Chapter 15 Review Answers

Reviewing Content

1. c
2. a
3. a
4. a
5. d
6. b
7. a
8. a
9. c
10. b

12. Darwin observed fossils, some of which resembled living organisms and others that were unlike any organisms he knew; that organisms everywhere seemed remarkably well suited to their environments; and that similar organisms, such as tortoises, were different on each island.

14. Hutton proposed that Earth had to be millions—not thousands—of years old. Lyell argued that the same forces change Earth in the present as in the past, so scientists should explain Earth's history in terms of processes that are observable in the present.

15. Lamarck said that structures that are used develop and are passed on to offspring, whereas structures that are not used are not passed on.

17. Artificial selection is the process by which humans select certain naturally occurring variations to use in breeding new plants and animals. Darwin thought that a similar process in nature could explain how organisms change over time.

18. Fitness, the ability of an individual to survive and reproduce in its specific environment, occurs through ongoing adaptation. An example is an animal that survives through camouflage. An adaptation is any inherited characteristic that increases an organism's chance of survival. Examples include a porcupine's quills and a lion's teeth and claws.

19. In the survival of the fittest, individuals that are best suited to their environment survive and reproduce most successfully.

21. Fossils that formed in different layers of rock provide evidence of the way species changed over time.

22. Evidence of evolution in living animals includes the existence of unrelated organisms from different locations that share traits because they evolved from similar environments. An example is the beaver in North America and the capybara in South America.

23. A vestigial organ is an organ, such as the human appendix, that is reduced in size and no longer has a function.

24. Similarities in embryology of different species have been used as evidence that the species evolved from a common ancestor.

Critical Thinking

26. Natural selection leads to organisms being better adapted to their environments and explains the diversity of organisms Darwin observed on the Galápagos Islands, which have varied environments.

27. Giraffes with slightly longer necks could reach plant materials that those with shorter necks could not reach and, therefore, would have a better chance of surviving and passing on their genes. Over many generations of natural selection, the long necks of modern giraffes evolved.

28. The few mosquitoes that were resistant to DDT survived and reproduced, whereas those that were not resistant were killed by the insecticide. The succeeding populations of mosquitoes were more resistant to DDT.

29. Their survival might depend on how well the turkey could avoid predators and whether there was an adequate food supply.

30. Most endangered species are endangered because human actions have changed or destroyed their habitats. Protecting endangered species—for example, by preserving their habitats or providing them with nesting sites—may restore the natural conditions.

Chapter 16 Review Answers

1. A 2. A 7. B 8. C 9. C

Understanding Concepts

11. The relative frequency of an allele is the number of times that the allele occurs in a gene pool compared with the number of times other alleles occur. For example, there are two alleles for the gene that controls fur color in mice. If one of the alleles is present in half the members of the population, its frequency is 50 percent.

12. In sexual reproduction, alleles can recombine to produce different genotypes, resulting in different phenotypes and hence variation within a population.

16. Evolution can be defined as a change in the relative frequency of alleles in the gene pool of a population.

19. Genetic drift is the random change in allele frequencies in a population. It is most likely to occur in small populations or when a small group of organisms colonizes a new habitat.

20. Genetic equilibrium occurs when the allele frequencies in a population remain constant. Five conditions are required to maintain genetic equilibrium: random mating, extremely large population size, no movement into or out of the population, no mutations, and no natural selection.