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Guided Reading Chapter 3: Changes Over Time

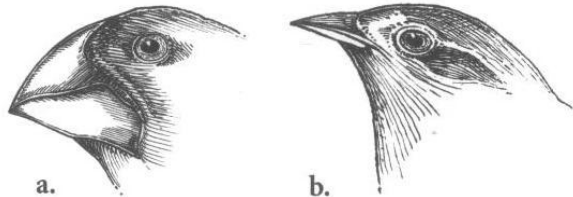
Section 3-1: Darwin's Voyage

1. Is the following sentence true or false? Charles Darwin was not surprised by the variety of living things he saw on his voyage around the world.
2. A group of similar organisms that can mate with each other and produce fertile offspring is called a(n) _____.
3. Is the following sentence true or false? Darwin observed a great diversity of organisms on the Galapagos Islands.
4. Circle the letter of each sentence that is true about Darwin's observations.
 - a. Many Galapagos organisms were similar to organisms on mainland South America.
 - b. Iguanas on the Galapagos Islands had small claws for climbing trees.
 - c. Darwin thought Galapagos animals and plants came from mainland South America.
 - d. All tortoises living in the Galapagos Islands looked exactly the same.
5. Darwin noticed many differences among similar _____ as he traveled from one Galapagos island to the next.

Look at the bird beaks below. Match the bird beaks with the kind of food the bird eats.

6. _____ insects

7. _____ seeds



8. A trait that helps an organism survive and reproduce is a(n) _____.
9. Circle the letter of each sentence that is true about Darwin's conclusions.
 - a. Darwin understood immediately why Galapagos organisms had many different adaptations.
 - b. Darwin thought that Galapagos organisms gradually changed over many generations.
 - c. Darwin believed that evolution had occurred on the Galapagos Islands.
 - d. Darwin knew how certain traits were selected for in nature.

10. Circle the letter of a well-tested concept that explains many observations.

- a. idea
- b. evolution
- c. scientific theory
- d. hypothesis

11. In his book, *The Origin of Species*, Darwin explained that evolution occurs by means of _____.

12. Is the following sentence true or false? Individuals with variations that make them better adapted to their environment will not survive.

Match the factors that affect the process of natural selection with their definitions.

13. _____ Caused by limited food and other resources a. overproduction

14. _____ Differences between individuals of the same species b. competition

15. _____ Species produce more offspring than can survive c. variations

16. Is the following sentence true or false? Only traits that are controlled by genes can be acted upon by natural selection.

17. Is the following sentence true or false? Darwin knew all about genes and mutations.

18. During a drought on one of the Galapagos Islands in 1977, only finches with _____ and _____ beaks were better able to survive.

19. Is the following sentence true or false? Evolution by natural selection can occur in as short a time as one year.

20. When does a new species form?

21. Give an example of how a group can be separated from the rest of its species.

22. Pangaea gradually split apart in a process called _____.

23. What happened to plant and animal species during continental drift?

Section 3-2: The Fossil Record

1. Some of the most important clues to Earth's past are _____.
2. Circle the letter of each item that can form a fossil.
 - a. bone
 - b. shell
 - c. footprint
 - d. stone
3. Is the following sentence true or false? Only the soft parts of an animal remain to form a fossil.
4. What parts of plants are most often preserved as fossils?
5. In what conditions do most fossils form?
6. Particles of soil and rock are called _____.
7. How does sedimentary rock form?
8. Remains of organisms that are actually changed to rock are called _____ fossils.
9. Circle the letter of each sentence that is true about molds and casts.
 - a. A mold forms when hard parts of an organism buried by sediments are gradually dissolved.
 - b. A cast is a hollow space in sediment in the shape of an organism.
 - c. A mold that becomes filled in with hardened materials is a cast.
 - d. A cast is a copy of the shape of an organism.
10. List three substances, other than sediments, in which organisms can be preserved.
11. Is the following sentence true or false? By determining the age of fossils, scientists can reconstruct the history of life on Earth.
12. In what two ways can scientists determine the ages of fossils?

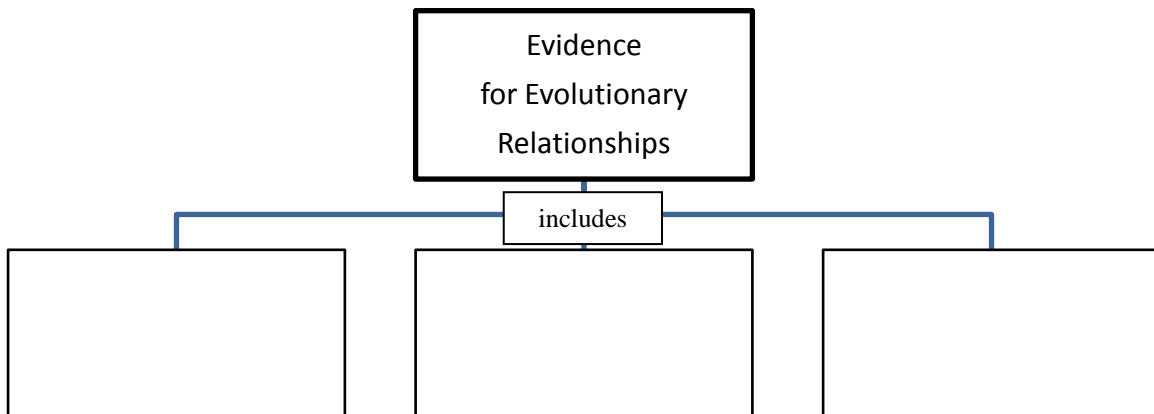
13. In layers of sedimentary rock, the _____ layer is at the bottom.
Each higher layer is _____ than the layers below it.
14. Is the following sentence true or false? Relative dating can only help scientists determine whether one fossil is older than another.
15. Scientists use unstable or _____ elements that decay to determine the actual age of a fossil.
16. What is the half-life of a radioactive element?
17. Potassium-40 breaks down into _____ over time.
18. How do scientists determine the age of a fossil?
19. The millions of fossils that scientist have collected are called the _____.
20. Is the following sentence true or false? The remains of all organisms have becomes fossils.
21. How have scientists learned about extinct species?
22. According to the fossil record, fish evolved about _____ years ago.
The first land plants evolved about _____ years ago.
23. Circle the letter of the largest span of time in the Geologic Time Scale.
- Precambrian Time
 - eras
 - periods
 - years
24. Why do scientists know very little about the Precambrian?
25. Look at *Exploring Life's History* on pages 94-95. What are the names of the three eras?

26. Complete the table below about the two theories of evolution.

How Fast Does Evolution Occur?		
Theory of Evolution	What the Theory Says	Intermediate Forms of Species? (yes or no)
Gradualism		
Punctuated Equilibria		

Section 3-3: Other Evidence for Evolution

- Complete the concept map to show what kinds of evidence scientists use to decide whether or not organisms are related.



- Why do scientists classify fish, amphibians, reptiles, birds, and mammals together in one group?
- Similar body structures that related species have inherited from a common ancestor are called _____.

4. What similarities in development lead scientists to infer that turtles, chickens, and rats share a common ancestor?

5. Evidence supports the conclusion that turtles are more closely related to _____ than they are to _____.

6. Is the following sentence true or false? The more closely related species are, the more similar their DNA sequences.

7. What have scientists learned about the elephant shrew based on DNA evidence?

8. The DNA from _____ is providing scientists with new evidence about evolution.

9. Circle the letter of each sentence that is true about evolutionary relationships of organisms.
 - a. DNA comparisons show that dogs are more similar to coyotes than to wolves.
 - b. Scientists had already made good conclusions about the evolutionary relationships of dogs, wolves, and coyotes based on their similar structures and developments.
 - c. A branching tree show how scientists think different groups of organisms are related.
 - d. DNA evidence shows that giant pandas are more closely related to raccoons than to bears.