

SECTION 2 The Urinary System

BEFORE YOU READ

After you read this section, you should be able to answer these questions:

- What is the function of the urinary system?
- How do the kidneys filter the blood?
- What are common problems with the urinary system?

National Science Education Standards
LS 1a, 1c, 1d, 1e, 1f, 3a, 3b

What Does the Urinary System Do?

As your cells break down food for energy, they produce waste. Your body must get rid of this waste or it could poison you! As blood moves through the body and drops off oxygen, it picks up the waste from cells. The **urinary system** is made of organs that take wastes from the blood and send them out of the body.

The chart below describes the main organs of the urinary system.

Organ	What it looks like	Function
Kidneys	a pair of organs	to clean the blood and produce urine
Ureters	pair of thin tubes leading from the kidneys to the bladder	to carry urine from the kidneys to the bladder
Urinary bladder	a sac	to store urine
Urethra	tube leading from the bladder to outside your body	to carry urine out of the body

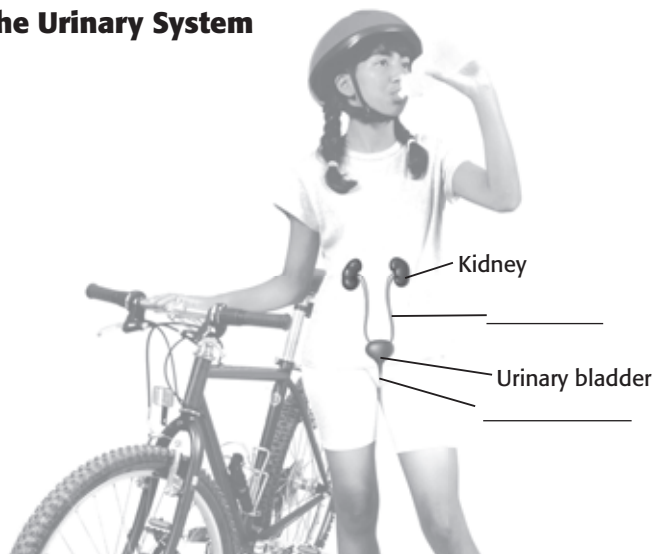


Underline As you read, underline any unfamiliar words. Use the glossary or a dictionary to find out what these words mean. Write the definitions in the margins of the text.

TAKE A LOOK

1. Identify Which organs clean the blood?

The Urinary System



TAKE A LOOK

2. Identify Use the chart above to help you label the organs of the urinary system.

SECTION 2 The Urinary System *continued*

Math Focus

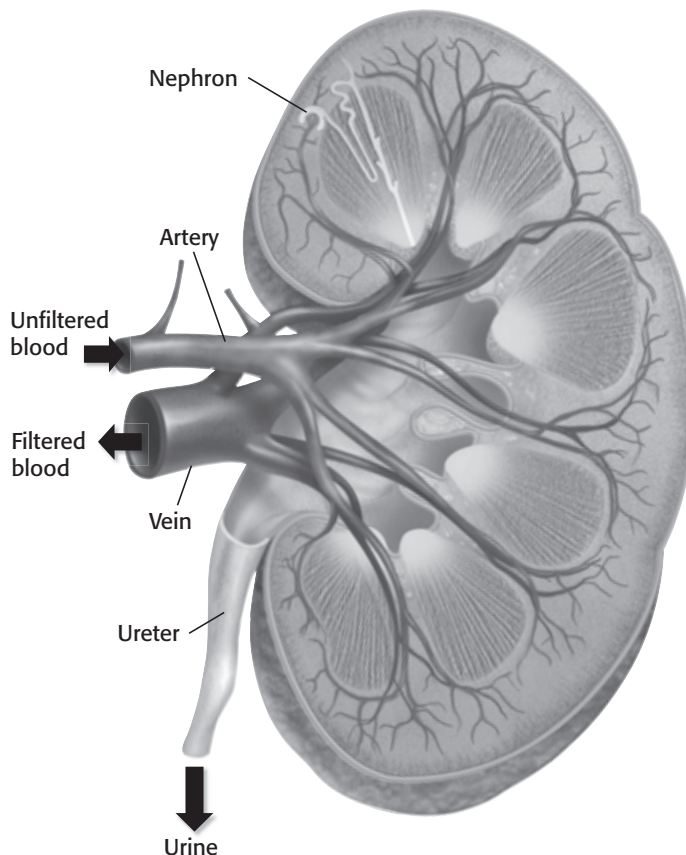
3. Calculate Your kidneys filter about 2,000 L of blood each day. Your body has about 5.6 L of blood. About how many times does your blood cycle through your kidneys each day?

How Do the Kidneys Clean the Blood?

The **kidneys** are a pair of organs that clean the blood. Each kidney is made of many small filters called **nephrons**. Nephrons remove waste from the blood. One of the most important substances that nephrons remove is urea. *Urea* is formed when your cells use protein for energy. The figure below shows how kidneys clean the blood.

How the Kidneys Filter Blood

- 1** Blood enters the kidney through an artery and moves into nephrons.
- 2** Water, sugar, salts, urea, and other waste products move out of the blood and into the nephron.
- 3** The nephron returns most of the water and nutrients to the blood. The wastes are left in the nephron.
- 4** The cleaned blood leaves the kidney and goes back to the body.
- 5** The waste left in the nephron is a yellow fluid called *urine*. Urine leaves the kidneys through tubes called *ureters*.
- 6** The urine is stored in the bladder. Urine leaves the body through the urethra.



TAKE A LOOK

4. Explain What happens to blood after it is cleaned in the kidneys?

5. Identify What structures carry urine from the kidneys?

SECTION 2 The Urinary System *continued*

How Does the Urinary System Control Water?

You lose water every day in sweat and urine, and you replace water when you drink. You need to get rid of as much water as you drink. If you don't, your body will swell up. Chemical messengers called *hormones* help control this balance.

One of these hormones is called *antidiuretic hormone* (ADH). ADH keeps your body from losing too much water. When there is not much water in your blood, ADH tells the nephrons to put water back in the blood. The body then makes less urine. If there is too much water in your blood, your body releases less ADH.



Drinking water when you exercise helps replace the water you lose when you sweat.

Some drinks contain caffeine, which is a diuretic. *Diuretics* cause kidneys to make more urine. This means that a drink with caffeine can actually cause you to lose water.

What Problems Can Happen in the Urinary System?

The chart below shows some common problems of the urinary system.

Problem	Description	Treatment
Bacterial infections	Bacteria can infect the urinary system and cause pain or permanent damage.	Antibiotics
Kidney stones	Wastes can be trapped in the kidney and form small stones. They can stop urine flow and cause pain.	Most can pass out of the body on their own. Some may need to be removed by a doctor.
Kidney disease	Damage to the nephrons can stop the kidneys from working.	A kidney machine can be used to filter the blood.

Critical Thinking

6. Infer What do you think happens when your body releases less ADH?

TAKE A LOOK

7. Explain What problems do kidney stones cause?

Section 2 Review

NSES LS 1a, 1c, 1d, 1e, 1f, 3a, 3b

SECTION VOCABULARY

kidney one of the pair of organs that filter water and wastes from the blood and that excrete products as urine

nephron the unit in the kidney that filters blood

urinary system the organs that make, store, and eliminate urine.

1. **List** What are the main organs that make up the urinary system?

2. **Summarize** Complete the process chart to show how blood is filtered.

a. Water is put back in the blood.



b. Blood goes into the kidney.



c. Water and waste go into the nephron.



d. Nephrons separate water and waste.

3. **Apply Concepts** Which of the following has more water: the blood going into the kidney, or the blood leaving it? Explain your answer.

4. **Explain** How does the urinary system control the amount of water in the body?

5. **Infer** Is it a good idea to drink beverages with caffeine when you are exercising? Explain your answer.

