

Taxonomy

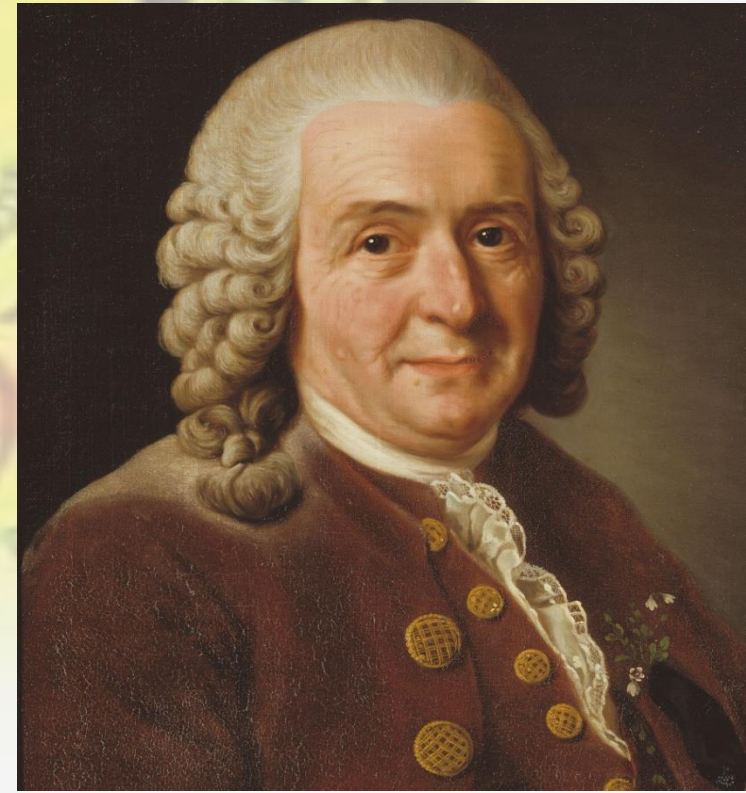
- Taxonomy is the science of classifying and categorizing living organisms based on shared characteristics and evolutionary relationships.
- Hierarchy: Taxonomy organizes organisms into a hierarchical system with various ranks from the broadest to the most specific. The major ranks, from highest to lowest, are Domain, Kingdom, Phylum, Class, Order, Family, Genus, and Species.
- Binomial Nomenclature: The system of naming species uses a two-part scientific name (binomial nomenclature) based on Latin or Greek words. The first part is the genus, and the second part is the species epithet (e.g., *Homo sapiens* for humans).

Taxonomy deals with three different things

- **Classification:** Taxonomy involves the systematic organization of living organisms into hierarchical groups based on shared characteristics and evolutionary relationships. This classification provides a framework for understanding the diversity of life and how different species are related to each other.
- **Identification:** Taxonomy plays a crucial role in the identification of individual organisms. It provides the tools and criteria for distinguishing one species from another. Taxonomists use characteristics such as morphology, genetics, behavior, and ecological traits to identify and differentiate organisms.

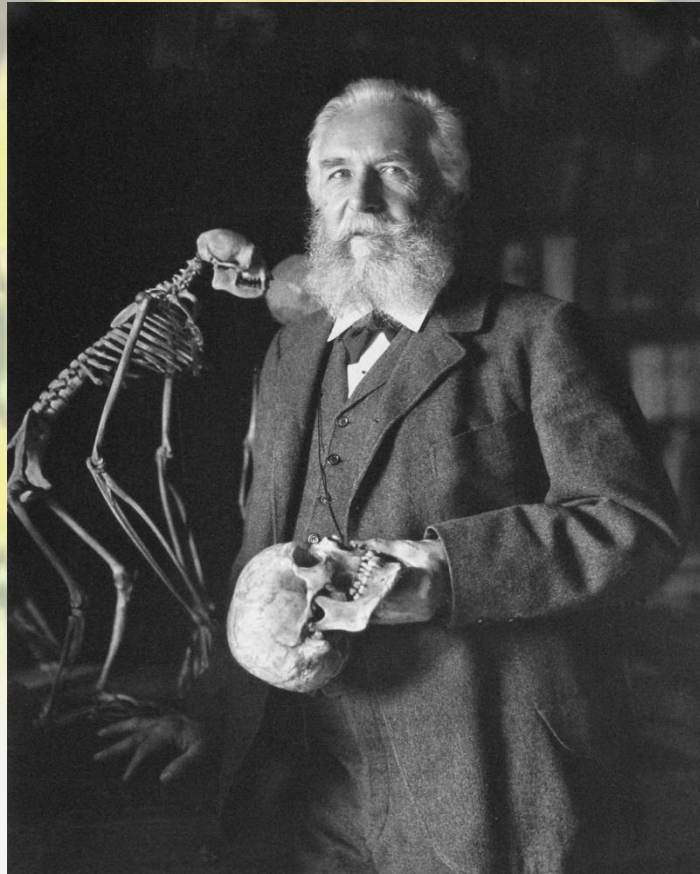
- **Nomenclature:** Nomenclature refers to the system of naming organisms. In taxonomy, a standardized naming system, called binomial nomenclature, is used. Each species is given a unique scientific name consisting of two parts: the genus name and the species epithet. This naming system ensures clarity and consistency in communication about species across languages and regions.

- The father of taxonomy is Carl Linnaeus, a Swedish botanist, physician, and zoologist.
- He published his most influential work, "Systema Naturae," in 1735,
- He gave the two kingdom classification
- Plant and Animal kingdom



- The three kingdom classification was given by
- Ernest Hackel

- Plant animal and protista(microorganims)
- Five king dom classification was given by RH Whitakker
- Plant
- Animal
- Protista
- Monera
- Fungi



R.H. Whittaker

- The six-kingdom classification system was proposed by American microbiologist and ecologist Carl Woese in the late 1970s.
- The six-kingdom classification system is an extension of the traditional five-kingdom system of classification, which includes Monera (bacteria), Protista (single-celled eukaryotes), Fungi (fungi), Plantae (plants), and Animalia (animals). The six-kingdom classification system adds a sixth kingdom called Archaea to account for a distinct group of microorganisms that differ from typical bacteria. Here are the six kingdoms in this system:



Hierarchy

- Kingdom: The domain is further divided into kingdoms. For example, within the domain Eukarya, you have kingdoms such as Animalia, Plantae, Fungi, and more.
- Phylum (for animals) or Division (for plants and fungi): Kingdoms are subdivided into phyla (or divisions for plants and fungi). These categories group together organisms that share fundamental body plans or characteristics.
- Class: Each phylum or division is further divided into classes. Classes are based on more specific features and characteristics.

Order: Within each class, organisms are grouped into orders based on additional shared characteristics.

Family: Orders are subdivided into families, which consist of closely related organisms with many shared characteristics.

Genus: Families are divided into genera (plural of genus), which includes species that are more closely related to each other.

Species: The most specific rank, species, is a group of individuals that can interbreed and produce fertile offspring. It is the basic unit of biological classification.

- Domain: Eukarya
- Kingdom: Animalia
- Phylum: Chordata
- Class: Mammalia
- Order: Carnivora
- Family: Felidae
- Genus: Panthera/ Homo
- Species: Panthera leo (Lion)/ Homo sapiens

Rules for writing scientific names

- **Bipartite Name:** Each scientific name consists of two parts:
 - The first part is the genus name (capitalized and italicized).
 - The second part is the species epithet (italicized, not capitalized).
- **Italics/Underlining:** When handwritten, scientific names should be underlined. In typewritten or printed documents, they should be italicized to distinguish them from regular text.
- **No Mixing Languages:** The names should be in Latin or, in some cases, Greek. The use of Latin or Greek helps ensure that scientific names are universally understood.

- **Genus Name Capitalization:** The genus name is always capitalized, while the species epithet is written in lowercase.
- **Abbreviating Genus Names:** After the full genus name is introduced in a text, it can be abbreviated to just the initial letter (e.g., *Homo sapiens* becomes *H. sapiens*).
- **Authors and Publication:** When citing a species name, it is customary to include the name of the author who first described it and the publication where it was described. The author's name is placed in parentheses, and the publication information follows.

Important scientific names for animals

- *Panthera leo*: Lion
- *Panthera tigris*: Tiger
- *Panthera pardus*: Leopard
- *Panthera onca*: Jaguar
- *Elephas maximus*: Asian Elephant
- *Loxodonta africana*: African Elephant
- *Gorilla gorilla*: Western Gorilla
- *Pongo pygmaeus*: Orangutan
- *Homo sapiens*: Human
- *Canis lupus*: Gray Wolf
- *Ursus arctos*: Brown Bear
- *Felis catus*: Domestic Cat
- *Felis domesticus*: Domestic Cat (an alternative scientific name)

- **Canis familiaris:** Domestic Dog
- **Equus ferus caballus:** Horse
- **Bos taurus:** Domestic Cattle
- **Bubalus bubalis:** Domestic Water Buffalo
- **Ovis aries:** Domestic Sheep
- **Sus scrofa:** Wild Boar (Pig)
- **Camelus dromedarius:** Dromedary Camel
- **Camelus bactrianus:** Bactrian Camel
- **Equus zebra:** Plains Zebra
- **Equus grevyi:** Grevy's Zebra
- **Lepus europaeus:** European Hare
- **Lepus timidus:** Mountain Hare
- **Cervus elaphus:** Red Deer
- **Capra aegagrus hircus:** Domestic Goat
- **Bos grunniens:** Yak
- **Crocodylus porosus:** Saltwater Crocodile
- **Alligator mississippiensis:** American Alligator

Important scientific names of plants

- *Triticum aestivum*: Wheat
- *Oryza sativa*: Rice
- *Zea mays*: Maize (Corn)
- *Sorghum bicolor*: Sorghum (Milo)
- *Hordeum vulgare*: Barley
- *Brassica oleracea*: Cabbage
- *Brassica napus*: Rapeseed (Canola)
- *Lycopersicon esculentum*: Tomato
- *Citrus x limon*: Lemon
- *Citrus x aurantiifolia*: Lime
- *Vitis vinifera*: Grape
- *Morus alba*: Mulberry
- *Solanum tuberosum*: Potato
- *Carica papaya*: Papaya

- **Theobroma cacao:** Cacao (Cocoa)
- **Coffea arabica:** Arabica Coffee
- **Coffea canephora:** Robusta Coffee
- **Camellia sinensis:** Tea (Tea Plant)
- **Olea europaea:** Olive
- **Musa acuminata:** Banana
- **Fragaria × ananassa:** Strawberry
- **Ricinus communis:** Castor Oil Plant
- **Gossypium hirsutum:** Upland Cotton
- **Gossypium barbadense:** Pima Cotton
- **Linum usitatissimum:** Flax
- **Pisum sativum:** Pea
- **Capsicum annuum:** Bell Pepper
- **Cucumis sativus:** Cucumber
- **Cucumis melo:** Cantaloupe (Muskmelon)
- **Piper nigrum:** Black Pepper

Criteria for classification

- Prokaryotic or Eukaryotic
- Multicellular or Unicellular
- Heterotroph or Autotroph
- Morphology: The physical characteristics, including shape, size, color, and structure, play a fundamental role in classification. Organisms with similar morphological features are often grouped together.
- Genetics: With advances in molecular biology, genetic information is increasingly used for classification. The comparison of DNA, RNA, and protein sequences helps determine evolutionary relationships among organisms.