

Chapter Project Worksheet 1

- Answers will vary. Sample: In newspaper articles, the opening sentence summarizes the rest of the story. Sometimes the opening sentence tells how the events described in the story could affect the reader's life. This makes the reader want to finish the story to get more information. Sample: "Area clinics are reporting high numbers of students coming in complaining of flu symptoms, and they predict the situation will get worse before it gets better."
- Answers will vary. Sample: An article about the flu discusses a predicted outbreak. Then it describes flu outbreaks in the past, and then discusses this disease in general. This article moves from the specific to the general.
- Answers will vary. Sample: A story about Nobel Prize winners helped readers understand the behavior of some electrons by comparing them to balls on a billiard table.
- Answers will vary. Sample: A story about conflict in Eastern Europe summarizes a previous day's story in a short paragraph.
- Answer will vary. Sample: A story about a flu outbreak ends with a quote from a doctor that states that too few people are getting the flu vaccine.
- Answers will vary. Sample: A story about conflicts in Eastern Europe includes a map that shows the site of a battle. This helps the reader to visualize the part of the world where the conflict is taking place.

Chapter Project Worksheet 2

Students' tables will vary depending on the disease they select.

- Answers will vary. Students should choose newspaper articles, television broadcasts, or radio broadcasts.
- Answers will vary. Sample: My first report will describe how the pathogens entered the person's body and the first symptoms of the disease. My second report will describe how the disease spreads through the body, the new symptoms that appear, and how the body fights back. My third report will describe how the disease is fought off by the body and how the person recovers.
- Answers will vary. Sample: I want to include sound effects of an interview with a disease organism and an interview with the person who has the disease.

Infectious Disease

Guided Reading and Study

Use Target Reading Skills

Sample answer:

What You Know

- Bacteria and viruses can cause disease.
- You can catch a cold from another person.
- Dogs can spread rabies.

What You Learned

- Organisms that can cause disease are called pathogens.
- Some bacteria produce poisons, or toxins.
- Some pathogens can spread through soil, food, or water.

Understanding Infectious Diseases

- pathogens
- An infectious disease is a disease that can pass from one organism to another.
- true
- b, c
- false
- Bacteria, Viruses, Fungi, Protists
- By directly damaging body cells,
 - By producing a poison, or toxin, that damages cells
- Viruses cause disease by damaging or destroying cells as they reproduce inside them.
- d
- infected people
 - soil, food, water
 - a contaminated object
 - an infected animal
- b, d

Infectious Disease

Review and Reinforce

- Answers will vary. Samples: coughing, sneezing
- Answers will vary. Sample: cold sore
- Answers will vary. Sample: flu, cold, pneumonia
- Answers will vary. Samples: Using utensils that a sick person has used, drinking from a glass that a sick person has used.
- Infected animal
- Answers will vary. Samples: malaria, Lyme disease.
- Answers will vary. Sample: botulism
- bacteria, viruses, fungi, protists
- A disease that can pass from one organism to another
- An organism that causes disease
- A poison produced by some bacterial pathogens that damages cells

Infectious Disease

Enrich

1. An infected animal
2. She lays eggs only in shallow water.
3. She bites a person who has malaria.
4. A person gets malaria by being bitten by a female *Anopheles* mosquito that has bitten a person with malaria.
5. This would eliminate Step 1 in the process. The result would be fewer mosquitoes to carry the malaria *Plasmodium*.
6. Answers may vary. Samples: Control the mosquitoes with insecticides. Prevent *Anopheles* mosquitoes from biting people through the use of insect repellent and screens. Cure everyone with malaria so *Plasmodium* can't enter a mosquito's body.

The Body's Defenses

Guided Reading and Study

Use Target Reading Skills

Accept all logical definitions for Key Terms.

1. The first line of defense is barriers, such as the surfaces of the skin, breathing passages, mouth, and stomach, that keep pathogens from getting into the body.
2. Harmful chemicals are in oil and sweat; pathogens fall off with dead skin cells; tightly packed layer of dead skin cells forms a barrier. Mucus and cilia trap pathogens. Coughing and sneezing force pathogens out of body. Saliva and stomach acid destroy pathogens.
3. inflammatory response
4. Fluid and certain types of white blood cells leak from blood vessels into nearby tissues. The white blood cells then fight the pathogens.
5. phagocytes
6. Blood vessels in the area widen to increase the flow of blood to the area.
7. A fever helps the body fight infection because some pathogens may not grow and reproduce well at higher temperatures.
8. immune response
9. a. T cells;
b. B cells
10. T cell; T cells; B cells; Antibodies
11. Lymphocytes can distinguish between different kinds of pathogens and react to each pathogen with a defense targeted specifically to it.
12. Antigens are molecules on cells that the immune system recognizes either as part of the body or as coming from outside the body.

13. a. Clump pathogens together;
b. Keep pathogens from attaching to body cells;
c. Make it easier for phagocytes to destroy the pathogens
14. AIDS is caused by a virus, HIV, that attacks the immune system.
15. T cells
16. true
17. a, d

The Body's Defenses

Review and Reinforce

1. Barriers
2. Inflammatory response
3. immune response
- 4–6. Answers will vary. Samples: Skin; mucus and cilia in breathing passages; saliva, stomach acid
7. T cells
8. B cells
9. antigen
10. AIDS
11. phagocyte
12. inflammatory response
13. immune response
14. antibody
15. lymphocytes

The Body's Defenses

Enrich

1. About 39.6°C
2. About 37.2°C
3. Between 2 and 2.5°C
4. Sample answer: During the first week there are a number of fever spikes, each followed by a drop of about 1 to 1.5°C. Starting in the second week, temperatures do not fluctuate greatly and hover around normal.
5. Sample answer: No. Somewhere toward the end of the first week, a patient with infectious hepatitis might have a near-normal temperature. In addition, if the doctor saw the patient during the second to fourth weeks, a near-normal temperature would be expected even though the patient still had infectious hepatitis.

Skills Lab

The Skin as a Barrier

For answers, see the Teacher's Edition.

Preventing Infectious Disease Guided Reading and Study

Use Target Reading Skills

Sample answers: Active Immunity—The body makes antibodies. Memory cells recognize antigens. Immunity may last for years or a lifetime. Passive Immunity—Antibodies are given; the body does not make antibodies. Immunity lasts only a few months. Immunity can be acquired from the mother during pregnancy. Both types can prevent diseases. Both may involve an injection.

- immunity
- a. active immunity;
b. passive immunity
- Active immunity occurs when a person's own immune system produces antibodies in response to the presence of a pathogen.
- true
- Memory cells recognize a pathogen's antigen and start the immune response quickly.
- vaccination
- Vaccines usually consist of pathogens that have been weakened or killed but can trigger the immune system to go into action.
- antibiotic
- true
- a. Get plenty of rest.
b. Eat well-balanced meals.
c. Drink plenty of fluids.
- passive
- false
- Antibodies from the mother's body pass into the baby's body.

Preventing Infectious Disease Review and Reinforce

- Passive
- Active
- Active
- Passive
- Active
- One way is by coming down with a disease. The body produces antigens which protect against catching that disease again. Another way is by getting vaccinated. The body responds to the vaccination by producing antibodies and memory cells that protect against getting that particular disease.
- An antibiotic could be used to treat a bacterial infection because it kills the living bacteria. An antibiotic cannot be used to treat a viral infection because it does not affect viruses.

- a
- c
- e
- d
- b

Preventing Infectious Disease Enrich

- Active immunity. Active immunity involves exposure to a pathogen or its parts. Passive immunity involves being injected with antibodies.
- The concentration of antibodies increased.
- Person B. This person had a concentration of antibodies to the pathogen *before* being vaccinated.
- The vaccine given to Person A. When the person was exposed to the antigen a second time, a large number of antibodies were rapidly produced. This would keep the person from getting the disease.

Noninfectious Disease Guided Reading and Study

Use Target Reading Skills

Possible questions and answers:

What is an allergy? (*An allergy is a disorder in which the immune system is overly sensitive to a foreign substance.*)

How does diabetes affect the body? (*A person's body cells do not have enough glucose.*)

What causes cancer? (*Different factors cause cancer, such as heredity and carcinogens.*)

- false
- noninfectious
- An allergy is a disorder in which the immune system is overly sensitive to a substance that is not normally found in the body.
- allergen
- a, b, c, d
- histamine
- true
- Asthma is a disorder in which the respiratory passages narrow, causing a person to wheeze and become short of breath.
- c
- diabetes
- false
- b, c
- Type I: Childhood or early adulthood; The pancreas produces little or no insulin. Injections of insulin
Type II: Adulthood; Either the pancreas doesn't

make enough insulin or body cells do not respond normally to insulin. Possibly get insulin injections; control symptoms through diet, weight control, and exercise.

- 14. Cancer is a disease in which cells multiply over and over, destroying healthy tissue in the process.
- 15. tumors
- 16. a. Inherited characteristics;
b. Factors in the environment called carcinogens
- 17. true
- 18. a, d

**Noninfectious Disease
Review and Reinforce**

- 1. An allergy is a disorder in which the immune system is overly sensitive to a foreign substance.
- 2. In Type I diabetes, the pancreas produces little or no insulin. Type I usually begins in childhood and early adulthood. In Type II diabetes, which usually begins in adulthood, the pancreas does not make enough insulin or body cells do not respond normally to insulin.
- 3. Cancer is a disease in which cells multiply uncontrollably. It is dangerous because the multiplying cells destroy healthy tissues.
- 4. Some people are more likely to develop cancer if their relatives developed it. Also, exposure to carcinogens makes a person more likely to develop cancer.
- 5. surgery, medicine, and radiation
- 6. You do not have to worry about catching diabetes or cancer from someone. They are noninfectious diseases, diseases that are not transmitted from person to person.
- 7. insulin
- 8. allergen
- 9. Histamine
- 10. tumor
- 11. Asthma
- 12. carcinogen

**Noninfectious Disease
Enrich**

- 1. In 1979, about 708,000 people died of heart disease. In 1996, about 743,000 people died of heart disease. More people died of heart disease in 1996.
- 2. In 1996, the U.S. population was much higher, so even though more people died, the death rate was lower. In addition, the death rates for other diseases may have increased.

3. Diabetes. Answers may vary. Example: One reason is that more people died from diabetes because they did not die from other causes such as heart disease.

4. Answers may vary. Examples: The decline in deaths due to heart disease was due to better nutrition, better medical treatments, or the decline in the number of smokers.

Skills Lab

Causes of Death, Then and Now

For answers, see the Teacher’s Edition.

**Cancer and the Environment
Guided Reading and Study**

Use Target Reading Skills

Possible answers include the following:

Cause	Effect
UV light	Skin cancer
Vinyl chloride	Cancers of the liver, brain, or lungs
Arsenic	Cancers of the liver, bladder, kidneys, and lungs

- 1. He observed that many chimney sweeps developed skin cancer.
- 2. false
- 3. To reduce the risk of cancer, the carcinogens need to be removed or people need to be protected from them.
- 4. The EPA identifies environmental carcinogens and develops strategies to protect people from them.
- 5. Vinyl Chloride: A colorless gas used to make PVC, which is used in plastic products; Liver, brain, or lung cancer; When people inhale the vapors over long periods of time
Ultraviolet Light: A part of sunlight; Skin cancer; By overexposure to sunlight

**Cancer and the Environment
Review and Reinforce**

- 1. Answers may vary: Samples: pressure-treated wood
- 2. Lung, liver, kidneys, bladder
- 3. Ultraviolet light

4. Skin
5. Chimney sweeps were exposed to a lot of soot and often didn't have water to clean it off their skin, and they had many cases of skin cancer. Dr. Pott recommended frequent bathing to remove the soot.
6. The Environmental Protection Agency. It identifies environmental carcinogens and develops strategies for protecting people from them.
7. CCA in wood products for homes will be eliminated by 2004.
8. Ozone absorbs ultraviolet light. As the level of ozone in the upper atmosphere has decreased, the number of skin cancer cases has increased.

Cancer and the Environment Enrich

1. 150 minutes, or 2 hours and 30 minutes
2. No. The person might be able to stay out 5 hours without getting a sunburn, but he or she might be outdoors longer than that. Also, sunlight would also be reflecting off the sand and water.
3. Answers may vary. Sample: Their faces would be exposed to a greater amount of UV light, because of the sun reflecting off the snow. Also, skiing is often done at high elevations, where sunlight is stronger. On the other hand, skiers usually cover the rest of their bodies with thick clothing that would block sunlight.
4. Answers may vary. Samples: Lower ozone levels may be increasing the amount of sunlight reaching Earth's surface; clothing and hats; sunscreen may rub off or wash off in water.

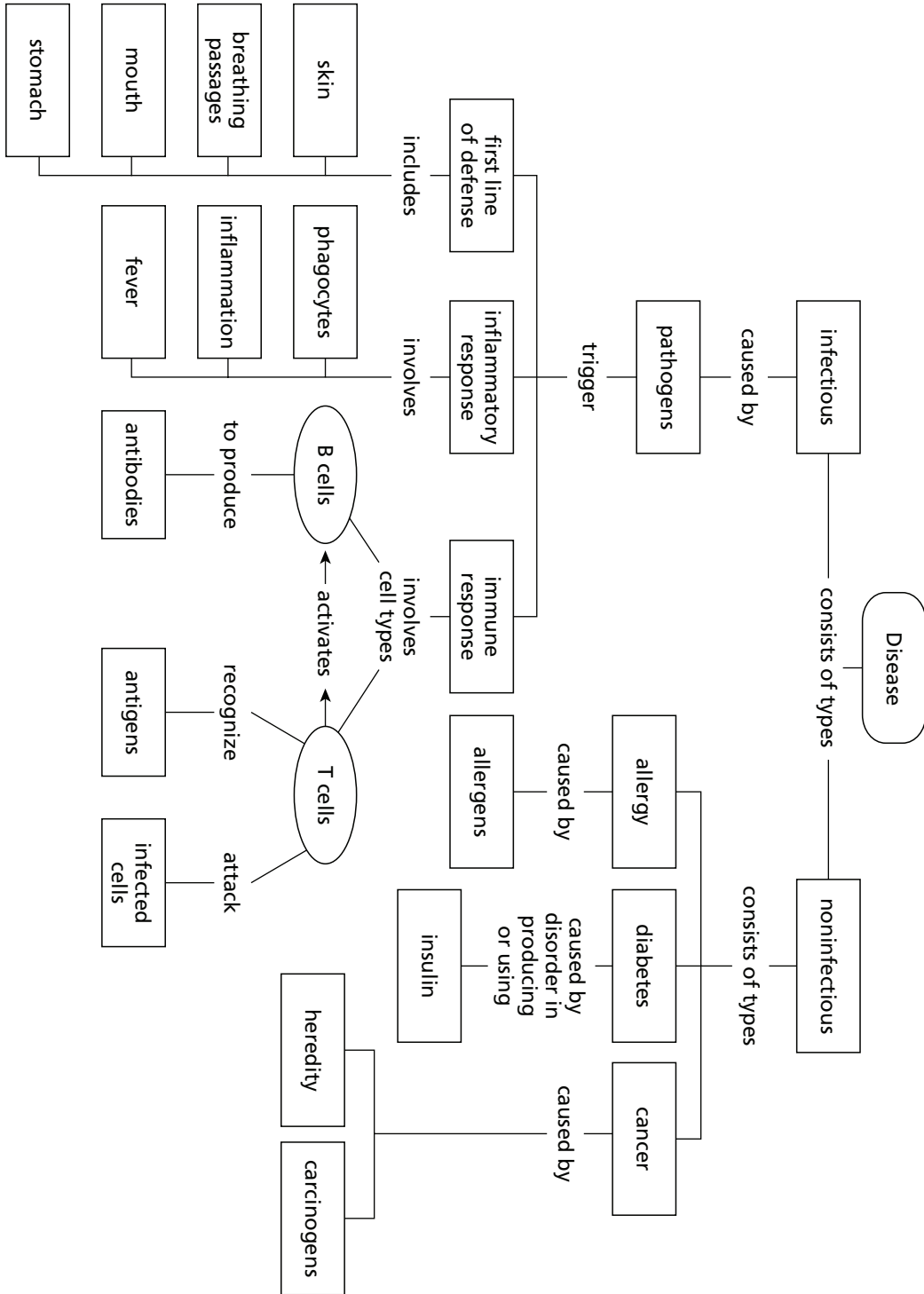
Key Terms

A	B	C	= <u>24</u>
<u>5</u>	<u>13</u>	<u>6</u>	= <u>24</u>
D	E	F	= <u>24</u>
<u>9</u>	<u>8</u>	<u>7</u>	= <u>24</u>
G	H	I	= <u>24</u>
<u>10</u>	<u>3</u>	<u>11</u>	= <u>24</u>
= <u>24</u>	= <u>24</u>	= <u>24</u>	= <u>24</u>



Connecting Concepts

This is one way to represent the main ideas and relationships in this chapter. Accept other logical answers from students.



Laboratory Investigation

Do Mouthwashes Work?

Pre-lab Discussion

1. bacteria, viruses, fungi, protists
2. Sources include an infected person, a contaminated object, an infected animal, and the environment.

Procedure

11. Possible predictions are that the mouthwashes will be equally effective in preventing microorganism growth or that one mouthwash will be more effective. Predictions may reflect personal experience or advertising effectiveness.

Analyze and Conclude

1. Dish C had more bacteria growing in it every day.
2. Dishes A and B should have less bacterial growth than dish C. The mouthwashes in dishes A and B prevented some bacterial growth.
3. Answers may vary. There may be different amounts of bacteria growing in dishes A and B. Different mouthwashes may have different effectiveness.
4. Dish C is a control for the experiment. Without it, students could not see how much bacteria would have grown without any mouthwash. Therefore, they could not compare the effect of the mouthwashes as completely as by using the control.

Critical Thinking and Applications

1. Most students will recommend the mouthwash that prevented the most bacterial growth in its dish. Other factors in their recommendation might include price, flavor, and odor of the mouthwash.
2. Answers may include antibacterial soaps and various kitchen and bathroom cleaners that claim to kill bacteria.

More to Explore

Antibacterial soaps contain ethyl alcohol to kill bacteria. Usually antibacterial soap costs more than regular soap.

Analyze and Conclude

There should be less bacterial growth with the antibacterial soap than with other kinds of soap.

Performance Assessment

Analyze and Conclude

1. Answers will vary. Sample: I modeled a pathogen with a ball of clay. I modeled its antigens with tiny pieces of clay in the shape of triangles. I broke toothpicks in half and used them to connect the antigens to the pathogen. I modeled a T cell with a plastic foam ball. I modeled antibodies with half of a toothpick stuck into a piece of clay shaped to “fit” around the triangular shape of the antigens. I modeled a B cell with a plastic foam ball with antibodies attached to it. I mounted a T cell next to a pathogen on a piece of cardboard to show that the T cell recognizes the pathogen. Then I mounted a B cell next to a couple of antibodies to show that the B cell has been activated by the T cell and is producing antibodies against the pathogen. Then I mounted a pathogen with antibodies bound to its antigens to show that the pathogen has been marked for destruction. I labeled each step and drew arrows between them to show the order in which the steps occur.
2. Answers may vary. Sample: I wasn’t able to show that some T cells attack infected body cells or that phagocytes destroy pathogens that are bound to antibodies because I ran out of materials.
3. Answers may vary. Sample: I modeled my antigens in the shape of triangles. I modeled my antibodies so that their shape would “fit” around the triangular shape of the antigens.
4. My model illustrates active immunity because the antibodies are produced by the body’s B cells. In passive immunity, the antibodies come from outside the person’s own body.
5. Some antibodies cause the pathogens to clump together. Some keep pathogens from attaching to body cells, and some make it easier for phagocytes to destroy the pathogens.

Chapter Test

1. c
2. a
3. b
4. a
5. d
6. a
7. b
8. d
9. d
10. c
11. pathogens
12. toxin
13. passive
14. histamine
15. carcinogen
16. immune
17. can
18. Asthma
19. true
20. high
21. true
22. Answers may include two of the following: Immunization, getting sick from a pathogen, or being exposed to a pathogen for the second time
23. HIV stands for human immunodeficiency virus. It attacks the body's immune system and causes acquired immune deficiency syndrome, or AIDS. The immune system of a person with AIDS cannot protect the body against illness.
24. Students should list three of the four sources discussed in the text: an infected person, a contaminated object, an infected animal, and soil, food, or water. Examples: an infected person—kissing a person with a cold or flu; contaminated object—drinking from a glass that a person with the flu has used; an infected animal—malaria is transmitted to humans by

tropical mosquitoes; soil, food, or water—botulism can be spread through foods that have been improperly canned.

25. Answers will vary. Examples: The skin is a physical barrier and its oils and sweat can kill pathogens. Mucus and cilia in the respiratory system trap pathogens and help the body to get rid of them. Saliva in the mouth helps kill to pathogens, and acid in the stomach kills pathogens that you swallow.

26. The people are exposing themselves to ultraviolet rays in sunlight.

27. Answers may vary. Examples: The people can get out of the sun. They can put on sunscreen. They can wear hats, long pants, and long-sleeved shirts.

28. The doctor would not give you an antibiotic to treat a cold because antibiotics kill only bacteria, and a cold is caused by a virus. If you have a viral disease like a cold, you can treat the symptoms with over-the-counter medicines.

29. The inflammatory response is the body's second line of defense. It is a general response that is the same for any pathogen. Fluids and phagocytes leak out of the circulatory system into surrounding tissues. Phagocytes surround and consume pathogens.

30. In both active and passive immunity, antibodies protect the body against specific pathogens. In active immunity, the body produces its own antibodies, either by getting vaccinated or by being sick with the disease. In passive immunity, the body acquires antibodies from an outside source. Examples include a baby getting antibodies from its mother when still inside her body or from the mother's milk and a person who is injected with antibodies to prevent rabies.