

## Biology Chapter 14 Test: The History of Life

### True/False

Indicate whether the statement is true or false.

- \_\_\_ 1. On the geologic time scale, an eon is longer than an era.
- \_\_\_ 2. The oblong shape of both chloroplasts and cyanobacteria is good evidence that endosymbiosis of ancestral cyanobacteria was an essential step in the evolution of higher plants.
- \_\_\_ 3. The fact that experiments mimicking conditions on early Earth create organic molecules but not living cells disproves Oparin's primordial soup hypothesis.
- \_\_\_ 4. Certain dinosaurs have been proven to be ancestral to birds because they share some features, including hollow bones, a fused collarbone, and flexible wrists.
- \_\_\_ 5. It is difficult to infer details about the behavior of extinct animals, but in this effort, trace fossils are more helpful than fossils preserved in amber.
- \_\_\_ 6. In the sequence of hypothesized events leading to the evolution of eukaryotes, prokaryotes appeared first.

### Multiple Choice

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

- \_\_\_ 7. While looking for fossils on an eroded hillside, you discover fossil coral and fish in one layer. In a layer just above, you find the fossil imprint of a fern frond and some fossil moss. Assuming the rock has not been disturbed, which of the following is the most probable conclusion?
  - a. The area had been a sea until recent times.
  - b. A forest had once grown there but had become submerged by water.
  - c. In ancient times a sea had been replaced by land.
  - d. A saltwater sea had changed to a freshwater lake long ago.

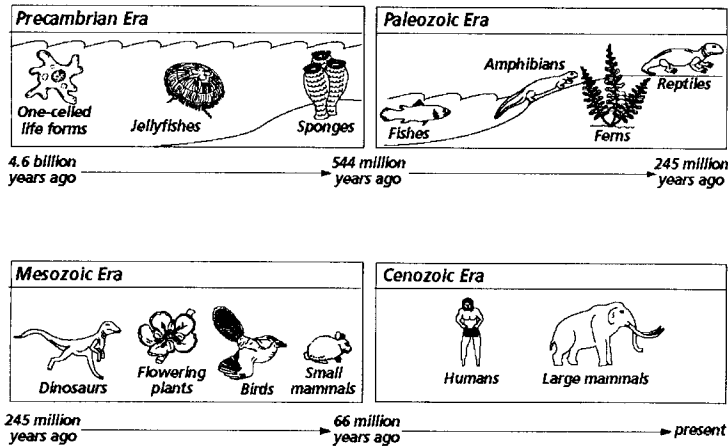


Figure 14-1

- \_\_\_\_\_ 8. According to Figure 14-1, the correct chronological order of organisms as they developed are \_\_\_\_\_.
- birds, dinosaurs, jawed fish, prokaryotes
  - dinosaurs, jawed fish, birds, prokaryotes
  - jawed fish, dinosaurs, prokaryotes, birds
  - prokaryotes, jawed fish, dinosaurs, birds
- \_\_\_\_\_ 9. Which is the correct order of the typical sequence of events for fossilization?
- The organism dies and is buried in sediment. / Sediments build up in layers so the organism is surrounded. / Minerals replace harder structures like bone and shell. / Erosion can expose buried fossils.
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- \_\_\_\_\_ 10. What was the source of the original atmosphere of early Earth?
- light elements from space
  - volcanoes
  - meteorite impacts
  - outgassing from rocks
- \_\_\_\_\_ 11. What is the difference between a cast fossil and a mold fossil?
- They are two terms for the same kind of fossil.
  - A cast fossil is an impression in rock, but a mold fossil is an impression that was filled in with minerals.
  - A mold fossil is an impression in rock, but a cast fossil is an impression that was filled in with minerals.
  - A mold fossil is preserved original tissue, and a cast fossil is petrified.

12. What criterion would you predict will be used to divide the Cenozoic from the next era in the future?
- the eruption of a volcano
  - a mass extinction
  - the extinction of the white rhino
  - a local warming trend
13. There is good evidence that a meteor hit Earth about 65 million years ago. Which of the following events that scientists think were triggered by the impact could have caused the simultaneous global extinctions of multiple species, including all the dinosaurs?
- The meteor was large enough to trigger powerful earthquakes.
  - The impact itself triggered global tsunamis.
  - Volcanic eruptions were set off by the impact.
  - Atmospheric debris changed global climates for months or years.
14. Which was most likely a consequence of the breakup of the supercontinent Pangea on the evolution of life on Earth?
- Populations of animals separated by the breakup of Pangea probably adapted to new environments and evolved into new species.
  - Continental drift could rapidly change local climates, driving species to extinction.
  - Populations of animals separated by the breakup of Pangea probably remained exactly the same over time.
  - Continental drift could rapidly change local climates, triggering the evolution of new species.
15. Which is an accurate statement of the differences between spontaneous generation and biogenesis?
- Spontaneous generation is the idea that life can only come from life, while biogenesis is the outdated notion that animals arise from nonliving elements of their environment.
  - Spontaneous generation and biogenesis are two names for the same principle concerning the origin of life.
  - Spontaneous generation is the idea that life can come from nonliving components, while biogenesis is the more modern concept that life can only arise from another living organism.
  - The concept of spontaneous generation recognizes that species generate offspring when environmental conditions are favorable, while biogenesis is the idea that life was created in a single event and has been unchanged ever since.
16. Which option places the likely events in the origin of life in the correct order?
- abiotic synthesis of amino acids and other organic molecules / synthesis of proteins / development of a genetic code / evolution of cells
  - abiotic synthesis of amino acids and other organic molecules / synthesis of proteins / evolution of cells / development of a genetic code
  - synthesis of proteins / abiotic synthesis of amino acids and other organic molecules / development of a genetic code / evolution of cells
  - abiotic synthesis of amino acids and other organic molecules / development of a genetic code / synthesis of proteins / evolution of cells

17. Fossil evidence proves that cyanobacteria were thriving as long as 3.5 million years ago. Integrating this evidence and your own knowledge of cyanobacteria, identify the most significant effect these organisms had on the ecosystem of the planet as a whole.
- Cyanobacteria extract energy from inorganic compounds such as hydrogen sulfide, so they could survive in places like hydrothermal vents at the ocean floor.
  - Cyanobacteria were among the first cells adapted as predators, so they spurred coevolution among their prey in an early "arms race."
  - Cyanobacteria were some of the first photosynthetic prokaryotes. The oxygen they produced formed the protective ozone layer.
  - Cyanobacteria were the first eukaryotic cells. They harbored smaller prokaryotes that evolved into mitochondria and chloroplasts.
18. Which of these is evidence for the endosymbiont theory?
- Mitochondria and chloroplasts cannot live on their own outside a cell.
  - Mitochondria and chloroplasts contain their own circular DNA.
  - Mitochondria and chloroplasts are surrounded by a membrane.
  - Mitochondria and chloroplasts both transform energy from one form to another.
19. During phagocytosis of one cell by another, the larger cell engulfs the smaller cell by enclosing it in a part of its plasma membrane which then pinches off so the cell is then within the larger cell. Given this may have been the process that brought bacterial cells into the ancestors of eukaryotic cells as endosymbionts, what structural characteristic might be expected in mitochondria and chloroplasts?
- amoeboid locomotion
  - flagella or cilia
  - a double membrane
  - a nucleus
20. Which is a reasonable description of the origin of a photosynthetic eukaryotic cell?
- An early eukaryote phagocytized a smaller cell, which did not die but provided the cell with energy.
  - An early eukaryote phagocytized a smaller cell, which did not die but used light to provide the cell with sugar.
  - An early eukaryote phagocytized a smaller cell, which did not die but provided the cell with energy. Later, that same cell or its descendants became host to a photosynthetic prokaryote.
  - An early eukaryote had the ability to photosynthesize. It was parasitized by a smaller photosynthetic prokaryote that provided the cell with additional sugar.
21. Which evidence has suggested to some researchers that birds and dinosaurs may have evolved from a common ancestor?
- Fossil dinosaurs with feathers have been found.
  - Birds and dinosaurs have a fused collarbone.
  - Fossilized true birds have been found from the same time period as feathered dinosaurs.
  - Both dinosaurs and birds have clawed feet.
22. What does relative dating depend on to identify similarly aged rocks in different locations?
- the kinds of fossils found in the rock
  - the radiometric age of the rocks
  - the mineral composition of the rock
  - the position of the rock layer

23. Consider a fossil find containing dinosaur nests, broken eggshells, and embryos. The shells and bones appear to have some original material and some mineralization. How would you classify it regarding fossil type?
- trace
  - original material
  - permineralized
  - trace, replacement, and original material
24. One hypothesis argues for a role of clay in the increasing complexity of organic molecules in the pre-life Earth environment. What role does the hypothesis suggest?
- acting as a cell membrane
  - assisting replication of molecules
  - filtering out key molecule components
  - stabilizing complex molecules
25. What effects of continental drift would you predict to be most likely to result in a new adaptive radiation following the Permian extinction?
- a breakup of Pangea into several land masses
  - the movement of the entire supercontinent farther to the south
  - formation of land bridges connecting islands to the mainland
  - the movement of the entire supercontinent farther to the north