The Living World

'Living' is something that can grow, move, reproduce, respire and carry out various cellular activities.

Properties of Living World:

Cellular Organization:
All living organisms are composed of one or more cells.
Cells are the basic structural and functional units of life.
Defining Property: Since all the organism have cellular structure.

Metabolism:
Living organisms exhibit metabolic activities such as digestion, respiration, and synthesis of complex molecules.
Defining Property: Some metabolic reactions can be demonstrated outside the body. Isolated metabolic reactions in vitro are not living things but living reaction.

Growth:
Living organisms grow and develop throughout their life cycle.
Growth is irreversible increase in mass and size of an organism.
Not a Defining Property: Since non living things such as Mountains, Stones etc also grow.

Reproduction:
Living organisms reproduce to produce offspring of their own kind.
Not a Defining Property: As some living organism cannot reproduce ex: Eunuchs

Male	Female	Inter breed Species
Lion	Tiger	Liger
Tiger	Lion	Tigon
Donkey	Donkey	Mule
Horse	Horse	Henny

Consciousness (Response to Stimuli):
Living organisms respond to external and internal stimuli in their environment.
Responses can be immediate (like reflexes) or delayed (behavioural responses like phototropism, phagocytosis etc).
Humans have self-consciousness.
Human in comma is Brain dead but a living organism.
Defining Property: Since all organism respond to stimuli without acceptation.

Diversity in Living World:

Biodiversity: The total number and types of organism present on earth.
It includes genetic diversity, species diversity, and ecosystem diversity.
Biodiversity is crucial for ecological balance and ecosystem stability

- Total no. of species discovered 1.7-1.8.
- Estimated no. of species – 5-30 million.
- Half of them are found in unexplored tropical rain forest (8% of total land but rich diversity) & large no. exists under water.
- Animal Species are more than 1 million out of these 70% are insects.
- Species increase with increase in area.
- New area more species to be discovered.

Que: What is Nomenclature? What is its need?
The process of giving a scientific name to an organism based on certain principles and criteria is called Nomenclature.
Local names vary from place to place, even within a country. Hence, giving a standard name to an organism so that organism is known by the same name all over the world.

Binomial Nomenclature – Carolus Linnaeus

- ICBN – International code for Botanical Nomenclature
- ICZN – International code of Zoological Nomenclature

Rules for Nomenclature

1. Each name has two words – First Name – Genus, Second name – Species.
2. Should be underlined when written manually and italicized when printed.

3. Names should be Latinized irrespective of their origin
4. Generic name begins with upper case and the specific name begins with lower case

- Name of the author appears after the specific epithet, i.e. written in an abbreviated form, e.g., Mangifera indica Linn.

Que: What is the need of classification?
Ans: Need for Classification:

- To identify an organism correctly.
- To know the origin and evolution of an organism.
- To establish the relationship among different organisms.
- It provides the information about living things in different geographical regions.
- It helps in understanding how complex organisms must have evolved from simpler ones.

Taxonomy (*Greek*- Taxis-arrangement, nomus- law) – it is the process of identification, Classification , nomenclature and organisation of life forms considering the morphological, anatomical, cell structure, and ecology etc.

- Oldest Classification Based on Use.
- Modern Classification based on: Character + Identification + Classification + Nomenclature
- Classification –Assigning creatures in specific groups (taxa) based on defined characters.

Systematics – Standard Taxonomy + Evolutionary Relationship
Investigating life forms in association with identification, nomenclature, arrangement and evolutionary correspondence.
Book by **Linnaeus- Systema Naturae**

Taxonomical Categories: Taxonomy is the science of classification, and living organisms are classified into various taxonomical categories based on their similarities and evolutionary relationships.
All categories together constitute the taxonomic hierarchy (ascending order species to kingdom)

1. **Kingdom**: The highest taxonomic categories include different phylum or divisions. Ex: Plantae, Animalia, Fungi, Protista, Monera.
2. **Phylum/Division**: Each kingdom is divided into phyla, that incorporates related classes in a division/phylum.
   Eg: Division Bryophytes, Pteridophytes comes under Kingdom Plantae.
   Phylum Porifera, Chordata, Annelida, Platyhelminthes etc comes under Kingdom Animalia
3. **Class**: Within each phylum, organisms are further classified into classes based on shared characteristics.
   Eg: Order Primata (monkey, gorilla and gibbon) & Carnivora comes under Class Mammalia.
4. **Order**: Each class is subdivided into orders, which include organisms with more specific similarities.
   Eg: Based on floral character families like Convolvulaceae, Solanaceae are included in the order Polymoniales
   Carnivora include family like Felidae, Canidae
5. **Family**: Orders are further divided into families, grouping related genera.
   Eg: Falidae (Family of Lion, tiger, Cat- Felis Catus)
   Canidae (Family of Dog, Wolf)
   Genera Solanum, Petunia and Datura are placed in the family Solanaceae.
   Fabaceae/Leguminoseae consist of all pulses.
6. **Genus**: Families are divided into genera (singular: genus), which include species that are closely related.
   Eg: Solanum tuberosum (Potato) Panthera tigris (tiger)
   Solanum nigrum (Black Night Shade) Panthera leo (lion)
   Solanum melongena (Brijal) Panthera pardus (Leopard)
7. **Species**: The most specific taxonomical category having fundamental similarities. A species comprises individuals that can interbreed and produce fertile offspring.
   Ex: Canis lupus familiaris (Dog)

Kids	**Kingdom**	Animalia	Plantae	Plantae	Animalia	Animalia	Animalia	Plantae
Prefer	**Phylum**	Arthropoda	Angiospermae	Angiospermae	Chordata	Chordata	Chordata	Angiospermae
Chinese	**Class**	Insecta	Dicotyledonae	Dicotyledonae	Mammalia	Mammalia	Mammalia	Dicotyledonae
Over	**Order**	Diptera	Sapindales	Fabales	Carnivora	Carnivora	Primata	Solanales
French	**Family**	Muscidae	Anacardiaceae	Fabaceae	Felidae	Canidae	Hominidae	Solanaceae
Green	**Genus**	*Musca*	*Mangifera*	*Pisum*	*Panthera*	*Canis*	*Homo*	*Solanum*
Salad	**Species**	*Domestica*	*Indica*	*sativum*	*Leo*	*lupus*	*Sapiens*	*Tuberosum*
Common Name		House fly	Mango	Pea	Lion	Wolf	Human	Potato

Father of Biology & Zoology	Aristotle
Father of Botany	Theophrastus
Father of Taxonomy	Carolus Linnaeus

Write the scientific names of the following.

1. Indian Cobra- Naja naja
2. Wheat - Triticum aestivum
3. Rice - Oryza sativa
4. Horse- Equus caballus/equus
5. Honey Bee- Apis indica
6. Cabbage- Brassica oleracea
7. Cockroach - Periplaneta americana
8. Maiz- Zea mays
9. China Rose- Hibiscus rosa
10. Rat- Rattus rattus
11. Frog – Rana tigrana
12. Earthworm- Pheretima posthuma