Worksheet 17.1: Genes & Variation
(pages 482-486; iBooks pages 819-828)

For Questions 1–4, complete each statement by writing the correct word or words.

1. Natural selection works on an organism’s ________ rather than its ________.

2. A(n) ________ consists of all the genes, including the alleles for each gene, that are present in a population.

3. A gene pool typically contains different ________ for each heritable trait.

4. The number of times that an allele occurs in a gene pool compared with the number of times other alleles for the same gene occur is called the ________ of that allele.

5. In the diagram below, use circles to represent the alleles within each segment of the population. Draw the B alleles as solid circles and the b alleles as outline circles.

   The total number of individuals in this population is ________; the total number of alleles is ________.

   ![Sample Population Diagram]

6. How many alleles for black fur are in the sample population and what percentage of allele frequency does that represent?

   ____________  ____________

7. How many alleles for brown fur are in the sample population and what percentage of allele frequency does that represent?

   ____________  ____________
8. Describe how a geneticist might be able to tell that this population is evolving.

9. Can you determine whether an allele is dominant or recessive on the basis of the ratio of phenotypes in the population? Explain your answer.

10. What are mutations? When do they affect evolution?

11. How does sexual reproduction affect a population’s genetic variation?

12. Identify two ways in which genes can be recombined during meiosis.

13. What is lateral gene transfer? How does it affect variation?
14. Label the two graphs to show which represents a single-gene trait and which represents a polygenic trait.

For Questions 15–19, write True if the statement is true. If the statement is false, change the underlined word or words to make the statement true.

15. The number of phenotypes produced for a given trait depends on how many genes control the trait.

16. Height in humans is an example of a single-gene trait.

17. Each gene of a polygenic trait often has two or more phenotypes.

18. A single polygenic trait often has many possible genotypes.

19. A symmetrical bell-shaped graph is typical of polygenic traits.

A concept map helps you see how the topics you read about are related to one another. Use the words and phrases below to fill in the empty spaces in the concept map.

Genetic recombination Genes
Chromosomes Crossing-over

Sources of Genetic Variation

Mutations involve changes in

Lateral gene transfer happens during

Meiosis