

## 17.1 Genes and Variation

How does evolution work in genetic terms?

- Natural selection does not affect a **single** gene, rather it works overall on a species
- Also instead of natural selection working on a single **organism**, it affects the **gene pool**, which is all the genes in a population
- **Allele Frequency** is the number of times an allele occurs in the gene pool
- Genetically speaking, evolution is just the **change** in allele frequency over time in a population

Sources of Genetic Variation

- There are three main sources of genetic variation
  - **Mutations**- any change in the genetic material of the cell. Most are neutral and scientists estimate every person is born with about 300 mutations
  - **Genetic Recombination**- the alleles that each parent donates are different from person to person making genes slightly different
  - **Lateral Gene Transfer**- passing of traits from one individual to the next, common in bacteria

What determines the number of phenotypes?

- The number of phenotypes is determined by how many **genes** control the trait
- A single gene trait normally has **two** phenotypes, the dominant and the recessive
- A polygenic trait will normally have **several** phenotypes
- The graph of frequency will often look like a **bell curve**

## 17.2 and 17.3 Genetic Change and Speciation

Natural Selection on Single Genes

- In single gene traits, mutations are easy to track
- As an example let's say the natural color in a lizard species is brown, and a mutation makes the lizard red and black
  - If the mutation is **advantageous**, it will become more common as more red and black lizards live and pass on their trait.
  - On the other hand, if the red and black coloring is **bad**, the lizards with the trait won't survive and the trait will eventually disappear
- In polygenic traits, natural selection affects the relative fitness and produces one of three possible types of selection
  - **Directional Selection**- Individuals at one end of the curve become more fit and the curve shifts in that direction
  - **Stabilizing Selection**- Individuals in the middle of the curve have a higher fitness, this causes the curve to become more slender and taller
  - **Disruptive Selection**- Individuals at the tips are more fit than those in the middle. Could eventually lead to speciation

Genetic Drift

- Over time, an individual with one allele may have more offspring than another and therefore affect allele frequency, this random change is called **genetic drift**
- If the population size is drastically reduced, then slowly builds back up, the gene pool is going to be different than the original population. We call this the **bottleneck effect**.

# Genes And Variation 17 Summary

**SJ Ball**



## **Genes And Variation 17 Summary:**

## **Genes And Variation 17 Summary** Book Review: Unveiling the Magic of Language

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