1. **virus** tiny, nonliving particle that enters and reproduces inside a living cell
   Why aren’t viruses considered “living” organisms? not cells, cannot make food or take in food or even produce wastes; reproduce only inside host cell

2. **host** an organism that provides a source of energy for another organism
   **parasite** an organism that lives on or in a host organism and causes it harm
   **bacteriophage** a virus that infects a bacteria; means “bacteria eater”

3. **nanometer** = one billionth of a meter = \(0.000000001 \, M = 10^{-9} \, M\)

4. Two parts of a virus: a) **protein coat** : protects the virus
   b) **inner core** : genetic material

5. Five steps for an active virus to multiply: see p. 44 for drawings

   a) virus attaches to the surface of a cell

   b) virus injects its genetic material into the cell

   c) virus takes over functions of the cell

   d) proteins and genetic material assemble to make viruses

   e) cell bursts open, releases viruses to infect more cells

6. How is a hidden virus different than an active virus? Virus invades cell and its genetic material becomes part of the cell but doesn’t affect it and remains inactive for a period of time.
7. AIDS  
**Acquired Immunodeficiency Syndrome**

8. gene therapy  
**viruses as “messenger service” to help cure gene defects**

9. cystic fibrosis  
**disease with genetic defect in the cells of the lungs**

10. bacteria  
**unicellular prokaryote (no nucleus)**

11. cytoplasm  
**gel-like liquid material inside a cell membrane**

12. ribosome  
**chemical “factories” in cytoplasm that make proteins**

13. flagellum  
**whip-like structure on a cell that helps it to move**

14. three bacterial cell shapes  
a) **sphere**  
b) **rod**  
c) **spiral**

15. micrometer  
**one millionth of a meter = 0.000001 M = 10^{-6} M**

16. autotrophic bacteria  
**bacteria producing own food from light or chemicals**

17. heterotrophic bacteria  
**bacteria that consume other organisms**

18. respiration  
**breaking down food to produce energy**

19. Healthy bacteria can reproduce every **twenty** minutes.

20. binary fission  
**asexually reproducing by splitting**

21. conjugation  
**“sexual” reproduction by bacteria sharing genetic material**

22. endospore  
**dormant thick-walled bacterial cells surviving bad conditions**

23. pasteurization  
**heating food enough to kill bacteria but not harm the food**

24. decomposer  
**break down dead organisms into nutrients for soil; “recycler”**

25. nitrogen-fixing bacteria  
**changes atmospheric nitrogen to fertilizers for soil**

26. intestinal bacteria  
**help digest food in animal intestines**

27. infectious disease  
**disease spread by contact with infected person or contaminated environmental source.**

28. toxin  
**poisonous material**

29. antibiotic  
**chemical that can kill a bacteria without harming the healthy cells**

30. antibiotic resistant  
**bacteria that can survive the presence of an antibiotic**

31. vaccine  
**a substance introduced into the body to destroy specific viruses or bacteria**
32. **Bacteria will grow in a laboratory in a gelatin-like nutrient called agar.** Viruses will not. **Predict** what kind of substance might be needed to grow viruses in a lab. Viruses cannot reproduce and live on their own. They need a living host to survive. They would need living animals in which to grow them.

33. **Contrast** the size of a red blood cell with a bacteria with a virus. A red blood cell’s diameter is about 10 times bigger than a bacteria, which makes it a thousand times more volume. A bacteria’s diameter is about 10 times bigger than a virus, which makes the virus a thousandth the volume of a bacteria and a millionth the size of a red blood cell.

34. **Contrast** how bacteria and viruses reproduce. Viruses cannot reproduce without a host cell to invade and control. Bacteria generally reproduce by fission, splitting in two.

35. **Compare** the structure of a bacteria and a virus. The both have a cell wall and both are prokaryotes which lack a nucleus.

36. A girl in the class says that bacteria are bad because they cause diseases. What might you say in response to her statement. **Bacteria also do a lot of good in the world.** They help us digest our food and keep us healthy. They decompose dead organisms and recycle the nutrients into the environment.

37. A certain kind of bacteria reproduces every twenty minutes. If you get one in your lungs and it reproduces unchecked, **predict** how many there would be in five hours? Show your work.

   - 20’ = 2; 40’ = 4; 1h = 8; 1h20’ = 16; 1h40’ = 32; 2h = 64;
   - 2h20’ = 128; 2h40’ = 256; 3h = 512; 3h20’ = 1,024; 3h40’ = 2,048; 4h = 4,096;
   - 4h20’ = 8,192; 4h40’ = 16,384; 5h = 32,768

38. **Draw** a bacteria and **label** its parts.

   See page 49 for sketch. **Drawing should include:** flagella, cell wall, cell membrane, cytoplasm, ribosomes, genetic material