

Chapter 6 Study Guide

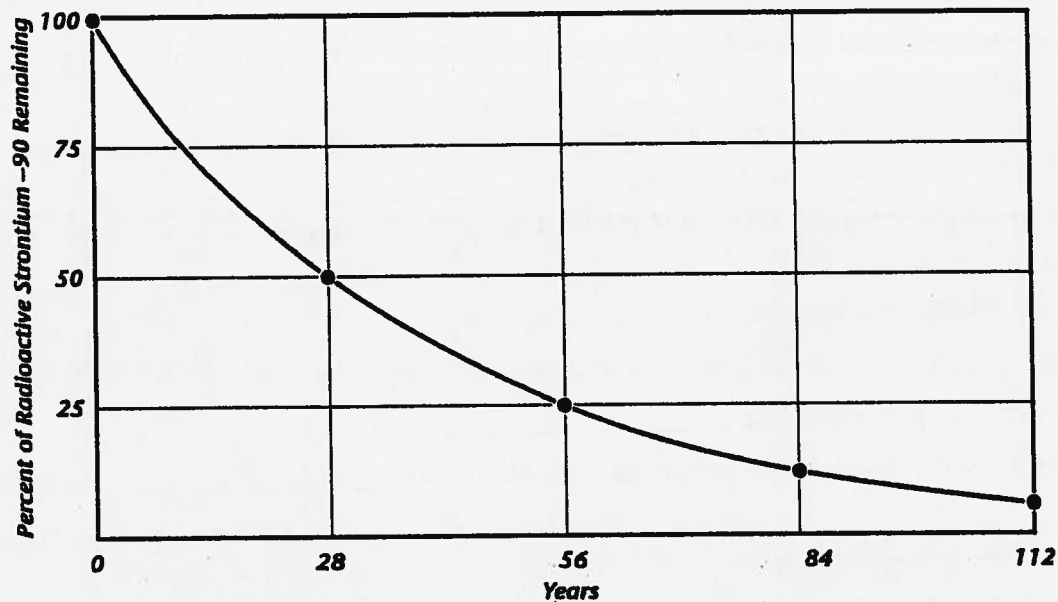
Completion

Complete each sentence or statement.

1. Scientists show how groups of organisms may be related by placing them on a diagram called a(n) _____.
2. The only traits that can be acted upon by natural selection are those that are controlled by _____.
3. In the process of natural selection, the organisms that are best suited to their environments are most likely to survive and _____.
4. Similarities in the early development of chickens and opossums suggest that these animals share a common _____.
5. Most fossils are found in _____ rock.
6. A new _____ can form when a group of individuals become isolated from the main group.
7. Earth's history spans more than _____ years.
8. The fossil record provides information about species that are _____, or have died out.
9. _____ dating can be used to determine which of two fossils is younger and which is older, but not what their actual ages are.
10. Living things first appeared during the geologic time period known as _____.
11. When minerals replace bone, a(n) _____ fossil forms.
12. The theory of _____ states that species evolve quickly over a relatively short time.
13. To determine a fossil's actual age, scientists analyze _____ elements in rocks near the fossils.
14. A(n) _____ is a well-tested concept that explains a wide range of observations.
15. The forelimbs of a bird and a mammal are examples of _____ structures.
16. The _____ of a radioactive element is the time it takes for half of the atoms in a sample to decay.

Short Answer

Use the diagram to answer each question.

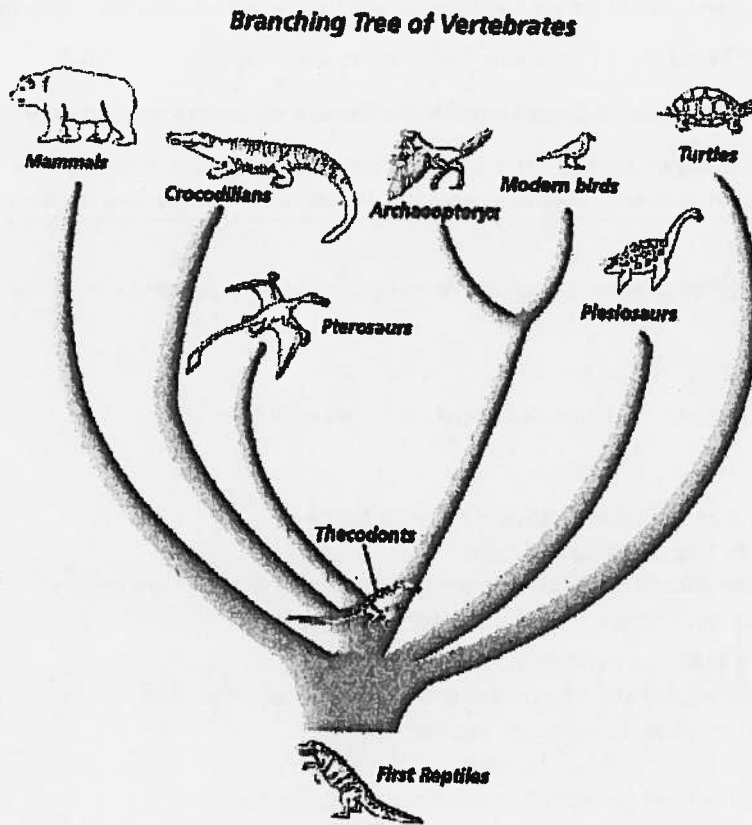
Radioactive Decay of Strontium - 90

17. According to the diagram, what is the half-life of strontium-90? Explain your answer.
18. According to the graph, how does the amount of strontium-90 in a sample change over time?

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Use the diagram to answer each question.



19. List two ancestors of *Archaeopteryx*.
20. Are pterosaurs more closely related to turtles or to crocodilians? Explain your answer.
21. Would you expect the DNA of crocodilians to be more similar to the DNA of modern birds or the DNA of turtles? Explain your reasoning.
22. Are modern birds more closely related to *Archaeopteryx* or to the first reptiles?
23. Name the common ancestor of pterosaurs and crocodilians.
24. Did birds evolve from the gliding reptiles called pterosaurs? Explain your reasoning.

Essay

25. A horse and a donkey can mate with each other. Their offspring, called a mule, is not fertile. Do horses and donkeys belong to the same species? Explain your answer.
26. Suppose a species lived in an environment that changed very little over millions of years. Which theory about how fast evolution occurs would most likely explain the evolution of that species? Explain your answer.
27. What is a mass extinction? What do scientists hypothesize causes mass extinctions?
28. Explain how a group of organisms that is separated from the rest of its species can evolve different traits.
29. Species A and species B are shown on the same branch of a branching tree. Species C is shown on a separate branch. All three species came from a common ancestor. What can you state about the similarities of the DNA of species A, B, and C?
30. How did studying selective breeding help Darwin develop his theory of evolution?

Multiple Choice

Identify the letter of the choice that best completes the statement or answers the question.

- _____ 31. A branching tree is
 - a. a drawing that shows where different animals live in a tree.
 - b. a homologous structure that many plants have.
 - c. a diagram showing how scientists think different groups of organisms are related.
 - d. a species of tree that is not closely related to other tree species.
- _____ 32. How does natural selection lead to evolution?
 - a. Helpful variations accumulate among surviving members of the species.
 - b. Stronger offspring kill weaker members of the species.
 - c. Environmental changes favor weaker members of the species.
 - d. Overproduction provides food for stronger members of the species.
- _____ 33. The gradual change in a species over time is called
 - a. mutation.
 - b. migration.
 - c. evolution.
 - d. variation.
- _____ 34. If two organisms look very similar during their early stages of development, this is evidence that the organisms
 - a. have exactly the same DNA.
 - b. evolved from a common ancestor.
 - c. evolved from different ancestors.
 - d. are not related.
- _____ 35. How do most fossils form?
 - a. An insect becomes trapped in amber.
 - b. A dead organism becomes buried in tar.
 - c. A dead organism becomes buried in sediment.
 - d. An entire organism becomes frozen in ice.

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- _____ 36. Which of these is one of the main ways that a new species forms?
- A group is separated from the rest of the species.
 - Cross-breeding occurs within the species.
 - Mutations occur in the alleles of members of the species.
 - Competition occurs between members of the species.
- _____ 37. If the half-life of a radioactive element is 4 days, how long will it take for three fourths of a sample of the element to decay?
- 16 days
 - 4 days
 - 8 days
 - 2 days
- _____ 38. Why do scientists think related species have similar body structures and development patterns?
- The species inherited many of the same genes from a common ancestor.
 - The species inherited all of the same genes from a common ancestor.
 - The species inherited many of the same proteins from each other.
 - The species inherited many of the same genes from each other.
- _____ 39. What did Darwin infer from his observations of organisms in South America and the Galápagos Islands?
- The organisms on the Galápagos Islands were virtually identical to mainland organisms.
 - A small number of different plant and animal species had come to the Galápagos Islands from the mainland.
 - A small number of different plant and animal species had come to the mainland from the Galápagos Islands.
 - The organisms on the Galápagos Islands were completely unrelated to mainland organisms.
- _____ 40. Which term refers to the process by which individuals that are better adapted to their environment are more likely to survive and reproduce?
- natural selection
 - variation
 - overproduction
 - competition
- _____ 41. Which term refers to similar structures that related species have inherited from a common ancestor?
- punctuated equilibria
 - homologous structures
 - developmental organisms
 - DNA sequences
- _____ 42. What is the role of genes in evolution?
- Parents with recessive genes die from overproduction.
 - The genes of most surviving parents have only dominant alleles.
 - Only genes can be acted on by natural selection.
 - Only traits that are controlled by genes can be acted on by natural selection.
- _____ 43. How long is Precambrian Time in the Geologic Time Scale?
- 4 million years
 - 4.6 million years
 - 4 billion years
 - 4.6 billion years

- _____ 44. What did Darwin observe about finches in the Galápagos Islands?
- Their feathers were adapted to match their environment.
 - They had identical genotypes in all locations.
 - They had identical phenotypes in all locations.
 - Their beaks were adaptations related to the foods the finches ate.
- _____ 45. A species is a group of similar organisms that
- can mate with each other and produce fertile offspring.
 - can migrate to an island from the mainland.
 - can live together on an island.
 - all have exactly the same traits.
- _____ 46. Which of the following is most likely to become preserved as a fossil?
- a clam shell
 - a leaf
 - a worm
 - a jellyfish
- _____ 47. What are fossils?
- molds and casts of organisms that live today
 - footprints or burrows of small animals that live today
 - drawings of ancient animals and other organisms
 - the preserved remains or traces of organisms that lived in the past
- _____ 48. What evidence is most important when using relative dating?
- the position of sediment in petrified rock
 - the types of minerals in a petrified fossil
 - the half-life of a radioactive element
 - the position of fossils in sedimentary rock layers
- _____ 49. Which term refers to a species creating more offspring than can possibly survive?
- variation
 - overproduction
 - evolution
 - natural selection
- _____ 50. What theory agrees with fossil records that show no intermediate forms for long periods of time?
- evolution
 - gradualism
 - natural selection
 - punctuated equilibria
- _____ 51. Which term refers to a species that no longer has any living members?
- extinct
 - fossilized
 - molded
 - petrified
- _____ 52. What evidence suggests that the ancestors of whales once walked on land?
- Whales breathe through lungs.
 - Whales have similar DNA to elephants.
 - Scientists have found fossils of whalelike creatures that had legs.
 - Whales perform walking motions as they swim.

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- _____ 53. How do remains become petrified fossils?
- A sedimentary rock becomes a cast.
 - Minerals replace all or part of an organism.
 - Molds and casts fill with sediment.
 - Sediment replaces all or part of an organism.
- _____ 54. A trait that helps an organism survive and reproduce is called a(n)
- selection.
 - variation.
 - mutation.
 - adaptation.
- _____ 55. What theory proposes that species evolve during short periods of rapid change?
- absolute dating
 - gradualism
 - punctuated equilibria
 - evolution
- _____ 56. Darwin concluded that organisms on the Galápagos Islands
- had no variations.
 - had changed over time.
 - were the result of selective breeding.
 - had remained the same.
- _____ 57. Scientists combine evidence from fossils, body structures, early development, DNA, and protein structures to
- determine the evolutionary relationships among species.
 - decide which fossils are older than others.
 - determine what bones an animal has in its forelimbs.
 - determine whether an organism will have gills during its early development.
- _____ 58. How do scientists determine the actual age of fossils?
- mold and cast dating
 - relative dating
 - radioactive dating
 - sedimentary dating
- _____ 59. What theory proposes that evolution occurs steadily in tiny changes over long periods of time?
- relative dating
 - gradualism
 - punctuated equilibria
 - natural selection
- _____ 60. Differences between members of the same species are called
- selections.
 - variations.
 - traits.
 - predators.

