Kingdoms of Life

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**General Characteristics of the Kingdoms of Life**

**Archaea & Eubacteria** (prokaryotes)
- 1* cells – survived for 2 Billion Years as only kinds of cells on earth
- dominate the biosphere in terms of numbers
- mostly unicellular, prokaryotic cells
- cells very small, no nucleus, little or no internal structure
- cells may be single or sometimes grouped into clusters, chains, or filaments
- have cell wall which gives them three basic shapes: cocci (spheres), bacilli (rods) or spirals
- some may have blue green pigment for photosynthesis
- species cannot be easily distinguished from each other but have tremendous physiological diversity

**Protists** (protozoa and algae)
- mostly unicellular eukaryotic cells
- generally much larger cells with nucleus and other structures visible inside cells
- protist cells are typically larger than the cells of the other eukaryotic (multicellular) kingdoms
- many different sizes and shapes of cells, some very geometric shapes
- some with rigid cell walls containing cellulose, chitin, proteins, silica or other materials, others lack cell walls and very flexible
- single cells, colonies, or filaments or chains of cells; some are large multicellular seaweeds
- many are photosynthetic using chlorophyll along with several kinds of accessory pigments within chloroplasts
- others are heterotrophs and eat organic foods
- most motile with flagella, cilia or false feet, or gliding movement

**Fungi** (mushrooms, yeasts and molds)
- simplest of three complex multicellular eukaryotic kingdoms in terms of structure
- extremely abundant in some ecosystems but not commonly seen; mostly in terrestrial ecosystems but some are aquatic
- body (= mycelium) made of eukaryotic cells; most are multicellular molds, some are unicellular yeasts
- cells are long and rectangular, fairly large, with rigid cell walls of chitin and forming long filaments called hyphae
- nonmotile, most seem to grow from the ground or rotting organic matter like plants (but they are not photosynthetic)
- no true tissues or real organs, just clumps of cells slightly specialized to
absorb food and produce spores
some hyphae are grouped together to form haustoria, rings & traps or fruiting bodies
most are saprobes (=decomposers) eat dead organic matter; fungi are absorptive heterotrophs: they digest outside their bodies
the most visible part of most fungi is the fruiting body which produces
the spores; it takes the form of a mushroom, bracket fungus, morrel, toadstool or just appears as a fuzzy blue, green, red, black or brown growth on living or dead organic matter
under a microscope they appear as a dense mat of interconnected, uncolored fibers (=hyphae) which grow into their food and form the fruiting bodies.

**Plants** (mosses, ferns, grasses, flowering plants)
made of eukaryotic cells
all plants are multicellular; most are large with distinct tissues (*dermal*, *vascular* & *ground* tissues) and organs;
some of the major organs are *roots, stems, leaves, flowers* and *fruits*
they are nonmotile, usually anchored in the ground but some attach to other plants
have fairly thick, rigid cell walls of cellulose giving most individual cells a square or rectangular shape
almost all are green; contain the pigment *chlorophyll* inside organelles called *chloroplasts* that carry out *photosynthesis*

**Animals** (sponges, jellyfish, worms, clams, insects, us)
the largest and most diverse kingdom; about 3/4ths of all know species belong in animal kingdom
body made of eukaryotic cells
all animals are multicellular but not all are large, many are microscopic and not much larger than some protists
cells do not have rigid walls and are often very small (you may only see individual cells under high power)
most (but not all) are motile and very active; animals have a much faster metabolism than members of any other kingdom
most (but not all) have distinct organs organized into organ systems such as a digestive tract, heart and blood vessels, brain and nerve cords, respiratory system, mouthparts, etc
most animals show **complex development**, with extended embryonic phase, often with free living larval stages
most rely on simple or complex behaviors for survival