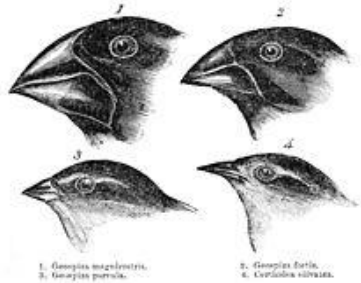

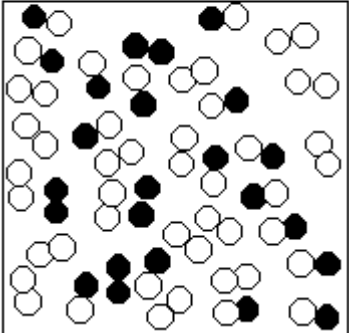
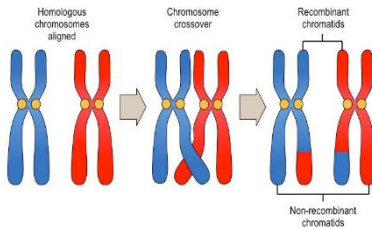




## Chapter 11 Study Guide

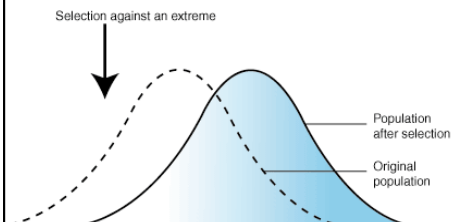
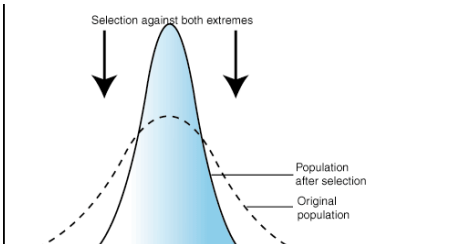
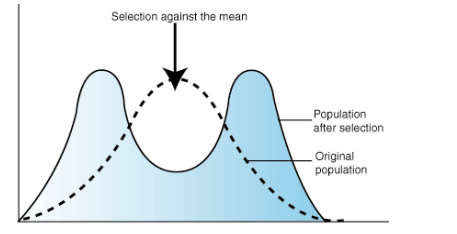
### Genetic Variation Within Populations

<p>Natural Selection</p>	<p>Acts on phenotypes</p>	
<p>Darwin's finches</p>	<p>Show evolution through beak shapes because of different food sources</p>	
<p>Gene pool</p>	<p>Genetic variation within a population (large gene pool is desired for a population)</p>	
<p>Gene frequency</p>	<p>Alles have different gene frequencies within a population</p>	<p>gene frequency          ● = .33    ○ = .67</p> 
<p>Genetic variation causes</p>	<ul style="list-style-type: none"> <li>• Mutations (natural selection)</li> <li>• Recombination             <ul style="list-style-type: none"> <li>• Meiosis</li> <li>• Crossing over of chromosomes</li> </ul> </li> </ul>	

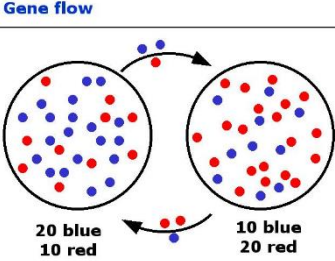
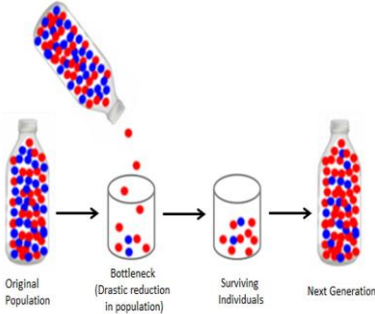

## Natural Selection in Populations

<p>Microevolution</p>	<ul style="list-style-type: none"> <li>• Observable change in allele frequency of a population over time</li> <li>• Occurs in a small population in a small scale</li> <li>• Natural selection can change distribution of trait along 3 paths</li> </ul>	
<p>Macroevolution</p>	<ul style="list-style-type: none"> <li>• Major evolutionary change</li> <li>• Occurs in a large population in a large scale</li> </ul>	

### 3 Paths of How Evolution Can Change Microevolution

<p>Directional Selection</p>	<ul style="list-style-type: none"> <li>• Value of trait shifts in direction of the desired trait (still bell curve, just shifted)</li> <li>• Same genetic diversity             <ul style="list-style-type: none"> <li>• Lead to rise in drug resistant bacteria</li> </ul> </li> </ul>	
<p>Stabilizing Selection</p>	<ul style="list-style-type: none"> <li>• Intermediate/middle phenotype is desired and is more common</li> <li>• Decreases genetic diversity</li> </ul>	
<p>Disruptive Selection (diversifying selection)</p>	<ul style="list-style-type: none"> <li>• Both extremes are favored and intermediate is lost</li> <li>• Can lead to formation of new species</li> </ul>	

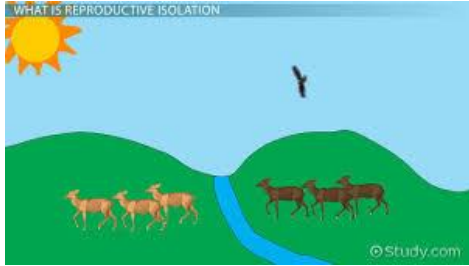

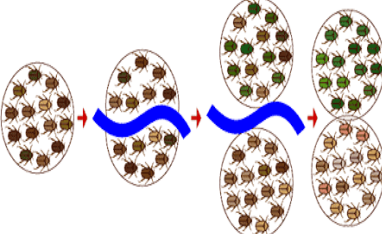
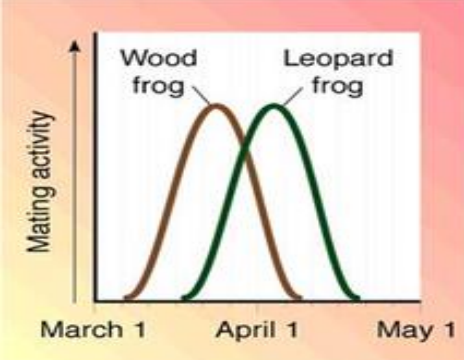
## Other Mechanisms of Evolution

<p>Gene flow</p>	<ul style="list-style-type: none"> <li>• Movement of alleles from one population to another (immigration, emigration)</li> <li>• Effects: increases genetic variation of receiving population, keeps gene pools similar between populations</li> <li>• Lack of gene flow = can create genetically different populations/increases chance of 2 different species evolving</li> </ul>	 <p>The diagram, titled 'Gene flow', shows two circular populations. The left population contains 20 blue and 10 red alleles. The right population contains 10 blue and 20 red alleles. Arrows indicate the movement of alleles between the two populations, showing that the gene pools become more similar.</p>
<p>Genetic drift</p>	<ul style="list-style-type: none"> <li>• Changes in allele frequencies due to chance (bottleneck effect, founder effect)</li> <li>• Effects: allele frequencies are different from original population</li> <li>• Small populations are more likely to be affected by chance</li> <li>• Lethal alleles may be more common</li> <li>• Loss of genetic variation</li> </ul>	 <p>The diagram illustrates the bottleneck effect. It starts with an 'Original Population' in a bottle containing a mix of blue and red alleles. A 'Bottleneck (Drastic reduction in population)' occurs, leaving only a few individuals in a smaller container. These 'Surviving Individuals' then reproduce to form the 'Next Generation', which has a different allele frequency than the original population.</p>
<p>Sexual selection</p>	<ul style="list-style-type: none"> <li>• Occurs when certain traits increase mating success</li> <li>• Certain traits can become very exaggerated (traits are not always adept for survival)</li> </ul>	 <p>A photograph of a peacock in a park-like setting, displaying its large, iridescent tail feathers. This is a classic example of sexual selection, where a trait that is not necessarily advantageous for survival (large, heavy tail) is favored because it increases mating success.</p>

## Hardy-Weinberg Equilibrium

- Describes what a population has to do to **not** 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

<p>Reproductive isolation</p>	<p>When members of different populations can no longer mate successfully with one another (evolved too different from one another)</p>	
<p>Behavioral isolation</p>	<p>Isolation caused by differences in mating behavior</p>	 <p><small>Agelaius phoeniceus © 2014 LARRY 2005</small></p>
<p>Geographic isolation</p>	<p>Physical barrier that divides 2 populations</p>	<p>Examples: ocean, mountains, river, etc</p> 
<p>Temporal isolation</p>	<p>Timing of mating between populations is different</p>	

# Patterns of Evolution

<p>Convergent evolution</p>	<p>Evolution towards similar characteristics in unrelated species (related to analogous structures)</p>	
<p>Divergent evolution</p>	<p>Related species evolve in different directions/become different (related to homologous structures)</p>	
<p>Coevolution</p>	<p>2 or more species evolve in response to one another (competition/predators vs prey)</p>	
<p>Extinction</p>	<p>Elimination of a species from Earth</p>	
<p>Punctuated equilibrium</p>	<p>Short spans of rapid evolution, then long periods of time without change</p>	<p>(a) Gradualism model</p> <p>(b) Punctuated equilibrium model</p>
<p>Adaptive radiation</p>	<p>Diversification of one ancestral species forming into many different species</p>	<p>Adaptive radiation in Galapagos finches</p> <p>© 2005 Encyclopædia Britannica, Inc.</p>