

The Living World

Given below are some important points related to the chapter The Living World, which is a part of the NEET Biology Syllabus.

- The unique features of living organisms are growth, metabolism, reproduction, consciousness, and life span.
- Protoplasm was termed by Huxley Wright as the physical basis of life, as all life processes occur within it.
- There are 1.7-1.8 million living organisms known to Science currently. Of those, 1.25 million are animals, and 0.5 million are plants.

Biological Nomenclature: The system of Biological nomenclature was provided by Carolus Linnaeus. It is a system of providing scientific names to known organisms. Every organism has a generic name (genus) and a specific epithet (species).

Taxonomic categories: It is the rank or level assigned to each organism in the hierarchical classification of organisms.

Taxonomic aids: Taxonomic aids are the techniques, stored information, and procedures that help identify and classify animals.

Biological Classification

- The scientific technique of classification of organisms into groups and subgroups based on their similarities and dissimilarities is called biological classification.
- There are two kingdoms, three kingdoms, and five-kingdom systems of classification. According to the two kingdoms classification system, organisms are classified into Plantae and Animalia. According to the three kingdom systems, organisms are classified into Plantae, Protista, and Animalia. According to the five-kingdom system, organisms are classified into Fungi, Protista, Monera, Animalia, and Plantae.
- Haeckel gave the concept of phylogeny. It can be defined as the developmental history of the entire race. Dogherty and Allen gave the term 'Monera'.

- The information about the rare plants growing in protected areas or botanical gardens is given in the green data book. The endangered species of the world are enlisted under the blue book.

Plant Kingdom

- The plant kingdom is classified into Cryptogams and Phanerogamae. Cryptogame refers to plants without seeds, while Phanerogamae refers to plants with seeds. Cryptogame is further classified into Thallophyta, Bryophyta, and Pteridophyta. Phanerogamae is further classified into Gymnosperms and Angiosperms.
- The group Thallophyta consists of the simplest plants with undifferentiated or thallus-like forms. It consists of only algae.
- The group Bryophytes consists of non-vascular mosses and liverworts growing in moist, shady regions. These plants live in soil but also depend on water for sexual reproduction. So, they are called amphibians of the plant kingdom.
- The group of Pteridophytes consists of vascular plants having sporophytic plant bodies and inconspicuous gametophytes. They contain vascular tissue, but the xylem lacks vessels. Also, they lack companion cells and sieve tubes.

Animal Kingdom

- Classification of animals is based on the arrangement of cells, body symmetry, nature of coelom, and the type of digestive, circulatory, and reproductive systems.
- The circulatory system in animals can be open or closed. In an open circulatory system, the blood is pumped out of the heart and directly bathes the cells and tissues. The blood circulates through arteries, veins, and capillaries in a closed circulatory system.
- Diploblastic animals are those in which cells are arranged in two layers of embryonic origin— ectoderm, which lies on the exterior, and endoderm, which lies on the interior. Examples of diploblastic organisms are Porifera and Cnidaria.

- Triploblastic animals are those in which the developing embryo has a third germ layer called mesoderm. Examples of such animals are Platyhelminthes and Chordates.
- Animals are classified into 11 phyla— Porifera, Cnidaria, Platyhelminthes, Annelida, Ctenophora, Aschelminthes, Arthropoda, Echinodermata, Mollusca, Hemichordata, and Chordata.

Morphology of Flowering Plants

- The root: Elongation of the radicle forms the primary roots in Dicotyledons. These primary roots bear lateral roots of several orders known as secondary roots, tertiary roots, etc. The Tap root system is formed by the primary roots and lateral roots. For example, Gram, Mustard, etc. The primary root in monocotyledons is replaced by a large number of roots at the base of the stem and is called the Fibrous Root System. For example, Rice, Wheat, etc.
- A root has five regions— region of maturation, root hair, region of elongation, region of meristematic activity, and the root cap.
- Sometimes, roots are modified for support, aeration, storage, or nitrogen fixation. The taproot of radish, carrot, turnip and adventitious root of sweet potato swell up to store food.
- The prop root of the Banyan tree and the stilt root of maize and sugarcane are modified for support.
- The inflorescence is the arrangement of flowers on the floral axis. A typical flower has a swollen end of the stalk or pedicel. It is called the thalamus, and four whorls of flowers, namely Calyx, Corolla, Androecium, and Gynoecium, are arranged on it.
- A flower is said to be Actinomorphic when it can be divided into two equal radial halves in any radii passing through the centre of symmetry of the flower.

Anatomy of Flowering Plants

- The tissue: Tissue is a group of morphologically similar cells that usually perform the same function.

- Plant tissues can be classified into meristematic and permanent tissue. Meristematic tissue is further divided into apical, intercalary, and lateral meristem. Permanent tissue is classified into simple and complex permanent tissue. Simple permanent tissue is classified into the parenchyma, collenchyma, and sclerenchyma. Complex permanent tissue is classified into xylem and phloem.
- The epidermal tissue system consists of epidermal cells, stomata, and epidermal appendages. It forms the outermost layer of the whole plant body.
- The ground tissue system consists of the tissues between the epidermis and vascular bundle.
- The vascular tissue system comprises complex tissue, xylem and phloem that together give rise to vascular bundles. The dicot stems have open vascular bundles, while the monocot stems have closed vascular bundles.
- Secondary growth is the increase in thickness because of the formation of secondary tissues by lateral meristem. The cambium present between xylem and phloem in the dicot stem is known as intrafascicular cambium.

Structural Organisation in Animals

- Animals have tissues of various types like epithelial tissue, connective tissue, muscular tissue, and neural tissue.
- Epithelial tissue is further classified into simple epithelium, compound epithelium, squamous epithelium, cuboidal epithelium, columnar epithelium, and columnar ciliated epithelium.
- Connective tissue is the most abundant and widely distributed one which links and supports other tissues. It can be classified into loose connective tissue and dense connective tissue.
- Muscular tissue is made up of long, cylindrical fibres called muscle fibres that are arranged parallel to each other. They are composed of myofibrils that contract and relax in response to stimulation. Muscle tissue is further of three types— skeletal, smooth and cardiac muscle tissue.

- The neural tissue is made up of basic units called neurons which are supported and protected by the neuroglial cells.

Cell: Structure and Functions

- Cytology can be defined as the study of the structure, form, and composition of a cell. The cell theory was given by Melthias Schleiden and Theodore Schwann in 1938.
- Cells are of two types— prokaryotic and eukaryotic cells. Examples of prokaryotic cells are Bacteria, Blue-green algae, Mycoplasma, and PPLO. They all share the property of multiplying rapidly, and they differ in size.
- Examples of organisms with eukaryotic cells are Protists, animals, plants, and fungi. Plant cells have a cell wall, a large and central vacuole, and plastids, while animal cells don't.
- A cell membrane is made up of lipids arranged in the form of a bilayer mainly composed of phosphoglycerides.
- The proteins in the cell membrane can be peripheral or central proteins. Peripheral proteins lie on the surface of the cell membrane, while integral proteins are buried deep inside it.
- A cell consists of many cell organelles that lie scattered in the cytoplasm, such as the nucleus, Golgi apparatus, Endoplasmic reticulum, mitochondria, centrioles, and plastids.

Biomolecules

- Biomolecules are the chemicals or molecules present in living organisms. Biomolecules can be organic or inorganic. Examples of organic biomolecules are carbohydrates, fats, proteins, and vitamins. Examples of inorganic biomolecules include minerals, gases, and water.
- Carbohydrates are polysaccharides or long sugar chains that contain monosaccharides as building blocks. The energy in plants is stored in the form of starch.
- In the structure of cellulose, glucose molecules are linked together by 1-4 beta linkage. Proteins are polypeptide chains made up of amino acids.

Amino acids are of two types— essential amino acids and non-essential amino acids. A protein can have a primary, secondary, tertiary, or quaternary structure.

- Nucleic acids are polynucleotides composed of three chemically distinct components called heterocyclic compounds, polysaccharides, and phosphoric acid. It can have two kinds of nitrogenous bases— purines or pyrimidines.

Cell Cycle and Cell Division

- Every 24 hours, the human cell divides at least once. It takes around 90 minutes to complete one cell cycle in yeast.
- The cell cycle has interphase, prophase, metaphase, telophase, and cytokinesis.
- Interphase is the phase during which the cell prepares to divide. The cell lies in interphase for 95% of the time.
- Prophase is the first mitotic phase. It involves initiation of condensation of chromosomal materials, movement of centrioles to the opposite ends of the cell, and disappearance of endoplasmic reticulum, nuclear membrane, and Golgi complex.
- Metaphase marks the complete disappearance of the nuclear membrane. It is the most suitable stage to study the morphology of the nuclear membrane.
- Anaphase involves the splitting of each chromosome at the centromere into two sister chromatids. Then the two chromatids start moving towards opposite poles.
- Telophase is the last mitotic phase, involving reassembling of the nuclear membrane around the cluster of chromosomes. It also marks the reappearance of the nucleolus, Golgi complex, and endoplasmic reticulum.