



HARLINGEN  
CONSOLIDATED INDEPENDENT SCHOOL DISTRICT

# Remote Learning

## Student Packet

### 7<sup>th</sup> Grade Science

#### Week 3

#### 7.12B Body Systems

(Nervous, Endocrine, Muscular, Skeletal, Integumentary,  
Circulatory, Respiratory) **Part 1**

**Instructions:** Students please complete the attached packet. If you need assistance, please let your campus contact know when they reach out to you each week.



# Explore Student Guide

## Part VI: The Nervous System

### Background

The Nervous System functions as a control center and coordinates all actions and reactions, sending immediate and specific information as electrical impulses.

### Organs of this system include:

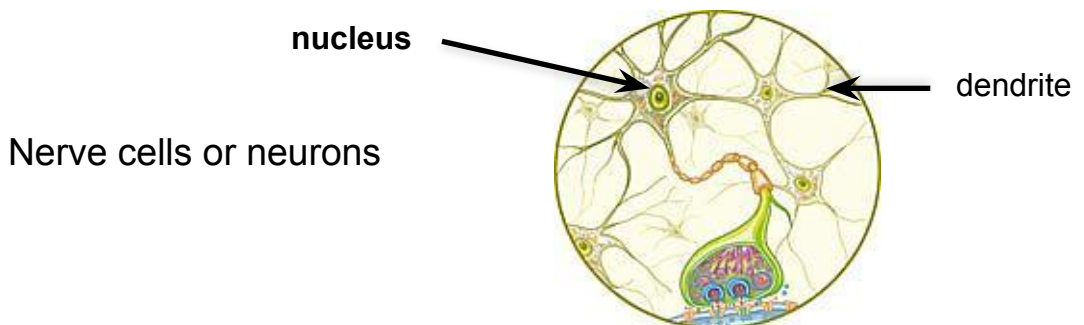
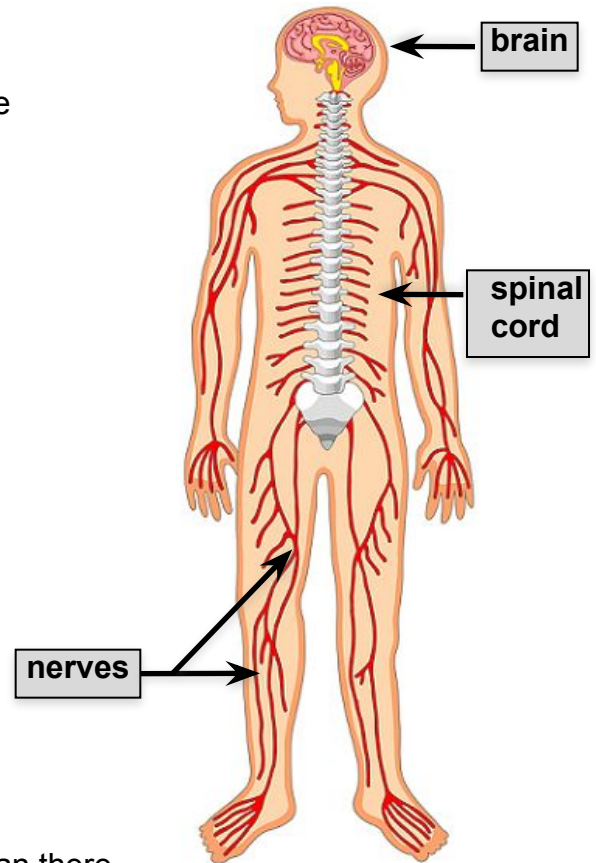
brain, spinal cord, and nerves

The brain uses information received from the nerves to coordinate actions. Thin threads of nerve cells, called neurons, carry messages throughout the body. Sensory nerves carry these messages to the brain through the spinal cord, while motor nerves carry them from the brain to all of the various muscles and glands.

A tiny electrical pulse generates when a neuron is stimulated by heat, cold, touch, sound, or vibrations. Chemicals help carry the electrical pulse from the finger-like projection or dendrites of one neuron to the next cell.

### Fun facts about the Nervous System:

- There are more nerve cells in the human brain than there are stars in the Milky Way.
- The left side of the human brain controls the right side of the body and vice-versa.
- As we get older, the brain loses a gram of brain mass per year.



Complete the activity and fill in your *Student Journal*.



# Explore Student Guide

## Part IX: The Endocrine System

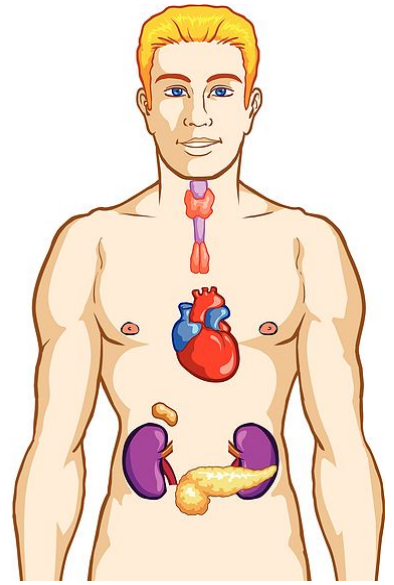
### Background

The Endocrine System regulates the body by secreting different types of hormones into the bloodstream. The endocrine system controls growth, reproduction, and metabolism.

### Organs of this system include:

glands (two types: pituitary and Adrenal), hormones

Hormones are chemical messengers released from glands, in response to instructions from the brain. There are over 30 hormones secreted by the endocrine system helping regulate body functions, such as mood, growth, development, tissue functions, and metabolism. When a person is frightened or anxious, a hormone called adrenaline releases into the bloodstream. This hormone speeds the breathing and heart rate, transporting more oxygen to the muscles. As a result, the body creates what is known as a “fight or flight” response. The “fight” response is exactly as it sounds. Your body tells you to stay and fight with whatever is causing the scary moment. “Flight” occurs when the body tells you to walk or run away from what has scared you.



Several different glands and their functions are:

Thyroid gland – regulates metabolism

Gonads – secretes sex hormones

Adrenal gland – secretes the hormone adrenalin for fight or flight response

Pancreas – secretes the hormone insulin to regulate blood sugar

Pituitary gland – called the master gland because it controls the other glands and influences growth and metabolism

### Fun facts about the Endocrine System:

- Without glands, there would be no sweat, mucus, or chemical juices in your body.
- For girls, puberty generally begins sometime between ages 9-13. For boys, puberty generally begins between ages 10-15. Puberty begins when hormones from various glands begin to increase.

Please complete the activity and fill in your *Student Journal*.

# Explore Student Guide

## Part IV: The Muscular System

### Background

The Muscular System allows the body to move when attached to bone and permits movement in internal organs, such as the heart and intestines. It also provides strength, posture, balance, and heat for body warmth.

### Organs of this system include:

muscles (three types: skeletal, smooth, and cardiac), ligaments, and tendons

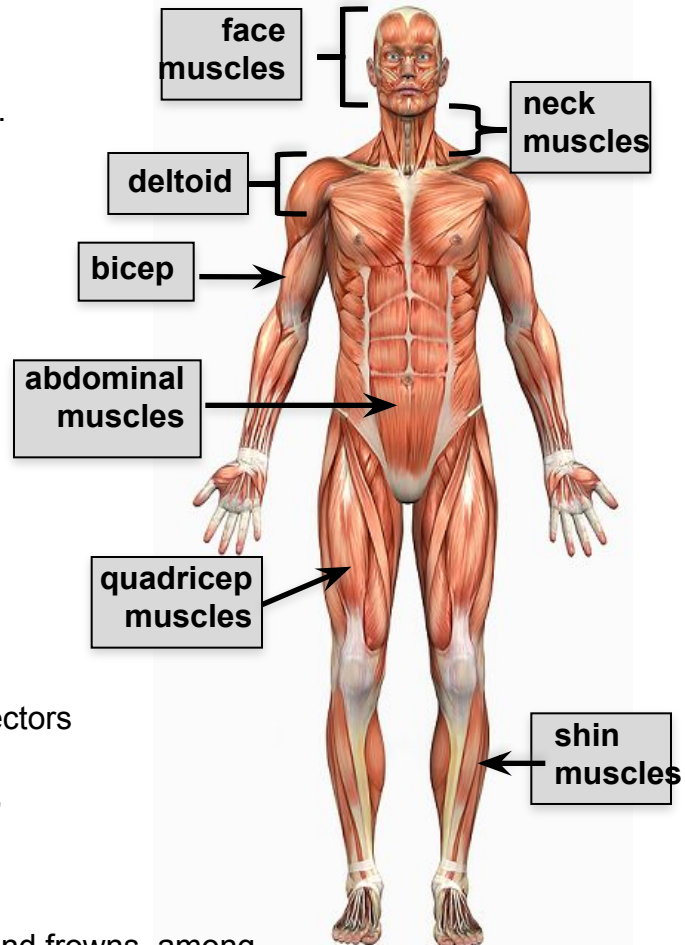
There are approximately 639 skeletal muscles in the body, and they make up about 40% of body weight. Smooth muscles make up the walls of hollow organs, specifically utilized in the digestive, circulatory, respiratory, and reproductive systems. Cardiac muscle is the heart's muscle tissue.

Ligaments and tendons are strong, fiber-like connectors assisting in efficient physical movement and stability. Ligaments connect bones to other bones, while tendons connect muscles to bones.

### Fun facts about the Muscular System:

- More than 30 facial muscles create smiles and frowns, among other expressions.
- Scientists estimate the eye muscles move more than 100,000 times a day.
- The largest muscle in the body is the muscle in the buttocks, the gluteus maximus.

Some of the body's muscles are "voluntary," meaning the muscles work because you specifically tell them to. You control these muscles. Some of the body's muscles are "involuntary," meaning the muscles work automatically. Moving them does not involve any thought, and you do not have control over these muscles.



Complete the activity and fill in your *Student Journal*.



# Explore Student Guide

## Systems of the Human Body

### Part I: The Circulatory System

#### Background

The Circulatory System circulates blood through the body, supplies cells with oxygen and nutrients, and removes waste products.

#### Organs of this system include:

heart, arteries, veins, and capillaries

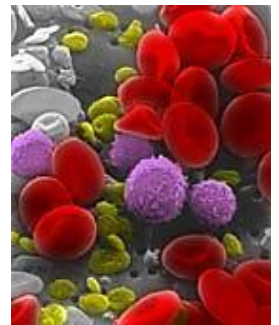
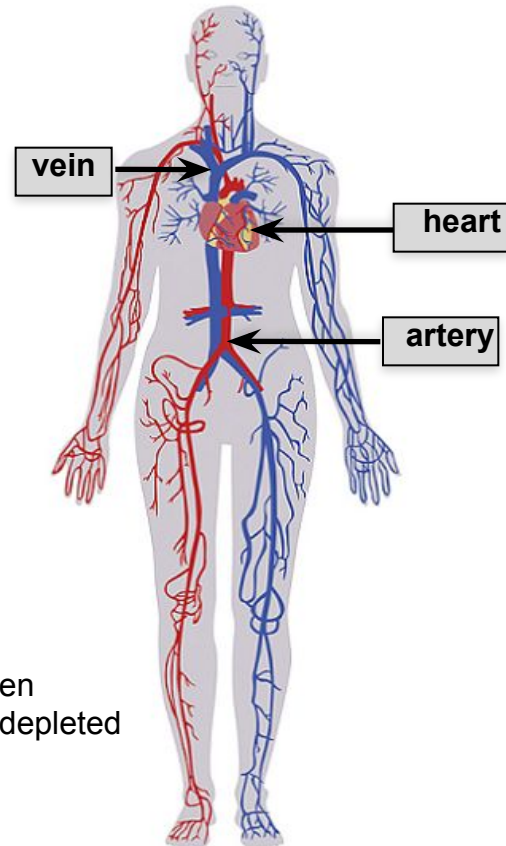
Even though the heart is the size of a clenched fist, it is a powerful muscle. The heart pumps blood through its chambers to all parts of the body by cycles of contracting and relaxing. Blood is carried to and from the heart in tubes called arteries and veins. Arteries carry pumped blood under high pressure away from your heart through progressively smaller branched tubes called capillaries. Veins are tubes that most commonly carry deoxygenated blood from tissues back into the heart, with less force.

With every breath, oxygen mixes with blood in the lungs and then is pumped to all cells in the body through the arteries. Oxygen-depleted blood then returns back to the heart and the process repeats.

#### Fun facts about the Circulatory System:

- Your heart pumps about 4,000 gallons of blood each day.
- An average human's heart beats 30 million times per year.
- The sound of a heartbeat is created by the valves in the heart closing as they push blood through its chambers.

The blood may look like a liquid to the unaided eye but if you were to look at it under a microscope you would see that it has four different parts. The red blood cells give the blood its color and their job is to carry oxygen, carbon dioxide and glucose to all cells of the body. The white blood cells attack invaders such as bacteria and the platelets help stop the blood from flowing out of cuts by creating scabs. The last part of the blood is the plasma. It is the liquid part of the blood and all the other parts float around in it.



Complete the activity and fill in your *Student Journal*.

# Explore Student Guide

## Part II: The Respiratory System

### Background

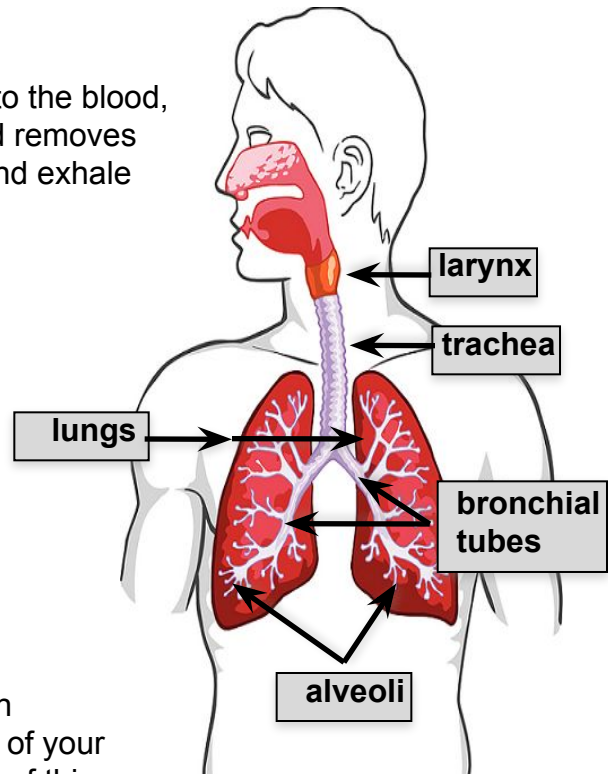
By breathing, the Respiratory System supplies oxygen to the blood, which transports this oxygen to all parts of the body and removes carbon dioxide. When we breathe, we inhale oxygen and exhale carbon dioxide.

### Organs of this system include:

Airways (larynx, trachea, bronchial tubes), diaphragm, lungs, and alveoli

Respiration is achieved through the mouth, nose, trachea, lungs, and diaphragm. First, air enters the body through your nose or mouth, then travels through your larynx (or voice-box), down your trachea (or windpipe), and finally splits into two bronchial tubes entering your lungs.

Your lungs, located inside the chest cavity, carry oxygen into your body when you inhale, and carbon dioxide out of your body when you exhale. Within the lungs are thousands of thin bronchial branches with endings composed of millions of alveoli. This is where the exchange of oxygen and carbon dioxide occurs. Around the alveoli are microscopic capillaries transporting carbon dioxide from the heart via the pulmonary artery and delivering oxygen back to the heart via the pulmonary vein. Lastly, muscles near the lungs, including the diaphragm, help the lungs expand and contract. This allows breathing to occur.



### Fun facts about the Respiratory System:

- There are approximately 1,500 miles of airways within the lungs.
- The fastest sneeze on record is 102 miles per hour.

As you breathe out, carbon dioxide is exhaled from your body. When carbon dioxide gas is combined with water it will make an acid called carbonic acid.

Bromothymol blue can be used to determine the acidity of a substance. Acidic solutions will have a yellow color. Neutral solutions result in a green color. Basic solutions appear blue.

Complete the activity and fill in your *Student Journal*.



# Explore Student Guide

## Part V: The Integumentary System

### Background

The Integumentary System continuously receives information about the external environment (temperature, humidity, etc.) and protects the body's deeper tissues. It excretes waste, helps rid the body of heat and synthesizes vitamin D.

### Organs of this system include:

skin (three layers: epidermis, dermis, hypodermis), hair, nails, sweat glands

Skin functions include excreting wastes, regulating temperature, waterproofing and protecting deeper tissues. Skin also serves as the sensory receptor attachment site, so that the body can detect pain, sensation, pressure, and temperature. Additionally, it synthesizes vitamin D from sunlight, which aids in metabolizing calcium in the body.

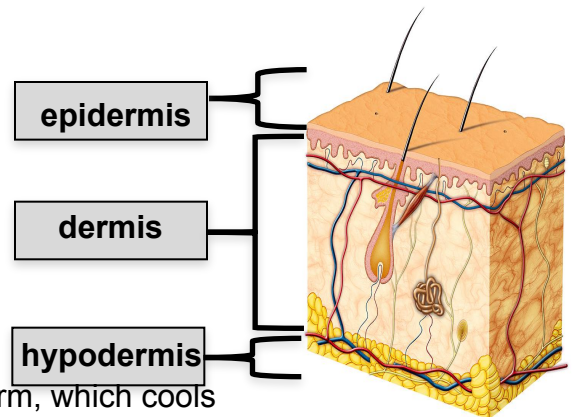
The three layers of the skin are the epidermis, dermis, and hypodermis. The epidermis is the visible outer layer where new skin cells form.

Finger nails function to protect the surrounding soft tissues of the fingers from injuries.

The dermis contains oil and sweat glands.

The sweat glands secrete sweat when the body is too warm, which cools the skin surface and body. Oil glands moisten the skin and hair and add flexibility.

The hypodermis helps the body stay warm and anchors the skin to all tissues beneath it. The hypodermis is mainly composed of fat, which also helps the body stay warm.



### Fun facts about the Integumentary System:

- You lose about 30,000 to 40,000 dead skin cells every minute.
- The skin is the largest organ in the human body.

The sensory receptors on the dermis gather information about what is affecting the skin and sends the information to the brain. If something is not right, the brain is alerted and the body takes action. There are two types of sensory receptors: touch receptors and pain receptors. Touch receptors are very sensitive and respond to the slightest contact. There are about 500,000 touch receptors in the human body, and they are found in areas such as the fingers, tongue, and lips. Pain receptors are not as sensitive. They do not react, unless there is a very strong stimulus or pain. There are 3 to 4 million pain receptors scattered all over the body. That tells you how important they are!

Complete the activity and fill in your *Student Journal*.



## Concept Attainment Quiz

Systems of the Human Body  
Organisms and Environments

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### I. Vocabulary Matching

Match the term in the box to the correct definition.

- |          |   |                |
|----------|---|----------------|
| 1. _____ | The system that pumps blood throughout the body                 | A. Circulatory |
| 2. _____ | The system that helps the body move by contracting and relaxing | B. Respiration |
| 3. _____ | The system that exchanges gases within the body                 | C. Skeletal    |
| 4. _____ | The system that provides the structural framework for the body  | D. Muscular    |



## Concept Attainment Quiz

Systems of the Human Body  
Organisms and Environments

### III. Open-Ended Response

Answer the questions below. Use additional paper if needed.

1. You touch a hot pan on the stove. How do the nervous system and muscular system work together to protect you?

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2. What is homeostasis? Explain how the respiratory system helps to maintain homeostasis within the body.

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HARLINGEN  
CONSOLIDATED INDEPENDENT SCHOOL DISTRICT

# Remote Learning

## Student Packet

### 7<sup>th</sup> Grade Science

#### Week 4

#### 7.12B Body Systems

(Nervous, Endocrine, Muscular, Skeletal,  
Integumentary, Circulatory, Respiratory) Part 2

**Instructions:** Students please complete the attached packet. If you need assistance, please let your campus contact know when they reach out to you each week.

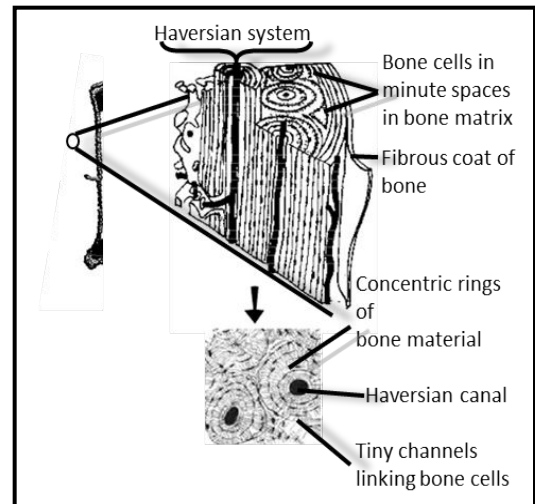


# Reading Science

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## The Skeletal System

1 Did you know that babies are born with a total of 350 bones? An adult only has about 206 of them! As they grow and age, a baby's bones fuse together. Bones must be made of living tissue in order to grow and change. The skeletal system is made of all the bones in the human body. A skeleton's rock-like bones are no longer alive. All the bones in your body, however, are still alive. In fact, each bone is a living organ, made of several different tissues. The cells in bones act in the same way as other body cells. They absorb nutrients and expend energy. Healthy bones are dense and strong.



2 The skeletal system has five major functions. First, bones act like the internal wooden structure of a house. Bones are the framework that supports your body. They also give your body its shape. Second, bones protect your delicate internal organs. For example, ribs surround the heart and lungs. A skull protects the brain. Third, major muscles attach to the bone and make them move. Fourth, blood cells are actually formed in the red marrow of some bones. Marrow is the soft tissue in the center of many bones. Both red and white cells are made there. We cannot live without them. Red blood cells take oxygen to all parts of the body. White blood cells fight off germs and diseases. Finally, calcium and phosphorus make bone hard. The skeleton is the place where calcium and phosphorous are stored for later use.

3 Bone is made of living tissue, which explains why a broken bone actually heals. To remain alive, the bone cells need blood. The bone is fed by the blood, which also removes its waste. Deep inside a compact bone are the **Haversian systems**, also known as circular structures. Did you know that you can actually see these systems in a cut bone? They look like the rings of a cut tree trunk. Also, bones are not as smooth as you might think. Instead, they are full of pits, rough spots, bumps, and edges. Without these spots, muscles would not be able to attach to the bone. There are also holes that allow blood vessels and nerve endings into the bone.

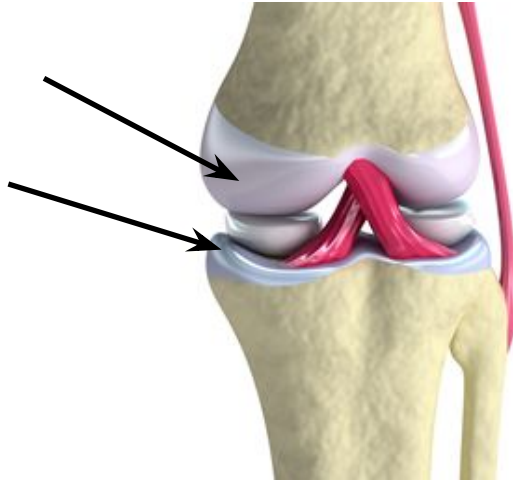


# Reading Science

- 4 You can usually tell a bone's function by its shape. Can you guess what the longest bone is in your body? It is the femur—the thigh bone. It is actually one-quarter of your height! Deep within the ear, you will find the smallest bone, the stirrup bone. It is usually about one-tenth of an inch long. Another interesting fact is that bones adapt to the functions they perform. Bone shapes are genetically controlled. They will, however, be modified by the work done by the muscle.
- 5 There are over 230 moveable and semi-moveable joints in the body. A semi-moveable joint allows little or no movement. These are seen with the bones of the skull. A moveable joint makes a flexible connection between bones. The body needs joints with flexibility to allow the body to move back and forth. This is easily seen with the knee. The knee joints work like door hinges, allowing you to move your leg back and forth. Still other joints allow twisting, such as in the neck, so you can turn your head. You also have shoulder joints, which allow the arm bone to move nearly full circle.
- 6 Cartilage is a thick smooth layer of cushiony tissue. Cartilage is usually found at the ends of the bones. It does not contain blood vessels or minerals. As people age, cartilage sometimes wears out. This causes the common painful condition known as arthritis. Each time a person moves, they feel intense pain.
- 7 Without the skeletal system, we would be like a human beanbag. We would flop around like one big puddle of skin and organs. Our flexible skeletal system allows us to stand and walk, bend and rotate, and work against the forces of gravity.



# Reading Science



- 1** What is the coating, marked by arrows in the diagram shown, at the ends of the leg bones?
- A** White blood cells
  - B** Rock
  - C** Marrow
  - D** Cartilage
- 2** What kind of joint is pictured in the diagram shown?
- A** A semi-moveable joint, allowing back and forth movement
  - B** A moveable joint, allowing back and forth movement
  - C** A semi-moveable joint, allowing twisting
  - D** A moveable joint, allowing twisting



# Reading Science

- 3** What is the main point of paragraph 3?
- A** Red blood cells
  - B** The skeletal system
  - C** The structure of a bone
  - D** Bones, cartilage, and blood vessels
- 4** In paragraph 3, which word or words best describe Haversian systems?
- A** Ligament
  - B** Bone marrow
  - C** Circular structures
  - D** Cartilage



# Reading Science

- 5** Which sentence would the author disagree with?
- A** Bones adapt to the functions they perform.
  - B** A flexible skeletal system allows mobility for our body.
  - C** Bone shapes are genetically controlled and routinely modified depending upon the work performed by the muscle.
  - D** Each bone is a non-living organ comprised of several different tissues.
- 6** The skeletal system has many functions. Which of the following body functions does the skeletal system **not** do?
- A** Remove germs from the blood
  - B** Protect the internal organs
  - C** Give shape and support to the body
  - D** Produce red and white blood cells

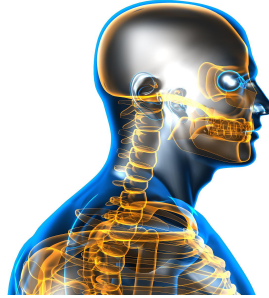


# Writing Science

Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Look



## Think

Think about the different systems of the human organism.

## Write

Explain the main functions of the systems of the human body.

### Be sure to –

- Address the prompt, provide support, and conclude your thoughts.
- Write legibly and concisely.



