

THE STORY OF DRINKING WATER

SECOND EDITION
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The Story of Drinking Water: An Activity Book for Grades 4-6

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Educational Editor: Kelley Staggs

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AWWA Publications Manager: Gay Porter De Nileon

Production Editor: Cheryl Armstrong

Library of Congress has been applied for....

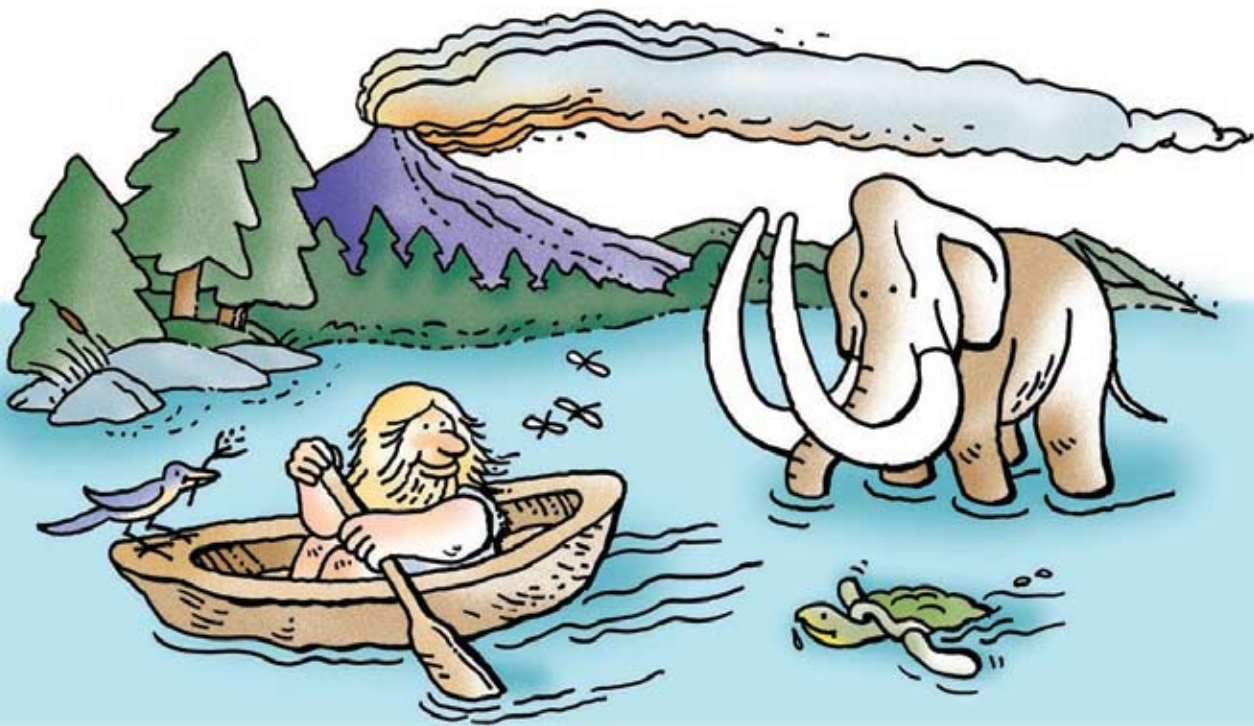
ISBN 1-58321-812-2

978-1-58321-812-9



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What is the story of water?

The story of water begins thousands of years ago in prehistoric times. Even then people built their homes on lakeshores or along rivers so they had water to drink and wash in, and so they could travel easily from place to place. These **waterways** contained some **contamination**, but the water was probably cleaner because **pollutants** produced by industrialization and population growth had not yet affected water sources.

The ancient Asians were the first to record methods for **purifying** (cleaning) water. In about 2000 B.C., the Asians kept water in copper vessels, exposing it to sunlight and **filtering** it through charcoal. Greek physician Hippocrates, who lived from 460–354 B.C., wrote about his ideas on how to purify water. After boiling rain water, he made a “Hippocrates’ sleeve,” which was a cloth bag for straining the rain water. Egyptian records dating to 400 A.D. indicate that the most common ways of cleaning water were by boiling it over a fire, heating it in the sun, or by dipping a heated piece of iron into it. Filtering boiling water through sand and gravel and allowing it to cool was another common treatment method.

Other ancient people, including the Anasazi in North America, the Mayans in Central America, the Inca of South America, and the Romans in Europe, developed clever ways to capture and transport clean water to their communities. Through **diversion dams** and **aqueducts**, people found ways to ensure that they had adequate supplies of water for washing, drinking and growing food.

Water treatment and distribution today use some of these same techniques but are more complex. These topics discussed later in this book. But first, let’s see what you know about water.

Solve the Problem: In your science journal, list several ancient cultures, what challenges they had with water and what methods they developed to solve those challenges.

Do you know all beings need water?

Without water, the earth would look like the moon. There wouldn't be any trees ... or animals ... or humans. All life depends on water. Next to the air we breathe, water is our most essential element of life.

The human body is about 70% water. Every system in our body uses water.



- Water makes up almost 70% of our brain.
- Water makes up 83% of our blood.
- Water makes up nearly 90% of our lungs.
- Water transports body wastes.
- Water lubricates body joints.
- Water keeps body temperature stable (think sweat!).
- Water aids in digestion (think spit!).

Human beings can live several weeks without food but only four to seven days without water, depending on conditions. We must drink four to eight glasses of water each day, depending on our size, to replace the water we lose from normal activity. Some water loss is visible through sweat and excretion.

Solve the Problem: Calculate how much water you need to replace each day by filling in the following numbers:

- How much do you weigh in pounds? _____
- What is 70% of that (percentage of water in an active person)? _____
- Turn that number into ounces _____ oz.
- Add 8 oz. for dry climates _____ oz.
- Add 8 oz. for strenuous exercise _____ oz.

Total per day _____ oz.

Divide that number by 8 to see how many cups you need each day: _____ cups.

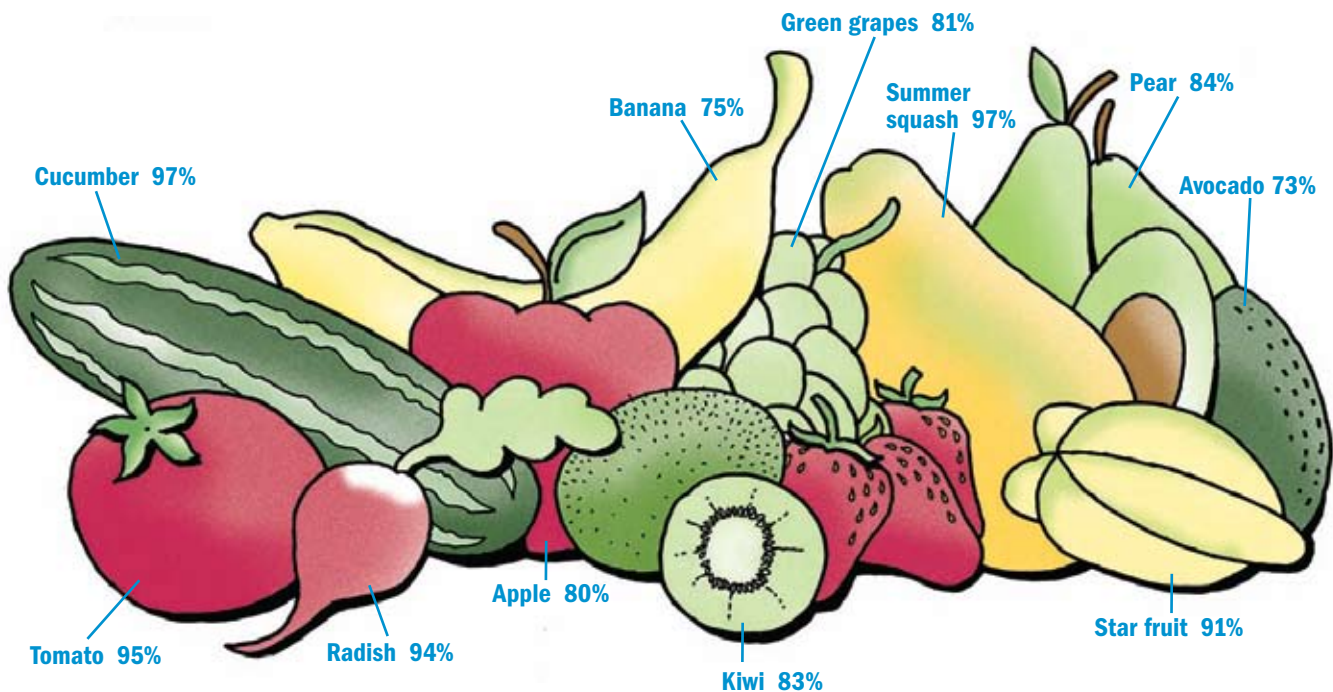
Divide by the hours you're awake to get number of ounces of water you need each hour: _____ oz.

How else can we get the water we need?

Drinking water or other liquids provides only part of the water we need. The other part comes from the foods we eat.

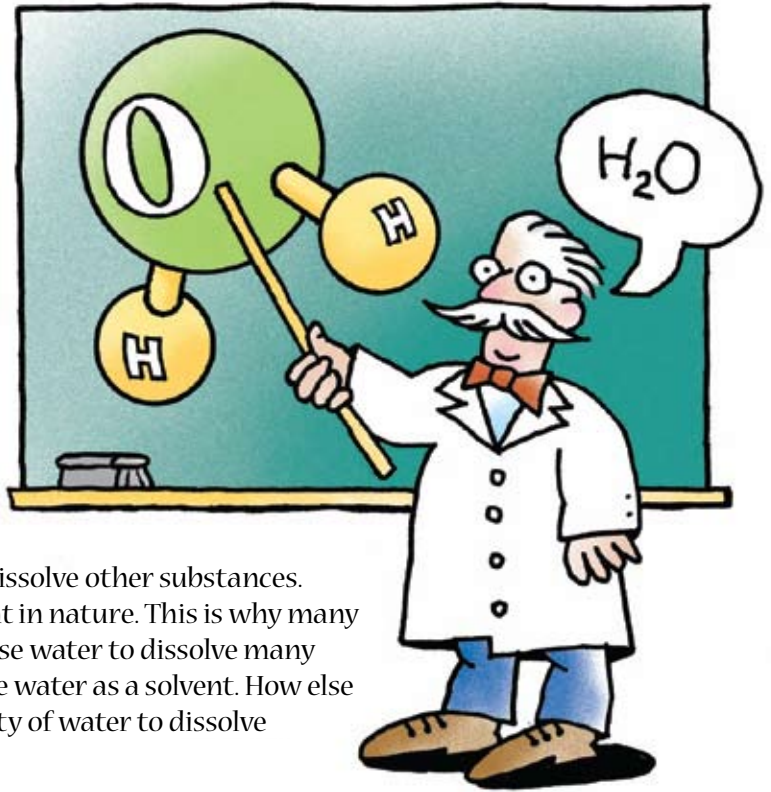
For example:

- A cucumber is about 97% water.
- A tomato is about 95% water.
- An apple is about 80% water.
- A banana is about 75% water.
- A slice of cheese pizza is about 47% water.
- Chicken nuggets is about 47% water.
- A slice of bread is about 37% water.
- French fries are about 35% water.
- Buttered popcorn is about 5% water
- Pretzels are about 3% water.
- Potato chips contain less than 1% water.



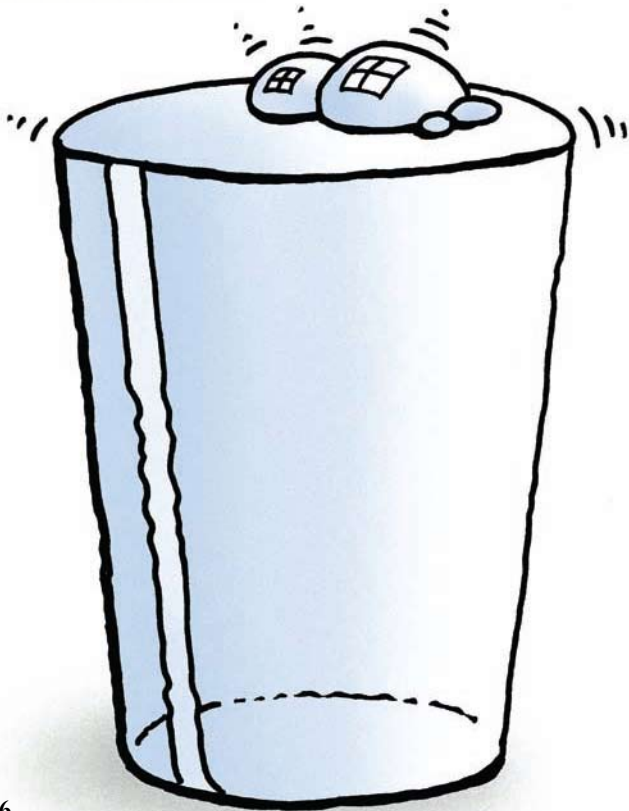
What do you know about the water molecule?

Everything is made of **atoms**. An atom is the smallest particle of an element, such as oxygen or hydrogen. Atoms join together to form **molecules**. A water molecule has three atoms: 2 hydrogen (H) atoms and 1 oxygen (O) atom. That's why water is sometimes referred to as H_2O . A single drop of water contains billions of water molecules.



What is a solvent?

A **solvent** is a liquid that can dissolve other substances. Water is the most common solvent in nature. This is why many minerals are found in water. We use water to dissolve many things. Even when we cook, we use water as a solvent. How else do we take advantage of this ability of water to dissolve almost anything?



What are some other properties of water?

- Water can **absorb** heat. This makes it useful in industries as a coolant for machinery.
- Water has very high **surface tension**. Water molecules naturally attract to each other, bunching together tightly at the surface, so you can fill a water glass above the rim. Surface tension also helps things float.
- Pure water has a neutral **pH** of 7. Pure water is not an acid or base, which allows plants and animals to live and thrive in it.
- Water weighs 8.34 pounds per gallon, and 1 liter of water weighs 1 kilogram.