

UNIT OVERVIEW

All living things are made of the same building blocks—cells. In some cases, these cells combine to form tissues and organs inside plants and animals. The Inside Living Things unit helps students explore the structures that make up plants and animals. Students will read about the major organs and body systems inside animals and discover how all of the parts of an organism work together to keep it alive and healthy.

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 cells and have parts that help them meet their needs. Cells come together to form tissues, tissues work together to make organs, and organs combine to create body systems. These parts must work together to keep an organism healthy. All organisms are susceptible to illness and injury. An understanding of how bodies work can raise our awareness of our own health, and lead 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: medical advancements, transport systems in plants, parasites, and different body systems that animals use to move.

SPARK

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

Materials

- orange
- paper plate
- plastic knife
- paper and pencil



Activity

In this activity, students will take apart an orange to identify its parts and think about the function of each part. Begin by holding up one orange and asking students the following questions:

What part of the orange plant is this?

Why does an orange tree grow fruit?

What does an orange look like inside?

Put students in groups. Have them discuss the parts they think are inside an orange. Then give each group an orange, a plate, and a plastic knife. Instruct students to use their knife to cut open the orange. Have a group recorder list all the parts of the orange on a sheet of paper.

After several minutes of collaborative work, ask a speaker from each group to share their list. Combine these into a master list on the board.

Below are questions to spark discussion.

Did all the oranges have the same parts? Why do you think this was so?

What do you think is the role of each part of the orange?

Why do you think each part is shaped the way it is?

Why do you think each part has the texture it has?

Could an orange plant survive without certain parts? If so, which ones? If not, why not?

Do any other living things have the same or similar parts as an orange? Which ones? Do the similar parts serve the same function?

Explain to students that in this unit they will learn about the inside of plants and animals, including humans. They will learn that each part and system inside a living thing plays a role and works with other parts and systems to keep the organism alive.

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 living things are made of.

Probing Questions to Think About

Use the following questions to have students begin thinking of what they know about living things.

- Are plants and animals made of some or all of the same things?
- How does a tiny seed turn into a giant tree?

- Do dogs and giraffes have all the same parts inside their bodies?
- Do birds and snakes have some of the same parts inside their bodies?
- Which parts of your body help you breathe? Which parts of other animals help them breathe?
- Which parts of your body help you run and jump?
- Which parts of organisms help them fight illness?

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 Inside Living Things 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.

- antibodies** chemicals produced by the body that attack invading germs
- artery** a blood vessel that moves oxygen-rich blood from the heart to the body tissues
- body system** a group of organs in the body that work together
- capillary** the tiniest blood vessel that carries blood from arteries to veins
- cell** the smallest independently functioning unit in an organism
- cell membrane** the outside covering of an animal cell that is also inside the cell wall of plant cells
- cell wall** the firm outside covering of a plant cell
- cytoplasm** the liquid that lies inside the cell membrane
- mitochondria** cell parts that produce energy
- multicellular** composed of more than one cell

nucleus	the cell part that controls a cell's activities
organ	a part of an organism, made of different kinds of tissue, that has a specific function
pathogen	a unicellular organism that causes disease
photosynthesis	the process by which chlorophyll in plant cells transforms sunlight, water, air, and nutrients into food
plasma	the liquid part of blood in which blood cells flow
pore	a tiny opening
tissue	a group of cells in an organism that is similar in form and function
unicellular	composed of only one cell
vacuole	a cell part that stores water, nutrients, and waste
vein	a blood vessel that carries blood back from the body's cells to the heart

Other Key Science Terms

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

bacteria	small one-celled organisms that sometimes cause infections and disease
chlorophyll	a material in green plants that can turn water, air, and sunlight into food
chloroplast	a part of a plant cell that contains chlorophyll and makes energy from sun, air, water, and nutrients
circulatory system	the body system that moves blood throughout the body
digestive system	the body system that breaks down food to give the whole body the nutrients it needs
disease	a condition, other than one caused by injury, that prevents a part of the body from working normally; illness; sickness
immune system	a collection of cells and organs in the human body that protect against disease-causing germs
infection	the invasion of the body by bacteria, viruses, fungi, or other organisms, which sometimes causes disease
microorganism	an organism of microscopic size, such as a virus or single bacteria cell
muscle	tissue that produces movement and force by contracting and relaxing

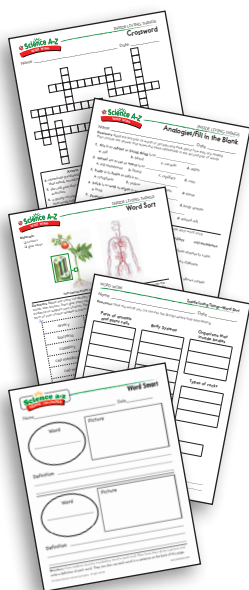
muscular system	the body system that allows internal and external body parts to move
nervous system	the body system that gathers information from and responds to the senses and affects thinking and behavior
nutrient	a substance in food or soil that organisms need to live, stay healthy, and grow
oxygen	the invisible, odorless gas that makes up part of the air humans must breathe to live
pulse	the heartbeat as felt through the walls of blood vessels
respiratory system	the body system that controls breathing by inhaling oxygen and exhaling carbon dioxide
skeletal system	the body system that provides a sturdy frame to support all other body systems
vaccine	a medicine made of weak or dead microbes that teach the body to fight stronger microbes of the same type
virus	a microorganism that invades and takes over a living cell, often causing a disease or infection

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: *Are all cells the same?*

A: No. Cells differ depending on the function they serve. For example, red blood cells do not have a nucleus, which maximizes the amount of oxygen they can carry. Also, while most cells are very small (10,000 to the head of a pin), some cells can be quite large, such as a giraffe's nerve cell (up to 2 meters).

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

A: 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 and other animals 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: *Is body tissue similar to paper tissue?*

A: While students may confuse the two uses of the term *tissue*, living tissue is significantly different from paper tissue. However, the similarities include the fact that there are many varieties of each, and some living tissue is thin and easily damaged, like paper.

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 can contract 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: The circulatory system is made of loops. The blood never leaves the blood vessels unless there is an 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 let students compare for themselves.

Q: Do human body systems work in isolation?

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.

Q: I have learned that all matter is made of atoms and molecules. Now I hear that living things are made of cells. Which is correct?

A: Both are correct. All living and nonliving things are made of atoms. Atoms join to form molecules. In living things, certain molecules have combined to form cells.

EXTENSION ACTIVITIES



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Using the Internet

Most search engines will yield many results when you enter *plant biology*, *animal anatomy*, or *inside the human body*. You can also search for a specific body part or body system. There is an abundance of sites related to living things on the Web. Be aware that some sites may not be educational or intended for the elementary classroom. More specific inquiries are recommended, such as:

- cell structure
- photosynthesis
- body systems
- plant parts
- diagram of the heart
- model of the brain
- fruit biology
- elephant anatomy



Projects and Activities

- **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:** Invite a doctor or scientist, preferably a specialist in a particular body system, to discuss his or her profession with students.
- **Arts:** Students can make labeled posters of one body system shown on an outline of a human or other animal body.
- **Community Service/Arts:** Have students create greeting cards for individuals with illnesses. These can be sent to hospitals, nursing homes, or rehabilitation centers.
- **Math:** Develop students' number sense by challenging them to symbolically represent the estimated number of cells in the human body—75 trillion.
- **Project:** Have students build a three-dimensional model of a human or other animal 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.
- **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.

