



1. THE LIVING WORLD

Life is a unique, complex organization of molecules, expressing through chemical reactions in order to bring about life activities.

CHARACTERISTICS EXHIBITED BY LIVING ORGANISMS

Non-defining property Not all living things exhibit this character or characters exhibited by non-living things also.	1. Grow in size and reproduce offspring similar to them. ✓ Growth is the increase in mass and number of cells. ✓ <i>In plants</i>, growth by cell division occurs continuously throughout their life span. ✓ <i>In animals</i>, growth is only up to a certain age. However, cell division occurs in certain tissues to replace lost cells. ✓ Non-living objects grow by accumulation of <i>material on the surface</i>. In living organisms, growth is <i>from inside</i>. ✚ Reproduction is the production of progeny similar to those of parents. ✚ Organisms reproduce asexually and sexually. ✚ In unicellular organisms, growth & reproduction are same. ✚ Many organisms do not reproduce (e.g. mules, worker bees, infertile human couples, etc).
Defining property All living things exhibit this character	2. Metabolism- Many biochemical reactions take place inside. 3. Cellular organisation- Complex entities formed of one or more cells. 4. Consciousness- Ability to sense environment and mount a suitable response. 5. Adaptation- Adapt to environmental changes and gradually evolve into new type of organisms.

DIVERSITY IN THE LIVING WORLD

✚ The living world is rich in variety (1.7-1.8 million) but a large number still remains unknown.

✚ **Systematics**- The branch of study dealing about different kinds of organisms and their diversities, the relationships among them.

✚ **Taxonomy**- The branch of science which deals with **identification, nomenclature** and **classification** of organisms.

International codes for taxonomy:

-for plants: **ICBN**- International Code for Botanical Nomenclature

-for animals: **ICZN**- International Code for Zoological Nomenclature

Binomial nomenclature (by **Carolus Linnaeus**).

- It is a method of naming by which an organism is known by two components- **Generic name & specific epithet**.

Rules:-

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 while the second component denotes the specific epithet.
3. Both the words in a biological name, when handwritten, are separately underlined, or printed in italics to indicate their Latin origin.
4. The first word denoting the genus starts with a capital letter while the specific epithet starts with a small letter.
5. Sometimes name of the author appears after the specific epithet, and is written in an abbreviated form.

Eg: *Mangifera indica* Linn. (printed), Linn.- indicates that this species was first described by Linnaeus

Mangifera indica (hand written)

Advantages:-

- ✓ The scientific names ensure that each organism has only one name.
- ✓ Description of any organism should enable the people (in any part of the world) to arrive at the same name.
- ✓ Also ensure that such a name has not been used for any other known organism.

TAXONOMIC CATEGORIES

✚ Organisms are placed in a series of ranks (taxonomic categories or **taxa**) according to their natural relationship.

All the categories constitute a **taxonomic hierarchy**.

Kingdom- Group of related phyla

Phylum/Division- Group of related classes

Class - Group of related orders

Order - Group of related families

Family - Group of related genus

Genus -Group of related species

Species -Composed of same kind of organisms

Eg: Plantae

Eg: Angiospermae

Eg: Dicotyledonae, Monocotyledonae, Mammalia, amphibians

Eg: Polymoniales, Sapindales,

Eg: Solanaceae, Convolvulaceae,

Eg: *Solanum*, *Petunia*, *Datura*,

Eg: *tuberosum*, *nigrum*, *melongena*,

Animalia

Chordata

Carnivora, Primata

Felidae, Canidae

Panthera, *Felis*

leo, *pardus*, *tigris*

TAXONOMICAL AIDS

These are aids which help in taxonomic process.

1. Herbarium

Herbarium is a store house of collected plant specimens.

Procedures of herbarium technique:-

Step 1. Collecting specimen

Step 2. Drying and pressing of specimen

Step 3. Mounting of specimen (by glue) on herbarium sheet (thick paper of 29 x 41.5 cm).

Step 4. Labelling- providing information about date and place of collection, English, local and botanical names, family, collector's name, etc.

Step 5. Storing- Sheets are arranged according to a universally accepted system of classification.

A design of the label

Botanical Name:
Common Name:
Family:
Locality: Habitat:
Notes:
Collector:..... Date:.....

2. Botanical Gardens

These specialised gardens have collections of living plants labelled with botanical/scientific name and its family for reference.

Famous botanical gardens:-

- Royal Botanical garden at Kew (England, 1600's). World largest- 80,000 plants; possess 6 million herbarium sheets also.
- Indian Botanical Garden, Howrah (1787) - India's largest; possess 1 million herbarium sheets also.
- National Botanical Research Institute, Lucknow (India).

3. Museum

Museums have collections of preserved plant and animal specimens for study and reference.

Museums contains:-

- Specimens preserved in the containers or jars in preservative solutions.
- Plant and animal specimens preserved as dry specimens.
- Insects are preserved in insect boxes after collecting, killing and pinning.
- Larger animals like birds and mammals are usually stuffed and preserved.
- Collections of skeletons of animals.

4. Zoological Parks (Zoos)

These are the places where wild animals are kept in protected environments under human care and which enable us to learn about their food habits and behaviour.

All animals in a zoo are provided, as far as possible, the conditions similar to their natural habitats.

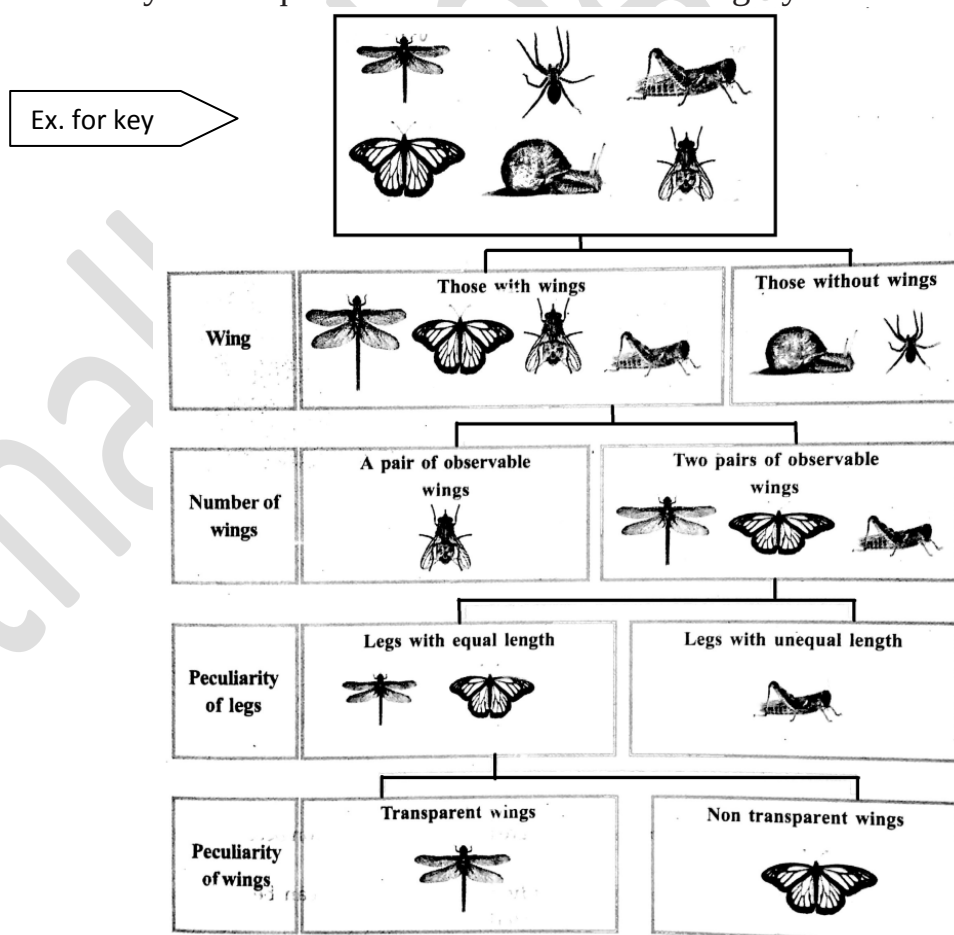
5. Taxonomic key

Key is a tool used for identification of plants and animals based on the similarities and dissimilarities.

The keys are based on the contrasting characters generally in a pair called **couplet**.

- It represents the choice made between two opposite options.
- This results in acceptance of only one and rejection of the other.
- Each statement in the key is called a **lead**.

Separate taxonomic keys are required for each taxonomic category such as family, genus and species for identification purposes.



→ Other written taxonomic aids for further studies.

6. Flora: Contains the actual account of habitat and distribution of plants of a given area.

→ These provide the index to the plant species found in a particular area.

7. Manuals: Provide information for identification of names of species found in an area.

8. Monographs: Contain information on any one taxon.

9. Catalogues: List of publications (books, periodicals and dictionary) which provide new information for taxonomic studies.