



KS3 Science

Adaptation and Competition

Question Paper

Time available: 30 minutes

Marks available: 46 marks

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1.

(a) Tom watched birds feeding in his garden. He spotted the birds shown below.



not to scale

Tom recorded what the birds in his garden ate. His results are shown below.

bird	type of food			
	fruit	nuts	worms	seeds
blackbird	✓		✓	
blue tit		✓		✓
bullfinch				✓
dove				✓
sparrow		✓		✓
robin	✓		✓	✓

Use the information in the table to answer the following questions.

(i) Tom put some pieces of fruit in his garden. Which **two** birds will eat this food?

..... and

1 mark

(ii) How many types of bird eat nuts?

.....

1 mark

(iii) Which food from the table opposite will attract the **most types** of bird?

.....

1 mark

(iv) Which bird from the table eats the most types of **food**?

.....

1 mark

(b) What are birds covered with to keep them warm?

.....

1 mark

(c) Many birds reproduce in the spring.



Suggest why birds need extra food in the spring.

.....
.....

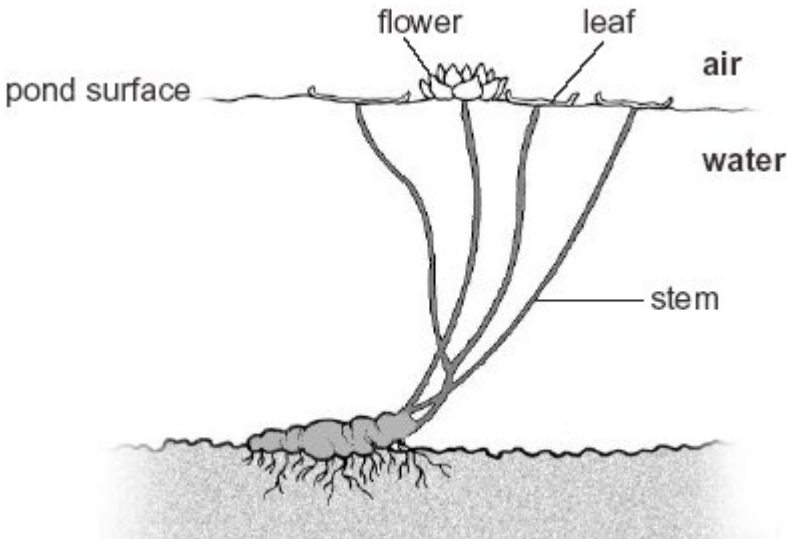
1 mark
maximum 6 marks

2.

The photograph below shows some water lilies in early summer.



This diagram shows a water lily plant.



(a) Water lilies do **not** grow well in moving water.

Suggest a reason for this.

.....
.....

1 mark

(b) During the winter, many water lily plants do **not** grow new leaves.

Suggest **one** reason why the plants do **not** grow new leaves in the winter.

.....

1 mark

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

.....

1 mark

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

.....
.....

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.

.....
.....

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.

.....
.....

1 mark
maximum 6 marks

3.

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

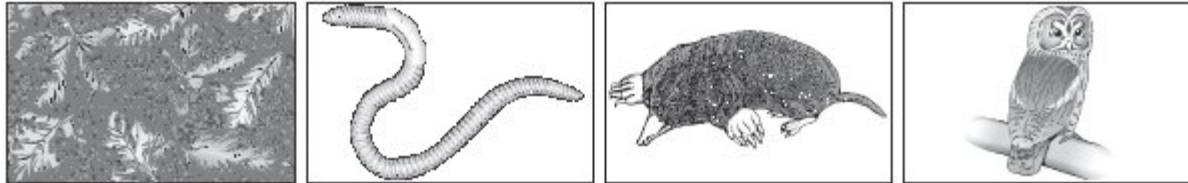


(a) Give **one** way a mole is suited for digging through soil.

.....
.....

1 mark

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



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

.....

1 mark

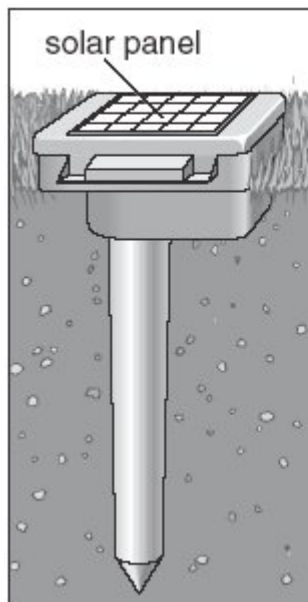
(ii) Which living thing in this food chain is a predator of moles?

.....

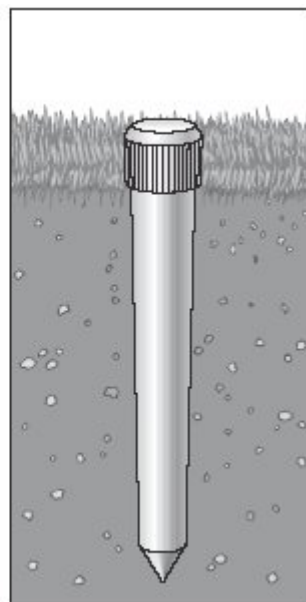
1 mark

(c) Some people use mole-scarers to get rid of moles from their gardens.

Two different mole-scarers are shown below.
They both produce sounds that scare moles away.



solar-powered mole-scarer



battery-powered mole-scarer

(i) Where does the energy come from for the solar-powered mole-scarer?

.....

1 mark

(ii) Suggest **one** reason for using a solar-powered mole-scarer instead of a battery-powered mole-scarer.

.....

.....

1 mark

(iii) Some gardeners use poison to kill moles.

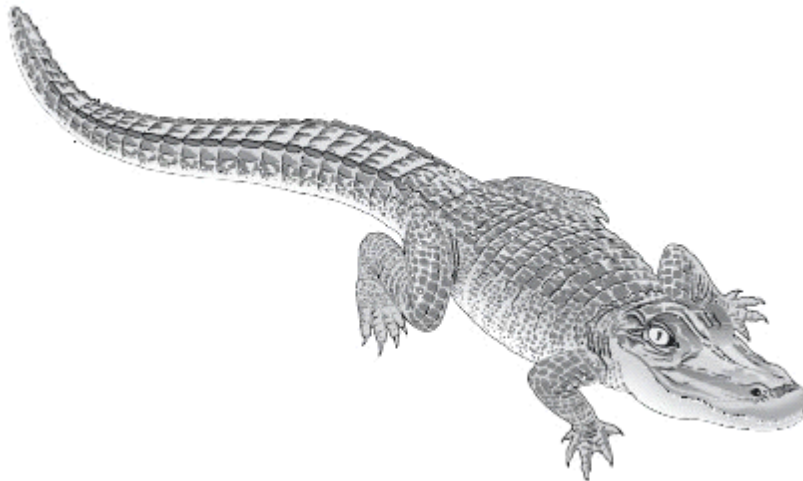
Suggest **one** reason for using a mole-scarer rather than poison to get rid of moles.

.....

.....

1 mark
maximum 6 marks

4. The drawing below shows an alligator.



(a) Alligators are carnivores.
What does the word carnivore mean?

.....

1 mark

(b) Alligators lay eggs in nests made from plant material.
The eggs have tough shells containing calcium carbonate.

(i) How does the eggshell help the developing alligator to survive before it hatches?

.....
.....

1 mark

(ii) Rotting plant material in the nest is acidic.
When the acid comes into contact with calcium carbonate in the eggshell it makes the shell weaker.

Why does the acid weaken the eggshell?

.....
.....

1 mark

(iii) Suggest **one** reason why it is helpful to the developing alligator in the egg if the eggshell becomes weaker.

.....
.....

1 mark

(c) The table below shows the percentage of female and male alligators that hatch from the eggs when the eggs are kept at different temperatures.

temperature (°C)	% eggs hatching as females	% eggs hatching as males
26	100	0
28	100	0
30	100	0
32	86	14
34	0	100
36	0	100

(i) Use the table to suggest how a zookeeper could make sure only females hatch from the eggs.

.....
.....

1 mark

- (ii) Between which **two** temperatures are 50% of the eggs likely to hatch as females?

Tick the correct box.

between 26°C and 30°C

between 30°C and 32°C

between 32°C and 34°C

between 34°C and 36°C

1 mark
maximum 6 marks

5.

The drawings show six living things.
They spend all or part of the time in water.



tadpole
A



trout
B



duck
C



crocodile
D



water vole
E



frog
F

not to scale

Look at the drawings.

- (a) (i) Give the letter of **one** living thing that uses gills to take in oxygen.

.....

1 mark

- (ii) Give the letter of **one** living thing that is covered in scales.

.....

1 mark

(b) Use a word from the list below to fill the gap in the sentence.

lungs legs eyes backbones

The trout, duck, crocodile, water vole and frog are all called vertebrates because they have

1 mark

(c) The trout spends all of its time in water.

Give **one** way the trout is suited for moving in water.

.....
.....

1 mark

(d) Draw a line from each animal below to the group it belongs to.
Draw only **three** lines.

animal

group

frog

reptiles

crocodile

mammals

water vole

amphibians

2 marks
maximum 6 marks

6. 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 → → →

1 mark

(ii) Why is an oak tree called a producer?

Tick the correct box.

It loses its leaves in autumn.

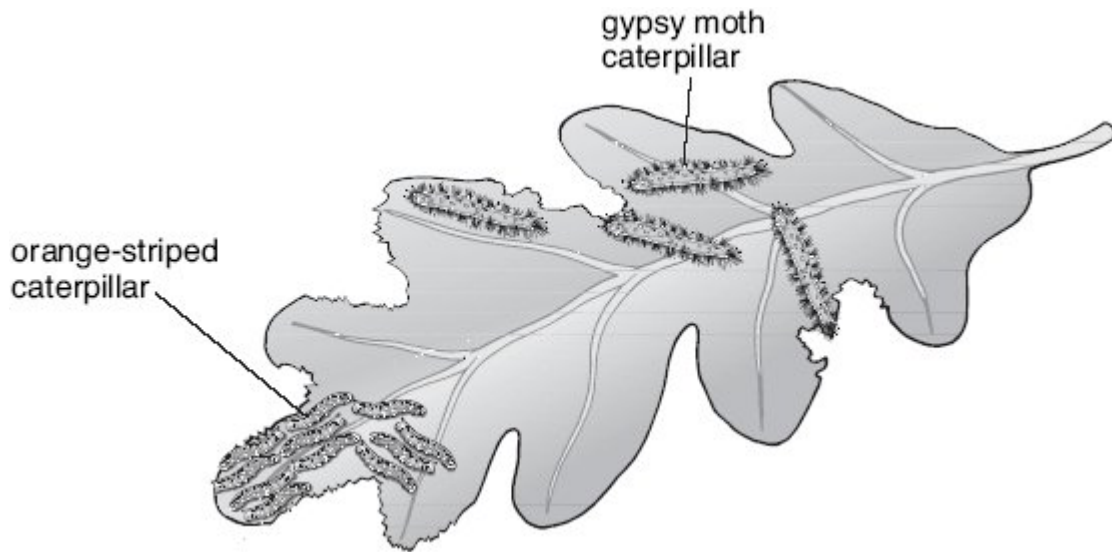
It makes food by photosynthesis.

Its flowers are tiny.

Its leaves will **not** rot.

1 mark

(b) On one oak tree, there were two types of caterpillar.



not to scale

All the caterpillars were eating the leaves.
The number of gypsy moth caterpillars increased.

What happened to the number of orange-striped caterpillars?

.....

1 mark

Explain your answer.

.....

.....

1 mark

(c) There are **no** caterpillars on the oak tree in winter.

Suggest a reason for this.

.....

.....

1 mark
maximum 5 marks

7.

Almost 200 years ago, an important investigation into plant growth was carried out.

George Sinclair, the Duke of Bedford's head gardener, planted seeds in 242 plots of land, each four feet square.

Charles Darwin concluded from this investigation:

If a plot of ground is sown with one species of grass and a similar plot is sown with several different species of grass, the second plot will produce a greater number of plants and a greater mass of plant material.

(a) Give **one** feature of the plots that was controlled in Sinclair's investigation.

.....
.....

1 mark

(b) Why did Sinclair use many plots rather than just two?

.....
.....

1 mark

(c) What **two** factors are named in Darwin's conclusion as the measurable outcomes in the investigation?
(These are the dependent variables.)

1.
2.

1 mark

(d) Which **one** factor was changed in Sinclair's investigation?
(This is called the independent variable.)

.....

1 mark

(e) The soil in each plot was tested.

Suggest **one** reason why these soil tests were helpful to the interpretation of the results of the investigation.

.....
.....

1 mark

- (f) Give **one** reason why several different species of grass in a plot produced a greater mass of plant material than a single species in a plot.

.....
.....
.....

1 mark
maximum 6 marks

- 8.** The diagram shows an oak tree.



- (a) An oak tree takes in water and oxygen from the soil.
Name **one** other **type** of substance an oak tree needs to take in from the soil.

.....

1 mark

- (b) The roots of an oak tree are long and split into many smaller roots. How does this help the tree to absorb water?

.....
.....

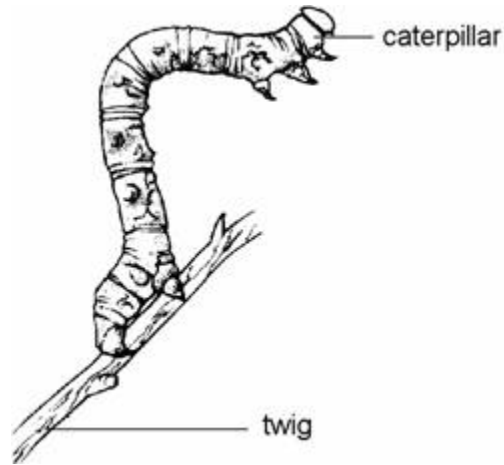
1 mark

- (c) By the time winter comes, the oak tree has lost its leaves. Explain why this stops the growth of an oak tree.

.....
.....

1 mark

- (d) The drawing shows a caterpillar of a moth called the Oak Beauty. These caterpillars feed on oak leaves and woodland birds eat them.



Describe how the appearance of the caterpillar can help it to survive.

.....

.....

.....

2 marks
Maximum 5 marks