

# Chapter-07 : Diversity in living organisms

**Need for classification of living organisms :** Living organisms have evolved on the earth over millions of years. There is a vast variety of living organisms. Living organisms show a wide range of variations.

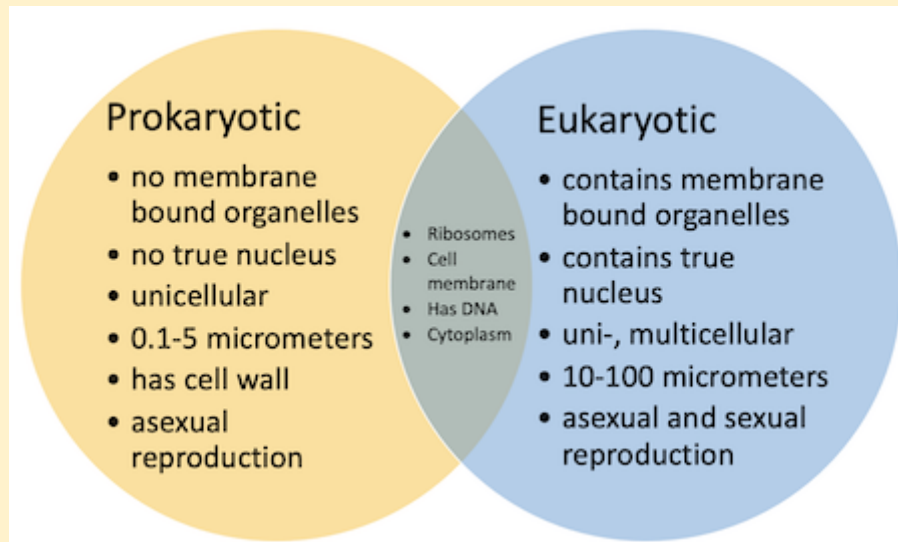


- Some microscopic bacteria are of a few micrometres in size. Whales and red wood trees are about 30 metres and 100 metres in size respectively.
- Some pine trees live for thousands of years while insects like mosquitoes die within a few days.
- Some organisms are colourless and even transparent and some are brightly coloured.
- To understand and study all these organisms are impossible. If they are arranged into different groups based on their similarities in characteristics then it is easier to study the different groups as a whole.

**Classification of living organisms** : The arranging of organisms into different groups on the basis of the similarities in their characteristics is called classification of living organisms.

**Basis of classification of living organisms** : The main characteristics which are considered for classification of living organisms into different groups are :

- Whether they are made of prokaryotic or eukaryotic cells.



- Whether the cells occur singly or they are grouped together and live as an indivisible group.
- Whether they produce their own food by photosynthesis or get their food from outside.
- The characteristics used for classification of plants will be different from the characteristics used for classification of animals because plants make their own food and animals get their food from outside.

**Classification and evolution** : The present day complex living organisms have evolved from the earlier simple forms due to the changes in their body designs over millions of years.

- The body designs of living organisms are gradually changing due to the changes in environment and the need to adapt themselves to the changes in the environment.
- Some groups of organisms having ancient body designs have not changed much during evolution and have simple forms and structure. These organisms are called 'primitive or lower organisms'.
- Some organisms have acquired their body designs relatively recently and have complex forms and structure. These organisms are called 'advanced or higher organisms'.

**The hierarchy of classification** : Living organisms have been broadly classified into five main kingdoms. They are Monera, Protista, Fungi, Plantae and Animalia. Each kingdom has been further classified into smaller sub-groups at various levels as :

Kingdom  
Phylum (for animals) / Division (for plants)  
Class  
Order  
Family  
Genus  
Species

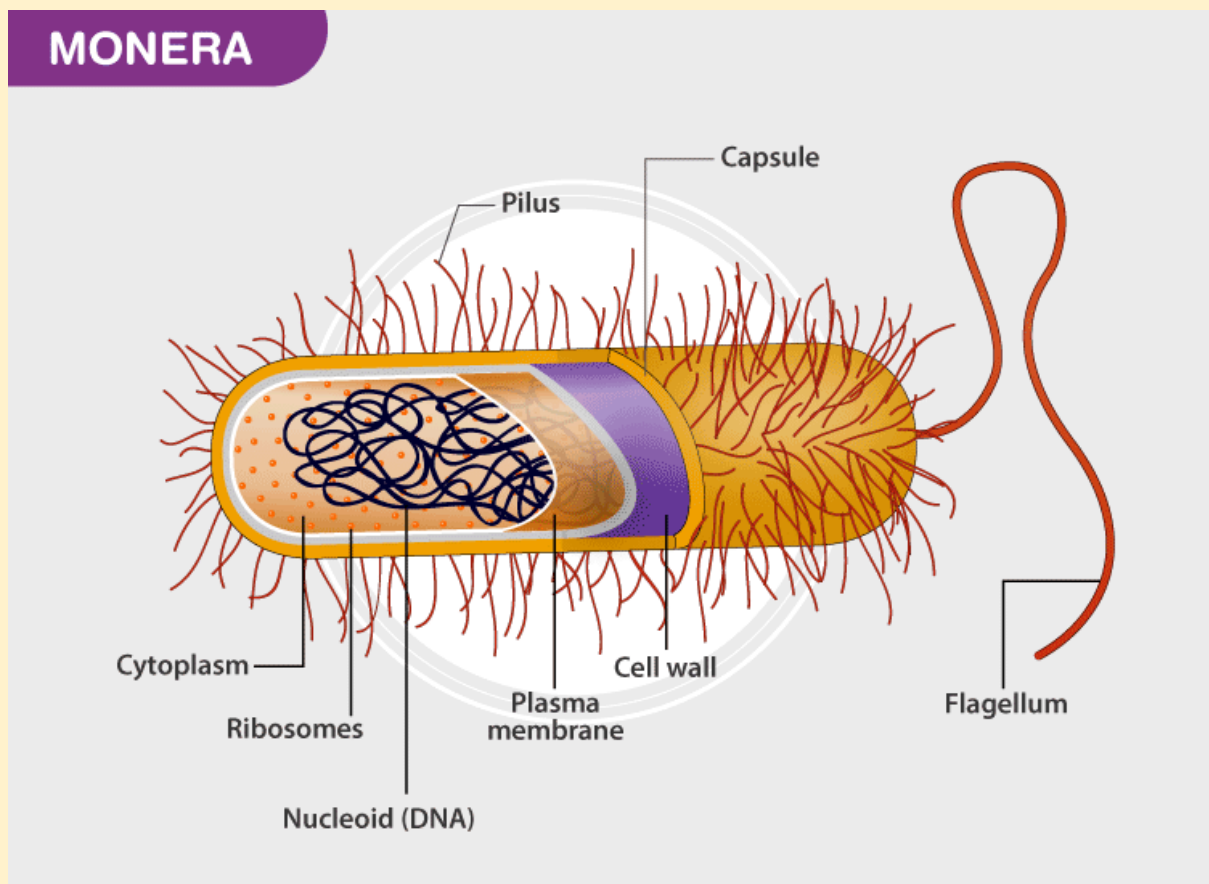
By arranging organisms on the basis of hierarchy and characteristics into smaller and smaller groups then we arrive at the basic unit of classification called species.

Website :) "[harsitbiowallah.github.io](https://harsitbiowallah.github.io)" :) youtube:) "harist bio wallah"

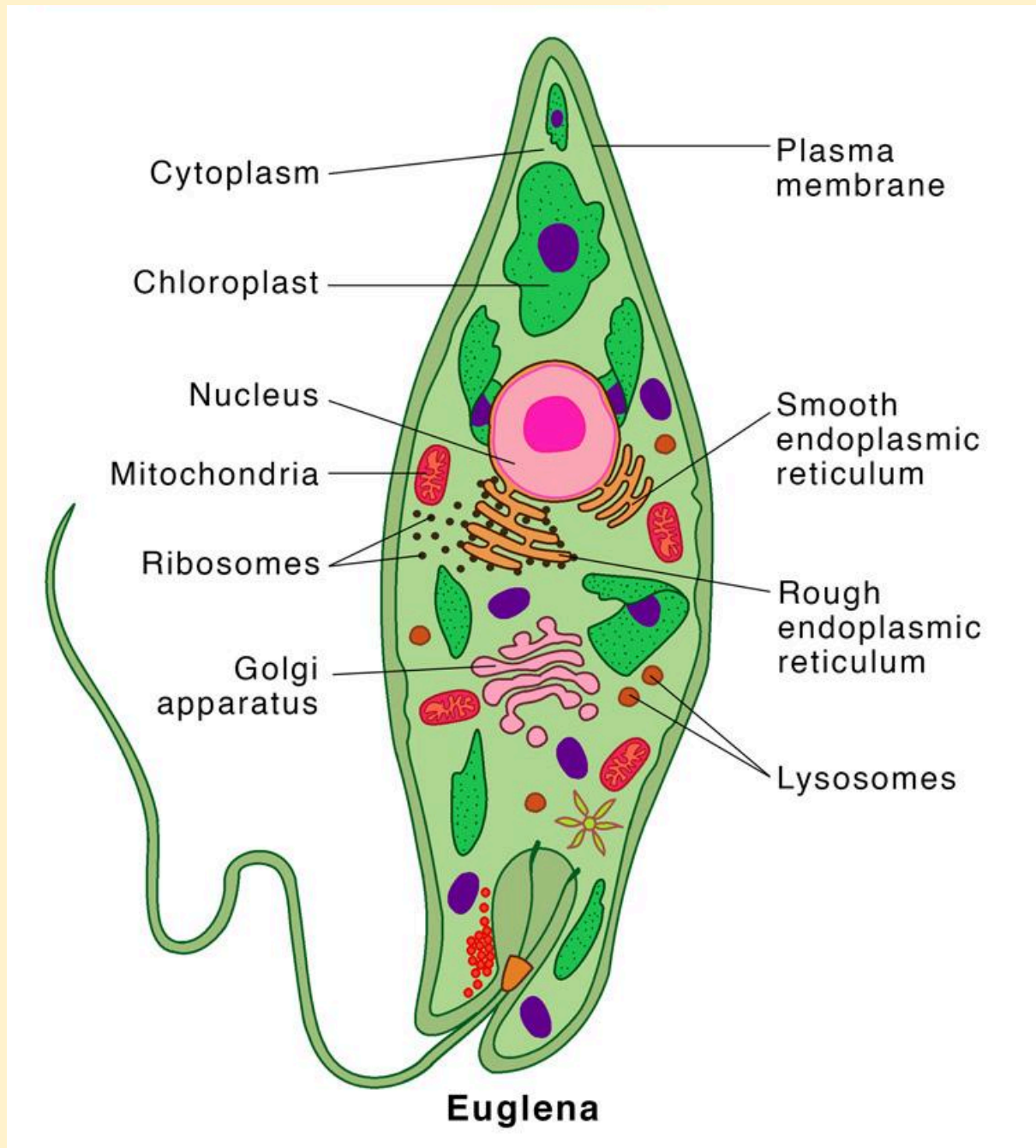
Full lecture video on youtube

- Species is group of organisms which are similar enough to breed and perpetuate.

**Monera** : They are mostly prokaryotic, unicellular, do not have a definite nucleus, may or may not have cell wall and the mode of nutrition is autotrophic or heterotrophic. E.g.- Bacteria, Blue-green algae (Cyanobacteria), Mycoplasma etc.



**Protista** : They are eukaryotic, unicellular, mostly aquatic, some have cilia or flagella which help them in moving and the mode of nutrition may be autotrophic or heterotrophic. E.g.- Algae, Diatoms, Protozoans etc.



**Fungi** : They are eukaryotic, unicellular or multicellular. They do not have chlorophyll and cannot prepare their own food and are heterotrophs. They use decaying organic matter as food.

So, they are called saprophytes. E.g.- Yeast, Aspergillus, Penicillium, Agaricus etc.

- Some of them live in association with algae are called lichens.





**Plantae (Plants)** : They are multicellular eukaryotes having cell walls. They use chlorophyll for photosynthesis. All plants are included in this group. They are divided into five groups. They are Thallophyta, Bryophyta, Pteridophyta, Gymnosperms and Angiosperms.



**Animalia (Animals)** : They include all organisms which are multicellular, eukaryotes, without chlorophyll and cell walls. They are heterotrophs. They are divided into ten groups. They are Porifera, Coelenterata, Platyhelminthes, Nematoda, Annelida, Arthropoda, Mollusca, Echinodermata, Protochordata and Vertebrata.



Website :) "[harsitbiowallah.github.io](https://github.com/harsitbiowallah)" :) youtube:) "harist bio wallah"

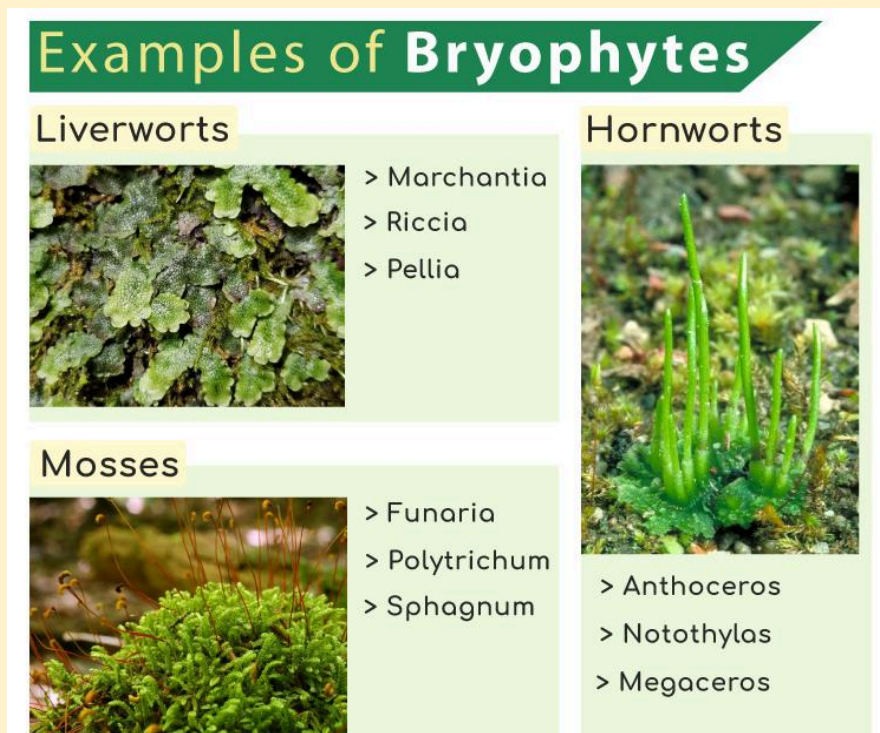
Full lecture video on youtube

## Classification of plants (Plantae) :

**Thallophyta** : In this group the plants do not have well differentiated body parts. The plants are called algae. They are mostly aquatic. E.g.- Spirogyra, Ulothrix, Cladophora, Chara etc.



**Bryophyta** : In this group the plant body is differentiated into stem and leaf like structures but there are no specialised structures for the conduction of water and other substances from one part of the plant body to the other. These plants are called the amphibians of the plant kingdom. E.g.- Moss (Funaria), Marchantia, Riccia etc.





**Pteridophyta** : In this group the plant body is differentiated into roots, stem and leaves and has vascular tissue for conducting water and other substances from one part of the plant body to the other. E.g.- Ferns, Marsilea etc.



**Gymnosperms** : The plants of this group bear naked seeds (gymno means naked and sperma means seed). They are usually perennial, evergreen and woody. E.g.- Pines (Pinus), Cycas etc.



Website :) "[harsitbiowallah.github.io](https://harsitbiowallah.github.io)" :) youtube:) "harist bio wallah"

Full lecture video on youtube



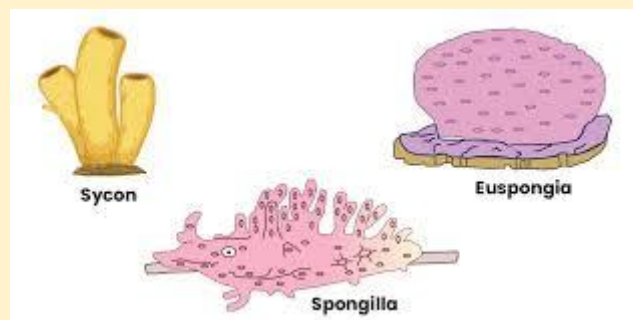
**Angiosperms** : The plants of this group bears covered seeds (angio means covered and sperma means seed). They are also called flowering plants. The plant embryo in the seed has cotyledons. Angiosperms are divided into two groups on the basis of the number of cotyledons. Plants with seeds having single cotyledon are called monocots. E.g.- rice, wheat, maize etc. Plants with seeds having two cotyledons are called dicots. E.g.- green gram, peas, tamarind etc.



## Classification of animals (Animalia) :

### Porifera (Sponges) :

- They are aquatic non-motile animals attached to some solid support.
- They have pores all over the body forming a canal system which helps to circulate water and bring food and oxygen.
- They have a hard outer skeleton and do not have any tissues. E.g.- Spongilla, Sycon, Euplectella etc.



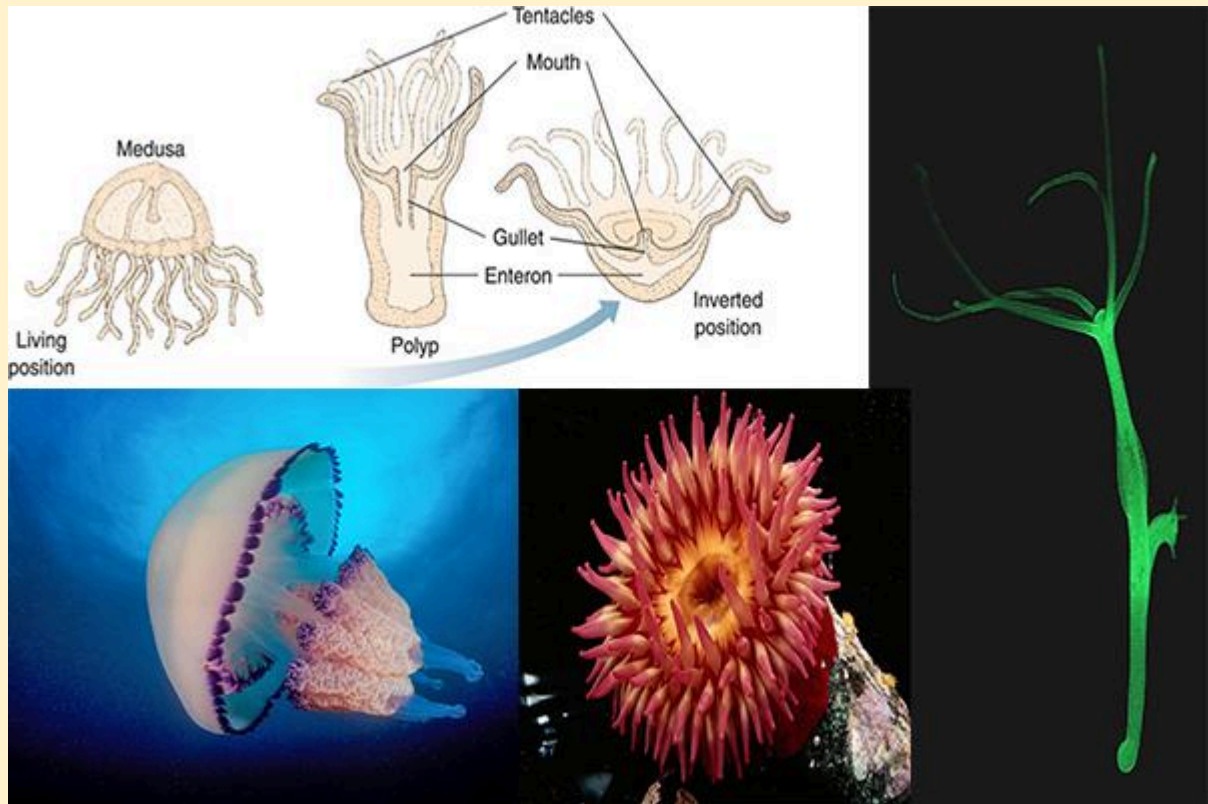
### Coelenterata :

- They are aquatic animals.
- There is a cavity in the body (coelom).

Website :) "[harsitbiowallah.github.io](https://harsitbiowallah.github.io)" :) youtube:) "harist bio wallah"

Full lecture video on youtube

- The body has two layers of cells as outer layer and inner layer.
- Some live in colonies (corals) and others are single. E.g.- Corals, Hydra, Jellyfish, Sea anemone etc.



### **Platyhelminthes (Flatworms) :**

- They have flat body which is bilaterally symmetrical i.e. both right and left half of the body is similar.
  - They have three layers of cells called triploblastic.
  - They do not have true body cavity.
  - They may be free living or parasitic.
- E.g.- Planaria (free living), Liver fluke and Tape worm (parasitic) etc.



Website :) "[harsitbiowallah.github.io](https://harsitbiowallah.github.io)" :) youtube:) "harist bio wallah"

Full lecture video on youtube

## **Nematoda :**

- They have cylindrical body.
- The body is bilaterally symmetrical and triploblastic.
- They do not have true body cavity.
- They have tissues but no real organs.
- They are parasitic.

E.g.- *Ascaris* (round worms), *Wuchereria* (pin worms) etc.



# **Phylum Nematoda**



## **Annelida :**

- Their body is bilaterally symmetrical and triploblastic.
- They have true body cavity.
- Their body is segmented.
- There is differentiation of organs.
- They are found in water and on land.

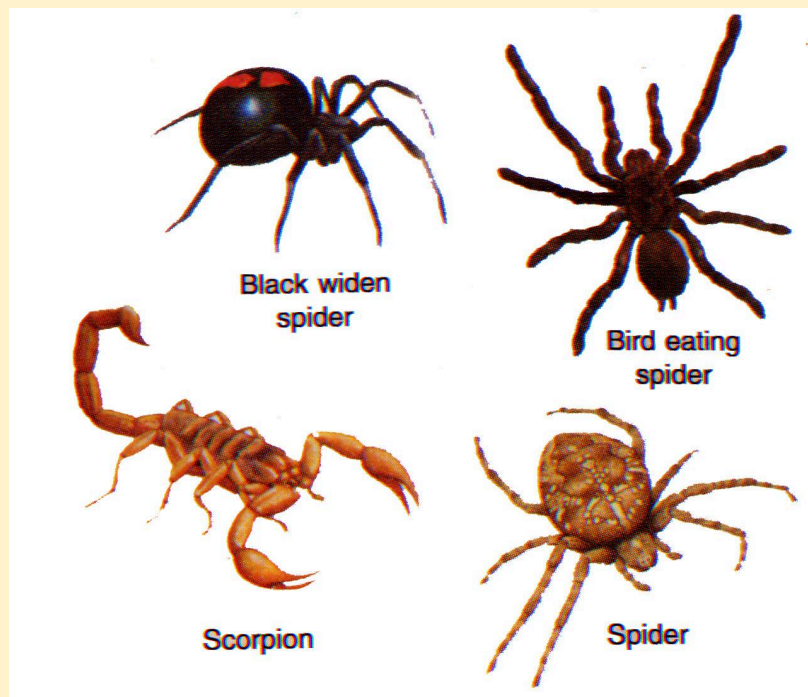
E.g.- Earthworm, *Nereis*, Leech etc.



### **Arthropoda (Joint legged) :**

- They have bilaterally symmetrical body.
- The body is segmented.
- They have an open circulatory system.
- The body cavity is filled with blood.
- They have jointed legs.

E.g.- Prawn, Crab, Cockroach, Spider, Scorpion, Butterfly, Housefly, Centipede etc.



Website :) ["harsitbiowallah.github.io"](https://harsitbiowallah.github.io) :) youtube:) "harist bio wallah"

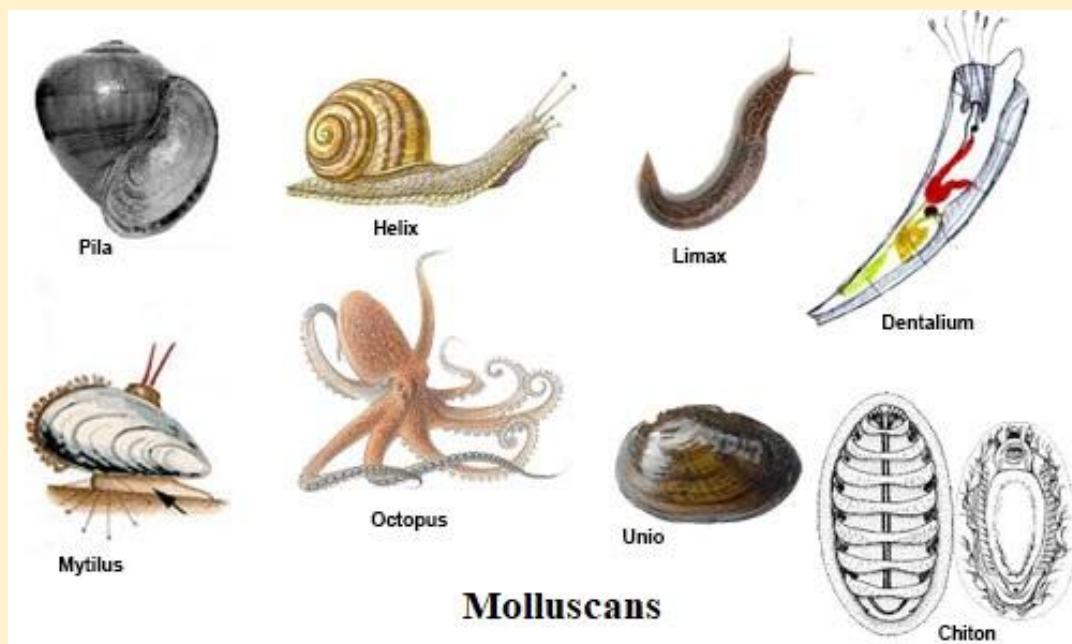
Full lecture video on youtube



## **Mollusca :**

- They have bilateral symmetry.
- The coelomic cavity is reduced.
- There is little segmentation.
- They have open circulatory system and kidney like organs for excretion.
- They have feet for moving around.

E.g.- Snails, Mussels, Chiton, Octopus etc.



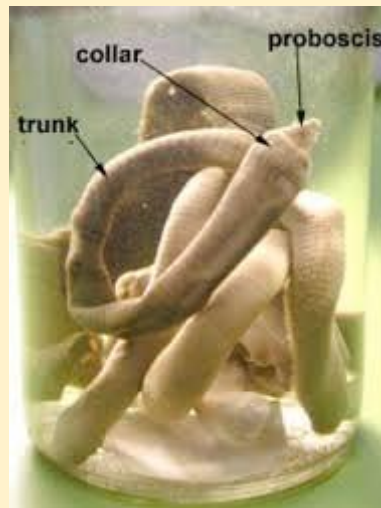
## **Echinodermata (Spiny skinned) :**

- They are spiny skinned organisms.
- They are free living marine animals.
- They are triploblastic and have coelomic cavity.
- They have water filled tube feet which help in movement.
- They have hard skeleton made of calcium carbonate.

E.g.- Star fish, Sea urchin, Feather star, Sea cucumber etc.

### **Protochordata :**

- They have bilateral symmetry and are tiploblastic.
- They have coelomic cavity.
- They have a notochord which is a long rod-like structure along its back to which muscles are attached and help in movement.  
E.g.- Balanoglossus, Amphioxus, Herdmania etc.



### **Vertebrata (Vertebrates) :**

- They have vertebral column and internal skeleton.
- They have bilateral symmetry and are triploblastic.
- They have coelomic cavity.
- Their body is differentiated into tissues and organs.
- Their body consists of four regions - head, neck, trunk and tail.
- They have two pairs of fins or limbs.
- The respiration in aquatic forms is by gills and in land forms respiration is by lungs.
- The sexes are separate.
- Vertebrates are grouped into five classes. They are Pisces, Amphibia, Reptilia, Aves and Mammalia.

# Vertebrates

Animals with backbones



Fish



Birds



Mammals



Reptile



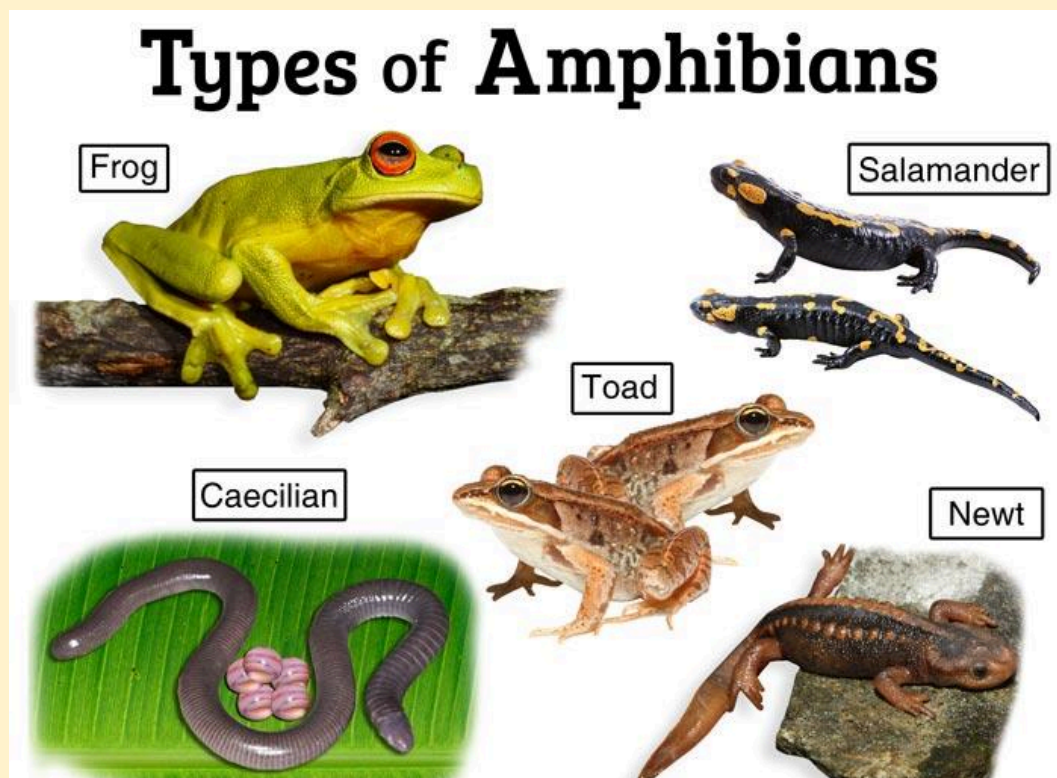
Amphibians

**Pisces (Fishes)** : They are fishes living in water. Their skin is covered with scales or plates. They respire by using gills. They have streamlined body and fins which help them to move in water. They are cold blooded and their heart has only two chambers. They lay eggs from which the young ones hatch out. Some fishes have

skeleton made of cartilage like Sharks, Rays etc. and some have skeleton made of bones and cartilage like Tuna, Rohu etc.



**Amphibia (Amphibians) :** They are found in land and water. They do not have scales but have mucous glands on their skin. They are cold blooded and the heart is three chambered. Respiration is through gills or lungs. They lay eggs in water. E.g.- Frogs, Toads, Salamanders etc.



Website :) "[harsitbiowallah.github.io](https://harsitbiowallah.github.io)" :) youtube:) "harist bio wallah"

Full lecture video on youtube



**Reptilia (Reptiles)** : They have scales and breathe through lungs. They are cold blooded. Most of them have three chambered heart but crocodiles have four chambered heart. They lay eggs with hard covering in water. E.g.- Snakes, Turtles, Lizards, Crocodiles etc.



**Aves (Birds)** : They are warm blooded animals. They have four chambered heart. They breathe through lungs. They have an outer covering of feathers. Their two fore limbs are modified into wings for flying. They lay eggs. E.g.- Crow, sparrow, Pigeon, Duck, Stork, Ostrich etc.



**Mammalia (Mammals)** : They are warm blooded animals. They have four chambered heart. They have mammary glands for production of milk to nourish their young ones. The skin has hairs and sweat glands. Most of them give birth to their young ones. Some of them lay eggs (like Platypus and Echidna). E.g.- Cat, Rat, Lion, Tiger, Whale, Bat, Human etc.



### Nomenclature :

- All living organisms have been given scientific names which can be used to identify them anywhere in the world.
- The system of scientific naming organisms is called binomial nomenclature. The binomial nomenclature consists of two parts. The first part is the name of the genus and the second part is the name of the species.
- The system of scientific naming or nomenclature we use today was introduced by Carolus Linnaeus.
- The scientific name of human beings is *Homo sapiens*. *Homo* is the name of the genus and *sapiens* is the name of the species.

## Binomial Nomenclature

Common Name

Tiger



Scientific Name

*Panthera tigris*



Genus

Species