

Roland-Story Biology Chapter 13 Test Review

True/False

Indicate whether the sentence or statement is true or false.

- ___ 1. Species that have evolved from a common ancestor should have certain characteristics in common.
- ___ 2. In his *Essay on the Principle of Population*, Malthus said humans were the only population that could continue to grow in size indefinitely.
- ___ 3. Darwin observed that the plants and animals of the Galápagos Islands were the same as those on islands off the coast of Africa with similar environments.
- ___ 4. The book *Principles of Geology* by Charles Lyell described how changes in land formations can cause species to evolve.
- ___ 5. The inheritance of acquired characteristics was one mechanism of evolution supported by Darwin.
- ___ 6. Natural selection can cause the spread of an advantageous adaptation throughout a population over time.
- ___ 7. The two major ideas that Darwin presented in *The Origin of the Species* were that evolution occurred and that natural selection was its mechanism.
- ___ 8. The theory of evolution states that species change over time.
- ___ 9. Natural selection causes allele frequencies within populations to remain the same.
- ___ 10. Punctuated gradualism refers to the hypothesis that evolution occurs only in short periods of time.
- ___ 11. Two hypotheses suggested about the rate at which evolution proceeds are gradualism and punctuated equilibrium.
- ___ 12. The fossil record suggests that species have become less complex over time.
- ___ 13. The theory of evolution predicts that genes will accumulate more alterations in their nucleotide sequences over time.
- ___ 14. Evidence for evolution occurs only in the fossil record.
- ___ 15. The human forelimb and the bat forelimb are homologous structures.
- ___ 16. Early in development, human embryos and the embryos of all other vertebrates are strikingly similar.
- ___ 17. The way an embryo develops is not important in determining the evolutionary history of a species.
- ___ 18. The environment dictates only the direction and extent of evolution.
- ___ 19. The bacteria that cause tuberculosis have been unaffected by natural selection.
- ___ 20. Mutant bacteria that cause tuberculosis were selected against by natural selection mechanisms.
- ___ 21. A mutation in the bacteria that cause tuberculosis made them resistant to antibiotics.
- ___ 22. The environment selects which organisms will survive and reproduce by presenting challenges that only individuals with particular traits can meet.
- ___ 23. When food is plentiful, there is little selective pressure on the beaks of finches.
- ___ 24. When food is scarce, there is little selective pressure on the beaks of finches.
- ___ 25. When food is scarce, the number of different beak shapes of finches increases.

- ___ 26. The accumulation of differences between species or populations is called convergence.
- ___ 27. Within populations, divergence leads to speciation.

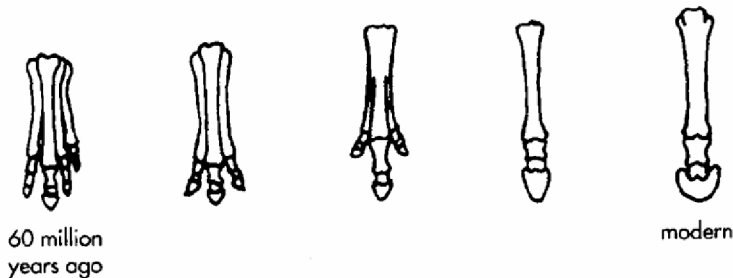
Multiple Choice

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

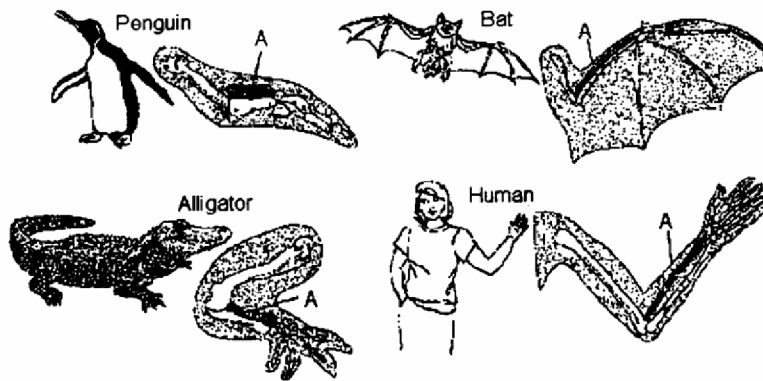
- ___ 28. Darwin thought that the plants and animals of the Galápagos Islands were similar to those of the nearby coast of South America because
- their ancestors had migrated from South America to the Galápagos Islands.
 - other scientists in South America had written about similar species.
 - the island organisms had the same nucleotide sequences in their DNA as the mainland organisms.
 - he found fossils, proving that the animals and plants had common ancestors.
- ___ 29. Darwin conducted much of his research on
- the Samoan Islands.
 - Manhattan Island.
 - the Hawaiian Islands.
 - the Galápagos Islands.
- ___ 30. Which of the following describes a population?
- dogs and cats living in Austin, Texas
 - four species of fish living in a pond
 - dogwood trees in Middletown, Connecticut
 - roses and tulips in a garden
- ___ 31. Natural selection is the process by which
- the age of selected fossils is calculated.
 - organisms with traits well suited to their environment survive and reproduce at a greater rate than less well-adapted organisms in the same environment.
 - acquired traits are passed on from one generation to the next.
 - All of the above
- ___ 32. Natural selection could *not* occur without
- genetic variation in species.
 - environmental changes.
 - competition for unlimited resources.
 - gradual warming of Earth.
- ___ 33. Natural selection causes
- changes in the environment.
 - plants and animals to produce more offspring than can survive.
 - changes in the frequency of certain alleles in a population.
 - All of the above
- ___ 34. The process by which a species becomes better suited to its environment is known as
- accommodation.
 - variation.
 - adaptation.
 - selection.
- ___ 35. According to Darwin, evolution occurs
- by chance.
 - during half-life periods of 5,730 years.
 - because of natural selection.
 - rapidly.
- ___ 36. Organisms well suited to their environment
- reproduce at a greater rate than those less suited to the same environment.
 - are always larger than organisms less suited to that environment.
 - always live longer than organisms less suited to that environment.
 - need less food than organisms less suited to that environment.

- _____ 37. When Darwin published his theory of evolution, he included all of the following ideas *except*
- the idea that species change slowly over time.
 - the idea that some organisms become less suited to their environment than others.
 - Mendel's ideas about genetics.
 - the idea that some organisms reproduce at a greater rate than others.
- _____ 38. The major idea that Darwin presented in his book *The Origin of Species* was that
- species changed over time and never competed with each other.
 - animals changed, but plants remained the same.
 - elephants and bacteria changed constantly.
 - species changed over time by natural selection.
- _____ 39. The hypothesis that evolution occurs at a slow, constant rate is known as
- gradualism.
 - slow motion.
 - natural selection.
 - adaptation.
- _____ 40. The hypothesis that evolution occurs at an irregular rate through geologic time is known as
- directional evolution.
 - directional equilibrium.
 - punctuated equilibrium.
 - punctuated evolution.

The diagrams below represent bones in the limbs of fossil horses and modern horses.



- _____ 41. Refer to the illustration above. The fossils indicate that horse evolution probably has taken place
- rapidly.
 - in only one place on Earth.
 - gradually.
 - five times by the process of punctuated equilibrium.
- _____ 42. Which of the following are examples of fossils?
- shells or old bones
 - any traces of dead organisms
 - footprints of human ancestors, insects trapped in tree sap, and animals buried in tar
 - All of the above



- ___ 43. Refer to the illustration above. An analysis of DNA from these organisms would indicate that
- they have identical DNA.
 - they all have pharyngeal pouches.
 - their nucleotide sequences show many similarities.
 - they all have the same number of chromosomes.
- ___ 44. Refer to the illustration above. The similarity of these structures suggests that the organisms
- have a common ancestor.
 - all grow at different rates.
 - evolved slowly.
 - live for a long time.
- ___ 45. Refer to the illustration above. The bones labeled A are known as
- vestigial structures.
 - sequential structures.
 - homologous structures.
 - fossil structures.
- ___ 46. The theory of evolution predicts that
- closely related species will show similarities in nucleotide sequences.
 - if species have changed over time, their genes should have changed.
 - closely related species will show similarities in amino acid sequences.
 - All of the above
- ___ 47. The occurrence of the same blood protein in a group of species provides evidence that these species
- evolved in the same habitat.
 - evolved in different habitats.
 - descended from a common ancestor.
 - descended from different ancestors.
- ___ 48. Evidence for evolution includes all of the following *except*
- punctuated sedimentation.
 - similarities and differences in protein and DNA sequences between organisms.
 - the fossil record.
 - homologous structures.
- ___ 49. Which of the following is a vestigial structure?
- the human tailbone
 - the bill of a finch
 - flower color
 - fossil cast
- ___ 50. Homologous structures in organisms suggest that the organisms
- have a common ancestor.
 - must have lived at different times.
 - have a skeletal structure.
 - are now extinct.
- ___ 51. Structures that have reduced in size because they no longer serve an important function are called
- inorganic.
 - mutated.
 - fossilized.
 - vestigial.

- ___ 52. A human embryo exhibits all of the following during development *except*
- pharyngeal pouches.
 - a bony tail.
 - fins.
 - a coat of fine fur.
- ___ 53. vestigial structures : macroevolution ::
- homologous structures : common ancestry
 - common ancestry : fossils
 - common ancestry : rock
 - homologous structures : unrelated species
- ___ 54. Populations of the same species living in different places
- do not vary.
 - always show balancing selection.
 - have a half-life in relation to the size of the population.
 - become increasingly different as each becomes adapted to its own environment.
- ___ 55. Scarcity of resources and a growing population are most likely to result in
- homology.
 - protective coloration.
 - competition.
 - convergent evolution.
- ___ 56. Since natural resources are limited, all organisms
- must migrate to new habitats.
 - face a constant struggle for existence.
 - display vestigial structures.
 - have a species half-life.
- ___ 57. A change in the frequency of a particular gene in one direction in a population is a result of
- natural selection.
 - acquired variation.
 - chromosome drift.
 - balancing selection.
- ___ 58. struggle for survival : competition ::
- time : environment
 - survival of the fittest : best traits
 - trait : time
 - environment : traits
- ___ 59. *Mycobacterium tuberculosis*
- always responds to antibiotics.
 - can mutate and become resistant to antibiotics.
 - is a harmless organism that normally occurs in human lungs.
 - has never responded to antibiotics.
- ___ 60. The lung disease tuberculosis
- kills more adults than any other infectious disease.
 - is easily treated with rifampin and isoniazid.
 - is caused by an unknown organism.
 - usually affects only children.
- ___ 61. The mutation that made *Mycobacterium tuberculosis* resistant to antibiotics involved
- a missing chromosome.
 - an extra gene.
 - a single base change.
 - None of the above
- ___ 62. Rifampin, the antibiotic commonly used to treat tuberculosis, acts by
- mutating bacterial RNA.
 - preventing bacteria from dividing.
 - mutating bacterial polymerase genes.
 - preventing bacterial mRNA transcription.
- ___ 63. The finches that Darwin studied differed in the shape of their beaks. According to Darwin, the finches probably
- all had a common ancestor.
 - would become more similar over time.
 - were descended from similar birds in Africa.
 - ate the same diet.

- ___ 64. Beak shape in finches is affected by
 a. the number of predators in the area. c. the color of the finch.
 b. the size of the finch. d. the availability of food.
- ___ 65. In order to fit into their habitat, the Galapagos finches had
 a. not changed. c. evolved.
 b. migrated. d. None of the above
- ___ 66. The accumulation of differences between species or populations is called
 a. gradualism. c. divergence.
 b. adaptation. d. differentiation.
- ___ 67. Which of the following statements is *not* true about members of subspecies?
 a. Members of different subspecies are not yet different enough to belong to separate species.
 b. Members of one subspecies cannot interbreed with members of any other such group.
 c. Subspecies often become increasingly different in response to their environment.
 d. Divergence between subspecies occurs because natural selection favors different survival strategies in different environments.
- ___ 68. New species form
 a. when subspecies diverge more and more.
 b. because of natural selection.
 c. when members of the same species become adapted to new environments.
 d. All of the above
- ___ 69. Populations of the same species that differ genetically because they have adapted to different living conditions are known as
 a. selected populations. c. genetic populations.
 b. subspecies. d. genetic races.

Completion

Complete each sentence or statement.

70. A change in species over time is called _____.
71. Charles Darwin sailed for five years on a ship named _____.
72. The process by which organisms with traits well suited to an environment survive and reproduce at a greater rate than organisms less suited for that environment is called _____.
73. Natural selection leads to changes in both the physical appearance and the _____ of a species.
74. Published in 1859, Charles Darwin's book, _____, changed biology forever.
75. A species that has disappeared permanently is said to be _____.
76. The most direct evidence that evolution has occurred comes from _____.
77. Closely related species show more _____ in nucleotide sequences than distantly related species.
78. Homologous structures are similar because they are inherited from a common _____.
79. Eyes in a blind salamander are an example of a type of organ known as _____.

80. Because they are inherited from a common ancestor, _____ structures are similar.
81. Evolution that occurs at a constant rate is the hypothesis called _____.
82. The raw material for natural selection is _____.
83. According to Darwin, the _____ determines the rate at which organisms survive and reproduce.
84. Some bacteria have developed _____ through the process of natural selection.
85. Mutant *Mycobacterium tuberculosis* is more dangerous than the normal strain because it is resistant to _____.
86. The mutant form of disease-causing bacteria becoming predominant is a result of _____.
87. Darwin's observations of finches led him to believe that there was a close correlation between beak shape and _____ source.
88. The availability of food supply affects the number of different _____ shapes in finches.

Essay

89. Why did Darwin believe that the finches he observed and collected in the Galápagos Islands shared a common ancestor?
90. In comparing two species that look very different, how could a comparison of the species' genes contribute to an understanding of their evolutionary relationship?
91. You are a biologist accompanying some other scientists on an expedition in a region that has not been studied intensively. In your explorations, you come across a colony of small vertebrates that do not look familiar to you. After conducting electronic searches of worldwide databases, you arrive at the tentative conclusion that this organism has never been observed before. Now your job is to determine what kind of vertebrate it is by identifying its closest relatives. Identify three types of data that you would collect and describe how you would use these data to draw your conclusions.
92. Why is competition among individuals of the same species generally so intense?
93. An agricultural plot of land is sprayed with a very powerful insecticide to destroy harmful insects. Nevertheless, many of the same species of insects are present on the land the following year. How might the theory of evolution account for this phenomenon?
94. What role does the environment play in natural selection?
95. Suppose that you are a zoologist studying birds on a group of islands. You have just discovered four species of birds that have never been seen before. Each species is on a separate island. The birds are identical to one another except for the shape of their beaks. How can you explain their similarities and differences?