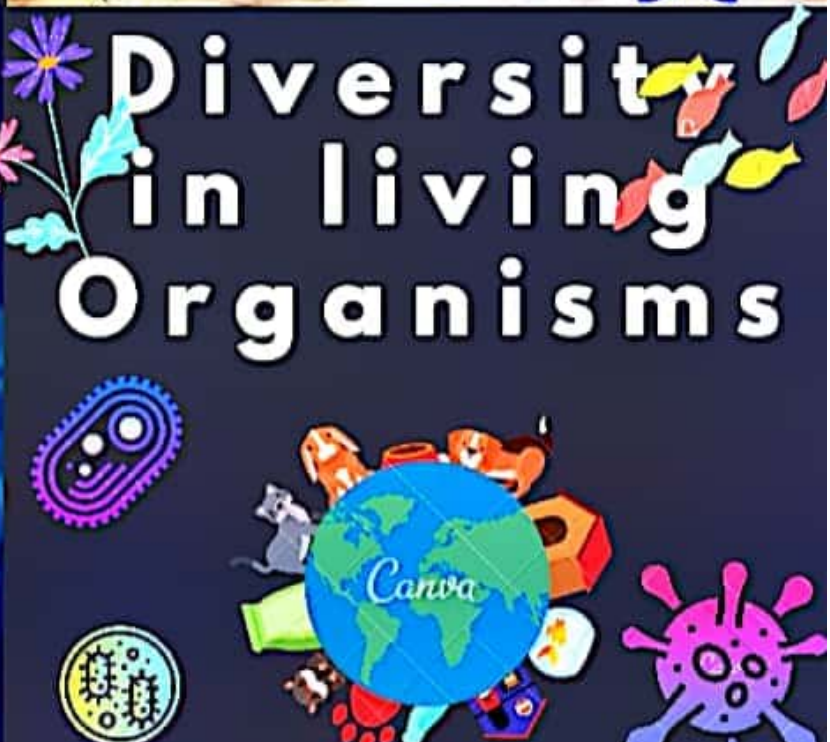
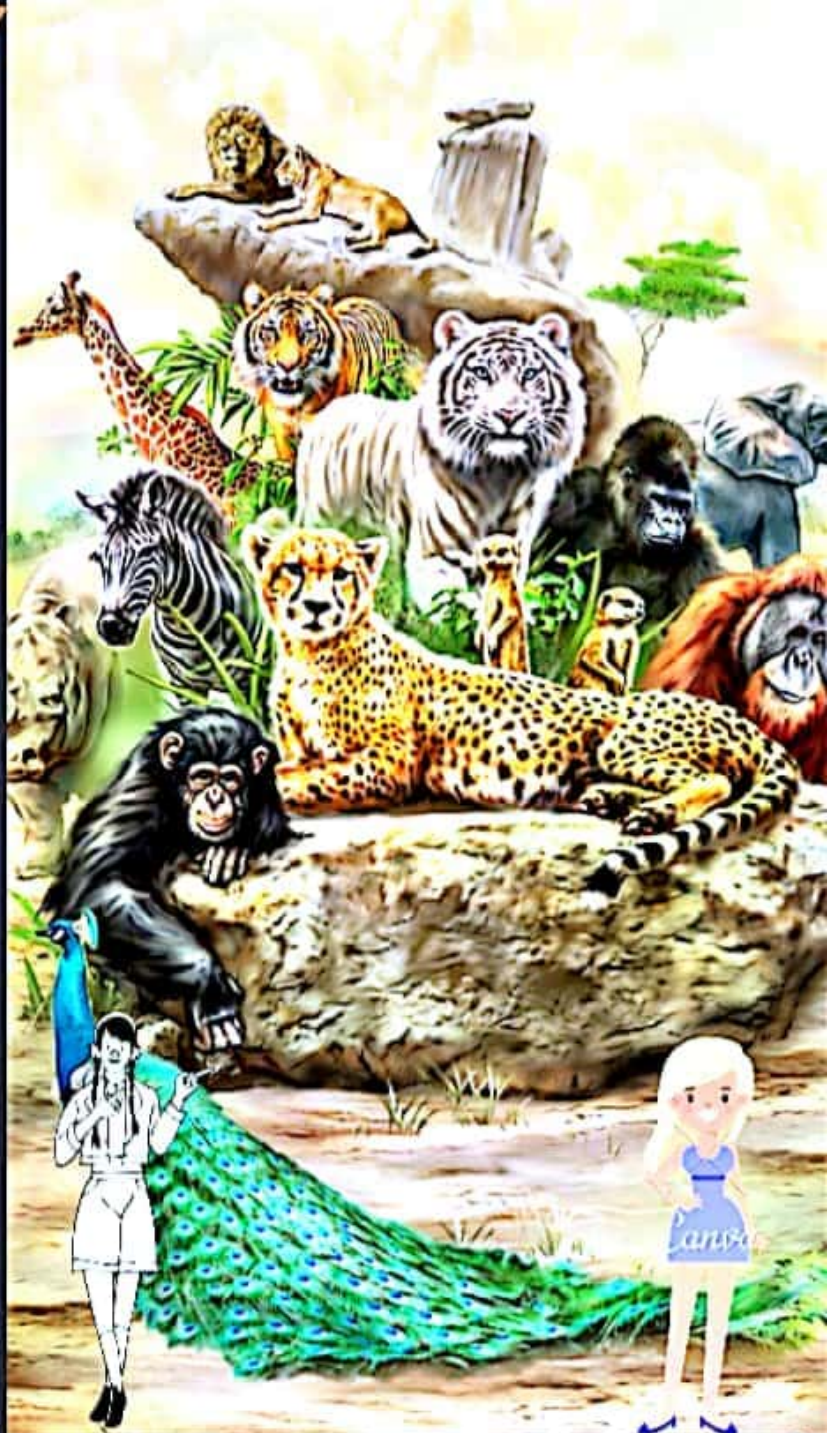


BIOLOGY

Class -9



Diversity in living Organisms

KINGDOM ANIMALIA

Kingdom Animalia or Animal Kingdom is the largest group among the living organisms. It includes the entire **fauna** (animal population) of the world. At present, about **30** Phyla, **68** Classes and **350** Orders of living animals have been recognised in the Animal Kingdom.

INVERTEBRATES AND VERTEBRATES

In the traditional system of classification, the entire animal kingdom has been divided into two major groups—**Invertebrata** and **Vertebrata**.

The group 'invertebrata' includes those animals that do not possess a vertebral column or backbone, while the group 'vertebrata' includes animals in which the vertebral column is present. Invertebrates include animals from the **Phylum Porifera** to **Phylum Echinodermata**. Let us study a few other characteristic features of animals which serve as the basis for their classification.

Symmetry

Symmetry means the arrangement of body parts around an axis. In other words, it refers to the *division of body into equal parts by lines or planes drawn through the central axis.*

The body of certain animals can be divided into similar halves. Such animals are considered **symmetrical**. Some animals like snails and many sponges are irregularly-shaped. Their bodies cannot be divided into similar halves through any plane. Such animals are said to be **asymmetrical**. Symmetrical animals may exhibit two types of symmetry:

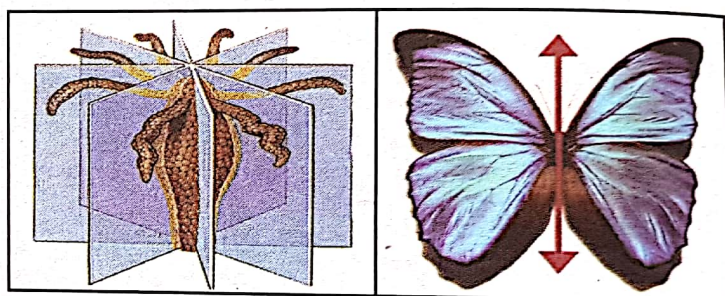
Radial Symmetry

The symmetry in which the body of an organism can be divided into two identical halves *through any plane passing through the central axis* is termed as **radial symmetry**. This type of symmetry is found in cnidarians and echinoderms. The animals exhibiting radial symmetry are called **radiata**.

Bilateral Symmetry

The symmetry in which the body can be divided into two equal halves *only through*

one plane is called **bilateral symmetry**. This type of symmetry is exhibited by annelids, arthropods and all chordates, including humans. The animals having bilateral symmetry are called **bilateria**.



(a) Radial

(b) Bilateral

Fig. 8.12: Symmetry in animals

Coelom

Coelom is the **large fluid-filled body cavity** which lies between the body wall and the gut wall. The fluid in the coelom is called **coelomic fluid**. On the basis of presence or absence of the coelom, the animals can be categorised mainly into three types:

True Coelomates

When the body cavity of organisms is *surrounded by the mesoderm on both the sides*, it is called

true coelom. Annelids, molluscs, arthropods, echinoderms and chordates possess true coelom. They are known as **true coelomates** or **eucoelomates**.

Pseudocoelomates

These organisms possess a body cavity but it is *not lined by the mesoderm*. Instead, mesoderm is present as scattered pouches in the body cavity. This type of coelom is known as **false coelom** and animals possessing it are called **pseudocoelomates**, for example, nematodes.

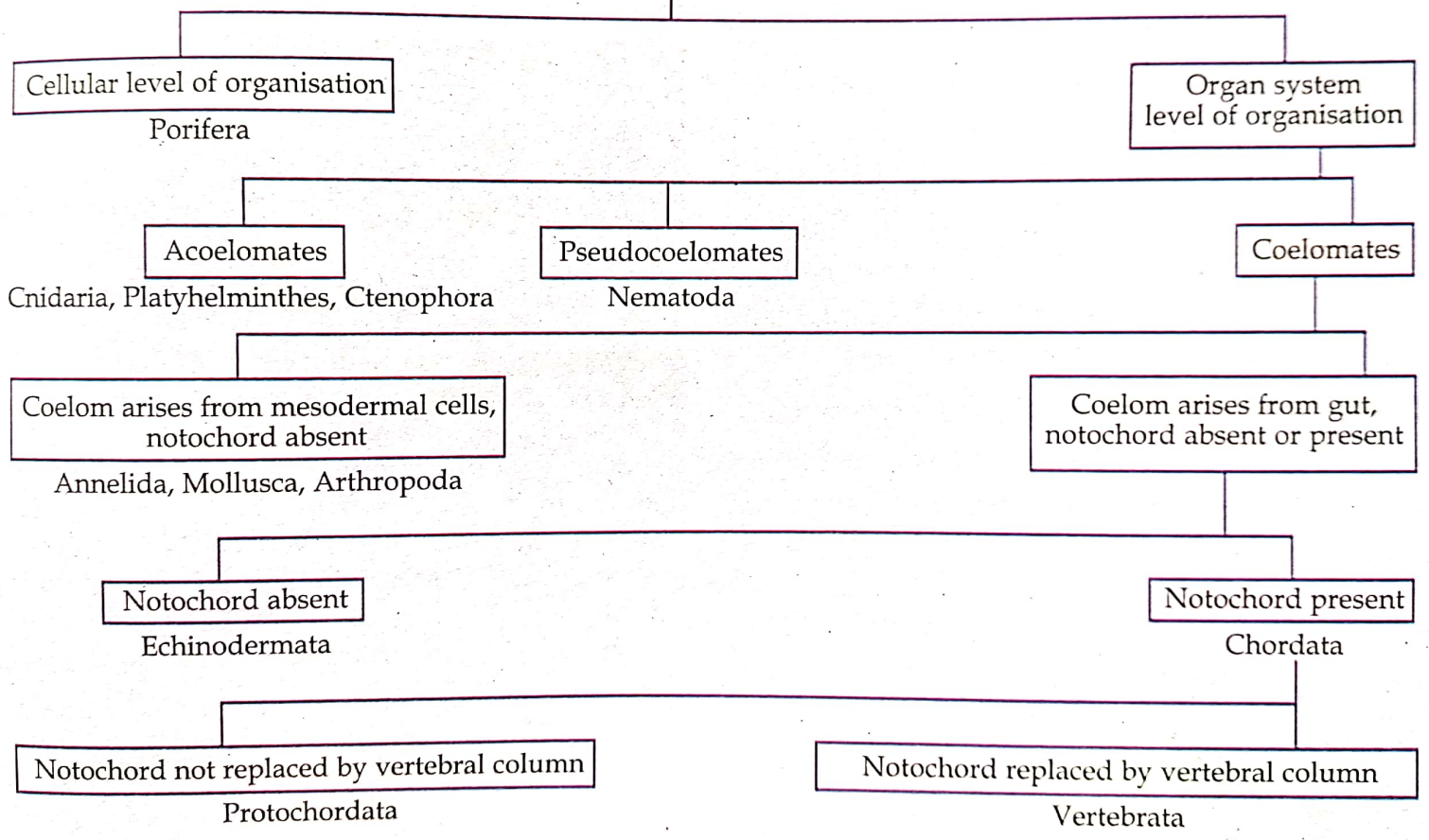
Acoelomates

These organisms do not have any body cavity as the space between the body wall and gut wall is *filled with parenchyma/mesenchyme*. Acoelomates include cnidarians, sponges, ctenophorans and platyhelminthes.

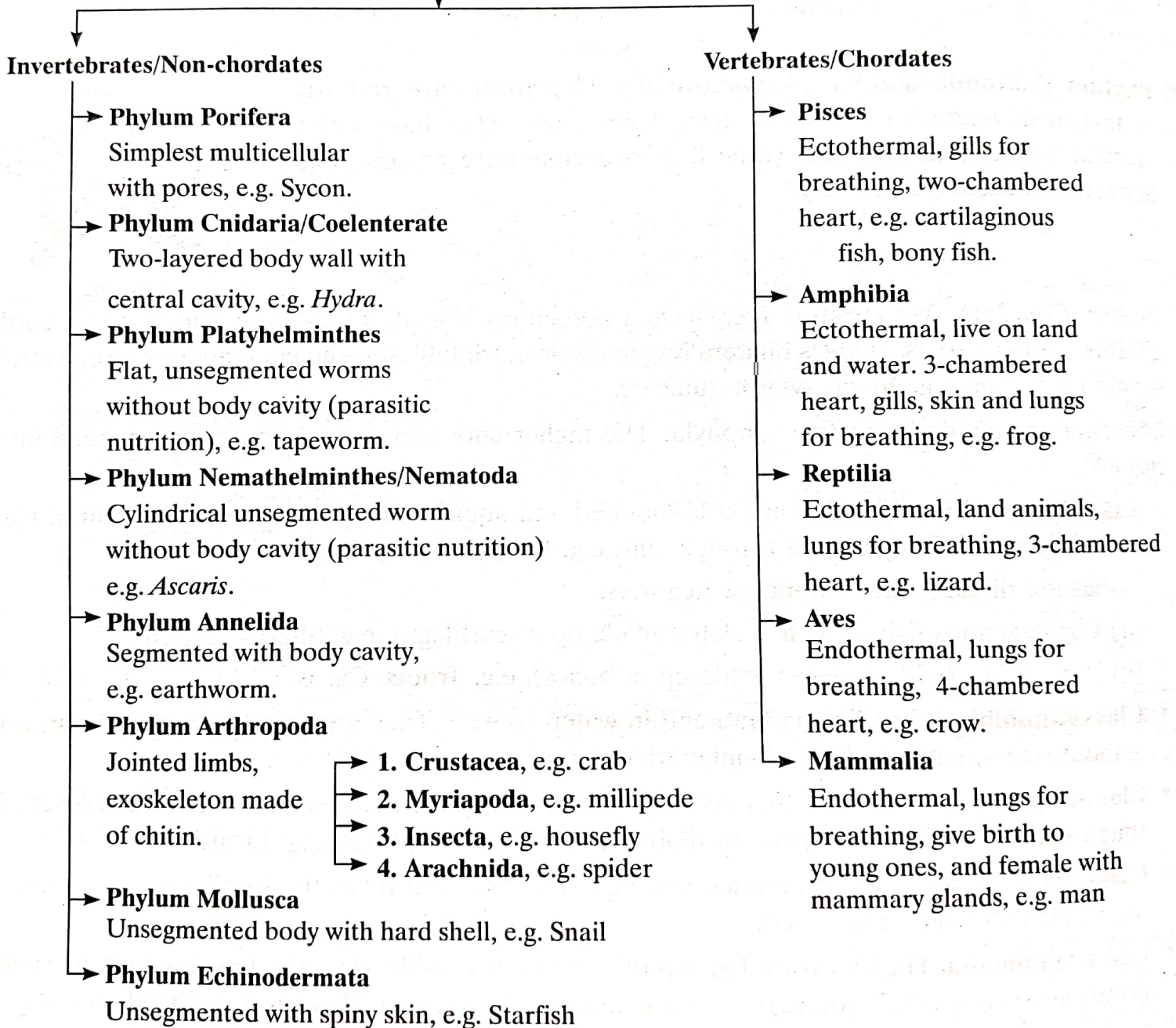
Vertebrata or Craniata

The subphylum vertebrata is also called **Craniata**. This name has been assigned to it because of the presence of a **cranium** or **skull** in all the animals present in the phylum. Cranium is a skeletal structure which houses the brain and its various parts.

Animal Kingdom



Animal Kingdom



<i>Characteristic Features</i>	<i>Chordata</i>	<i>Non-Chordata</i>
Notochord	Present at some stage and may get replaced by the vertebral column.	Absent.
Nerve cord	Single, dorsal.	Double, ventral.
Heart	Ventrally placed.	Dorsal, lateral or may be absent.
Pharyngeal gill slits	Present at some stage of life.	Absent.
Gut position	Ventral to the nerve cord.	Dorsal to the nerve cord.
Post-anal tail	Present at some stage.	Absent.
Germ layers	Three.	None; may be two or three.
Level of organisation	Organ system.	Protoplasmic to organ system.
Coelom	True coelom.	Absent, if present, may be false or true coelom.

Types of Fishes

Cartilaginous Fishes (Class Chondrichthyes)

- Skeleton is made entirely of cartilages.
- Gills are directly exposed to water.

Examples: Scoliodon, sharks and rays.

Bony Fishes (Class Osteichthyes)

- Skeleton is made of bones and cartilages.
- Gills are covered by gill covers.

Examples: Carps, trouts and sea horse.

1. Give **three** characteristic features of chordates.
2. Distinguish between vertebrates and protochordates.
3. Why is subphylum vertebrata also called **Craniata**?
4. Write **any three** adaptive features which enable:
 - (a) fishes to live an aquatic life.
 - (b) reptiles to live on dry land.
 - (c) birds to fly in air successfully.
5. Name **two** classes which include warm-blooded animals.
6. What is the similarity between bryophytes and amphibians?
7. Name the class to which the following animals belong:
Cobra, Scoliodon, Corvus, Echidna, Bufo, Emu, Trout, Whale, Columba, Kiwi.
8. Name the organs of respiration present in the fishes, adult frog, mammals, birds, tadpole and crocodile.