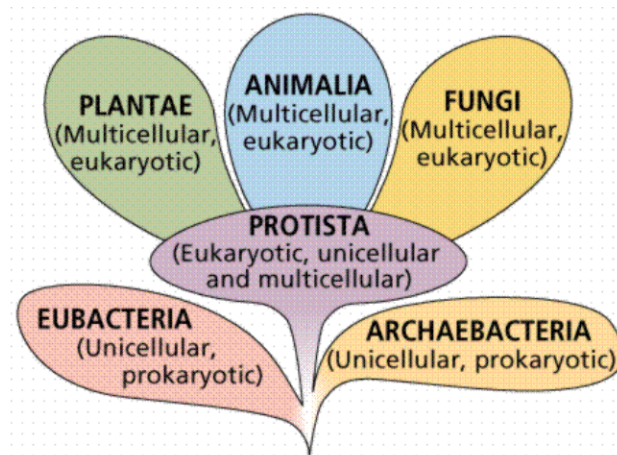


Chapter 7: “Diversity in Living Organisms”

KEY CONCEPTS

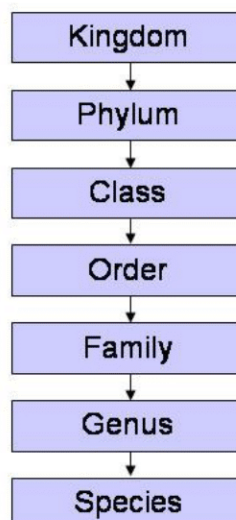
CONCEPTS
Basis of classification
Hierarchy of classification
Kingdom Plantae
Kingdom Animalia

1. Each **organism** is different from all other organisms.
2. In this activity, we decide which **characteristics** (we can run, but the Banyan tree can't run is a characteristic) are important in forming the desired **category**.
3. **Greek thinker Aristotle classified animals according to whether they lived on land, in water or in air.** This classification is a landmark in ideology, but has limitations. For example, animals that live in the sea include Corals, Whales, Octopus, Starfish, and Shark. In fact they are different from each other.
4. **Classification and Evolution:** organisms are classified based on body design, hierarchy in developing, relation to evolution. **Charles Darwin** first described the idea of evolution in 1859 in his book “ **The Origin of Species**”
5. The Biologists, such as Haeckel, Whittaker & Carl Woese tried to classify all living organisms into broad Kingdoms. **The Whittaker proposed five kingdoms: Monera, Protista, Fungi, Plantae and Animalia.** Carl Woese introduced by dividing Monera into Archaeobacteria and Eubacteria.



Hierarchy of Classification :

Linnaeus's System of Classification



Monera: They have **unicellular, Prokaryotic organisms** (do not have defined nucleus or organelles). The cell wall may or may not be present. The mode of nutrition is **autotrophic** (synthesizing food on their own) **(or) heterotrophic** (getting food from environment). **Ex. Bacteria, Anabaena.**

Protista: They have **unicellular eukaryotic organisms** (do have well defined nucleus or organelles). The body is covered by **cilia, flagella for locomotion**. The mode of nutrition is **autotrophic or heterotrophic**. **Ex. Diatoms, protozoans.**

Fungi: These are multi-cellular **eukaryotic organisms with cell wall, made up of Chitin**. They do not perform Photosynthesis (**heterotrophic**), **Saprophytic** (derive nutrition from decaying material). Ex. Aspergillus, Penicillium, Mushroom, Rhizopus. The fungi living with algae forms **Lichen** (Symbiotic **Association**) .

. **Plantae:** These are multi-cellular eukaryotic organisms with cell wall, made up of Cellulose. Able to perform photosynthesis (**autotrophic**). Ex. Rice, wheat.

. **Animalia:** These are multi-cellular eukaryotic organisms without cell wall. They are not able to perform photosynthesis (**heterotrophic**). Ex Human beings, Peacock.

DETAILS OF KINGDOM PLANTAE

1. The kingdom Plantae is further classified as Thallophyta, Bryophyta, Pteridophyta, Gymnosperms, Angiosperms .

2. **Thallophyta:** The plants do not have well defined body design, commonly called as "Algae", mostly aquatic. Ex. **Spirogyra, Ulothrix**.

3. **Bryophyta:** These are commonly called as the "**Amphibians of Kingdom**". The plant body is differentiated into **roots like, stem like and leaf like structures**. No specialized tissues for the conduction of water and food. Ex. Marchantia, Funaria.

4. **Pteridophyta:** These are commonly called as the "**First vascular land plants**". The plant body is differentiated into root, stem and leaf. Specialized tissues for the conduction of water and food are developed in these plants. The reproductive organs are inconspicuous. Ex. Marsilea, Fern.

Special Note: The reproductive organs are inconspicuous in Thallophyta, Bryophyta, Pteridophyta are can't develop seeds. They are together called as "**Cryptogamae (Non-Flowering Plants)**". The plants with well differentiated reproductive organs and that

ultimately **make seeds** are called” **Phanerogams (Flowering Plants)**”. This group is further classified **Gymnosperms** (Bear naked Seeds) &**Angiosperms** (Bears seeds inside Fruit).

Gymnosperms: These are commonly called as “**Naked seed bearing plants**”. They are usually perennial, evergreen and woody. Ex. Pinus, Cycas

Angiosperms: These are commonly called as “**Enclosed seed bearing plants**”. Plants with seeds having a single cotyledon are called as” **Monocotyledons or Monocots**”. Plants with seeds having two cotyledons are called as “**Dicots**”. Ex. Ipomoea, Paphiopedium.

DETAILS OF KINGDOM ANIMALIA

These are Eukaryote, multicellular and hetero-trophic.

They are further classified as **Non- Chordates**(Porifera, Coelenterata, Platyhelminthes , Nematoda, Annelida, Arthropoda, Mollusca, Echinodermata) and **Chordates** { Protochordata, Vertebrata (Pisces, Amphibians, Reptilia, Aves, Mammalia)} .

I.Non- Chordates

1. **Porifera:** The word Porifera” **means organisms with holes**”. The **canal system** helps in circulating water, food, oxygen. They are non-motile with cellular level of organization and mainly **marine** organisms with hard outer coat called as **Skeleton**. They are commonly called as **Sponges**. Ex. Spongilla, Sycon

2. **Coelenterata:** The word Coelenterata” **means organisms with body cavity called Coelenteron**” . They are radially symmetrical, **Diploblastic** (two layers of cells), commonly called as **Cnidarians** (Stinging cells for protection are present in the body). Ex. Hydra, Sea Anemone

3. **Platyhelminthes:** The word **Platyhelminthes** **means organisms with flatworms (dorsocentrally flattened)**”. They are bilaterally symmetrical **Triploblastic** (three layers of

cells), **either free-living or parasitic. No true Coelom is present - Acoelomates.** Ex. Planaria(Free living) , Tape worm(Parasitic)

4. Nematoda: The word **Nematoda** “means **organisms with roundworms**”. They are bilaterally symmetrical **Triploblastic** (three layers of cells), **familiar with parasitic worms.** The **false Coelom is called as Pseudocoelome.** Ex. **Ascaris, Wuchereria (Filarial worm causes elephantiasis).**)

5. Annelida: The word **Annelida** “ means **organisms with metameric-segmented**”. They are bilaterally symmetrical Triploblastic(three layers of cells) with closed circulatory system, **familiar with earth worms.** The **Coelom is called as true Coelom.** Ex. **Nereis, Earth worm, Leech**

6. Arthropoda: The word **Arthropoda** “means **organisms with jointed legs**” They are bilaterally symmetrical Triploblastic(three layers of cells), **familiar with cockroaches.** The **Coelom is blood filled called as Haemo Coelom.** Ex. **Prawn, Scorpion, Housefly**

7. Mollusca: The word **Mollusca** “means **organisms with soft body**” They are bilaterally symmetrical, Triploblastic(three layers of cells), **familiar with Octopus, Pila.** Foot is for moving, kidney like organ for excretion, with open circulatory system. Ex. **Unio, chiton**

8. Echinodermata: The word **Echinodermata** “means **organisms with spiny skinned**”. **Exoskeleton is with calcium carbonate.** They are radially symmetrical **Triploblastic** (three layers of cells) with coelomic cavity, **familiar with Star fish.** They are **exclusively free-living marine animals.** Ex. **Sea Cucumber, Feather Star**

II. Chordates: They are further classified as two major groups such as **Protochordata & Vertebrata**

(A). Protochordata: **Notochord present in at least larval forms, but very rudimentary.** It is a rod like supporting structure, runs along with nervous tissue from the gut of animal. They

are bilaterally symmetrical, triploblastic(three layers of cells) with a Coelom, **familiar with Amphioxus. Ex. Balanoglossus**

(B).Vertebrata: Notochord is replaced by vertebral column and internal skeleton. They are bilaterally symmetrical, triploblastic, coelomic and segmented having paired gill pouches. Vertebrates are grouped into five classes.

1. Pisces: These are commonly called as “fishes”, exclusively aquatic. Body is streamlined and a tail for locomotion. Gills for respiration, heart is two chambered, cold blooded, skin is covered with scales, plates. They are cold-blooded animals. Skeleton of bone (Rohu) / cartilage(Shark). They lay eggs. Ex. Lion Fish, Dog Fish

2. Amphibians: These are commonly called as “Amphibians” because they can live on land and in water”. Body is streamlined and a webbed foot/ foot for locomotion. Gills or lungs or skin for respiration, heart is three chambered, cold blooded, skin is lack of scales, plates. They are cold-blooded animals. They lay eggs. Ex. Rana, Hyla

3. Reptilia: These are commonly called as “Reptilians”. A lung for respiration, heart is three chambered (Crocodile heart is four chambered), skin have scales. They are cold-blooded animals. They lay eggs. Ex. Snakes, Turtles

4. Aves :These are commonly called as “Birds”. A lung for respiration, heart is four chambered, fore limbs are modified for flight, skin has feathers. They are warm-blooded animals. They lay eggs. Ex. Ostrich (Flightless Bird), Pigeon, Sparrow

5. Mammalia: These are commonly called as “animals with mammary glands for producing milk to nourish their young ones”. A lung for respiration, heart is four chambered, skin has hairs, sweat or oil glands. They are warm-blooded animals. They lay eggs (Platypus, Echidna), give birth to young ones poorly developed (Kangaroo) & give birth to developed

DETAILS OF NOMENCLATURE

NOMENCLATURE: The system of **scientific naming or nomenclature** was **introduced by Carolus Linnaeus**. It is **unique to identify in the world**. We limit ourselves to writing **the names of the Genus and Species** of that particular organism. The world over, it has been agreed that both these names will be used in **Latin forms**. When **printed** is given in **italics** and when **written by hand**, the Genus and Species name have to be **underlined separately**.
Ex. Ostrich (Common name): ***Struthiocamelus*** (scientific name with two parts namely the Genus and Species).