Healthy Water Healthy People

How does your body use water?

GRADE LEVEL

- 3-6

SUBJECT AREAS

- Health, Life Science, Environmental Science

SKILLS

- Organize, Analyze, Interpret, Evaluate, Technology

VOCABULARY

Abdominal, alveoli, carbon dioxide, cartilage, cell, cilia, dehydration, digestion, duct, excretion, evaporate, feces, femur, fibula, gastric juices, gland, hydration, ingest, involuntary muscles, MRI, mucous, mucous membranes, nutrient, olfactory bulb, organ, perspiration, plasma, platelets, pore, respiration, saliva, synovial fluid, tibia, tissue, urea, voluntary muscles, water balance

CONTENTS

MEASURABLE OBJECTIVES

The learner will:

- Identify roles water plays in the different parts of the body.
- Determine why it is important to keep the body hydrated.

BACKGROUND AND TEXT OVERVIEW

INTRODUCTION

All living things contain water. In fact, your body is mostly water, even though you don't feel wet or make sloshing sounds. Most of the water in your body is contained within your cells—in your blood and tissues. Water keeps your organs moist and helps your systems function.

IMPORTANCE OF WATER TO YOUR BODY

There is a direct relationship between healthy water and healthy people. People need large supplies of healthy water to live. Humans can survive for a month without food but only a week without fresh water to drink.

LOCATION OF WATER IN YOUR BODY

Where is water located within the body? Water is found throughout our bodies, in all of our cells, tissues and organs. Body parts also vary in their water content.

WATER BALANCE AND HYDRATION

Your body is constantly losing water—as waste and through perspiration (sweating) and respiration (breathing). In fact, our bodies lose about 300ml (about 10 ounces) of water a day through breathing; about 450 ml (about 15 ounces) of water a day through our skin; about 1.6 liters (about 54 ounces) per day through urination; about 200 ml (about 7 ounces) of water a day through defecation. An average adult loses about 2.5 l (about 85 ounces) of water each day—and

Organ	Percentage Water
Skin	64
Skeleton (bones)	31
Muscle	79
Brain	73
Liver	71
Heart	73
Lungs	83
Kidneys	79

Food	Percentage Water
Watermelon	92
Pineapple	80
Yogurt	85
Apple	84
Carrot	87
Broccoli	91
Lettuce	95

more water can be lost through increased activity (exercise).

Maintaining a healthy water balance means constantly replacing the water going out with water coming in to stay hydrated. We do this through drinking water and ingesting water in the food that we eat. We get about 1/3 of our water daily through foods.

DEHYDRATION
Sometimes when we feel tired, it can be caused by not drinking enough water to stay properly hydrated. Dehydration is when your body does not have enough water.

Symptoms of Dehydration

- Thirst
- Dry lips and mouth
- Dark urine
- Less frequent urination
- Sunken eyes
- Tiredness

The exact amount of water you need to consume everyday varies by age, body type, the climate you live in and your activity level. If you are exercising hard or if you are sick, you may need to drink even more water.

Steps to Staying Hydrated

- Monitor urine color
- Drink before you are thirsty
- Drink more water in warm weather
- Drink water before, during and after participating in physical activity (sports)

WATER QUALITY
Healthy water is water that supports and sustains life. It is water of sufficiently high quality to meet a user's needs. Many years ago, people used water and returned it to streams, rivers or oceans without cleaning (wastewater treatment). This resulted in polluted waters. Today, we have learned the importance of protecting water quality, and we take extraordinary steps to clean water before and after it is used. For drinking water, governments set acceptable levels for all physical, chemical and biological parameters. This insures that water that has been treated before it reaches your faucet is safe for you to drink.

We know water is important for our bodies, but how do our bodies actually use water? Doctors have machines that are able to take pictures of the inside of your body—like X-rays but more than the bone is visible. These are called MRI machines—Magnetic Resonance. Here MRI stands for My Real Insides--you can use this MRI vision to see how the body uses water.

Brain
You brain is responsible for controlling nearly all of your body's functions. Your brain processes touch and pain, coordinates balance and movement, controls vital body processes including heartbeat and breathing. Your brain controls chemical messengers that can make you feel hungry or thirsty and control your body temperature. Your brain controls your memory, speech, hearing and sight. Creativity and emotions are also your brain's responsibility. Your brain is about 73 percent water. Water keeps the brain active and alert.

Eyes
Your eyes are like a window transmitting and collecting visual information about the world around you. They allow you an up-to-date, three dimensional,

full color view that your brain processes. Your eyes continually produce tears, which contain water and clean dust and germs from your eyes when you blink. This fluid then drains through the tear ducts into the nose.

Nose
We use our noses for smelling, but the nose plays another important role in the body. The nose is lined with moist tissue called mucous membranes. When air is breathed in through the nose, it is warmed and moistened before entering the lungs. Also, watery mucous in the nose, as well as small hairs called cilia, catch dust and germs from the air that we breathe.

Mouth
The mouth contains glands that produce saliva, a substance that is more than 99 percent water. Saliva helps us not to choke on our food, aids in our sense of taste, helps us to speak, starts the process of digestion and helps to protect our mouth from germs and our teeth from erosion.

Lungs
The lungs are the organ the body uses for respiration—breathing. The lungs contain hundreds of thousands of tiny air sacs called alveoli. They look like tiny clusters of grapes. It is through the alveoli that oxygen is transferred to the blood and carbon dioxide is removed from the blood stream. Mucous, which is largely water, is present in the lungs to trap germs and protect the lungs from infection. The lungs are about 83 percent water.

Blood
Over half of blood is water. Water keeps blood fluid. Blood moves oxygen, nutrients and waste to and from all areas of the body. Blood transports sugar which is used to produce energy for your muscles and brain. Blood also carries germ-fighting white blood cells and can clot and create a scab if the skin is cut. Blood helps to control the body's temperature. Warmer blood is circulated near the skin surface where heat is released and then the cooler blood is redistributed throughout the body.

Muscles
All of your movements happen because of muscles. Your brain controls the movements of your muscles. Muscles attached to your bones, called skeletal muscles, are used in everyday activity. If you decide you want to stand up or run, you are using these voluntary muscles. Involuntary muscles, such as some abdominal muscles, or the muscles around your heart, allow your body to digest or your heart to keep beating even if you are asleep. Muscle tissue is about 79 percent water. Water helps maintain muscle tone.

Skin
Your skin is your largest and heaviest organ. Your skin provides a protective barrier for your insides, houses you sense of touch and helps control your body temperature. Water helps control body temperature and moves waste out of the skin. When we sweat through our skin's pores, the sweat evaporates and cools the body. Water also keeps the skin supple.

Kidneys
Your kidneys are organs that filter waste materials from your blood. Wastes, called urea, are removed from the blood as it flows through the kidneys. The urea is then dissolved in water to be released from the body as urine. The kidneys control the amount of water removed from the body as urine. If you don't drink enough water, your urine may be more concentrated and darker in color.

Stomach, Small and Large Intestine
In the stomach, gastric juices containing water break down food. Nutrient particles from food are absorbed in the small intestine as the food passes through. In the large intestine, leftover food materials are consolidated into waste to be removed from the body as feces. Feces are normally about 75 percent water. Any excess water that the body can reuse is reabsorbed by the large intestine.

Joints
Joints are places in the body where two bones meet. Joints like your knees, elbows, hips and ankles allow parts of your body to move relative to each other. Where bones end in joints, a smooth substance called cartilage that can contain up to 70 percent water helps them slide without grinding. A gel-like fluid, which contains water also helps cushion the bones and allow the joints to move smoothly.

ACTIVITIES

WATER IN THE BODY ACTIVITY
Please see *Water in the Body Activity* student copy page.

ANSWER KEY
Please see *Water in the Body Activity* answer key.

TAKE ACTION!

POSTER ITEMS

1. I will drink enough water everyday to stay hydrated.
2. I will do something active every day to help keep my body and mind healthy—ride a bike, play a sport or go for a walk!
3. I will wash my hands with warm soapy water after I use the bathroom and before I prepare or eat food to control the spread of germs.

ACTIVITIES

- Students create a school yearbook that allows each of them to provide their water profile. Combine totals to see how many gallons of water are represented by the class, school or even local community (based on population size). Display this information in public places where community members can observe.
- Organize a health fair for your parents and school.
- Create posters to remind others to hydrate, wash their hands to prevent the spread of disease, exercise and so forth and place them throughout the community.
- Ride your bike whenever you can. Every four-mile trip you cycle instead of riding in a car reduces 15 pounds of air pollution and makes you healthier.
- For cold drinks, keep a pitcher of water in the refrigerator instead of running the tap. This way, every drop of water goes down you and not the drain.
- Drink enough water to stay hydrated. Boys and girls of different ages need to drink different amounts of water. On the Internet, research how much water you need to drink and healthy hydration habits.

ASSESSMENTS

PRETEST/POSTTEST

Before students visit the *Healthy Water Healthy People Unit* of the *Discover Water* website, have them take the following quiz to see what they already know about water and their bodies. Have students take the same quiz again as a posttest to measure learning.

PRETEST/POSTTEST ANSWER KEY

1. True
2. All of the above
3. True
4. All of the above
5. All of the above
6. All of the above
7. True

CRITICAL THINKING QUESTIONS

LEVEL 1

What is dehydration? How can you tell if you are dehydrated?

Answers should discuss the idea that dehydration means not having enough water in the body. If a person is dehydrated, they may feel thirsty and have additional symptoms including: headache, tiredness, dark colored urine and more.

LEVEL 2

How does your body use water?

Answer should include discussion of various body parts included in the Water and the Body online activity and how they utilize water. Examples of these body parts and how they use water are listed above in the Water and the Body Activity Answer Key.

LEVEL 3

Describe water balance—how does the body lose and gain water?

Answers should include discussion to the affect that to stay healthy, the amount of water going into the body should equal the amount of water leaving the body. The body loses water through perspiration (sweating), respiration (breathing) and elimination of waste. The body gains water through drinking and eating.

WHAT DID I LEARN? ONLINE QUIZ ANSWER KEY

Q. What percentage of your body is water?

A. 60%

Q. The main control center for your body is _____.

A. Your brain

Q. Mucous helps protect your body from germs.

A. True

Q. The muscles that control your heart beat are _____.

A. Involuntary

Q. Your skin helps control your body temperature by producing sweat, which evaporates and cools your body.

A. True

EXTENSIONS

Ideas for ways to support and expand lesson plans about this topic or provide additional activities for advanced learners.

- Challenge students to keep

track of how much fluid they ingest for one day or one week. Are they staying hydrated?

RESOURCES

PROJECT WET RESOURCES

Project WET KIDS (Kids in Discovery Series) Booklets

- *Healthy Water, Healthy People*
- *Water, Every Drop Counts*

Project WET Curriculum and Activity Guide 2.0 Activities

- *A Grave Mistake*
- *Aqua Bodies*
- *Aqua Notes*
- *Germ Busters*
- *Healthy Habits*
- *On Track with Hydration*
- *Poison Pump*
- *Storm Water*
- *The Life Box*
- *The Pucker Effect*
- *Water Quality? Ask the Bugs!*

ADDITIONAL STUDENT RESOURCES

Royston, Angela. 2009. *Water and Fiber for a Healthy Body*. Chicago, IL: Heinemann Library.

Kurtz, Jane, and Christopher Kurtz. 2002. *Water Hole Waiting*. New York, NY: Greenwillow Books.

Kerley, Barbara. 2006. *A Cool Drink of Water*. Des Moines, IA: National Geographic Children's Books.

Hidalgo, Maria. 2003. *Water*. Mankato, MN: Creative Education.

ADDITIONAL EDUCATOR RESOURCES

Freedman, Marjorie R. and Audrey Nickell. 2010. "Impact of After-School Nutrition Workshops in a Public Library Setting." *Journal of Nutrition Education and Behavior*, 42 (3), 192-196.

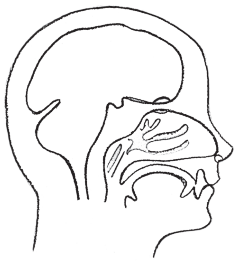
Schuster, Mark A. 2008. Availability of Drinking Water in California Public Schools. Testimony Presented before the California State Assembly Subcommittee on Education on April 2, 2008.

Symons, Dr. James M. 1997. *Plain Talk About Drinking Water: Questions and Answers About the Water You Drink*. New York, NY: American Water Works Association.

The Watercourse and Project WET. 2003. *Healthy Water Healthy People Water Quality Educators Guide*. Bozeman, MT: The Watercourse.

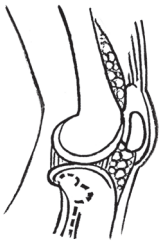
WATER IN THE BODY ACTIVITY

Use this worksheet while completing the online *Water in Your Body Activity*. Draw a line to match each drawing to its label. Then, write at least one way that water plays a role in that part of the body (see example below).



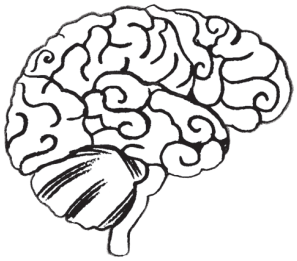
MOUTH

Glands in the mouth produce saliva which is mostly water. Saliva helps break down food in the first step of digestion. Saliva also helps with speech.

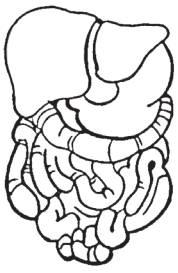


BLOOD

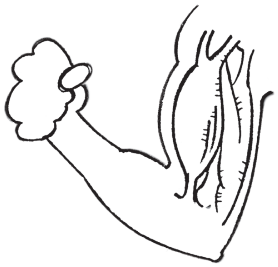
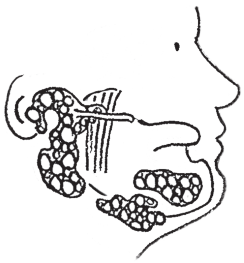
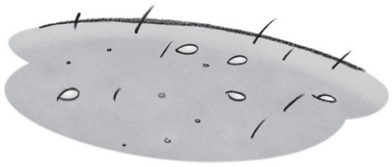
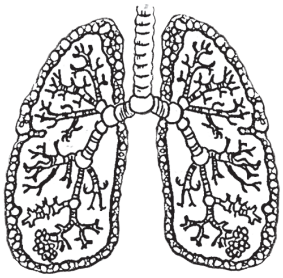
NASAL CAVITY



STOMACH, SMALL AND LARGE INTESTINES

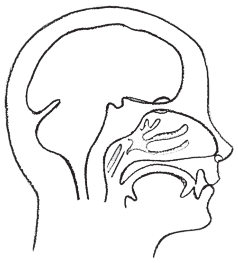


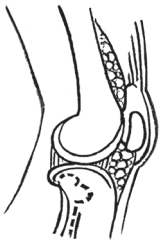
EYE

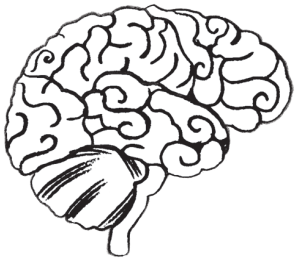
	**SKIN**
	**BRAIN**
	**KIDNEY**
	**JOINT**
	**LUNGS**
	**MUSCLE**

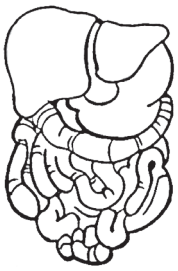
WATER IN THE BODY ACTIVITY (Answer Key)

Use this worksheet while completing the online *Water in Your Body Activity*. Draw a line to match each drawing to its label. Then, write at least one way that water plays a role in that part of the body (see example below).









MOUTH

Glands in the mouth produce saliva which is mostly water. Saliva helps break down food in the first step of digestion. Saliva also helps with speech.

BLOOD

Blood is over half water. It is responsible for moving oxygen and energy throughout the body, and carrying waste away from all areas of the body. Blood also plays a role in keeping us healthy by attacking infection, and helps maintain body temperature.

NASAL CAVITY

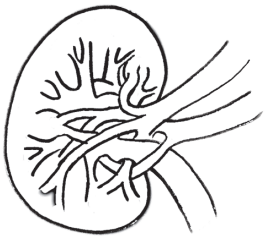
Watery mucous in the nose helps catch dust and germs before they enter the body.

STOMACH, SMALL AND LARGE INTESTINES

Gastric juices in the stomach, which help break down food, contain water. Water and food is broken down and absorbed in the stomach, small and large intestine. Feces, which is about 75 percent water is formed in the large intestine.

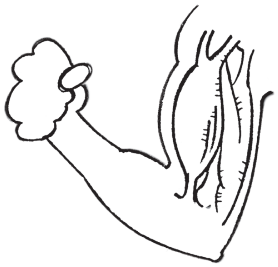
EYE

Glands above the eyes produce tears (which are mostly water) that coat the eye and keep it clean.



SKIN

Perspiration, which is mostly water, helps control body temperature through the skin.

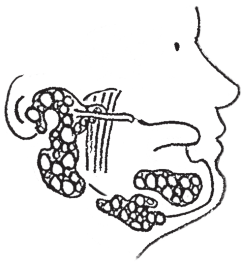


BRAIN

Brain tissues are nearly 75% water. The brain is the control center for the body. It controls body functions such as: vision, speech, hearing, memory, learning, movement, touch, pain, balance, hunger, thirst, heartbeat, breathing and blood pressure.

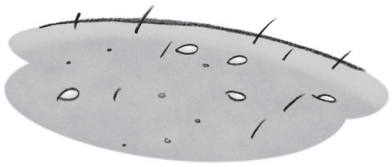
KIDNEY

The kidneys filter waste from the blood and remove it to the urine.



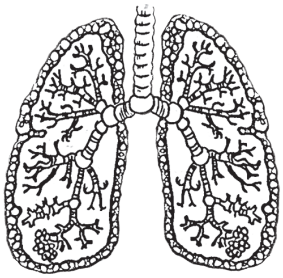
JOINT

Cartilage and fluid in joints contain water and help to cushion and lubricate bones as they move against each other.



LUNGS

Lung tissue is about 83 percent water. Lungs are responsible for moving oxygen to the blood and body and removing waste from the body as we breathe. Watery mucous in the lungs helps catch germs.



MUSCLE

Muscle tissue is about 79 percent water. Muscles enable all body movement, including the beating of the heart.

Healthy Water Healthy People Unit Pretest/Posttest

1. True or false, most of the water in your body is contained within cells in your blood and tissues?

2. Your body loses water as:
   a. Perspiration (sweat)
   b. Respiration (breathing)
   c. Urination
   d. All of the above

3. True or false, you consume water by both eating and drinking?

4. A symptom of dehydration is:
   a. Thirst
   b. Dark urine
   c. Tiredness
   d. All of the above

5. A factor that affects how much water you need to drink is:
   a. Climate
   b. Activity level
   c. Illness
   d. All of the above

6. A way to stay hydrated is:
   a. Drink water before you feel thirsty
   b. Drink more water in warm weather
   c. Drink water before, during and after participating in physical activity
   d. All of the above

7. True or false, many fruits and vegetables contain a high percentage of water.

Score: ___/7