CHAPTER 20 GUIDED NOTES: GENES WITHIN POPULATIONS

Raven 9th edition

1. Define "descent with modification"

    _____

    _____

2. Evolution was not an idea original to Darwin, so what was Darwin's key contribution to this theory.

    _____

3. Distinguish between Lamarck's concept of evolution and Darwin's.

    _____

    _____

4. What is the raw material of evolution?

    _____

5. List the five conditions that must be met by a population for genotypes to remain unchanged from generation to generation (i.e., a population in Hardy-Weinberg equilibrium).

    a. _____

    b. _____

    c. _____

    d. _____

    e. _____

6. Assuming a population is in Hardy-Weinberg equilibrium, write the equation that describes genotype frequencies.

    _____

7. In reference to the Hardy-Weinberg Principle, define the following:

a. p^2 _____

 b. 2pq_____

c. q^2 _____

8. Work out these practice problems. Assuming H-W equilibrium, find both the allele and genotype frequencies.

a. In *Drosophilia*, the allele for normal length wings is dominant over the allele for vestigial wings. In a population of 1,000 individuals, 160 show the recessive phenotype.

   1. allele frequencies: dominant allele (**W**) = _____;
   recessive allele (**w**) = _____

   2. genotype frequencies: **WW** = _____; **Ww** = _____; **ww** = _____

b. The allele for the hair pattern called "widow's peak" is dominant over the allele for no "widow's peak." In a population of 1,000 individuals, 360 show the dominant phenotype.

   1. allele frequencies: dominant allele (___) = _____; recessive allele (___) = _____

    2. genotype frequencies: _____ = _____; _____ = _____; _____ = _____

9. What is the value of using the Hardy-Weinberg equation when researching evolution in a population?
   _____
   _____

10. List and briefly explain the five agents of evolutionary change.

   a._____

   b._____

   c._____

   d._____

   e._____

11. How does genetic drift apply to each of the following? Give an example of each.

a. Founders effect

_____
_____

b. Bottleneck effect

_____
_____

12. On page 441, the book states, "only selection regularly produces *adaptive* evolutionary change, but the genetic constitution of populations, and thus the course of evolution, can also be affected by mutations, gene flow, nonrandom mating, and genetic drift." Explain the distinction.

_____

_____

13. Describe two examples of documented cases of selection in natural populations which have resulted in evolutionary change of a population.

a._____

_____

b._____

_____
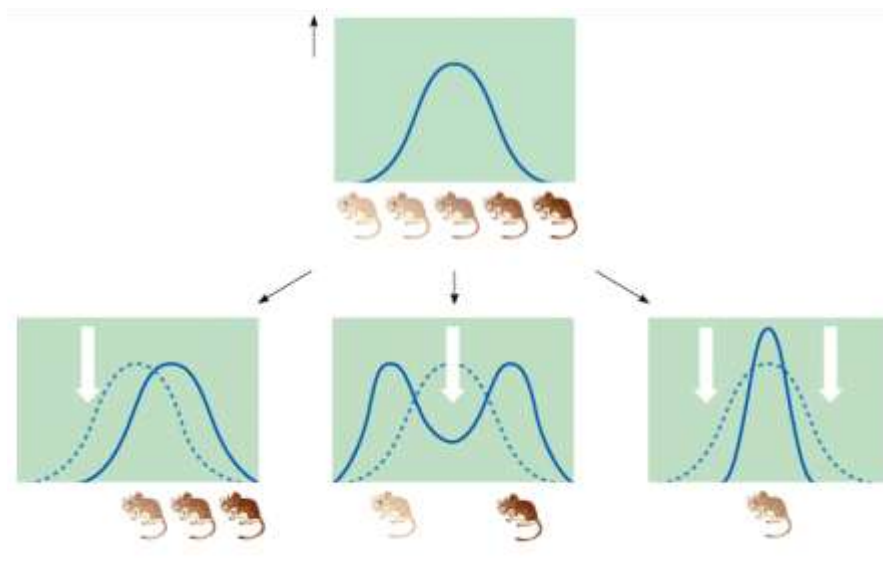
14. Define fitness (as it is used in evolutionary biology).

_____

_____

15. Explain "heterozygote advantage" and give an example.

_____

_____

Original population

16. Distinguish between the three types of selection illustrated in these graphs of the distribution of coat color in mice.

_____   _____   _____