

UNDERSTANDING SCIENCE

Pupil's Books

6

2ND EDITION

Kaweesi Publishers Ltd

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Theme: The world of living things

Topic 1: Classification of animals

Section 1.1: Living things

Living things are things that have life.

Characteristics of living things

- **They feed.** Plants make their own food by the process called photosynthesis whereas animals cannot make their own food but they feed on already made food by plants.
- **They respire.** The cells in living things break down food to release energy.
- **They grow.** Living things undergo irreversible increase in size as a result of increase in the number of cells.
- **They excrete.** Living things remove waste products from their bodies.
- **They reproduce.** Living things give rise to new organisms.
- **They move.** Animals can move from one place to another, that is, they carry out locomotion but plants cannot move from one place to another. Plants can only move mainly by growth movement such as bending of a plant towards light.
- They are **sensitive** and **respond** to the changes in their environment.

Kingdoms of living things

- Kingdom animalia
- Kingdom monera
- Kingdom plantae
- Kingdom protocista
- Kingdom fungi

Classification of animals

Classification is the process of grouping living things according to their common characteristics. Classification helps the scientists to easily identify organisms belonging to the same group.

Characteristics used in classifying animals (factors considered when classifying animals)

- Way of movement.
- Way of feeding.
- Way of reproduction.
- Way of protection.
- Way of breathing.
- Body structure

Groups of animals

There are two main groups of animals.

- Invertebrates.
- Vertebrates.

Activity 1.1

1. Why are animals grouped under living things?

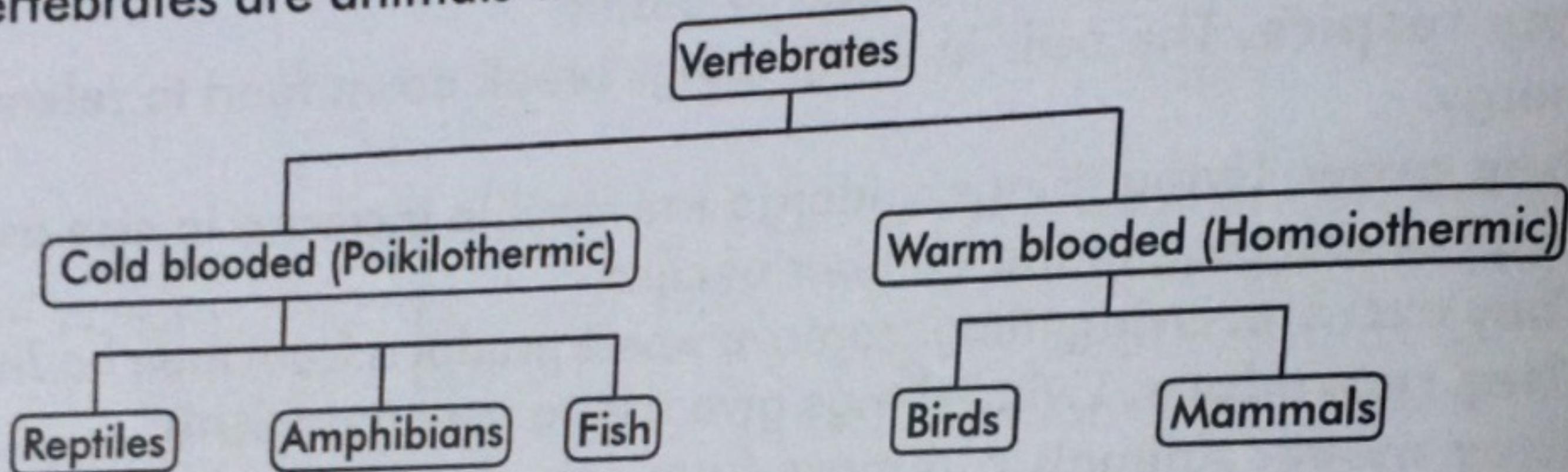
2. Mention the kingdom of living things to which bacteria belong.

3. Why is a car not a living thing yet it can move?

4. How do plants move?

Section 1.2: Vertebrates

Vertebrates are animals with back bones/vertebral column.



Characteristics of vertebrates

- They have back bones and therefore, they have an endoskeleton. **Endoskeleton** is the type of skeleton found as a main supporting frame inside the body of an organism.
- They have a nervous system with a brain.
- They have a protective skin covering the body.
- They have blood that circulates through blood vessels.

Examples of vertebrates

- | | | | | |
|------------|------------|------------|------------|---------|
| • Rat | • Whale | • Snake | • Platypus | • Frog |
| • Rabbit | • Rabbit | • Rabbit | • Tilapia | • Sheep |
| • Squirrel | • Hedgehog | • Elephant | • Dog | • Man |

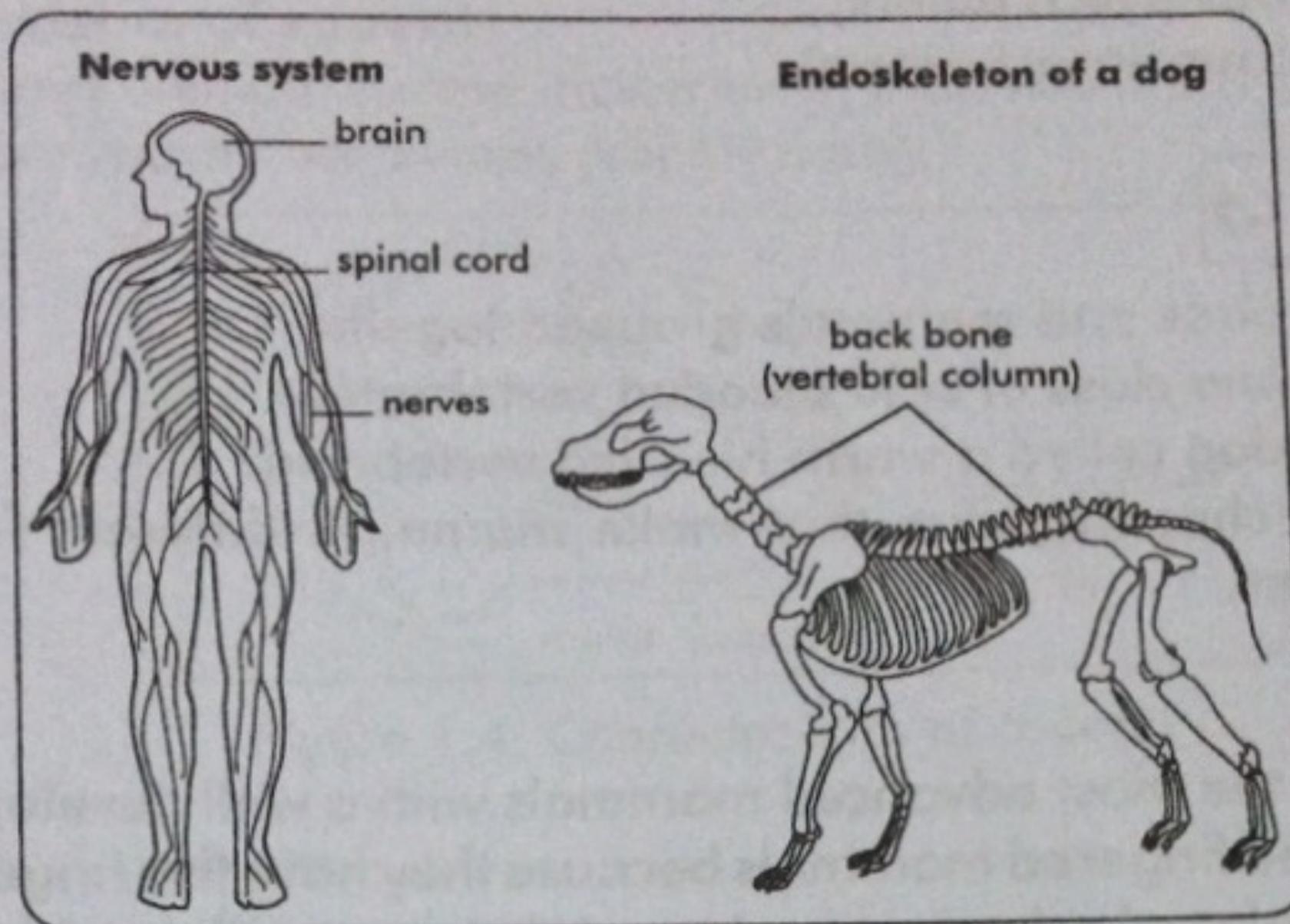


Figure 1.1: Characteristics of vertebrates.

Warm blooded vertebrates

Warm blooded vertebrates are vertebrates which maintain a constant body temperature. These animals are also called **homoiothermic animals/endothermic** animals. Examples are mammals and birds.

Mammals

Mammals are vertebrates with mammary glands

Characteristics of mammals

- They have mammary glands.
- They undergo internal fertilisation.
- Their skins are covered by hair or fur.
- Most mammals give birth to live young ones except the platypus and spiny anteaters.
- They are warm blooded animals (homoiothermic/endothermic).

Groups of mammals

- Primates (fingered mammals)
- Rodents (Gnawing mammals)
- Lagomorphs
- Ungulates (Hoofed mammals)
- Marsupials (pouched mammals)
- Monotremes (Egg laying mammals)
- Chiroptera (Flying mammals)
- Cetaceans (Sea mammals)

- Carnivorous (Flesh eaters)
- Insectivorous (insect eaters)

Activity 1.2

1. Why are birds and mammals grouped together?
2. Mention one class of cold blooded vertebrates.
3. Why is a dog called a warm blooded vertebrate?
4. Give two characteristics that make mammals different from other vertebrates.

Primates

Primates are the most advanced mammals with a well developed brain. They are called fingered mammals because they have five fingers on their hands. Examples of primates are human beings, gorillas, chimpanzees, baboons, bush babies and monkeys. **Apes** are primates with no tails. Examples of apes include gorillas, chimpanzees and gibbons.

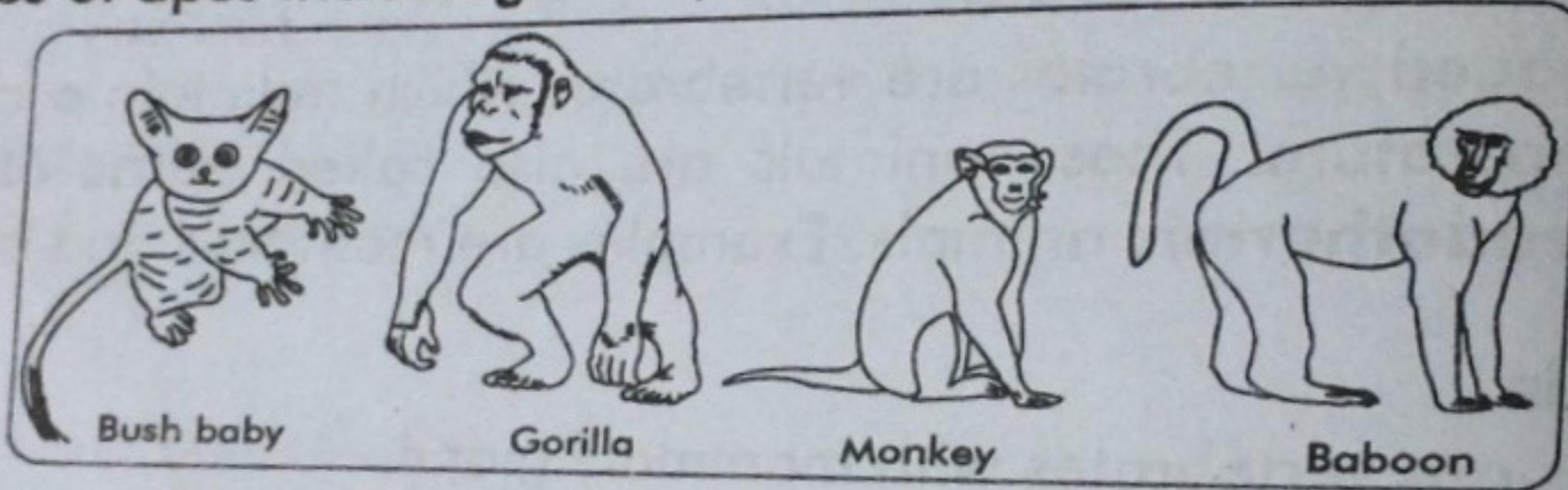


Figure 1.2: Examples of primates.

Characteristics of primates

- They have a well-developed brain.
- They produce live young ones.
- They have five fingers on each hand and five toes on each foot.

Rodents (gnawing mammals)

Rodents are mammals that bite rapidly. Examples of rodents are rats, squirrels, mice, porcupines and moles.

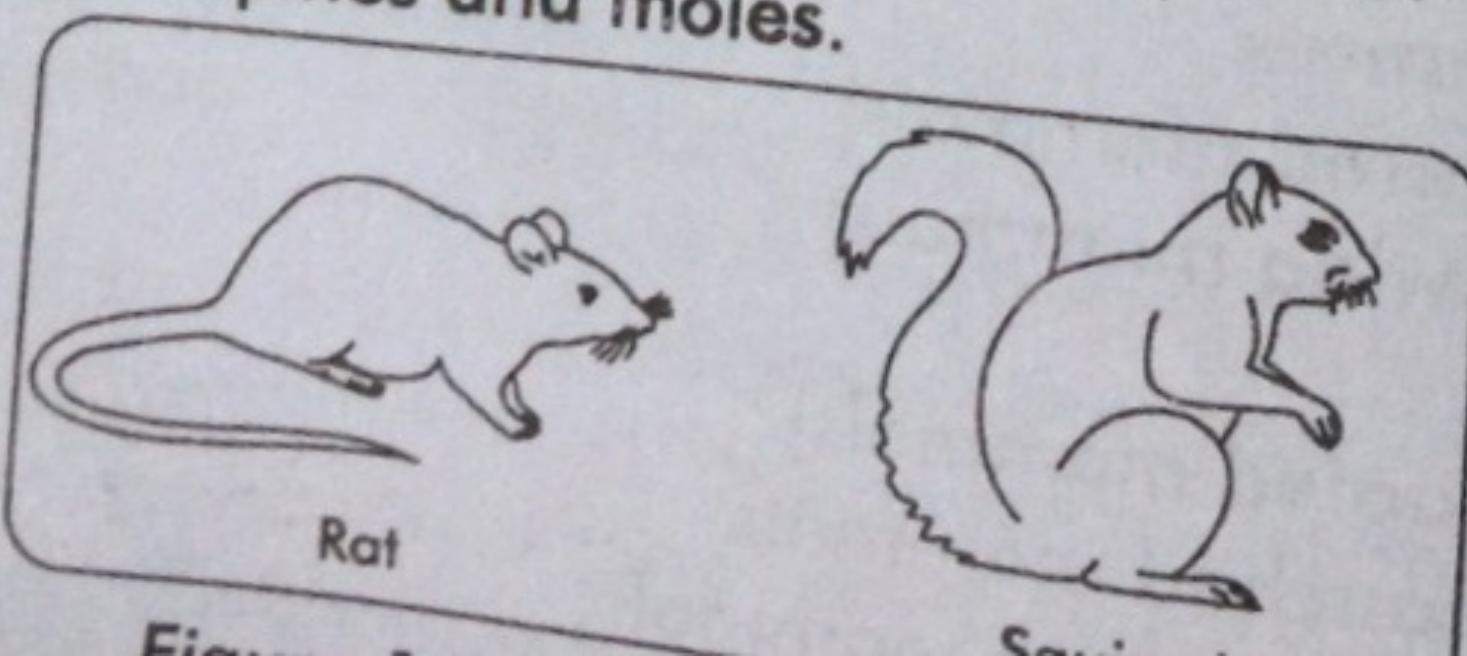


Figure 1.3: Examples of rodents.

Characteristics of rodents

- They have well developed incisor teeth that help them to bite rapidly.
- They are mostly herbivores (vegetarians).

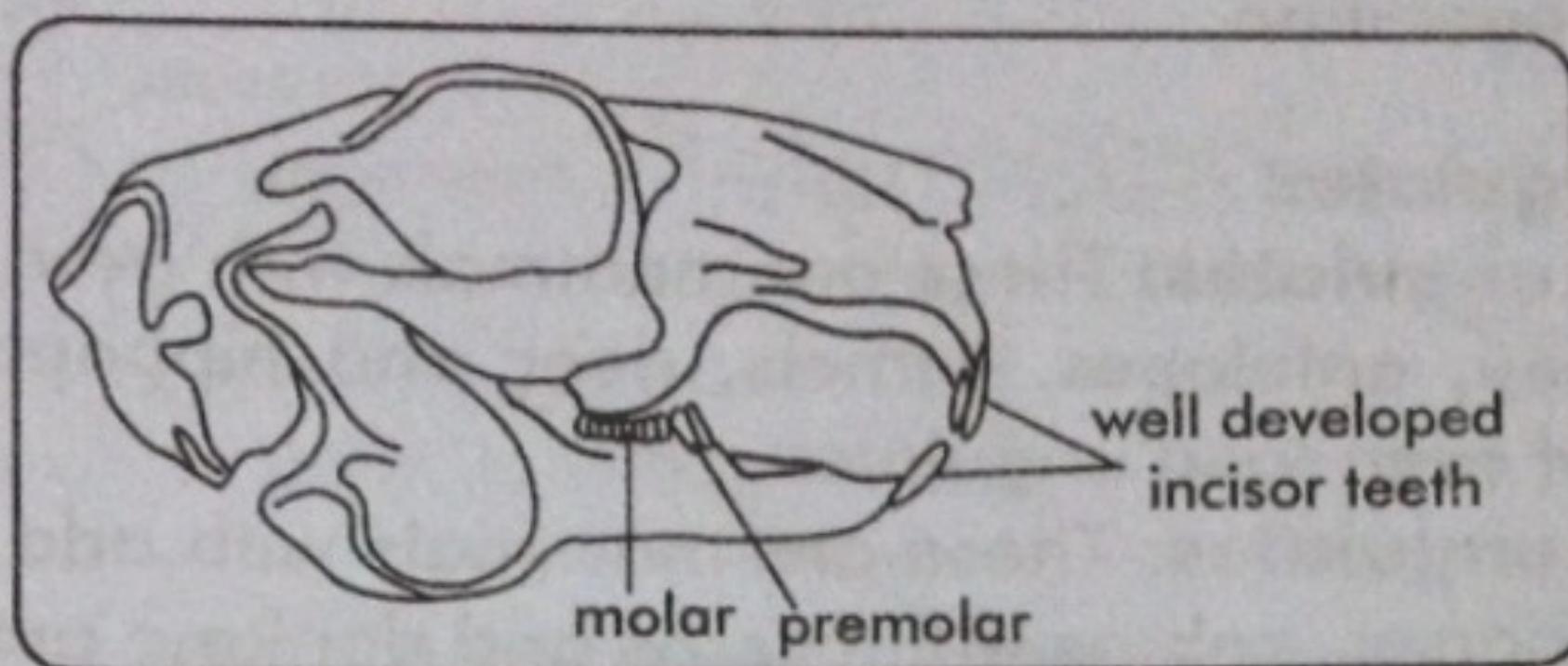


Figure 1.4: Characteristics of rodents

Dangers of rodents

Rodents destroy farmers' crops.

Lagomorphs

Lagomorphs are herbivorous mammals that have two pairs of incisors in the upper jaw. They resemble rodents but are not rodents. Examples of lagomorphs include;

- Rabbits
- Hares
- Pikas

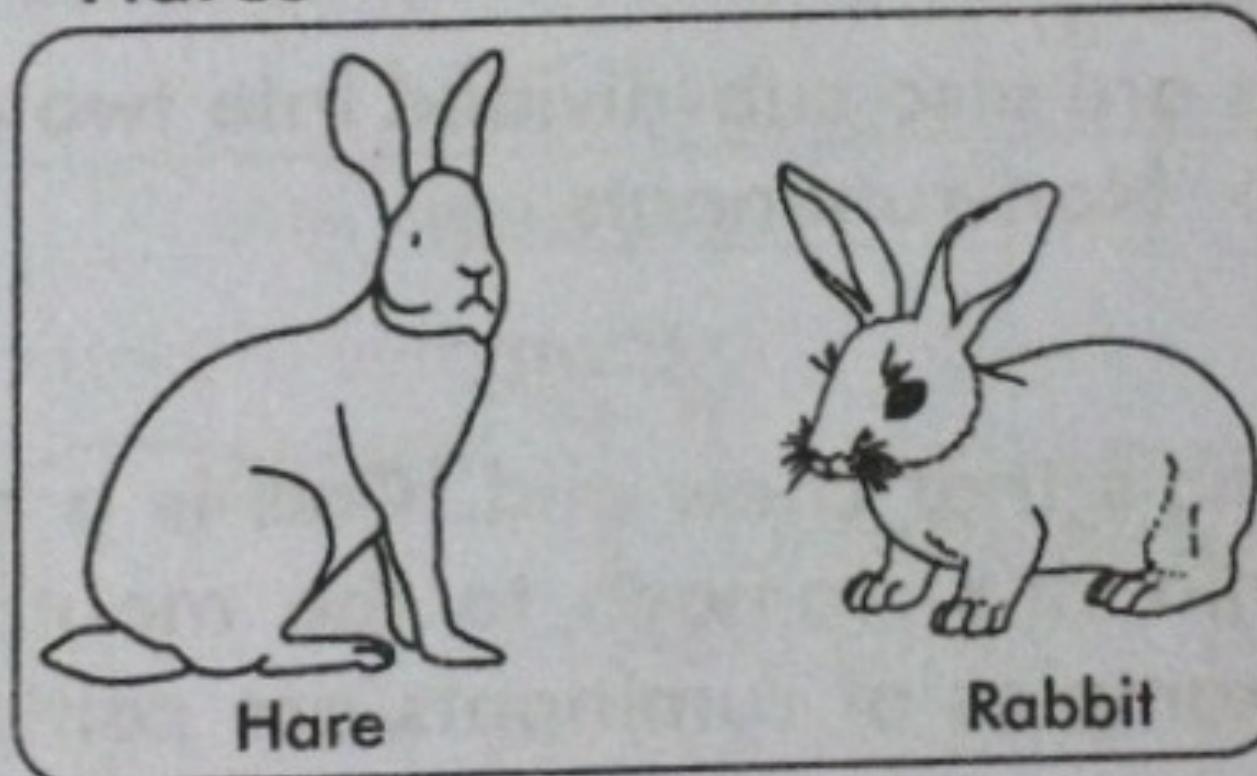


Figure 1.5: Examples of lagomorphs.

Activity 1.3

1. Why are primates referred to as the most advanced group of mammals?
2. How are apes different from other primates?
3. State one difference between rodents and lagomorphs.
4. Give one danger of rodents in the environment.
5. Give the difference between apes and monkeys.
6. How are rodents different from lagomorphs?

Ungulates (Hoofed mammals)

Ungulates are vertebrates with hooves on their feet. Hooves protect the underneath tissues from physical injuries. They are herbivorous, that is, they feed on vegetation.

Groups of ungulates

- **Even toed ungulates:** These are mammals with even toed hooves. Cattle, sheep, antelopes, camels, deer and hippopotamuses are examples of even toed ungulates.
- **Odd toed ungulates:** These are mammals with odd toed hooves. Elephants, horses, zebras, rhinoceros and donkeys are examples of odd toed ungulates.

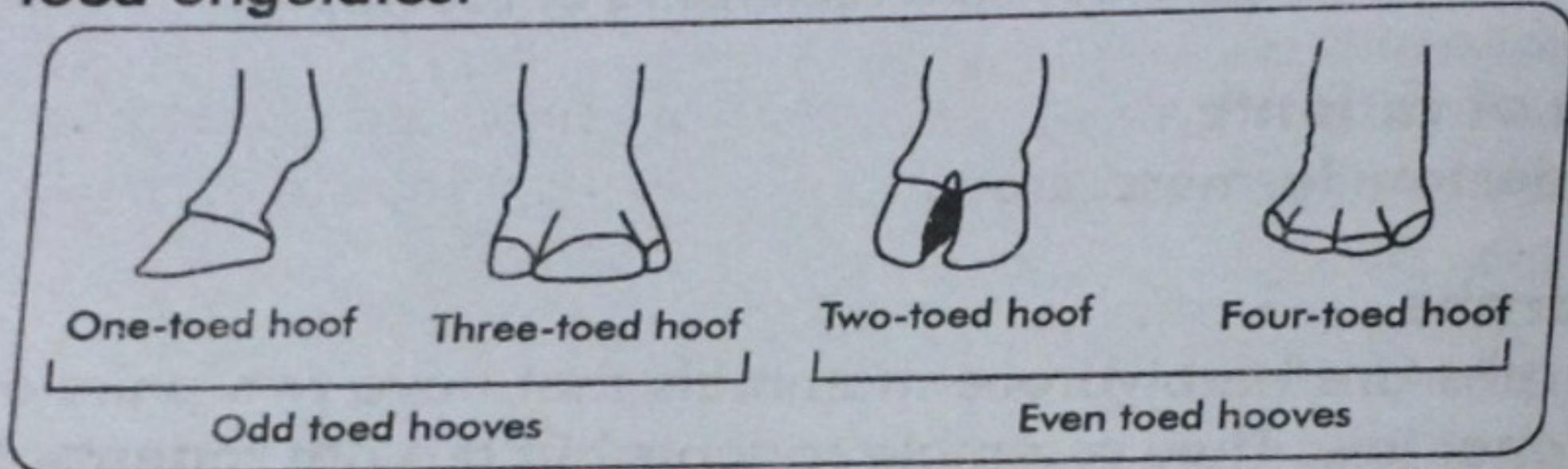


Figure 1.6: Hooves of ungulates.

Even toed ungulates

Even toed ungulates are also sub-divided into two groups.

- Ruminants
- Non-ruminants

Ruminants

Ruminants are animals that chew cud. **Cud** is a portion of food that returns from a ruminant's stomach to the mouth to be chewed for the second time. Examples of ruminants are cattle, goats, sheep and camels.

Characteristics of ruminants

- They chew cud.
- They have four stomach chambers.
- Most of them use horns for protection.

Four stomach chambers

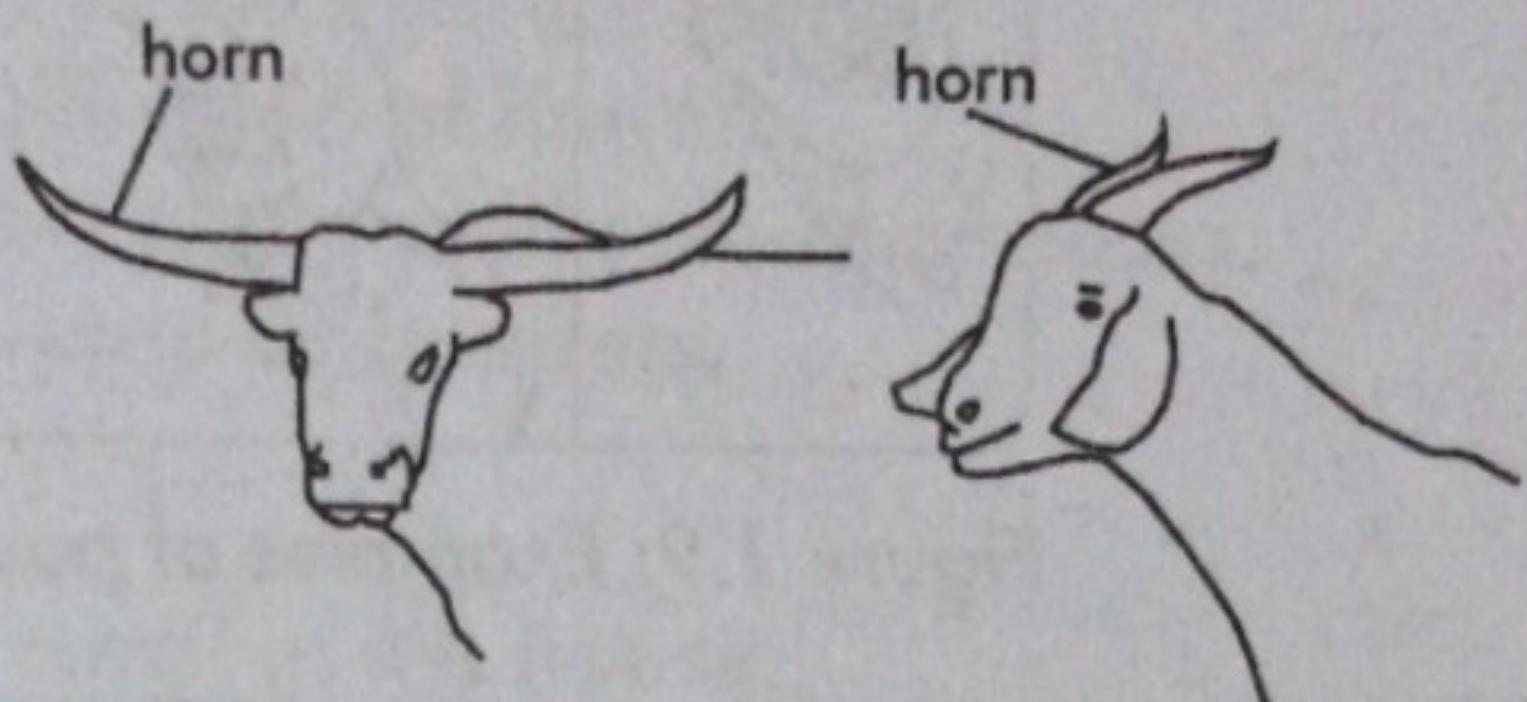
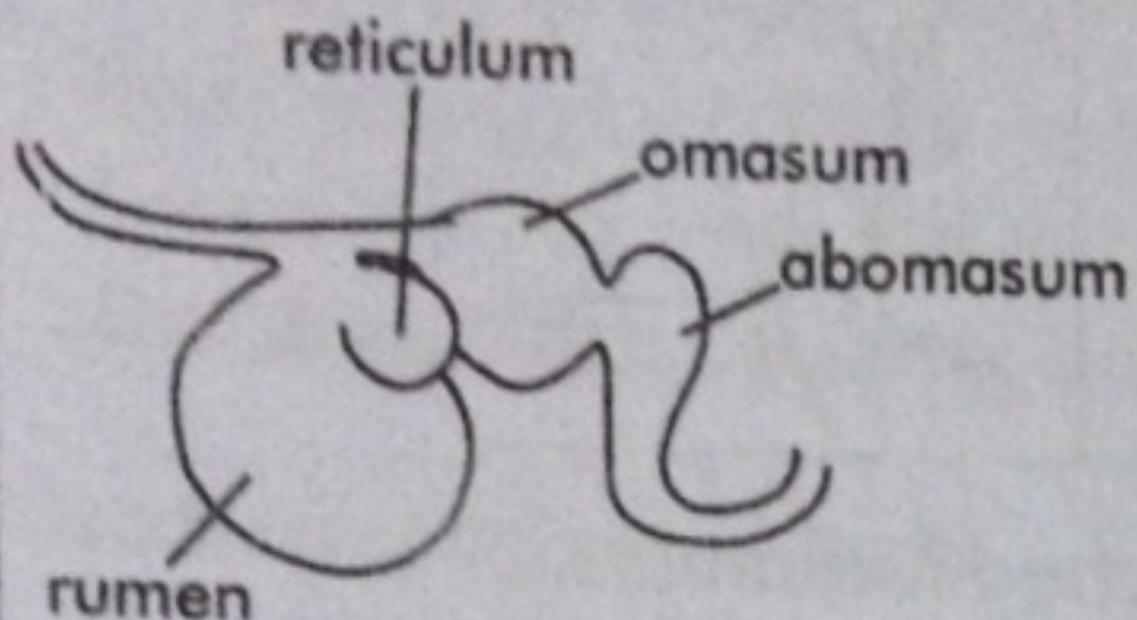


Figure 1.7: Characteristics of ruminants

Non-ruminants

Non-ruminants are animals that do not chew cud. Examples of non-ruminants are pigs, hippopotamuses and warthogs (wild pigs).

Characteristics of non-ruminants

- They have a single chambered stomach.
- They have complete dentition. **Dentition** is the arrangement of teeth in the jaws.
- They use their well developed canine teeth for protection.

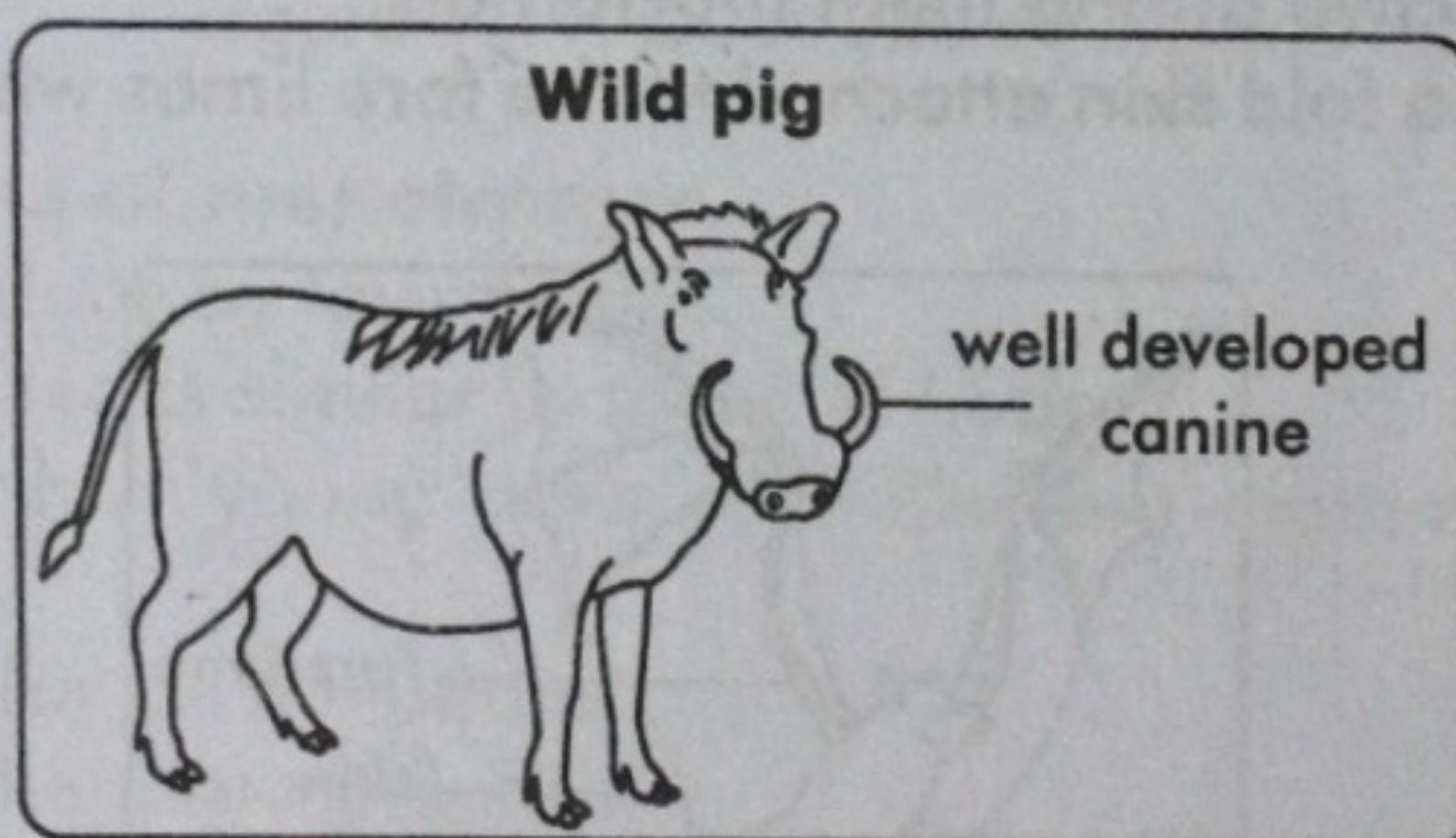


Figure 1.8: A wild pig

Marsupials (pouched mammals)

Marsupials are characterised by premature birth and continued development of the newborn while attached to the nipples of the mother in a pouch (bag-like structure). The function of the pouch is for carrying the baby (joey). Examples of marsupials are kangaroos, koala bears and wallabies.

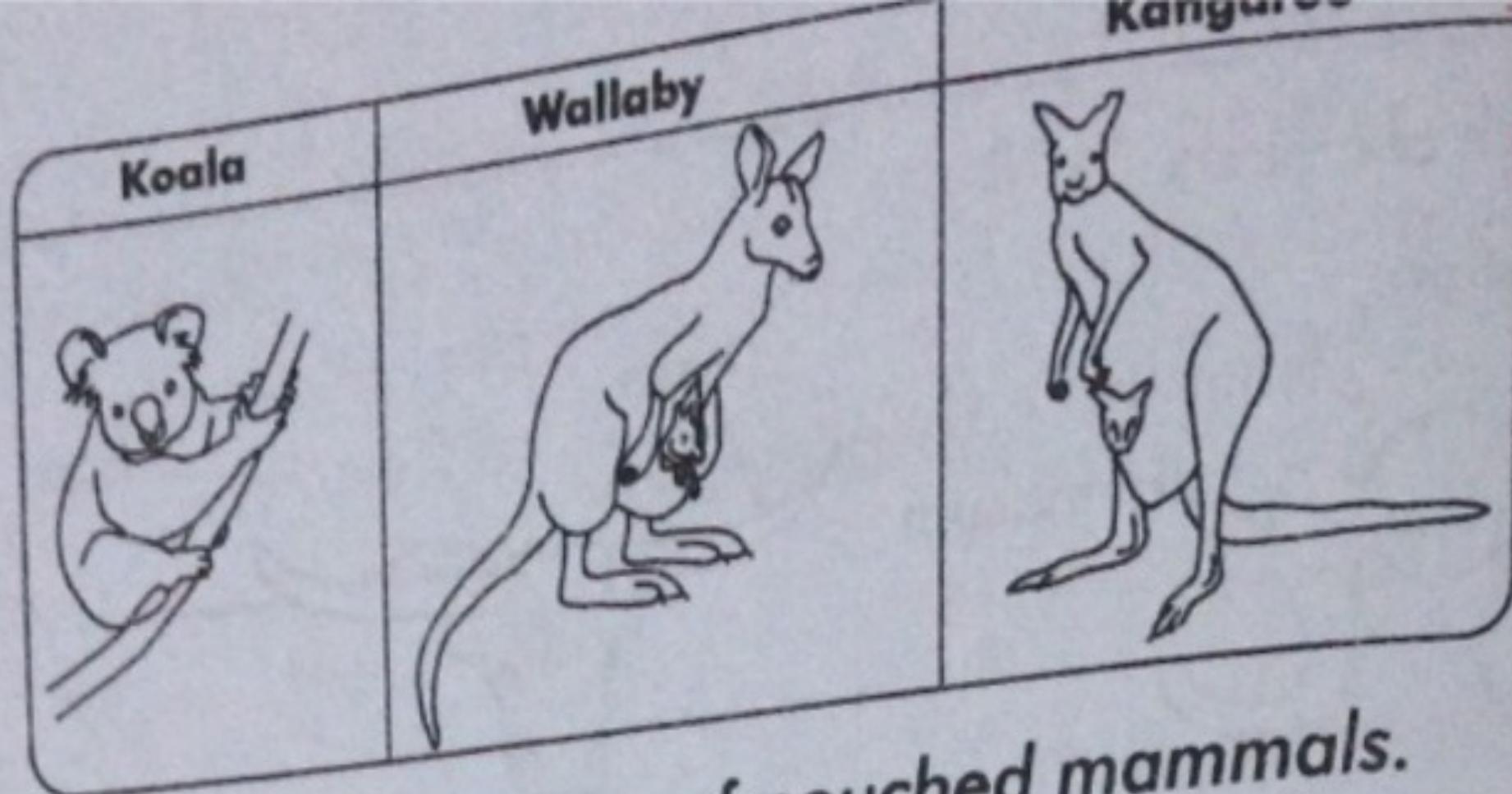


Figure 1.9: Examples of pouched mammals.

Activity 1.4

1. Why is a cow called a ruminant?
2. How do most ruminants protect themselves?
3. State the importance of a pouch to a kangaroo.
4. How are hooves important to ungulates?

Chiroptera (flying mammals)

An example of flying mammals is a bat. Bats use echoes to locate places and food.

Characteristics of chiroptera

- They are active during night (nocturnals).
- They have a fold skin attached to the fore limbs which act as wings.

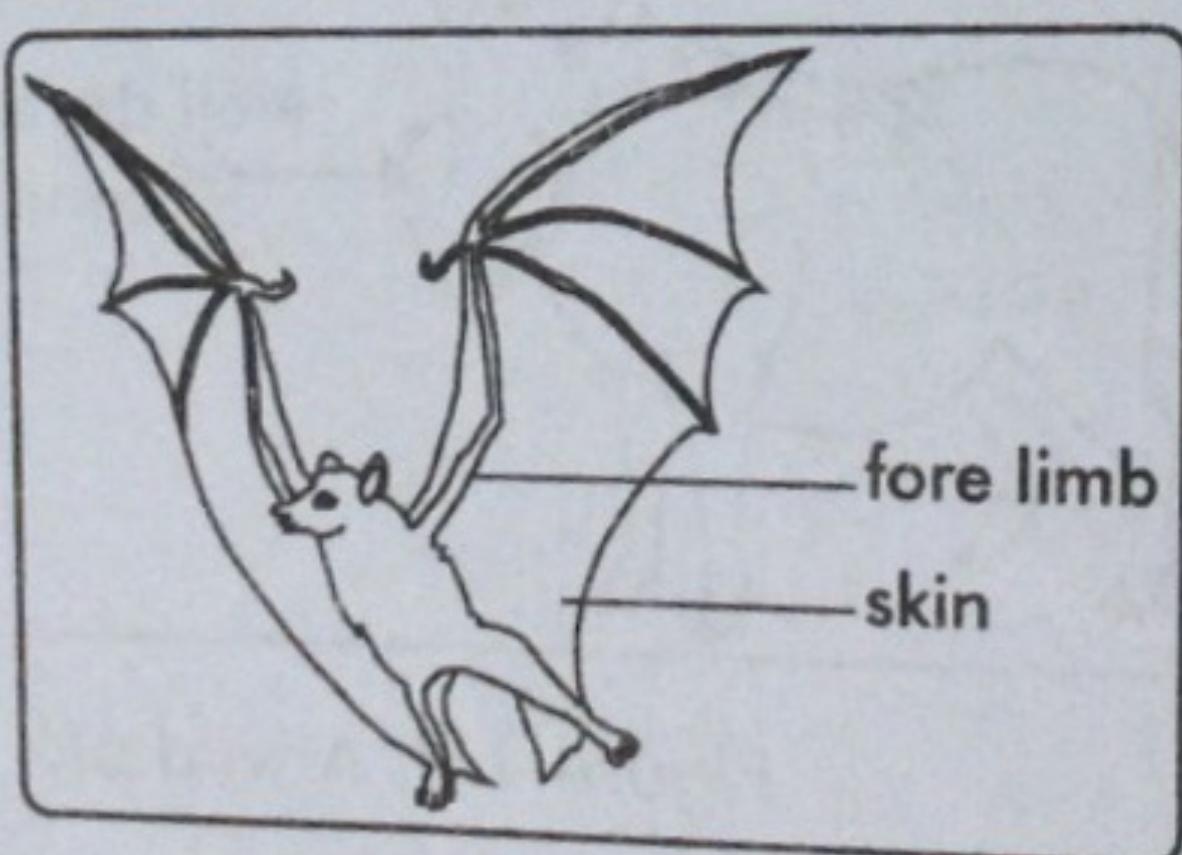


Figure 1.10: A bat

Groups of bats

Bats are grouped into three types.

- Insect eating bats
- Fruit eating bats
- Blood suckers (vampire bats). A vampire is an example of blood suckers.

Importance of bats in the environment

- Fruit eating bats help in seed dispersal. **Seed dispersal** is the scattering of seeds away from their parent plants.
- Fruit eating bats help in pollination of flowers.
- Insect eating bats eat vectors that would spread diseases.
- Bat droppings (guano) are used as fertilisers.

Disadvantages of bats

- Bat droppings lead to bad smell in the house.
- Some bats suck blood from animals causing anaemia.
- Some bats eat and destroy man's crops.

Monotremes (egg laying mammals)

Monotremes are the most primitive of all the classes of mammals. Examples of egg laying mammals are duck billed platypus and spiny ant eater (echidna). They are the most primitive mammals because they have characteristics of birds, reptiles and mammals.

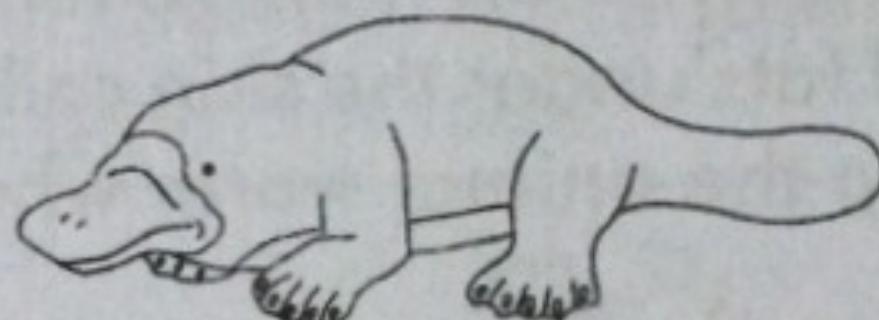


Figure 1.11: Duck billed platypus.

Characteristics of monotremes

- They reproduce by laying eggs.
- They have beaks similar to those of birds.
- They feed their young ones on milk from mammary glands after hatching.
- They have fur on the bodies.
- They breathe through lungs.

Activity 1.5

1. Why is a bat called a nocturnal?
2. How are vampire bats dangerous in the environment?
3. Give one way in which a spiny anteater is different from a whale in terms of reproduction.
4. Which part of the body is present in both birds and monotremes?
5. Why are monotremes said to be very primitive mammals?
6. Why is a duck-billed platypus classified as a mammal although it lays eggs?