Name _____ **Period** _____

AP Biology **Date** _____

CHAPTER 21 GUIDED NOTES: GENES WITHIN POPULATIONS

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** = _____; **W*w*** = _____; ***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.

    _____

    _____

    _____

    _____

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