

## Definitions: taxonomic classes

We'll need these to properly appreciate how massive the mass extinctions are. We've talked about different divisions of life, and have indicated that at a basic level life can be divided into *domains*: bacteria, archaea, and eukaryotes (we belong to the last of these). However, historically people have focused mainly on eukaryotes (plants, animals, fungi, protists), and have devised a taxonomic scheme for those members. From the most general to the most specific (pun intended), we have **kingdom**, **phylum**, **class**, **order**, **family**, **genus**, and **species**. To give examples of each in order, humans are

- Kingdom: animals (alternatives: plants, fungi, etc.)
- Phylum: chordata, subphylum vertebrates (i.e., we have backbones; alternatives include mollusks, arthropods [insects, spiders, etc.], and many others)
- Class: mammals (alternatives are birds, fish, reptiles, and amphibians)
- Order: primates (many alternatives: bats, rodents, etc.)
- Family: hominids (alternatives: lemurs, tarsiers, monkeys, ...)
- Genus: homo (alternatives: chimpanzees, gorillas, orangutans, some extinct genera)
- Species: sapiens (homo sapiens means “wise man”, which in some cases is debatable!)

We gave the species definition in one of our main lectures: two individuals are members of the same species if (assuming one male and one female!) they can in principle produce viable offspring, i.e., offspring who have offspring. Thus although horses and donkeys can produce offspring (mules) and lions and tigers can produce offspring (ligers or tigons), the offspring are sterile and thus horses and donkeys, or lions and tigers, are different species (other fun examples are zonkeys, zorses, hebras, donkras, jaglions, jagupards, and wholphins; perhaps zoologists have too much free time!). The more general definitions are less clear, but basically a genus is a group of related species, a family is a group of related genera (plural of “genus”), and so on.

The relation to mass extinctions is that for a species to go extinct means you have no remaining members of just that species. For example, passenger pigeons are extinct. To make a genus go extinct requires that all species in that genus go extinct. To make a family go extinct requires that all genera in that family go extinct. For example, for hominids to go extinct requires that not just all humans, but also all chimpanzees, gorillas, and orangutans go extinct. Hominids don't include many species, but some (e.g., some beetle families) can have thousands. Therefore, as we discuss mass extinctions, you should keep in mind that family extinction is pretty impressive!