



Structures of Living Things

Lessons 1–4

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Structures of Living Things

Lessons 1–4

Lesson 1

-  How Do Organisms Transport Materials? 2

Lesson 2

-  How Do the Circulatory and Respiratory Systems Work Together? 8

Lesson 3

-  How Do the Organs of the Digestive System Work Together? 14

Lesson 4

-  How Do Plants and Animals Rid Themselves of Wastes? 18



How Do Organisms Transport Materials?



VOCABULARY



cell



tissue



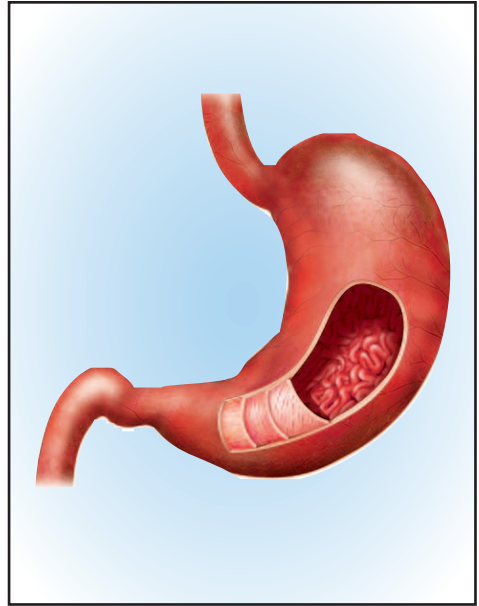
organ



organ system



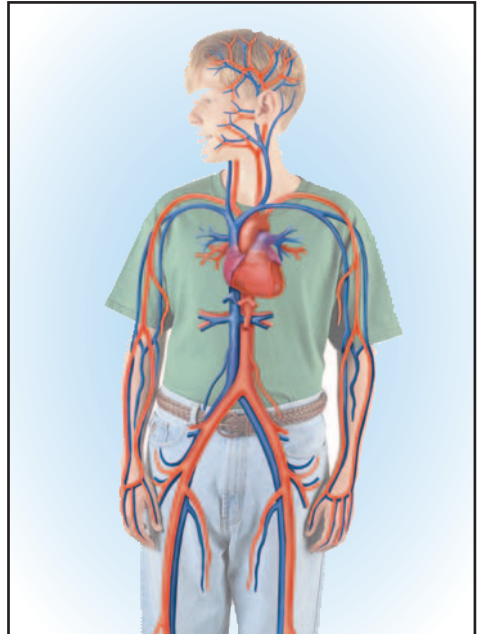
A **cell** is the basic unit of all living things. Most cells can be seen only with a microscope.



Stomach **tissue** is a group of stomach cells that work together to perform the stomach's function.



▶ The heart is an **organ** made up of heart tissue.



▶ The parts of an **organ system** work together to do a job for the body.



READING FOCUS SKILL

MAIN IDEA AND DETAILS

The **main idea** is what the text is mostly about.

Details are pieces of information about the **main idea**.

Look for **details** about cells.

Cells As Building Blocks

A **cell** is the basic unit of structure and function in living things. Every living thing is made up of cells.

Some living things have only one cell. Most living things have many cells. Most cells can be seen only with a microscope.

Plants and animals have different types of cells. Each type of cell has its own job. The cells work together to keep an organism alive and healthy. Each cell contains structures called *organelles*. Organelles have important jobs that keep the cell alive.



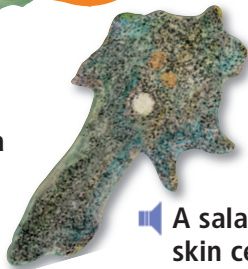
What is one detail about cells?

Cells



The outer cells of this plant's leaf help keep the plant from losing too much water. The leaf's inner cells make food for the plant.

The single cell that makes up this amoeba [uh•MEE•buh] carries out all the functions that the organism needs to stay alive.



A salamander's skin cells don't look like a plant's cells, but they also help keep the organism from drying out.

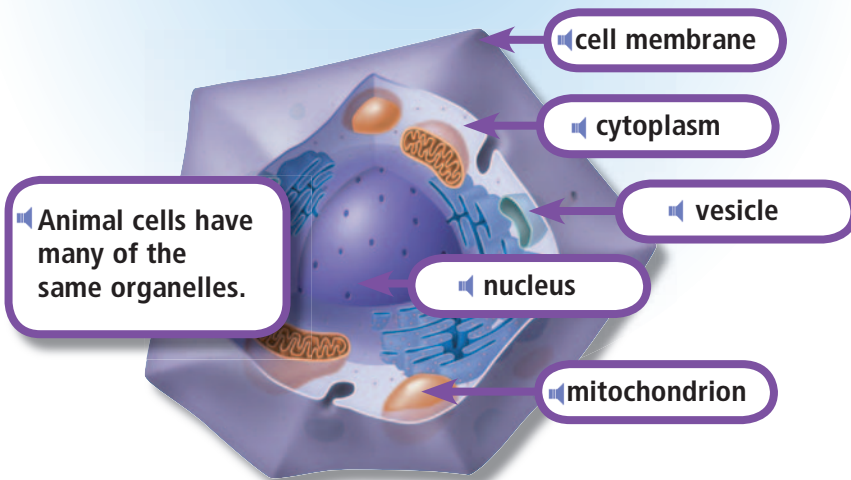
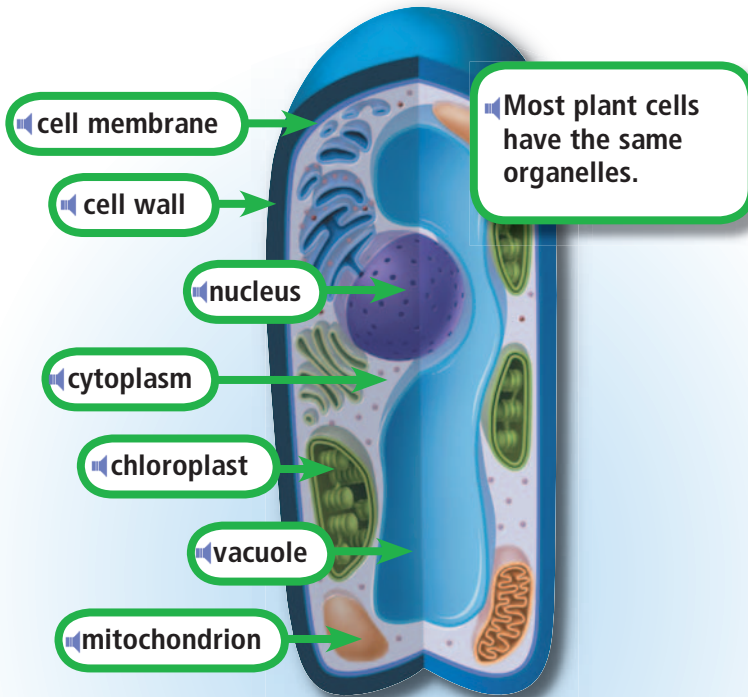


Cell Structures and Functions

▶ All plant and animal cells have certain organelles in common. A cell membrane is an organelle that keeps a cell together. A nucleus is another organelle. It directs all of a cell's activities.



▶ What organelle directs all the functions of a cell?



Cells, Tissues, Organs, Systems

Many-celled organisms like you have trillions of cells. **Tissue** is formed by cells that work together for a special job. Tissues work together in organs. An **organ** is made up of different kinds of tissues working together. Every organ has a special job in the body.

Different organs also work together in special ways for the body. Organs that work together form an **organ system**.



What is one detail about how cells work together?

The lungs, heart, and stomach are part of different organ systems.



Transport in Multicellular Organisms

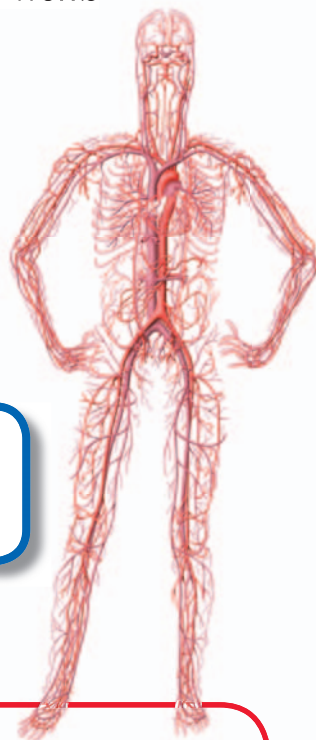
▶ All cells in plants and animals need certain things to live. They need oxygen, water, nutrients, and food. Most plants and animals have structures to bring these things to each cell.

▶ The structures of the circulatory system bring oxygen and nutrients to cells. The circulatory system also works with other organ systems. They work together to remove wastes made by cells.



Does the circulatory system remove cell wastes by itself? Explain.

▶ The circulatory system helps bring food to cells and remove waste.



Review



▶ Complete this **main idea** statement.

▶ 1. All living things are made up of _____ .

▶ Complete these **detail** statements.

▶ 2. Most cells can only be seen with a _____ .

▶ 3. Cells have a _____ that directs all of the cell's activities.

▶ 4. Tissue is formed by _____ that work together.

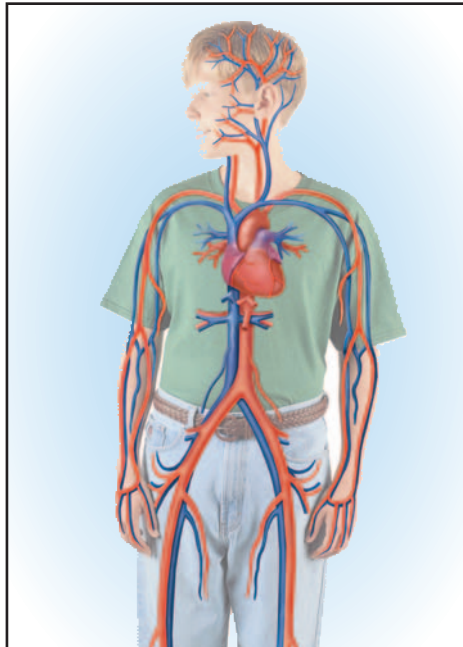
**VOCABULARY**

circulatory system



respiratory system

How Do the Circulatory and Respiratory Systems Work Together?



The heart, blood vessels, and blood make up the **circulatory system**.



■ Your **respiratory system** includes your lungs and other organs and tissues. They work together to let you breathe.



READING FOCUS SKILL

SEQUENCE

When you put things in a **sequence** you put them in order.

Follow the **sequence** of blood as it moves through the body.

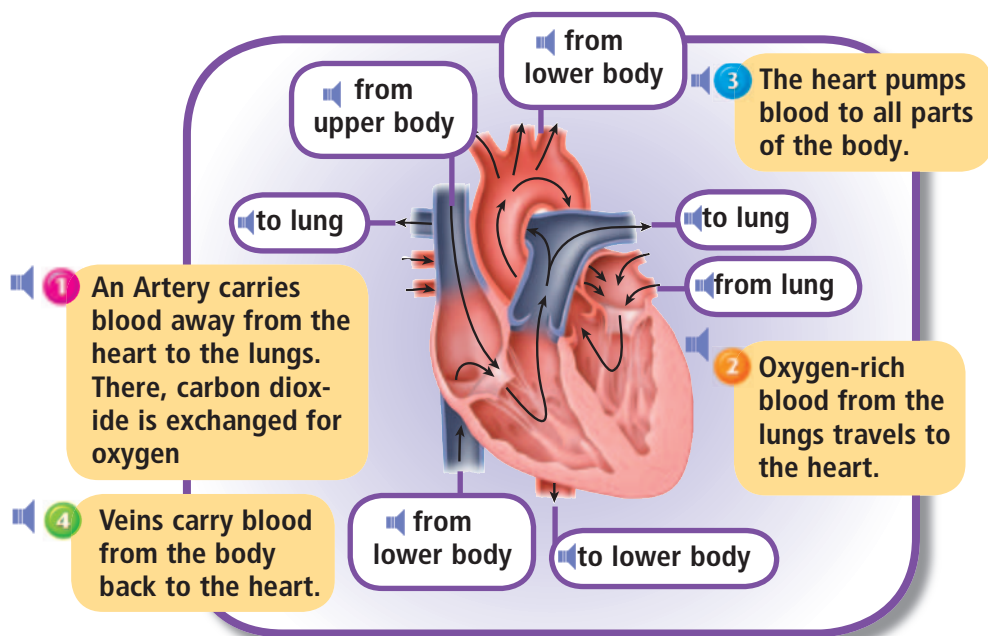
The Heart

■ The heart is a muscular pump. It carries blood to all parts of the body. Blood travels in a certain path.

■ Blood from the body returns to the right side of the heart. The heart then pumps it to the lungs. The lungs take carbon dioxide out of the blood. The blood gets oxygen from the lungs. This oxygen-rich blood goes to the left side of the heart. The blood is then pumped to all body cells.



What path does blood follow from the body to the left side of the heart?

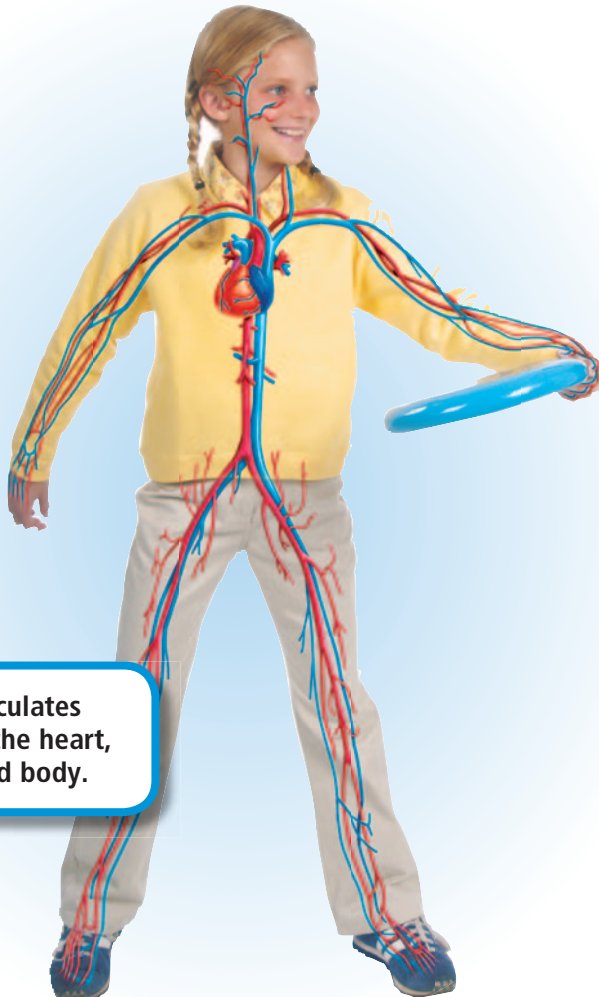


The Circulatory System

🔊 The **circulatory system** is one of the body's most important systems. The circulatory system transports blood loaded with oxygen and nutrients. It brings food to each cell of the body. It also takes away wastes from the cells. The circulatory system is made up of the heart, blood vessels, and blood.



**What does the circulatory system bring to cells?
What does it take away?**



🔊 Blood circulates through the heart, lungs, and body.

The Respiratory System

■ Your cells need oxygen. The **respiratory system** makes it possible for the blood to get oxygen for your cells. The respiratory system is a group of organs and tissues. They exchange oxygen and carbon dioxide between your body and your environment.

■ Air travels from your nose or mouth into the trachea. It travels through smaller and smaller tubes in the lungs. The smallest tubes are where oxygen is exchanged with carbon dioxide.



What path does air take when you inhale?



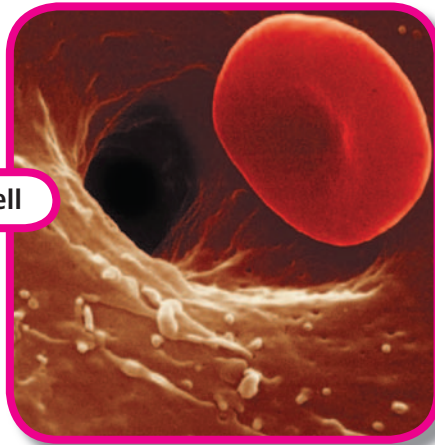
■ Follow the path of oxygen into the musician's body.

Working Together

Our organ systems are always working together for us. You inhale air and take in oxygen. Oxygen moves from the respiratory system into the blood. Carbon dioxide moves from the blood into the respiratory system. Carbon dioxide leaves the body when you exhale. The exchange of gases takes place in the lungs.



How does oxygen get from the air into your blood?



A blood cell

Review



Complete these **sequence** statements.

1. Oxygen enters the respiratory system from the _____ you breathe in.
2. _____ from the air you inhale enters the blood.
3. The _____ transports blood loaded with oxygen and nutrients to cells.
4. _____ leaves the body when you exhale.

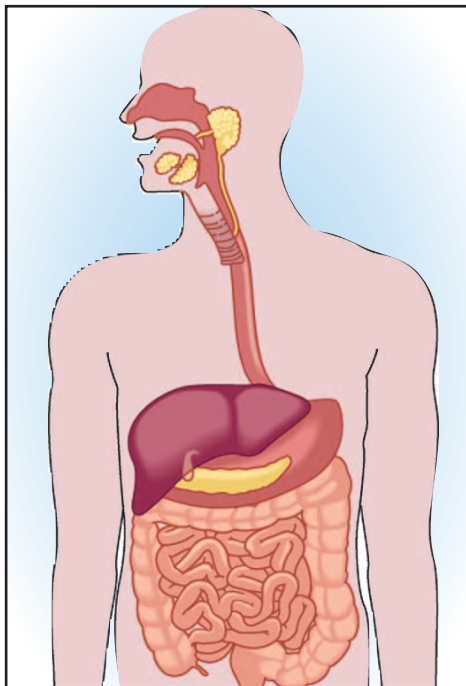


VOCABULARY



digestive system

How Do the Organs of the Digestive System Work Together?



🔊 Your **digestive system** breaks down food.



READING FOCUS SKILL

SEQUENCE

When you put things in **sequence** you put them in order.

See if you can follow the **sequence** of digestion.

Food Breaks Down

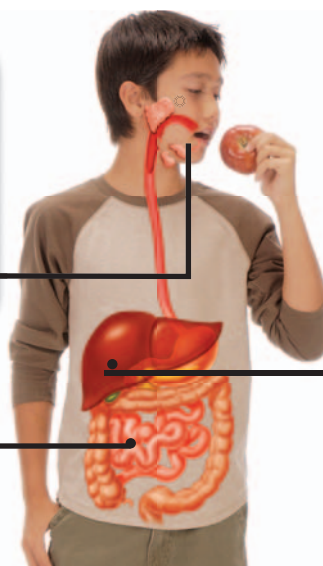
- ▶ The organs of the **digestive system** break down food. These organs are the mouth, esophagus, stomach, small intestine, and large intestine.
- ▶ Your digestive system breaks down food into nutrients. Your cells need nutrients.
- ▶ Your teeth grind food into smaller pieces. The saliva in your mouth begins the digestion of food. Food then travels down the esophagus to the stomach. In the stomach, strong muscles mix the food with digestive juices.



What path does food follow from the mouth to the stomach?

▶ Digestion begins in the mouth. There, your teeth and tongue break food into smaller pieces. Saliva helps soften the food and also begins the digestion of starches.

▶ In the small intestine, digestion is completed. The nutrients pass into capillaries in the villi (vil-eye) and then go to your body's cells.



▶ In the stomach, food mixes with digestive juices. When the food is nearly liquid, it passes into the small intestine.

Water and Nutrients Are Absorbed

Partly digested food flows from the stomach into the small intestine. Chemicals from the liver and pancreas break food down more. Nutrients are absorbed into the blood.

Some food cannot be broken down any further. This food moves into the large intestine. Water from this food is absorbed into the body. What remains is a solid waste called feces. The colon stores it until it is passed from the body.



What path does food follow from the stomach to the colon?

Review



Complete these **sequence** statements.

1. Your teeth grind food, and then _____ begins the digestion of food.
2. Food travels down the esophagus to the _____ .
3. Food flows from the stomach into the _____ .
4. Feces move from the _____ to the colon.



How Do Plants and Animals Rid Themselves of Wastes?



VOCABULARY



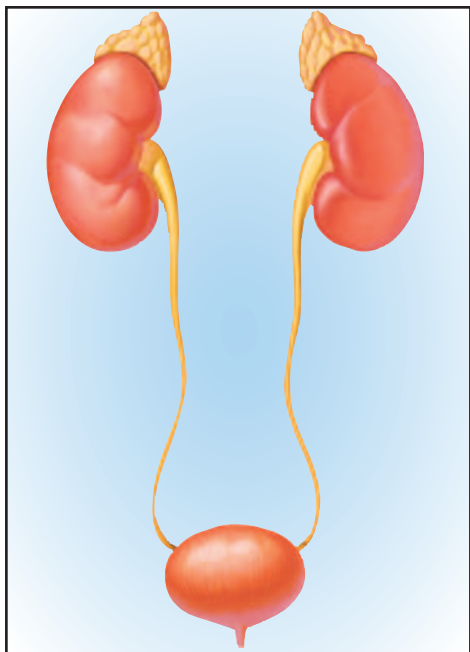
excretory system



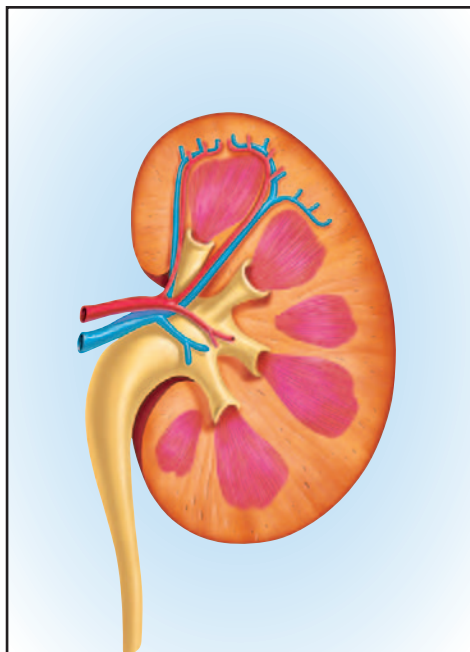
kidney



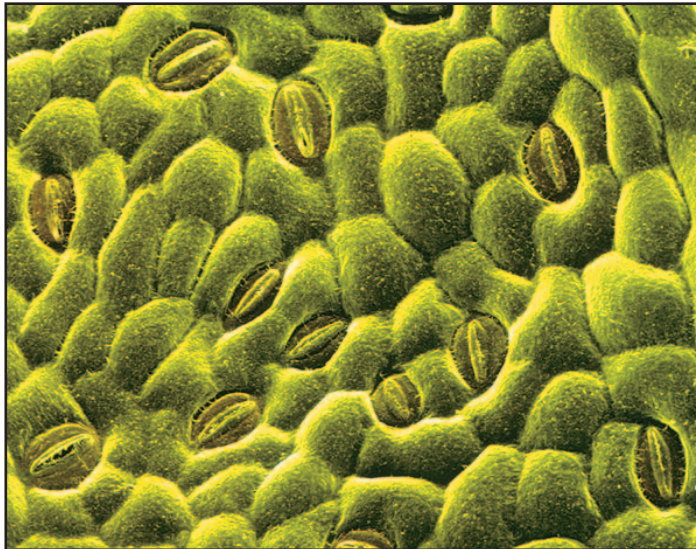
transpiration



Your **excretory system** removes waste from your body.



Your **kidneys** are the main organs in your excretory system.



Water moves out of plants through tiny holes in the leaves. This is called **transpiration**.



READING FOCUS SKILL

COMPARE AND CONTRAST

You **compare** when you look at how things are alike.
You **contrast** when you look at how things are different.

Compare and **contrast** the ways animals and plants rid themselves of waste.

The Excretory System

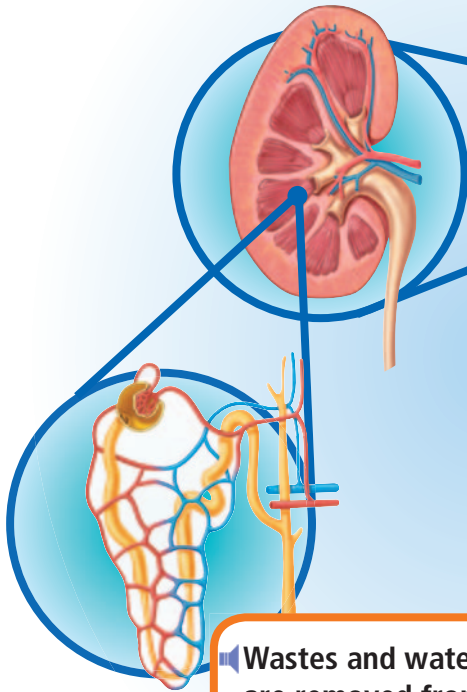
■ Your body must remove the things it doesn't need. Carbon dioxide is a waste gas. It is removed from the body as you exhale. Other wastes are removed by the **excretory system**. This system is made up of the kidneys, ureters, bladder, and urethra.

■ Ammonia is a waste. The blood carries it to the liver. There it is converted to urea. The blood moves it to the bladder as urine. There it is stored until the bladder is full. Then it is removed from the body. Urine flows out of the body through the urethra.



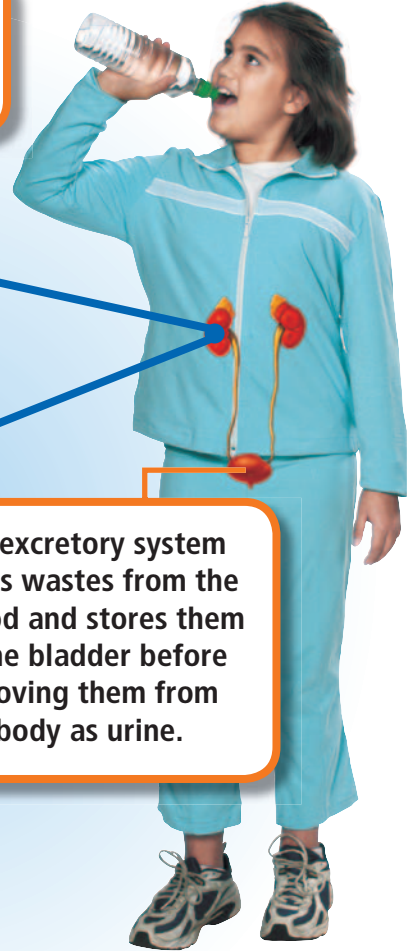
Carbon dioxide is removed differently than other wastes. Can you tell how it is different?

▶ The excretory system keeps the amount of water in the body fairly constant.



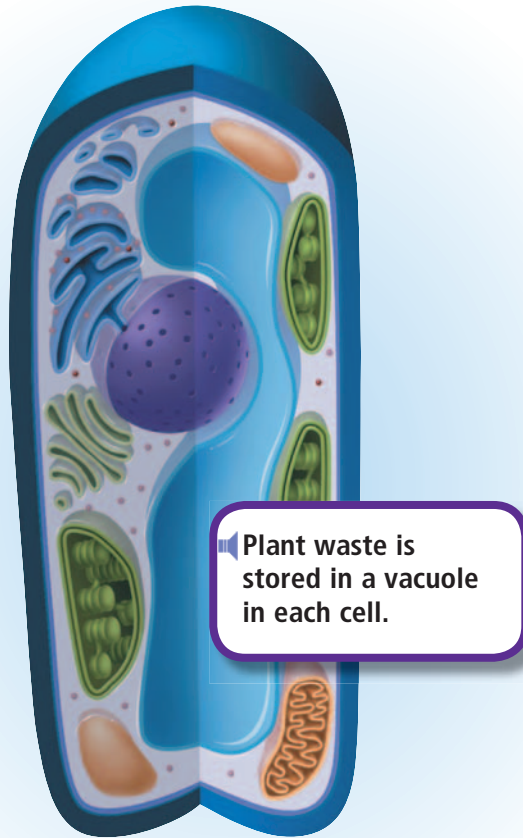
▶ The excretory system takes wastes from the blood and stores them in the bladder before removing them from the body as urine.

▶ Wastes and water are removed from the capillaries that run through the kidneys. Materials that the body needs are returned to the capillaries.



How Plants Rid Themselves of Wastes

- Plant cells also produce wastes. Plant waste material includes oxygen and water. Vascular plants have structures that remove wastes.
- Plants do not have an excretory system. Instead, plants store cell wastes until they can be removed.
- Some plants store wastes in organs that will fall off. An example is leaves that drop off in the autumn. The mariposa lily stores wastes in stems and leaves that die each year. Most plants store wastes in cells.



Plants do not have lungs to exhale waste gas. They do not have kidneys to filter and remove water. Wastes move out of plants through tiny holes. The holes are on the undersides of leaves. Water moves out of plants in a process called **transpiration**. During transpiration, water moves up through a plant. The water passes through the tiny holes and evaporates.



Contrast the ways plants and animals remove waste.

Review



Complete these **compare and contrast** statements.

1. Carbon dioxide is removed from the body as you exhale. Other cellular wastes are removed by the _____ .
2. Like animal cells, plant cells also produce _____ .
3. Unlike animals, plants do not have an _____ .
4. Animals have kidneys to _____ waste, but plants do not.

GLOSSARY

-  **cell** [SEL] The basic unit of structure and function in all living things.
-  **circulatory system** [SER•kyoo•luh•tawr•ee sis•tuhm] A group of organs that transports needed materials throughout the body.
-  **digestive system** [dih•JES•tiv sis•tuhm] The organ system that breaks down food into chemical nutrients the body can use.
-  **excretory system** [EKS•kruh•tawr•ee sis•tuhm] The system that removes wastes from the body.
-  **kidney** [KID•nee] The main organ of the excretory system.
-  **organ** [AWR•guhnh] A group of tissues that work together to perform a certain function.
-  **organ system** [AWR•guhnh sis•tuhm] A group of organs that work together to do a job for the body.
-  **respiratory system** [RES•per•uh•tawr•ee sis•tuhm] A group of organs and tissues that exchange oxygen and carbon dioxide between your body and the environment.
-  **tissue** [TISH•oo] A group of cells that work together to perform a certain function.
-  **transpiration** [tran•spuh•RAY•shuhn] The process by which water moves up and out of plants through tiny holes in their leaves.

Think About the Reading

-  **1.** What can you do to help you remember what you have learned?
-  **2.** What questions do you have after reading this book? How can you find the answers?

Hands-On Activity

Use a resealable bag and a cracker to show what the digestion of a cracker might look like.

-  **1.** Place the cracker in the bag. Put in a tablespoon of water.
-  **2.** Close the bag and crush the cracker with your fingers. Continue crushing it until it is a smooth paste.

School-Home Connection

Explain to a family member what you have read about the structures of living things. Then ask that person to describe some of the structures of a living thing.