“In my work what I try to say is that as human beings we are more alike than we are unalike.”

—Maya Angelou, American novelist and poet

TEST YOUR GROWTH IQ

True or False?

1. Heart disease can begin to develop during childhood.
   TRUE: Although the symptoms of heart disease do not usually appear until middle age or older, one in six teenagers has well-developed plaque deposits in their arteries.

2. Shaking a baby is a good way to stop him or her from crying.
   FALSE: A baby’s neck and brain are fragile and damage easily. Because neck muscles are weak, shaking a baby can result in blindness, brain damage, or even death.

3. People with learning disabilities cannot be successful.
   FALSE: There have been many successful people who have had learning disabilities. For instance, Thomas Edison had dyslexia. He and many others had significant accomplishments despite their disabilities.

Talented Teens

Discuss Many children now have opportunities to learn new skills at an earlier age than ever before. But some argue that pushing a child to excel can be harmful. Research two or three talented teens (for example, Olympic athletes, musicians, or actors). Were their opportunities positive or negative, or a combination of both? Discuss your findings with your class as part of an oral report.

LESSON 19
Keeping Your Body Healthy

LESSON 20
Learning About the Reproductive Systems

LESSON 21
Learning About Pregnancy and Childbirth
Visit www.glencoe.com to find regularly updated statistics on U.S. life expectancy. Using the information provided, determine the answer to this question: How has U.S. life expectancy changed in the last 50 years?

Visit www.glencoe.com to use Your Health Checklist, an interactive tool that helps you determine your health status.

WHAT'S YOUR VERDICT?
To evaluate this advertisement, use the criteria for analyzing and evaluating health messages delivered through media and technology that you learned in Unit 1.
Keeping Your Body Healthy

• I will keep my body systems healthy.

Your body is made of cells, tissues, and organs that form body systems. A *cell* is the smallest living part of the body. An *organ* is a body part consisting of several kinds of tissue that do particular jobs. A *body system* is a group of organs that work together to perform a main body function. This lesson will help you review information about body systems and what you can do to keep these body systems healthy.

**What You’ll Learn**

1. Identify behaviors to keep your cardiovascular, nervous, and immune systems healthy. *(pp. 210, 213, 214)*
2. List behaviors important to the health of your respiratory, skeletal, and muscular systems. *(pp. 215, 216, 217)*
3. Identify behaviors important to the health of your endocrine and digestive systems. *(pp. 219, 221)*
4. List behaviors important to the health of your integumentary and urinary systems. *(pp. 223, 224)*

**Why It’s Important**

Think about a car. Many parts need to work together to keep it running well. Your body also has many parts that make up your body systems, which need to work together to keep you well.

**Key Terms**

- cardiovascular system
- nervous system
- immune system
- respiratory system
- skeletal system
- muscular system
- endocrine system
- digestive system
- integumentary system
- urinary system

**Writing About Stretching** Suppose one of your friends says she is not going to warm up and stretch before the big track meet. She says that warming up wastes valuable energy that she could use for running. After you read the information on the muscular system on page 217, write a response to this situation in your health journal.
The body system that transports nutrients, gases, hormones, and cellular waste products throughout the body is the **cardiovascular system**. The cardiovascular system consists of the blood, blood vessels, and the heart.

**What to Know About the Cardiovascular System**

**Blood** Your blood carries nutrients, oxygen, carbon dioxide, and cellular waste products to and from your body cells. The average-sized adult body has about ten pints of blood. Blood is composed of plasma and blood cells. **Plasma** is the liquid component of blood that carries blood cells and dissolved materials. It is about 95 percent water. Plasma contains two major types of blood cells—red blood cells and white blood cells. Plasma also consists of particles called platelets. A **platelet** is a particle that helps the blood clot. Blood clots stop the bleeding when blood vessels are injured.

A **red blood cell** transports oxygen to body cells and removes carbon dioxide from body cells. Red blood cells contain hemoglobin. **Hemoglobin** is an iron-rich protein that helps transport oxygen and carbon dioxide in the blood. New red blood cells are constantly produced in bone marrow, which is the spongy material inside some bones.

A **white blood cell** is a blood cell that attacks, surrounds, and destroys pathogens that enter the body and prevents them from causing infection.

A **pathogen** is a germ that causes disease. The number of white blood cells in your blood increases when you have an infection.

**Blood vessels** There are three major types of blood vessels—arteries, veins, and capillaries. An **artery** is a blood vessel that carries blood away from the heart. Arteries have thick muscular walls that move blood between heartbeats. A **coronary artery** supplies nutrients and oxygen to the heart muscle. A **pulmonary artery** carries blood from the heart to the lungs, where it absorbs oxygen and releases carbon dioxide.

The cardiovascular system consists of blood, arteries, veins, and the heart.
A vein is a blood vessel that returns blood to the heart. Veins have thinner walls than arteries. A capillary is a tiny blood vessel that connects arteries and veins. Capillaries have thin walls that allow the transfer of nutrients, oxygen, carbon dioxide, and cellular waste between the blood and the body cells.

Heart A four-chambered muscle that continually pumps blood throughout the body is called the heart. The two upper chambers are atria. The two lower chambers are ventricles. The heart is divided into the right atrium and ventricle and the left atrium and ventricle. Blood that is poor in oxygen, returning from the body, flows constantly into the right atrium and ventricle. From the right ventricle, blood is pumped through the pulmonary artery to the lungs. Carbon dioxide is released and oxygen is absorbed as the blood circulates in capillaries around the air sacs in the lungs. This oxygen-rich blood flows into the left atrium and ventricle. Contractions of the left ventricle pump the blood through the aorta to the body. The aorta is the main artery in the body. The aorta branches into smaller arteries through which blood flows to all parts of the body.

How to Keep Your Cardiovascular System Healthy

The following are some of the ways you can keep your cardiovascular system healthy:

- Reduce the amount of fat in your diet.
- Reduce the amount of salt in your diet.
- Exercise regularly to strengthen your heart muscles.
- Avoid using tobacco products because they increase blood pressure.
- Maintain a healthful weight.
- Practice stress-management skills.

Heart rate is the number of times the heart contracts each minute. Pulse is the surge of blood that results from the contractions of the heart. Blood pressure is the force of blood against the artery walls.
The most common type of heart disease is coronary heart disease, also referred to as coronary artery disease (CAD). There are two coronary arteries that branch from either side of the ascending aorta at the top of the heart. The coronary arteries are the vessels that supply the heart muscle with oxygenated blood.

With age, these arteries, which are normally elastic, harden and lose their elasticity. This condition is known as arteriosclerosis (ar TEER ee o skluh ROH suhs). A form of arteriosclerosis, called atherosclerosis (a thuh roh skluh ROH suhs), involves the buildup of deposits within the coronary arteries.

As these deposits accumulate on the interior walls of these vessels, the diameter of the arteries decreases, restricting and blocking the flow of blood to the heart muscle. The effects of atherosclerosis on the coronary arteries results in CAD.

Cholesterol Excess cholesterol, which comes from foods we ingest, also is deposited in arteries. Although some cholesterol is needed by the body to make cell membranes and some hormones, it is needed only in small amounts.

As the flow of blood to the heart is restricted, the heart’s ability to pump effectively is reduced. This can lead to a condition called angina (an JI nuh), in which a person may feel pain in the chest, left shoulder, and left arm. Angina also can result in a heart attack, in which some of the heart muscle tissue actually dies from a lack of proper blood supply.

Symptoms of CAD These can range from not having any symptoms or discomfort at all to shortness of breath and fatigue, or to mild or severe chest pain.

Risk factors Can the development of CAD be avoided? The risk factors for CAD include: age, family history of heart disease, high blood cholesterol, smoking, high blood pressure, diabetes, overweight/obesity, and physical inactivity. Some of these factors, such as age and family history, are not in your control. Many of the others can be controlled through diet, regular exercise, and controlling diabetes or other relevant medical conditions.

CAD is the leading cause of death for both men and women in America today. More than 13 million Americans suffer from CAD. Practicing positive health behaviors, such as following a well-balanced diet and exercising regularly, can help reduce your risk of developing CAD later in life.

Visit www.glencoe.com to research more information about coronary artery disease.

- How can risk factors, such as blood cholesterol levels, blood pressure, and weight, be controlled?

- What effect does stress have on the development of CAD?

- What role, if any, does gender play in the risk of developing CAD?

Create a presentation that outlines health behaviors that everyone in your family can follow to reduce the risk of CAD. In your presentation, be sure to address risk factors such as smoking, physical inactivity, and high blood pressure.
The body system that carries messages to and from the brain and spinal cord and all other parts of the body is the **nervous system**. The nervous system is composed of two divisions—the central nervous system and the peripheral nervous system.

### What to Know About the Nervous System

The **central nervous system** consists of the brain and spinal cord. The **peripheral nervous system** is made up of nerves that branch out from the central nervous system to muscles, skin, internal organs, and glands. Your sense organs continually send messages, such as odors, sights, or tastes, to your brain through the peripheral nervous system. Your central nervous system, in turn, relays responses to these messages to your muscles and glands as your body responds to changes in your environment.

**Brain**

The mass of nerve tissue that acts as the control center of the body is called the **brain**. The human brain weighs about three pounds and can store more information than all the libraries in the world put together. Your brain creates ideas and controls thinking, reasoning, movement, and emotions. The brain has three major parts—the cerebrum, the cerebellum, and the brain stem.

The **cerebrum** is the largest part of the brain and controls the ability to memorize, think, and learn. The cerebrum also determines a person’s intelligence and personality. It consists of two halves, called hemispheres. The right hemisphere controls the left side of the body, and the left hemisphere controls the right side of the body. The **cerebellum** is the part of the brain that controls and coordinates muscle activity. It also helps you maintain your balance.

**Concussion**

A brain injury that sometimes results in a loss of consciousness is a concussion. An impact creates a sudden movement of the brain within the skull.
Your ability to catch a ball is a function of your cerebellum. The brain stem is the part of the brain that controls the functions of the internal organs.

**Spinal cord** The column of nerve cells that extends downward from the brain is the spinal cord. Your spinal cord carries messages to and from your brain and all parts of your body. It keeps your brain informed of changes in your body and in your environment. Your spinal cord is protected by your vertebrae.

**Nerve cells** The nervous system is composed of cells called neurons. A neuron is a nerve cell that is the structural and functional unit of the nervous system. Some neurons in the spinal cord may be several feet long. A neuron consists of a cell body, an axon, and dendrites. A cell body is the main body of the neuron. An axon is an elongated fiber that carries impulses away from the cell body to the dendrites of another neuron. Dendrites are branching fibers that receive impulses and carry them to the cell body.

Sensory and motor neurons work together to help you respond to your environment. Sensory neurons carry impulses from the sense organs to the spinal cord and brain. Motor neurons carry responding impulses to muscles and glands from the brain and spinal cord. Motor neurons cause responses in muscles and glands.

**Reflex action** Have you ever touched something hot and quickly pulled away from it? You experienced a reflex action. A reflex action is an involuntary action in which a message is sent to the spinal cord, is interpreted, and is responded to immediately.

Sensory neurons carry the message that you touched a hot surface to your spinal cord and brain. Your brain interprets the message. Motor neurons carry the message back to your muscles. You respond by moving your hand. Reflex actions do not involve conscious thought and take only a fraction of a second. Reflex actions help keep you safe.

How to Keep Your Nervous System Healthy

The following suggestions will protect your nervous system:

- Wear a protective helmet for sports.
- Avoid diving into shallow water or water of unknown depth.
- Use a safety belt.
- Follow directions for taking any medications that affect the nervous system.
- Avoid drinking alcohol and using other drugs that impair the functions of the brain.
- Follow directions for using household products that contain chemicals that may affect the nervous system.
How to Keep Your Immune System Healthy

The following are ways to keep your immune system healthy:

- Choose foods that are high in protein and vitamin B.
- Keep accurate records of all immunizations.
- Get plenty of rest and sleep.
- Exercise to keep bones dense and to protect bone marrow.
- The immune system protects your body from pathogens.

The immune system protects your body from pathogens. A pathogen is a germ that causes disease. When white blood cells attack pathogens, the pathogens are filtered into the lymph. Lymph is a clear liquid that surrounds body cells and circulates in lymph vessels. Lymph carries harmful pathogens and other small particles to lymph nodes. A lymph node is a structure that filters and destroys pathogens. The spleen is an organ on the left side of the abdomen that filters foreign matter from the blood and lymph.

Immunity is the body’s resistance to disease-causing agents. White blood cells are formed in bone marrow and circulate in the blood. These white blood cells are changed to T cells within the thymus gland. A T cell is a white blood cell that destroys pathogens. A B cell is another kind of specialized white blood cell that produces antibodies. An antibody is a special protein that helps fight infection.

What to Know About the Immune System

The immune system is composed of lymph, lymph nodes, lymph vessels, tonsils, the thymus gland, and the spleen.

1. What is a pathogen?
2. What is immunity?
The body system that provides body cells with oxygen and removes carbon
dioxide that cells produce as waste is the **respiratory system**. Air enters through your nose or mouth when you
inhale. Mucus in the nasal passages and sinuses warms and moistens the air and traps dust particles and
pathogens. **Mucus** is a thick secretion that moistens, lubricates, and protects mucous membranes. A **mucous membrane**
is a type of tissue that lines body cavities and secretes mucus.

### What to Know About the Respiratory System

Air moves from your nose or mouth through your pharynx to your trachea. The **epiglottis** is a flap that covers the
entrance to the trachea when you swallow. When you inhale, the epiglottis opens and air flows into the trachea. The **trachea** is a tube through which
air moves to the bronchi and lungs. The trachea is lined with cilia. **Cilia** are hairlike structures that remove dust and other particles from the air.

The **bronchi** are two tubes through which air moves to the lungs. The **lungs** are the main organs of the
respiratory system. As the bronchi enter each lung, they branch to form bronchioles. The **bronchioles** are small tubes that branch to form alveoli. **Alveoli** are microscopic air sacs. The walls of the alveoli are so thin that oxygen and carbon dioxide easily pass through them.

Two exchanges take place in the alveoli. Oxygen passes from the alveoli into your capillaries and carbon
dioxide passes from your capillaries into the alveoli. You exhale carbon
dioxide. Blood rich in oxygen flows from your lungs to your heart.

### How to Keep Your Respiratory System Healthy

The following are ways to keep your respiratory system healthy:

- Do not smoke.
- Avoid breathing secondhand smoke.
- Do not inhale harmful drugs.
- Avoid breathing polluted air.
- Exercise regularly.
- Avoid inhaling harmful chemicals.
- Seek medical help for respiratory infections.
The body system that serves as a support framework, protects vital organs, works with muscles to produce movement, and produces blood cells is the **skeletal system**.

**What to Know About the Skeletal System**

**Bone** is the structural material of the skeletal system. **Periosteum** (per see AHS tee um) is a thin tissue that covers bone and contains nerves and blood vessels. **Bone marrow** is soft tissue in the center of most bones where both red and white blood cells are formed.

**Cartilage** is soft, connective tissue on the ends of some bones. It also acts as a cushion where bones meet, such as in the knee and hip joint. Cartilage disks between vertebrae serve as shock absorbers. A **ligament** is a tough fiber that connects bones together. A **joint** is the point where two bones meet. There are several types of joints in your body.

**How to Keep Your Skeletal System Healthy**

The following are ways to keep your skeletal system healthy:

- Choose foods rich in calcium, phosphorus and vitamin D.
- Exercise to strengthen joints.
- Wear protective equipment and well-cushioned, properly fitting shoes and warm up before exercising.
- Sit, stand and walk with correct posture. Participate in screening for scoliosis.

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1. List three functions of the skeletal system.
2. What connects bones?

---

The skeletal system serves as a support framework for your body.
Muscles are divided into two major groups: voluntary and involuntary. A voluntary muscle is a muscle a person can control. Muscles in your arms and legs that help you move are voluntary muscles. An involuntary muscle is a muscle that functions without a person’s control. Muscles in your stomach and other internal organs are involuntary muscles.

There are three types of muscle tissue in your body. Smooth muscle is involuntary muscle tissue found in many internal organs. Skeletal muscle is voluntary muscle tissue that is attached to bone. Cardiac muscle is specialized muscle tissue found only in the heart. It is unique from other muscle tissue because of its structure. Contractions in cardiac muscles are generated by nerve stimulation.

A tendon is tough tissue fiber that attaches muscles to bones. Skeletal muscles work in pairs to move your body. One muscle in the pair contracts and shortens, while the other relaxes and lengthens.

Did You Know?

Muscles shorten and lengthen because of elasticity in muscle fibers. This allows movement at the joints.

How to Keep Your Muscular System Healthy

The following are ways to keep your muscular system healthy:

- Discontinue exercise if you have a muscle injury.
- Warm up and stretch before exercise.
- Exercise different muscle groups regularly.
- Maintain your desirable weight.
- Bend at the knees and keep your back straight when lifting heavy objects.
- Select foods and beverages containing carbohydrates and proteins for energy and muscle development.
- Sleep on a firm mattress.
The body system that consists of glands that produce hormones is the **endocrine system**. A group of cells that secretes hormones is a **gland**. A chemical messenger released into the bloodstream is a **hormone**. Hormones control many body activities.

**What to Know About the Endocrine System**

**Pituitary gland** The endocrine gland that produces hormones, which control growth and other glands is the **pituitary gland**. The pituitary gland is located below the hypothalamus in the brain and is about the size of a pea.

Hormones from the pituitary gland influence growth, metabolism, development of the reproductive organs, uterine contractions during childbirth, and many other body functions.

The pituitary gland often is called the master gland because it releases hormones that affect the function of other glands.

**Thyroid gland** The endocrine gland that produces thyroxin is the **thyroid gland**. A hormone that controls metabolism and calcium balance in the body is **thyroxin**. The rate at which food is converted into energy in body cells is **metabolism**. The thyroid gland is located near the upper portion of the trachea.

**Parathyroid glands** The endocrine glands that secrete hormones, which control the amount of calcium and phosphorus in the body are the **parathyroid glands**. There are four parathyroid glands that are located on the thyroid gland. Each parathyroid gland is about the size of a grain of rice.
Pancreas  The gland that produces both digestive enzymes and insulin is the pancreas. The digestive enzymes produced by the pancreas are essential to the digestion of food.

Insulin  is a hormone that regulates blood sugar level. If the pancreas fails to produce enough insulin, a person develops diabetes mellitus. Diabetes mellitus is a disease in which the body produces little or no insulin. Diabetes will be discussed further in Lesson 48.

Adrenal glands  The endocrine glands that secrete several hormones, including adrenaline, are the adrenal glands. A hormone that prepares the body to react during times of stress, danger, or in an emergency is adrenaline. When adrenaline is secreted into the bloodstream, both heart rate and blood pressure increase.

The adrenal glands also secrete hormones that affect the body’s metabolism. There are two adrenal glands in the body, located on each kidney.

Ovaries  There are two ovaries in the female body. The ovaries are female reproductive glands that produce ova and estrogen. Ova are egg cells, or female reproductive cells.

Estrogen  is a hormone produced by the ovaries that stimulates the development of female secondary sex characteristics and affects the menstrual cycle.

Testes  There are two testes in the male body. The testes are male reproductive glands that produce sperm and testosterone. Testosterone is a hormone that produces the male secondary sex characteristics.

How to Keep Your Endocrine System Healthy

The following are important ways to keep your endocrine system healthy:

- Have regular medical checkups.
- Perform testicular self-examinations each month.
- Keep track of the length and dates of your menstrual cycles.
The body system that breaks down food into nutrients that can be used by the body is the **digestive system**. The digestive system also allows nutrients to be absorbed by body cells and waste materials to be eliminated from the body. **Digestion** is the process by which food is changed so that it can be absorbed by body cells.

### What to Know About the Digestive System

**Mouth** When food is chewed in the mouth, teeth break it into smaller pieces. The **salivary glands** are glands in the mouth that release saliva, which contains a chemical that begins the digestion of carbohydrates. **Saliva** is a fluid that helps soften food so that it can be swallowed more easily.

Approximately 10,000 microscopic taste buds are on the tongue. Each taste bud contains 50–100 receptor cells. A tiny hair extends from each receptor cell. When the hairs are stimulated by food, they send nerve impulses to the brain that register one of four basic flavor sensations: sweet, salty, sour, or bitter.

**Esophagus** When you swallow food, it moves into the esophagus. The **esophagus** is a tube that connects the mouth and the stomach. Food passes to your stomach by the process of peristalsis. **Peristalsis** (per uh STAHL suhs) is a series of involuntary muscle contractions. Peristalsis can move food to your stomach even if you are standing on your head.
**Stomach** The organ that releases acids and juices that mix with food and produce a thick paste called chyme (KIM) is the stomach. The stomach produces a layer of mucus to protect its lining from the strong acids released in digestion. After about four hours of churning the food, muscle contractions force the food into the small intestine.

**Small intestine** The coiled tube in which the greatest amount of digestion and absorption take place is the small intestine. The small intestine is about 21 feet long and is lined with villi. Villi are small folds in the lining of the small intestine that increase the surface area and allow more food to be absorbed. Several enzymes are produced in the lining of the small intestine. An enzyme is a protein that regulates chemical reactions.

**Liver** The gland that secretes bile to help break down fats, maintain blood sugar level, and filter poisonous wastes is the liver. Bile flows to the small intestine to help in the digestion of fats. Bile is stored in the gallbladder, which is a small sac-like organ located under the liver.

**Pancreas** The gland that produces both digestive enzymes and insulin is the pancreas. Enzymes from the pancreas break down proteins, starches, and fats from food in the small intestine.

**Large intestine** After food passes through the small intestine, it enters the large intestine, also called the colon. The large intestine is a tube extending from the small intestine in which undigested food is prepared for elimination from the body. When the large intestine is full, it contracts, and solid wastes leave the body through the rectum and anus. The rectum is the lower end of the large intestine that stores wastes temporarily. The anus is the opening to the outside of the body at the end of the rectum.

**TABLE 19.1 Keep Your Digestive System Healthy**

<table>
<thead>
<tr>
<th>Healthful Behavior</th>
<th>Description of Healthful Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fiber-rich foods</td>
<td>Choose a variety of foods every day and eat plenty of foods that contain fiber. Whole-grain breads and cereals, as well as fruits and vegetables, are good sources of fiber. Fiber stimulates digestive tract muscles.</td>
</tr>
<tr>
<td>Enjoyment</td>
<td>Chew slowly and enjoy your food. Do not rush to finish a meal. Chew food well and avoid indigestion. Avoid arguments when eating.</td>
</tr>
<tr>
<td>Fluids</td>
<td>Drink at least six to eight glasses of water each day. Water is involved in many body functions, including digestion and maintaining normal body temperature.</td>
</tr>
</tbody>
</table>

1. What is digestion?
2. What are the four basic flavor sensations detected by taste buds?
The body system that covers and protects the body and consists of skin, glands associated with the skin, hair, and nails is the *integumentary* (in TEG yuh MENT uh ree) system. The skin performs several functions that are essential for survival.

### What to Know About the Integumentary System

The largest organ in the body is skin. It contains nerve cells that help you detect pain, pressure, touch, heat, and cold. Skin protects some body parts against injury, serves as a protective layer that keeps microorganisms from entering the body, and helps maintain a healthful body temperature.

Skin helps with the removal of wastes from the body and helps you sense the environment. It also helps protect you from ultraviolet radiation because of the presence of melanin. **Melanin** is a pigment that gives the skin its color.

**Two layers** Skin is made up of two layers. The **epidermis** is the outer layer of skin cells. These cells are constantly shed and replaced. The epidermis does not contain blood vessels or nerve endings. New skin cells are produced in the deepest layer of the epidermis. The **dermis** is a thick layer of cells below the epidermis that contains sweat glands, hair follicles, sebaceous (oil) glands, blood vessels, and nerves.

**Glands** A gland that aids the body in getting rid of wastes, such as salt, is a **sweat gland**. Sweat glands also help cool the body by releasing sweat through pores to evaporate on the surface of your skin.

A **sebaceous gland** is a small oil-producing gland that helps protect the skin. **Sebum** is the oil produced by sebaceous glands. Sebaceous glands are usually found together with hair follicles, though some exist in hairless areas. Below the dermis is the subcutaneous layer. The **subcutaneous layer** is a layer of fatty...
tissue located below the dermis. A large portion of the body’s fat is stored in this layer.

**Birthmarks and Scars** Because skin is the largest organ in the body, it also is the most vulnerable organ. There are several types of conditions that affect the skin. Common skin conditions include birthmarks and scars. A birthmark is an area of discolored skin that is present at birth. Birthmarks include different types of freckles and moles and may be removed by a physician. A scar is a mark left on damaged tissue after the tissue has healed. If a person is cut or has a severe burn, a scar may develop. Some people are more likely than others to develop scars.

**Warts** Warts and acne are other common skin conditions. A *wart* is a contagious growth that forms on the top layer of the skin. Warts are caused by a viral infection. They usually grow in groups and can be spread by contact. Warts can be treated with over-the-counter drugs. However, if warts spread, they should be treated by a physician.

**Acne** A skin disorder in which hair follicles or pores in the skin become plugged with sebum is *acne*. Acne may be prevalent during adolescence because hormonal changes stimulate the sebaceous glands to produce sebum. A *pustule* is a dome-shaped lesion that contains pus consisting of white blood cells, dead skin cells and bacteria. The plug may close the pore, causing it to swell, creating a whitehead. If the pore is open, it is commonly called a blackhead because the surface of the plug has a dark appearance. Blackheads are not caused or colored by dirt.

Acne can last through early adulthood. Acne may be aggravated by application of oil-based makeup, suntan oil, or hair products.

**Ringworm** A skin condition that causes small, red, ring-shaped marks on the skin is *ringworm*. Ringworm is caused by a fungal infection and can be spread by physical contact. Physicians usually treat ringworm with ointments or creams. However, severe cases of ringworm may require treatment with antifungal tablets.

**Nails and hair** Nails and hair also are part of the integumentary system. *Nails* are made up of dead cells and keratin, a tough protein. *Hair* is a threadlike structure consisting of dead cells filled with keratin. Hair protects skin from harmful sun rays and helps maintain body temperature. Hair varies in color, texture, and amount for each person. From 100,000 to 200,000 hairs may be on your head. Each hair grows from a follicle. A *hair follicle* is a depression on the surface of the dermis that contains nutrients a hair needs to grow. The roots of hairs are made up of living cells.

**How to Keep Your Integumentary System Healthy**

The following tips will help you keep this body system healthy:

- Wear sunscreen with an SPF of at least 15 when you are exposed to the sun.
- Examine skin monthly for any changes in moles, warts, or freckles.
- Follow directions when using makeup.
- Shower or bathe each day.
- Eat foods containing vitamin A.
- Seek proper medical care for skin rashes.
- Wash hair regularly.
- Treat dandruff with appropriate products.
The body system that removes liquid wastes from the body and maintains the body’s water balance is the **urinary system**. The organs of the urinary system are the kidneys, ureters, bladder, and urethra.

### What to Know About the Urinary System

**Kidneys** An organ that filters the blood and excretes waste products and excess water in the form of urine is a **kidney**. A pale yellow liquid composed of water, salts, and other waste products is **urine**. The body has two kidneys. They lie on either side of the spinal column just above the waist.

**Ureters** A narrow tube that connects a kidney to the urinary bladder is a **ureter** (YUR uh tur). Two ureters carry urine from the kidneys to the urinary bladder.

**Urinary bladder** The muscular sac that stores urine is the **urinary bladder**. As the urinary bladder fills with urine, it expands. During urination, urine is forced out of the bladder into the urethra.

**Urethra** The narrow tube extending from the urinary bladder to the outside of the body, through which urine passes out of the body is the **urethra** (yu REE thuh).

### How to Keep Your Urinary System Healthy

These two tips will help you keep this body system healthy:

- Drink plenty of water a day, especially in hot weather or when doing physical activity.
- Maintain a healthful blood pressure, as high blood pressure damages the kidneys.

To keep your urinary system healthy, make sure you stay hydrated.
Key Terms Review

Match the following definitions with the lesson Key Terms on the left. Do not write in this book.

1. produces a hormone that controls growth
2. includes ligaments and joints
3. contains cells that transmit messages to body parts
4. includes plasma and hemoglobin
5. helps the body remove liquid wastes
6. the main organs are the lungs
7. helps provide motion and maintain posture
8. covers and protects the body
9. includes antibodies that fight infection
10. produces enzymes that break down proteins and starches

Recalling the Facts

11. What is the function of white blood cells?
12. List three ways to keep your integumentary system healthy.
13. What is the difference between pulse and blood pressure?
14. What are three types of muscle? How are they different?
15. Describe the exchange that occurs in the alveoli.
16. What is the function of the urinary system?
17. Why is it important to eat foods that contain fiber?
18. Name and describe the five functions of the brain.

Critical Thinking

19. How are sensory and motor neurons similar? How are they different? How do they work together?
20. How are the cardiovascular and immune systems related?
21. Explain the relationship between the muscular and the skeletal systems in the way they function.
22. Explain how the integumentary and urinary systems have a common function.

Real-Life Applications

23. Why would having a hyperventilating person breathe into a paper bag be helpful?
24. Investigate what options are available to you if you injure the cartilage in your knee joint.
25. How might eating too fast affect your digestive system?
26. Explain why physical activity might be beneficial to a person recovering from coronary artery disease.

Activities

Responsible Decision Making

27. Journaling You are going to a midday baseball game with a friend. The weather is going to be hot and sunny. Your friend tells you that you should protect yourself from the sun so that you don’t get sunburned. What should you do? Write a response to this situation in your journal. Refer to the Responsible Decision-Making Model on page 61 for help.

Sharpen Your Life Skills

28. Analyze Influences on Health Set up six or eight stations. Choose an activity (such as push-ups or jumping jacks) for each station. Circulate through the stations. Record your heart rate before and after each activity. Allow two minutes at each station. A rest station is last. Evaluate your results. Did your heart rate differ? Discuss how the heart reacts to activity and then recovers.

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