CHAPTER REVIEW

CONTENT REVIEW

Multiple Choice

Choose the letter of the answer that best completes each statement.

1. The length of time it takes for one half of a radioactive element to decay is a (an)
   a. era.
   b. half-life.
   c. year.
   d. epoch.
2. Another term for radioactive dating is
   a. relative dating.
   b. geologic time scale.
   c. calendar dating.
   d. absolute dating.
3. The ability of an organism to survive and reproduce is known as
   a. fitness.
   b. evolution.
   c. diversity.
   d. adaptation.
4. Fitness arises through a process called
   a. common descent.
   b. half-life.
   c. homologous change.
   d. adaptation.
5. Evidence for the age of the Earth is provided by all of the following except
   a. fossils.
   b. radioactive dating.
   c. the rate of sediment formation.
   d. vestigial organs.
6. Most fossils are found in
   a. sedimentary rock.
   b. amber.
   c. ice.
   d. tar pits.
7. A vestigial organ is
   a. always useful.
   b. useless.
   c. not evidence for evolution.
   d. sometimes useful.
8. Change in species over time is called
   a. fitness.
   b. evolution.
   c. diversity.
   d. relative dating.

True or False

Determine whether each statement is true or false. If it is true, write "true." If it is false, change the underlined word or words to make the statement true.

1. Paleontologists are scientists who study fossils.
2. The ability of an organism to survive and reproduce is known as diversity.
3. In the Earth's history, periods are divided into eras.
4. Embryos are early stages in an organism's development.
5. Relative dating is the same as radioactive dating.
6. Today, scientists have evidence that shows that the Earth is 1 million years old.
7. The theory that organisms share a common ancestor is known as common descent.
8. A human's arm and a dog's leg are examples of vestigial organs.

Word Relationships

A. *In each of the following sets of terms, three of the terms are related. One term does not belong. Determine the characteristic common to three of the terms and then identify the term that does not belong.*

1. appendix, tailbones, ear muscles, heart
2. absolute dating, double dating, radioactive dating, relative dating
3. half-life, era, epoch, period
4. diversity, fitness, fossil, adaptation

B. *An analogy is a relationship between two pairs of words or phrases generally written in the following manner: a:b::c:d. The symbol : is read "is to," and the symbol :: is read "as." For example, cat:animal::rose:plant is read "cat is to animal as rose is to plant."*

In the analogies that follow, a word or phrase is missing. Complete each analogy by providing the missing word or phrase.

5. biologist:organism::paleontologist:_____
6. era:periods::sedimentary rock:_____
7. half-life:absolute dating::rock position:_____
8. appendix:vestigial organ::bat wing and whale flipper:_____

CONCEPT MASTERY

Use your understanding of the concepts developed in the chapter to answer each of the following in a brief paragraph.

1. Explain how radioactivity is used to date rock samples.
2. What is the geologic time scale? How was it developed?
3. What is a vestigial organ? Give an example of a vestigial organ in humans.
4. What does the phrase common descent mean?
5. What is a fossil?
6. How is sedimentary rock formed?

CRITICAL AND CREATIVE THINKING

Discuss each of the following in a brief paragraph.

1. **Summarizing information** Evolutionary biologists say that there is good reason for gaps in the fossil record. Can you explain why some extinct animals and plants were never fossilized?
2. **Applying concepts** A giraffe's long neck enables it to eat the leaves of trees. How does this adaptation help the giraffe survive?
3. **Sequencing events** How did the work of geologists help Darwin formulate his theory of evolution?
4. **Applying technology** Discuss the limitations of radioactive dating.
5. **Making inferences** How did the diversity of life that Darwin observed during the five-year voyage of the *Beagle* contribute to the development of his theory?
6. **Using the writing process** You have been given the opportunity to become the first person to travel back in time to the age when dinosaurs roamed the Earth. Describe your feelings as you observe these ancient creatures walking through the area you now call home.
7. **Using the writing process** This time you will travel forward in time several million years. Use your imagination to describe the kinds of organisms now living on Earth. (*Hint:* Remember that any organism you describe must be well adapted to the environment of Earth in the distant future.)

CHAPTER REVIEW

CONTENT REVIEW

Multiple Choice

Choose the letter of the answer that best completes each statement.

1. Darwin was familiar with the works of all of the following except
   a. Mendel.
   b. Lyell.
   c. Lamarck.
   d. Malthus.
2. Which of the following is needed for new species to form?
   a. a niche
   b. homologous structures
   c. analogous structures
   d. reproductive isolation
3. Farmers change the gene pool of a population by
   a. adaptive radiation.
   b. natural selection.
   c. artificial selection.
   d. convergent evolution.
4. The source of random variation on which natural selection operates are changes in
   a. a niche.
   b. genes.
   c. relative frequency.
   d. the survival of the fittest.
5. An example of analogous structures are a
   a. whale's flipper and a bat's wing.
   b. bird's wing and a butterfly's wing.
   c. hawk's wing and a robin's wing.
   d. dog's leg and a horse's leg.
6. Which of the following ideas proposed by Lamarck was later found to be incorrect?
   a. Acquired characteristics can be inherited.
   b. Analogous structures can be inherited.
   c. Living things change over time.
   d. The Earth is very young.
7. Malthus thought that all of the following would prevent the endless growth of the human population except
   a. famine.
   b. war.
   c. disease.
   d. evolution.
8. Natural selection is also known as
   a. adaptive radiation.
   b. convergent evolution.
   c. survival of the fittest.
   d. divergent evolution.

True or False

Determine whether each statement is true or false. If it is true, write "true." If it is false, change the underlined word or words to make the statement true.

1. The theory of <u>gradualism</u> states that the fossil record shows long periods of stability and short periods of rapid evolution.
2. <u>Lamarck</u> developed a theory of evolution by natural selection.
3. Members of a <u>population</u> share a common group of genes, called a gene pool.
4. <u>Speciation</u> is any change in the relative frequencies of alleles in the gene pool of a population.
5. The combination of an organism's "profession" and the place in which it lives is called its <u>niche</u>.
6. <u>Divergent evolution</u> has produced many of the analogous structures in organisms today.
7. Random change in the frequency of a gene is called <u>relative frequency</u>.
8. More dark-colored peppered moths were found when soot darkened the color of tree trunks. This is an example of <u>artificial selection</u>.

Word Relationships

Give the vocabulary word whose meaning is opposite that of the following words.

1. gradualism
2. convergent evolution
3. natural selection
4. interbreeding

CONCEPT MASTERY

Use your understanding of the concepts developed in the chapter to answer each of the following in a brief paragraph.

1. Explain how the work of Lamarck, Lyell, and Malthus influenced Darwin's thinking.
2. What are two errors in Lamarck's theory of evolution?
3. What is punctuated equilibria?
4. How can farmers change a population of chickens?
5. Why is reproductive isolation needed for a new species to form?
6. How do genes provide the raw material for natural selection?
7. What is survival of the fittest?
8. Two organisms cannot occupy the same niche at the same time. Explain why this is so.

CRITICAL AND CREATIVE THINKING

Discuss each of the following in a brief paragraph.

1. **Applying concepts** How does punctuated equilibria try to explain gaps in the fossil record?
2. **Making predictions** Domesticated turkeys cannot fly. This is an advantage to a farmer who raises thousands of birds. What would happen to these birds if they escaped from the farm into the woods? Explain your answer.
3. **Evaluating theories** Is protecting endangered species defying natural selection? Explain.
4. **Relating cause and effect** The giant panda occupies a very small niche by eating only one kind of food: bamboo. How can being adapted to such a small niche actually endanger this species' survival?
5. **Applying concepts** How might having a small gene pool cause a species to become extinct?
6. **Using the writing process** A friend of yours invents a time machine through which you both embark on a trip far into the future. When you arrive at your destination, you discover that Earth is much warmer and the sunlight more intense. You see many plants and animals that are unlike any you have ever seen before. Write a short story that describes the new life forms that are able to survive under these different conditions. You may wish to accompany your story with one or more drawings depicting these unusual plants and animals.