

Revision Notes

Class 9 Science

Chapter 7 - Diversity in Living Organisms

1. What is the basis of classification?

- The form, structure, and manner of life of organisms differ. As a result, they should be classified together based on their similarities.
- The classification of closely related organisms aids in the study of their evolutionary links.
- The categorization of organisms into groups and sub-groups based on their properties is known as **classification**.
- A characteristic could be a **specific shape** or **function**.

2. Classification and Evolution:

- The majority of today's living forms are the result of a series of modifications in body design that enable the creature that possesses them to live better.
- There's a chance that design complexity may rise through time, and it's not unreasonable to suggest that older species are simpler and younger organisms are more complicated.

3. The hierarchy of classification groups:

- In the **Charles Darwin**'s book, **The Origin of Species**, published in 1859, he proposed evolution.
- Living species have been classified into kingdoms by scientists such as **Ernst Haeckel**, **Robert Whittaker**, and **Carl Woese**.
- The '**Five Kingdoms classification**' of living beings was proposed by **Robert Whittaker** in **1969**.
- **Kingdom** subgrouping into **Phylum for animals** and **Division for plants**, Class, Order, Family, Genus, and Species can be used to show the **hierarchy**.
- As a result, the **species** is the **fundamental unit of taxonomy**.
- All organisms that are similar to breed and produce fruitful offspring are classified as species.
- The sub-groups are further classified by naming them at various levels, as shown in the following system.

KINGDOM

Phylum (for Animals) / Division (for Plant)

Class

Order

Family

Genus

Species

3.1 Monera:

- **Prokaryotic cells** without a nucleus and membrane-bound cell organelles are included.
- Some have cell walls, whereas others don't. Some Monerans are **autotrophic**, whereas others are **heterotrophic** in nature.
- Kingdom Monera includes **bacteria, cyanobacteria, blue-green algae, and mycoplasma**, etc.

3.2 Protista:

- Algae, diatoms, and protozoans are all part of it.
- These are the simplest **eukaryotes**, being **unicellular** and capable of both **autotrophic** and **heterotrophic feeding**.
- Whip-like flagella and hair-like cilia or finger-like pseudopodia allow locomotion and movement.
- **Unicellular algae, diatoms, and protozoans** are examples.

3.3 Fungi:

- These **saprophytes** are **multicellular eukaryotic eukaryotes**.
- **Chitin** makes up the **cell wall of fungus**.
- They eat decaying and dead stuff.
- **Mushrooms, rhizopus, and mucor** are among them.
- Some fungus create a **symbiotic** relationship with **algal cells**.
- **Lichens** are the name given to these **symbionts**.

3.4 Plantae:

- All **non-motile, multicellular, and eukaryotic** creatures with **cellulose-based cell walls** are included in this category.
- These are sophisticated organisms capable of **photosynthesis**.
- Plants are made up of cells that have **thick cell walls**.

3.5 Animalia:

- It refers to all **animals** that are **motile, multicellular, eukaryotic** entities with no cell walls.
- It demonstrates a wide range of species.
- Members of this kingdom are **multi-tissue** creatures.

4. Plantae

4.1 Thallophyta:

- According to **Eichler**, **Cryptogamae** and **Phanerogamae** are two **sub-kingdoms** of the plant kingdom.
- **Cryptogamae** - Plants having hidden reproductive organs that do not bear flowers or seeds belong to this sub-kingdom.
- **Thallophyta, Bryophyta, and Pteridophyta** are the three subgroups of cryptogams.
- **Thallophyta** are the most basic of plants, with no discernible body structure.
- **Algae** are the popular name for the plants in this group.
- These are primarily **aquatic** in nature.
- **Spirogyra, Ulothrix, Cladospira, and Chara** are other examples.
- **Bryophyta** are known as the plant kingdom's **amphibians** because they require both **aquatic** and **terrestrial** conditions to complete their life cycle.
- Differentiation of the plant body to create stem and leaf-like structures is widespread.
- **Moss or Funaria** are the example.
- **Pteridophyta** are fern plants with a plant body that is divided into stems, leaves, and roots.
- Underneath the leaf, they have **naked embryos** in the form of **spores**.
- **Phanerogamae** :
 - Plants that produce seeds and have well-formed stems, leaves, and roots belong to this sub-kingdom.
 - **Gymnosperms** and **Angiosperms** are the two types of Phanerogams.
- **Gymnosperms**:
 - The first plants to have a seed habit were **Gymnosperms**.
 - These are plants that have **no seeds** and are **perennial, evergreen, and woody** in nature.
 - **Pinus, cycas, and deodar** are the examples.

- **Angiosperms:**

- **Flowers, fruits, and seeds** are all found in **angiosperms**, which are highly evolved plants bearing flowers, fruits, and seeds.
- **Flowering plants** are another name for them.
- The seeds of these plants are contained within the fruit of these plants.
- The seed sprouts and grows into a new plant.
- **Cotyledons** are structures found in plant embryos and seeds.
- **Seed leaves**, also known as **cotyledons**, indicate a **pre-designed plant in the seed**.
- Angiosperms are split into **two groups based on the number of cotyledons** they have: **monocots** and **dicots**.
- **Paphiopedilum** is a **monocot**, whereas **Ipomea** is a **dicot**.

5. Animalia:

- These are organisms which are **eukaryotic, multicellular** and **heterotrophic**.
- Their cells **do not have cell wall**.
- The majority of animals are **mobile**.
- Animals are classed based on characteristics such as **cellular or tissue-level body** organisation, body symmetry, coelom type, presence or absence of segmentation, and presence or absence of a backbone.
- Animalia is divided into two kingdoms: **Invertebrata** and **Vertebrata**.

5.1 Invertebrata:

- It refers to a group of animals **that lack a vertebral column**.
- Porifera, Coelenterata, Platyhelminthes, Nematoda, Annelida, Arthropoda, Mollusca, and Echinodermata are some of the phyla of invertebrates.

a) Porifera:

- Porifera are **multicellular** creatures with only **rudimentary tissue** organisation.
- They **do not have a neurological system**.
- These **aren't mobile** at all.
- All across the body, there are openings called **pores**.
- These creatures have a hard outer covering, or skeleton, that protects them from the elements.
- **Sponge** is a frequent name for them.
- Sycon, Spongilla, and Euplectella are all members of the Porifera family.

b) Coelenterata:

- Coelenterates are **water-dwelling, radially symmetrical** creatures.
- Some are isolated, while others are colonial.
- They have a more distinct body design.
- The body has a **hole** in it.
- Corals, Hydra, and sea anemones are the examples.

c) Platyhelminthes:

- Platyhelminthes can be **parasitic** or **free-living**.
- They are **triploblastic** and **bilaterally symmetrical** animals.
- There is some tissue **body cavity** or **coelom** present.
- Flatworms are what they're called.
- Planaria (free-living) and liverfluke (parasite) are the examples.

d) Nematoda:

- Nematoda are **parasitic worms** that are **bilaterally symmetrical** and **triploblastic**.
- The body is **spherical**.
- There is **pseudo coelom** present.
- Elephantiasis, for example, is a disease caused by them.

e) Anthropoda:

- Arthropoda animals have **true coelom** and are **bilaterally symmetrical, segmented, triploblastic** animals.
- **Insects** are among them.
- Their legs are joined.
- Blood does not pass through blood vessels since their **circulatory system** is **open**.
- For example, prawns, butterflies, and other insects.

f) Molluscs:

- Molluscs are **triploblastic** animals with a **reduced coelom** that are **bilaterally symmetrical**.
- Molluscs move about by using a **muscular foot**.
- They don't have a lot of **segmentation**.
- They have an **open circulatory system** and **excretion organs**

that resemble kidneys.

- Pila, Unio, and octopus are the examples.

g) Echinodermata:

- Echinodermata animals have a **true coelomic cavity** and are **triploblastic**.
- Echinodermata are creatures with a **spiky skin**.
- Echinoderm skeletons are made up of **rigid calcium carbonates**.
- They are **symmetrical** in the **radial direction**.
- Starfish and sea urchins are the examples.

h) Protochordata:

- These **primitive chordates** are **bilaterally symmetrical, triploblastic**, and have a **coelom**.
- During their early stages of development, protochordates have a **notochord**.
- The notochord is a **long rod-like structure** that runs the **length of the animal's back**, dividing the **neurological and digestive systems**.
- Balanoglossus, Herdmania, and Amphioxus are examples of marine animals.

5.2 Vertebrata:

- These animals are the **most advanced**, with a **real vertebral column** and a **strong endoskeleton**.
- **Bilateral symmetry, notochord, dorsal nerve cord, paired gill pouches, triploblastic, and coelomate** are all used to classify vertebrates.
- **Pisces, Amphibia, Reptilia, Aves, and Mammalia** are the five classes.

a) Pisces:

- All **fish** are included in Pisces.
- These are **scale-covered aquatic cold-blooded** creatures.
- The body is **streamlined**, and movement is provided by a muscular tail.
- Fish use their **gills to breathe**.
- The skeleton can be **cartilaginous or bony**.
- They have a **two-chambered heart** and **lay eggs to reproduce**.
- Torpedo, Mandarin fish, Stingray, and so on.

b) Amphibians:

- **Cold-blooded** creatures are amphibians.
- Amphibians are creatures that can **live on land and in water**.
- **Gills** and **lungs** are used to breathe.
- They have a **heart with three chambers**.
- **Laying eggs** is how amphibians reproduce.
- Frogs, toads, and salamanders are the examples.

c) Reptilia:

- Reptilia are **cold-blooded** animals that **breathe via their lungs and have scales**.
- **Except in crocodiles, the heart has three chambers**.
- Reptiles reproduce by **laying eggs** as well.
- Snakes, crocodiles, lizards, turtles, and other reptiles are the examples.

d) Aves:

- The avengers are **warm-blooded** creatures.
- Their **forelimbs** have been changed to allow them to **fly**.
- Bones have a **hollow interior**.
- **Feathers** cover the body.
- **Lungs** are used to breathe.
- They have a **heart with four chambers**.
- They **produce eggs**.
- Crow, ostrich, and sparrow are the examples.

e) Mammals:

- Mammals have **four chambered hearts** and are **warm-blooded** animals.
- Hair, sweat glands, and oil glands cover their skin, which helps to regulate body temperature.
- Mammals give **birth to their offspring**.
- They have **mammary glands** that produce milk in order to feed their offspring.
- Platypuses lay eggs.

- Kangaroos give birth to young that are underdeveloped and carried in their mother's abdominal pouch.
- Humans, rats, cats, etc are the examples.

