



ChapterNotes

chapternotes.in · free NEET & JEE prep

CHAPTER NOTES

Animal Kingdom Class 11 Notes | CBSE Biology Chapter 4

- ✓ Chapter-wise notes & important questions
- ✓ Free gamified practice app — streaks, levels, revision
- ✓ Free mock & prediction papers with answer keys

Source: [https://chapternotes.in/cbse/class-11-biology/animal-kingdom-class-11-](https://chapternotes.in/cbse/class-11-biology/animal-kingdom-class-11-notes/)
notes/



Scan to practice this
chapter free in the app

Animal Kingdom Class 11 Notes | CBSE Biology

Chapter 4

Animal Kingdom is Chapter 4 of CBSE Class 11 Biology — and for a NEET aspirant it is pure gold. This is one of the most fact-dense, scoring chapters in the entire syllabus, where every phylum brings its own set of “examples to remember” that examiners love to test directly. Get the classification logic right once, and dozens of one-mark facts fall neatly into place.

By the end of these notes you will be able to state the basis of classification (symmetry, germ layers, coelom, segmentation, notochord), place any animal into its correct phylum from a single distinguishing feature, and rattle off the standard examples for each group. This is a high-yield chapter for NEET (3–4 questions typical) and carries solid weightage in your CBSE boards too.

Table of Contents

- Key Concepts — Basis of classification, symmetry, coelom, and every animal phylum
 - Weightage in Board & Entrance Exams
 - Important Definitions
 - Solved Examples
 - Important Questions for Board Exams
 - Quick Revision Points
-

Key Concepts

1. Basis of Classification

Animals are extremely diverse, but they share a few fundamental features that let us group them. Even before we name a single phylum, we sort animals by their **body organisation, symmetry, germ layers, body cavity (coelom), segmentation, and presence of a notochord**.

These criteria are the real backbone of this chapter — examiners test the *criterion* far more than the animal name itself.

Levels of Organisation

- **Cellular level:** cells are loosely arranged, no tissues (e.g., sponges — Porifera).
- **Tissue level:** cells performing the same function are grouped into tissues (e.g., Coelenterata).
- **Organ level:** tissues group into organs, each with a specific function (e.g., Platyhelminthes).
- **Organ-system level:** organs work together as systems (e.g., Annelida onward to Chordata).

2. Symmetry

Symmetry describes how the body can be divided into equal halves. It is one of the first things you check when classifying an animal.

- **Asymmetrical:** cannot be divided into two equal halves by any plane (e.g., sponges).
- **Radial symmetry:** any plane through the central axis gives two equal halves (e.g., Coelenterata, Ctenophora, adult Echinodermata).
- **Bilateral symmetry:** only one plane divides the body into identical left and right halves (e.g., Annelida, Arthropoda, Chordata).

Note: Echinoderms are bilaterally symmetrical as larvae but radially symmetrical as adults — a classic NEET trap.

3. Diploblastic and Triploblastic Organisation

This refers to the number of **germ layers** in the embryo from which adult tissues develop.

- **Diploblastic:** two germ layers — ectoderm and endoderm — with a jelly-like **mesoglea** in between (e.g., Coelenterata, Ctenophora).
- **Triploblastic:** three germ layers — ectoderm, mesoderm, and endoderm (e.g., Platyhelminthes to Chordata).

4. Coelom (Body Cavity)

A **coelom** is a fluid-filled cavity lined by mesoderm. Its presence and origin is a major classification criterion.

Type	Description	Examples
Coelomate	True coelom, lined entirely by mesoderm	Annelida, Arthropoda, Mollusca, Echinodermata, Chordata
Pseudocoelomate	Body cavity not lined by mesoderm (mesoderm in scattered pouches)	Aschelminthes (roundworms)
Acoelomate	No body cavity at all	Platyhelminthes (flatworms)

5. Segmentation and Notochord

Segmentation (metamerism): the body is divided into serially repeated segments, both externally and internally (e.g., the body of an earthworm). True metameric segmentation first appears in Annelida.

Notochord: a flexible rod-like structure formed on the dorsal side during embryonic development. Animals *with* a notochord are **chordates**; those without it are **non-chordates**.

6. Phylum Porifera

- Commonly called **sponges**; mostly marine, asymmetrical, cellular level of organisation.

- Have a **water canal system** — water enters through **ostia** into the central **spongocoel** and leaves through the **osculum**.
 - **Choanocytes (collar cells)** line the canals and help in food capture; body supported by spicules or spongin fibres.
 - Reproduction: asexual by budding, sexual by gametes; **hermaphrodite**; indirect development with a larval stage.
 - **Examples:** *Sycon* (*Scypha*), *Spongilla* (freshwater), *Euspongia* (bath sponge).
-

7. Phylum Coelenterata (Cnidaria)

- Aquatic, mostly marine; radially symmetrical, **diploblastic**, tissue level of organisation.
 - Characterised by **cnidoblasts (nematocysts)** on tentacles — used for defence, anchorage, and capturing prey.
 - Have a central **gastrovascular cavity** with a single opening (hypostome).
 - Exhibit two body forms — **polyp** (sessile, e.g., *Hydra*) and **medusa** (free-swimming, e.g., jellyfish); alternation of these forms is called **metagenesis**.
 - **Examples:** *Hydra*, *Adamsia* (sea anemone), *Physalia* (Portuguese man-of-war), *Pennatula* (sea-pen), *Aurelia* (jellyfish), *Meandrina* (brain coral).
-

8. Phylum Ctenophora

- Exclusively marine; commonly called **sea walnuts** or **comb jellies**.
 - Radially symmetrical, **diploblastic**, tissue level of organisation.
 - Body bears eight external rows of **ciliated comb plates** that help in locomotion.
 - Show **bioluminescence** (the ability to emit light). Digestion is both extracellular and intracellular.
 - **Examples:** *Pleurobrachia*, *Ctenoplana*.
-

9. Phylum Platyhelminthes

- Commonly called **flatworms**; dorsoventrally flattened body; bilaterally symmetrical, **triploblastic**, organ level, and **acoelomate**.
 - Mostly **endoparasites** of animals including humans.
 - Excretion and osmoregulation by special **flame cells**.
 - Hermaphrodite; show high power of **regeneration** (e.g., *Planaria*).
 - **Examples:** *Taenia* (tapeworm), *Fasciola* (liver fluke), *Planaria*.
-

10. Phylum Aschelminthes (Nematoda)

- Commonly called **roundworms**; bilaterally symmetrical, **triploblastic**, organ-system level, and **pseudocoelomate**.
- Body circular in cross-section (hence “round” worms); may be free-living, aquatic, or parasitic in plants and animals.
- Alimentary canal complete with a well-developed muscular pharynx.

- **Sexes are separate (dioecious)** — females are longer than males; often shows sexual dimorphism.
 - **Examples:** *Ascaris* (roundworm), *Wuchereria* (filaria worm), *Ancylostoma* (hookworm).
-

11. Phylum Annelida

- Aquatic or terrestrial; bilaterally symmetrical, **triploblastic**, organ-system level, **coelomate**.
 - First phylum to show true **metameric segmentation** — body divided into ring-like segments (metameres).
 - Closed circulatory system; **nephridia** for excretion and osmoregulation.
 - Locomotion by **setae (chaetae)** in earthworms, parapodia in *Nereis*.
 - **Examples:** *Pheretima* (earthworm), *Hirudinaria* (blood-sucking leech), *Nereis* (aquatic).
-

12. Phylum Arthropoda

- The **largest phylum** of the animal kingdom — about two-thirds of all known animal species.
 - Bilaterally symmetrical, **triploblastic**, segmented, coelomate; body has a **chitinous exoskeleton** and jointed appendages ("arthros" = jointed, "podos" = feet).
 - Body divided into head, thorax, and abdomen; respiration by gills, book gills, book lungs, or tracheal system.
 - **Open circulatory system**; excretion by **Malpighian tubules**; sensory organs include antennae and compound eyes.
 - **Examples:** economically important — *Apis* (honey bee), *Bombyx* (silkworm), *Laccifer* (lac insect); vectors — *Anopheles*, *Culex*, *Aedes* (mosquitoes); living fossil — *Limulus* (king crab).
-

13. Phylum Mollusca

- **Second largest phylum**; mostly marine; bilaterally symmetrical, triploblastic, coelomate.
 - Soft body usually covered by a calcareous **shell** and a soft **mantle**; body has a distinct head, muscular foot, and visceral hump.
 - A file-like rasping organ, the **radula**, is present in the mouth for feeding.
 - Respiration and excretion by feather-like gills (**ctenidia**); usually dioecious with indirect development.
 - **Examples:** *Pila* (apple snail), *Pinctada* (pearl oyster), *Sepia* (cuttlefish), *Loligo* (squid), *Octopus*, *Aplysia* (sea hare), *Dentalium* (tusk shell), *Chaetopleura* (chiton).
-

14. Phylum Echinodermata

- Exclusively marine; adults **radially symmetrical** but larvae bilaterally symmetrical; triploblastic, coelomate.
- Characterised by a unique **water vascular system** used for locomotion, capture and transport of food, and respiration; ends in **tube feet**.
- Endoskeleton of calcareous ossicles (hence the spiny-skinned name); high power of regeneration.
- Sexes separate; development indirect; digestive system complete.

- **Examples:** *Asterias* (starfish), *Echinus* (sea urchin), *Antedon* (sea lily), *Cucumaria* (sea cucumber), *Ophiura* (brittle star).
-

15. Phylum Hemichordata

- A small group of **worm-like marine** animals; bilaterally symmetrical, triploblastic, coelomate.
 - Earlier placed as a sub-phylum of Chordata; now a **separate phylum** under non-chordates because it has only a rudimentary **stomochord** (buccal diverticulum), not a true notochord.
 - Body has three parts — proboscis, collar, and trunk; respiration through gill slits; open circulatory system.
 - **Examples:** *Balanoglossus*, *Saccoglossus*.
-

16. Phylum Chordata

Chordates are defined by **four fundamental features** present at some stage of life: a **notochord**, a **dorsal hollow nerve cord**, **paired pharyngeal gill slits**, and a **post-anal tail**. They also have a ventral heart and a closed circulatory system.

Subphylum Urochordata (Tunicata)

Notochord is present **only in the larval tail** and disappears in the adult. Marine. **Examples:** *Ascidia*, *Salpa*, *Doliolum*.

Subphylum Cephalochordata

Notochord extends from head to tail and **persists throughout life**. **Example:** *Branchiostoma* (Amphioxus or lancelet).

Subphylum Vertebrata

The notochord is replaced during development by a **bony or cartilaginous vertebral column** (backbone). Thus *all vertebrates are chordates, but all chordates are not vertebrates*. Vertebrates have a ventral muscular heart with 2–4 chambers, kidneys, and paired appendages.

Vertebrata is further divided into two divisions — **Agnatha** (jawless, e.g., *Petromyzon*, *Myxine*) and **Gnathostomata** (jawed), which includes the following classes:

Class	Key Features	Examples
Chondrichthyes	Cartilaginous fishes; marine; ventral mouth; placoid scales; air bladder absent	<i>Scoliodon</i> (dogfish), <i>Pristis</i> (saw fish), <i>Trygon</i> (sting ray)
Osteichthyes	Bony fishes; air bladder present; terminal mouth; cycloid/ctenoid scales	<i>Labeo</i> (rohu), <i>Hippocampus</i> (sea horse), <i>Catla</i> , <i>Clarias</i>
Amphibia	Two habitats; moist skin; three-chambered heart; cold-blooded	<i>Rana</i> (frog), <i>Bufo</i> (toad), <i>Salamandra</i> , <i>Ichthyophis</i>
Reptilia	Dry cornified skin with scales; three-chambered heart (four in crocodiles); cold-blooded	<i>Chelone</i> (turtle), <i>Naja</i> (cobra), <i>Chameleon</i> , <i>Crocodilus</i>
Aves	Birds; body covered with feathers; forelimbs as wings; bones pneumatic; four-chambered heart; warm-blooded	<i>Corvus</i> (crow), <i>Columba</i> (pigeon), <i>Pavo</i> (peacock), <i>Psittacula</i> (parrot)
Mammalia	Presence of mammary glands; body has hair; external ears (pinnae); four-chambered heart; warm-blooded; mostly viviparous	<i>Ornithorhynchus</i> (egg-laying platypus), <i>Macropus</i> (kangaroo), <i>Homo sapiens</i> (man)

[DIAGRAM: A flowchart of the animal kingdom branching from "Levels of organisation → Symmetry → Diploblastic/Triploblastic → Coelom → Notochord present/absent" down to the named phyla.]

Weightage in Board & Entrance Exams

Exam	Typical Weightage	Most-Tested Areas
CBSE Board (Class 11)	4–5 marks (Diversity unit)	Basis of classification, distinguishing features, examples
NEET	3–4 questions	Phylum-example matching, coelom types, chordate features, class characters
State CETs / Boards	3–5 marks	Symmetry, germ layers, diagnostic features of each phylum

[TABLE: Question-type split — VSA (1 mark): definitions & one example per phylum; SA (2–3 marks): comparison of two phyla, classification criteria; LA (5 marks): salient features of a phylum / classes of vertebrata with examples.]

Important Definitions

Term	Definition
Symmetry	The arrangement of body parts about an axis or plane; may be radial or bilateral
Diploblastic	Body derived from two germ layers — ectoderm and endoderm, with mesoglea between them
Triploblastic	Body derived from three germ layers — ectoderm, mesoderm, and endoderm
Coelom	A true body cavity lined on all sides by mesoderm
Pseudocoelom	A body cavity that is not lined by mesoderm (e.g., Aschelminthes)
Metameric segmentation	Serial repetition of body segments, externally and internally (first true in Annelida)
Notochord	A flexible dorsal rod formed during embryonic development; defines chordates
Metagenesis	Alternation between polyp and medusa forms in Coelenterata
Water vascular system	A unique system of canals and tube feet in echinoderms for locomotion and feeding
Choanocytes	Collar cells lining the canals of sponges that drive water flow and capture food

Solved Examples

Example 1

An animal is radially symmetrical, diploblastic, and possesses cnidoblasts. Identify its phylum and give one example.

Answer: Cnidoblasts (stinging cells) are the defining feature of **Phylum Coelenterata (Cnidaria)**. Example: *Hydra*.

Example 2

Why is Echinodermata considered both radially and bilaterally symmetrical?

Answer: Adult echinoderms are **radially symmetrical**, but their **larvae are bilaterally symmetrical**. This shows their bilateral ancestry, making it a favourite NEET point.

Example 3

Name the excretory structures in Platyhelminthes, Annelida, and Arthropoda respectively.

Answer: Platyhelminthes — **flame cells**; Annelida — **nephridia**; Arthropoda — **Malpighian tubules**.

Example 4

Distinguish between a coelomate, a pseudocoelomate, and an acoelomate with one example each.

Answer: Coelomate — true mesoderm-lined cavity (Annelida); pseudocoelomate — cavity not lined by mesoderm (Aschelminthes/*Ascaris*); acoelomate — no cavity (Platyhelminthes/*Planaria*).

Example 5

List the four fundamental characters that define Phylum Chordata.

Answer: (1) Notochord, (2) dorsal hollow nerve cord, (3) paired pharyngeal gill slits, and (4) a post-anal tail — present at some stage of life.

Example 6

In which subphylum does the notochord persist throughout life, and what is the example?

Answer: In **Cephalochordata**, the notochord extends head-to-tail and persists for life. Example: *Branchiostoma* (Amphioxus). In Urochordata it is restricted to the larval tail only.

Important Questions for Board Exams

1-Mark Questions (VSA)

1. Which is the largest phylum in the animal kingdom?
2. Name the cells in sponges that help in capturing food.
3. What is metameric segmentation? In which phylum does it first appear?
4. Give one example each of a diploblastic and a triploblastic animal.
5. Why are all vertebrates chordates but all chordates not vertebrates?

2–3-Mark Questions (SA)

1. Differentiate between Coelenterata and Ctenophora with examples.
2. Explain the water vascular system of echinoderms and state its functions.
3. Compare coelomate, pseudocoelomate, and acoelomate animals with one example each.
4. Write the distinguishing features of Phylum Arthropoda that make it the most successful group.

5-Mark Questions (LA)

1. Describe the basis of classification of animals (levels of organisation, symmetry, germ layers, coelom, segmentation, notochord).

2. Write the salient features of Phylum Chordata and describe its three subphyla with examples.
 3. Classify Vertebrata into its main classes and write two distinguishing features with an example for each.
-

Quick Revision Points

- Classification bases: organisation level, symmetry, germ layers, coelom, segmentation, notochord
 - Porifera = sponges; choanocytes, ostia–spongocoel–osculum; *Sycon*, *Spongilla*
 - Coelenterata = cnidoblasts, diploblastic, metagenesis; *Hydra*, *Aurelia*
 - Ctenophora = comb plates, bioluminescence; *Pleurobrachia*
 - Platyhelminthes = flatworms, acoelomate, flame cells; *Taenia*, *Planaria*
 - Aschelminthes = roundworms, pseudocoelomate, dioecious; *Ascaris*, *Wuchereria*
 - Annelida = first true segmentation, nephridia; *Pheretima*, *Hirudinaria*
 - Arthropoda = largest phylum, jointed legs, Malpighian tubules; *Apis*, *Anopheles*
 - Mollusca = second largest, radula, mantle; *Pila*, *Sepia*, *Octopus*
 - Echinodermata = water vascular system, tube feet, adult radial; *Asterias*
 - Hemichordata = stomochord (not true notochord); *Balanoglossus*
 - Chordata = notochord + dorsal hollow nerve cord + gill slits + post-anal tail; Uro/Cephalo/Vertebrata
-

Next Chapter: Chapter 5 — Morphology of Flowering Plants



Got this PDF from a friend?

Everything here is free at **chapternotes.in** — 134 chapters of notes, a gamified practice app, and full NEET mock & prediction papers.



Scan to practice this chapter free in the app