

Chapter 24

The Immune System and Disease Worksheets



(Opening image courtesy of Bruce Wetzel/Harry Schaefer/National Cancer Institute, <http://visualsonline.cancer.gov/details.cfm?imageid=1762>, colored by Sam McCabe, and under the public domain.)

- Lesson 24.1: Nonspecific Defenses
- Lesson 24.2: The Immune Response
- Lesson 24.3: Immune System Diseases
- Lesson 24.4: Environmental Problems and Human Health

24.1 Nonspecific Defenses

Lesson 24.1: True or False

Name _____ Class _____ Date _____

Write true if the statement is true or false if the statement is false.

- _____ 1. The skin is the single most important defense the body has.
- _____ 2. Sneezing removes pathogens from your nose.
- _____ 3. Sweat, mucus, tears, and saliva are all types of mechanical barriers used to protect you.
- _____ 4. The inflammatory response is part of the body's first line of defense.
- _____ 5. Leukocytes are white blood cells that fight infections and get rid of debris.
- _____ 6. Barriers that keep out pathogens are the body's first line of defense.
- _____ 7. The second line of defense attacks pathogens that manage to enter the body.
- _____ 8. The second line of defense includes mechanical, chemical, and biological barriers.
- _____ 9. The first line of defense includes the inflammatory response and phagocytosis.
- _____ 10. A nonspecific defense can be tailored to a particular pathogen.
- _____ 11. The inflammatory response is triggered by chemicals called histamines and cytokines.
- _____ 12. Biological barriers include millions of harmless bacteria live on the human skin.


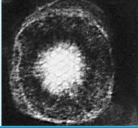


Lesson 24.1: Critical Reading

Name _____ Class _____ Date _____

Read these passages from the text and answer the questions that follow.

The First Line of Defense

The body's first line of defense consists of different types of barriers that keep most pathogens out of the body. **Pathogens** are disease-causing agents, such as bacteria and viruses. These and other types of pathogens are described in the figure below. Regardless of the type of pathogen, however, the first line of defense is always the same.

Type of pathogen	Description	Human diseases caused by pathogens of that type
Bacteria <i>Escherichia coli</i> 	Single-celled organisms without a nucleus	Strep throat, staph infections, tuberculosis, food poisoning, tetanus, pneumonia, syphilis
Viruses <i>Herpes simplex</i> 	Non living particles that reproduce by taking over living cells	Common cold, flu, genital herpes, col sores, measles, AIDS, genital warts, chicken pox, small pox
Fungi <i>Death cap mushroom</i> 	Simple organisms, including mushrooms and yeasts, that grow as single cells or thread like filaments.	Ringworm, athlete's foot, tineas, candidiasis, histoplasmosis, mushroom poisoning
Protozoa <i>Giardia lamblia</i> 	Single-celled organism with a nucleus.	Malaria, "traveller's diarrhea" giardiasis, typano somiasis ("sleeping sickness")

Types of pathogens that commonly cause human diseases include bacteria, viruses, fungi, and protozoa. Which type of pathogen causes the common cold? Which type causes athlete's foot? (From top to bottom, images courtesy of Rocky Mountain Laboratories/NIAID/NIH and under the public domain, courtesy of CDC/Dr. Erskine Palmer and under the public domain, courtesy of Archenzo and under GNU-FDL 1.2, and courtesy of CDC/Janice Carr and under the public domain. Composite created by CK-12 Foundation.)

Mechanical Barriers

Mechanical barriers physically block pathogens from entering the body. The skin is the most important mechanical barrier. In fact, it is the single most important defense the body has. The outer layer of the skin is tough and very difficult for pathogens to penetrate. **Mucous membranes** provide a mechanical barrier at body openings. They also line the respiratory, GI, urinary, and reproductive tracts. Mucous membranes secrete **mucus**, a slimy substance that traps pathogens. The membranes also have hair-like cilia. The cilia sweep mucus and pathogens toward body openings where they can be removed from the body. When you sneeze or cough, pathogens are removed from the nose and throat. Tears wash pathogens from the eyes, and urine flushes pathogens out of the urinary tract.

Chemical Barriers

Chemical barriers destroy pathogens on the outer body surface, at body openings, and on inner body linings. Sweat, mucus, tears, and saliva all contain enzymes that kill pathogens. Urine is too acidic for many pathogens, and semen contains zinc, which most pathogens cannot tolerate. In addition, stomach acid kills pathogens that enter the GI tract in food or water.

Biological Barriers

Biological barriers are living organisms that help protect the body. Millions of harmless bacteria live on the human skin. Many more live in the GI tract. The harmless bacteria use up food and space so harmful bacteria cannot grow.

Questions

1. What is a pathogen? Which type of pathogen causes the common cold? Which type causes athlete's foot?
2. What is meant by *The First Line of Defense*?
3. What is a mechanical barrier? Give an example.
4. What is a chemical barrier? Give an example.
5. What is a biological barrier? Give an example.

Lesson 24.1: Multiple Choice

Name _____ Class _____ Date _____

Circle the letter of the correct choice.

- Which statement best describes the immune system?
 - The immune system produces gametes.
 - The immune system exchanges gases between the blood and lungs.
 - The immune system protects the body from pathogens.
 - The immune system digests food into usable nutrients.
- The immune system is comprised of _____ lines of defense.
 - two
 - three
 - four
 - five
- Which statement best describes the first line of defense?
 - The first line of defense consists of different types of barriers that keep most pathogens out of the body.
 - The first line of defense includes the inflammatory response.
 - Leukocytes are the cells responsible for the first line of defense.
 - The first line of defense includes the skin, mucous membranes and biological barriers such as white blood cells.
- Which statements are true about mechanical barriers? (1) Mechanical barriers physically block pathogens from entering the body. (2) The skin is the most important mechanical barrier. (3) Mechanical barriers are living organisms that help protect the body. (4) Mechanical barriers destroy pathogens on the outer body surface.
 - 1 and 2
 - 3 and 4
 - 1, 2, and 3
 - 1, 2, 3, and 4
- Which statement describes the second line of defense?
 - The second line of defense includes biological and chemical barriers.
 - The skin is the major organ of the second line of defense.
 - The second line of defense keeps most pathogens out of the body.
 - The second line of defense is encountered by pathogens that enter the body.
- What is the inflammatory response?
 - The inflammatory response begins when cytokines or histamines infect a tissue.
 - The inflammatory response is the first reaction of the body to tissue damage or infection.
 - The inflammatory response is a chemical barrier that destroys pathogens on the body surface.
 - none of the above
- Leukocytes
 - are red blood cells that bring extra oxygen to the site of infection.
 - are biological barriers that help protect the body.
 - are white blood cells that fight infections and get rid of debris.
 - are released by mucous membranes at body openings.

8. Phagocytosis

- (a) is the process in which leukocytes engulf and break down pathogens and debris.
- (b) are chemical barriers destroy pathogens.
- (c) are part of the first line of defense.
- (d) all of the above

Lesson 24.1: Vocabulary I

Name _____ Class _____ Date _____

Match the vocabulary word with the proper definition.

Definitions

- _____ 1. provide a mechanical barrier at body openings
- _____ 2. disease-causing agents
- _____ 3. a type of white blood cell
- _____ 4. living organisms that help protect the body
- _____ 5. the most important mechanical barrier
- _____ 6. a slimy substance that traps pathogens
- _____ 7. the process in which leukocytes engulf pathogens
- _____ 8. destroy pathogens on the outer body surface, at body openings, and on inner body linings
- _____ 9. the first reaction of the body to tissue damage or infection
- _____ 10. physically block pathogens from entering the body
- _____ 11. protects the body from worms, germs, and other agents of harm
- _____ 12. sweep mucus and pathogens toward body openings

Terms

- a. biological barriers
- b. chemical barriers
- c. cilia
- d. immune system
- e. inflammatory response
- f. leukocyte
- g. mechanical barriers
- h. mucous membrane
- i. mucus
- j. pathogens
- k. phagocytosis
- l. skin

Lesson 24.1: Vocabulary II

Name _____ Class _____ Date _____

Fill in the blank with the appropriate term.

1. _____ are disease-causing agents, such as bacteria and viruses.
2. _____ is the process in which cells engulf and break down pathogens and debris.
3. The skin _____ is the single most important defense the body has.
4. The _____ response is the first reaction of the body to tissue damage or infection.
5. _____ membranes secrete mucus, a slimy substance that traps pathogens.
6. _____ barriers destroy pathogens on the outer body surface.
7. Leukocytes are _____ blood cells that fight infections and get rid of debris.
8. A _____ defense is tailored to a particular pathogen.
9. A _____ defense is the same no matter what type of pathogen is involved.
10. Millions of harmless _____ live on the human skin.
11. Mucous membranes provide a _____ barrier at body openings.
12. Sweat, mucus, tears, and saliva all contain _____ that kill pathogens.
13. The _____ line of defense attacks pathogens that manage to enter the body.
14. Barriers that keep out pathogens are the body's _____ line of defense.

Lesson 24.1: Critical Writing

Name _____ Class _____ Date _____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Describe the barriers that keep most pathogens out of the human body.

24.2 The Immune Response

Lesson 24.2: True or False

Name _____ Class _____ Date _____

Write true if the statement is true or false if the statement is false.

- _____ 1. The third line of defense is referred to as the immune response.
- _____ 2. The lymphatic system produces leukocytes called lymphocytes.
- _____ 3. Lymphocytes can destroy certain cancer cells.
- _____ 4. Lymph is a fluid that leaks out of cells into spaces between capillaries.
- _____ 5. The human body has as many as two billion lymphocytes.
- _____ 6. Antigens trigger the immune system to react against the cells that carry them.
- _____ 7. T cells mature in bone marrow, and B cells mature in the thymus.
- _____ 8. B cells must be activated by an antigen before they can fight pathogens.
- _____ 9. Antibodies are large, Y-shaped proteins that recognize and bind to antigens.
- _____ 10. The cell-mediated immune response leads to the destruction of cells that are infected with viruses.
- _____ 11. Helper T cells destroy virus-infected cells and some cancer cells.
- _____ 12. Cytotoxic T cells suppress other T cells that mistakenly react against self antigens.
- _____ 13. Memory B and T cells help protect the body from re-infection by pathogens.
- _____ 14. Since antibodies are such important proteins, they can recognize many types of antigens.
- _____ 15. Immunization is a form of passive immunity.

Lesson 24.2: Multiple Choice

Name _____ Class _____ Date _____

Circle the letter of the correct choice.

- The immune response
 - is specific to a particular pathogen.
 - is the third line of defense.
 - allows the immune system to “remember” the pathogen after the infection is over.
 - all of the above
- The immune response mainly involves the
 - lymphatic system.
 - spleen and tonsils.
 - blood cells.
 - antibodies and lymphocytes.
- Organs of the lymphatic system include
 - the spleen, which filters and destroys lymphocytes.
 - the thymus, which stores and matures antibodies.
 - bone marrow, which produces lymphocytes.
 - all of the above.
- Which statement concerning lymphocytes is correct?
 - B cells mature in bone marrow, and T cells mature in the thymus, and both B and T cells recognize and respond to particular pathogens.
 - B cells mature in bone marrow, and T cells mature in the thymus, and both B and T cells recognize and respond to particular lymphocytes.
 - B cells mature in bone, and T cells mature in the thymus, and both B and T cells recognize and respond to particular pathogens.
 - B cells mature in bone, and T cells mature in the thymus, and both B and T cells recognize and respond to particular lymphocytes.
- The humoral immune response
 - involves mainly T cells and takes place in blood and lymph.
 - involves mainly B cells and takes place in blood and lymph.
 - involves mainly antibodies and takes place in blood and lymph.
 - involves mainly antigens and takes place in blood and lymph.
- Antibodies are
 - large, Y-shaped proteins that recognize and bind to antigens.
 - large, X-shaped proteins that recognize and bind to antigens.
 - large, Y-shaped proteins that recognize and bind to lymphocytes.
 - large, X-shaped proteins that recognize and bind to lymphocytes.
- The cell-mediated immune response
 - involves mainly B cells and leads to the destruction of cells that are infected with lymphocytes.
 - involves mainly T cells and leads to the destruction of cells that are infected with lymphocytes.
 - involves mainly B cells and leads to the destruction of cells that are infected with viruses.
 - involves mainly T cells and leads to the destruction of cells that are infected with viruses.
- Active immunity

- (a) can last a lifetime.
- (b) can result from an immunization.
- (c) results when an immune response to a pathogen produces memory cells.
- (d) all of the above

Lesson 24.2: Vocabulary I

Name _____ Class _____ Date _____

Match the vocabulary word with the proper definition.

Definitions

- _____ 1. involves mainly T cells and leads to the destruction of cells that are infected with viruses
- _____ 2. involves mainly B cells and takes place in blood and lymph
- _____ 3. being able to resist a pathogen that infected the body in the past
- _____ 4. the deliberate exposure of a person to a pathogen in order to provoke an immune response
- _____ 5. part of the immune system that produces lymphocytes
- _____ 6. results when antibodies are transferred to a person who has never been exposed to the pathogen
- _____ 7. the third line of defense
- _____ 8. lymphocyte that matures in bone marrow
- _____ 9. lymphocyte that matures in the thymus
- _____ 10. results when an immune response to a pathogen produces memory cells
- _____ 11. long-living plasma cells
- _____ 12. the fluid that leaks out of capillaries into spaces between cells
- _____ 13. the key cells involved in the immune response
- _____ 14. Y-shaped proteins that recognize and bind to antigens

Terms

- a. active immunity
- b. antibody
- c. B cell
- d. cell-mediated immune response
- e. humoral immune response
- f. immune response
- g. immunity
- h. immunization
- i. lymph
- j. lymphatic system
- k. lymphocyte
- l. memory cell
- m. passive immunity
- n. T cell

Lesson 24.2: Vocabulary II

Name _____ Class _____ Date _____

Fill in the blank with the appropriate term.

1. The _____ line of defense is referred to as the immune response.
2. _____ are large, Y-shaped proteins that recognize and bind to antigens.
3. The lymphatic system produces leukocytes called _____.
4. _____ cells and _____ cells are the two major types of lymphocytes.
5. Lymphocytes recognize and help destroy _____ in body fluids and cells.
6. Memory B and T cells help protect the body from re-infection by pathogens that have infected the body in the past, a protection called _____.
7. The human body has as many as _____ trillion lymphocytes.
8. The _____ immune response involves mainly T cells.
9. The cell-mediated immune response leads to the destruction of cells that are infected with _____ - _____.
10. B and T cells recognize and respond to _____ on pathogens.
11. Active immunity can result from _____.
12. _____ cells are activated B cells that secrete antibodies.
13. _____ cells help launch a rapid response against the pathogen if it invades the body again in the future.
14. Organs of the lymphatic system are the bone marrow, thymus, spleen, and _____.

Lesson 24.2: Critical Writing

Name _____ Class _____ Date _____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Define immunity, and distinguish between active and passive immunity.

24.3 Immune System Diseases

Lesson 24.3: True or False

Name _____ Class _____ Date _____

Write true if the statement is true or false if the statement is false.

- _____ 1. AIDS is not a single disease but a set of diseases.
- _____ 2. AIDS occurs with elevated levels of helper T cells.
- _____ 3. The HIV frequently mutates and changes its surface antigens.
- _____ 4. Autoimmune diseases occur when the immune system attacks itself.
- _____ 5. An allergen is a disease in which the immune system makes an inflammatory response to a harmless antigen.
- _____ 6. Any allergen that causes an allergy is an antigen.
- _____ 7. Ragweed pollen and poison ivy are two common causes of allergies.
- _____ 8. Allergies can be very dangerous, even life-threatening.
- _____ 9. Histamines can reduce or eliminate the effects of the antihistamines that cause allergy symptoms.
- _____ 10. Multiple sclerosis attacks the insulin-producing cells of the pancreas.
- _____ 11. Systemic lupus erythematosus can attack the joints, heart, and other organs.
- _____ 12. Immunodeficiency can occur naturally in older individuals.
- _____ 13. Immunodeficiency can occur in people who have undergone organ transplants.
- _____ 14. AIDS is a virus that attacks the immune system.
- _____ 15. Because HIV screening is not accurate, donated blood can still be infected with the virus.

Lesson 24.3: Critical Reading

Name _____ Class _____ Date _____

Read these passages from the text and answer the questions that follow.

Autoimmune Diseases

Autoimmune diseases occur when the immune system fails to recognize the body's own molecules as "self," or belonging to the person. Instead, it attacks body cells as though they were dangerous pathogens. Some relatively common autoimmune diseases are listed in **Table 24.1**. These diseases cannot be cured, although they can be treated to relieve symptoms and prevent some of the long-term damage they cause.

Table 24.1: **Autoimmune Diseases**

Name of Disease	Tissues Attacked by Immune System	Results of Immune System Attack
Rheumatoid arthritis	tissues inside joints	joint damage and pain
Type 1 diabetes	insulin-producing cells of the pancreas	inability to produce insulin, high blood sugar
Multiple sclerosis	myelin sheaths of central nervous system neurons	muscle weakness, pain, fatigue
Systemic lupus erythematosus	joints, heart, other organs	joint and organ damage and pain

Why does the immune system attack body cells? In some cases, it's because of exposure to pathogens that have antigens similar to the body's own molecules. When this happens, the immune system not only attacks the pathogens. It also attacks body cells with the similar molecules.

Immunodeficiency

Immunodeficiency occurs when the immune system is not working properly. As a result, it cannot fight off pathogens that a normal immune system would be able to resist. Rarely, the problem is caused by a defective gene. More often, it is acquired during a person's lifetime. Immunodeficiency may occur for a variety of reasons:

- The immune system naturally becomes less effective as people get older. This is why older people are generally more susceptible to disease.
- The immune system may be damaged by other disorders, such as obesity or drug abuse.
- Certain medications can suppress the immune system. This is an intended effect of drugs given to people with transplanted organs. In many cases, however, it is an unwanted side effect of drugs used to treat other diseases.
- Some pathogens attack and destroy cells of the immune system. An example is the virus known as HIV. It is the most common cause of immunodeficiency in the world today.

Questions

1. What is an autoimmune disease?

2. Describe rheumatoid arthritis.

Lesson 24.3: Multiple Choice

Name _____ Class _____ Date _____

Circle the letter of the correct choice.

1. What is an allergy?
 - (a) An allergy is a disease in which the immune system makes an inflammatory response to a harmless antibody.
 - (b) An allergy is a disease in which the immune system makes an inflammatory response to a harmless antigen.
 - (c) An allergy is a disease in which the lymphatic system makes an inflammatory response to a harmless antigen.
 - (d) An allergy is a disease in which the immune system destroys harmless pathogens.
2. Two common causes of allergies are
 - (a) ragweed and poison ivy.
 - (b) ragweed and poison roses.
 - (c) poison ragweed and ivy.
 - (d) all of the above.
3. An autoimmune disease
 - (a) occurs when the immune system initiates an immune response against foreign pathogens.
 - (b) occurs when the immune system attacks the body's own pathogens.
 - (c) occurs when the immune system fails to recognize the body's own molecules as belonging to the person.
 - (d) occurs when the immune system fails to recognize foreign molecules as belonging to the person.
4. Type 1 diabetes
 - (a) attacks the insulin-producing cells of the pancreas.
 - (b) is an autoimmune disease.
 - (c) results in high blood sugar levels.
 - (d) all of the above
5. Causes of immunodeficiency include
 - (a) damage of the immune system by other disorders.
 - (b) suppression of the immune system by certain medications.
 - (c) destruction of cells of the immune system by pathogens.
 - (d) all of the above.
6. Which statement is true of the relationship between HIV and AIDS?
 - (a) HIV causes AIDS.
 - (b) AIDS causes HIV.
 - (c) HIV and AIDS are the same disease.
 - (d) HIV and AIDS are not related.
7. HIV transmission
 - (a) can occur through saliva.
 - (b) occurs through the direct contact of mucous membranes or some body fluids.
 - (c) can occur through kissing.
 - (d) all of the above
8. AIDS occurs

- (a) when helper T cells fall to a very low level.
- (b) about 3-5 years after an HIV infection.
- (c) when HIV levels match the level of helper T cells.
- (d) after years of damage to the immune system by helper T cells.

Lesson 24.3: Vocabulary I

Name _____ Class _____ Date _____

Match the vocabulary word with the proper definition.

Definitions

- _____ 1. occur when the immune system fails to recognize the body's own molecules as "self"
- _____ 2. can treat mild allergy symptoms
- _____ 3. occurs when the immune system is not working properly
- _____ 4. autoimmune disease that attacks central nervous system
- _____ 5. destroyed by HIV infections
- _____ 6. the virus that attacks cells of the immune system and causes AIDS
- _____ 7. any antigen that causes an allergy
- _____ 8. the most severe allergic reaction
- _____ 9. autoimmune disease that attacks tissues at joints
- _____ 10. a disease in which the immune system makes an inflammatory response to a harmless antigen
- _____ 11. a set of diseases that results from years of damage to the immune system by HIV

Terms

- a. anaphylaxis
- b. antihistamines
- c. AIDS
- d. allergen
- e. allergy
- f. autoimmune disease
- g. helper T cells
- h. HIV
- i. immunodeficiency
- j. multiple sclerosis
- k. rheumatoid arthritis

Lesson 24.3: Vocabulary II

Name _____ Class _____ Date _____

Fill in the blank with the appropriate term.

1. An _____ is a disease in which the immune system makes an inflammatory response to a harmless antigen.
2. Any _____ that causes an allergy is called an allergen.
3. In autoimmune diseases, the _____ system attacks body cells as though they were dangerous pathogens.
4. _____ occurs when the immune system is not working properly.
5. AIDS results from years of damage to the _____ system by HIV.
6. Many people infected with _____ eventually develop acquired immune deficiency syndrome (AIDS).
7. HIV is a _____ that attacks cells of the immune system.
8. HIV is transmitted through direct contact of _____ membranes or certain body fluids.
9. HIV is no longer transmitted through _____ transfusions.
10. HIV infects and destroys helper _____ cells.

Lesson 24.3: Critical Writing

Name _____ Class _____ Date _____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Explain how HIV is transmitted and how it causes AIDS.

24.4 Environmental Problems and Human Health

Lesson 24.4: True or False

Name _____ Class _____ Date _____

Write true if the statement is true or false if the statement is false.

- _____ 1. Most carcinogens cause cancer by producing mutations in DNA.
- _____ 2. Most cancers are caused by viruses.
- _____ 3. UV radiation is the leading cause of lung cancer.
- _____ 4. Tumor-suppressor genes normally help control cell division.
- _____ 5. More cancer deaths in adults are due to lung cancer than any other type of cancer.
- _____ 6. Almost 5 million people die each year because of air pollution.
- _____ 7. Oncogenes promote the division of cells with damaged DNA.
- _____ 8. A low AQI value is the most hazardous.
- _____ 9. Smog contains tiny particles of solids or liquids that are suspended in the air.
- _____ 10. Bioterrorism is usually an accident.
- _____ 11. Exposure to tobacco smoke is the leading cause of lung cancer.
- _____ 12. Not smoking, or stopping smoking, can reduce your own risk of getting cancer.

Lesson 24.4: Critical Reading

Name _____ Class _____ Date _____

Read these passages from the text and answer the questions that follow.

Carcinogens and Cancer

A **carcinogen** is anything that can cause cancer. Cancer is a disease in which cells divide out of control. Most carcinogens cause cancer by producing mutations in DNA.

Types of Carcinogens

There are several different types of carcinogens. They include pathogens, radiation, and chemicals. Some carcinogens occur naturally. Others are produced by human actions.

- Viruses cause about 15 percent of all human cancers. For example, the virus called hepatitis B causes liver cancer.
- UV radiation is the leading cause of skin cancer. The radioactive gas known as radon causes lung cancer.
- Tobacco smoke contains dozens of carcinogens, including nicotine and formaldehyde. Exposure to tobacco smoke is the leading cause of lung cancer.
- Some chemicals that were previously added to foods, such as certain dyes, are now known to cause cancer. Cooking foods at very high temperatures also causes carcinogens to form.

How Cancer Occurs

Mutations that lead to cancer usually occur in genes that control the cell cycle. These include tumor-suppressor genes and proto-oncogenes.

- Tumor-suppressor genes normally prevent cells with damaged DNA from dividing. Mutations in these genes prevent them from functioning normally. As a result, cells with damaged DNA are allowed to divide.
- Proto-oncogenes normally help control cell division. Mutations in these genes turn them into oncogenes. Oncogenes promote the division of cells with damaged DNA.

Cells that divide uncontrollably may form a tumor, or abnormal mass of cells. Tumors may be benign or malignant. Benign tumors remain localized and generally do not harm health. Malignant tumors are cancerous. There are no limits to their growth, so they can invade and damage neighboring tissues. Cells from malignant tumors may also break away from the tumor and enter the bloodstream. They are carried to other parts of the body, where new tumors may form.

Questions

1. What is a carcinogen? What is cancer?

2. Describe two carcinogens.

Lesson 24.4: Multiple Choice

Name _____ Class _____ Date _____

Circle the letter of the correct choice.

- Which statement is true concerning cancer?
 - Most carcinogens cause cancer by producing mutations in DNA.
 - Cancer is a disease in which cells divide out of control.
 - A carcinogen is anything that can cause cancer.
 - all of the above
- Carcinogens include
 - viruses, which cause about 50 percent of all human cancers.
 - UV radiation, which is the leading cause of lung cancer.
 - exposure to tobacco smoke, which is the leading cause of skin cancer.
 - none of the above.
- The most common deadly cancer in the United States is
 - skin cancer.
 - lung cancer.
 - breast cancer.
 - prostate cancer.
- Tumor-suppressor genes
 - help cells with damaged DNA to divide.
 - normally help control cell division.
 - prevent cells with damaged DNA from dividing.
 - normally help stop cell division.
- Warning signs of cancer include
 - a lump in the breast or elsewhere.
 - an obvious changes in a wart or mole.
 - an unusual bleeding or discharge.
 - all of the above.
- The Air Quality Index
 - measures levels of ground-level ozone and particulates.
 - is one of the main components of smog.
 - is harmful to people with certain health problems, such as asthma.
 - affects almost 5 million people each year.
- Bioterrorism
 - contains dozens of carcinogens, and is the leading cause of lung cancer.
 - is the intentional release of disease causing viruses, bacteria, or other toxins.
 - includes pollutants in the outdoor air.
 - includes anything that causes cancer.
- Air pollution
 - can make asthma and other diseases more severe.
 - can cause skin cancer.
 - is the leading cause of lung cancer.
 - all of the above

Lesson 24.4: Vocabulary I

Name _____ Class _____ Date _____

Match the vocabulary word with the proper definition.

Definitions

- _____ 1. kills almost 5 million people die each year
- _____ 2. when inhaled, replaces oxygen in the blood and quickly leads to death
- _____ 3. anything that can cause cancer
- _____ 4. normally help control cell division
- _____ 5. contains dozens of carcinogens
- _____ 6. an assessment of the pollutants in the outdoor air based on their human health effects
- _____ 7. the leading cause of skin cancer
- _____ 8. the intentional release or spread of agents of disease
- _____ 9. normally prevent cells with damaged DNA from dividing
- _____ 10. one of the main components of smog
- _____ 11. cause about 15 percent of all human cancers
- _____ 12. a disease in which cells divide out of control

Terms

- a. Air Quality Index (AQI)
- b. air pollution
- c. bioterrorism
- d. cancer
- e. carbon monoxide
- f. carcinogen
- g. ozone
- h. proto-oncogenes
- i. tobacco smoke
- j. tumor-suppressor genes
- k. UV radiation
- l. viruses

Lesson 24.4: Vocabulary II

Name _____ Class _____ Date _____

Fill in the blank with the appropriate term.

1. A carcinogen is anything that can cause _____.
2. There are no limits to the _____ of malignant tumors, so they can invade and damage neighboring tissues.
3. Most carcinogens cause cancer by producing _____ in DNA.
4. Exposure to _____ smoke causes lung cancer.
5. UV radiation is the leading cause of _____ cancer.
6. Air pollution harms the _____ and circulatory systems.
7. Tumor-suppressor _____ normally prevent cells with damaged DNA from dividing.
8. Proto-oncogenes normally help control cell _____.
9. _____ is the intentional release or spread of agents of disease.
10. Indoor air may contain harmful substances such as mold, _____, and radon.
11. _____ cause about 15 percent of all human cancers.
12. Cells that divide uncontrollably may form a _____.

Lesson 24.4: Critical Writing

Name _____ Class _____ Date _____

Thoroughly answer the question below. Use appropriate academic vocabulary and clear and complete sentences.

Identify two causes of air pollution and its effects on human health.