FIVE KINGDOM CLASSIFICATION

WHAT IS SPECIES ?

Species means an organism of a particular kind whose members can interbreed among themselves to produce fertile young ones.

SOME OTHER EXAMPLES OF CROSSES BETWEEN TWO DIFFERENT SPECIES

- **Zebra** mated with **donkey** produces "**Zenkey**". It is sterile.
- Tiger mating with a female lion produces "**Tigon**" (sterile).
- "**Geep**" is the product of a goat and a sheep, again sterile.
- **Pomato** is a combination that produces potatoes underground and tomatoes above ground, but it produces no seeds.

CATEGORIES HIGHER THAN SPECIES

GENUS: Similar species constitute the next higher called genus (plural: genera). For example- The hill crow & the house crow. They are two different species. They cannot interbreed; yet they are crows, easily made out from other birds. These two kinds of crows belong to the same genus **Corvus.**

FAMILY: A group of genera with certain common characteristics form a family. For example- Lion (Panthera leo) and tiger (Panthera tigris).

ORDER: A group of related families make an order. For example, the cat family Felidae (lions, tigers and cats) and the dog family Canidae (dogs, foxes, jackals, etc.) possess some common features and so they make an order.

CLASS: **Related orders make a class**. **For example, dogs, cats, bats, whales, monkeys and even humans, etc., have some common features such as hairy skin and milk-glands they belong to class Mammalia.**

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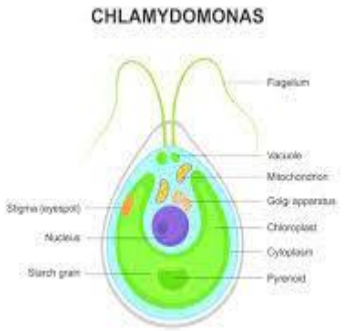
1. Kingdom MONERA (unicellular & prokaryotic).Ex- bacteria, blue- green bacteria, cyanobacteria and some unicellular algae.

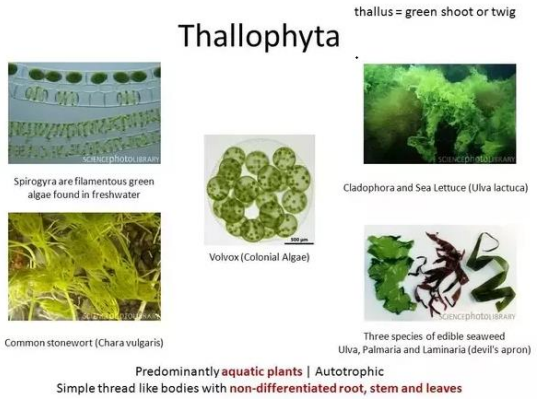
- **These are single- celled organisms.**
- **They have no organized nucleus.**
- **.• The nuclear material (DNA) is distributed in the cell without being enclosed in a nuclear membrane.**



2. Kingdom PROTISTA (Unicellular & eukaryotic) - These are single-celled organisms having a well-defined nucleus with a nuclear membrane (eukaryotic). They include both the unicellular green autotrophic organisms (e.g. Chlamydomonas) as well as unicellular non- green heterotrophic organisms.

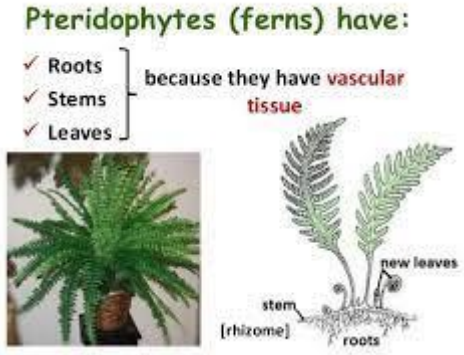
3. Kingdom FUNGI : (multicellular, eukaryotic and saprophytic)- Most fungi are made up of thread-like hyphae rather than cells, and there are many nuclei distributed in the continuous cytoplasm. Examples: Bread mould, Toadstool, Yeast, Penicillium.

4. Kingdom PLANTAE (multicellular, eukaryotic and autotrophic) - These are made of many cells (multicellular). They all have chlorophyll and they make their own food by photo- synthesis (autotrophic i.e. self nourishing). They include thallophyta (algae), bryophytes (mosses), pteridophytes (ferns), gymnosperms (pine, etc), and angiosperms (flowering plants).



Thallophyta : Includes all algae e.g. chlamydomonas, volvox etc. Thallophytes are autotrophic as they contain chlorophyll. They have a thallus like body, i.e. the plant body cannot be distinguished into roots, stem or leaves. They are primarily aquatic.

Bryophyta: e.g. mosses and liverworts. Plants belonging to this group have a plant body that has false root-like structures called rhizoids, and leaf-like structures. They are autotrophs.



Pteridophytes: Includes all ferns. Plants belonging to this group have a plant body that can be distinguished into root, stem, and leaves. The leaves are often made of leaflets bearing spores on the underside. They are non- flowering plants.

Gymnosperms: e.g. cycas, pine, fir etc. The plants belonging to this group bear naked seeds, i.e. the seeds are not enclosed in fruits. Gymnosperms bear seeds in structures called cones. They bear both male and female cones containing pollen and ovules respectively. They may be trees or shrubs.

Angiosperms: Includes all flowering plants. Plants belonging to this group have a highly developed plant body, which can be differentiated into root, stem, leaves, flowers and fruits. The seeds are enclosed in a fruit. They are further divided into monocots and dicots.

Monocots: The plant belonging to this group bear seeds having only one cotyledon, the leaves have parallel venation, and the root system is fibrous, e.g. maize, rice, grass etc.

Dicots: The plants belonging to this group bear seeds with two cotyledons, the leaves have reticulate venation, and a tap root system. e.g. pea, potato, apple, sunflower, rose etc.

5. Kingdom ANIMALIA (Multicellular, eukaryotic and heterotrophic) These are multicellular organisms without cell wall, without chlorophyll, usually mobile, and obtaining food by eating or sucking, etc. (heterotrophic i.e., differently nourished).

INVERTEBRATA AND VERTEBRATA

The Porifera to Echinodermata are grouped together under the category Invertebrates, i.e. animals without a backbone.

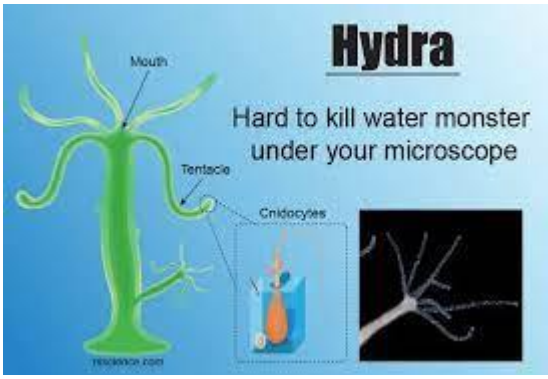
The last phylum Chordata includes all such animals which have some kind of backbone and these are popularly called the Vertebrates.

INVERTEBRATE PHYLA - PORIFERA TO ECHINODERMATA

1. Phylum Porifera :The pore-bearers (Sponges)

Porifera are the simplest multicellular animals. Their body consists of a hollow tube. There is no single mouth but many pores or canals are present. Ex Bath Sponge, Sycon

2. Phylum Cnidaria / Coelenterata (Sac-like animals). Examples: Hydra, jellyfish, sea anemone, corals.



In cnidarians a two-layered body wall encloses a single cavity known as coelenteron in which digestion takes place. The cavity opens by a mouth at one end only. There are tentacles to catch food organisms. The cnidarians are found in water .

3. Phylum Platyhelminthes (Flatworms)

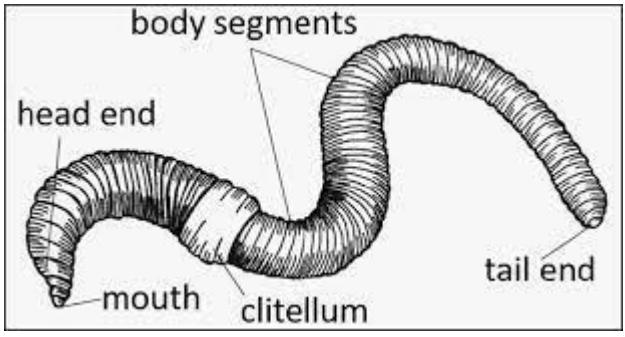
These are small, soft, flattened, usually unsegmented worms without a body cavity coelom. The alimentary canal has only one opening, the mouth. Most of the flatworms live on or inside other animals as parasites, but a few are free, living in the sea or fresh water.Ex Tapeworm, Planaria

4. Phylum Nematoda (Roundworms)

They are long, cylindrical and unsegmented, with a fluid-filled or false body cavity (without a true body cavity). The alimentary canal opens at the two ends, mouth and anus. They are mostly parasitic but some live free in the soil. Ex- Ascaris

5. Phylum Annelida (Segmented or ringed worms). Ex- Earthworms, Leeches and Nereis

The body of an annelid worm is cylindrical and divided into ringlike segments. An annelid worm has a well-developed digestive system with the alimentary canal open at both ends, with a mouth and anus. They have a true body cavity, the coelom.



Earthworm:

The common Indian earthworm Pheretima posthuma has a long

cylindrical body which is divided into a series of 80-100 ring-like segments. There is no head and there are no appendages (legs), no eyes and no tail. The mouth is a simple opening at the front end. There are no jaws. The anus is located at the extreme hind end. In a mature worm, a short cylindrical band of thick glandular skin (clitellum) surrounds the body like a belt in the segments 14-16.

Economic importance: The earthworm is highly useful in agriculture.

(i) It loosens up and aerates the soil as it burrows.

(ii) The earthworms keep interchanging the top soil with the lower layer thus increasing the fertility of the soil.

(iii) The earthworm's excreta is rich in nitrogenous matter which is required for plant growth.

(iv) Presently, earthworms are being used in vermiculture for producing high-quality manure.

(v) Many people use earthworms as baits in catching fish.

6. Arthropoda (Jointed-legged animals) Examples: Crayfish, crabs, millipede, centipede, insects, scorpions, spiders, etc. This phylum has the largest number of species in the animal kingdom.

These animals have jointed limbs, one pair each on some or on all body segments. There is an exoskeleton made of chitin. They [illegible]ng growth in early life, which is regrown. The casting off and the regrowing of the exoskeleton is collectively called moulting.

7. Phylum Mollusca. **Examples: snail, slug, oyster, mussel, clam, squid and octopus.**

These animals have a soft, unsegmented body, with a hard, calcareous shell to protect the soft body. They have a muscular foot to help locomotion and also to act as a weapon in some cases.

8. Phylum Echinodermata. (Spiny-skinned animals) Examples: Starfish, brittle-star, sea-urchin and sea-cucumber.

Echinoderms are unsegmented, marine animals. They have an exoskeleton and a spiny surface. They move by means of tube-feet. They are radially symmetrical, i.e. they have similar parts (usually five) arranged regularly around a central point.

PHYLUM CHORDATA (VERTEBRATA)

All chordates possess a notochord which is a rod-like structure present in the mid-dorsal axis of the body. Except a few primitive forms in which the notochord persists throughout life, in all others it is replaced by a backbone (vertebral column). All vertebrates, including humans, have a notochord in embryonic life.

The chordates which possess a backbone are called Vertebrates. Vertebrates have a well- vertebral column forming the main axis of their internal skeleton, which may be of bones or cartilage. These animals have a head, a trunk and two pairs of appendages.

(i) Class Pisces

The class Pisces includes fishes. They are completely adapted to aquatic life. They have a two- heart, breathe by means of gills, and are cold-blooded or poikilothermal (i.e. their body temperature fluctuates directly with the temperature of the environment).

Fishes are of two main types:

(1) Cartilaginous fishes whose skeleton is made of cartilage, e.g. sharks, dogfish, skates, and

(2) Bony fishes whose skeleton is made of bones, e.g. carps, roaches, herrings, trouts.

(ii) Class Amphibia. Examples: Frog, toad, salamander and newt.

Amphibians spend part of life on land (adult) and part of life (egg, larva) in water. It means they live partly on land and partly in water. Eggs are laid in water. In early stages of life (larvae), they breathe by means of gills. But their adults breathe by means of lungs. They have a smooth, non-scaly moist, slimy skin. The eardrum

(tympanum) lies on the surface of the skin. They have five fingered (pentadactyl) limbs, and a three-chambered heart. They are cold blooded.

(iii) Class Reptilia. Examples: Lizard, snake, tortoise, turtle, crocodile, alligator and gharial (found only in the rivers of India, Malaysia and Myanmar).

Reptiles are completely adapted to life on land. Their eggs have a leathery shell. They breathe by means of lungs right from birth. They have rough, horny scales on the skin, and a three-chambered heart in which the ventricle is partially divided.

(iv) Class Aves. Examples: Pigeon, sparrow, crow, duck, owl, penguin, ostrich, emu, etc.

All birds belong to this class. They breathe by means of lungs. They have an exoskeleton of feathers. Their fore-limbs are modified into wings. They have scaly legs and a four-chambered heart. Their body is streamlined and the skeleton is light to facilitate flying. They are warm-blooded or homeothermal.

(v) Class Mammalia. Examples: Cat, dog, cow, sheep, rat, bat, seal, monkey, apes, man, etc.

Mammals are the most highly developed animals for life on land, although some of them, such as whales and porpoises live in water and bats fly in air. They give birth to living young ones (viviparous) with two exceptions of the Australian spiny ant-eater and duckbilled platypus which lay eggs. They suckle the young ones by means of mammary glands. They have hair on their skin. They are warm-blooded. They have a muscular diaphragm separating the thorax and abdomen internally. They have a four-chambered heart and breathe by means of lungs.