Ecosystems and Food Chains

Living things depend on each other in complex ways — understanding food chains, webs and ecosystems is key KS3 biology knowledge that also underpins GCSE Science.

3. The drawings below show four living things found in a wood.



owl



oak tree



blackbird



caterpillar

not to scale

- Caterpillars eat oak leaves.
- Owls eat blackbirds.
- Blackbirds eat caterpillars.

(a) (i) Complete the food chain for these four living things.

oak tree → _____ → _____ → _____

3ai

1 mark

KS3 Science SATs, Tier 3-6, Paper 1 (2005) - Q3(a)(i)

(ii) Female horseflies bite horses and feed on their blood.
Male horseflies feed on plants.

Draw a line from each horsefly below to the word that describes the way it feeds.
Draw only **two** lines.

horsefly	describing word
	herbivore
female horsefly	
	carnivore
	producer
male horsefly	
	prey

maximum 6 marks

5dii

1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2008) - Q5(d)(ii)

7. The drawing below shows a mole. Moles dig tunnels through soil.

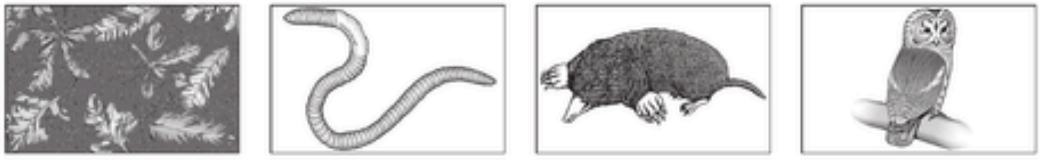


(a) Give **one** way a mole is suited for digging through soil.

7a

1 mark

(b) Moles are part of the food chain shown below.



not to scale

(i) Which living thing in this food chain do moles eat?

7bi

1 mark

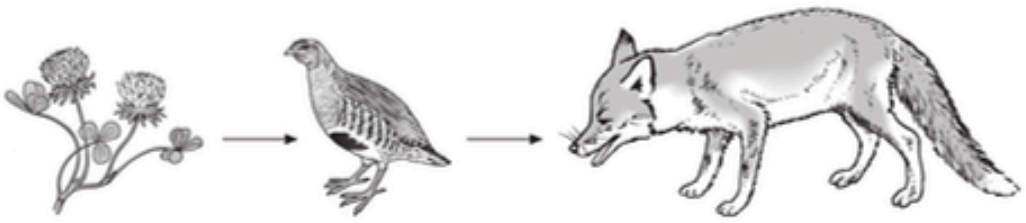
(ii) Which living thing in this food chain is a predator of moles?

7bii

1 mark

Modern Tuition

10. The drawings show part of a farmland food chain.

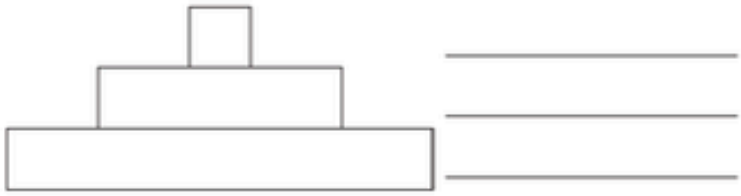


plant partridge fox

not to scale

(a) A pyramid of numbers represents the number of organisms at each stage in a food chain.

On each line by the pyramid of numbers below, write the name of the correct organism from the food chain above.



10a

1 mark

(b) Partridges feed mainly on insects and wild plants (weeds).

Some farmers spray their crops with chemicals to kill insects and weeds.

How would this affect the number of foxes?

_____

Explain your answer.

_____

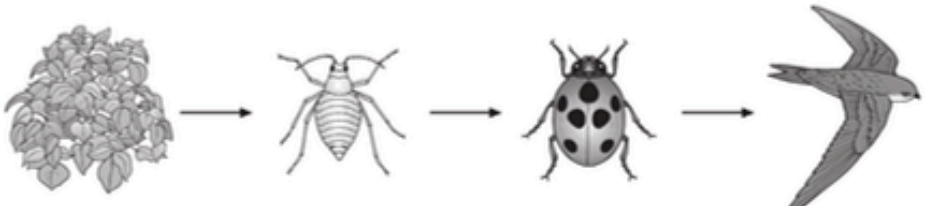
_____

10b

1 mark

Modern Tuition

(c) Aphids are insects that feed on potato leaves.
Aphids and potato plants are part of the food chain shown below.



plant (potato leaves) **aphid** **ladybird** **swift**

not to scale

(i) Some farmers put ladybirds on their potato plants to get rid of aphids.

How do ladybirds get rid of aphids?

_____

_____

8ci
1 mark

(ii) What else could farmers use to get rid of aphids?
Tick the correct box.

fertiliser	☐	insecticide	☐
slug pellets	☐	weedkiller	☐

8cii
1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2007) - Q8(c)

7. The drawing below shows a barn owl.
Barn owls hunt for small animals such as mice.



(a) (i) Look at the drawing of the barn owl.

Give **two** ways the barn owl is suited for catching small animals.

1. _____

2. _____

7ai 1 mark

7ai 1 mark

(ii) Draw a line from each animal below to the word that describes it.
Draw only **two** lines.

animal	word that describes the animal
mouse	predator
barn owl	prey
	producer

7aii 1 mark

7aii 1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2007) - Q7(a)

9. Copper and arsenic are present in the soil near copper mines.
When earthworms eat this soil they change from brown to bright yellow.
The copper and arsenic are **not** poisonous to earthworms.

(a) Earthworms are part of the food chain shown below.



soil containing plant remains → **earthworm** → **blackbird** → **sparrowhawk**

not to scale

(i) Use the food chain to suggest how copper and arsenic get into the body of a sparrowhawk.

_____

_____

_____

9ai

1 mark

(ii) Mary suggested that blackbirds are more likely to catch bright yellow earthworms than brown earthworms.

Give **one** reason why this might be true.

_____

_____

9aii

1 mark

(b) Mary wanted to count the bright yellow earthworms and the brown earthworms in the soil at different distances from the mines.

What important information about the soil could she get from her results?

_____

_____

9b

1 mark

Modern Tuition

(c) Snails are herbivores. Thrushes and blackbirds eat snails.

Complete the food web below to show the relationship between plants, snails, thrushes and blackbirds.

Draw arrows on the diagram.



2c
1 mark

2c
1 mark

(d) Snails that live in woodland areas are usually brown or red.



Suggest how the colour of snails in woodland areas protects them from birds.

2d
1 mark

KS3 Science SATs, Paper 1 (2009) - Q2(c)-(d)

(d) Otters catch fish and birds for food.

Which word below describes an otter?
Tick the correct box.

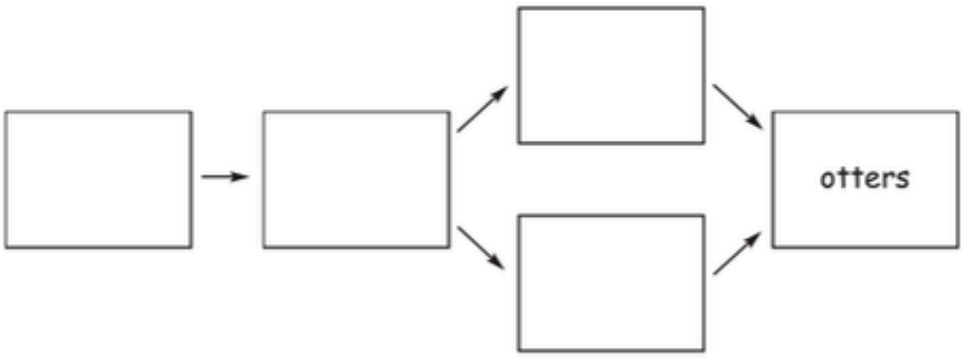
herbivore	☐	predator	☐
prey	☐	producer	☐

☐ 3d
1 mark

(e) The information below describes what some animals eat.

- Insects eat plants.
- Birds and fish eat insects.
- Otters eat fish and birds.

Complete the food web using this information.
One box has been done for you.



☐ 3e
1 mark

☐ 3e
1 mark

(f) In the 1960s, the number of otters in England decreased.
To increase otter numbers, scientists released otters in pairs (one male and one female).

Why were the otters released in pairs?

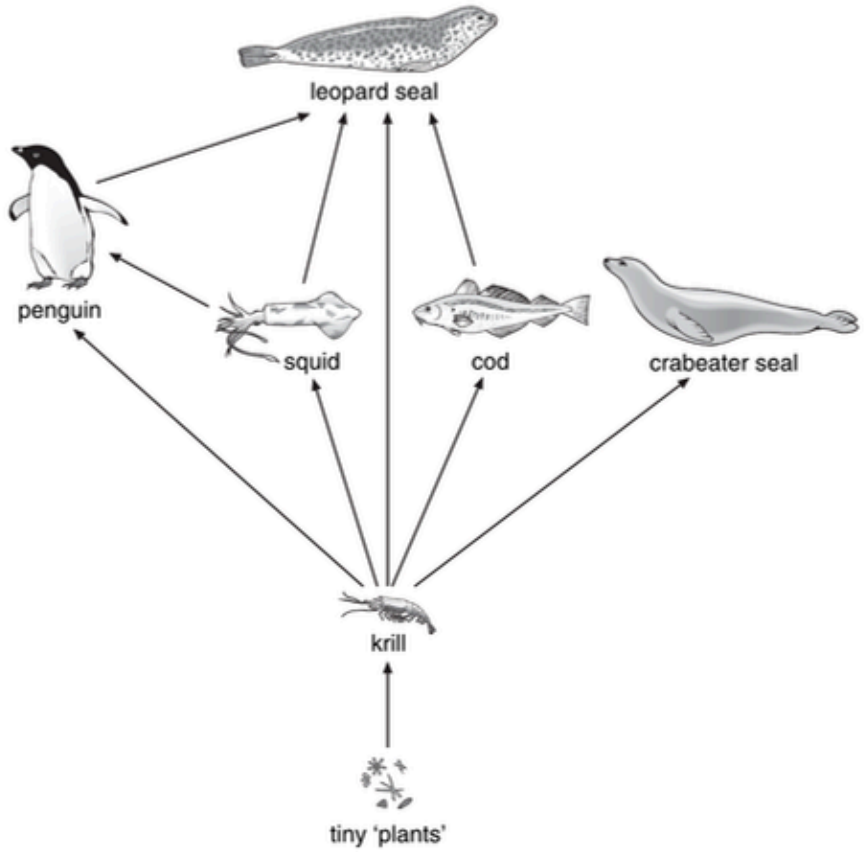
_____

_____

☐ 3f
1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2009) - Q3(d)-(f)

1. The drawing below shows part of a food web in the sea around Antarctica.



not to scale

(a) From the food web, give the names of two animals that only eat krill.

1. _____ 1a 1 mark

2. _____ 1a 1 mark

KS3 Science SATs, Tier 3-6, Paper 1 (2006) - Q1(a)

(b) (i) Which word describes the plants in a food web?
Tick the correct box.

producers	☐	predators	☐
herbivores	☐	carnivores	☐

1bi
1 mark

(ii) Krill are small animals that eat tiny plants.

Which word describes krill in the food web?
Tick the correct box.

producers	☐	predators	☐
herbivores	☐	carnivores	☐

1bii
1 mark

(c) (i) Crabeater seals eat krill.
Fishermen catch large amounts of krill from the sea.

How would a decrease in the number of krill affect the number of crabeater seals?

_____

_____

1ci
1 mark

(ii) Look at the food web.
Leopard seals also eat krill.

A decrease in the number of krill will affect the crabeater seals sooner than it affects leopard seals.
Give the reason for this.

_____

_____

1cii
1 mark

KS3 Science SATs, Tier 3-6, Paper 1 (2006) - Q1(b)-(c)

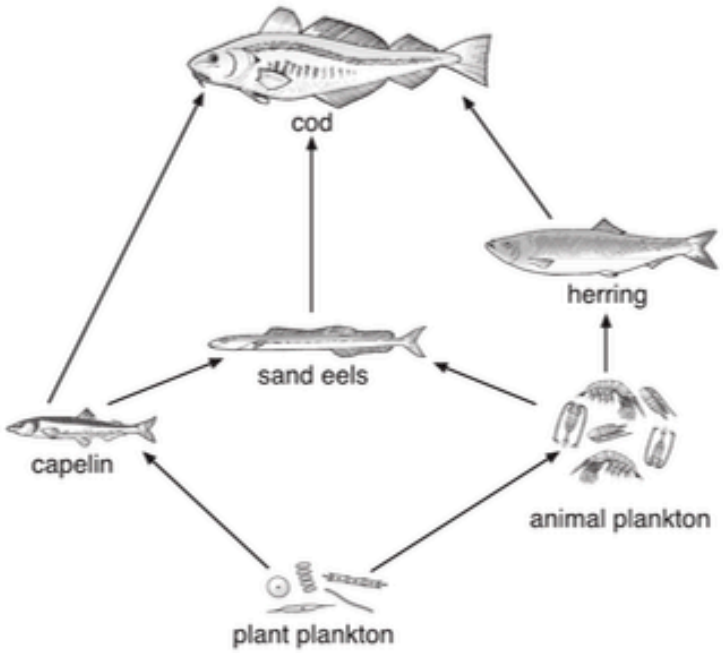
(iii) Herring **cannot** breed until they are four years old.
Fishing for herring was banned in the Norwegian Sea from 1972 to 1976.
Suggest **one** reason why fishing for herring was banned **for this period**.

_____

_____

9aiii
1 mark

(b) The diagram below shows a food web in the Norwegian Sea.



not to scale

(i) How could a decrease in the number of herring cause a **decrease** in the number of sand eels?

_____

_____

9bi
1 mark

(ii) How could a decrease in the number of herring cause an **increase** in the number of sand eels?

_____

_____

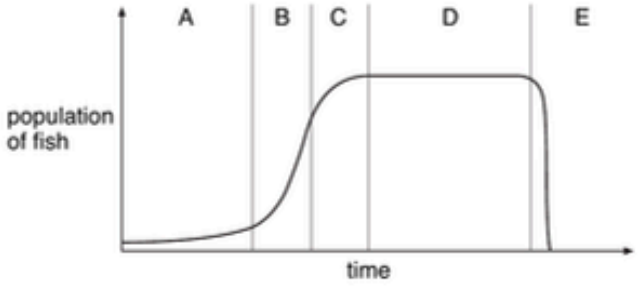
9bii
1 mark

maximum 5 marks

Total
5

Modern Tuition

9. The graph below shows how a population of fish in a lake changed over a period of time.



(a) In which time interval, A, B, C, D or E, did the population of fish increase most quickly?

_____

How can you tell this from the graph?

_____

_____

9a 1 mark

(b) Which part of the graph shows when the fish **began** to compete with each other for food?
Give the letter.

_____

How can you tell this from the graph?

_____

_____

9b 1 mark

(c) What does part D of the graph show about the birth rate and the death rate of the fish?

_____

How can you tell this from the graph?

_____

_____

9c 1 mark

(d) Part E of the graph shows a population crash when all the fish died.

Suggest **two** reasons why a population might crash in this way.

1. _____

_____

2. _____

_____

9d 1 mark

9d 1 mark

Modern Tuition

(c) (i) Give **one** way water lily plants are adapted to live in water.

_____

10ci
1 mark

(ii) Explain how this adaptation helps the water lily to grow in water.

_____

_____

10cii
1 mark

(d) In the summer, water lilies produce large yellow flowers.
The flowers float on the surface of the pond.



Suggest **one** way these colourful floating flowers help the water lily to reproduce.

_____

_____

10d
1 mark

(e) When water lilies cover the pond surface with leaves, the pond does not get as hot during the day.

Explain why the pond does **not** get as hot.

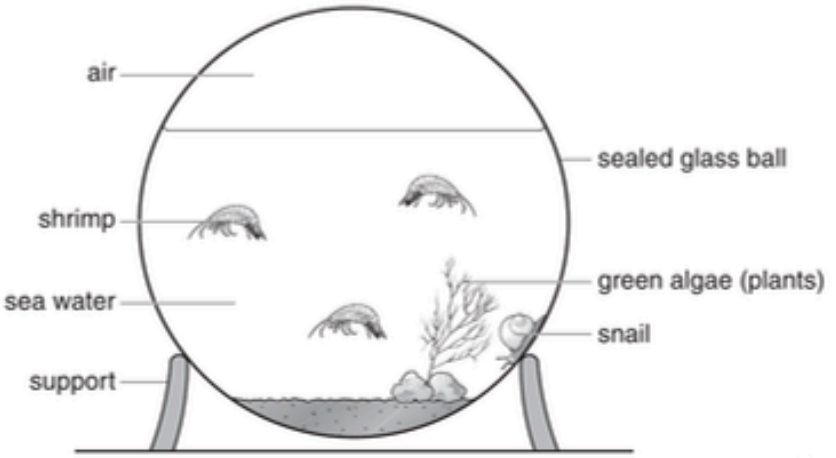
_____

_____

10e
1 mark

KS3 Science SATs, Tier 3-6, Paper 2 (2009) - Q10(c)-(e)

14. An ecosphere is a model habitat that can last for many years.
The ecosphere below is a sealed glass ball containing sea water, green algae, bacteria, a snail and shrimps.



not to scale

(a) The ecosphere must receive plenty of light.

Explain why light is necessary for the survival of the green algae and the animals in the ecosphere.

14a
1 mark

14a
1 mark

14a
1 mark

(b) When organisms in the ecosphere die, they are broken down by bacteria. Nutrients, such as nitrates, are released back into the ecosphere.

Why is this necessary for the survival of the other organisms in the ecosphere?

14b
1 mark

KS3 Science SATs, Tier 5-7, Paper 2 (2006) - Q14

Modern Tuition