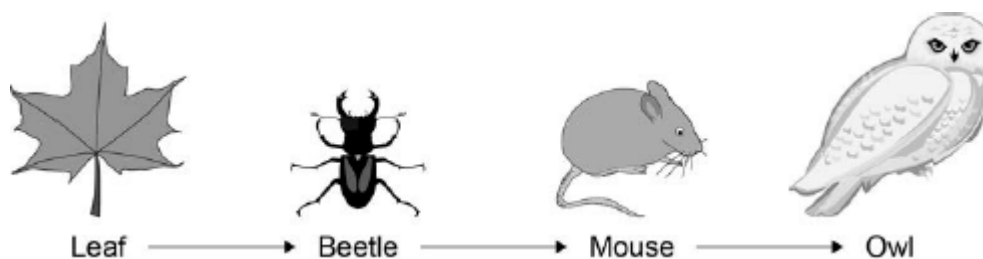
Viruses

☐

(2)
(Total 7 marks)

Q2.Feeding relationships can be shown using food chains.

The figure below shows a food chain for organisms in a habitat.



- (a) What is the **producer** in the food chain?

Tick **one** box.

Beetle

☐

Leaf

☐

Mouse

☐

Owl

☐

(1)

- (b) Name the **primary consumer** in the food chain.

.....

(1)

- (c) What is the group of leaves, beetles, mice and owls in a habitat called?

Tick **one** box.

Community

☐

Ecosystem

☐

Population

☐

Species

☐

(1)

- (d) What are two **abiotic** factors that can affect the food chain?

Tick **two** boxes.

Availability of food

☐

Light intensity

☐

New diseases

☐

New predators

☐

Wind direction

☐

(2)
(Total 5 marks)

Q3.(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.

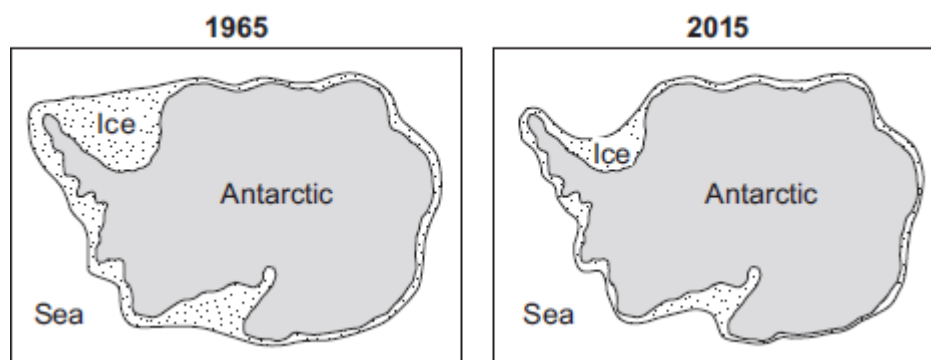
Figure 1



Adelie 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.

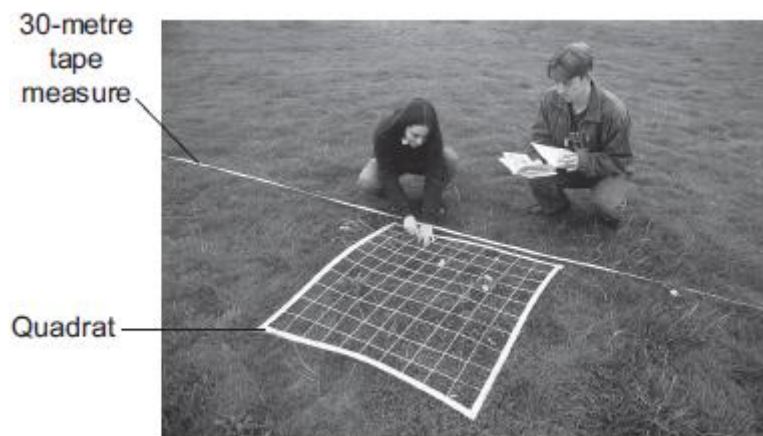
☐

(1)
(Total 5 marks)

Q4. 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

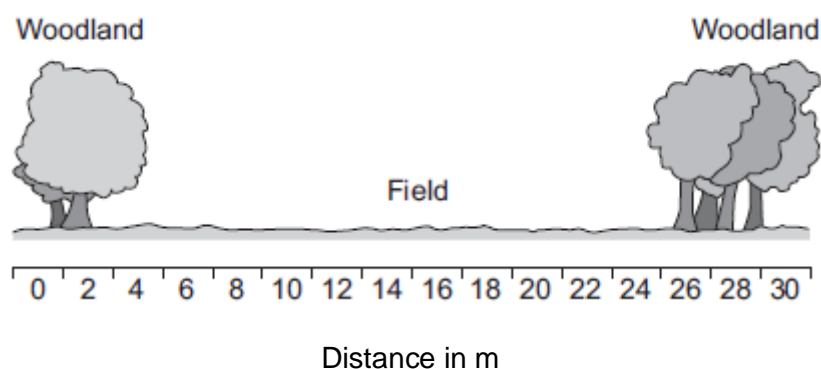
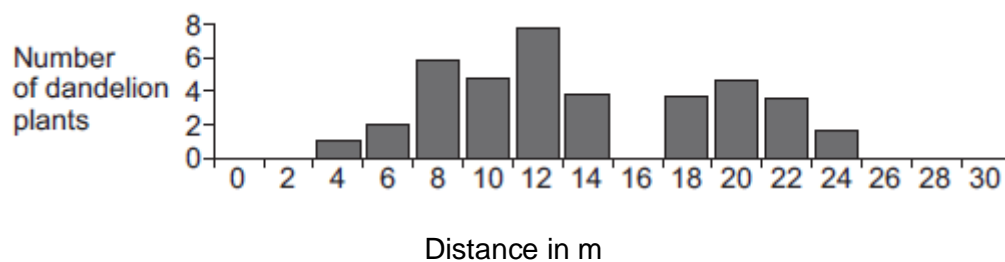


Figure 3



- (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.

.....

.....

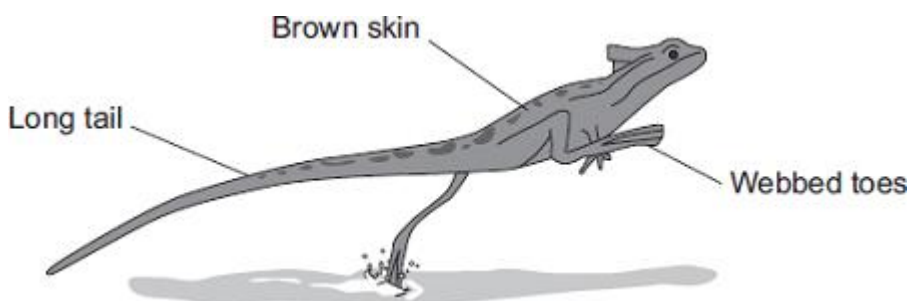
.....

.....

(2)

(Total 7 marks)

Q5. 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

Toes on the back feet are webbed

For camouflage on branches of trees

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)

Q6. Animals and plants are adapted in different ways in order to survive.

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

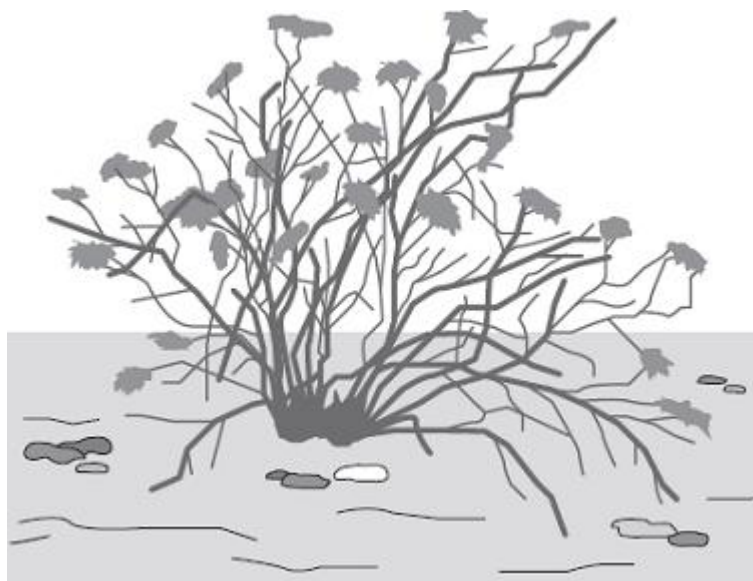
- (i) Name **two** things for which plants compete.

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)

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 Wikimedia 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.

.....

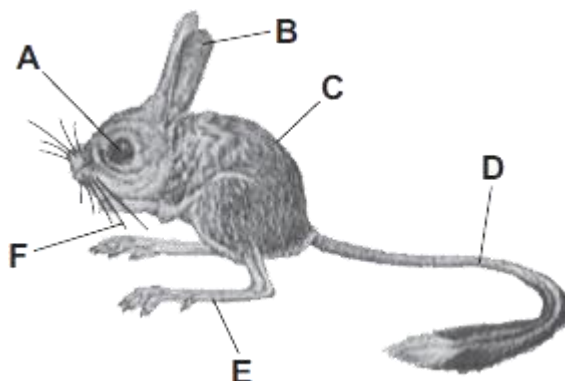
.....

.....

.....

(2)
(Total 6 marks)

Q8. The 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)

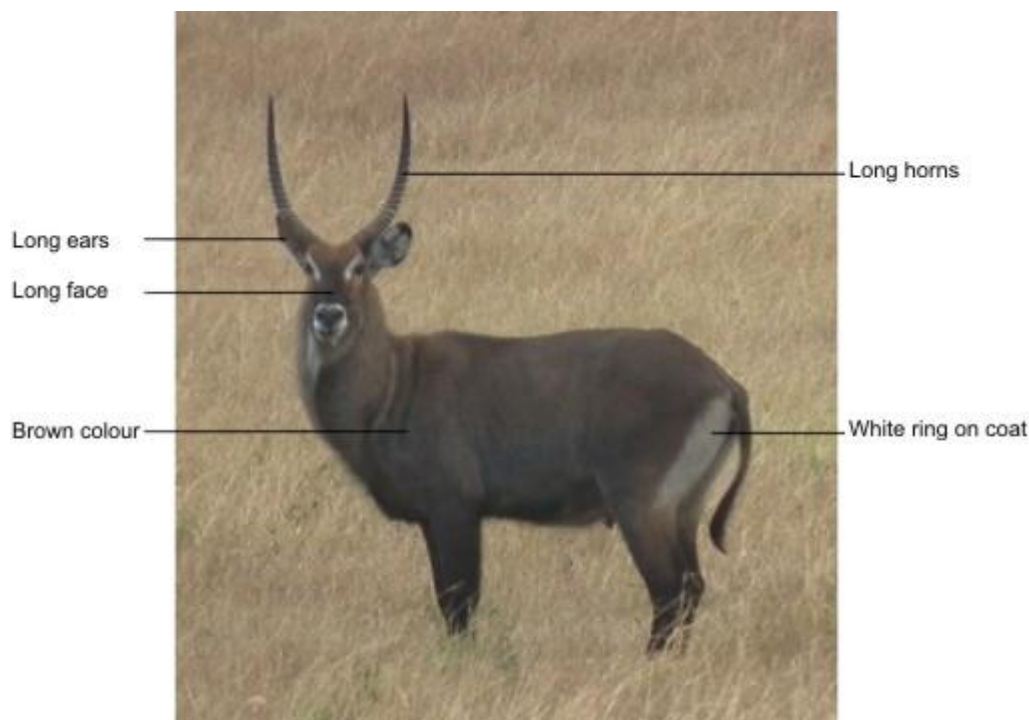
(e) helps the jerboa to know the width of its underground hole in the dark?

(1)

(Total 5 marks)

Q9. 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 Wikimedia 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)

- Q10.** 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)

Q11. 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 Wikimedia 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 Wikimedia 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)