

CHAPTER-1

THE LIVING WORLD



Facts that Matter

Characteristics of Living Beings

1. **Growth.** All living organisms grow in size and number. Some non-living things also grow. For example clouds develop bigger in size But growth of clouds is a result of accumulation of substances from outside. On the other hand, growth of living beings comes from inside. This is the result of continuous cell division.

2. **Reproduction.** All living beings reproduce their progeny. Progeny are more or less similar to their parents. Reproduction can be sexual or asexual.

3. **Metabolism.** All the processes going on inside the body of a living organism are called \ metabolism. Metabolism can be classified in two types:

(a) **Anabolism.** The process which results in synthesis of something, is called anabolism. e.g., Photosynthesis.

(b) **Catabolism.** The process which results in breaking down of a compound, is called catabolism. e.g., Respiration.

4. **Response to Outside Stimuli.** All living organisms show a response to outside stimulus. These stimuli can be light, heat, other organisms or chemicals. In other words, all living beings are conscious of their surroundings.

Diversity in the Living World

Biodiversity. The variety of living beings found in a given geographical area is called biodiversity of that area.

Nomenclature and Identification. Because of the huge diversity present in the living world it became necessary to develop a system to classify and name all plants and animals.

Nomenclature. Assigning a unique name to an organism is called nomenclature.

Identification. Associating an organism with its unique name is called identification.

ICBN. International Code for Botanical Nomenclature has developed a system for identification and classification of plants.

ICZN. International Code of Zoological Nomenclature has developed a system for identifying and classifying the animals.

Biological Name. This system gives a unique name to each species. The name is called biological name and is usually represented by two words. The first word always starts with a capital letter and the second word always starts with a small letter.

Example: *Mangifera indica* is the biological name of mango. The word *Mangifera* indicates the genus and *indica* indicates the species.

General Rules for Nomenclature

1. Biological names are generally in Latin and written in italics. They are Latinised or derived from Latin irrespective of their origin.
2. The first word in a biological name represents the genus.
3. The second component denotes the species.
4. Both the words in a biological name, when handwritten, are separately underlined, or printed in italics to indicate their Latin origin.
5. The first word denoting the genus starts with a capital letter while the second word denoting species starts with a small letter.

Taxonomic Categories and Hierarchy

Classification is not a single step process but involves hierarchy of steps in which each step represents a rank or category. Since the category is a part of overall taxonomic arrangement, it is called the taxonomic category and all categories together constitute the taxonomic hierarchy. Each category, referred to as a unit of classification, in fact, represents a rank and is commonly termed as taxon (pl.: taxa).

Table of Taxonomic Categories

Kingdom
Phylum
Class
Order
Family
Genus
Species

Species. Taxonomic studies consider a group of individual organisms with fundamental morphological similarities, as a species. One should be able to distinguish one species from the other closely related species based on the distinct morphological differences. Members of species are able to Interbreed .

Genus. Genus comprises a group of related species which has more characters' In common in comparison to species of other genera. We can say that genera are aggregates of closely related species. For example, potato, tomato and brinjal are three different species but all belong to the genus Solanum. Lion (Pantheraleo), leopard (P. pardus) and tiger (P. tigris) with several common features, are all species of the genus Panthera. This genus differs from another genus Felis which includes cats.

Family. The next category, Family, has a group of related genera with still less number of similarities as compared to genus and species. For example, if you observe the features of a cat and a dog, you will find some similarities and some differences as well. They are separated into two different families Felidae and Canidaerespectively.

Order. Generally, order and other higher taxonomic categories are identified based on the aggregates of characters. Order being a higher category, is the assemblage of families which exhibit a few similar characters. The animal order, Carnivora, includes families like Felidae andCancidae Families are characterised on the basis of both vegetative and reproductive features of plant species.

Class. This category includes related orders. For example, order Primata comprising monkey, gorilla and gibbon is placed in class Mammalia along with order Carnivora, that includes animals. like tiger, cat and dog. Class Mamma/ia has other orders also.

Phylum. Classes comprising animals, like fishes, amphibians, reptiles, birds along with mammals constitute the next higher category called Phylum. All these, based on the common features like presence of notochord and dorsal hollow neural system, are included in phylum Chordata. In case of plants, classes with a few similar characters are assigned to a higher category called Division.

Kingdom. All animals belonging to various phyla are assigned to the highest category called Kingdom Animalia in the classification system of animals. The Kingdom 75/antae, on the other hand, is distinct, and comprises all plants from Various divisions.

Some Organisms with Taxonomic Categories

Common Name	Biological name	Genus	Family	Order	Class	Phylum/ Division
Man	Homo Sapiens	Homo	Hominidae	Primata	Mammalia	Chordata
Housefly	Musa domestica	Musca	Muscidae	Diptera	Insecta	Arthropoda
Mango	Mangifera indica	Mangifera	Anacardiaceae	Sapindales	Dicotyledon	Angiosperm
Wheat	Triticum aestivum	Triticum	Poaceae	Poales	monocotyledon	Angiosperm

Taxonomical Aids

These help scientists keep a record and study common and uncommon characteristics of animals and plants. This study helps them to decide about the correct place of a species in the given taxonomical category.

Herbarium. Collected plant species are dried for preservation. The place where they are kept as collection is known as herbarium. '

Botanical Gardens. Here live plants are reared for ready reference. Through live plants botanists can study certain features, like mode of reproduction, pattern of pollination, etc.

Museums. Dead animal specimens are preserved in museums. Extinct species, like Dodo are kept in certain museum and act as good reference source .

Zoological Parks. They are helpful In studying live specimens of animal species. Certain ferocious animals are easier to study in zoological parks.

Keys. Keys are pairs of contrasting characters, out of which either of the characters is carried forward across generations and another is discarded to gain better adaptability. These keys are good tool to understand, how complex organisms evolved from simpler organisms.

Manuals and Records. Manuals and records show historical data about flora and fauna of a particular geographical location.