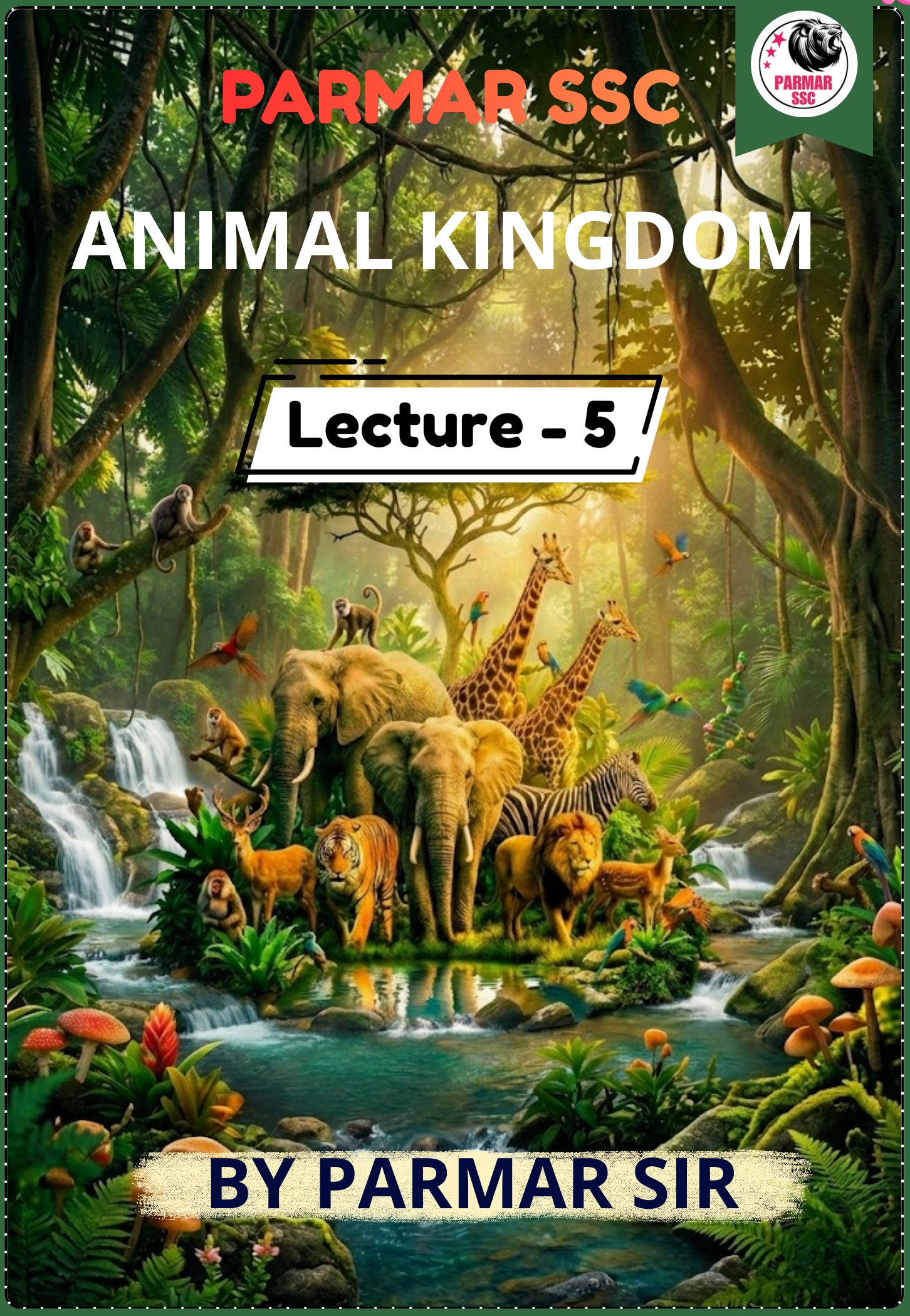
PARMAR SSC

ANIMAL KINGDOM

Lecture - 5

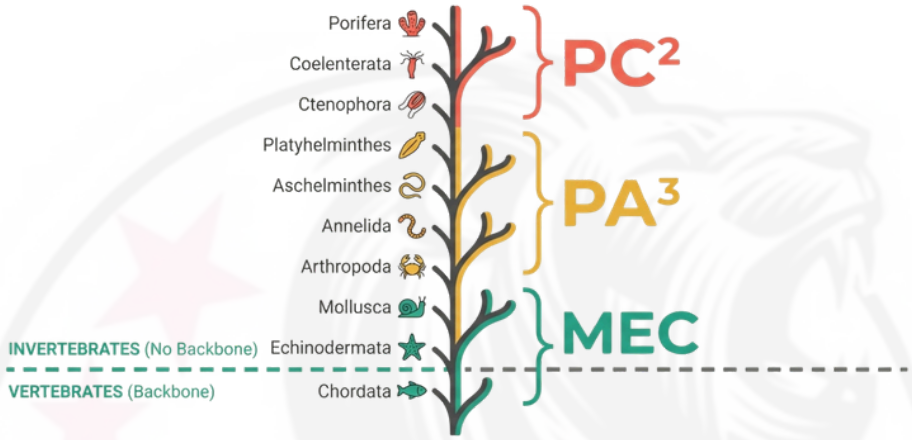


BY PARMAR SIR

Animal kingdom

Organisms classified as animals have these characteristics

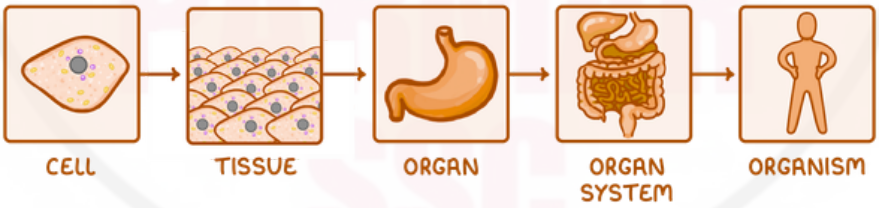
- They are eukaryotic and multicellular organisms.
- They are heterotrophic.
- Animal cells lack a rigid cell wall.
- Mobility: Most animals are capable of movement at some stage of their life cycle.
- Kingdom Animalia is classified into phylum on the basis of extent and type of body design differentiation found in them.



Basis of Classification

Body Level Organisation

- Body level organization refers to the hierarchical arrangement of structures within a living organism, from the smallest units to the entire organism.
- It involves five main levels: cells, tissues, organs, organ systems, and the organism.

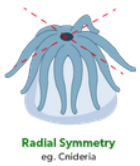


On the Basis of Symmetry



Asymmetrical

Asymmetry refers to the lack of symmetry in an organism's body plane.
E.g. Porifera.



Radial Symmetry

In radial symmetry, any plane passing through the central axis divides the organism into two equal halves.
E.g. Coelenterata, Echinodermata.

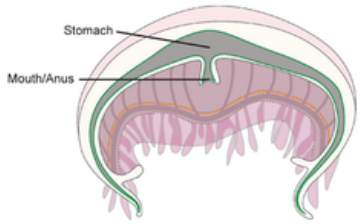


Bilateral symmetry

Bilateral symmetry is characterized by a single plane of symmetry that divides the organism into left and right halves.
E.g. Rest all

On the Basis of Digestive System

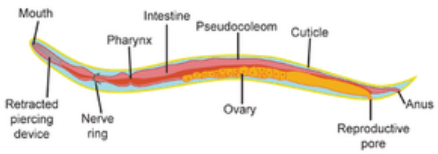
Incomplete Digestive System



Incomplete Digestive System (Jellyfish)

- Single Opening
- Behave as both Mouth & Anus
- Porifera - Intracellular digestion
- Coelenterata
- Ctenophora
- Platyhelminthes

Complete Digestive System



Complete Digestive System (Roundworm)

- Tube in Tube
- Aschelminthes
- Annelida
- Arthropoda
- Mollusca
- Echinodermata
- Chordata

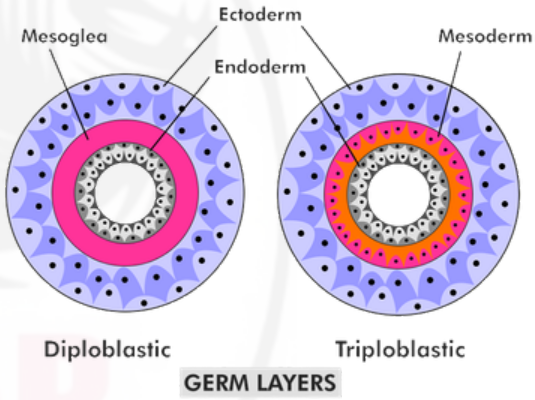
On the Basis of Germ Layers

Diploblastic

- Animals with only two germ layers:
- Ectoderm (outermost germ layer) and Endoderm (innermost germ layer).

Triploblastic

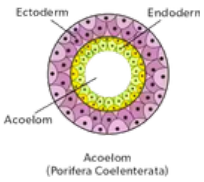
- Animals with three germ layers: Ectoderm, Mesoderm (middle germ layer), Endoderm.



Note: Porifera, Coelenterate and Ctenophora are Diploblastic and rest all are Triploblastic.

On the Basis of Coelom

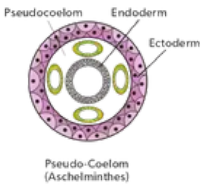
- **Coelom**: It is the fluid-filled body cavity present between the body wall, and the gut wall.
- Coelom has a mesodermal lining.



Acoelom
(Porifera Coelenterata)

Acoelomate

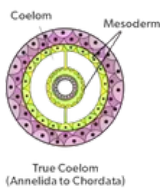
- No coelom.
- E.g. Porifera, Coelenterate, Ctenophora, Platyhelminthes.



Pseudo-Coelom
(Aschelminthes)

Pseudocoelomate

- False coelom.
- E.g. Nematoda.



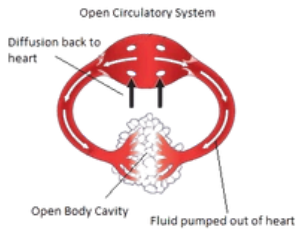
True Coelom
(Annelida to Chordata)

Eucoelomate

- True coelom.
- E.g. Annelida, Aschelminthes, Mollusca, Echinodermata, Chordata.

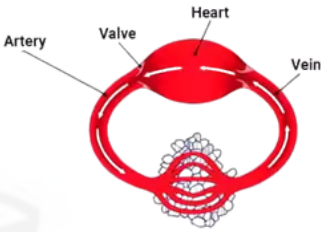
On the Basis of Circulatory System

Open Circulatory System



- It is a system where there is no vessel to contain the blood and it flows freely through the cavities of the body.
- E.g. Arthropoda, Mollusca.

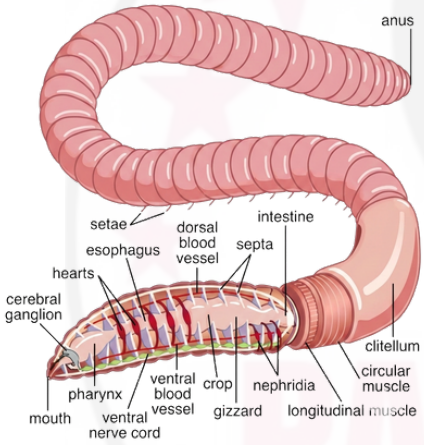
Closed Circulatory System



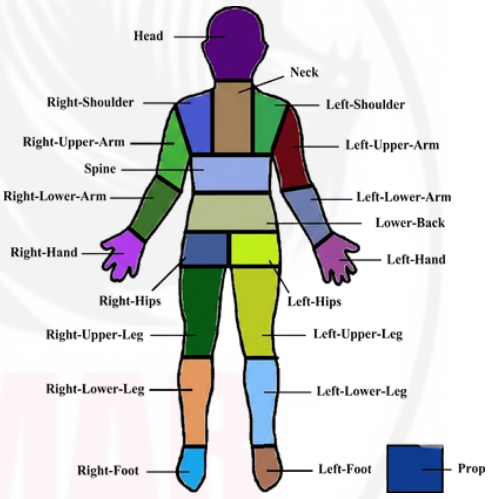
- It is a system where the blood is always contained within vessels in the heart while circulating.
- E.g. Annelida, Chordata, Cephalopod mollusca.

On the Basis of Segmentation

- Annelida, Arthropoda

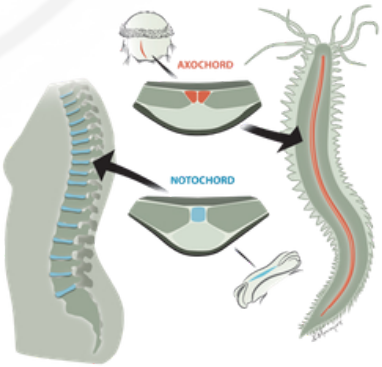


- Chordata



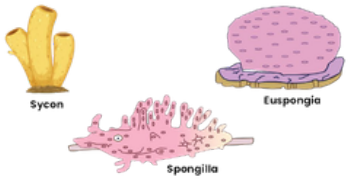
Notochord

- The notochord is a rod-like structure made of a cartilaginous substance that develops in all chordates at early embryonic stages as a rudimentary backbone.
- It is derived from mesoderm.
- It is present in the dorsal side (upper side or back side of an animal). E.g. Chordata.

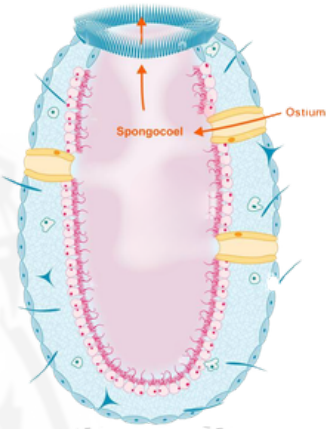


Phylum

1. Porifera



- **Habitat**: Mostly aquatic, marine, and a few freshwater species (E.g. Spongilla).
- **Body symmetry**: Asymmetrical.
- **Body structure**: Body is perforated with many tiny holes or pores (Ostium: Water canal system).
- Pores lead to a large central cavity called the Spongocoel. They have specialized "collar cells".
- **Level of organization**: Cellular level organization (no true tissues or organs).
- **Germ layer**: Diploblastic (endoderm and ectoderm).
- **Movement**: Non-motile.
- Endoskeleton is present.
- They are hermaphrodites (possess both male and female reproductive systems).
- Other E.g. Euplectella (glass sponge), Scyon, Euspongia (bathing sponge).

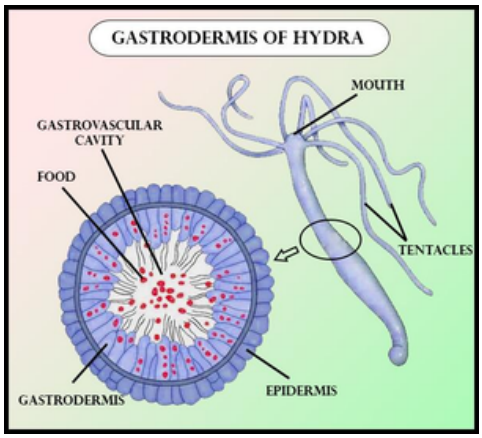


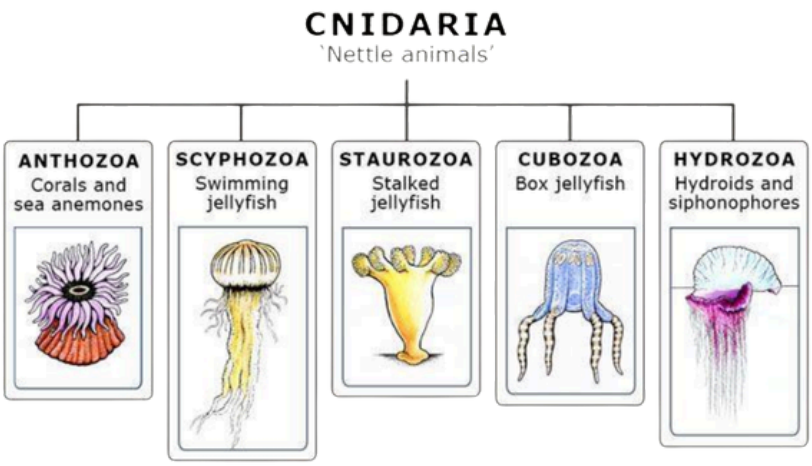
2. Coelenterata/Cnidaria



- **Habitat**: Aquatic, mostly marine, a few freshwater species (E.g. Hydra).
- **Symmetry**: Radial symmetry.
- **Level of organization**: Tissue level organization.
- **Germ layers**: Diploblastic.
- **Body structure**: Sac-like body with a central gastrovascular cavity (E.g. Coral, Hydra) having only one opening (hypostome) that serves as both mouth and anus.
- Tentacles surround the mouth, used for capturing food.
- **Special cells**: Stinging cells called Cnidoblast contain a stinging capsule known as Nematocyst.
- Hard skeleton is developed outside the body called Exoskeleton (made of calcium carbonate). E.g. Jellyfish, Aurelia.

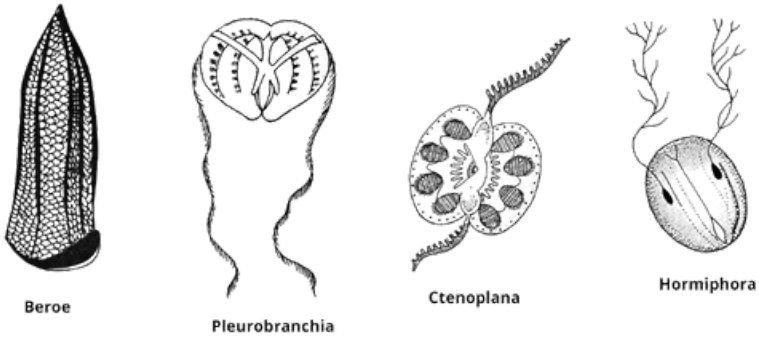






3. Ctenophora

- **Habitat**: Exclusively marine.
- They exhibit bioluminescence.
- **Body symmetry**: Radial symmetry.
- Known as Sea Walnuts and Comb Jellies.
- **Reproduction**: Sexual reproduction.
- They are hermaphrodites.
- **E.g.** Pleurobrachia and Ctenoplana



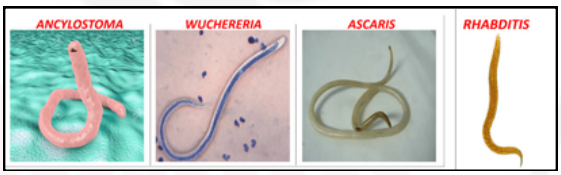
4. Platyhelminthes

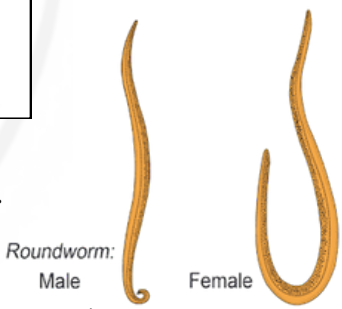
- **Body shape:** Body is dorsoventrally flattened like a ribbon (flat from top to bottom).
- Suckers and hooks are present in few.
- **Habitat and nature**: Free living or parasitic and terrestrial.
- **E.g.** Planaria (free-living), Liverfluke (parasitic), Tapeworm.
- **Symmetry**: Bilateral symmetry.
- **Germ layers**: Triploblastic.
- **Level of organization**: Organ level of organization.
- **Coelom**: Acoelomate.
- **Digestive system**: Incomplete (common opening for mouth and anus). Anus is absent.
- **Excretory system**: Excretion and osmoregulation through specialized cells called flame cells.
- They are hermaphrodites.



5. Aschelminthes/Nematodes

- **Body shape:** Cylindrical, elongated, unsegmented body, tapered at both ends (spindle-shaped).
- **Symmetry**: Bilateral symmetry
- **Germ layers**: Triploblastic
- **Level of organization**: Organ level
- **Coelom:** Pseudocoelomate.
- **Habitat:** Mostly parasitic, some free living in soil or water.
- **Digestive system**: Alimentary canal is complete (mouth and anus present).
- **Sexual Dimorphism**: Males and females look different. Mostly unisexual.
- **Excretory system**: Renette cells are present.
- **E.g.** Ascaris (roundworm), Wuchereria (filarial worm), Ancyclostoma (hookworm).





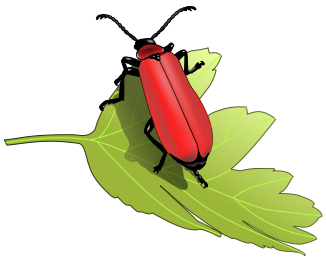
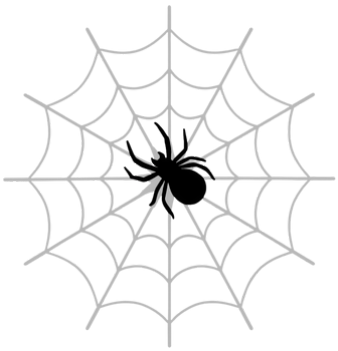
6. Annelida

- **Body**: Dorsoventrally flattened, cylindrical, segmentation present.
- **Symmetry**: Bilateral;
- **Germ layers**: Triploblastic;
- **Coelom**: Eucoelomate;
- **Level of organization**: Organ system level.
- **Digestive System**: Alimentary canal is tube-like from mouth to anus.
- **Circulatory system:** Closed.
- **Locomotion**: Through organs like parapodia (Nereis).
- **Excretory system**: Nephridia present for osmoregulation and excretion.
- E.g. Earthworms, Leech, Nereis, Hirudinaria.



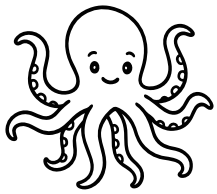
7. Arthopoda

- Largest phylum in Animal Kingdom; Insecta is the largest class.
- **Body**: Segmented into head, thorax, and abdomen; jointed appendages (legs).
- **Exoskeleton**: Made of chitin.
- **Symmetry**: Bilateral;
- **Coelom**: True, filled with blood;
- **Germ layer**: Triploblastic.
- **Circulatory System**: Open.
- **Respiration**: Gills, trachea, or book lungs.
- **Excretion**: Malpighian tubules.
- **E.g.** Spider, scorpio, crab, silver fish, cray fish.


8. Mollusca

- Second largest phylum.
- **Body:** Soft, little segmentation; divided into head, foot, and mantle.
- **Covering:** Calcareous shell (most).
- **Circulatory System:** Mostly open; closed in octopus and squid.
- **Excretory system:** Kidney-like organs (nephridia).
- **Blue blood:** Due to Haemocyanin.
- **E.g.** Octopus (Devil fish), snails (pila), oysters, squid.

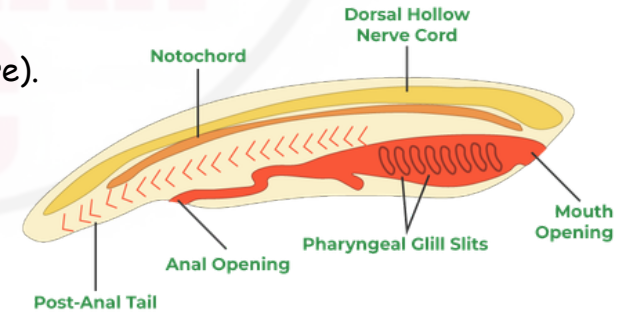



9. Echinodermata

- **Body**: Star-shaped, spherical, elongated; spiny-skinned, no segmentation.
- **Symmetry**: Radial;
- **Coelom**: Eucoelomate;
- **Germ layer:** Triploblastic.
- **E.g.** Sea urchins, starfish, Holothuria, sea cucumber.

10. Chordata

- They have a notochord (rod-like supportive structure).
- They have pharyngeal gill slits in pharynx
- Heart is ventral.
- Circulatory system: Closed circulatory system.
- Coelom: Eucoelomate.
- Symmetry: Bilateral
- Germ layer: Triploblastic
- Level of organization: Organ level of organization.
- Phylum Chordata is divided into two major groups: Protochordata and Vertebrata.





Remember. Hemichordata is not a sub-phylum under Chordata.
It consists of small group of worm like animals.
Protochordata have notochord, but never form a vertebral column.

Sub-Phylum: Protochordata

- They do not have proper notochord (present only in larval stage or not well developed).
- No vertebral column, post anal tail present.
- Bilateral, triploblastic, coelomate.
- Nerve cord is present.
- Germ layer: Triploblastic.
- Pharyngeal gill slits present.
- Protochordata have notochord, but never form a verbal column.

CLASSES OF VERTEBRATES

Cyclostomata

- They are jawless vertebrates.
- They have elongated eel-like body, circular mouth, and slimy skin.
- E.g. Petromyzon/Myxine, hog fishes, lamprey.

Pisces

- They are fishes.
- They are Cold blooded.
- E.g Dog fish, shark, tuna, sea horse, etc.
- Pisces have two-chambered heart.

Amphibians

- They use mucous glands or gills for respiration.
- They have three-chambered heart.
- They are cold blooded animals.
- They breathe through lungs or gills (in water) and skin (in land).
- E.g. Frogs, toads, salamander.

Reptiles

- They have three-chambered heart (exception: Crocodile (has four-chambered heart).
- They are cold blooded animals.
- They breathe through their lungs.
- E.g. Snake, turtle, lizard, crocodile, chameleon.

Tortoise:
- Habitat – Land
- Diet – Herbivorous

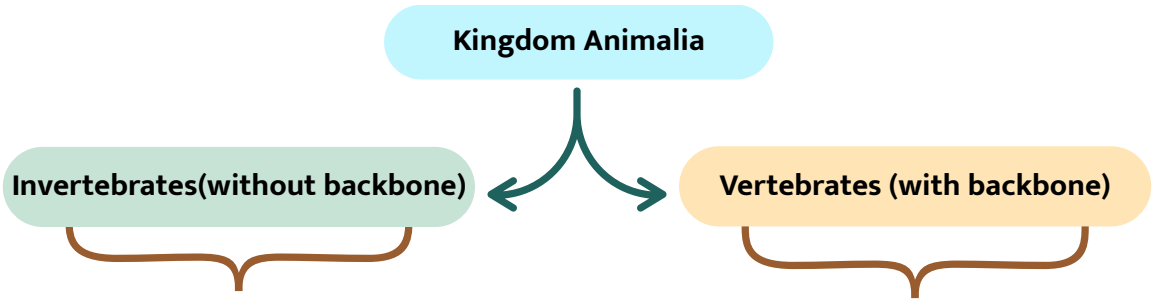
Turtle:
- Habitat – Both land & water)
- Diet – Omnivorous

Aves (Birds)

- They have four-chambered heart.
- They are warm blooded.
- They lay eggs (oviparous).

Mammals

- They have four-chambered heart.
- They are warm blooded.
- They have mammary glands (viviparous).
- Exception: Platypus and echidnas (lay eggs).
- E.g. Dolphin, whale, humans.



- Porifera
- Cnidaria
- Platyhelminthes
- Aschelminthes
- Annelida
- Arthropoda
- Mollusca
- Echinodermata.

- Fish
- Reptiles
- Birds
- Mammals
- Amphibians.



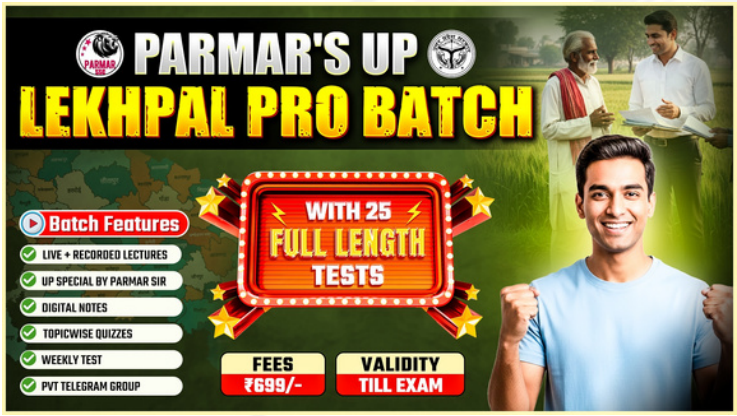


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