

SCIENTIA

## SUMMARY

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- **Aristotle**, the Greek philosopher, classified animals based on whether they live on land, in water or in the air.
- **Classification of living organisms** is based on characteristics and divided the animals into groups and sub-groups.
- **Charles Darwin** put forward the idea of evolution in 1859, in his book, **The Origin of Species**.
- **Ernst Haeckel, Robert Whittaker** and **Carl Woese** have tried to classify living organisms into broad categories, called kingdoms. Kingdom subgrouping into Phylum for animals or Division for plants, Class, Order, Family, Genus and Species is called **hierarchical classification**.
- The scientific naming or nomenclature was introduced by **Carolus Linnaeus**.
- The method of naming of an organism with genus first and the species later is called **binomial nomenclature**.
- **Conventions followed while writing scientific names** includes the name of the genus should begin with a capital letter and the name of the species should begin with a small letter.
- **Monera** includes prokaryotic cells which lack organized nucleus and membrane bound cell organelles. Monera are **autotrophic**, so they derive their nutrition by synthesizing their own food.
- **Protista** are unicellular and the simplest form of eukaryotes and includes algae, diatoms and protozoans.
- Most **fungi** are multicellular and eukaryotic and include mushrooms, rhizopus and mucor.

## DIVERSITY IN LIVING ORGANISMS

- Both fungi and algae together live in a symbiotic relationship, called **lichens**.
- Fungi decay dead plants and animals to derive their food, hence called **saprophytes**.
- Some fungi live in a mutual relationship with blue-green algae, this relationship is called **symbiosis**.
- **Plantae** includes all plants that are multicellular and eukaryotic with cell walls made of cellulose.
- **Animalia** includes all the animals that are multicellular, eukaryotic without cell walls.
- **Photosynthesis** is the process by which plants use energy from the sun to convert water and **carbon dioxide** into sugar and release oxygen into the atmosphere.
- **Criteria for plant classification** is based on features like: does the plant have distinct parts like stem, roots and leaves, do these parts have tissues that transport food and water, does the plant bear naked seeds and are these seeds enclosed in fruits.
- **Eichler** classified the plant kingdom into two sub-kingdoms Cryptogamae and Phanerogamae.
- **Cryptogamae** includes plants with hidden reproductive organs and plants do not bear flowers or seeds.
- **Thallophyta** are the simplest of plants that do not have a well-differentiated body design.
- **Algae** do not have leaves, stems or roots.
- **Bryophyta** are often called **amphibians of the plant kingdom** as they require both aquatic and terrestrial conditions for the completion of their life cycle.

- **Moss** or *Funaria* belongs to the group **Bryophyta**. **Bryophyta** include **Riccia** and **Marchantia**.
- **Pteridophyta** include **fern** plants, in which the plant body is differentiated into stem, leaves and roots and also have naked embryos in the form of spores underneath the leaf.
- All plants that develop seeds and have well-formed stem, leaves and roots, belong to the sub-kingdom **Phanerogamae**.
- **Gymnosperms** include the plants with naked seeds.
- **Angiosperms** include the plants with flowers and seeds enclosed in fruits. Embryos in these seeds have '**seed leaves**' called cotyledons.
- **Cotyledons** supply food to the growing embryos, when the seeds germinate.
- An amazing variety of flora and fauna are included in the **chart-classification of plant kingdom**.
- **Differences between monocots and dicots plants includes the variation in seed, root and in leaves.**
- **Animalia classification** includes Invertebrata and Vertebrata.
- **Invertebrata classification** is characterized by absence of vertebral column.
- **Porifera** includes **Sycon, Spongilla** and **Euplectella**. **Sponges** are covered with **spongin fibres** and has **canal system**.
- **Coelenterata** includes **Hydra, Obelia, Corals** and **Sea anemone** and has **gastrovascular cavity**.

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- Coelenterates are **radially symmetrical**. **Platyhelminthes** are **acoelomates, triploblastic** and **bilaterally symmetrical**. **Tapeworms** includes **Liver fluke** and **Planaria**.
- **Platyhelminthes** are also called **flatworms**. **Nematoda** includes **Ascaris, Enterobius** and **Wuchereria**. **Filarial worms** cause **elephantiasis**.
- **Annelida** includes **earthworms** and **leeches** and has **true coelom**.
- **Arthropoda** includes **Honey bees, Spiders, Prawns** and **Centipedes** and has **open circulatory system**.
- **Mollusca** includes **chiton, mussel, snail** and **octopus**. **Echinodermata** includes **starfish, sea cucumbers** and **sea urchins** and have **tube feet** for locomotion.
- **Protochordata** has **notochord** and includes **Balanoglossus, Herdmania** and **Amphioxus**.
- **Basis for vertebrata classification** are **notochord, dorsal nerve cord** etc.
- **Classification of vertebrata** includes **Pisces, Amphibia, Reptilia, Aves** and **Mammalia**
- **Fishes** includes **cartilaginous and bony fishes**. **Fish heart** is **2 chambered**. **Salamanders, frogs and toads** are **tetrapods**.
- **Amphibian heart** is **3 chambered**. **Reptiles** includes **lizards, chameleons, flying lizards, snakes, crocodiles** and **turtles**. **Crocodile heart** is **4 chambered**.
- **Reptilian heart** is **3 chambered**.
- **Aves** includes **birds** like **sparrows, penguins** and **eagles**. **Bird heart** is **4 chambered**. **Modification of fore-limbs in birds** into **feathers**.

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- **Mammalia** includes **platypus, kangaroo, polar bear** and **dolphin**. **Mammalian skin** maintains body temperature. Mammals have **mammary glands**. **Mammalian heart** is 4 chambered.