Chapter 2: Biological Diversity, Bacteria, and Archaea

MULTIPLE CHOICE

1. The science of biological classification is used to
   a. predict an organism's future evolution.
   b. decide when an organism died.
   c. show relationships among organisms.
   d. decipher an organism's DNA.

   ANS: C DIF: Easy REF: 2.1 OBJ: A1
   MSC: Factual

2. At the base of the evolutionary tree of all life is the
   a. universal ancestor.
   b. convergent ancestor.
   c. derived ancestor.
   d. descended ancestor.

   ANS: A DIF: Easy REF: 2.1 OBJ: A1
   MSC: Factual

3. Convergence is an evolutionary process that produces similar but not shared derived traits in organisms having common life histories but not common ancestors; which of the pairs of features is *not* convergent?
   a. the caudal fins of the whale and shark
   b. the opposable thumbs of the human and panda
   c. the hands of the chimpanzee and human
   d. the wings of the bat and bird

   ANS: C DIF: Difficult REF: 2.1 OBJ: A1
   MSC: Conceptual

4. Which of the following events occurred between each branch on an evolutionary tree?
   a. the evolution of a new derived feature
   b. the loss of a derived feature
   c. the evolution of a shared ancestral feature
   d. the evolution of a convergent feature

   ANS: A DIF: Difficult REF: 2.1 OBJ: A1
   MSC: Factual

5. The following numbered sets of characters each represent a distinct group of organisms:

   1. three toes per foot, feathers, cold-blooded, no finger adaptations
   2. three toes per foot, body hair, warm-blooded, opposable thumbs
   3. three toes per foot, feathers, warm-blooded, no finger adaptations
   4. three toes per foot, body hair, warm-blooded, no finger adaptations

   Which of the following choices is the most likely to represent the order in which these groups would appear on an evolutionary tree, from oldest to youngest group? (*Hint*: the more primitive characters are cold-bloodedness, feathers, and no finger adaptations.)
   a. 1, 2, 3, 4
   b. 4, 2, 3, 1
   c. 1, 3, 4, 2
   d. 2, 1, 4, 3

   ANS: C DIF: Difficult REF: 2.1 OBJ: A1

MSC: Conceptual

6. Evolutionary tree diagrams representing the relationships between various organisms can be drawn only when those organisms share a
   a. common cellular metabolism.
   b. distinct lineage.
   c. common cellular organization.
   d. common ancestor.

   ANS: D DIF: Easy REF: 2.1 OBJ: A2
   MSC: Applied

7. Evolutionary trees are based on
   a. the principle of convergent evolution.
   b. a set of shared characteristics believed to have arisen in a common ancestor.
   c. similarities in the function of a characteristic or trait.
   d. consensus among biologists regarding the usefulness of particular traits.

   ANS: B DIF: Easy REF: 2.1 OBJ: A2
   MSC: Factual

8. What single feature, shared by all organisms, allows scientists to reliably compare distantly related living or recently extinct organisms?
   a. most recent common ancestor
   b. universal ancestor
   c. most recent common lineage
   d. DNA

   ANS: D DIF: Easy REF: 2.1 OBJ: A2
   MSC: Factual

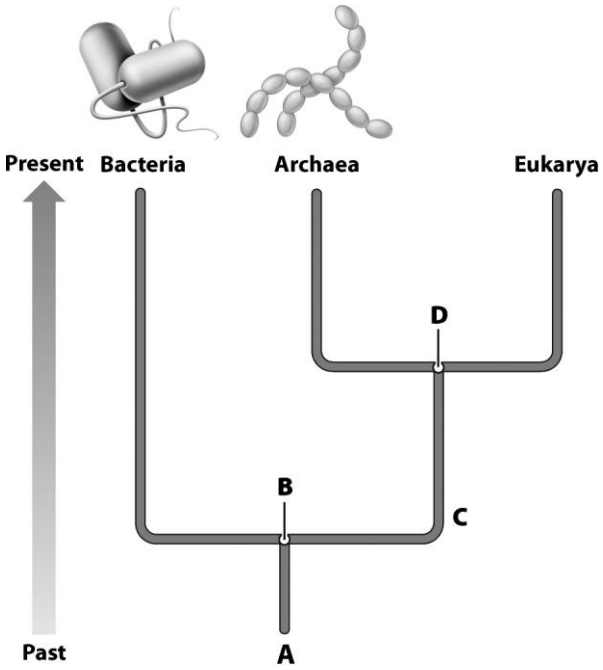
9. The current classification system used by biologists is
   a. complex and unchanging.
   b. universally accepted by all biologists.
   c. based on four generalized types of living organisms: the Bacteria, the Archaea, the Eukarya, and the Protista.
   d. updated and revised whenever new information becomes available.

   ANS: D DIF: Medium REF: 2.1 OBJ: A2
   MSC: Factual

10. In order to determine relationships among different organisms scientists would examine
    a. DNA.
    b. behavior.
    c. body structures.
    d. all of the above

    ANS: D DIF: Medium REF: 2.1 OBJ: A2
    MSC: Factual

11. The diagram below is an evolutionary tree showing the relationship between the three domains. Which letter represents the most recent common ancestor of the Archaea and Eukarya?



a. A
b. B
c. C
d. D

ANS: D DIF: Medium REF: 2.1 OBJ: A2
MSC: Factual

12. Any two groups of organisms will have
a. 2 most recent common ancestors.
b. no more than 4 most recent common ancestors.
c. only 1 most recent common ancestor.
d. as many as 16 most recent common ancestors.

ANS: C DIF: Medium REF: 2.1 OBJ: A2
MSC: Applied

13. All of the following sources of information except _____ can be used to construct evolutionary trees.
a. habitat preferences
b. body form
c. instinctive behavior
d. learned behaviors

ANS: D DIF: Medium REF: 2.1 OBJ: A2
MSC: Applied

14. A set of shared derived features
a. will be unique to each Linnaean taxon.
b. marks a group of species as a set of close relatives.
c. most often indicates convergences.
d. can be found only in humans.

ANS: B DIF: Medium REF: 2.1 OBJ: A2
MSC: Factual

15. DNA analysis has become a useful tool for understanding the relationships between organisms because
a. shared characteristics are usually the products of shared genes.
b. DNA is used by all organisms to collect energy.

c. only mammals have DNA.
d. knowing the DNA codes means biologists no longer have to use taxonomy.

ANS: A DIF: Medium REF: 2.1 OBJ: A2
MSC: Factual

16. The emergence of each new branch on the evolutionary tree represents
a. the addition of a new Linnaean taxon within that lineage.
b. the completion of a generation for that particular organism.
c. the introduction of the most important features of a group.
d. a common ancestor and the introduction of a new shared derived feature.

ANS: D DIF: Medium REF: 2.1 OBJ: A2
MSC: Conceptual

17. To produce an evolutionary tree it is necessary to first determine
a. which organisms are the oldest.
b. the full DNA sequence of each organism that will be included within the tree.
c. the shared derived features present within each group of organisms.
d. the number of lineages in each group.

ANS: C DIF: Medium REF: 2.1 OBJ: A2
MSC: Applied

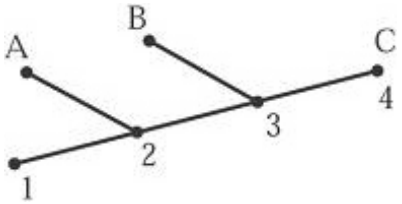
18. Descendant organisms
a. do not share any features with their descendants.
b. have all the same features as their descendants.
c. share some features with their ancestors.
d. do not have features their ancestors lacked.

ANS: C DIF: Difficult REF: 2.1 OBJ: A2
MSC: Conceptual

19. The organisms most distant from the base of an evolutionary tree are
a. unrelated to the organisms separated by one or more branch points.
b. less primitive than the organisms lower on the tree.
c. those that have evolved most recently.
d. chronologically older than the organisms lower on the tree.

ANS: C DIF: Difficult REF: 2.1 OBJ: A2
MSC: Applied

20. Examine the evolutionary tree pictured below.

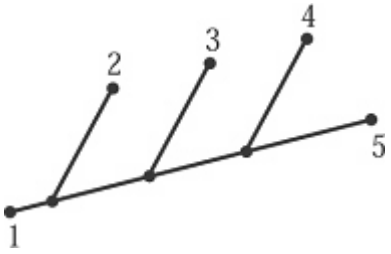


In this evolutionary tree, which number represents the most recent common ancestor of A, B, and C?
a. 1
b. 2
c. 3
d. 4

ANS: B DIF: Difficult REF: 2.1 OBJ: A2

MSC: Conceptual

21. Examine the evolutionary tree pictured below.



In this evolutionary tree, which groups of organisms are likely to share the most behaviors?

a. 5 and 4
b. 5 and 3
c. 5 and 2
d. 5 and 1

ANS: A DIF: Difficult REF: 2.1 OBJ: A2
MSC: Conceptual

22. With the exception of the _____ the following kingdoms are placed within the domain Eukarya.

a. Protista
b. Plantae
c. Bacteria
d. Fungi

ANS: C DIF: Easy REF: 2.1 OBJ: A3
MSC: Factual

23. Which of the following is a kingdom?

a. Bacteria
b. Eukarya
c. Plantae
d. Archaea

ANS: C DIF: Easy REF: 2.1 OBJ: A3
MSC: Factual

24. Evolutionary trees have been successfully used to

a. identify which multicellular species are most closely related to humans.
b. explain how evolution works.
c. explain why most carnivorous mammals have four or five toes.
d. explain the potential impact of global climate change.

ANS: A DIF: Medium REF: 2.1 OBJ: A4
MSC: Applied

25. Which of the following is *not* one of the three primary methods used to classify organisms?

a. the Linnaean hierarchy
b. the Darwinian hierarchy
c. domains
d. an evolutionary tree

ANS: B DIF: Easy REF: 2.2 OBJ: A3
MSC: Factual

26. Which of the following pairs of kingdoms would be included exclusively in the domain Eukarya?

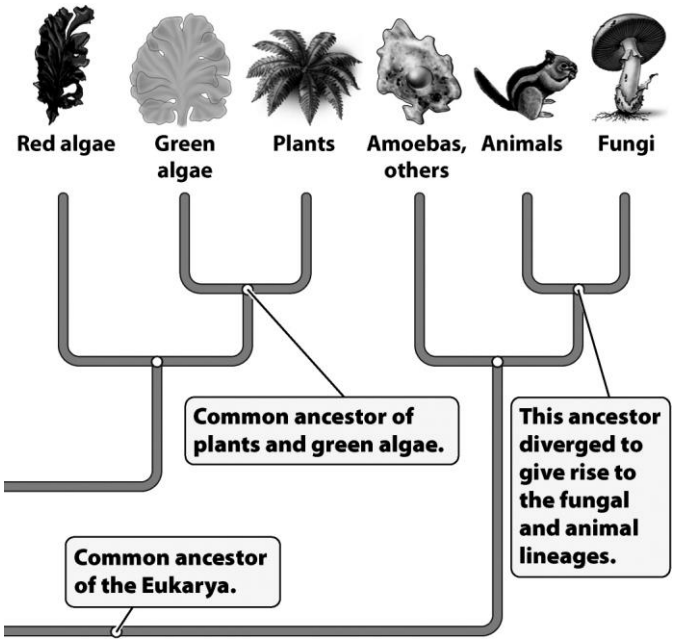
a. Plantae and Bacteria
b. Animalia and Archaea
c. Animalia and Fungi
d. Protista and Bacteria

ANS: C DIF: Easy REF: 2.2 OBJ: A3
MSC: Factual

27. Taxonomy is the subdiscipline in biology that classifies living organisms; at the present time
    a. all living organisms have been discovered, named, and their relationships to other organisms described.
    b. humans have just finished a complete count of the number of species on Earth.
    c. the diversity of organisms on Earth is not completely known and estimates of the number of unknown species vary 10-fold.
    d. there is no consensus regarding the appropriate classification strategy for the currently known organisms.

    ANS: C DIF: Medium REF: 2.2 OBJ: A3
    MSC: Applied

28. Based on the evolutionary tree shown below, which of the following are thought to be most closely related?



    a. an oak tree and a squirrel
    b. a mushroom and a cactus
    c. a honeybee and a clover plant
    d. a clam and a mushroom

    ANS: D DIF: Medium REF: 2.2 OBJ: A3
    MSC: Applied

29. Classification systems are continually revised as new information becomes available from various sources such as
    a. better understanding of the details of physiological processes.
    b. using DNA analysis to compare nonstructural features of different organisms.
    c. the continued evolution of current Earth species.
    d. the identification of alien species that have reached Earth via meteorites and comets.

    ANS: B DIF: Difficult REF: 2.2 OBJ: A3
    MSC: Applied

30. The level in the Linnaean hierarchy immediately above the class is the
    a. phylum.
    b. genus.
    c. kingdom.
    d. order.

ANS: A DIF: Easy REF: 2.2 OBJ: A4
MSC: Factual

31. Which of the following would contain the most closely related group of phyla?
a. class
b. order
c. genus
d. kingdom

ANS: D DIF: Easy REF: 2.2 OBJ: A4
MSC: Factual

32. Which of the following taxa in the Linnaean hierarchy has the greatest total number of species?
a. phylum
b. order
c. family
d. class

ANS: A DIF: Easy REF: 2.2 OBJ: A4
MSC: Factual

33. The most inclusive category in the Linnaean classification system is
a. order.
b. phylum.
c. kingdom.
d. species.

ANS: C DIF: Easy REF: 2.2 OBJ: A4
MSC: Factual

34. The members of which of the following taxa would be most similar to one another?
a. class
b. genus
c. order
d. kingdom

ANS: B DIF: Medium REF: 2.2 OBJ: A4
MSC: Applied

35. The most restrictive category in the Linnaean classification system is
a. species.
b. order.
c. kingdom.
d. phylum.

ANS: A DIF: Medium REF: 2.2 OBJ: A4
MSC: Applied

36. In taxonomy, individuals belonging of the same class would also belong to the same
a. species.
b. genus.
c. order.
d. none of the above

ANS: D DIF: Medium REF: 2.2 OBJ: A4
MSC: Applied

37. Which of the following statements about modern classification is *not* correct*?*
a. Systematic studies have revealed so many errors within the Linnaean hierarchy that it is no longer considered useful.
b. The number of taxa in the Linnaean hierarchy has been determined subjectively; it represents a human understanding of natural processes.
c. A complete evolutionary lineage includes all the descendants of a single common ancestor.
d. Many scientists are reluctant to accept classification information from newer technologies like DNA analysis.

ANS: A DIF: Difficult REF: 2.2 OBJ: A4

MSC: Conceptual

38. *Canis latrans* is the scientific name for the coyote. The term *Canis* represents the coyotes'
    a. genus.
    b. kingdom.
    c. order.
    d. species.

    ANS: A DIF: Easy REF: 2.2 OBJ: A5
    MSC: Applied

39. Which of the following avian species are most closely related?
    a. *Picoides villosus* and *Picoides borealis*
    b. *Picoides borealis* and *Phylloscopus borealis*
    c. *Numenius borealis* and *Picoides borealis*
    d. *Numenius americanus* and *Grus americana*

    ANS: A DIF: Medium REF: 2.2 OBJ: A5
    MSC: Applied

40. There are currently three recognized domains; which of the following is *not* included within this taxon?
    a. Archaea
    b. Bacteria
    c. Procarya
    d. Eukarya

    ANS: C DIF: Easy REF: 2.2 OBJ: B1
    MSC: Factual

41. The chemical composition of ancient sediments suggests that oxygen was essentially absent from the atmosphere of the early Earth; how can its abundance in today's atmosphere be explained?
    a. Sunlight split water molecules apart, a process that produced oxygen gas.
    b. Volcanic activity released oxygen that had been trapped beneath the Earth's surface.
    c. Cyanobacteria and some eukaryotes produced oxygen as a byproduct of photosynthesis.
    d. Chemical erosion of the Earth's surface released oxygen initially bound in surface rocks.

    ANS: C DIF: Medium REF: 2.2 OBJ: C1
    MSC: Factual

42. Prokaryotes differ in several ways from eukaryotes; one of the most distinctive is
    a. the absence of a plasma membrane.
    b. having hereditary material composed of DNA.
    c. the presence of chromosomes.
    d. a nucleus that encloses the cell's DNA.

    ANS: D DIF: Easy REF: 2.3 OBJ: A1
    MSC: Factual

43. Bacteria can be distinguished from most other organisms because
    a. bacterial cells have membrane-bound organelles.
    b. bacterial DNA is not located within an organelle.
    c. bacteria reproduce by splitting in two.
    d. bacteria are generally single-celled.

    ANS: B DIF: Medium REF: 2.3 OBJ: A1
    MSC: Factual

44. In addition to the Bacteria, which other kingdom is comprised exclusively of prokaryotic organisms?
    a. Archaea
    c. Protista

b. Fungi
d. Plantae

ANS: A DIF: Medium REF: 2.3 OBJ: A1
MSC: Factual

45. When success is defined as the greatest number of living individuals, Earth's most successful inhabitants are the
a. vertebrates and birds.
b. fungi and animals.
c. bacteria and archaea.
d. plants and animals.

ANS: C DIF: Easy REF: 2.3 OBJ: A2
MSC: Factual

46. Microscopic examination can often resolve questions in taxonomy, for example, cells that possess a nucleus are never classified as
a. eukaryote.
b. fungi.
c. archaean.
d. protist.

ANS: C DIF: Medium REF: 2.3 OBJ: A2
MSC: Applied

47. Which of the following terms describes organisms that can survive in extremely salty environments?
a. thermophiles
b. halophiles
c. methanogens
d. none of the above

ANS: B DIF: Easy REF: 2.3 OBJ: A3
MSC: Factual

48. Which of the following would you most likely find surviving in a boiling-hot spring?
a. an archaean
b. bacteria
c. a eukaryote
d. none of the above

ANS: A DIF: Easy REF: 2.3 OBJ: A3
MSC: Factual

49. The photograph below shows Sulfolubus, an archaean that lives in environments with very high temperatures.

What hypothesis can explain the extreme habitats of the archaeans?

a. They came to Earth from other planets, where harsher conditions prevail.
b. They would be more widespread, but are unable to successfully compete with bacteria and now occupy habitats where bacteria cannot live.
c. Archaeans evolved when Earth was much less hospitable, and are now relegated to those habitats most similar to early Earth.
d. Numerous food resources are available and unexploited in Earth's extreme habitats.

ANS: B DIF: Difficult REF: 2.3 OBJ: A3
MSC: Conceptual

50. Bacterial cells can typically be described by one of the following three shapes:

a. the sphere, rod, or cube.
b. the rod, sphere, or corkscrew.
c. the corkscrew, cube, or rod.
d. the cube, sphere, or comma.

ANS: B DIF: Easy REF: 2.3 OBJ: A4
MSC: Factual

51. A distinguishing difference between bacteria and archaeans is

a. that bacteria are prokaryotic and archaeans are eukaryotic.
b. the molecules used to construct their cell walls.
c. the presence of membrane-bound organelles, which are observed only in bacteria.
d. the greater size of the bacterial nucleus.

ANS: B DIF: Medium REF: 2.3 OBJ: B1
MSC: Factual

52. What best explains why bacteria can reproduce so much more rapidly than an organism like a mushroom?
    a. Mushrooms reproduce using spores that require a lengthy exposure to the environment before the outer coating can break open.
    b. Bacteria live in extreme environments and can avoid having to wait for more favorable conditions to reproduce, like mushrooms and other plants.
    c. Because most disease-causing bacteria are avoided by consumers, whereas organisms like mushrooms are quickly eaten, preventing rapid population growth.
    d. Mushrooms reproduce sexually, so the proper mating types must contact one another before reproduction can proceed.

    ANS: D DIF: Difficult REF: 2.3 OBJ: B2
    MSC: Conceptual

53. Prokaryotic genomes
    a. do not contain DNA.
    b. are relatively small, containing only DNA that is actively used.
    c. are relatively large, containing extra DNA that serves no known function.
    d. contain about four times as much DNA as eukaryotic genomes.

    ANS: B DIF: Medium REF: 2.3 OBJ: B5
    MSC: Factual

54. The group with the greatest diversity in the strategies used to obtain carbon and energy is the
    a. Fungi.
    b. Animalia.
    c. prokaryotes.
    d. Plantae.

    ANS: C DIF: Easy REF: 2.3 OBJ: B6
    MSC: Factual

55. Prokaryotes obtain their nutrition in a variety of ways; all of the following methods except _____ have been observed.
    a. consuming other organisms
    b. acquiring carbon from nonliving sources
    c. using noncarbon-based nutritional systems
    d. photosynthesis

    ANS: C DIF: Medium REF: 2.3 OBJ: B6
    MSC: Applied

56. Carbon and energy are among the most basic life resources and organisms that have been classified with respect to how they are obtained. What term describes an organism that obtains these substances from rock?
    a. chemoheterotroph
    b. photoautotroph
    c. photoheterotroph
    d. chemoautotroph

    ANS: D DIF: Difficult REF: 2.3 OBJ: B6
    MSC: Applied

57. Because plants lack the ability to directly use the _____ present in the atmosphere, their abundance often depends on bacterial populations present within the soil.
    a. nitrogen
    b. oxygen
    c. water
    d. carbon dioxide

    ANS: A DIF: Medium REF: 2.3 OBJ: C3

MSC: Applied

58. Which of the following statements about bacteria is *false*?
    a. They help a variety of organisms digest their food.
    b. They can provide the nitrate necessary for plant nutrition.
    c. They can be used to clean up oil spills.
    d. The membranes from their organelles can be used to produce medicines.

    ANS: D DIF: Medium REF: 2.3 OBJ: C3
    MSC: Applied

59. What do these products have in common—soy sauce, yogurt, swiss cheese, and buttermilk?
    a. All four are modified dairy products.
    b. Antibiotic therapy often depresses the intestinal bacterial flora; any of the four can be used to reestablish those bacterial colonies.
    c. Each is one of the better sources of protein for individuals choosing a meatless diet.
    d. The production of each involves bacterial fermentation.

    ANS: D DIF: Easy REF: 2.3 OBJ: C4
    MSC: Factual

60. The workers shown in the photograph below are involved in bioremediation; what explanation could account for their specific actions?

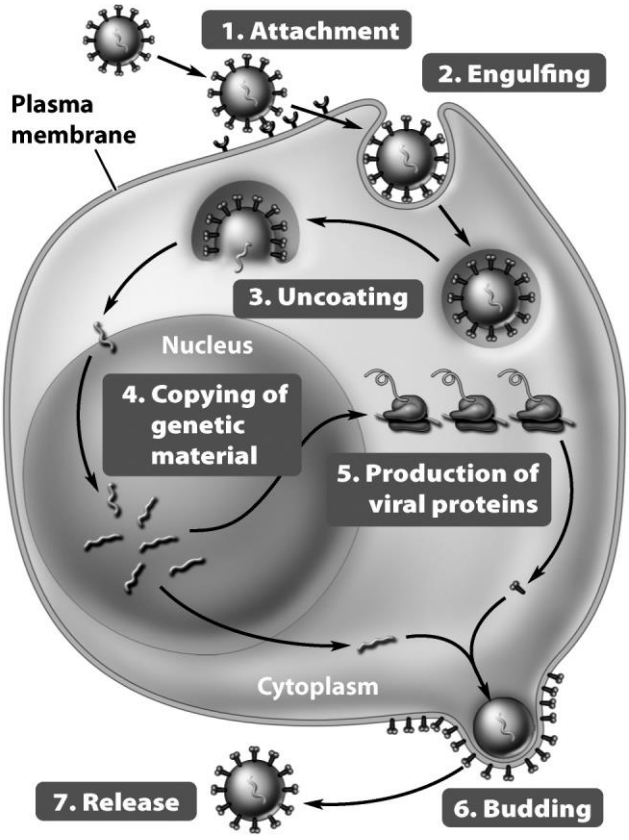
    a. They could be adding fertilizers to stimulate the growth of naturally occurring microbes that will consume a pollutant like oil.
    b. They could be dispersing nonnative microbes that will consume a pollutant like oil.
    c. They could be dispersing seeds to reestablish vegetative growth that will remove pollutants from the environment.
    d. All of the above are examples of bioremediation.

    ANS: D DIF: Medium REF: 2.3 OBJ: C5
    MSC: Applied

61. Viral classification and biology has been challenging; presently most biologists agree that viruses
    a. should be classified as members of the kingdom Protista.
    b. are constructed from a protein wrapped around DNA or RNA.
    c. use a photosynthetic process more similar to bacteria than plants.
    d. should be classified as autochemotrophic.

    ANS: B DIF: Difficult REF: 2.4 OBJ: D2
    MSC: Applied

62. What aspect of the viral life cycle depicted in the illustration below explains the pathology associated with a viral infection?



    a. Infected cells produce new virus particles rather than the proteins associated with normal cell activity and homeostasis.
    b. Newly replicated virus particles are released by budding, a process that depletes the cell membrane.
    c. The immune response to the presence of viral protein may be extremely intense.
    d. Retroviral insertion of DNA causes immediate cell death.

    ANS: A DIF: Difficult REF: 2.4 OBJ: D3
    MSC: Applied

63. The infective strategy seen in the retroviruses involves _____ the host cell.
    a. the insertion of RNA and its conversion to DNA within
    b. the integration of the viral genetic material into the DNA of
    c. an initial symptom-free period with no pathology evident in
    d. all of the above

ANS: D DIF: Difficult REF: 2.4 OBJ: D3
MSC: Applied

64. A disproportionate number of viral infections occur in the respiratory and digestive systems; how might this be explained?
    a. New viral particles can be easily released in feces or exhaled air.
    b. The lung, stomach, and intestinal tract can be easily reached when the virus contacts a new host.
    c. The immune response may be less vigorous or effective in these locations.
    d. All of the above are reasonable hypotheses.

    ANS: B DIF: Difficult REF: 2.4 OBJ: D4
    MSC: Applied

65. Like any disease or parasite, viruses need to reach new hosts to extend the infective cycle, which explains why such a large number of viral infections are associated with the
    a. urinary and cardiovascular systems.
    b. digestive and respiratory systems.
    c. nervous and integumentary systems.
    d. reproductive and integumentary systems.

    ANS: B DIF: Difficult REF: 2.4 OBJ: D4
    MSC: Applied

66. Viruses may rapidly evolve resistance to vaccines and medications by modifying their DNA; what mechanism(s) do they use?
    a. Dying viruses burst open, and another virus can take up the released DNA.
    b. Adjacent viruses form a conjugation tube and exchange DNA laterally.
    c. Viral DNA replication is sloppy; random DNA variations often result in viral proteins that reduce the effectiveness of current treatments.
    d. All of the above commonly occur in viruses.

    ANS: C DIF: Difficult REF: 2.4 OBJ: D5
    MSC: Applied

67. Cipro, an antibiotic that is taken orally, has been recently reevaluated for its impact on intestinal microbial flora; what best summarizes the findings?
    a. Not surprisingly, there was virtually no effect; otherwise, human trials would have indicated that Cipro was unsuitable for human use.
    b. A small but insignificant reduction in species diversity followed each course of antibiotics, but test participants quickly reestablished a normal intestinal community.
    c. A single course of antibiotics was tolerated well by the majority of test participants, but a second course of antibiotics administered shortly after the first caused an extensive and prolonged change.
    d. Intestinal microbial are particularly sensitive to Cipro; their populations crashed almost immediately after the first dose was taken.

    ANS: C DIF: Medium REF: Biology in the News
    OBJ: C6 MSC: Factual

COMPLETION

1. New features that allow a group to survive and reproduce successfully can be called _____ innovations.

ANS: evolutionary

DIF: Easy REF: 2.1 OBJ: A1 MSC: Factual

2. _____ is the science of naming and classifying organisms within the Linnaean hierarchy.

ANS: Taxonomy

DIF: Easy REF: 2.1 OBJ: A1 MSC: Factual

3. Within an evolutionary tree descendants share common features because they share a common _____.

ANS: ancestor

DIF: Easy REF: 2.1 OBJ: A1 MSC: Factual

4. Bacteria, Archaea, and Eukarya are the three _____; they form the highest hierarchical level in the organization of life.

ANS: domains

DIF: Easy REF: 2.1 OBJ: A2 MSC: Factual

5. Fossil evidence suggests that the _____ were the first eukaryotic group to evolve.

ANS: protists

DIF: Easy REF: 2.1 OBJ: A2 MSC: Applied

6. _____ are diagrams that show the relationships between various organisms as indicated by DNA analysis or comparative studies on body form, physiology, or behavior.

ANS: Evolutionary trees

DIF: Medium REF: 2.2 OBJ: A1 MSC: Applied

7. The Linnaean hierarchy goes from species to genus to family to order to _____ to phylum to kingdom.

ANS: class

DIF: Easy REF: 2.2 OBJ: A4 MSC: Factual

8. The father of modern scientific naming is _____.

ANS: Carolus Linnaeus

DIF: Easy REF: 2.2 OBJ: A4 MSC: Factual

9. The figure below shows a bacterium dividing by binary fission; because the process is asexual you would expect the DNA in each daughter cell to be _____.

ANS: identical

DIF: Medium REF: 2.2 OBJ: B2 MSC: Applied

10. Infective bacteria are usually too large to enter cells but can cause pathology by releasing an _____ that kills adjacent tissues.

ANS: exotoxin

DIF: Medium REF: 2.2 OBJ: C6 MSC: Applied

11. Wetland soils are saturated with water and devoid of oxygen creating a habitat ideally suited for _____ prokaryotes.

ANS: anaerobic

DIF: Easy REF: 2.3 OBJ: B3 MSC: Applied

12. _____ describes those prokaryotes able to live in unusually cold conditions.

ANS: Psychrophile

DIF: Medium REF: 2.3 OBJ: B3 MSC: Factual

13. Dental hygienists carefully remove plaque, an aggregate of prokaryotic cells organized as a _____, from the surface of the teeth of their patients.

ANS: biofilm

DIF: Medium REF: 2.3 OBJ: B4 MSC: Applied

14. During _____ bacteria trade small sections of plasmid DNA with one another.

ANS: conjugation

DIF: Easy REF: 2.3 OBJ: B5 MSC: Factual

15. The status of viruses has been controversial but most biologists now agree that the most appropriate description for a virus is a microscopic, _____ infective particle.

ANS: noncellular

DIF: Medium REF: 2.4 OBJ: D1 MSC: Factual

16. A viral particle is very simple, consisting of a core of DNA or RNA surrounded by a _____.

ANS: protein coat

DIF: Medium REF: 2.4 OBJ: D1 MSC: Factual

17. Using the simplest methods to study the composition of intestinal microbial flora, it is necessary to collect a _____ sample from the subject.

ANS: fecal

DIF: Easy REF: Biology in the News OBJ: C2
MSC: Applied

TRUE/FALSE

1. A lineage is a group of relatives that have a common ancestor.

ANS: T DIF: Easy REF: 2.1 OBJ: A1
MSC: Applied

2. Switching the order of the last two organisms on an evolutionary tree has no effect on how the tree is read.

ANS: T DIF: Medium REF: 2.1 OBJ: A1
MSC: Conceptual

3. Evolutionary trees can be used to predict the behavior of organisms.

ANS: T DIF: Medium REF: 2.1 OBJ: A1
MSC: Applied

4. Protists are part of the domain Bacteria.

ANS: F DIF: Easy REF: 2.1 OBJ: A2
MSC: Factual

5. Bacteria, protists, and fungi belong to the domain Archaea.

ANS: F DIF: Easy REF: 2.1 OBJ: A2
MSC: Factual

6. DNA analysis has confirmed the relationships among most species well beyond any reasonable doubt.

ANS: F DIF: Easy REF: 2.1 OBJ: A2
MSC: Applied

7. The broadest classification category currently used by most biologists is the domain.

ANS: T DIF: Easy REF: 2.2 OBJ: A3
MSC: Applied

8. The most commonly used classification system includes 12 kingdoms.

ANS: F DIF: Easy REF: 2.2 OBJ: A3
MSC: Factual

9. The organisms found living inside boiling-hot geysers can be described as thermophiles.

ANS: T DIF: Easy REF: 2.3 OBJ: B3
MSC: Factual

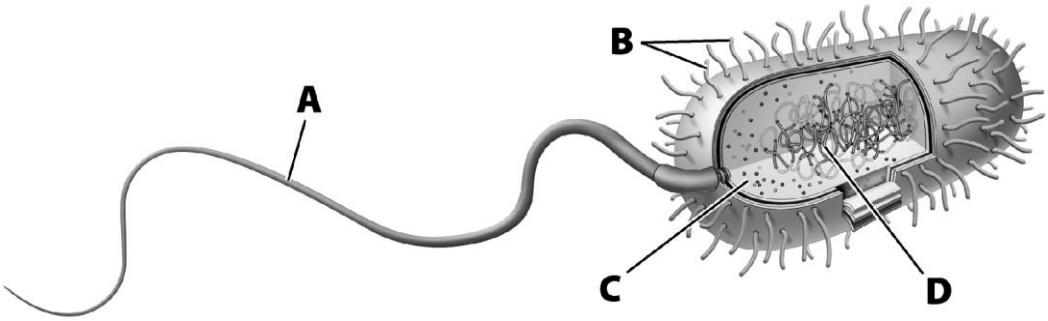
10. Aerobic organisms can survive without oxygen.

ANS: F DIF: Easy REF: 2.3 OBJ: B3
MSC: Factual

11. All bacteria have the same shape.

ANS: F DIF: Medium REF: 2.3 OBJ: B4
MSC: Factual

12. The structure labeled A, below, is cilia, used by both prokaryotes and eukaryotes to move through fluid.



ANS: F DIF: Medium REF: 2.3 OBJ: B4
MSC: Applied

13. During nitrogen fixation, bacteria convert toxic ammonia into atmospheric nitrogen.

ANS: F DIF: Easy REF: 2.3 OBJ: C3
MSC: Factual

14. Archaea, Bacteria, and Eukarya are the three biological domains.

ANS: T DIF: Easy REF: 2.4 OBJ: A2
MSC: Factual

15. The kingdom Bacteria consists of the same species as the domain Bacteria.

ANS: T DIF: Medium REF: 2.4 OBJ: A3
MSC: Applied

16. The rate of evolution in prokaryotes may be accelerated by lateral gene transfer; a process that appears to move genes from one branch of an evolutionary tree to another.

ANS: T DIF: Medium REF: 2.4 OBJ: B5

MSC: Applied

17. Recent studies on the effects of antibiotics on the normal intestinal microbial flora confirm previous views that these medications are entirely harmless to humans.

ANS: F DIF: Medium REF: Biology in the News
OBJ: C6 MSC: Applied