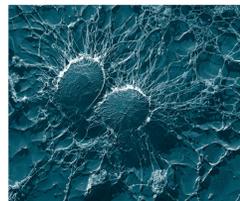


# Classification

## What is Classification?

With 1.8 million species known to science and more being discovered every day, how do we make sense of biodiversity? The answer is classification. By grouping living things into defined hierarchies and giving them individual names we create order which allows us more easily to study the seemingly chaotic world of nature. The most fundamental division of classification is the kingdom, of which five are generally recognised:



### Prokaryotes

Prokaryotic cells do not have a nucleus or any other membrane-bound organelles, such as mitochondria. They include the “true” bacteria and archaea.



### Protists

Cells are eukaryotic - they have a nucleus and other membrane-bound organelles. They do not have the specialised features of other eukaryotic organisms such as plants and animals.



### Fungi

Cells are eukaryotic and have cell walls which contain chitin. Originally classified as plants, fungi lack chlorophyll and other characteristic structures such as roots and stems.



### Plants

Cells are eukaryotic and have cell walls containing cellulose. They are autotrophic, using light energy captured by chlorophyll to manufacture sugars in the process called photosynthesis.



### Animals

Cells are eukaryotic but have no cell wall. They obtain their food by consuming other organisms (heterotrophs). All are capable of spontaneous movement.

## Definitions

### Taxonomy

“The science of classification”.  
From taxon: the name given to a group of similar organisms.

### Phylogeny

“The evolutionary history of a species or other taxonomic group of organisms”.

## Kingdoms or Domains?

While the five kingdom system of classification has been in use for many years, recent work has indicated that the Prokaryotes actually consist of two very distinct groups: the “true” bacteria or Eubacteria and the Archaea. The Archaea were originally detected in extreme environments such as hot springs and salt lakes but have since been found in a number of other habitats. While sharing many properties such as cells which lack nuclei and organelles, the two groups are now considered to be genetically distinct. This has led to the proposal of a new level of classification: the **Domain**. The three domains are the Archaea, the Eubacteria and the Eukaryota comprising all other living things.



## Classification of Species

In classification, organisms are grouped at a series of levels, from domain all the way down to species. Originally the groups were based on physical characteristics, but since Darwin’s theory of evolution the groups are chosen to reflect common evolutionary descent (i.e. reflecting the phylogeny of organisms). These days molecular evidence from DNA is also used to classify organisms.

At the higher levels, the groups contain large numbers of organisms, classified according to fundamental properties such as cell structure. As you proceed down the levels, groups get smaller and smaller until the level of a species which consists of only one type of organism.



Example of classification: the common house cat

<b>Domain</b>	- Eukaryota
<b>Kingdom</b>	- Animalia
<b>Phylum</b>	- Chordata
<b>Class</b>	- Mammalia
<b>Order</b>	- Carnivora
<b>Family</b>	- Felidae
<b>Genus</b>	- <i>Felis</i>
<b>Species</b>	- <i>catus</i>

## Making Sense of Classification

Imagine you found an interesting plant and wanted to know what it is. If it is a species that has already been discovered and classified, the best way would be to use a **dichotomous key**. This system involves following a series of questions about the structure of the organism you are looking at, each with two potential answers. Depending on which you choose you get a different set of questions to continue to follow. Thus by systematically working through the key you narrow down your options until you are left with the name of the species.



## The Binomial System of Nomenclature

Today, scientists use a universal system for naming species which involves assigning them a two word Latin name, such as *Felis catus* for the common housecat. The first part refers to the genus and the second to the species itself. This scientific name is used throughout the world, avoiding the confusion that would arise if a species had many different names. The binomial system was developed by Carl Linnaeus (1707-1778) who sought to name every animal and plant in this way. At the time this task seemed daunting, with 7,700 species of plant and 4,400 species of animal known to science. Today there are an estimated 1.2 million species worldwide still to be described, making the universal naming system devised by Linnaeus of greater value and significance than he could ever have imagined.



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