

UNIT OVERVIEW

Humans have important body systems that help us stay alive and healthy. Each system plays an important role and is made up of several key organs and/or components. The Human Body unit helps students explore the structures that make up their body and how the various parts of their body work together. This unit focuses on the following body systems: skeletal, muscular, nervous, respiratory, circulatory, digestive, and excretory.

Certain reading resources are provided at three reading levels within the unit to support differentiated instruction. Other resources are provided as a set, with different titles offered at each reading level. Dots on student resources indicate the reading level as follows:

- low reading level
- middle reading level
- high reading level

THE BIG IDEA

Humans have a common bond with all other life on Earth. All living things are made up of key parts that help them meet their needs. These parts must work together to keep an organism healthy. An understanding of how our bodies work can raise our awareness of our own health, thereby leading us toward safe and healthy practices. In this way, we can protect our most important asset—our body.

Other topics

This unit also addresses topics such as: why we yawn, what happens when bones break, and human reaction time.

SPARK

The spark is designed to get students thinking about the unit's topics and to generate curiosity and discussion.

Materials

- clock or stopwatch



Activity

Ask for three volunteers who are willing to jump up and down in front of the class for thirty seconds. First, help the class take note of the volunteers' facial color and general appearance before the volunteers jump. Have the volunteers take their resting pulse rate for thirty seconds, and ask other students to count the number of breaths each volunteer takes in thirty seconds. (Model how to find your pulse on your wrist.) Record the data on the board.

Ask the volunteers to start jumping up and down. Say "stop" after thirty seconds have passed. Now have the class observe the facial color of the volunteers and note any other changes that are apparent, such as sweating or a change in posture. Again, measure the breathing rate and pulse of the volunteers for thirty seconds. Record the data on the board. Then compare the results from before and after jumping.

Below are questions to spark discussion.

How did the volunteers look before jumping up and down, and how did they look afterward?

What happened to the volunteers' breathing after they jumped up and down for thirty seconds? Why do you think this was so?

What happened to the volunteers' heart rates after they jumped up and down for thirty seconds? Why do you think this was so?

Which parts of their bodies did you see the volunteers using while they jumped up and down?

What was happening inside the volunteers' bodies while they jumped up and down?

How did the volunteers know when to stop jumping? What parts of their bodies did they have to use so they would know when to stop?

Use this activity to begin an introductory discussion about the human body. Explain that the human body is a very complicated collection of parts. In order to jump up and down or do anything else, those parts each have to do certain jobs, and they must work together. Throughout the unit, students will learn more about the human body and many of its important systems.

Many of the unit's vocabulary terms are related to the spark activity and can be introduced during the spark. For vocabulary work, see the Vocabulary section in this [Unit Guide](#).

PRIOR KNOWLEDGE

Invite students to explain their understanding of what is inside a person's body.

Probing Questions to Think About

Use the following questions to have students begin thinking of what they know about the human body.

- Why do we need bones?
- Why do we need muscles?
- What do you think happens inside your body that makes you let go of a pot handle if it is really hot?
- Which parts of your body help you breathe?
- Why does your heart beat?
- What happens to the food you eat once it enters your body?
- Which parts of your body do you use in your favorite games and sports?
- Are certain parts of your body more important to your everyday life than others? Which ones? Why?

Tell students they will learn more about these topics soon.

UNIT MATERIALS

Each unit provides a wide variety of resources related to the unit topic. Students may read books and other passages, work in groups to complete hands-on experiments and investigations, discuss science ideas as a class, watch videos, complete writing tasks, and take assessments.

Resources are available for printing or projecting, and many student resources are also available for students to access digitally on **Kids A-Z**.

Selected unit resources are available in more than one language.

For a complete list of materials provided with the unit, see the Human Body unit page on the Science A–Z website.

VOCABULARY

Use the terms below for vocabulary development throughout the unit. They can be found in boldface in the *Nonfiction Book*, the *Quick Reads*, and/or other unit resources. These terms and definitions are available on *Vocabulary Cards* for student practice. Additional vocabulary lists are provided in the teaching tips for *Investigation Packs* and *FOCUS Books*.

Core Science Terms

These terms are crucial to understanding the unit.

artery	a blood vessel that moves oxygen-rich blood away from the heart toward the body's cells
bone marrow	spongy material that produces blood cells and is found in the center of bones
brain	the control center of the nervous system
cardiac muscle	the type of muscle found in the heart
heart	the organ that pumps blood throughout the body
kidneys	a pair of excretory organs that filter waste products from blood
large intestine	the thick, lower end of the digestive system in which water is removed from digested food
liver	a large excretory organ that filters blood and helps with digestion
lungs	two spongy organs that bring oxygen to the blood and remove carbon dioxide from the blood
muscle	body tissue that lets the body move by contracting and relaxing
nerve	a thin fiber that carries signals between the brain and other parts of the body
skeletal muscles	strong muscles that connect to bones and allow the body to move
small intestine	the thin, coiled part of the digestive system in which nutrients are removed from food and put into the bloodstream
smooth muscle	muscle that moves substances without a person's control and is found in many internal organs
spine	a column of bones that provides the main support for the body; the backbone
stomach	the organ where food is mixed with chemicals and partially digested
vein	a blood vessel that carries blood from the body's cells toward the heart

Other Key Science Terms

The following vocabulary is not essential for comprehending the unit but may enrich students' vocabulary.

blood	the liquid that is moved by the heart through the body in blood vessels
bone	a hard, white piece of the skeleton
brain stem	the part of the brain that controls basic body functions such as breathing, heart rate, and blood pressure
carbon dioxide	a clear gas that is given off as a waste product during breathing
cells	the tiny parts that all plants and animals are made of
cerebellum	the part of the brain that controls muscles, movement, and balance
cerebrum	the largest part of the brain, which controls thinking, feeling, and some of the senses
circulatory system	the body system that moves blood throughout the body
diaphragm	a sheet of muscle that allows the lungs to take in and release air
digestive system	the body system that breaks down food to give the whole body the nutrients it needs
esophagus	the tube that connects the throat to the stomach
excretory system	the body system that removes waste and poisons from the body
joint	a place where two bones meet
muscular system	the body system that allows body parts to move
nervous system	the body system that gathers information from the senses and controls thinking and behavior
oxygen	the invisible, odorless gas that makes up part of the air humans must breathe to live
pancreas	an organ that produces a fluid to help digest food
pelvis	a group of bones that connects the spine to the legs and supports the upper body
respiratory system	the body system that controls breathing by inhaling oxygen and exhaling carbon dioxide

ribs	a group of long, curved bones that support and protect the chest
saliva	a liquid in the mouth that mixes with food to help begin digestion
skeletal system	the body system that provides a sturdy frame to support all other body systems
skull	the main bone structure of the head
system	a group of parts that work together for the same purpose or to do the same job
trachea	the windpipe through which air travels in and out of the lungs

Vocabulary Activities

You may choose to introduce all the terms that will be encountered in the unit before assigning any of the reading components. *Vocabulary Cards* with the key science terms and definitions are provided. Dots on the cards indicate the reading levels of the *Nonfiction Book* or the *Quick Reads* in which each term can be found. If all level dots appear, the term may come from another resource in the unit. Students can use these cards to review and practice the terms in small groups or pairs. The cards can also be used for center activity games such as Concentration.

The *Word Work* activity sheets offer fun puzzles and practice with key vocabulary terms from the unit. For further vocabulary practice and reinforcement, you can choose from the vocabulary *Graphic Organizers*. To build customized vocabulary lessons with terms related to the topic, see *Vocabulary A-Z*.

Students can use the *Word Smart* vocabulary *Graphic Organizer* to organize information on the science terms. You may want to assign each student one to three words to share his or her *Word Smart* knowledge with classmates. Students who have the same word should first compare their *Word Smart* sheets with each other and then report to the larger group.

The science terms can be used in oral practice. Have students use each term in a spoken sentence.

As students read, encourage them to create a science dictionary by recording new vocabulary terms and definitions in their *SAZ Journal*.



BACKGROUND AND MISCONCEPTIONS

Use this section as a resource for more background knowledge on unit content and to clarify the content for students if misconceptions arise. Refer to Using the Internet below for more ways to extend the learning.



Q: *Does each human body system work by itself?*

A: No. Each system does have specific components and functions, but no system could work without the others. For example, the respiratory system brings oxygen into the body. The circulatory system transports blood containing that oxygen throughout the body, including to muscles. Those muscles are attached to the skeletal system, and the interconnectedness goes on and on. This is why it is so crucial to keep the entire body healthy.

Q: *Is blood in my veins red or blue? Some veins look blue.*

A: It is red. The blood in veins may be a darker red than blood in arteries because it has less oxygen in it. Through the skin, the blood in your veins may look bluish-green.

Q: *Do people get bigger as they grow because of all the food they eat?*

A: The increase in size is due to cell growth as well as the production of new cells via cell division. Food provides energy for this process to take place, but the increase in body mass is not due to the accumulation of food.

Q: *Do muscles push and pull?*

A: Not exactly. Muscles work only by contracting (or shortening) and relaxing (or lengthening). Sometimes there are opposing muscles, so that one muscle contracts in one direction while the other relaxes, but then the second muscle contracts while the first relaxes.

Q: *Do arteries drop blood off at an organ, and veins pick it up to take it back to the heart?*

A: Not exactly. The circulatory system is made of continuously flowing loops. There is never a time when all the blood leaves an organ or vessel unless there is a severe injury.

Q: *We see lots of hearts on Valentine's Day. Are real human hearts shaped the same way?*

A: Real human hearts are somewhat similar in shape to the standard depiction of a heart, but they certainly do not come to a sharp point at the base, and the two chambers at the top are not symmetrical. Refer to Using the Internet in this guide to begin a search for good images of the heart and then let students compare for themselves.

Q: *I've heard that our skin is our largest organ. Is skin an organ?*

A: Yes, it is. Since the skin is made up of a variety of tissues (nerves, muscle, blood vessels), it is, by definition, an organ.

Q: *Does the nervous system have anything to do with feeling nervous?*

A: Actually, it does. The word *nervous* can refer to a feeling of anxiety or a body system made up of nerves. But in order to feel nervous or to feel any other emotion, signals do have to pass through your nervous system.

Q: *Does every human have exactly 206 bones?*

A: Actually, no. As with many aspects of the body, there can be significant variation from one individual to the next. Some people have fewer than 206 bones, while others have more, and that number can change throughout one's lifetime. Babies are born with more than 300 bones, but as they grow, many of those bones fuse together. For instance, 5 vertebrae at the base of the spine fuse together to form the sacrum, and 4 vertebrae fuse together to make the coccyx, or tailbone. Later in life, a single bone can break, and if the bone fragments heal separately, they can become separate bones. But 206 is widely accepted as a general guideline for the number of bones in the human body.

EXTENSION ACTIVITIES



Using the Internet

Most search engines will yield many results when the term *human body* is entered. You can also search for more on a specific body part or body system. Be aware that some sites may not be educational or intended for the elementary classroom. More specific inquiries are recommended, such as:

- how we breathe
- model of the human brain
- model of the human heart
- muscles of the human body
- keeping your body healthy
- Why do I sneeze?
- Why do I cough?
- Where does food go when I eat?



Projects and Activities

- **Arts:** Have each group of students trace the outline of one of their bodies on a large sheet of butcher paper. Then have them use different colors of markers or paint to sketch each body system described in the book *The Human Body*. Groups should include a color key on their poster.
- **Project:** Have students build a three-dimensional model of a human body or a particular organ or body system, such as the brain, heart, or skeleton. Students should develop familiarity with the shapes and relative sizes and locations of body parts.

- **Writing:** Have students write a persuasive report convincing readers to take care of their bodies. They should include specific suggestions that target the health of certain organs or body systems. See [Writing A-Z](#) for extensive writing instruction.
- **Drama:** Challenge groups of students to create and present a short skit in which each student portrays a major body organ. You might assign each group one body system, and each student in the group can represent a portion of that system.
- **Guest/Science Careers:** Invite a doctor or scientist, preferably a specialist in a particular body system, to discuss his or her profession with students.
- **Community Service/Art:** Have students create greeting cards for individuals with injuries or illnesses. These can be sent to hospitals, nursing homes, or rehabilitation centers.
- **Technology:** Help students create a web presentation on what they have learned in this unit.
- **Research/Home Connection:** Students can conduct research as a family/home project or in the library/media center to extend the learning about a topic in one of the [Quick Reads](#) or other unit resources.

