The Living World

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What are characteristics of Living ?

- Growth
- Reproduction
- Metabolism
- Self- organize
- Response to stimuli

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Biodiversity

- Term coined by **W.G. Rosen**
- Term used to refer to the variety of microorganisms, plant and animals on earth.
- The number of species known **1.7-1.8 million.**

Need for classification :

- To organise the vast number of microorganisms, plants and animals into categories that could be named, remembered, studied and understood.
- The plants and animals in our own area by their local names. These local names would vary from place to place, even within a country.

- There is a need to standardise the naming of living organisms such that a particular organism is known by the same name all over the world. This process is called **Nomenclature.**
- Obviously, nomenclature or naming is only possible when the organism is described correctly and we know to what organism the name is attached to. This is **Identification.**
- **Classification** is the process by which anything is grouped into convenient categories based on some easily observable characters.
- Scientific names are based on agreed principles and criteria, which are provided in

International Code for Botanical Nomenclature (ICBN) for plants

International Code of Zoological Nomenclature (ICZN) for animals.

Binomial nomenclature

- Naming system given by **Carolus Linnaeus** (Father of Taxonomy).
- Being practised by biologists all over the world.
- Each name has two components – the **Generic name** and the **specific epithet.**
- Effectively begin with his work **Species Plantarum** in 1753.

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Universal rules of nomenclature

1. Latinised names are used.
2. First word is genus, second word is species name.
3. Pirnted in italics; if handwrittten then underlined separately.
4. First word starts with capital letter while species name written in small letter.
5. It can be illustrated with the example of *Mangifera indica.*
6. Name of the author appears after the specific epithet, i.e., at the end of the biological name and is written in an abbreviated form, e.g., *Mangifera indica* Linn.

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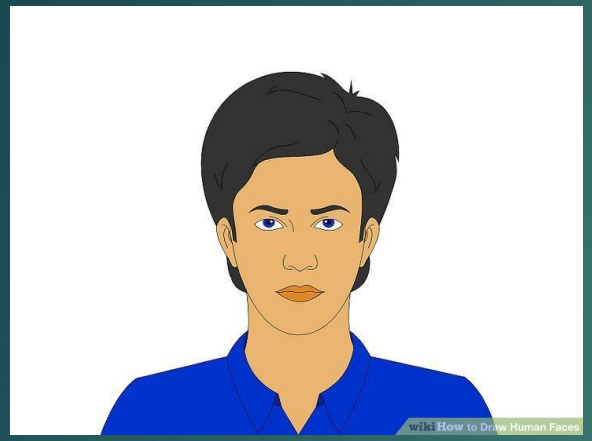
Scientific names of some organisms



Homo sapiens

Musca domestica

Triticum aestivum

Mangifera indica

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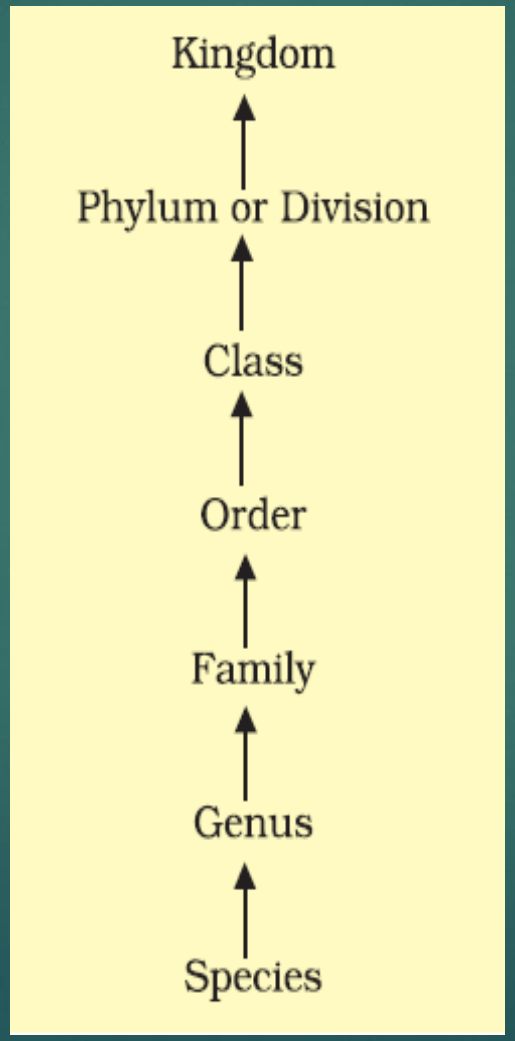
- **Classification** is the process by which anything is grouped into *convenient categories* based on some easily observable characters.
- The scientific term for these categories is **taxa** i.e. Each category (*i.e.*, unit) of classification is called as a taxon.
- Animals', 'mammals', 'dogs' are all taxa –a dog is a mammal and mammals are animals. Therefore, 'animals', 'mammals' and 'dogs' represent taxa at different levels.
- **Taxonomy** : Study of principles and procedures of identification, nomenclature and classification.
- **Systematics** : derived from the Latin word 'systema' which means systematic arrangement of organisms. It deals with classification of organisms based on their diversities and relationships among them. Terms was proposed by Carolus Linnaeus who wrote '*Systema Naturae*'.

Taxonomic Hierarchy

Classification of organisms in a definite sequence of taxon or category or rank in a descending order.



Mnemonics:

Keep **P**ot **C**lean **O**r **F**amily **G**et **S**ick

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TABLE 1.1 Organisms with their Taxonomic Categories

Common Name	Biological Name	Genus	Family	Order	Class	Phylum/ Division
Man	*Homo sapiens*	*Homo*	Hominidae	Primata	Mammalia	Chordata
Housefly	*Musca domestica*	*Musca*	Muscidae	Diptera	Insecta	Arthropoda
Mango	*Mangifera indica*	*Mangifera*	Anacardiaceae	Sapindales	Dicotyledonae	Angiospermae
Wheat	*Triticum aestivum*	*Triticum*	Poaceae	Poales	Monocotyledonae	Angiospermae

- **Concept of Species** : All the members that can interbreed among themselves and can produce fertile offsprings are the members of same species. This is the biological concept of species proposed by **Mayr.**
- **Genus** comprises a group of related species which has more characters in common in comparison to species of other genera.
- **Family**, has a group of related genera with still less number of similarities as compared to genus and species.

So on.....

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TAXONOMICAL AIDS

- Taxonomical Aids are the tools for study of taxonomy. Some of these are :

1. **Herbarium**
   - Store house of collected plant specimens that are dried, pressed and preserved on sheets.
   - These specimens, along with their descriptions on herbarium sheets, become a store house or repository for future use.
   - Sheets also carry a label providing information about
     - Date and place of collection,
     - English, local and botanical names,
     - Family,
     - Collector's name, etc.

2. Botanical Gardens

- Have collections of living plants for reference
- Plant species in these gardens are grown for identification purposes and each plant is labelled indicating its botanical/scientific name and its family.
- Famous botanical gardens are:
  - Royal Botanical Garden, Kew (England),
  - Indian Botanical Garden, Howrah (India) and
  - National Botanical Research Institute, Lucknow (India).

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3. Museum

- Are generally set up in educational institutes such as schools and colleges.
- Museums have collections of preserved plant and animal specimens for study and reference.
- Specimens are preserved in the containers or jars in preservative solutions.
- Insects are preserved in insect boxes after collecting, killing and pinning.
- Larger animals like birds and mammals are usually stuffed and preserved.

4. Zoological Parks

- 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.

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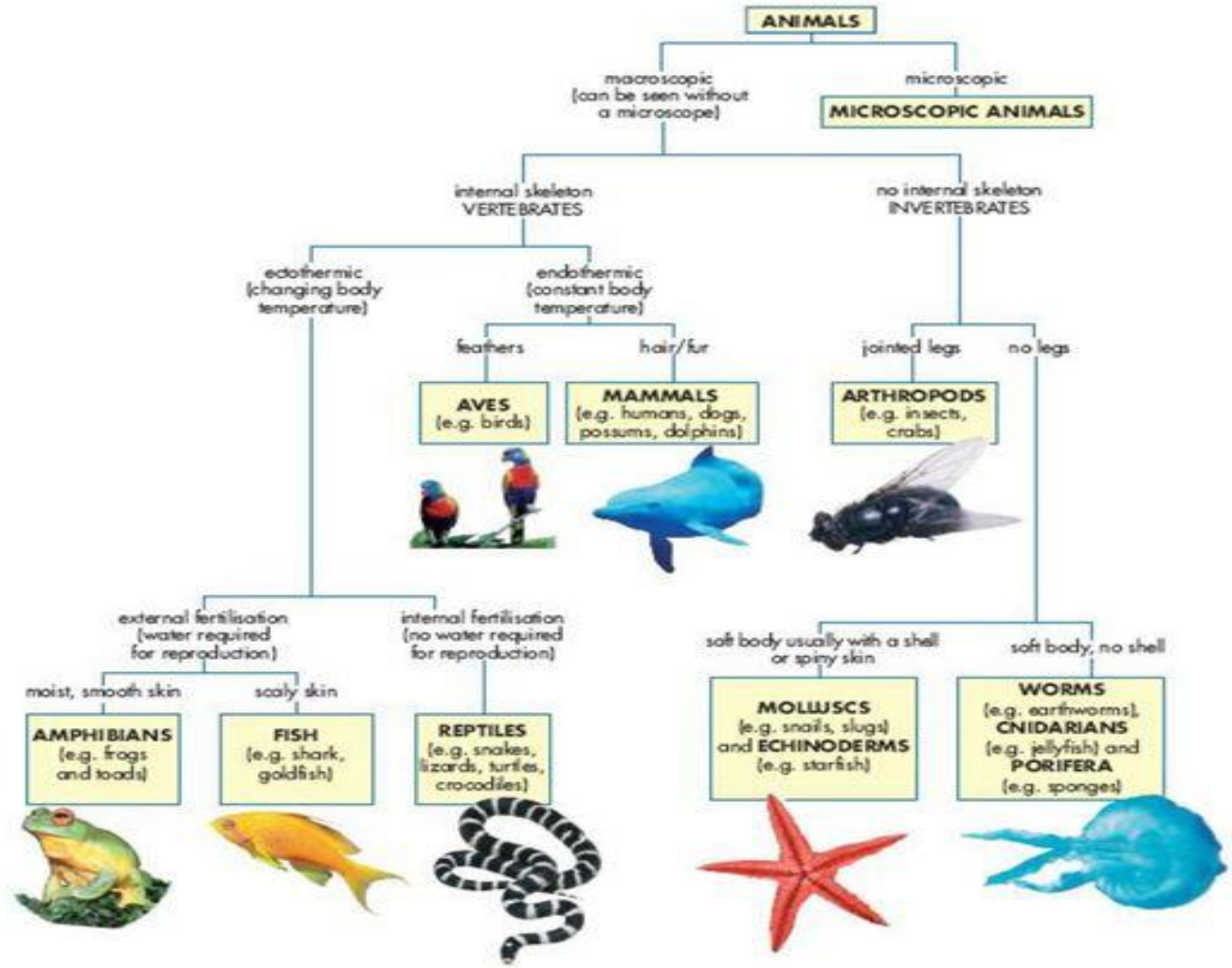
5. **Key**

- 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.

Dichotomous Key: Animals



- **Flora** (Index to plant species found in a particular area.
- **Manuals** (Provide information for identification of name of species in an area.)
- **Monographs** (Contain information on any one taxon.)

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