

Phylogeny

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- Phylogenetic trees may be constructed through analysis of fossils or comparison of DNA proteins.
- In Analogous Structures — Convergent evolution occurs when similar environmental pressures produce similar (analogous) adaptations in different animals
- Phylogenetic Tree vs. Cladogram — In a Phylogenetic tree, the length of branches matters, while, in a cladogram, the length does not. A cladogram depicts patterns of shared characteristics among taxa.
- A clade is a group of species that includes an ancestral species and all of its descendants
- A valid clade is monophyletic
- A shared primitive character is a character that is shared beyond the taxon we are trying to define
- A shared derived character is an evolutionary novelty unique to a particular clade
- An outgroup is a group of organisms not belonging to the group whose evolutionary relationships are being compared
- Parsimony — The principle of parsimony implies that we should prefer the phylogeny that requires the fewest evolutionary changes
- How do new species form?
 1. Isolation (allopatric or sympatric)
 - (a) Allopatric — Geographic separation (other country)
 - (b) Sympatric — Still live in same area, but different parts (same country)
- Barriers to Reproduction:
 1. Geographic Isolation (Being in different areas)

2. Ecological Isolation (Being in different environments)
 3. Temporal Isolation (Mating in different seasons)
 4. Behavioral Isolation (Bird songs)
 5. Mechanical Isolation (Unable to reproduce)
 6. Gametic Isolation (Gametes reject)
- Post-Reproduction Barriers:
 1. Reduced Hybrid Viability (Survive worse due to combination of parents)
 2. Reduced Hybrid Fertility (Offspring unable to reproduce)
 3. Hybrid Breakdown
 - Rate of Speciation:
 1. Gradualism — Gradual accumulation of small changes over a long time
 2. Punctuated Equilibrium — Rapid bursts of change mixed with long periods of little or no change

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