THE LIVING WORLD

TAXONOMIC CATEGORIES

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- There are **7 main taxonomic categories (known as obligate or essential or broad categories)** which are essentially used in classification of organism.
- There are many **intermediate categories** like subkingdom, super phylum or super division, sub division, super class, sub-class, super order, sub order, super family, sub family, Tribe, sub species, variety etc. to facilitate more sound and scientific placement of various taxa.

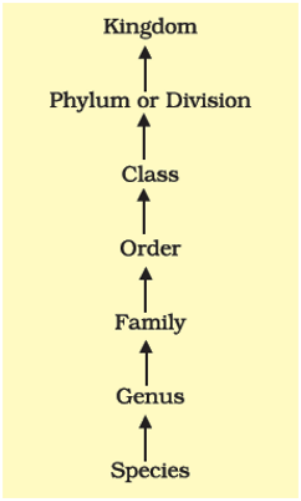


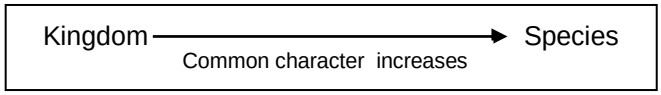
Fig.: Taxonomic categories (ascending hierarchy)

- Kingdom is the highest category.
- Species is smallest category / basic unit of classification.
- Descending or Ascending arrangement of taxonomic categories known as hierarchy of classification.
- Classification of any organism is written in descending order.
- No suffix for kingdom, genus and species.

TAXON V/S CATEGORY

- **Taxon deals with real objects/living while category deals with ranking / abstract term.**
- Taxon belong to any rank while category belongs to one particular rank.
  e.g. Bryophyta is a taxon while division is a category. Similarly pea is a taxon while species is a category.
- The number of common character goes on decreasing from species (more common character) to kingdom (less common character). **e.g.** order being a higher category is the

assemblage of families which exhibit a few similar character. And the similar character are less in number as compared to different genera included in family.



- Higher the category, greater is the difficulty of determining relationship to other taxa at the same level so problem the classification become more complex.

SPECIES

- Taxonomic studies consider **a group of individual organisms** with fundamental similarities as a **species**.
- **Species is a basic unit for understanding taxonomy as well as evolution.**
- one species can be distinguished from the other closely related species based on the distinct **morphological differences**.

e.g.
Mango – Mangifera indica
Potato – Solanum tuberosum
Brinjal – Solanum melongena
Makoi – Solanum nigrum
Lion – Panthera leo
Tiger – Panthera tigris
Human – Homo sapiens

} indica, tuberosum, melongena, nigrum, leo, tigris, sapiens represent the specific epithets

Species concept:

- Species term and species concept was proposed by **John Ray.**
- Biological species concept was given by **Ernst Mayr**. According to Mayr "species is group of organism with similar morphology which can interbreed among themselves and produce fertile offspring". It is based on reproductive isolation.

GENUS

- Genus comprises **a group of related species** which has more characters in common in comparison to species of other genera.

- Each genus may have one or more than one specific epithets representing **different organisms, but having morphological similarities.**
- Genus may be monotypic (Single species in a genus e.g. Gregoria fenestrata) and Polytypic (many species in a genus).

Solanum (Genus)
- Tomato - Solanum lycopersicum
- Brinjal - Solanum melongena
- Potato - Solanum tuberosum

Panthera
- Lion – Panthera leo
- Tiger – Panthera tigris
- Leopard – Panthera pardus
- Jaguar – Panthera onca

Felis (Cat) and Canis (Dog)

FAMILY (SUFFIX – ACEAE)

- **Family** has **a group of related genera** with still less number of similarities as compared to genus and species.
- Families are characterised on the **basis of both vegetative and reproductive features** of plant species.

Solanaceae (Family)
- Solanum
- Petunia
- Datura

Falidae (cat family)
- Felis (Cats)
- Panthera

Canidae (Dog family)

ORDER (SUFFIX – ALES)

- Order being a higher category, is the **assemblage of families.**

Polymoniales (Order)	Convolvulaceae, Solanaceae
Carnivora	Felidae, Canidae
Primata	Cercopithecidae (Catarrhini) (Monkey), Hylobatidae (Gibbon), Pongidae (Gorilla and Chimpanzee), Hominidae (Human)

CLASS (SUFFIX – AE, – OPSIDA, – PHYCEAE)

- This category includes **related orders**.

Mammalia (Class)	Carnivora (order), Primata
Dicotyledoneae (Magnoliopsida)	Sapindales, Lamiales

PHYLUM / DIVISION (SUFFIX – PHYTA)

- Phylum (Animals) / Division (Plants) include related classes.

Chordata (Phylum) → Pisces, Amphibia, Reptilia, Aves, Mammalia.

Angiosperm (division) → Dicotyledoneae, Monocotyledoneae.

KINGDOM

- **Highest Taxonomical category**
- Plant Kingdom includes different divisions of plants and Kingdom Animalia includes all phylum of animals.

Organisms with their Taxonomic Categories						
Common Name	**Biological Name**	**Genus**	**Family**	**Order**	**Class**	**Phylum/ Division**
Human	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
Tulsi	Ocimum sanctum	Ocimum	Lamiaceae	Lamiales	Dicotyledonae	Angiospermae
Dog	Canis familiaris	Canis	Canidae	Carnivora	Mammalia	Chordata