

Chapter 19 Assessment

Reviewing Content

1. a 5. a 9. b
2. a 6. d 10. c
3. b 7. d
4. b 8. c

Understanding Concepts

11. Prokaryotes are the smallest and most common microorganisms. They are unicellular and lack a nucleus.
12. The three most common shapes of prokaryotes are the rod-shaped bacilli, spherical-shaped cocci, and corkscrew-shaped spirilla.
13. Gram-positive bacteria with a single cell wall layer absorb only the violet primary stain. Gram-negative bacteria have a thin layer of peptidoglycan. This layer absorbs the red stain so that the bacteria appear red.
14. Some prokaryotes move by flagella, some spiral forward, and some glide along on a slime-like material they secrete.
15. Both photoautotrophs and chemoautotrophs make their own food. Photoautotrophs obtain energy from photosynthesis and thus depend upon light. Chemoautotrophs obtain energy from chemical reactions involving ammonia, hydrogen sulfide, nitrates, sulfur, or iron.

(Continued from page 492)

16. They are similar in that both require organic compounds in order to stay alive.
17. Obligate aerobes require oxygen to survive. Obligate anaerobes are killed by oxygen.
18. Because facultative anaerobes are able to switch between cellular respiration and fermentation for their energy demands, they are able to live anywhere.
19. Plants can't use nitrogen gas directly. Certain bacteria that have symbiotic relationships with plants carry out nitrogen fixation, which is the process of converting nitrogen gas into a form plants can use.
20. One thing all viruses have in common is that they enter living cells and, once inside, use the machinery of the infected cell to multiply.
21. The capsid protein of a virus is important because it binds to the surface of a cell and tricks the cell into allowing it inside. Once inside, the viral genes take over.
22. In a lytic infection, a virus enters a cell, makes copies of itself, and causes the cell to burst.
23. In a lysogenic infection, a virus integrates its DNA into the DNA of the host cell, and the viral genetic information replicates along with the host cell's DNA.
24. The best way to protect against most viral diseases is prevention. Once a viral disease has been contracted, it might be too late to control the disease.
25. Viruses are highly specific to the cells they infect because they must bind precisely to proteins on the cell surface in order to penetrate the cytoplasm.

Critical Thinking

26. Because other organisms depend on bacteria for converting nitrogen gas into nitrogen compounds, these organisms might die if bacteria lost their ability to fix nitrogen.
27. Viruses can replicate only within living things. As a result, bacteriophages can grow on cultures of bacteria but not on synthetic media.
28. Not brushing your teeth leaves particles on teeth that bacteria can use for food. This encourages bacterial growth.
29. The organism probably belongs to Eubacteria because it is unicellular, has a cell wall containing peptidoglycan, and lacks a nucleus.
30. Antibiotics B and C were the least effective. The growth of the bacteria was not retarded at all.
31. Antibiotics A and D would be good treatments because both retarded the growth of the bacteria.
32. Viruses, prokaryotes, and eukaryotes all have nucleic acids and proteins. Prokaryotes and eukaryotes have cell membranes, and eukaryotes have organelles.
33. Binary fission produces two cells from one, whereas endospore formation and conjugation do not increase the number of cells. In addition, conjugation results in genetic recombination.
34. Two labeled agar plates are needed. Touch one plate with a finger. Leave both plates uncovered for 20 minutes. Then, cover the plates, and store them in a protected area of the classroom. Use a hand lens to count the bacteria colonies after 24 and 48 hours.
35. Students should infer that if the agar plates are not sterile at the beginning of the lab, the results of the lab may be suspect. The reason is that the bacterial colonies that grow on the plates may not be the result of wiping the swab across the plate. For instance, the bacterial colonies that develop might not be of the same species as the bacteria in the bacterial culture and might grow at different rates under the same conditions.

Standardized Test Prep

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|------|------|-------|
| 1. D | 5. E | 9. C |
| 2. B | 6. A | 10. D |
| 3. A | 7. E | 11. B |
| 4. C | 8. C | 12. D |