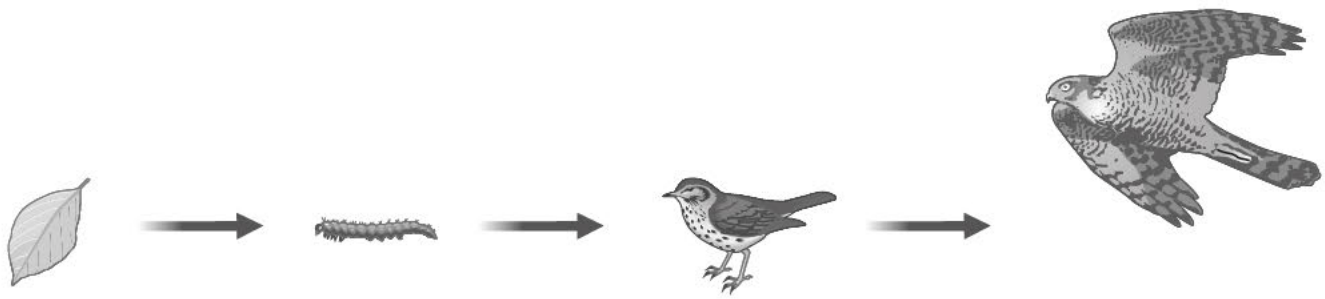
1 Caterpillars feed on hawthorn bushes. The caterpillars are eaten by small birds such as the dunnock. The dunnocks are preyed on by a larger carnivorous bird, the sparrowhawk.



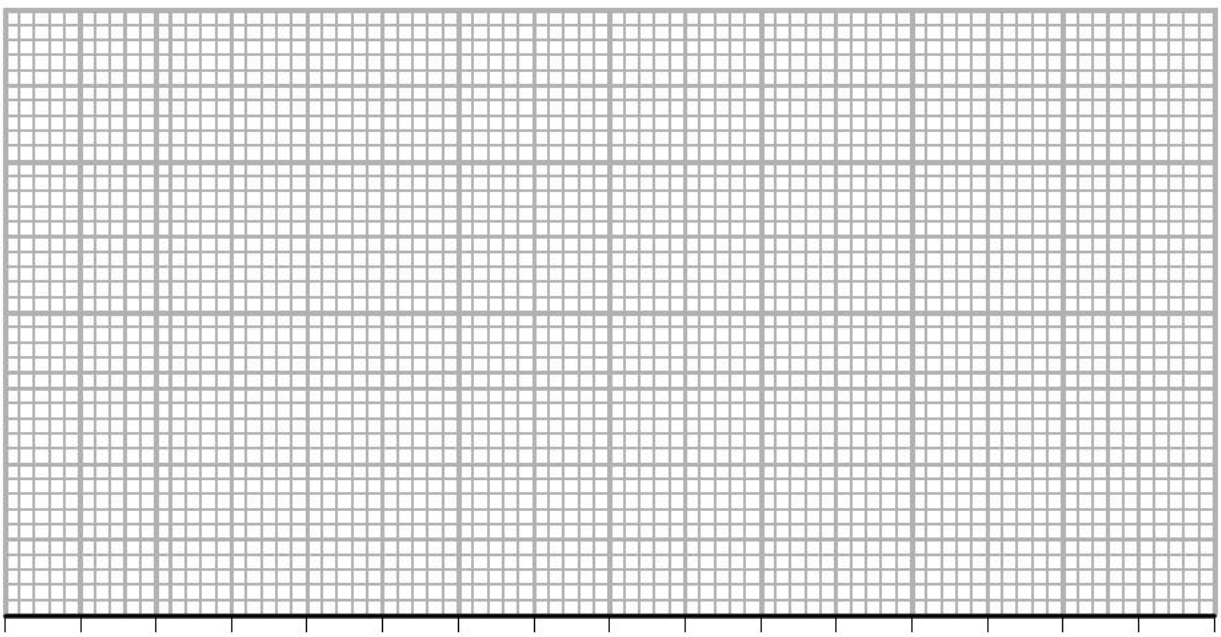
producer primary consumer secondary consumer tertiary consumer

This data was collected from a hedgerow.

Organism	Trophic level	Number of organisms
caterpillar	primary consumer	80
dunnock	secondary consumer	8
hawthorn bush	producer	4
sparrowhawk	tertiary consumer	1

(a) Use the information in the table to draw an accurate pyramid of numbers for this data on the grid below.

(4)



(b) Describe how a pyramid of biomass from the same data would differ from the pyramid of numbers.

(2)

(c) Explain why not all the energy in a producer passes to the primary consumer.

(2)

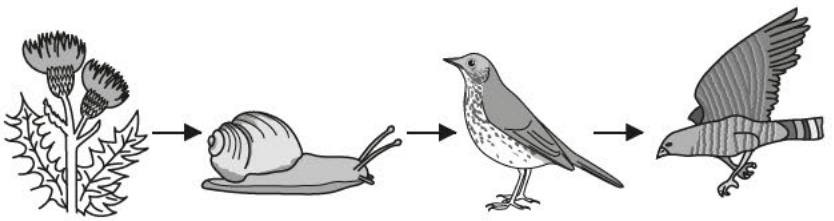
(d) Some farmers are removing hedges in order to increase the size of their fields. This means that the number of hawthorn bushes is decreasing.

Suggest how removing hawthorn bushes will affect the size of the dunnock population.

(2)

(Total for Question = 10 marks)

2 The diagram shows a food chain.



(a) (i) Name the producer in this food chain.

(1)

.....

(ii) Name the secondary consumer in this food chain.

(1)

.....

(b) The sparrowhawk uses its eyes to see its prey. The photograph shows a sparrowhawk's eye.



(i) Name the parts labelled A and B.

(2)

A .....

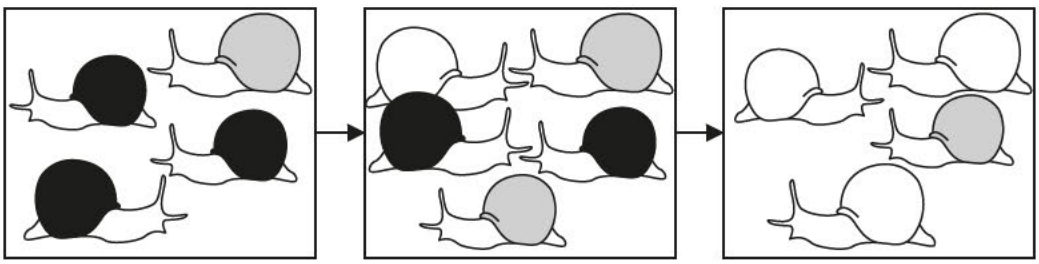
B .....

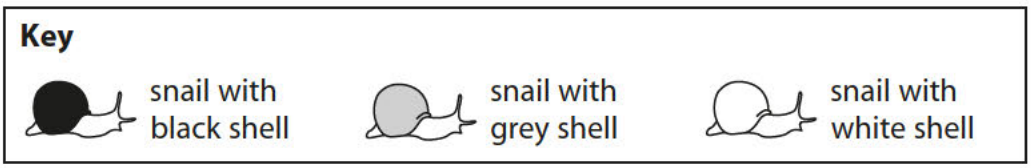
(ii) The table describes other parts of the eye.
Complete the table by naming each part that is described.

(3)

Description	Name of part of eye
the tough protective outer layer	
the nerve from the eye to the brain	
focuses light onto the retina	

(c) A student put these drawings in her book to help her understand how natural selection affects shell colour in a snail population.





(i) What is meant by the term **population**?

(1)

.....

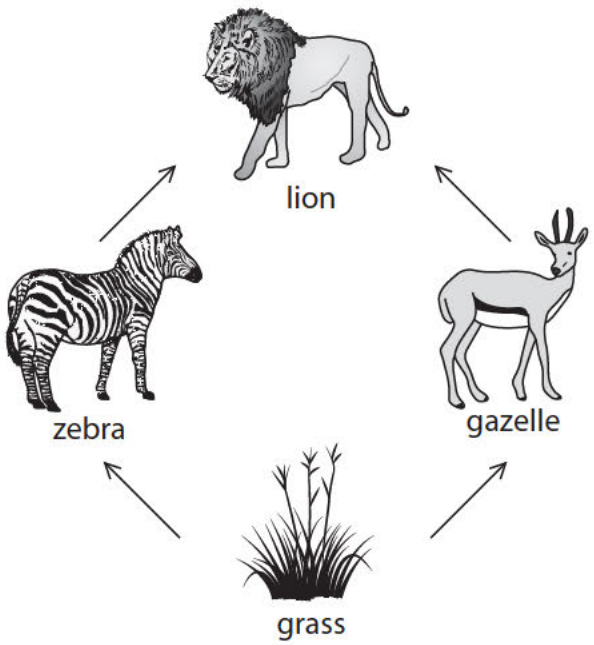
.....

(ii) Use the information in the drawings to explain the process of natural selection.

(5)

(Total for Question = 13 marks)

3 The diagram shows a simple food web in East Africa.



(a) Name the producer in this food web.

(1)

.....

(b) Gazelles try to avoid being caught by lions by running away quickly. They can run at a top speed of 96 km per hour.

(i) Calculate the distance in metres a gazelle runs in one minute at a speed of 96 km per hour.

Show your working.

(2)

distance = ... metres

(ii) Gazelles cannot maintain their top speed for a long time because a change in the type of respiration takes place in their muscle cells.

Explain how this change in respiration stops gazelles from running at a top speed for a long time.

(3)

.....

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(c) Zebras also try to avoid being caught by lions. It was thought that the striped coat of zebras helps to camouflage them.

A new theory suggests the striped coat evolved because it reduces the number of biting flies that feed on zebra blood.

Use your knowledge of natural selection to explain how a striped coat that reduces the number of flies feeding on zebra blood may have evolved.

(4)

(d) Lions' eyes are adapted to help them see in dim light.

(i) Their eyes have a layer of cells behind the retina that reflects light which has passed through the retina.

Suggest how this would help a lion see in low light intensities.

(1)

(ii) Suggest one other adaptation in the structure of a lion's eye that helps the lion to see in low light intensities.

(1)

(e) When a lion catches its prey it tears the meat into smaller pieces in its mouth before swallowing.

(i) Suggest why the saliva released into the lion's mouth does not contain amylase.

(2)

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.....

(ii) Explain how tearing the meat into smaller pieces helps digestion in the stomach.

(2)

.....

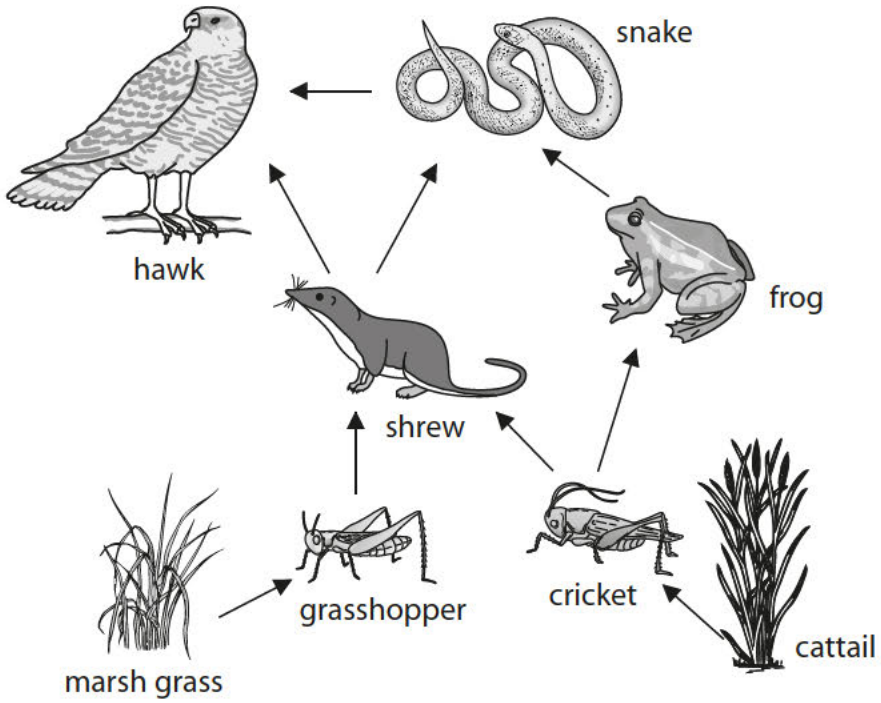
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(Total for Question = 16 marks)

4 The diagram shows a food web from a habitat.



(a) Use information in the food web to complete the table.

The first one has been done for you.

(4)

number of organisms	8
number of different types of plant	
number of animals	
number of primary consumers	
number of food chains	

(b) (i) The plants in this food web make the food for some of the animals to eat.

Give the name used to describe these plants.

(1)

.....

(ii) The hawk catches and eats its prey.

Give the name used to describe the hawk in this food web.

(1)

.....

(c) A pesticide can be used to kill the grasshoppers in this habitat.

(i) Describe the effect that killing grasshoppers would have on the number of shrews.

(1)

.....

.....

.....

(ii) Describe the effect that killing grasshoppers would have on the number of marsh grass plants.

(1)

.....

.....

.....

(Total for Question = 8 marks)