

UNIT I INTRODUCTION TO LIFE

CHARACTERISTICS OF LIVING ORGANISMS

There are seven characteristics of living things: **movement, breathing or respiration, excretion, growth, sensitivity and reproduction**. Some non-living things may show one or two of these characteristics but living things show all seven characteristics.

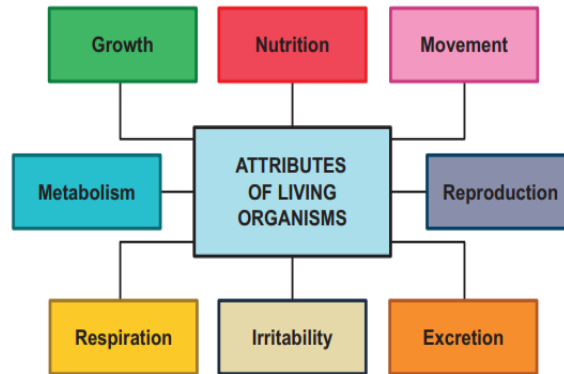


Figure 1.1: Attributes of living organisms

All the species in a particular kingdom have similar characteristics in terms of their growth and the way they function.

Nutrition. Autotrophic (makes its own food) or heterotrophic (feeds on other living things).

Cell organisation. Unicellular (having only one cell) or multicellular (having two or more cells).

Cell type. Eukaryotes (the genetic material is surrounded by a membrane) or prokaryotes (lacking a membrane).

Respiration. Aerobic (needs oxygen) or anaerobic (does not use oxygen).

Reproduction. Sexual, asexual or through spores.

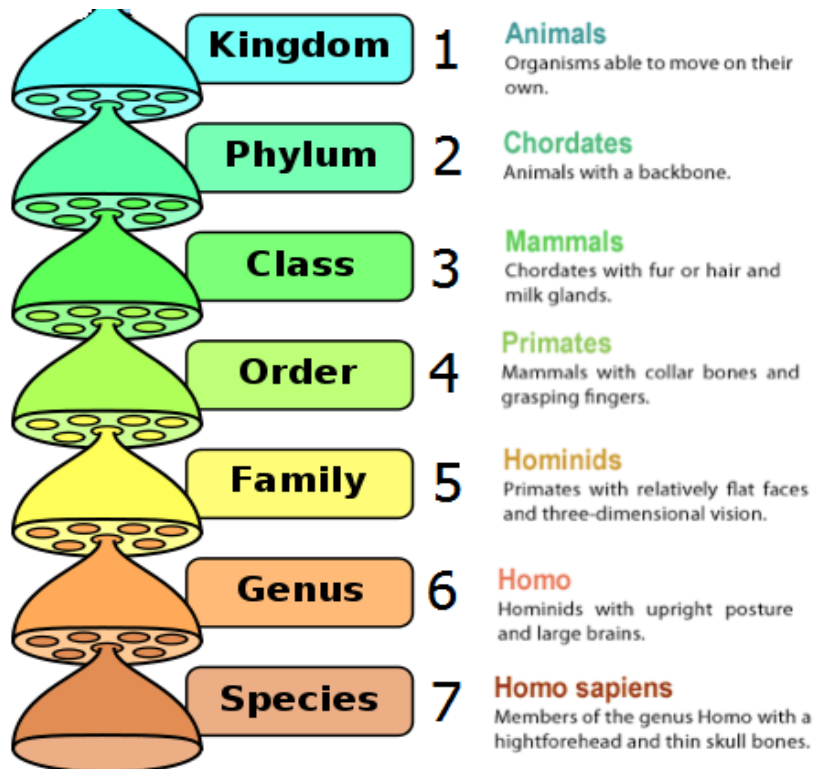
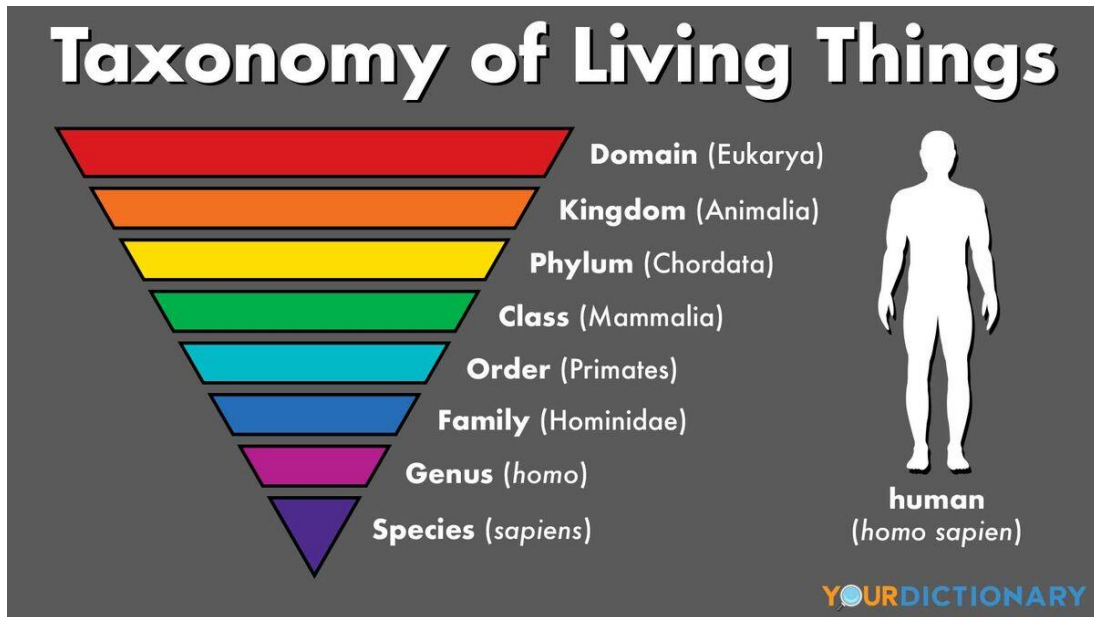
Movement. Self-moving or static.

BASIC CLASSIFICATION

CLASSIFICATION OF LIVING THINGS INTO FIVE KINGDOMS

The first person to divide living things into five broad kingdoms was North American ecologist Robert Whittaker. This researcher proved in 1959 that fungi were not plant organisms

- previously it was thought that they were - and a decade later he proposed the creation of the fungi kingdom to differentiate them from plants.



Animal kingdom

The kingdom Animalia is the most evolved and is divided into two large groups - **vertebrates and invertebrates**.

These animals are **multi-celled, heterotrophic eukaryotes with aerobic respiration, sexual reproduction and the ability to move**. This kingdom is one of the most diverse and

comprises mammals, fish, birds, reptiles, amphibians, insects, molluscs and annelids, among others.

Plant kingdom

Trees, plants and other species of vegetation make up part of the Plantae kingdom - one of the oldest, and characterised by its immobile, multicellular and eukaryotic nature.

These autotrophic things, whose cells contain cellulose and chlorophyll **are essential for life on Earth since they release oxygen through photosynthesis**. As regards their method of reproduction, this may be either sexual or asexual.

Fungi kingdom

This Kingdom is used to designate the fungi kingdom which includes yeasts, moulds and all species of mushrooms and toadstools. These **multicellular aerobic heterotrophic eukaryotes** have chitin in their cell walls, feed off other living things, and reproduce through spores.

Protista kingdom

This group is the most primitive of the eukaryotes and all the others are descendants of it. The Protista kingdom is paraphyletic - it contains the common ancestor but not all its descendants - and **it includes those eukaryotic organisms that are not deemed to be animals, plants or fungi** such as protozoa. As it is so heterogeneous it is difficult to categorise it, since its members have very little in common.

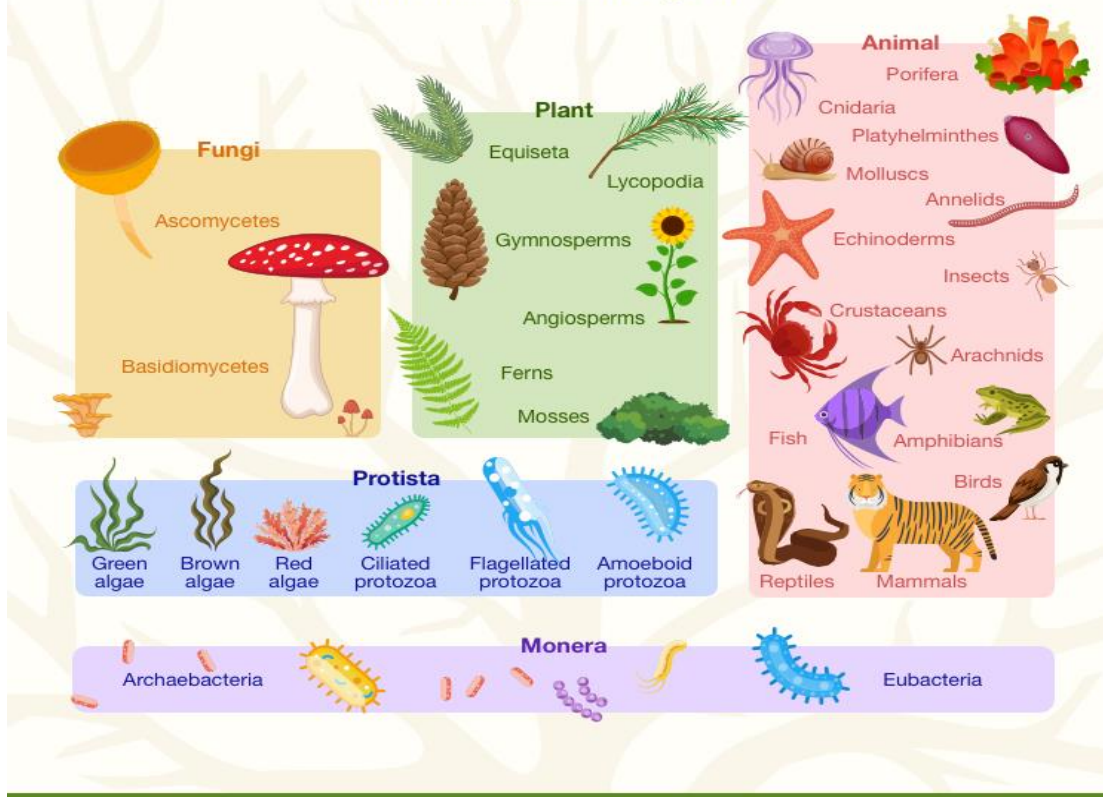
Monera kingdom

This is the kingdom of microscopic living things and groups together the prokaryotes (archaea and bacteria). This group **is present in all habitats and is made up of single-cell things with no defined nucleus**.

Most bacteria are **aerobic and heterotrophic**, while the **archaea are usually anaerobic** and their metabolism is **chemosynthetic**.

The classification of the five kingdoms of nature remains most accepted today, although **the latest advances in genetic research** have suggested new revisions and reopened the debate among experts.

The kingdoms of living things and their species at a glance

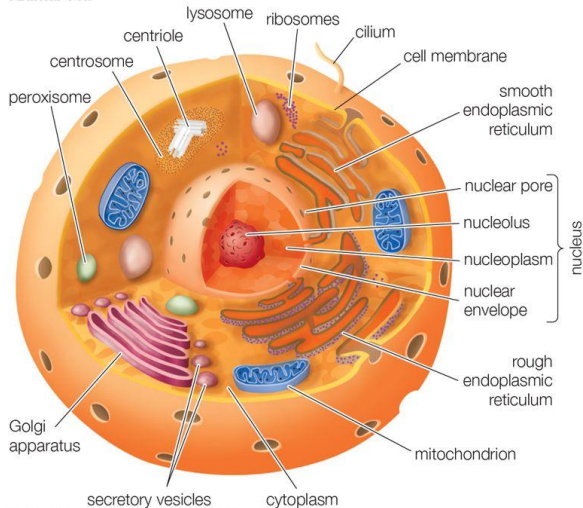


Such is the case for the **sixth kingdom** of Carl Woese and George Fox, who in 1977 divided bacteria into two types (**Archaea and Bacteria**), and the **seventh kingdom** of Cavalier-Smith, who added a new group to the previous six for algae called **Chromista**.

CELL THEORY - STRUCTURE OF PROKARYOTIC AND EUKARYOTIC CELL

Typical animal cell and plant cell

Animal cell



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Plant cell

