

Living World

What is Living??

→ growth, development, reproduction, metabolism, ability to sense env., responsiveness → unique features of living organisms

→ ↑↑ in mass and number
↳ Two characteristics of growth.

Growth →

Indeterminate growth (directionless) Determinate growth (direction)

Non-living also grow → accretion.

Living beings growth → Intrinsic

Growth → not defining Intussusception property of living being.

Reproduction →

Sexual Asexual

Fungi → Spores

Hydra → Budding

Planaria → Regeneration

Filamentous algae → Fragmentation

Many organisms don't reproduce.

↳ Mules, sterile worker bees,

Infertile human beings

Reproduction → not defining property

Metabolism →

Catabolism Anabolism

Metabolism → defining property of living organism.

No exception. *

Cellular organisation of body is defining of life forms. *

Cell → Tissue → Organ → Organ System
↓
Organism.

→ All organisms are aware of their surroundings.
Human beings are aware of themselves. (Self consciousness)

Consciousness
↳ defining property. *

exception - Coma patient.

Diversity In The Living World

→ No. of species known → 1.7 to 1.8 million.

↳ Referred to as biodiversity

(no. and type of organisms present on Earth).

→ There is need to standardise the naming of living organisms.

↳ Nomenclature.

→ Nomenclature is possible only when organism is described correctly and we know what organism name is attached to → Identification

Scientific Name and Criteria

ICBN → International Code for Botanical Nomenclature.

ICZN → International Code for Zoological Nomenclature.

ICNV → International Code for Nomenclature of Bacteria. *

ICVN → International Code for Viral Nomenclature.

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Binomial Nomenclature →

Carlous Linnaeus

→ Systemae Plantarum

Systemae Naturae (1758) (1753)

2 Components

Generic Name Specific Epiphet

Rules for Nomenclature →

- ① Biological names are generally in latin and are written in italics.
- ② 1st Word → Genus
2nd Word → Specific epithet.
- ③ Handwritten → Underlined.
printed → Italics.
- ④ Genus - Starts with Capital letter
Specific epithet - starts with small letter

Example → *Mangifera indica* Linn
Genus name specific epithet Carleous Linneous

eg- *Catla catla* → tautonyms.

Classification → process by which anything is grouped into categories.

- Scientific term for these categories is Taxa.
- Taxa can indicate category at different levels.

All living organisms can be classified into different Taxa.

This process of classification is called Taxonomy

Systematics → Systematic arrangement of organisms.

Linnaeus, Latin Word - Systema

Neo Systematics → (Julian Von Huxley)

→ Used to know inter relationship amongst living organism.

Taxonomic

Categories \rightarrow

Classification involves hierarchy of steps in which each step represents a rank or category

↳ Taxonomic category

All categories together constitute taxonomic hierarchy.

→ Taxonomic categories are distinct biological entities and not only morphological aggregates.

Kingdom
phylum/division
Class
Order
family
genus
species

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Species → Smallest taxonomic category.

Organisms with similar morphological characters.
eg → *Mangifera indica*.

→ *Panthera leo*

→ *Solanum tuberosum*

Genus → Group of related species.
e.g - potato, brinjal, tomato

Same genus (Solanum)

lion, leopard, tiger

Same genus (panthera)

felis → include cats.

Genus with Single Species \rightarrow Monotypic
 \rightarrow 1 species \rightarrow polytypic.

Family → Group of related genera with still less number of similarities as compared to genus and species

→ 3 different genera - *Solanum*, *Petunia* and *Datura* are placed in Family *Solanaceae*.

→ genus *panthera* and *felis* in Family *Felidae*.

Order → assemblance of family which exhibit few similar characters.

plant families like *Convolvulaceae*, *Solanaceae* — *polymoniales*.

→ Order → Carnivora
(family = *Felidae* and *Canidae*) → dogs

Class → Order *primata* comprising monkey, gorilla and gibbon is placed in class *Mammalia* along with Order *Carnivora*.

Division / Phylum → classes comprising plants / animals like fishes, amphibians, reptiles, birds and mammals are included in phylum *Chordata*.

Kingdom → Highest Taxonomic Category.

Higher the category, greater is difficulty of determining the relationship to other taxa at same level.

| | | |
|-----------------|---------------------|-------------------------|
| Common name | Man | Mango |
| Biological name | <i>Homo-sapiens</i> | <i>Mangifera indica</i> |
| Genus | <i>Homo</i> | <i>Mangifera</i> |
| Family | <i>Hominidae</i> | <i>Anacardiaceae</i> |

| | | |
|------------------|-----------------|----------------------|
| Order | <i>primata</i> | <i>Sapindales</i> |
| Class | <i>Mammalia</i> | <i>Dicotyledonae</i> |
| phylum/ division | <i>Chordata</i> | <i>Angiospermae</i> |

Housefly - *Musca domestica*
Wheat - *Triticum aestivum*.

Table - 1.1 NCERT.

Taxonomical AIDS *

Herbarium → Store house of collected plant specimen, that are dried, pressed and preserved on sheets.

Herbarium carries label providing information about Data, place of collection, English, local and botanical name, family, collector name.

It serves as quick referral system, in taxonomic studies.

Standard Size - 11.5 X 16.5 inch

Vasculum - special type of box in which collected plant specimen are kept.

Botanical Gardens

Collection of living plants. plants grown for identification

Label - Botanical Name and Family

Ex-situ Conservation

Royal Botanical Garden (Kew)

→ England

Indian Botanical Garden (Howrah)

→ India

National Botanical Research Institute, Lucknow

Indian Botanical Garden (Sibpur) - Kolkata

Main Botanical Garden - Moscow

Museum → Collection of preserved plant and animal species for study and reference.

Insect Box - Killing - pinning - paper

Zoological Park → Wild animals kept in protected environment.

Ex situ Conservation.

Key → Taxonomic aid used for identification of plants and animals based on similarities and dissimilarities.

- Contrasting Character
- pair / couplet
- each statement in key is called a lead
- Keys are analytical in Nature.

Flora — actual account of habitat and distribution of plant in given area.

Manuals — Useful in providing information for identification of name of species found in that area.

Monograph — Contains information on any one taxon.



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