5 Mechanisms for Evolution of a Population

How genes can change
Essential Questions

1. Explain 5 ways genes can change.
2. What are the 6 forces that drive Natural Selection?
3. What are the 3 types of natural selection? Explain the differences between them.
Migration

- **When members of the population leave the gene pool or new members enter the gene pool**
  - Eliminates some traits from the population
  - Introduces new traits.
Small Populations

• Known as **Genetic Drift**
  – **Random events can lead to a drastic change in the gene frequencies**
• Gene pool can change, but not due to natural selection.
Selective Mating

• **When mates are selected based on characteristics that identify them as more “FIT”**

• This is sexual selection, a type of natural selection.
Mutations

- Errors in the genes make new or slightly different proteins.
- If this “error” is beneficial, it will be naturally selected and become a new trait in the population.
- Example: Sickle-cell trait
Natural Selection

• **Any time there is competition for survival or mating, the individual that is most “FIT” for the environment will pass on more good genes to the population.**
  
  – Each generation changes slightly.
*6 Forces that drive Natural Selection

- Climate/ Temperature
- Food Sources
- Predators
- Water availability
- Habitat/Living space
- Competition

The motto for all species: “EVOLVE OR DIE!”
How does “nature select”?

- **Fitness** = The members of the population that survive and reproduce more
  - must have traits better suited for their environment.

- These organisms that are more “fit” will create more offspring that have these better traits/genes.

- Each generation gets stronger with Natural Selection!
3 Types of Natural Selection

- **Stabilizing Selection**
  – organisms with the average form of a trait are more fit in their environment
Types of Natural Selection

- **Directional Selection**
  - organisms with one extreme form of a trait are more fit
Types of Natural Selection

- **Disruptive Selection**
  - with either extreme form of a trait are more fit
Variation of Disruptive Selection

• **Sexual Selection** – Females (usually) tend to chose mates based on certain traits
  – The trait usually indicates the health of the male