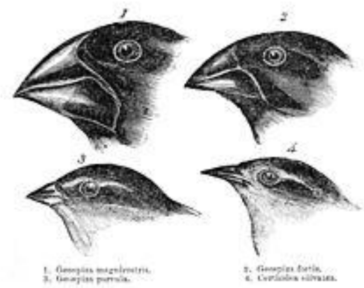
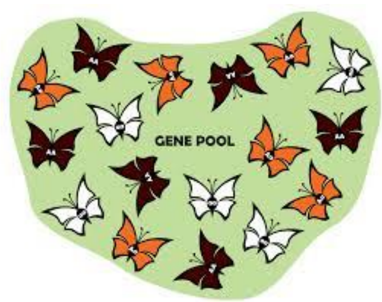
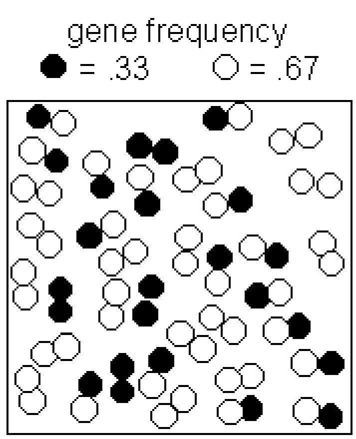
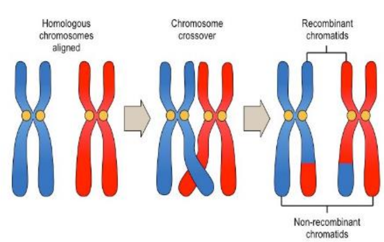
Ishaan Mody (period 1)

Chapter 11 Study Guide

Genetic Variation Within Populations

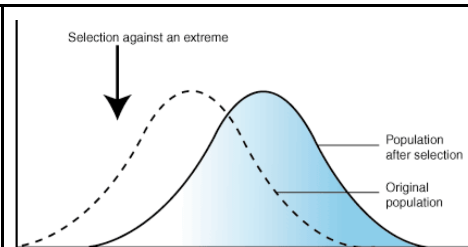
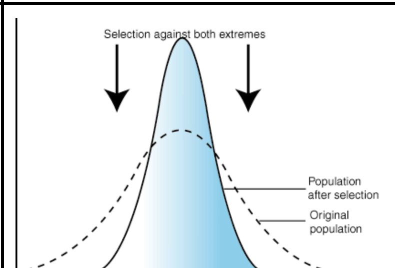
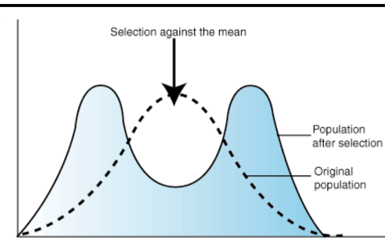
Natural Selection	Acts on phenotypes	
Darwin's finches	Show evolution through beak shapes because of different food sources	
Gene pool	Genetic variation within a population (large gene pool is desired for a population)	
Gene frequency	Alles have different gene frequencies within a population	

Genetic variation causes	• Mutations (natural selection)
	• Recombination
	    • Meiosis
	    • Crossing over of chromosomes
		

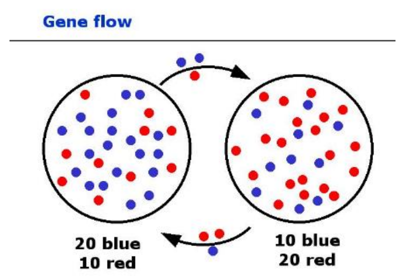
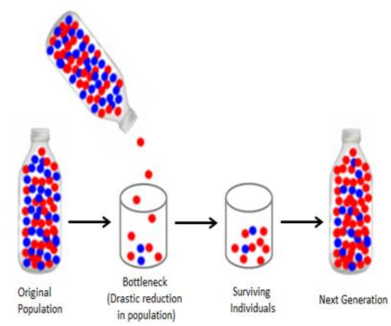
Natural Selection in Populations

Microevolution	• Observable change in allele frequency of a population over time • Occurs in a small population in a small scale • Natural selection can change distribution of trait along 3 paths	
Macroevolution	• Major evolutionary change • Occurs in a large population in a large scale	

3 Paths of How Evolution Can Change Microevolution

Directional Selection	• Value of trait shifts in direction of the desired trait (still bell curve, just shifted) • Same genetic diversity • Lead to rise in drug resistant bacteria	
Stabilizing Selection	• Intermediate/middle phenotype is desired and is more common • Decreases genetic diversity	
Disruptive Selection (diversifying selection)	• Both extremes are favored and intermediate is lost • Can lead to formation of new species	

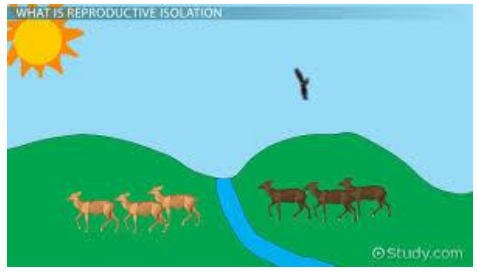
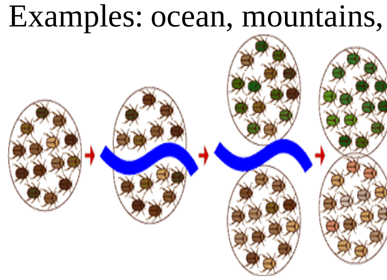
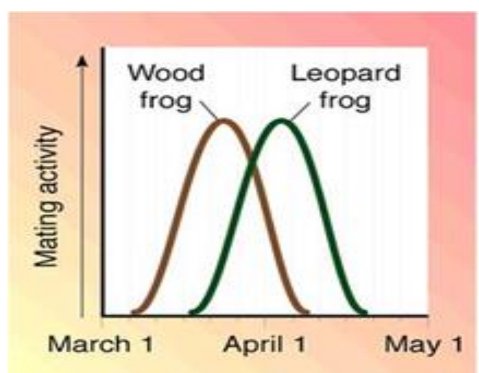
Other Mechanisms of Evolution

Gene flow	• Movement of alleles from one population to another (immigration, emigration) • Effects: increases genetic variation of receiving population, keeps gene pools similar between populations • Lack of gene flow = can create genetically different populations/increases chance of 2 different species evolving	
Genetic drift	• Changes in allele frequencies due to chance (bottleneck effect, founder effect) • Effects: allele frequencies are different from original population • Small populations are more likely to be affected by chance • Lethal alleles may be more common • Loss of genetic variation	
Sexual selection	• Occurs when certain traits increase mating success • Certain traits can become very exaggerated (traits are not always adept for survival)	

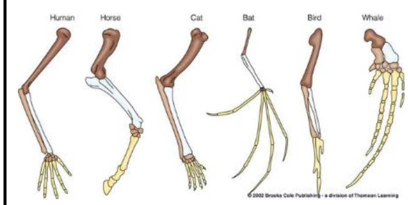
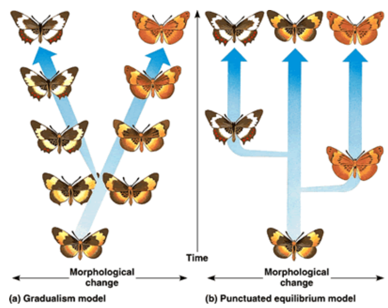
Hardy-Weinberg Equilibrium

- Describes what a population has to do to ***<u>not</u>*** evolve with 5 conditions:
  1. Maintain a large population (no genetic drift)
  2. No emigration or immigration (no gene flow)
  3. No mutations
  4. Random mating (no sexual selection)
  5. No natural selection (all traits are equal)
- Equation is used to predict genotype frequencies in a population
- If calculated frequencies match actual frequencies, then population is in equilibrium

Speciation through Isolation

Reproductive isolation	When members of different populations can no loner mate successfully with one another (evolved too different from one another)	
Behavioral isolation	Isolation caused by differences in mating behavior	
Geographic isolation	Physical barrier that divides 2 populations	Examples: ocean, mountains, river, etc 
Temporal isolation	Timing of mating between populations is different	

Patterns of Evolution

Convergent evolution	Evolution towards similar characteristics in unrelated species (related to analogous structures)	
Divergent evolution	Related species evolve in different directions/become different (related to homologous structures)	
Coevolution	2 or more species evolve in response to one another (competition/predators vs prey)	
Extinction	Elimination of a species from Earth	
Punctuated equilibrium	Short spans of rapid evolution, then long periods of time without change	
Adaptive radiation	Diversification of one ancestral species forming into many different species