

CHAPTER 21.3: Hardy-Weinberg Equilibrium

1. 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. **allelic frequency:**

2. 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 H-W equilibrium).

a. _____

b. _____

c. _____

d. _____

e. _____

3. Assuming a population is in Hardy-Weinberg equilibrium, write the equation (and define the terms) that describes allelic frequencies.

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

a. p^2 - _____

b. $2pq$ - _____

c. q^2 - _____

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

6. Work out these practice problems. Assuming H-W equilibrium, find both the allele 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.

- i. allele frequencies:

dominant allele (**W**) = _____

recessive allele (**w**) = _____

- ii. 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.

- i. allele frequencies:

dominant allele (___) = _____

recessive allele (___) = _____

- ii. genotype frequencies:

(___) = _____

(___) = _____

(___) = _____

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