1 **(a)** Fig. 1.1 shows seven species of fish that live on reefs in the Caribbean.

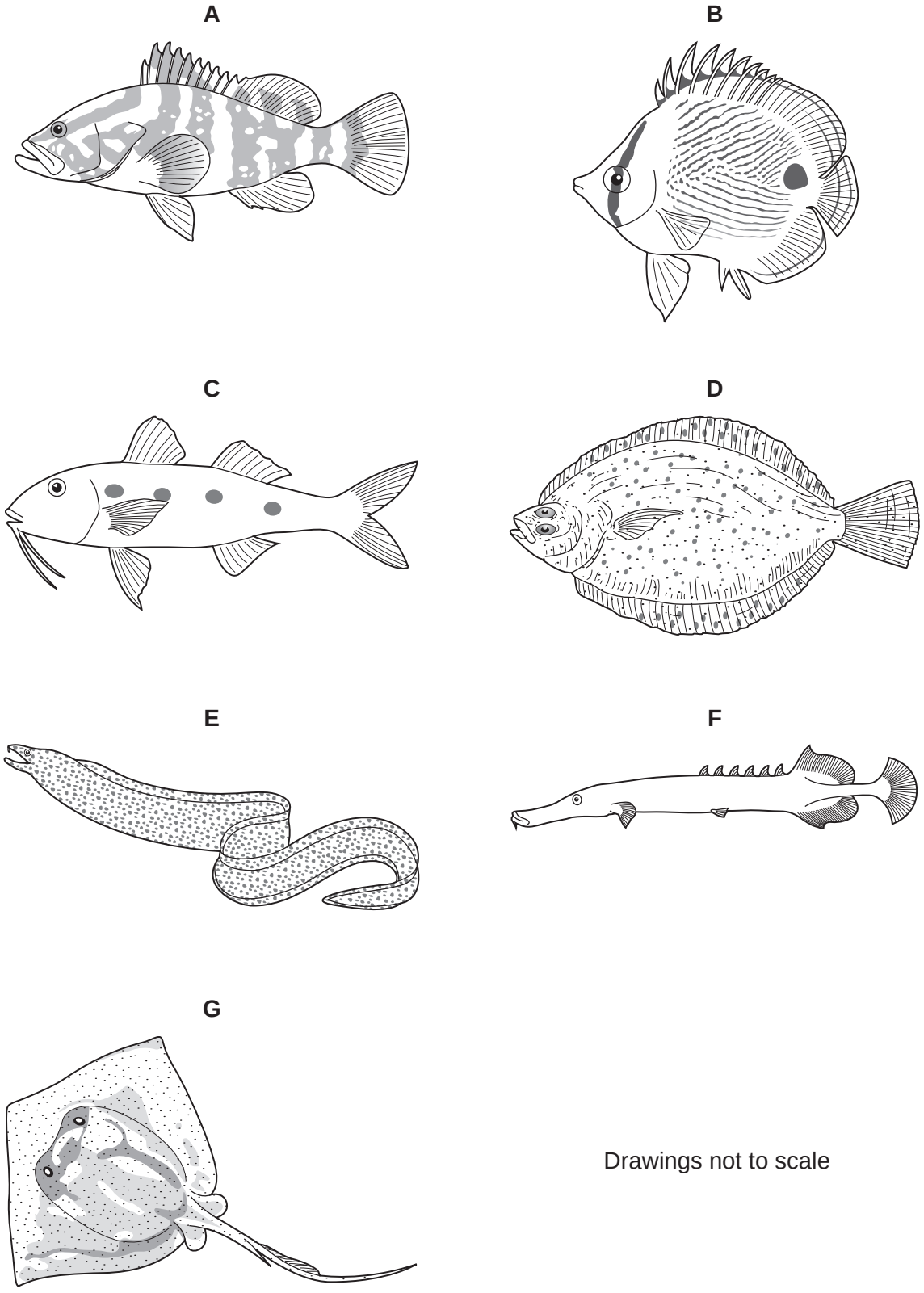


Fig. 1.1

Use the key to identify each species. Write the letter of each species (**A** to **G**) in the correct box beside the key. One has been done for you.

Key

1 (a)	Body shape is long and narrow, at least 10 times as long as its depth	go to 2	
(b)	Body shape is not long and narrow, less than 10 times long as its depth	go to 3	
2 (a)	Fins are pointed	*Aulostomus maculatus*	**F**
(b)	Fins are smooth	*Gymnothorax moringa*	
3 (a)	Both eyes are on top of the head	go to 4	
(b)	Eyes are on either side of the head	go to 5	
4 (a)	Tail fin is long and thin	*Dasyatis americana*	
(b)	Tail fin is short	*Bothus ocellatus*	
5 (a)	Fish has one or several dark spots	go to 6	
(b)	Fish has no dark spots	*Epinephelus striatus*	
6 (a)	Fish has two fins on its back	*Pseudupeneus maculatus*	
(b)	Fish has more than two fins on its back	*Chaetodon capistratus*	

[4]

The wavelengths of light that penetrate water influence the features of fish. Blue light does not penetrate far into water; red light penetrates much further.

Many different species of cichlid fish live in Lake Victoria in Africa. Some species live in shallow water and others live in deeper water.

Table 1.2 summarises some of the features of males and females of these species.

Table 1.2

habitat	body colour of males	retina in eyes of females
shallow water	blue	detects blue light
deep water	red	detects red light

Body colour and colour vision are both inherited features. Females select the males that they mate with and prefer bright coloured males. Male and female eyes of the same species of cichlid fish are similar.

(b) (i) The ancestors of red and blue cichlid fish were brown.

State how the different body colours of the males first happened.

.....

.....

[1]

(ii) Suggest the advantages of different cichlid fish being able to detect blue and red light.

.....

.....

.....

.....

.....

[2]

(c) Lake Victoria receives considerable pollution from the surrounding area which makes the water cloudier and reduces the penetration of blue light.

Suggest and explain the likely long-term effects of the cloudy water on the red and blue cichlid fish.

.....

.....

.....

.....

.....

.....

..... [4]

[Total: 11]

2 Table 1.1 shows some of the external features of the five classes of vertebrates.

Complete the table by using a tick (✓) to indicate if each class has the feature or a cross (×) if it does not. The first row has been completed for you.

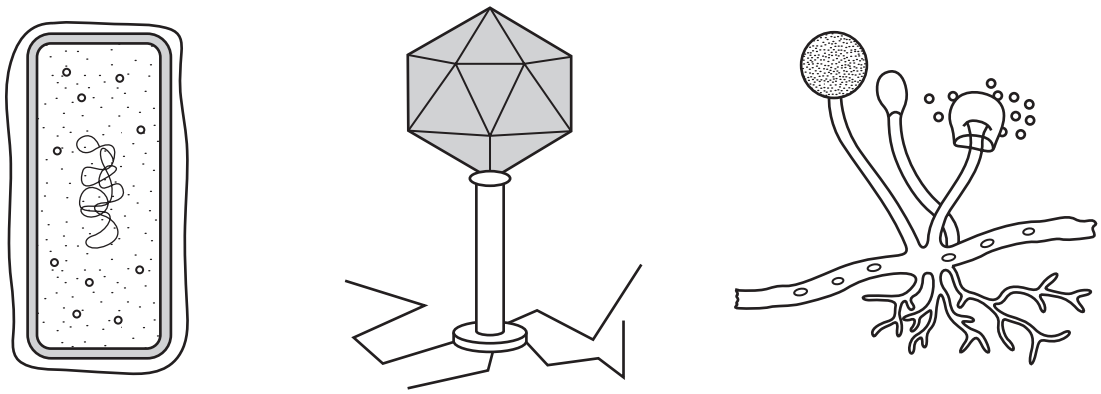
Table 1.1

feature		amphibia	reptiles	birds	mammals
mammary glands	×		×	×	✓
fur / hair					
scales / scaly skin					
external ears					
feathers					

[4]

[Total: 4]

3 Fig. 1.1 shows a bacterium, a virus and a fungus.



not to scale

Fig. 1.1

(a) Complete the table to compare the three organisms shown in Fig. 1.1 by using a tick (✓) to indicate if the organism shows the feature, or a cross (**X**) if it does not. The first row has been completed for you.

feature	**ba**	**virus**	**fungus**
produces spores	X		✓
hyphae			
capsule			
nucleus			

[3]

(b) Explain how the fungus shown in Fig. 1.1 is adapted to obtain its food.

.....

.....

.....

.....

.....

..... [3]

(c) Explain how the fungus spreads to new sources of food.

.....

.....

.....

..... [2]

[Total: 8]

4 The freshwater mussel, *Margaritifera margaritifera*, is a mollusc which lives in rivers and streams.

When the mussel reproduces, gametes are released into the water and fertilisation takes place.

The embryos, in the form of larvae, attach themselves to the gills of fish and develop there for a few months.

The larvae then release themselves and grow in sand in the river, feeding by filtering food from the water.

The number of mussels is falling due to human predation and the species is threatened with extinction.

(a) The mussel belongs to the group known as the molluscs. State two features you would expect the mussel to have.

1. .....

2. ..... [2]

(b) Explain how the species name of the freshwater mussel can be distinguished from its genus.

.....

..... [1]

(c) State the type of reproduction shown by the mussel.

Explain your answer.

type of reproduction .....

explanation .....

..... [2]

(d) **(i)** Fish gills have the same function as lungs. Suggest **one** advantage to a mussel larva of attaching itself to fish gills.

.....

..... [1]

(ii) The mussel develops on the fish gills. Define the term *development*.

.....

..... [1]

(e) The mussel is threatened with extinction. Name another organism which is also threatened with extinction and outline how it could be conserved.

name of species .....

outline of conservation .....

.....

..... [3]

[Total: 10]

5 Fig. 3.1 shows a female lion in a game reserve.

Fig. 3.1

(a) (i) State **one** feature, visible in Fig. 3.1, which identifies the lion as a mammal.

..... [1]

(ii) State **one** other feature, **not** visible in Fig. 3.1, which distinguishes mammals from all other vertebrate groups.

..... [1]

(b) Study the eyes of the lion in Fig. 3.1.

(i) Suggest and explain what the light conditions were when the photograph was taken.

light conditions .....

explanation .....

..... [2]

(ii) Explain the importance of the eyes reacting to light in this way.

.....

..... [2]

(c) Scientists say that lions are unable to see in colour.

Suggest how a study of a lion's retina would provide evidence for this statement.

.....

..... [1]

(d) The lion in Fig. 3.1 was observing tourists nearby. It turned its head to see zebras moving in the distance.

Describe how the eyes of the lion would adjust to focus on the zebras.

.....

.....

.....

..... [3]

(e) The lion was photographed in a game reserve in Namibia.

Explain why the conservation of animals in game reserves is important.

.....

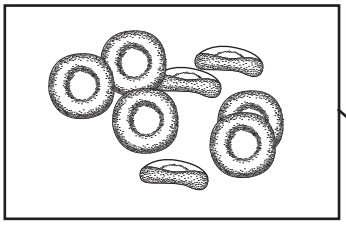
.....

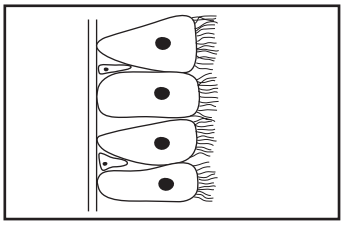
.....

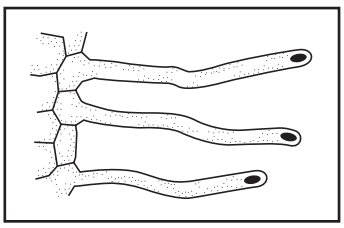
..... [3]

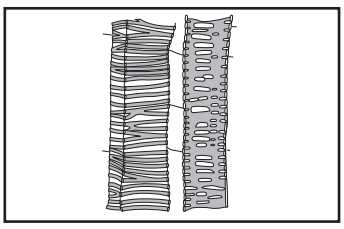
[Total:13]

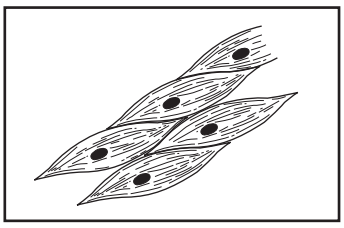
6 **(a** Draw a straight line to match the diagram of each tissue with its function. The first has been completed for you.











absorbs water and minerals from soil for the plant

carries oxygen around the body of mammals

contracts to cause movement within animals

moves dust and bacteria up the bronchi of a mammal

transports water and minerals through the stem of a plant

(not drawn to same scale)

[4]

(b) Explain why a leaf is described as an organ, not a tissue.

.....

.....

.....

.....

..... [3]

[Total: 7]

7 The Ruddy duck, *Oxyura jamaicensis*, is a native of America.
A flock of 20 birds was introduced into Britain from America before 1950.
The original flock settled quickly in their new habitat and started breeding. Numbers now exceed 6000.
The White-headed duck, *Oxyura leucocephala,* (a native of Spain) is a closely related species to the Ruddy duck.
Female White-headed ducks are more attracted to male Ruddy ducks than to males of their own species.
Cross-breeding between the two species produces a new variety of fertile duck.
The White-headed duck is now threatened with extinction.
Some conservationists are considering a plan to kill the British population of Ruddy ducks to prevent the White-headed duck becoming extinct.

Fig. 6.1 shows a male Ruddy duck.

Fig. 6.1

(a) State two features, visible in Fig. 6.1, that distinguish birds, such as the Ruddy duck, from other vertebrate groups.

1 .....

2 ..... [2]

(b) **(i)** With reference to an example from the passage, describe what is meant by the term *binomial system*.

.....

..... [2]

(ii) State two reasons, based on information in the passage, why the Ruddy duck and White-headed duck are considered to be closely related.

1 .....

.....

2 .....

..... [2]

(c) **(i)** Explain why Ruddy ducks would **not** become ex conservationists carried out their plan.

.....

..... [1]

(ii) Suggest **one** factor, other than the breeding habits of the Ruddy duck, that could result in the extinction of a bird such as the White-headed duck.

.....

..... [1]

(d) The Ruddy duck feeds on seeds and insect larvae. The ducks are eaten by foxes and humans.

Explain why these feeding relationships can be displayed in a food web, but not in a food chain.

.....

.....

..... [2]

[Total: 10]