

# Evolutionary Change

Mechanisms of Evolution

# The 5 Mechanisms of Evolution

## 1. Natural Selection\*\*

- a. **Sexual selection is sometimes listed as another mechanism, and sometimes considered as part of natural selection**

## 2. Genetic drift (Population shrinks)

## 3. Migration (Gene Flow)

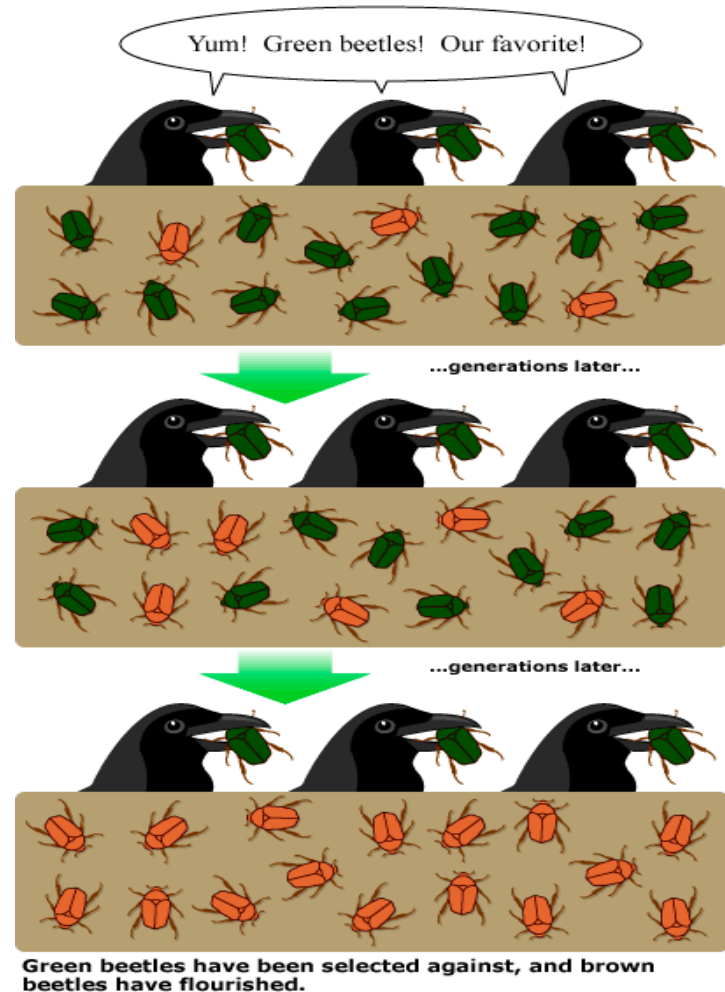
## 4. Mutation

## 5. Horizontal Gene Transfer

# 1. Natural Selection

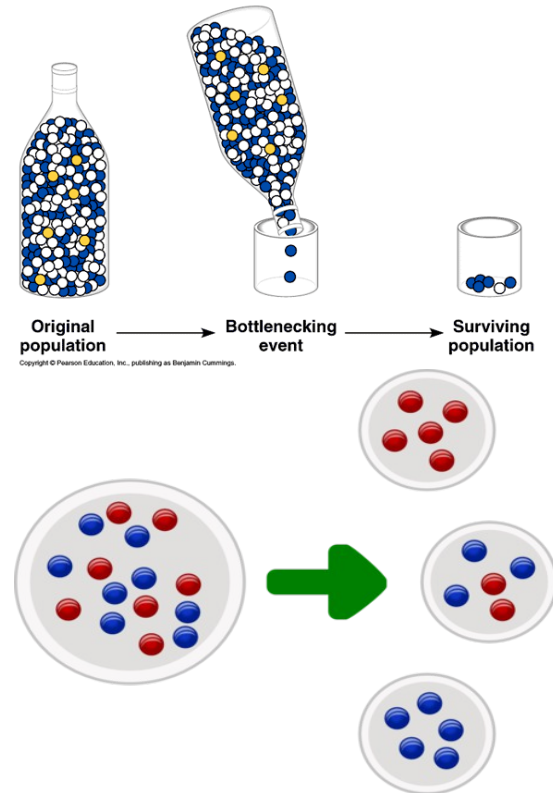
- **In a nutshell: if you have:**
  - **Variation (in traits)**
  - **Differential reproduction**
    - **Not all individuals get the opportunity to reproduce.**
  - **Heredity (of traits)**
- **This will result in evolution by natural selection**

Natural selection, in a nutshell:



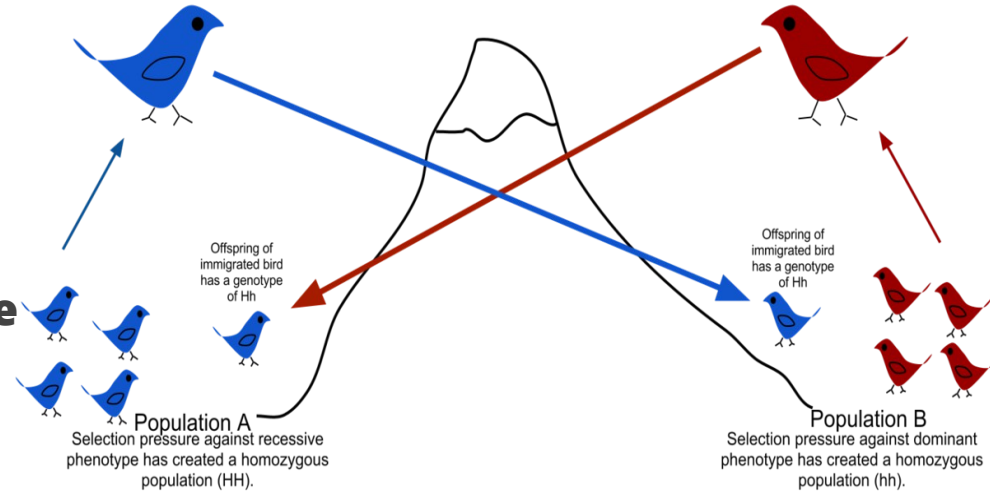
## 2. Genetic Drift (Population shrinks)

- **Two major types:**
  - **Population bottlenecks**
  - **The founder effect**
- **Genetic makeup changes by chance**
- **The smaller the population the greater the effect**
- **Often results in certain alleles becoming very common and/or certain alleles disappearing**



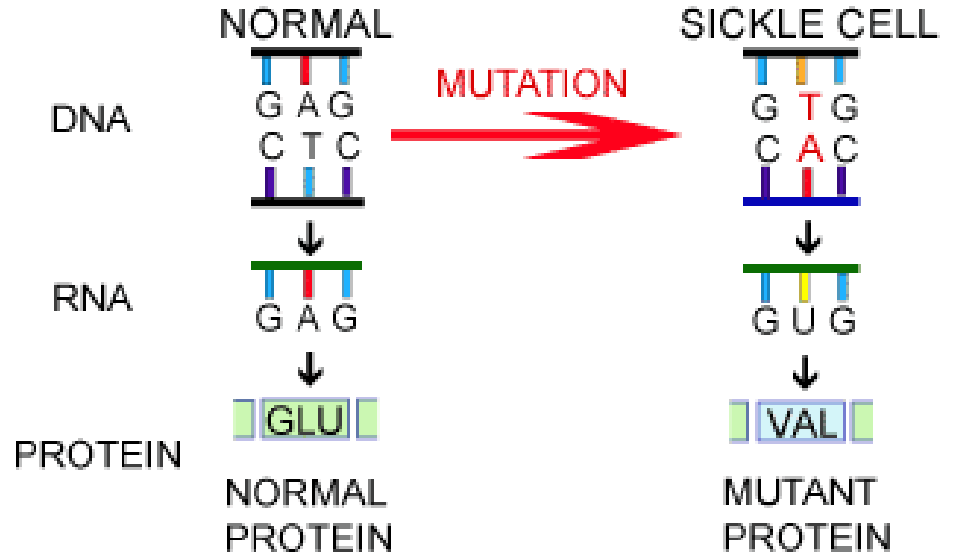
# 3. Migration (Gene Flow)

- **The movement of populations, groups or individuals.**
  - **Enabling gene flow**
  - **The movement of genes from one population into another**
- **May introduce alleles or remove them**
- **May change the frequency of alleles in the population**



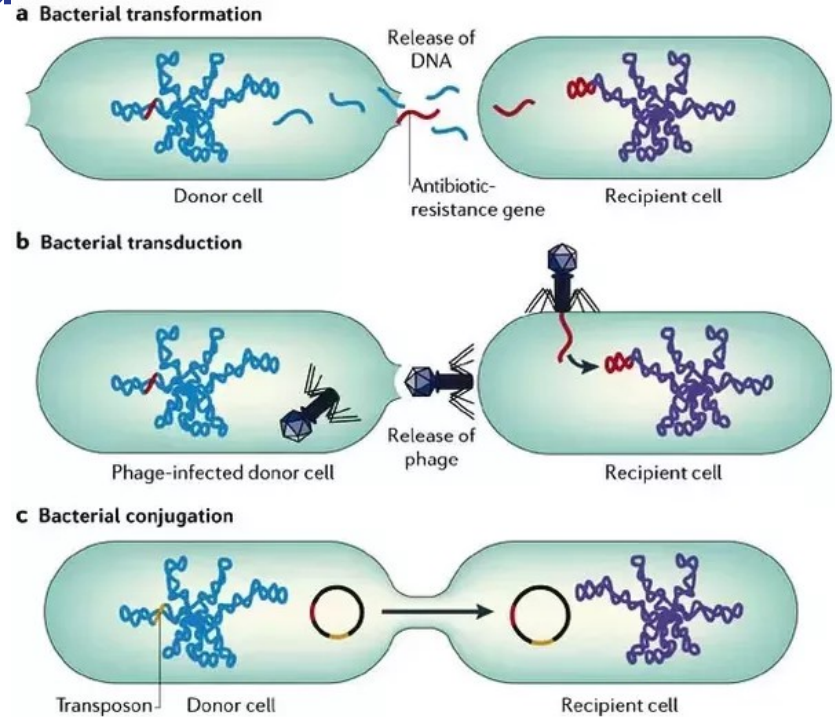
# 4. Mutation

- **Mutations to various alleles may occur**
- **Introduces new alleles to a population**
  - **Often the foundation for evolutionary change**
  - **The cause of many diseases**



# 5. Horizontal Gene Transfer

- **Gaining of new alleles from a different species**
- **Very common in prokaryotes**
- **Happens in eukaryotes through viruses**



Other Key Concepts...



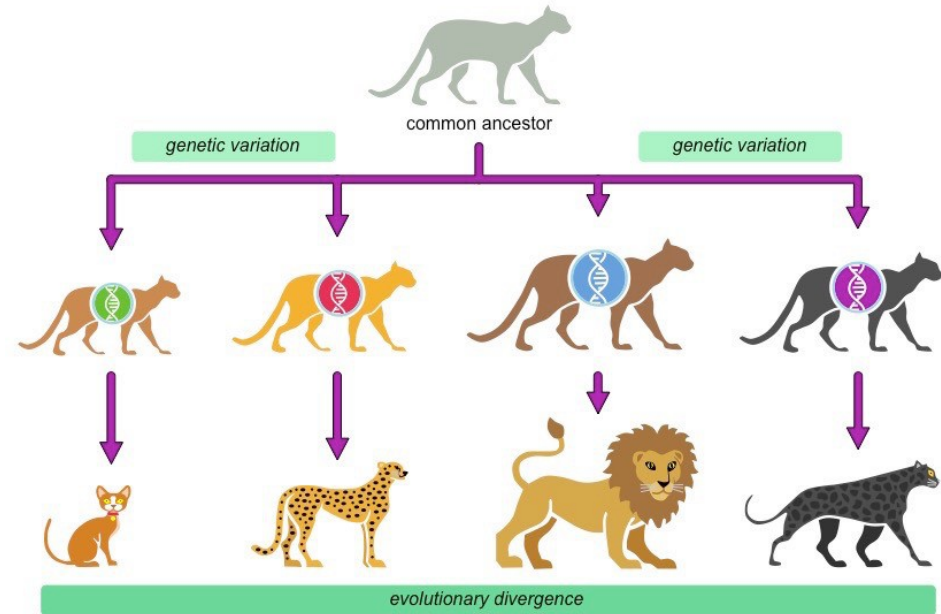
# Microevolution

- **Evolution on a small scale**
  - **Within a population**
- **A population being a group of organisms that interbreed with each other**
- **An example of this would be change in colour of moths based on pollution levels**
- **In other words there is a change in the gene frequency in the population**



# Speciation

- **Formation of a new species**
- **Species is defined as a group of individuals that actually or potentially interbreed in nature.**
- **Often blurry lines of what a species is (it is after all a human definition)**



# Macroevolution

- Large scale evolutionary changes including the formation of new species and taxa
- Evolution above the species level
- Example: Origin of mammals

