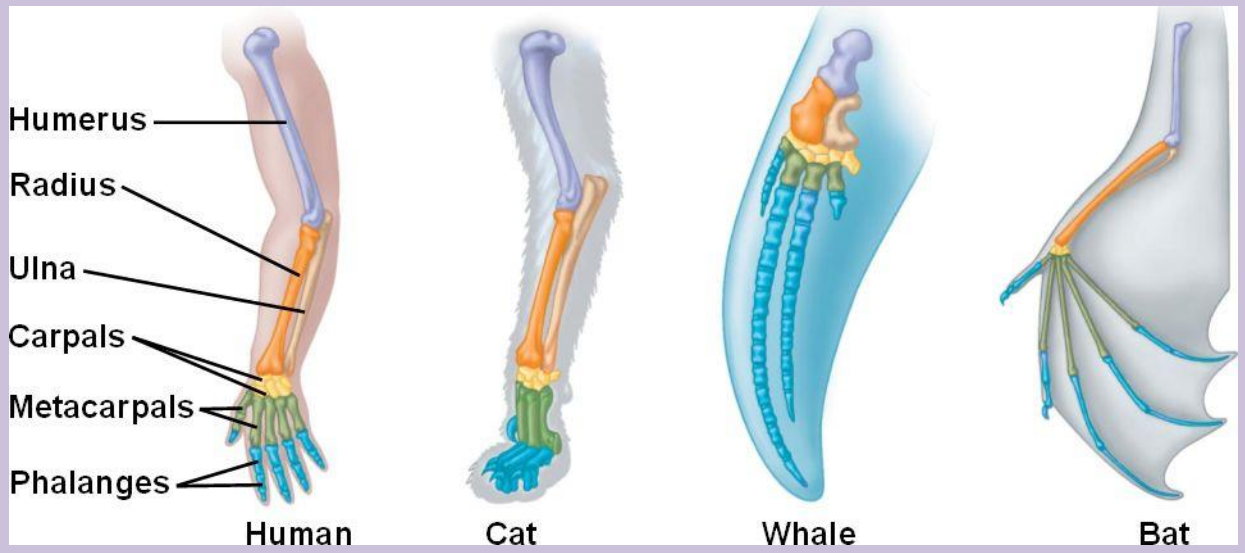
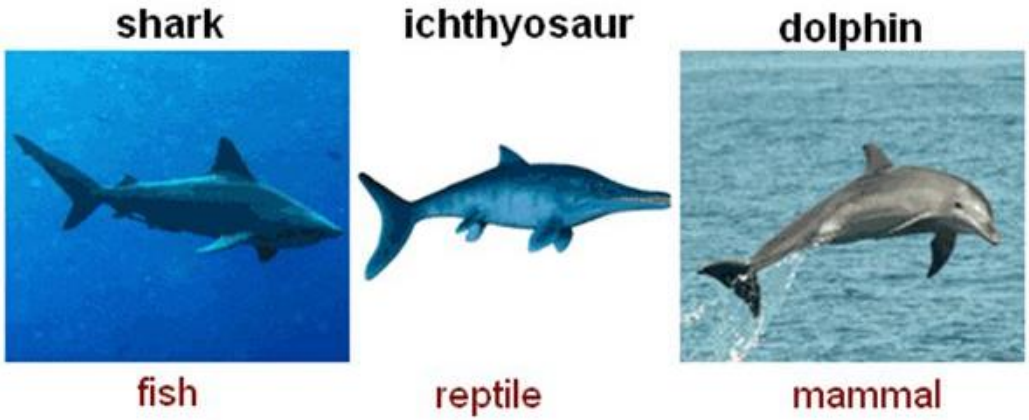
# HOMOLOGOUS VS. ANALOGOUS

- Homologous= similar structure, different functions
- Analogous=similar function, different structure (Ex: bird wing, butterfly wing)




# Convergent vs. Divergent Evolution

- **Convergent Evolution** —different species evolve similar traits but **do not share a common ancestor**.
  - Do share a **common environment**.
  - Therefore, nature selects similar adaptations for survival
  - They **evolve independently**, but end up **with similar traits**.
  - Ex: **Shark (fish)  Ichthyosaur (extinct reptile)  Dolphin (mammal)**

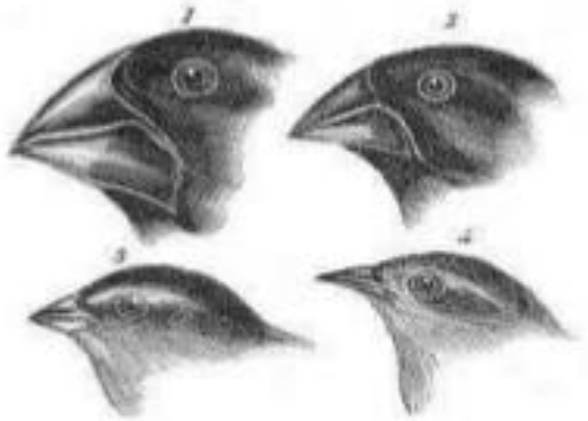



http://www.all-about-reptiles.com/convergent-evolution.html

# . Divergent Evolution

- Divergent evolution—species with **same ancestor** become more and more **different** until they are different species!
- DIFFERENT ENVIRONMENTS
  - Example: Finches on the Galapagos Islands evolved into many different species to eat different foods.

Remember what a species is?




Finches from Galapagos Archipelago

| CONVERGENT |
| --- |
| Different Ancestor |
| Converge to produce analogous structures |
| Species appearance becomes more similar over time |
| Species are unrelated (genetically different) |
| Example: Wings in insects, birds, and bats |

| DIVERGENT |
| --- |
| Common Ancestor |
| Diverge to produce homologous structures |
| Species appearance becomes more different over time |
| Species are closely relate (share genetic homology) |
| Example: Pentadactyl limb structure (vertebrates) |

# Types of Isolation

# What is a species?

**A group of organisms that can mate and produce fertile offspring.**

# Remember the Definition of Species?

A group of organisms that can mate **and produce fertile offspring.**

# (1) Reproductive Failure/Isolation

**mating between groups do not produce fertile offspring.**

# Are these separate species?

Tiger

Lion

Liger

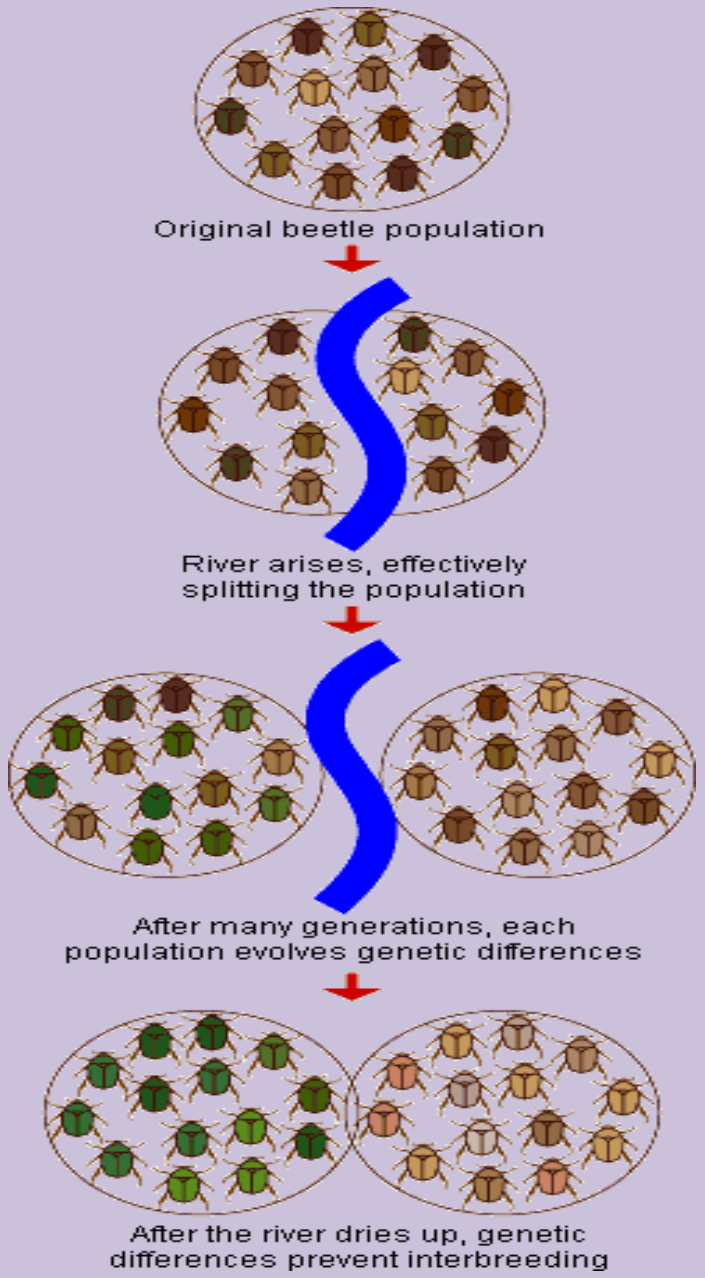
# (2) Mechanical Isolation

- **Two species cannot physically breed together.**

# (3) Geographic Isolation

- **Two populations are separated by geographic barriers**

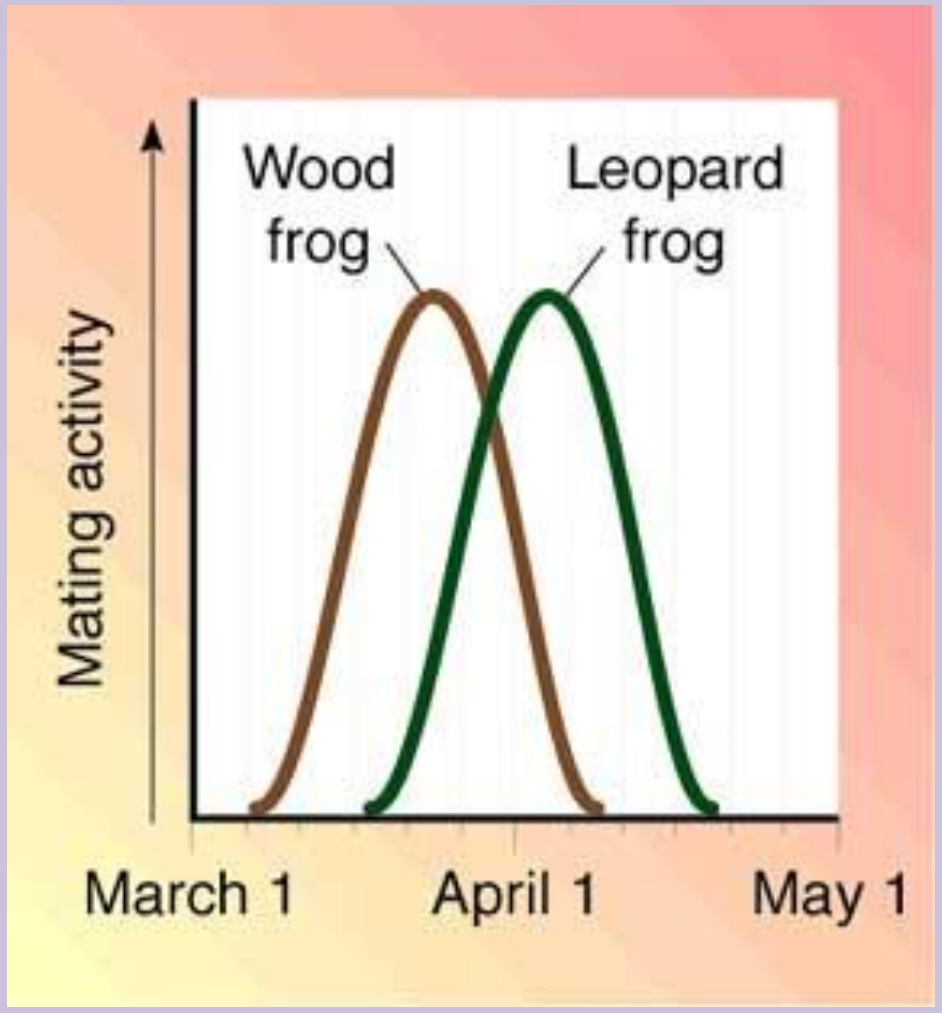



Original beetle population
River arises, effectively splitting the population
After many generations, each population evolves genetic differences
After the river dries up, genetic differences prevent interbreeding

# (4) Temporal Isolation

**groups reproduce at different times of the day or year.**

**Ex.** Red Drum and Black Drum, Wood Frog and Leopard Frog



# Behavioral Isolation

**EX:**

- mating dance
- Ostrich Mating Dance

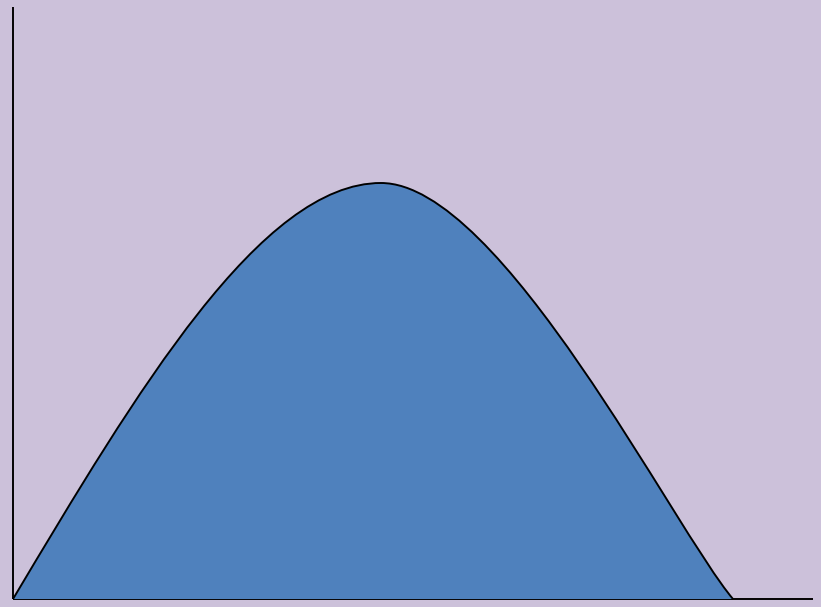
- When two populations are **capable of interbreeding** but have **different courtship rituals, or reproductive strategies.**

# Types of Natural Selection

- Some variations increase or decrease an organism's chance of survival in an environment.
- Thus the **allelic frequencies** in a population's gene pool will change over generations due to the natural selection of variations.
- **There are three different types of natural Selection that act on variation**
  - Directional
  - Stabilizing
  - Disruptive

# Normal Distribution

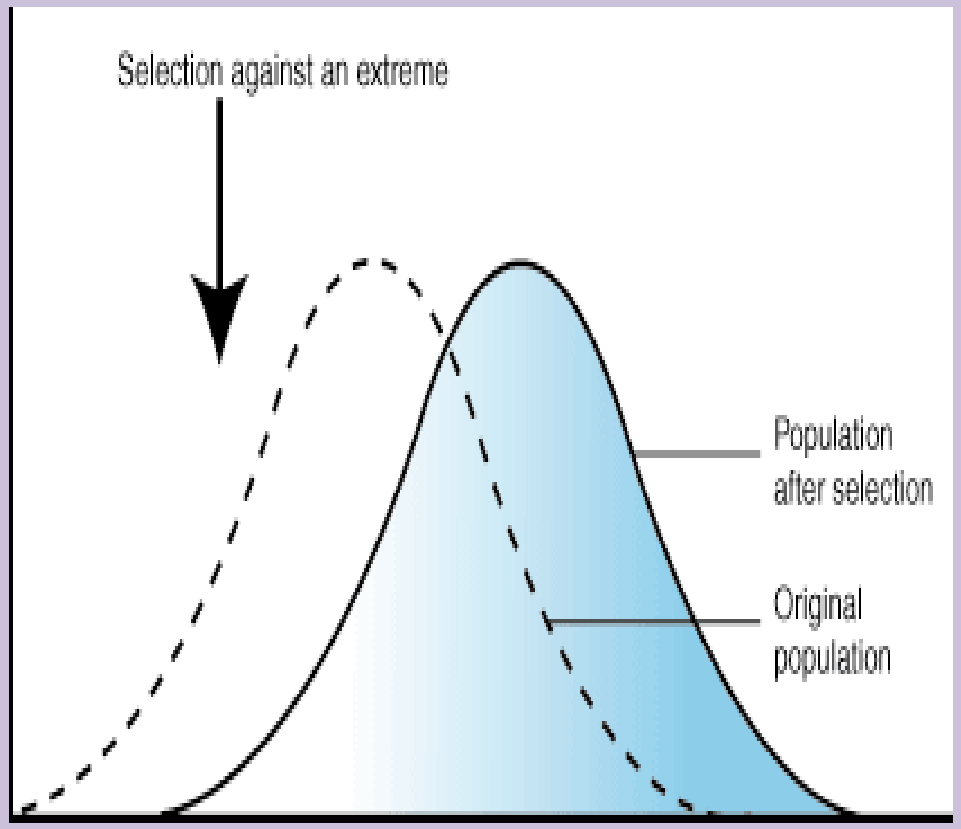
- For polygenic traits we usually see **NORMAL DISTRIBUTION** of phenotypes.



Ex. Height – avg height of class at Top of curve

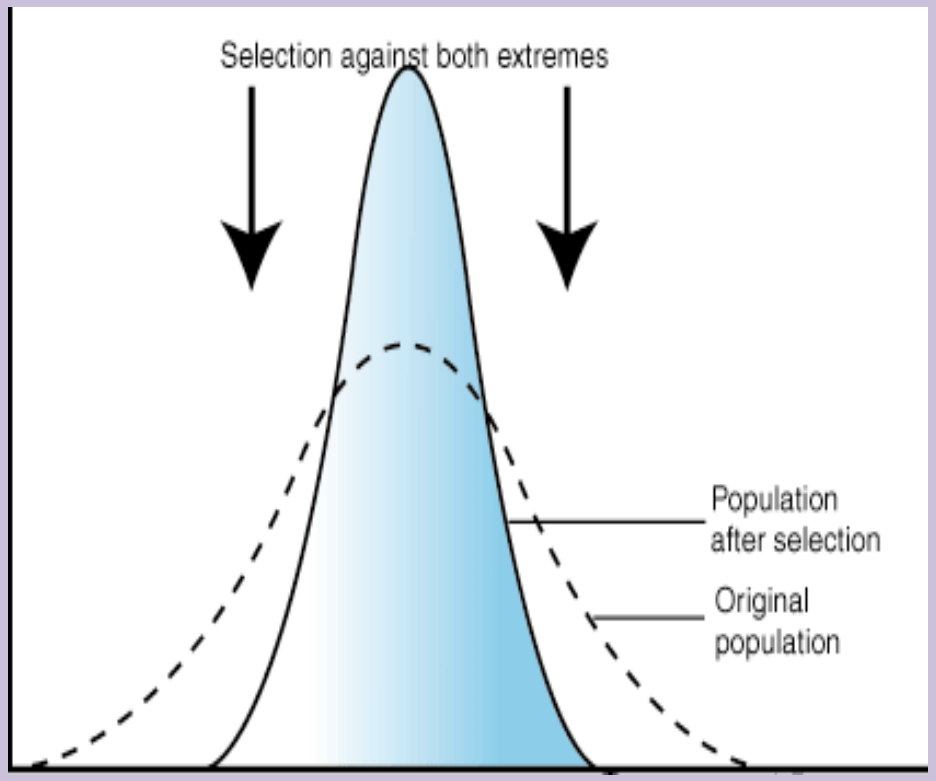
# (1) Directional Selection

- When individuals at one end of the curve have **higher fitness** than individuals in the middle or at the other end.
- The range of phenotypes shifts as some individuals fail to survive and reproduce while others succeed.



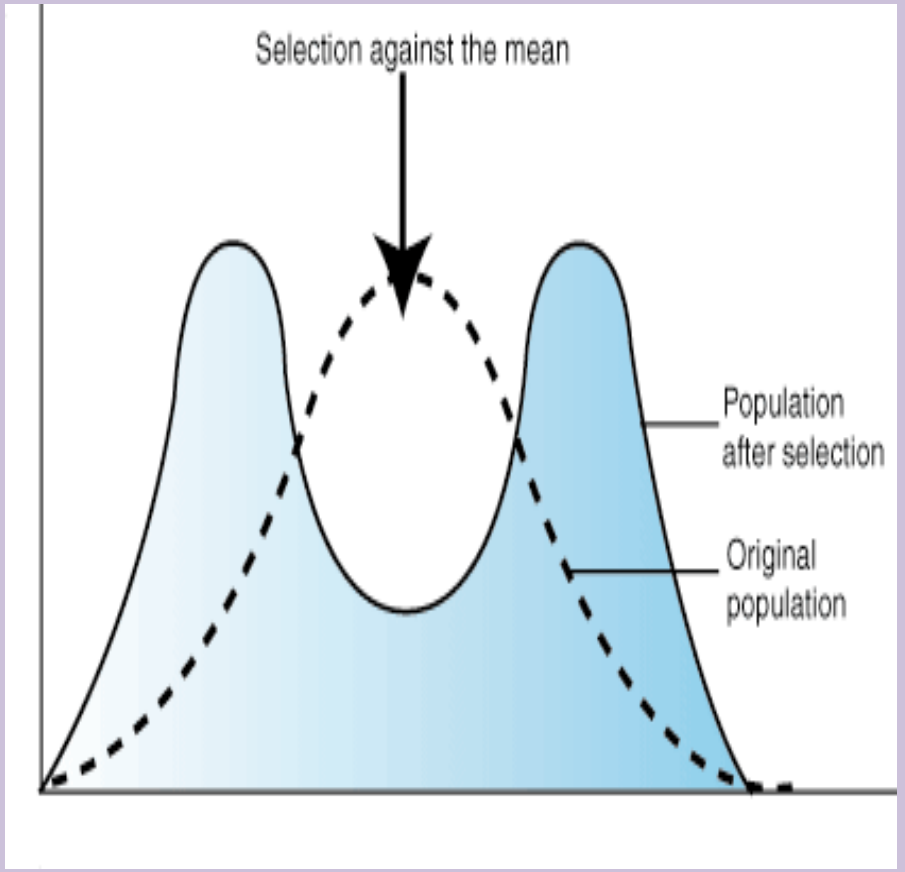
# (2) Stabilizing Selection

- When individuals near the center of the curve have higher fitness.
- Individuals on either extreme of the bell curve are less fit for their environment.



# (3) Disruptive Selection

- When individuals at the upper and lower ends of the curve have higher fitness than individuals near the middle.
- Selection acts mostly strongly against an intermediate type.
- Could cause the curve to split in two.



# Basically…

- You are different (variation)
- You compete for resources
- If you are suited for your environment, you survive and reproduce and pass on the good genes

# OR

- You're born unsuited for your environment
- You die
- Your bad genes die with you
- Your species goes extinct