Topic Review Guide: Genetic Drift (Video #5)

To Think About: How is natural selection a major mechanism of evolution?

Watch: Mr. Andersen's Genetic Drift video.
Read: Chapter 15, Hillis' Principles of Life 1st ed. (2012), p. 297-310.

Supplementary Resources: Click on the links to view.
- Crash Course's Population Genetics video.
- Kimball's Biology Pages: The Hardy-Weinberg Equilibrium
- Genetic Drift Simulation at the University of Arizona
- Palomar College: Hardy-Weinberg Equilibrium
- Scitable (Nature Education): The Hardy-Weinberg Principle
- Matt Ridley Essay: The Advantage of Sex

Listen and Look: Here is a list of key terms you will hear and see during this podcast. Get to know them! Be able to connect them to one another using a concept map.

Gene pool	Alleles	Genetic drift	Population
Allele frequency	Founder effect	Hardy-Weinberg Equilibrium	
Bottleneck effect	Species		

Recall and Review: Use the lecture in the video and the reading from your textbook to help you answer these questions in your BILL.
1. In a few words, **describe** what genetic drift is.
2. **Define** the variables p and q.
3. **Explain** how each of the following affect the allele frequency of a population:
   a. Small population
   b. Large population
   c. Sexual selection
   d. Natural selection
4. **Explain** why genetic drift takes place less often in a large population.
5. **Explain** how natural selection results in an increase in the frequency of beneficial alleles in a population over time, and a decrease in the frequency of deleterious (harmful) alleles.
6. **Compare and contrast** the founder effect with a bottleneck event and **describe** how they both affect the allele frequencies in a gene pool.
7. **Explain** how the process of sexual reproduction affects the evolutionary process.
8. **Describe** examples of directional selection, stabilizing selection and diversifying selection.
9. Using a drawing, **illustrate** and **explain** how each of the following mechanisms can affect allele frequencies in a population:
   a. mutation
   b. gene flow
   c. genetic drift
   d. nonrandom mating
   e. selection (natural or otherwise)

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10. The Hardy-Weinberg equilibrium is a mathematical model used to study the allele frequencies in a population. **Explain** why such a model is a valuable tool for studying the gene pools of real populations.

11. Although the assumptions of the Hardy-Weinberg equilibrium are never met completely in real populations, the genotype frequencies of many populations do not deviate significantly from H-W expectations. **Explain** why.

12. **Explain** why heterozygotes can have survival advantages over homozygotes in a population.

13. **Describe** the significance of noncoding DNA in the genomes of organisms in terms of how they influence evolution of species.

Learn More: To learn more about genetic drift, use the links below:
- Brief video tutorial about genetic drift (Lego people!)
- UC Berkeley's Understanding Evolution: Genetic Drift
- PBS' Evolution site: The Founder Effect and Polydactyly
- Genetic drift simulator at UConn

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