

Species and taxonomy

Species

Taxonomy refers to the classification of living things by giving unique names to each **species**, and creating a **hierarchy** based on evolutionary descent. This is a challenging task, as most species that have ever lived on this planet are now extinct, and many more alive today have yet to be discovered and classified.

In order to achieve the above, though, we need a definition for both species and hierarchy. In the old days, a species was known as a collection of individuals similar enough in resemblance to be put in the same box. This was purely based on physical features. Today we know that similar physical characteristics on their own aren't enough to define a species.

A **species** is defined in terms of **observable physical features** as well as the ability to produce **fertile offspring**.

Courtship behaviour

What is courtship behaviour? The acts it encompasses are as varied as life itself; a sound, a gesture, an action, etc. The overarching and general attribute all these behaviours have (which makes them courtship) is whether they appear to be connected to **successful mating**.

The first feature of courtship behaviour is that it enables organisms to **identify members of their own species**. The central part of the definition of a species is the members' ability to produce viable offspring. Hence, attempting to mate with members of a different species is not an advantageous behavioural trait in the context of **reproductive success**.

Courtship behaviours also allow organisms to **approach one another without aggression** or invasion of their personal space.

Sometimes the outcome of courtship behaviour is the formation of a **pair bond**. This bond results in a better reproductive success, due to the increased survival probability of the offspring. In some species this is the case, while in others it isn't. This is tightly related to a specific organism's physiology. Fish are able to lay a huge number of eggs, while pigeons only lay one or two. Therefore, it is more likely that pigeons would form a pair bond, rather than fish.

Last, but by no means least, is the nature of courtship behaviour which makes it a tool for **sexual selection**. This is not a mere test of survival (natural selection takes care of that), but a test of relative superiority in a variety of attributes which vary between species, at different times, and even between individual organisms. These attributes can be anything, and in many cases they seem random or peculiar. In others, they seem very much expected.

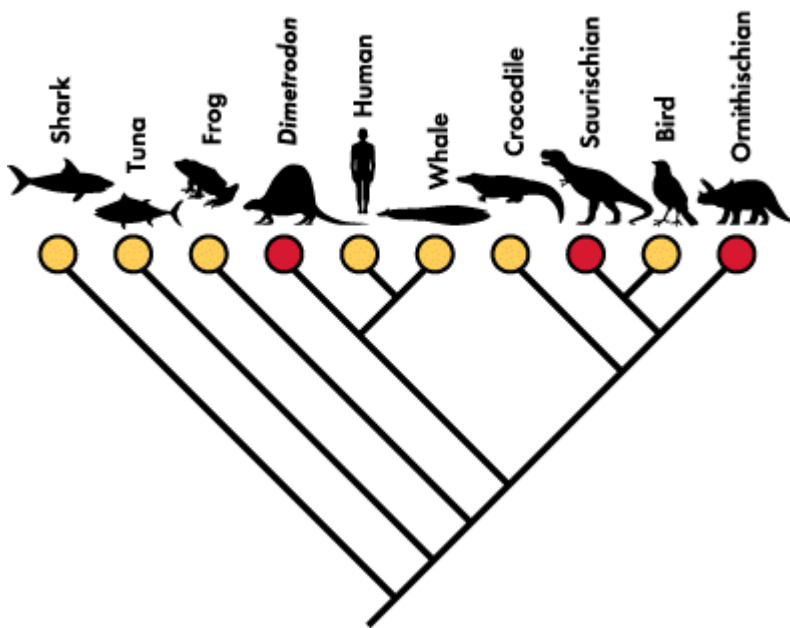
Classification



This is Hercules, the liger. Hercules has a lion father and a tiger mother. Does that mean tigers and lions are really one

species? This is one example of the issues surrounding both the definition of species, and taxonomy generally.

What is a hierarchy? A **hierarchy**, put simply, is a system of classification comprised of small groups contained within larger groups contained within larger groups, and so forth, where there is **no overlap**.



The above diagram is a **phylogenetic tree**. It is a representation of various species in terms of their genetic relatedness. Each “crossroads” is a different ancestor. From this diagram it is easy to see that humans are more closely related to whales than to birds, or indeed any other species represented.

The species with a red circle beneath are extinct. If a phylogenetic tree was made with all species that have ever lived up to today, the vast majority would be extinct.

Aside from simple observable features and their similarity, advances in **immunology** and **genome sequencing** can add to the information required to create, maintain and update the tree of life according to new findings. Different organisms’ genes, proteins and physiologies can be compared to see how closely related they are.

The names above are used for convenience, yet the scientifically correct way of classifying organisms is by giving them a two-word (**binomial**) name. These names are in Latin or Greek.

Let's take *Homo sapiens* for example (us!):

1. It's written in *italics* as all species names should be, by convention.
2. It's made up of two words: Homo and sapiens.
3. Homo denotes the **genus** to which the species belongs to. A genus is the group higher than species. For example, *Homo erectus* and *Homo neanderthalensis* are part of the same genus as *Homo sapiens* (both now extinct). That genus is called Homo... getting the hang of it?
4. Sapiens denotes the **species** itself, and is the smallest group in the hierarchy.

What does the rest of the hierarchy look like?

Kingdom, Phylum, Class, Order, Family, Genus, Species (fearing you can't possibly remember this sequence?)

Kinky, Policemen, Can, Often, Find, Gay, Sex. You're more than welcome.