06 Animal Diversity

6.1 Vertebrates and invertebrates

Animal world consists of millions of different animals with a wide diversity.

Assignment 6.1

- Observe the school garden and identify 10 different animals and name them.
- Group them based on different features you observed in them.
- Compare the way you grouped with the way your friends in the class did.

You and your friends may have grouped animals based on different criteria. Mode of locomotion, body shape, body colour, size of the body and mode of nutrition are some of the criteria you can use to group animals. Therefore you will learn that there is a vast diversification in animals. Human also is one member of this diversified animal world.


Human


Turtle


Snail


Worm


Crow


Crab


Elephant


Frog

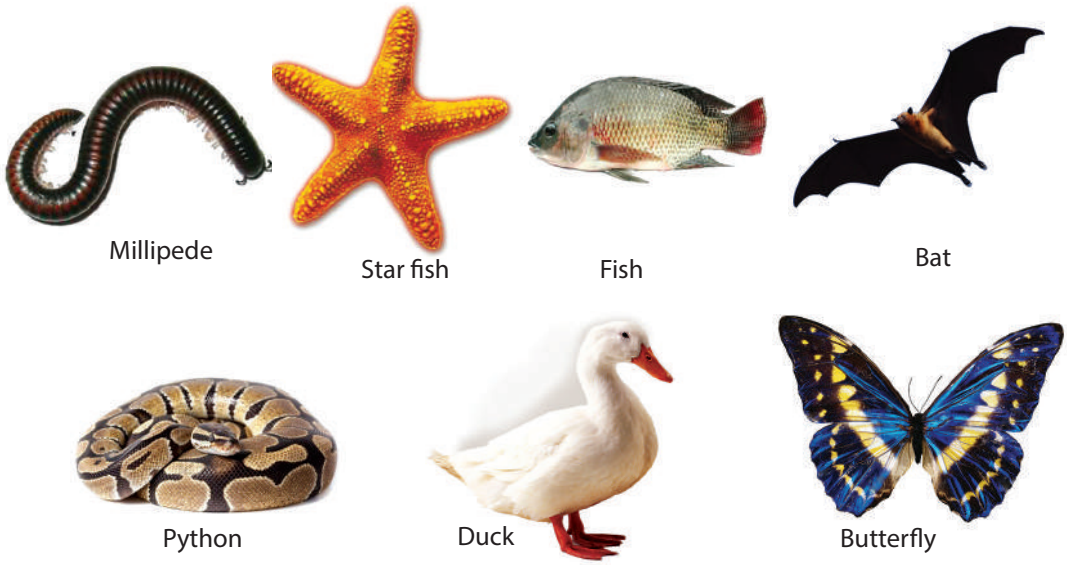


Figure 6.1 ▲ Several species of animals

As there are many different species of animals living in the animal world, they are grouped in oder to make it easy for naming, identification and to study about them. Recall how you grouped the animals using different criteria.

Considering the mode of locomotion, bat, butterfly and crow can be grouped into one group as 'flying' animals, but these animals display a huge diversity with regard to other features. Therefore, a scientific way of classification is essential to group animals. Observe a human skeleton in your school laboratory.

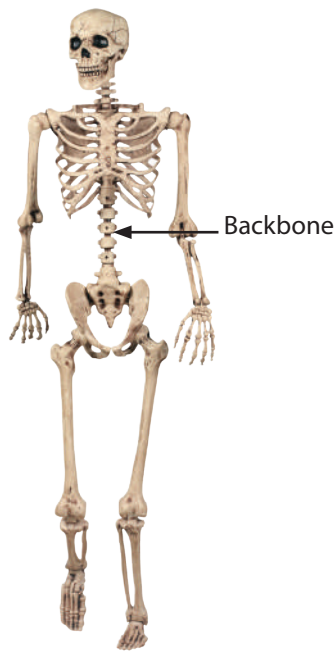


Figure 6.2 ▲ Skeleton of human

The central line of bones is known as **backbone**. Many animals including a human being have this backbone. Observe the skeletons given in Figure 6.3 and identify the backbone of the animals.

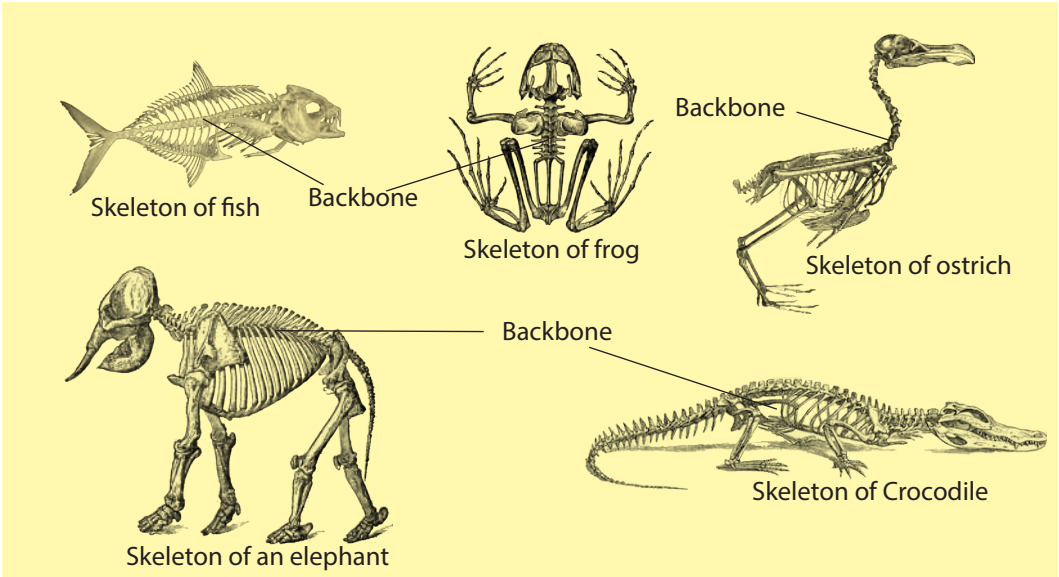


Figure 6.3 ▲ Skeletons of vertebrates

Some animals do not have a backbone. The Figure 6.4 shows several species of animals, without a backbone.

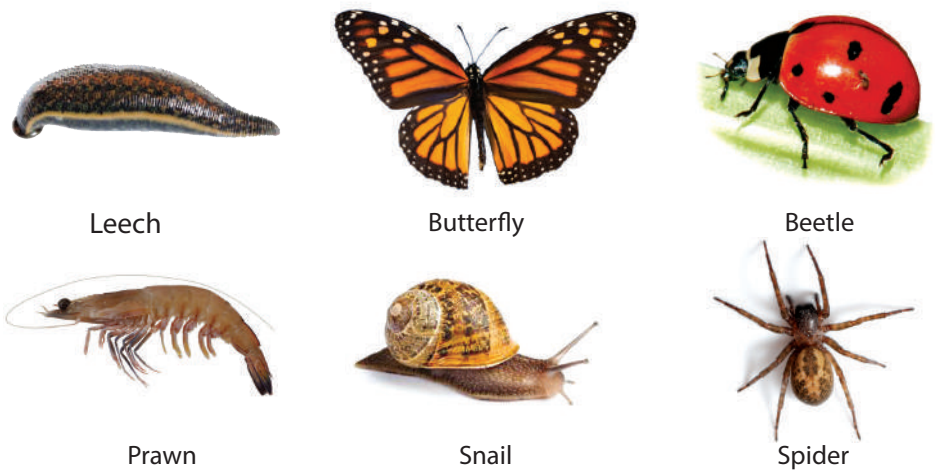


Figure 6.4 ▲ Several species of invertebrates

Animals can be divided into two groups as animals with a backbone and animals without a backbone.

Animals with a backbone are called **vertebrates**; and animals without a backbone are called **invertebrates**.

Animals
- Animals with backbone (vertebrates)
- Animals without backbone (invertebrates)

Engage in Assignment 6.2 to identify vertebrates and invertebrates in our environment

Assignment 6.2

The picture given below shows you some species of organisms living in sea shore. Group them into vertebrates and invertebrates.

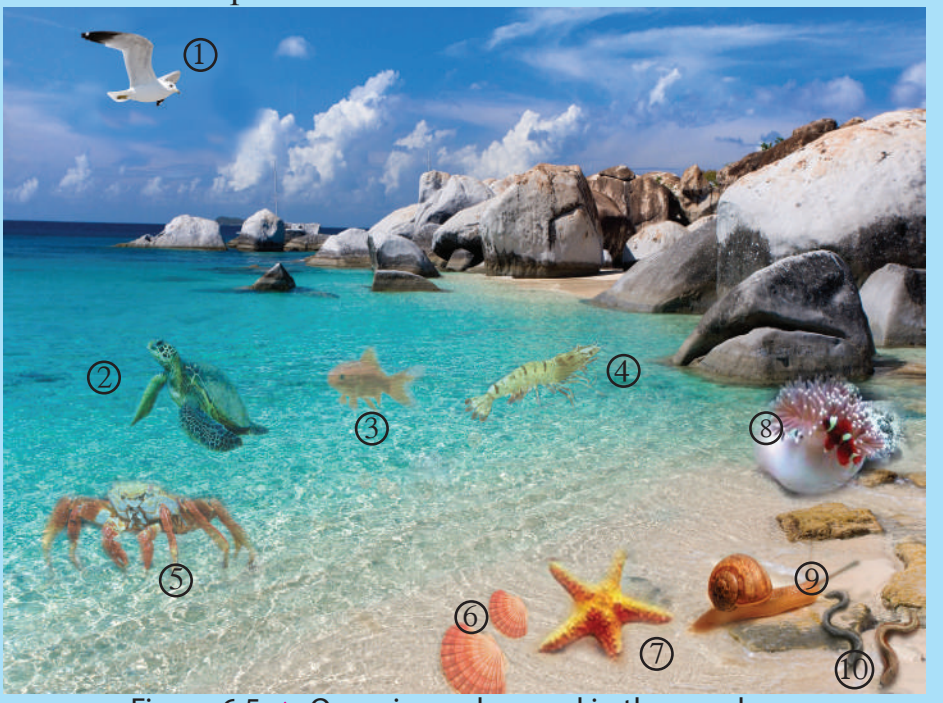


Figure 6.5 ▲ Organisms observed in the sea shore

1. Sea gull
2. Turtle
3. A species of fish
4. Prawn
5. Hermit crab
6. Bivalve
7. Star fish
8. Sea anemone
9. Snail
10. Worm

Compare the way you grouped them with the table given below.

Table 6.1

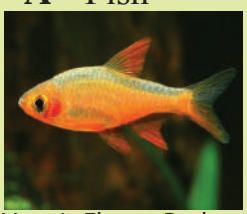
Vertebrates	Invertebrates
Sea gull Fish species Turtle	Hermit crab Star fish Bivalves Snail Prawn Worm Sea anemone

For extra knowledge

Vertebrates can be further divided into following groups;

- Fish
- Amphibians
- Reptiles
- Birds
- Mammals

A - Fish


Vateria Flower Rasbora


Black Ruby Barb


Shark


Tuna

B - Amphibians

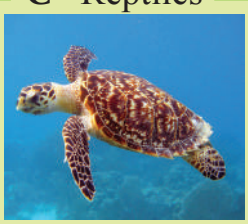

Toad

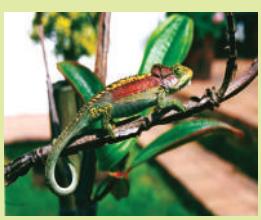

Ichthyophis

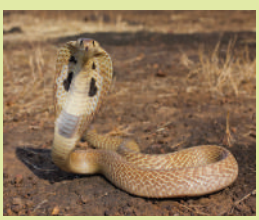

Frog


Salamander

C - Reptiles


Turtle

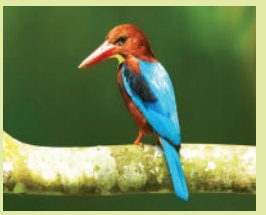

Chameleon


Snake


Crocodile

D- Birds


Hawk


Kingfisher


Magpie

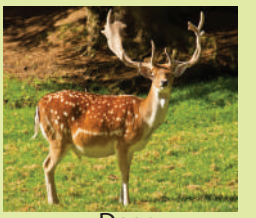

Oriole

E- Mammals


Squirrel


Bat


Dolphin


Deer

Engage in Activity 6.1 and classify the vertebrates mentioned in it.

Activity 6.1

The diagram given below shows the picture of a forest. Identify organisms in the picture.

Figure 6.6 ▲ Several species of animals

Classify above animals as vertebrates and invertebrates.

Vertebrates	Invertebrates

6.2 Adaptations of organisms to environment

Organisms live in various environments like water, land, atmosphere, on other organisms and also inside other organisms. Other than that there are organisms who live in snow, deep sea, in deserts as well as hot water springs. They have conquered such difficult environmental conditions due to their ability to adapt for these environments.

The ability of organisms adapt to their environment is called adaptation. These adaptations are useful for them to fulfil their needs. (e.g.:- food, shelter, protection) Thereby the organisms ensure their existence in the environment.

How colour is useful for the existence of animals

Most of the time colour of the animal blend with their living environment; thereby an animal cannot easily be identified by the predators and they will be protected.

Activity 6.2

You will need :- 100 small pieces of ekles/tooth picks, colours (red, green, white, brown)

Method :-

- Colour the pieces of ekle/tooth picks (25 in one colour)
- Spread the wrapped pieces of ekle in a lawn randomly.
- Appoint 4 students to pick up the pieces of ekle.

- What colour ekles were picked up at first? What colour was completed picking up at last?
- Next spread the above ekle on a gravel floor. Which pieces of ekle will be collected at last if they were asked to pick up as before.
- Do this activity in different environments in the above manner.

It is obvious that you might have collected the green colour ekle sticks last. Due to the similar colour of the grass and the green colour wrapped eakle sticks make difficult to separate them when picking.

Then, disperse all these eakle sticks on a gravel floor. When you make the students to pick them once again which colour of ekle sticks would be picked by them last.

Some of the animals who show camouflage are shown in the Figure 6.7.

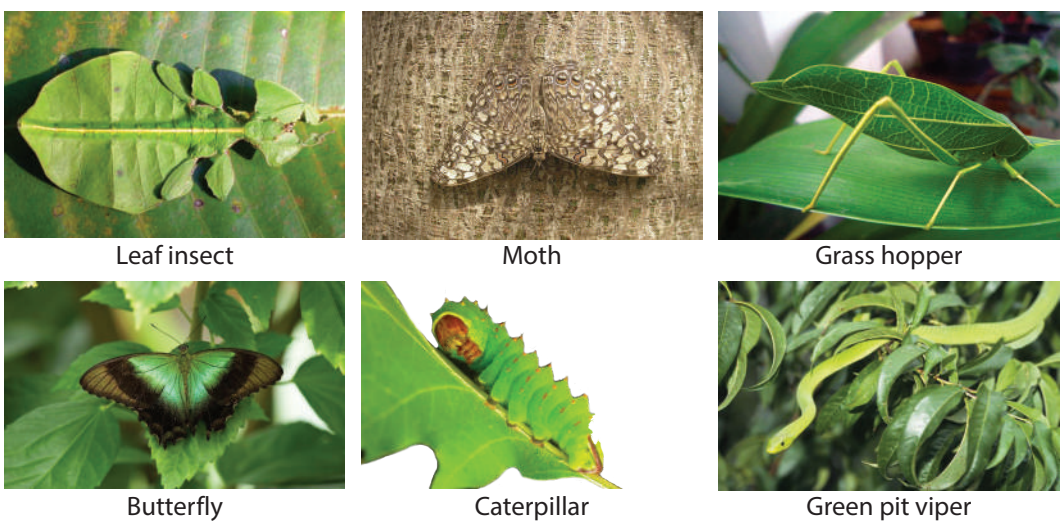


Figure 6.7 ▲ Camouflage among different animals

Assignment 6.3

Complete the following table using Figure 6.7.

Table 6.2

Name of the animal	Environment	Colour of the Environment	Colour of the body
Grass hopper	Grass	.....	.....
Leaf insect	Leaves of guava	.....	.....
Butterfly	Flowers	.....	.....
Caterpillar	Plant leaves	.....	.....
Green pit viper	Stem twigs of plants	.....	.....
Moth		.....	.....

The colour of these animals are properly blended with their environment. Therefore, the predators cannot identify them at once.

Presence of the same colour in the environment and the body of many animals will help them to protect themselves from the predators.

The difficulty to identify animals separately from their surroundings due to blending of body colour to particular environments is called **camouflage**.

Animals get the following benefits due to camouflage.

Figure 6.8 ▲ Leopard seeking for prey

As the skin colour of animals blend with the environment they live in, predators find difficult to catch them on sight at once. **Most of the animals do not become victims to predators due to their adaptations to the environment.**

Skin colour of the animals helped them not only to protect themselves from predators but also to find prey for them.

e.g.:- The leopard with lumpy skin helps to be invisible to catch preys.

For extra knowledge

Biston betularia, a moth species lived in Manchester town in England. They were in two colours as white and black. The black coloured moths easily became the preys of predators as they were clearly visible. After industrial revolution the environment became grey and the black moths were safe due to their black colour.

Some kinds of lizards change their colour according to the environment they live.

Figure 6.9 ▲ Species of Lizard showing camouflage

Assignment 6.4

Find the animals who show camouflage. Prepare an album with a collection of photographs of them.

How shape helps the existence of animals

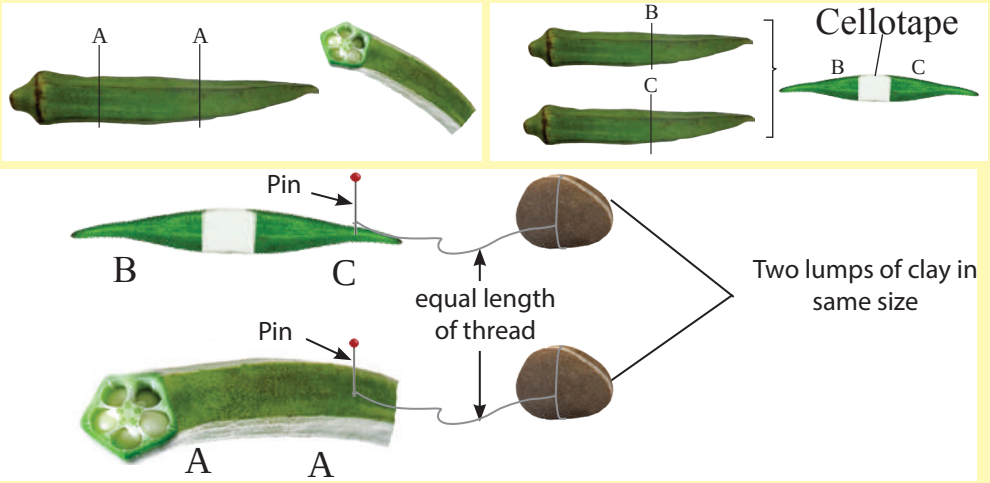
It is important to change the body colour of animals for their own protection. Similarly, the body shape of them is also very important for locomotion. Let us engage in Activity 6.3 to examine that.

Activity 6.3

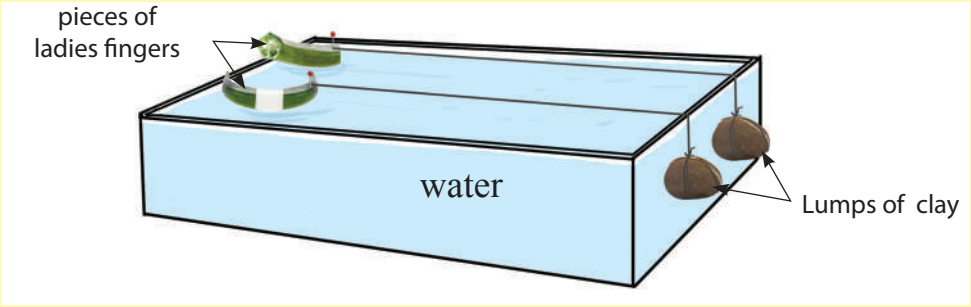
Showing how the body shape helps locomotion

You will need :- Some pods of ladies fingers, two pieces of thread about 50 cm, two small lumps of clay pins

Method :- Cut the ladies fingers according to the illustrated picture.



Make the two forms of prepared ladies fingers to float on a tray filled with water.



Observe whether both the structures move with a similar speed or their speed differs.

Both the ends of the A-A form of ladies fingers get a circular shape whereas the B-C form gets pointed shape (Tapering ends).

When the two lumps of clay lower down two forms of ladies fingers float along the tray.

You will be able to see that streamlined shaped (B-C) form reaches the end of the tray faster than the other form (A-A) of ladies fingers.

Figure 6.10 ▲ Streamlined body shape of fish and birds

Name few streamlined shape animals.
You will observe several kinds of birds and fish possess of streamlined shape.

The body shape of birds and aquatic animals helps to overcome the difficulties they have in their environment.

The body shape of birds and fish is mainly of streamlined shape because they need to have efficiency in their locomotion.

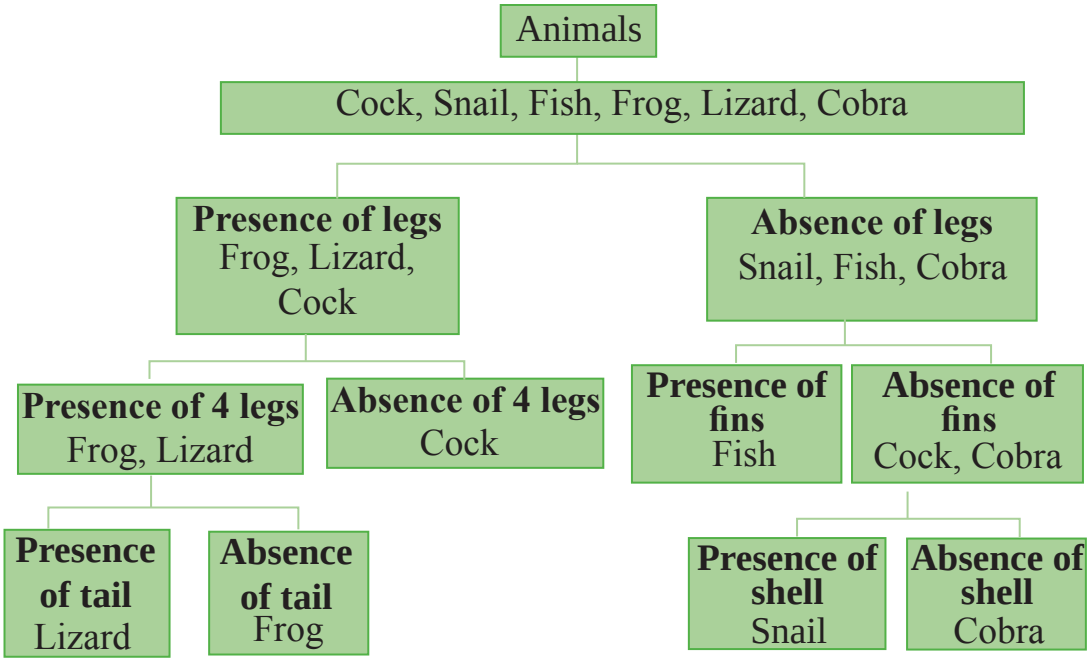
6.3 Use of dichotomous key for classification of organisms

Assume that you remember how several plant leaves were classified using the dichotomous key. Dichotomous key is used to classify living organisms based on the presence and the absence of characteristics. It is more appropriate if the characteristics chosen for this purpose is easily observable.

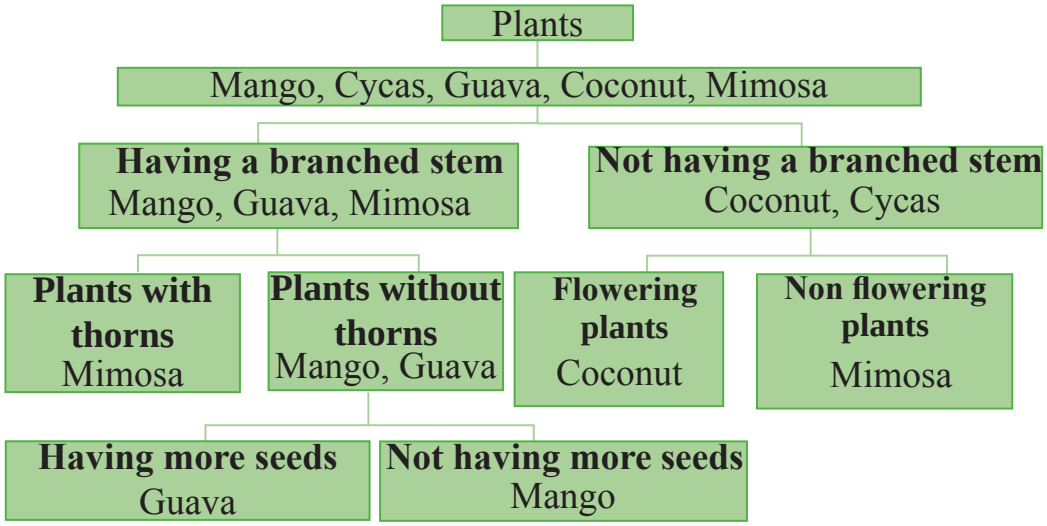
Features of dichotomous key

- Select a feature that could be differentiated easily.
- Consider one feature at a time and separate that feature as present or absent.
- Finally, separate the items so that only one item will remain at the end.

Some examples of categorisation using dichotomous key



Similarly, a dichotomous key can be prepared for the following plants.



You might have realized that plants and animals can be identified separately by classifying them with the use of a dichotomous key.

Assignment 6.5

- Observe the birds in your school premises/in your garden.
- Based on the various features of those observed birds, prepare a dichotomous key.

Summary

- Animals can be grouped into two as animals with a backbone and animals without a backbone.
- Animals with a backbone are named as vertebrates and animals without a backbone are named as invertebrates.
- Similarities and differences can be seen among vertebrates.
- Various changes occur in organisms to suit and survive in their habitat is called adaptation.
- Organisms are well-adapted to live in their environment with body colour and shape.
- Dichotomous keys are used to classify organisms mainly based on their external features.

Exercise

1. Choose the correct answer.

i). Select the group of animals consists of only vertebrates.

a. Bull, Snail, Crow

b. Butterfly, Sparrow, Bat

c. Gecko, Iguana, Crocodile

d. Crab, Prawn, Shark

ii). Select the invertebrate;

a. Toad b. Sea horse c. Prawn d. Rat snake

2. A list of animals is given below.

Iguana, Mosquito, Squirrel, Fish (Snake head), Whale, Crow, Bat, Crab, Bull, Butterfly, Bee, Scorpion, Millipede

i) Group the animals in the above list as vertebrates and invertebrates

ii) Name three mammals.

iii) Make a dichotomous key for the above vertebrates

3.

i). Name three animals showing camouflage.

ii). State three advantages of camouflage with examples.

4. Write two adaptations shown by the below mentioned animals, to their living environment.

e.g.:-

Fish	-	presence of fins	-	streamlined shape
Green pit viper	-	.....	-	.....
Bird	-	.....	-	.....
Millipede	-	.....	-	.....
Mantis	-	.....	-	.....
Caterpillar	-	.....	-	.....

Technical Terms

Vertebrates	-	පෘෂ්ඨවංශීන්	-	முள்ளந்தண்டுளிகள்
Invertebrates	-	අපෘෂ්ඨවංශීන්	-	முள்ளந்தண்டிலிகள்
Adaptation	-	අනුවර්තන	-	இசைவாக்கம்
Camouflage	-	වේශාන්තරය	-	பொய்க்கோலம்
Streamlined shape	-	අනාකුල හැඩය	-	அருவிக்கோட்டு வடிவம்
Dichotomous key	-	දෙබෙදුම් සුචිය	-	இரு கிளைச் சாவி