

Name \_\_\_\_\_

Period \_\_\_\_\_

Ms. Foglia

Date \_\_\_\_\_

**AP: CHAPTER 23: THE EVOLUTION OF POPULATIONS**

1. How does the “modern synthesis” theory of evolution differ from Darwin’s Theory of Natural Selection?

\_\_\_\_\_

\_\_\_\_\_

2. Population genetics puts a mathematical approach to the study of microevolution. Define each of the terms commonly used in population genetics.

a. population: \_\_\_\_\_

b. gene pool: \_\_\_\_\_

c. gene frequency: \_\_\_\_\_

3. What are the gene frequencies for the red and white flowers?

a.  $p =$  \_\_\_\_\_

b.  $q =$  \_\_\_\_\_

4. List the five condition that must be met by a populations to insure stability (no evolution).

a. \_\_\_\_\_

b. \_\_\_\_\_

c. \_\_\_\_\_

d. \_\_\_\_\_

e. \_\_\_\_\_

5. Assuming Hardy-Weinberg distribution of genes in a population, write the equation that describes genotype frequencies.

\_\_\_\_\_

6. Define the following:

a.  $p^2$  = \_\_\_\_\_

b.  $2pq$  = \_\_\_\_\_

c.  $q^2$  = \_\_\_\_\_

7. Work out these practice problems. Find both the gene and genotype frequencies:

a. In *Drosophila*, 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.

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.

8. What is the H-W assumption that is broken when genetic drift occurs? Explain

\_\_\_\_\_  
\_\_\_\_\_

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

a. Founders effect: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

b. Bottleneck effect \_\_\_\_\_

\_\_\_\_\_

10. How do each of the following break H-W assumptions?

a. natural selection: \_\_\_\_\_

\_\_\_\_\_

b. gene flow: \_\_\_\_\_

\_\_\_\_\_

c. mutation: \_\_\_\_\_

\_\_\_\_\_

d. selective mating: \_\_\_\_\_

\_\_\_\_\_

11. Why is genetic variation important to evolution?

\_\_\_\_\_

\_\_\_\_\_

12. How can populations vary along a geographic axis compared to isolated populations?

\_\_\_\_\_

\_\_\_\_\_

13. What is the role of mutations to forming variation?

\_\_\_\_\_

\_\_\_\_\_

14. What factors of sexual reproduction lead to variations within a population?

\_\_\_\_\_

\_\_\_\_\_

15. How does diploidy preserve variation?

---

---

16. What is “balanced polymorphism?”

---

---

17. How can parasites contribute to balanced polymorphism?

---

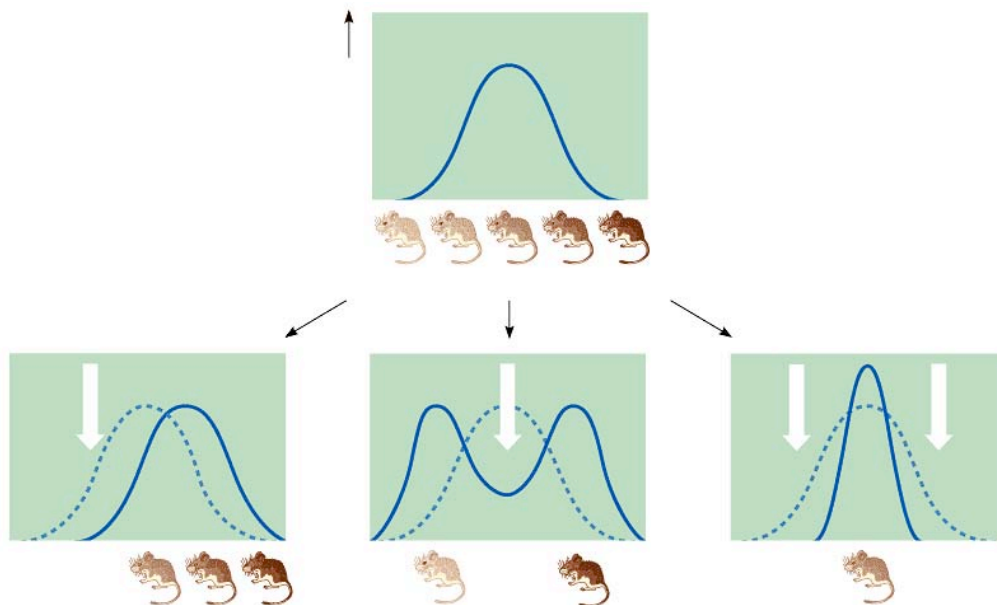
---

18. In a biological sense, what is fitness?

---

---

19. Label the following graphs of variation in color with the type of selection.



20. What is the effect of sexual selection?

---

---

21. For each of the following, give an example or describe what is meant by the statement.

a. Natural selection cannot fashion perfect organisms: \_\_\_\_\_

---

b. Evolution is limited by historical constraints: \_\_\_\_\_

---

c. Adaptations are often compromises: \_\_\_\_\_

---

d. Not all evolution is adaptive: \_\_\_\_\_

---

e. Selection can only edit existing variations: \_\_\_\_\_

---