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# TAXONOMY

This presentation aims to teach you about taxonomy.

This presentation has the following structure:

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## What is Taxonomy?

Taxonomy is the science of identifying, naming, describing and classifying different organisms. Taxonomy includes all organisms, both living and extinct, and classifies them into distinct groups, or, 'categories'.

Taxonomy provides a basic understanding of the components of biodiversity which is vital in ensuring effective decision-making about conservation and sustainability.

The Swedish botanist, physician and zoologist, Carl Linnaeus is regarded as the father of modern taxonomy. He developed a system known as Linnaean taxonomy which systematised the categorisation and naming of organisms.



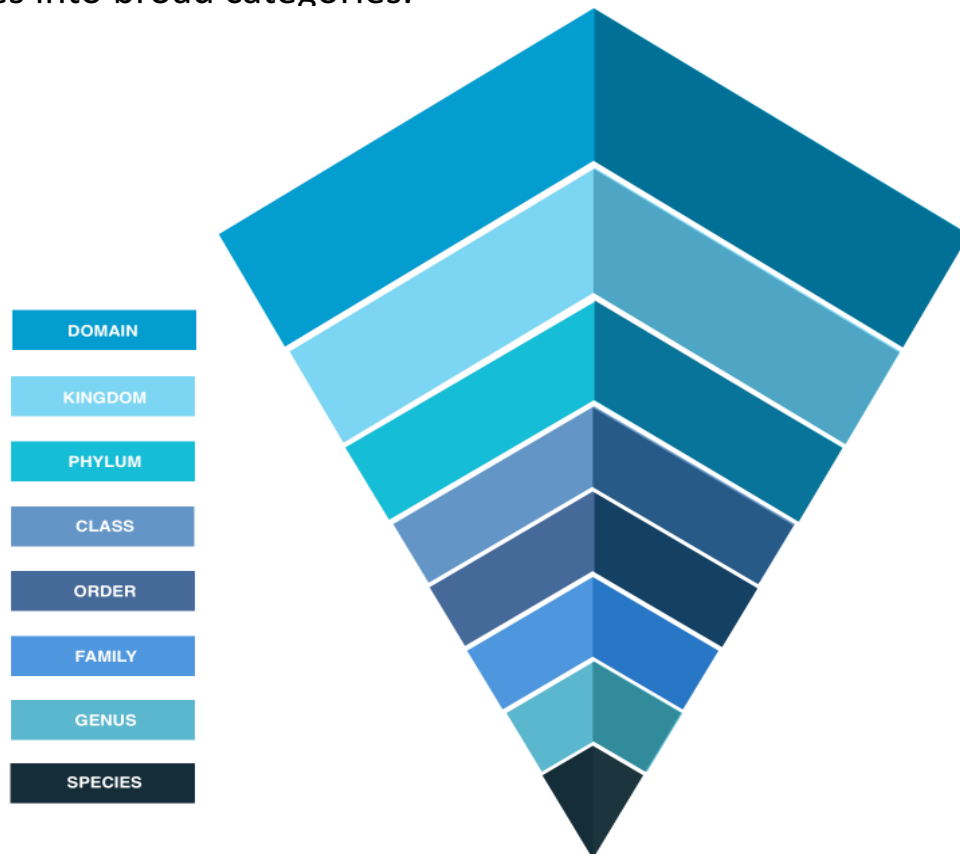
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## Features of Taxonomy

Linnaeus's taxonomy system has two main features that contribute to its ease of use in naming and grouping organisms. The first is the use of binomial nomenclature, which is the formal system of naming species.

The second feature of Linnaeus's taxonomy system is the ordering of species into broad categories.



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## Taxonomic Classification

A hierarchical system is used to classify organisms to the species level. Organisms are grouped together into taxa (singular: taxon) and groups are given a taxonomic rank based on similarities and presumed evolutionary relationships. There are eight distinct taxonomic categories: Domain, Kingdom, Phylum, Class, Order, Family, Genus and Species.

Taxonomists classify organisms in a way that reflects their biological ancestry. Because the ancestral relationships are complex, the taxonomic schemes are also complex and often the subject of revision. The broadest classifications are by domain and kingdom; the most specific classification is by genus and species.

For example, the animals in the Kingdom Animalia are split into multiple phyla (plural of phylum). The animals in the phylum Chordata are split into multiple classes such as mammals, reptiles and amphibians. The broadest category splits all organisms into three groups called Domains. The three Domains of life are Bacteria, Archaea and Eukaryota.

For a long time, all life was separated into five or six kingdoms. These included kingdoms such as animals, plants, fungi, protists, archaea and bacteria.



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## Naming Species

Binomial nomenclature is a formal system of naming species. The formal introduction of this system is credited to Carl Linnaeus' work in 1753. However, he was not the first to use binomial nomenclature, but simply, the first to use it consistently.

Binomial nomenclature gives each species a name that is composed of two parts, both of which use Latin grammatical forms (although they can be based on words from other languages).

When identifying an organism, familiar names — like human, fruit fly, or maple tree — are most likely the names you use. Scientists avoid using common names because they are often not specific to a particular species. For instance, the blue crab is only one of many species of crab that can be described as blue. Thus, each type of organism has a scientific name — humans are called *Homo sapiens*, for example.

In binomial nomenclature, the first part of the name identifies the genus to which the species belongs; the second part identifies the species within the genus. For example, humans belong to the genus *Homo* and within this genus to the species *Homo sapiens*.



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## Binomial Nomenclature

The binomial nomenclature system allows for a common language with which biologists can both classify and compare organisms. It also provides a basis for biologists to communicate their findings with other scientists. A key aspect of taxonomy is the ability to characterize each level of description with unifying features, thus relaying information about the organism(s). For example, for *Homo sapiens*, the classification would break down as follows:

Classification level	Name	Characterized by:
Domain	Eukarya	Nucleus, organelles
Kingdom	Animalia	Ingests food, multicellular, no cell wall
Phylum	Chordata	Spinal cord
<i>Subphylum</i>	Vertebrata	Segmented backbone
<i>Superclass</i>	Tetrapoda	Four limbs
Class	Mammalia	Nurse offspring
<i>Subclass</i>	Theria	Live birth
Order	Primates	High level of intelligence
Family	Hominidae	Walk upright
Genus	<i>Homo</i>	Human
Species	<i>H. sapiens</i>	Modern human



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## Carl Linnaeus

Carl Linnaeus (1707-1778) was a Swedish botanist, physician and zoologist who ushered in a new era of taxonomy. His system for naming, ranking, and classifying organisms – though modified over the years - is still widely used today and has remained the standard guiding literature for over 200 years.

His works have been studied by every generation of naturalists, including Erasmus Darwin and Charles Darwin.

Linnaeus has provided the basis of a universally accepted classification system that has vastly shaped and expanded our understanding of the natural world.

He was knighted in 1755 under his Swedish name, Carl von Linné.



Photo credit: Per Krafft the Elder



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## Australian Curriculum Mapping

GRADE 6 SCIENCE (ACSSU094): The growth and survival of living things are affected by the physical conditions of their environment.

YEAR 7 SCIENCE (ACSSU112): Interactions between organisms, including the effects of human activities can be represented by food chains and food webs.

YEAR 7 – 10 LANGUAGES (ACLFWC048): Investigate, analyse and synthesise information obtained from a range of sources on topics and issues related to their Country/Place and community [Key concepts: change, social and environmental issues, community initiatives/ projects, health and well-being; Key processes: researching, investigating, interviewing, comparing, summarising].

YEAR 9 SCIENCE (ACSSU176): Ecosystems consist of communities of interdependent organisms and abiotic components of the environment; matter and energy flow through these systems.

YEAR 9 HISTORY (ACDSEH019): The emergence and nature of key ideas in the period, with a particular focus on ONE of the following: capitalism, socialism, egalitarianism, nationalism, imperialism, Darwinism, Chartism.

SUSTAINABILITY (01.1): The biosphere is a dynamic system providing conditions that sustain life on Earth.





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