Darwin’s Theory of Evolution

Darwin’s Voyage
Artificial Selection
Natural Selection

Natural selection, in a nutshell:

Yum! Green beetles! Our favorite!
Extinction
Selective Factors that Drive Natural Selection

• Climate and Weather
• Availability of food
• Predators and Diseases
• Competition for mates
Key Inferences from Darwin’s Observations

• Observation 1: Members of a population often vary in their traits, that were inherited from parent to offspring.
• Observation 2: All species have the ability to overproduce.
• Inference 1: Individuals whose inherited traits give them a higher probability of survival tend to leave more offspring.
• Inference 2: Favorable traits will accumulate in a population over generations.
Studying fossils provides strong evidence for evolution
Reinforcing the evolutionary view of life

Comparative anatomy:

• Similarities in characteristics that results from common ancestry is known as Homology.
Homologous structures

- Humerus
- Radius
- Ulna
- Carpals
- Metacarpals
- Phalanges

- same bone structures modified for different functions
Evolutionary Tree
The Evolution of Populations
Mutation and sexual reproduction

- Mutation:

- Sexual reproduction
Hardy-Weinberg Equation

- \( pp + 2pq + qq = 1 \)
  - \( p \) is the dominant allele frequency
  - \( q \) is the recessive allele frequency
  - The equilibrium must satisfy 5 main conditions
  - 1. Very large population
  - 2. No gene flow between populations
  - 3. No mutations
  - 4. Random mating
  - 5. No natural selection
Mechanisms of Microevolution

• Bottleneck effect

• Founder effect
Natural selection can alter variation in a population in three ways.
Sexual Dimorphism
Intrasexual selection
Intersexual selection