
BIOLOGY

Diversity in Living Organisms

- The variety in living organisms existing on the Earth is called **biodiversity**.
- **Taxonomy** is a biological science which deals with the identification, nomenclature and classification of organisms.
- The system of sorting living organisms into various groups based on their characteristic similarities and differences is called **classification**.
- The principles of classification help us in tracing the evolutionary relationships of the species around us.
- Organisms with ancient body designs are referred to as **primitive** or lower organisms, while organisms which have acquired their body designs relatively recently are called **advanced** or higher organisms.
- A **species** is a group of organisms of a particular kind whose members can interbreed among themselves to produce fertile young ones.

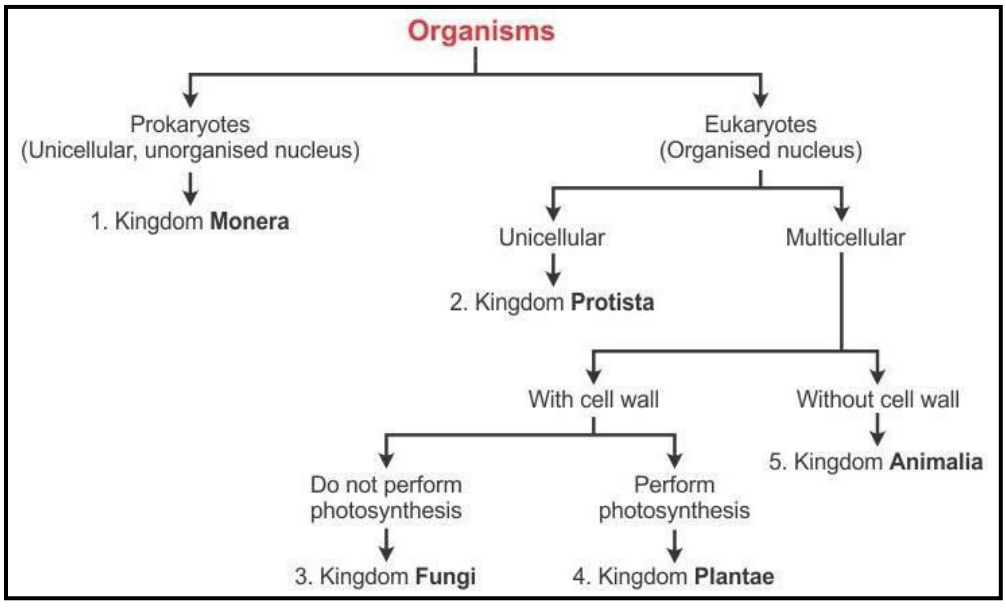
Binomial Nomenclature

- The **binomial nomenclature** system was suggested by the Swedish botanist **Carolus Linnaeus**.
- According to binomial nomenclature, every organism is given a scientific name for identity. The scientific name includes two terms. The **first term** is the name of the **genus**, and the **second term** is the name of the **species**.

Hierarchy of Classification

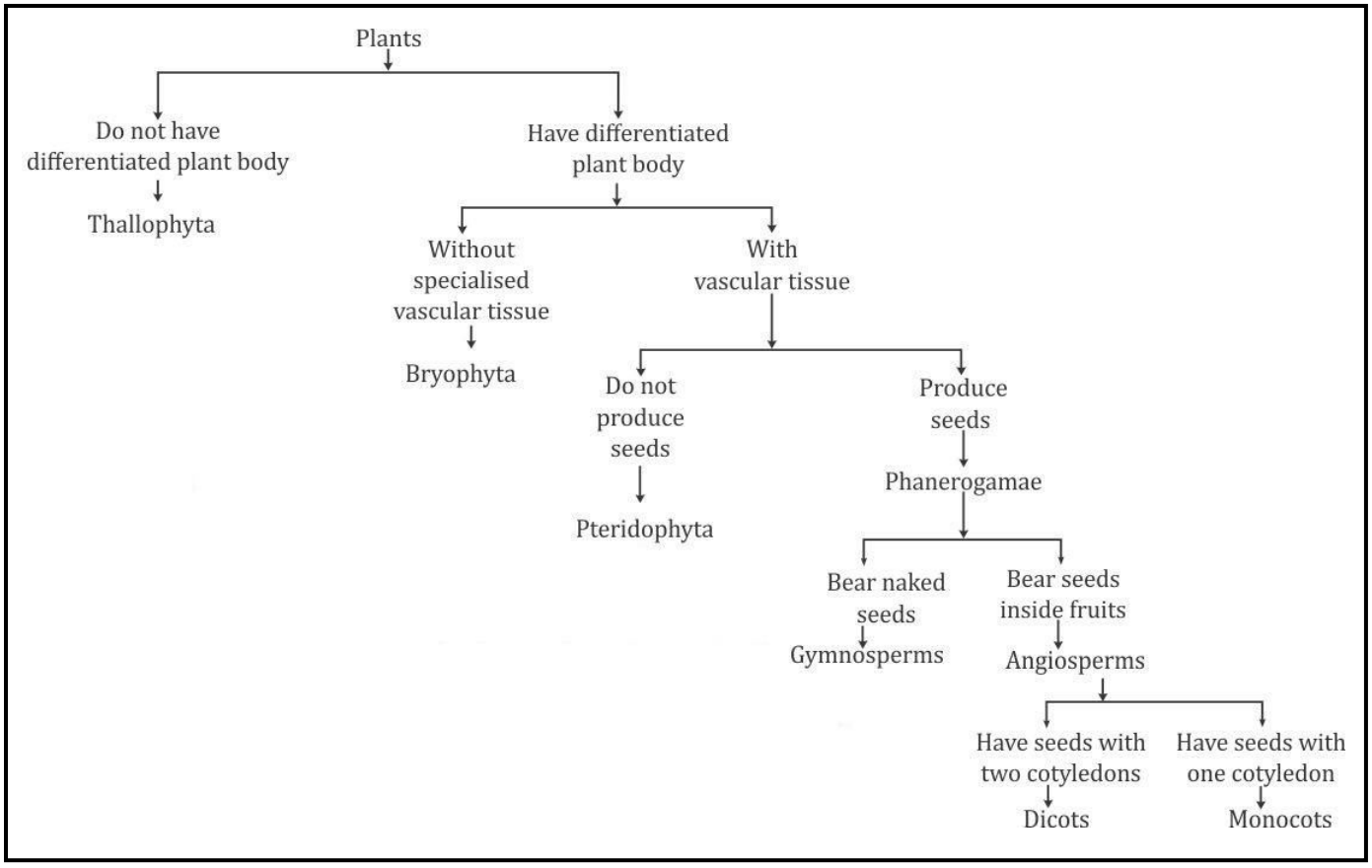
Kingdom → Phylum → Class → Order → Family → Genus → Species

Five Kingdom Classification



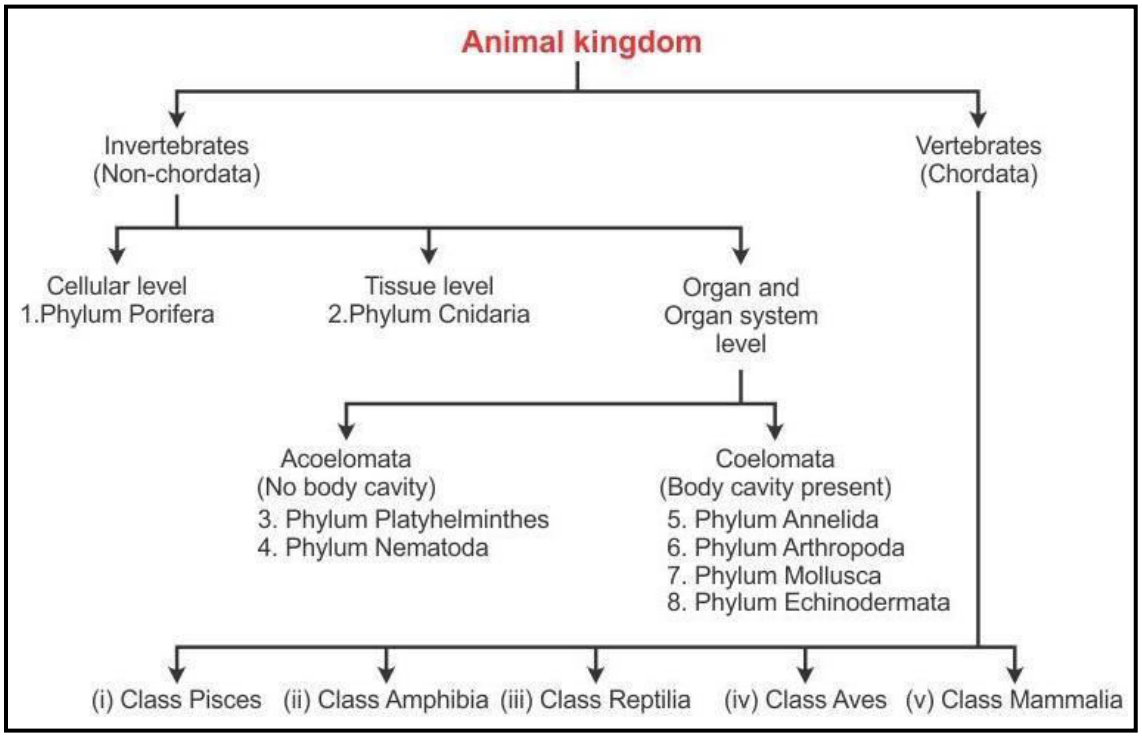
KINGDOM	CHARACTERISTICS	EXAMPLES
Monera	• Organisms have a prokaryotic cell structure. • The cell lacks a distinct nucleus.	Bacteria, *Cyanobacteria*, *Mycoplasma*
Protista	• Contain a well-defined nucleus. • Nuclear materials are organised in the form of a linear, double-stranded and helical DNA along with proteins.	*Chlamydomonas*, *Euglena*, *Amoeba*
Fungi	• Possess a true nucleus and a definite cell wall, which is composed of chitin.	*Mucor*, *Rhizopus*, *Puccinia*
Plantae	• Cell is bound by a cell wall, which is made of cellulose. • Contains a true nucleus and membrane-bound cell organelles.	Algae, mosses, ferns
Animalia	• Lack cell wall and plastid.	Earthworm, *Sycon*, beetle

Classification of Kingdom Plantae



SUBKINGDOM–DIVISION	CHARACTERISTICS	EXAMPLES
Subkingdom Cryptogamae Division Thallophyta/Algae	• Plants have an irregularly shaped, undifferentiated body called thallus. • Predominantly aquatic.	*Nostoc, Oscillatoria, Chlamydomonas*
Subkingdom Cryptogamae Division Bryophyta	• Plant body is either in the form of an undifferentiated thallus or in the form of leafy erect structures. • No specialised tissue for the conduction of water and other substances from one part of the plant body to another.	*Riccia, Funaria, Anthoceros*
Subkingdom Cryptogamae Division Pteridophyta	• Plant body is differentiated into stem, leaves and roots. • Have specialised tissue for the conduction of water and other substances from one part of the plant body to another.	*Psilotum, Nephrolepis, Equisetum*
Subkingdom Phanerogamae Division Gymnospermae	• Bear naked seeds. • Usually perennial, evergreen and woody.	*Gingko, Pinus, Gnetum*
Subkingdom Phanerogamae Division Angiospermae	• Plant body produces seeds which are enclosed within the fruits. • Based on the number of cotyledons, angiosperms are divided into two classes—monocots and dicots.	Maize, bean, wheat

Classification of Kingdom Animalia



Classification of Phylum Invertebrata

PHYLUM	CHARACTERISTICS	EXAMPLES
Porifera	• Simplest multicellular animals with perforated bodies. • The body consists of a tube.	*Sycon*, bath
Coelenterata	• Have a two-layered body wall, which encloses a single cavity in which digestion takes place. • There are finger-like projections called tentacles present near the mouth for catching food.	*Hydra*, jellyfish
Platyhelminthes	• Small, soft, flattened and unsegmented worms. • Do not have a body cavity or a coelom.	Liver fluke, tapeworm
Annelida	• The body is cylindrical and divided into ring-like segments. • Have a true body cavity called coelom, present between the body wall and the digestive tube, which is filled with coelomic fluid.	Earthworm, leech
Nemathelminthes	• The body is long, cylindrical and unsegmented without a body cavity. • The nervous system is well-developed and consists of simple nerves.	Hookworm, *Ascaris*
Arthropoda	• Have jointed limbs, one pair each on some or on all body segments. • Have an exoskeleton made of chitin but lack cilia.	Crayfish, crab
Mollusca	• Have a soft, unsegmented body without appendages but with a hard and calcareous shell to protect the soft body.	Snail, slug
Echinodermata	• The body may be spherical, cylindrical or star-shaped, hard, unsegmented or non-metameric. • Possess a spiny exoskeleton.	Starfish, brittle star
Urochordata	• Triploblastic animals with a coelom which show bilateral symmetry. • The body has three distinct parts—proboscis, collar and trunk.	*Balanoglossus, Amphioxus*

Classification of Phylum Vertebrata

CLASS	CHARACTERISTICS	EXAMPLES
Pisces	• Organisms belonging to Class Pisces are fish. • They are cold-blooded or poikilothermic animals.	Shark, dogfish
Amphibia	• The body is divisible into a head and trunk. Neck is absent. • Have a three-chambered heart with two auricles and one ventricle. • They are cold-blooded animals.	Frog, toad
Reptilia	• The body is divisible into head, neck, abdomen and tail. • Most of them have a three-chambered heart. Ventricle of the heart is partially divided.	Lizard, snake
Aves	• All birds belong to Class Aves. • Warm-blooded or homeothermic animals. • Heart is four-chambered.	Pigeon, sparrow
Mammalia	• Warm-blooded animals. • Have a four-chambered heart with two auricles and two ventricles.	Cat, dog

Differences between Vertebrates and Invertebrates

VERTEBRATES	INVERTEBRATES
1. Have an internal skeleton	1. No internal skeleton
2. Backbone present	2. Backbone absent
3. Tail usually present	3. Tail absent (anus at the tip of the back end of the body)
4. Heart on the ventral side of the body	4. Heart, when present, on the dorsal side of the body
5. Nerve (spinal) cord dorsal and hollow	5. Nerve cord ventral and solid
6. Have two pairs of limbs	6. Have three or more pairs of limbs if present
7. Haemoglobin in red blood cells	7. Haemoglobin, if present, dissolved
8. Examples: Fish, frog, lizard, bird	8. Examples: Leech, earthworm, *Sycon*