

**TEST**

**Part A**

**MATCHING QUESTIONS**

From the list below, select the term that best fits each description. Each term may be used more than once, but there is only one correct answer for each description.

Questions 1–3 refer to the following:

- a. Jean Baptiste de Lamarck    b. Charles Lyell    c. Charles Darwin    d. Alfred Wallace

1. author of the *Law of Use and Disuse* 1. \_\_\_\_\_  
 2. author of *On the Origin of Species by Means of Natural Selection* 2. \_\_\_\_\_  
 3. author of *The Principles of Geology* 3. b

Questions 4–7 refer to the following:

- a. recombination    b. migration    c. genetic drift    d. adaptive radiation

4. a source of genetic variation that occurs when individuals move into or out of a population 4. \_\_\_\_\_  
 5. a source of genetic variation that occurs when gametes fuse 5. \_\_\_\_\_  
 6. occurs in a small population when all members possessing a certain allele happen to die 6. \_\_\_\_\_  
 7. may occur when a species evolves into a number of different species after entering a new environment 7. \_\_\_\_\_

**MULTIPLE-CHOICE QUESTIONS**

Select the lettered choice that best fits each question or statement. In each case, there is only one correct choice.

8. Weismann's experiments showed that 8. \_\_\_\_\_  
 a. natural selection produced new species    c. organisms have to struggle for survival  
 b. acquired characteristics were not inherited    d. Earth was very old
9. Malthus influenced Darwin's thinking with respect to 9. \_\_\_\_\_  
 a. acquired characteristics    b. mutation    c. competition    d. variation
10. Which of the following is the combination of Darwin's theory and population genetics? 10. \_\_\_\_\_  
 a. synthetic theory of evolution    c. punctuated equilibrium  
 b. organic theory of evolution    d. gradualism
11. Natural selection means that those organisms that survive 11. \_\_\_\_\_  
 a. are selected randomly  
 b. possess characteristics that enable them to adapt better to their environment  
 c. have characteristics that enable them to survive in all environments  
 d. have characteristics that will never be altered
12. An aspect of the evolutionary process that is clearly illustrated in the history of the peppered moth is that 12. \_\_\_\_\_  
 a. the light-colored moth will eventually increase in number  
 b. a darker moth appeared when the tree trunks became lighter  
 c. the changing environment caused darkening of the pigments of the moth  
 d. the darker moth increased in number when the environment became more favorable for its traits

## Part B-1

**MULTIPLE-CHOICE QUESTIONS (continued)**

13. The coloration of the viceroy butterfly is an example of 13. \_\_\_  
a. camouflage c. adaptive radiation  
b. mimicry d. protective coloration
14. A group of organisms of the same species that lives in a given region is called a 14. \_\_\_  
a. colony c. ecosystem  
b. community d. population
15. Hugo de Vries was a botanist who described sudden changes in his plant populations as 15. \_\_\_  
a. mutation c. emigration  
b. natural selection d. biogenesis
16. The process by which Koala bears have come to resemble placental bears is called 16. \_\_\_  
a. adaptive radiation c. convergent evolution  
b. speciation d. differential reproduction
17. The experiments conducted by the Lederbergs showed that 17. \_\_\_  
a. most bacteria can become resistant to DDT  
b. some bacteria may already possess a gene for resistance to an antibiotic  
c. changes in the environment caused the development of resistance to streptomycin  
d. exposure to the antibiotic streptomycin caused certain bacterial cells to become resistant to it
18. Which of the following statements about the effect of DDT on insects is CORRECT? 18. \_\_\_  
a. It created a resistance in many insect populations.  
b. It became more effective as more insects became exposed to it.  
c. It killed all members of the insect population when it was first introduced.  
d. It has acted as an environmental agent for the selection of resistant individuals.
19. Which of the following is an example of directional selection? 19. \_\_\_  
a. selection against mice that are too small or too large  
b. selection for crabs that are very light or very dark in color  
c. selection for high speed in running away from predators  
d. selection against humans that are extremely underweight or extremely overweight
20. The coloration of the monarch butterfly is an example of 20. \_\_\_  
a. camouflage c. adaptive radiation  
b. mimicry d. warning coloration

**SHORT-ANSWER QUESTIONS**

In one or two complete sentences, answer the following questions on a separate sheet of paper.

21. What is the most important factor in speciation?  
22. Why is the Hardy-Weinberg law important in the modern theory of evolution?

**ESSAY QUESTION**

In one or two paragraphs, answer the following questions on a separate sheet of paper.

23. Using Lamarck's theory, explain how the giraffe developed a long neck. Explain why this theory is incorrect.

# CHAPTER REVIEW

# CHAPTER 28

## Know the Terms

Match the best answer with each statement or definition.

- |                        |                       |                  |
|------------------------|-----------------------|------------------|
| a. comparative anatomy | e. analogous          | i. embryology    |
| b. homologous          | f. radioactive dating | j. fossils       |
| c. sedimentary rock    | g. biochemistry       | k. vestigial     |
| d. extinction          | h. index fossils      | l. petrification |

1. body parts with similar embryological development 1. \_\_\_\_
2. remnants of structures that functioned in ancestral forms 2. \_\_\_\_
3. death of all members of a species 3. \_\_\_\_
4. evolutionary evidence provided by structural similarities 4. \_\_\_\_
5. use of carbon-14 to determine the age of fossils 5. \_\_\_\_
6. traces or remains of organisms 6. \_\_\_\_
7. body parts with similar function but different development 7. \_\_\_\_
8. replacement of body parts by minerals in water 8. \_\_\_\_
9. evolutionary evidence from patterns of development 9. \_\_\_\_
10. evolutionary evidence from DNA and proteins 10. \_\_\_\_

Define or describe the following words.

11. organic evolution: \_\_\_\_\_  
\_\_\_\_\_
12. geologic evolution: \_\_\_\_\_  
\_\_\_\_\_
13. spontaneous generation: \_\_\_\_\_  
\_\_\_\_\_
14. biogenesis: \_\_\_\_\_  
\_\_\_\_\_
15. heterotroph hypothesis: \_\_\_\_\_  
\_\_\_\_\_
16. coacervates: \_\_\_\_\_  
\_\_\_\_\_
17. heterotrophs: \_\_\_\_\_  
\_\_\_\_\_

## Understand the Concepts

Answer the following questions in one or two sentences.

1. Where do evolutionists derive support for their theories? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

2. How did Francesco Redi help disprove spontaneous generation? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

3. Why is sedimentary rock important to scientists studying evolution? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

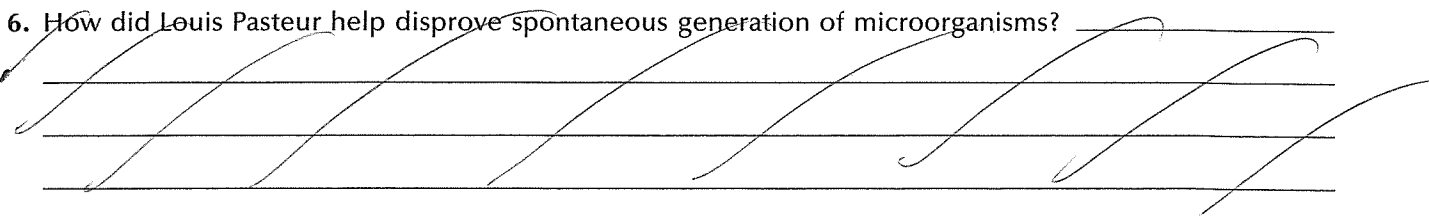
4. How is relative dating important to the study of evolution? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

5. What is the difference between relative dating and absolute dating? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

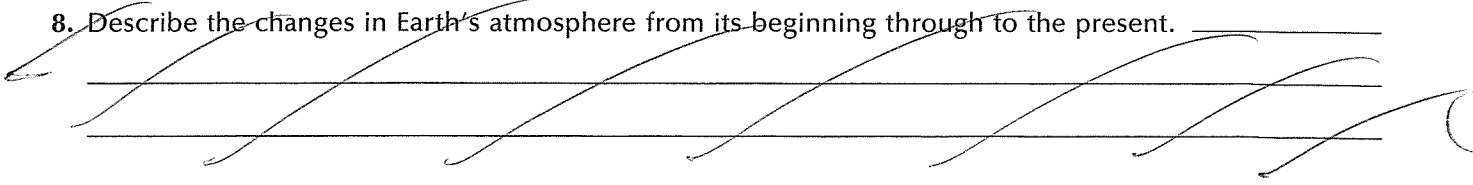
6. How did Louis Pasteur help disprove spontaneous generation of microorganisms? \_\_\_\_\_



7. Name two ways each in which soft and hard tissues may become fossilized. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. Describe the changes in Earth's atmosphere from its beginning through to the present. \_\_\_\_\_



# CHAPTER REVIEW

# CHAPTER 7

## Know the Terms

Complete the following paragraphs, using the list of words below. You may use a word more than once.

- |              |           |          |          |
|--------------|-----------|----------|----------|
| species      | Aristotle | genus    | phylum   |
| Theophrastus | kingdom   | John Ray | order    |
| Linnaeus     | family    | class    | taxonomy |

Several early attempts at classification were made by different individuals. (1) attempted to classify living organisms according to the environment in which they lived. (2) grouped plants according to the type of stem they had. In the 1600s (3) grouped organisms according to similar structures and coined the word, (4). Groups of these then were included in a broader group called (5). Finally, the Swedish botanist (6), now called the father of taxonomy, devised our modern system of taxonomy.

Our modern system of taxonomy is based upon grouping living organisms according to structural characteristics. It proceeds from the general to the specific. The categories, from the most general to the most specific, are (7), (8), (9), (10), (11), (12), and (13).

1. Aristotle
2. Theophrastus
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_
7. \_\_\_\_\_
8. \_\_\_\_\_
9. \_\_\_\_\_
10. \_\_\_\_\_
11. \_\_\_\_\_
12. \_\_\_\_\_
13. \_\_\_\_\_

Supply the defined term.

14. \_\_\_\_\_ is the most specific part of the scientific name of an organism.
15. \_\_\_\_\_ is the classification of living things.
16. A \_\_\_\_\_ is used to identify and classify a living organism.
17. A \_\_\_\_\_ is the largest group within a kingdom.
18. \_\_\_\_\_ is the kingdom in which organisms are mostly unicellular and have no defined nucleus.

14. \_\_\_\_\_
15. \_\_\_\_\_
16. \_\_\_\_\_
17. \_\_\_\_\_
18. \_\_\_\_\_

**TEST**  
Part A

CHAPTER **7**

**MATCHING QUESTIONS**

From the list below, select the term that best fits each of the following descriptions. Each term may be used more than once, but there is only one correct answer for each question.

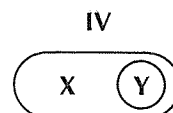
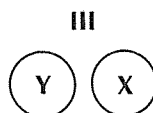
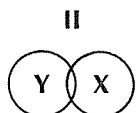
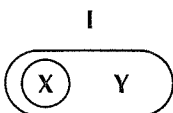
- |             |             |
|-------------|-------------|
| a. Monera   | d. Animalia |
| b. Protozoa | e. Fungi    |
| c. Plantae  | f. Protista |

- |  |         |
|--|---------|
| 1. multicellular and motile                  | 1. ____ |
| 2. chlorophyll contained within chloroplasts | 2. ____ |
| 3. lack of membrane-bound nucleus            | 3. ____ |
| 4. heterotrophic and nonmotile               | 4. ____ |

**MULTIPLE-CHOICE QUESTIONS**

Select the lettered choice that best fits each question or statement. In each case, there is only one correct choice.

5. Animalia is a  
 a. kingdom                      b. phylum                      c. genus                      d. class                      5. \_\_\_\_
6. The scientific name of an organism is formed from its  
 a. kingdom and phylum names                      c. family and genus names  
 b. phylum and class names                      d. genus and species names                      6. \_\_\_\_
7. Modern taxonomists classify organisms according to their  
 a. evolutionary relationships                      c. age  
 b. kind of environment                      d. seasonal variation                      7. \_\_\_\_
8. Using numbers to represent taxonomic categories as listed below, which sequence indicates progressively increasing specificity?  
 Class—1;    Phylum—2;    Order—3;    Family—4;    Species—5;    Genus—6  
 a. 2-3-1-5-4-6                      b. 4-1-3-2-5-6                      c. 2-1-4-5-6-3                      d. 2-1-3-4-6-5                      8. \_\_\_\_
9. The classification system that will be used 100 years from now probably will be  
 a. identical to the one used today  
 b. unable to show relationships  
 c. modified from the present system  
 d. subdivided into ten groups                      9. \_\_\_\_
10. The hydra, earthworm, and grasshopper are all  
 a. in the same phylum  
 b. heterotrophs  
 c. organisms with well-developed brains  
 d. land dwellers                      10. \_\_\_\_
11. Which of the following best illustrates the relationship between a genus (Y) and one of its species (X)?                      11. \_\_\_\_
- |      |       |        |       |
|------|-------|--------|-------|
| a. I | b. II | c. III | d. IV |
|------|-------|--------|-------|



**Part B-1****MULTIPLE-CHOICE QUESTIONS (continued)**

12. The founder of modern taxonomy is considered to be  
 a. Aristotle                      b. Ray                      c. Linnaeus                      d. Theophrastus                      12. \_\_\_\_
13. The ability to interbreed is characteristic of all organisms in the same  
 a. phylum                      b. order                      c. family                      d. species                      13. \_\_\_\_
14. The starfish, jellyfish, and crayfish are examples of  
 a. genus names                      c. autotrophs  
 b. common names                      d. taxonomic categories                      14. \_\_\_\_
15. Which are in the same kingdom?  
 a. protozoans and bacteria                      c. monerans and blue-green bacteria  
 b. grasshopper and protozoans                      d. green algae and fungi                      15. \_\_\_\_
16. The term binomial refers to  
 a. five kingdoms                      c. two names  
 b. multiple groupings                      d. dichotomous categories                      16. \_\_\_\_
17. Kingdom is to phylum as  
 a. species is to genus                      c. family is to class  
 b. phylum is to class                      d. order is to genus                      17. \_\_\_\_
18. Which of the following statements about taxonomic keys is NOT true?  
 a. They can be used only for plants, animals, and fungi.  
 b. They are usually dichotomous.  
 c. They describe and classify organisms.  
 d. Microscopes are not always needed to use a key.                      18. \_\_\_\_
19. The evolutionary history of a group of organisms is represented by a  
 a. fossil bone                      c. phylogenetic tree  
 b. sample of DNA                      d. taxonomic key                      19. \_\_\_\_
20. All fungi  
 a. are parasitic                      c. are multicellular  
 b. lack chlorophyll                      d. are microscopic                      20. \_\_\_\_
21. Grasshopper is to Arthropod as Human is to  
 a. Coelenterata                      b. Annelida                      c. Chordata                      d. Mammalia                      21. \_\_\_\_

**SHORT-ANSWER QUESTIONS**

In one or two complete sentences, answer the following questions on a separate sheet of paper.

22. What is the difference between autotrophs and heterotrophs?  
 23. What is the major distinction between fungi and plants with respect to nutrition?  
 24. What does the species name of an organism indicate?

**ESSAY QUESTION**

In one or two paragraphs, answer the following question on a separate sheet of paper.

25. Explain how the theory of evolution serves as the basis for modern taxonomy.





# CHAPTER REVIEW

# CHAPTER

# 7

## Understand the Concepts

Answer the following questions in one or two sentences.

1. Why was Linnaeus' system of taxonomy selected over previous systems? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

2. What does the scientific name of an organism tell you about it? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

3. List the taxonomic categories from the broadest to the most specific. \_\_\_\_\_

\_\_\_\_\_

4. What is the purpose of a classification system? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

5. Why did early attempts at classification fail within a short period of time? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

6. Phylogeny is the evolutionary history of a group of organisms. What information do taxonomists use to produce a phylogenetic tree? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

7. Describe the basic characteristics of organisms in the kingdom Fungi. \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

8. How does a taxonomic key help to classify an unknown organism? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Evolution**

10. Which of the following would be homologous structures? 10. \_\_\_\_  
a. hindleg of a cat and arm of a human  
b. wing of a bird and arm of a human  
c. gills of a fish and lungs of a human  
d. wings of a bird and wings of an insect
11. Some snakes and whales have remains of hindlegs embedded in their body walls. These are examples of 11. \_\_\_\_  
a. analogous structures  
b. embryonic structures  
c. vestigial structures  
d. homologous structures
12. The similarity of human and gorilla hemoglobin indicates that 12. \_\_\_\_  
a. the organisms are in the same genus  
b. the organisms have identical DNA codes  
c. the organisms have similar enzymes and hormone molecules  
d. no antibodies would develop if blood from the gorilla was transfused into a human
13. The assumption of Lamarck's theory that proved to be incorrect was 13. \_\_\_\_  
a. the law of use and disuse  
b. the inheritance of acquired characteristics  
c. the process of natural selection  
d. that reproduction must be random
14. Pasteur and Redi performed experiments to disprove the 14. \_\_\_\_  
a. theory of Lamarck  
b. heterotroph hypothesis  
c. findings of Miller and Fox  
d. theory of abiogenesis
15. According to Darwin's theory, what determines whether a variation is favorable or unfavorable? 15. \_\_\_\_  
a. the organism's chromosome number  
b. the size of the organism's gene pool  
c. the number of favorable variations the organism possesses  
d. the environment of the organism
16. Darwin believed that 16. \_\_\_\_  
a. all members of a population have similar characteristics  
b. variations in anatomical structures are not inherited  
c. some variations are advantageous to an organism  
d. all organisms have an equal chance of survival
17. Which of the following is NOT a source for genetic variation? 17. \_\_\_\_  
a. immigration  
b. asexual reproduction  
c. recombination  
d. gene mutations
18. The evolution of a new species occurs 18. \_\_\_\_  
a. through the gradual accumulation of small variations  
b. slowly and continuously over many millions of years  
c. suddenly and quickly after many years of equilibrium  
d. but its rate is still being debated by scientists
19. Which of the following are correct statements about the synthetic theory of evolution? 19. \_\_\_\_  
I. It states that evolution happens to individuals and not to populations.  
II. It defines evolution as a change in allele frequencies.  
III. It includes Darwin's theory.  
a. I only  
b. II only  
c. II and III only  
d. I, II, and III

**Evolution**

20. The Hardy-Weinberg Law 20. \_\_\_\_\_  
a. demonstrates that evolution is occurring  
b. applies to all situations  
c. can not be affected by mutations  
d. can not be affected by differential reproduction
21. In order, what type of adaptations are used by the flounder, viceroy butterfly, and monarch butterfly? 21. \_\_\_\_\_  
a. camouflage, warning coloration, mimicry  
b. warning coloration, camouflage, mimicry  
c. camouflage, mimicry, warning coloration  
d. warning coloration, mimicry, camouflage
22. If organisms are geographically isolated from each other for a long time, they 22. \_\_\_\_\_  
a. will always remain in the same species  
b. will become polyploids  
c. will probably experience convergent evolution  
d. will probably become reproductively isolated
23. Darwin's finches served as an example of 23. \_\_\_\_\_  
a. convergent evolution  
b. adaptive radiation  
c. industrial melanism  
d. spontaneous generation
24. If dark-colored birds and light-colored birds were introduced into an environment that predominately contained trees with dark colored bark 24. \_\_\_\_\_  
a. both types of birds would have the same chance of escaping predators  
b. light colored birds would try to change their color to dark color  
c. light colored birds would have a better chance of survival  
d. light colored birds would be more easily seen by predators
25. DDT and streptomycin 25. \_\_\_\_\_  
a. are both antibiotics  
b. are chemicals to which individual organisms developed resistance  
c. act as environmental agents for the selection of resistant strains of organisms  
d. are mutagenic agents that are known to contribute to cancer in humans
26. Which scientist believed in biogenesis? 26. \_\_\_\_\_  
a. Aristotle  
b. Needham  
c. Van Helmont  
d. Redi
27. Which of the following is the correct sequence in the origin of life? 27. \_\_\_\_\_  
a. amino acids formed coacervates which formed proteins  
b. amino acids formed proteins which formed coacervates  
c. coacervates formed amino acids which formed proteins  
d. proteins formed amino acids which formed coacervates
28. Which of the following gases was NOT included in Miller's apparatus? 28. \_\_\_\_\_  
a. oxygen  
b. hydrogen  
c. water vapor  
d. ammonia
29. Which of the following are correct statements about the heterotroph hypothesis? 29. \_\_\_\_\_  
I. It was proposed by Oparin.  
II. It has been proven to be scientifically valid.  
III. It is subject to change as new information becomes available.  
a. I only  
b. I and II only  
c. II and III only  
d. I, II, and III
30. The first living organism was 30. \_\_\_\_\_  
a. chemosynthetic  
b. an aerobe  
c. an anaerobe  
d. photosynthetic

**Part B-2****MULTIPLE-CHOICE QUESTIONS (continued)**

13. The major difference between gradualism and punctuated equilibrium is the 13. \_\_\_\_  
a. speed at which evolution occurs  
b. type of organism involved in evolution  
c. effect of evolution on populations vs. individuals  
d. concept of inheritance of acquired traits
14. Which of the following statements about mutations is CORRECT? 14. \_\_\_\_  
a. Most zygotes do not have mutations.  
b. Most mutations affect the dominant gene.  
c. Some mutations may be useful to a species.  
d. Crossing-over is an example of a gene mutation.
15. If the frequency of the recessive allele in a population is 50%, then what percent of the population would be homozygous dominant? 15. \_\_\_\_  
a. 10% c. 50%  
b. 25% d. 75%
16. All of the following are conditions that must occur for the Hardy-Weinberg Law to hold true EXCEPT 16. \_\_\_\_  
a. populations must be small  
b. mutations must not occur  
c. migration must not occur  
d. mating must be random
17. As a result of differential reproduction 17. \_\_\_\_  
a. all allele frequencies eventually increase  
b. environments can adapt to select other traits  
c. the frequency of the allele for short-necked giraffes increased over time  
d. the environment can determine which alleles will increase and which will decrease

**SHORT-ANSWER QUESTIONS**

In one or two complete sentences, answer the following questions on a separate sheet of paper.

18. Define *coevolution* and give one example.
19. Define *evolution* in terms of allele frequencies.
20. Are allele frequencies in human populations changing? Why or why not?
21. Name two of the processes that can change allele frequencies in a given population.

**ESSAY QUESTIONS**

In one or two paragraphs, answer the following questions on a separate sheet of paper.

22. At one time, snakes had legs. Using Darwin's theory of evolution, explain the steps that resulted in legless snakes.
23. Define *adaptation* and give examples of several different types of adaptations.
24. Has *Homo sapiens* ever undergone speciation? Will *Homo sapiens* undergo speciation in the future? Why or why not?

**TEST****UNIT****6****Evolution****MULTIPLE-CHOICE QUESTIONS**

Select the lettered choice that best fits each question or statement. In each case, there is only one correct choice.

1. Which of the following organisms would NOT have a similar pattern of embryological development? 1. \_\_\_\_
  - a. human
  - b. fish
  - c. bird
  - d. lobster
2. Approximately how old is the earth? 2. \_\_\_\_
  - a. 1 billion years
  - b. 4.5 billion years
  - c. 8 billion years
  - d. 20 billion years
3. During a study, 4 undisrupted sedimentary rock layers were uncovered with a fossil in each layer. Layer A was at the top, layer B was next, layer C was under layer B, and layer D was at the bottom. 3. \_\_\_\_  
Based on this layer arrangement, all of the following statements about the fossils are correct EXCEPT
  - a. the fossil in layer B is younger than the fossil in layer C
  - b. the fossil in layer B is older than the fossil in layer A
  - c. the fossil in layer C is younger than the fossil in layer D
  - d. the fossil in layer A is the oldest
4. What part of an organism is most likely to be found in the fossil record? 4. \_\_\_\_
  - a. stomach
  - b. brain
  - c. bone
  - d. skin
5. Correlation of sedimentary rock enables geologists to 5. \_\_\_\_
  - a. determine the exact age of a fossil
  - b. compare the age of rocks and fossils in all parts of the world
  - c. establish relative ages of fossils in a particular region
  - d. determine the relative dating of rocks within a narrow time span
6. Which statement about evolution is accurate? 6. \_\_\_\_
  - a. Complex animals were among the first organisms to exist on earth.
  - b. There was a sudden transition from earlier forms of life to later forms.
  - c. Many transitional forms have not been found in the fossil record.
  - d. The horse is smaller now than its ancestor was millions of years ago.
7. An absolute date for a fossil's age can best be determined by 7. \_\_\_\_
  - a. using index fossils
  - b. correlating to adjacent layers
  - c. the radioactive dating of rock in which the fossil is found
  - d. referring to a geologic time scale and determining the era in which the fossil occurred
8. The relationship of Mesozoic to reptiles is similar to the relationship of Cenozoic to 8. \_\_\_\_
  - a. mammals
  - b. birds
  - c. amphibians
  - d. fish
9. Which of the following individuals boiled his "soup" a little longer to disprove Needham's results of spontaneous generation? 9. \_\_\_\_
  - a. Miller
  - b. Pasteur
  - c. Oparin
  - d. Spallanzani