

Biodiversity

- Evolution works via three mechanisms: natural selection, genetic drift, and migration
- Macroevolution can lead to speciation, which can lead to behavioral/morphological changes
- Evolution has produced the all of life on Earth today
- Systematics: study of how organisms are organized
 - Often according to evolutionary relatedness
 - Often using phylogenetics
- All species have a scientific name, made up of the species and genus name
 - *Homo Sapiens*: *sapiens* is species name and *Homo* is genus
- How we classify things
 - Eight levels of classification, each getting smaller and more specific
 - Kingdom, phyla, class, order, family, genus, species
 - There are actually many disagreements about how to classify organisms
 - Disagreement on what type of data to use
 - Hybridization
 - Asexual organisms, such as bacteria
- The beginning of life
 - Earth is around 4.5 billion years old
 - Very inhospitable at first because not much oxygen or soil
 - First life appeared around 3.4 billion years ago in the form of prokaryotic microbes
- Three domains: Bacteria, Archaea, and Eukarya
 - Bacteria and Archaea are prokaryotes
 - Single cellular organisms, without membrane bound organelles that reproduce asexually by binary fission
 - Can live just about anywhere, and can be symbiotic with other organisms
 - Very small, eukaryotes are 10-100x larger
 - Extremely diverse --> you have about 500 bacterial species in your mouth
 - Bacteria
 - Relatively simple but efficient prokaryote
 - Has a cell wall made of peptidoglycan (mix of carbs and protein)
 - Very short generation time (1-3 hours)
 - Can feed on organic molecules, chemicals, or sometimes do photosynthesis
 - Have a main chromosome, which is circular
 - Each cell may also have additional plasmids
 - Smaller circles of DNA
 - May carry accessory genes
 - Aid in metabolism
 - Can also make a harmless bacteria deadly
 - Can receive plasmids/DNA from other bacteria, viruses, or just free-floating DNA
 - These plasmids can confer resistance to antibiotics

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