

Water

At a Glance

Recommended Dietary Intake:

Six to eight 8oz glasses a day

Calories per Gram of Food: 0

Water contains no calories

Types of Water:

- Distilled Water
- Carbonated Water
- Filtered Water
- Mineral Water
- Spring Water
- Public Water (Tap)

Function: Water is the most important nutrient in our body, as it delivers all other nutrients to the cells. Our bodies are made up of 60% water – the brain is 80% water. Water helps cleanse the body.

Food Sources: Drinking water, juices, teas, fruits and vegetables

Typical Serving size: 1 cup of water, or 8 ounces

Health Concerns: Dehydration can lead to major health problems in the body. In the short term, low energy and fatigue are common. Severe dehydration leads to pale skin, rapid breathing, and thickening of blood. Chronic dehydration can contribute to cancers of the bladder and colon, heart attack, kidney stones and more.

Water in Food and the Body

Water is essential to all life and provides a medium for physical and chemical reactions, transportation of nutrients and waste, and temperature regulation. Water is distributed throughout the body in different levels of concentration. For example, muscle is 75% water while bone is 25% water. Staying hydrated by drinking fluids is vital. There is no substitute for drinking pure water, though some other beverages like tea, fruit juice, milk, and soymilk or coconut water can hydrate the body.

Food also contributes water to the body. Fruits and vegetables have very high water content. For example, spinach is 92% water, carrots 87% water, apples 84%, watermelon 92%, and tomatoes are 94% water, and they come loaded with vitamins, minerals, and fiber. Eat these foods in abundance.



Factors that Influence Hydration

There are many factors that influence a person's hydration level. In terms of intake, since the body cannot store water or make enough, we need to supply 80% of daily water needs with fluids. On average, 13 cups for men and 9 cups for women with the additional 20% coming from food. Soda and sports drinks have become the largest suppliers of fluids, but their high sugar and caffeine content adds calories without nutrients.

In terms of output, water is lost mostly through urine and evaporation from lungs and skin. The environmental temperature, humidity, body size and intensity of physical activity greatly influence the rate of sweating and evaporation, and the need to replace the lost water. In addition, direct sunlight, caffeine and salty food influence the water balance in your body. While salt is an incredibly important mineral in determining movement of water into and out of cells, consuming too much, as most Americans do, increases the need for water to help us flush the excess salt out. The brain and kidneys regulate water balance.

Selecting Healthy Food Using Food Labels

Goal: Understand the importance of being an educated consumer of drinking water.

Objective: Analyze the difference in quality and price of bottled versus tap water. Drinking water is regulated, as is food, by government agencies. The Environmental Protection Agency (EPA) regulates public tap water while the Food and Drug Administration (FDA) regulates bottled water. The EPA sets standards for 90 contaminants in public drinking water and enforces compliance making the public water safe and monitored by state, local and consumer groups. The FDA adopts the same standards for contaminants in bottled water; however, monitoring is limited. In addition, there are no labeling laws that define the source of water. A bottler can claim the water is “artesian” or “spring” water even when it comes from a municipal source. Don’t be fooled into paying extra for bottled water that may not be healthier for you. Find out whether your state monitors and inspects bottling plants, where the source of water is coming from and where the empty bottles end up.

International Bottled Water Association

<http://www.bottledwater.org/> and www.bottledwater.org/newsroom/policy-statement/labeling

Ask the Regulators, Bottled Water Regulation and the FDA

<http://www.fda.gov/downloads/Food/FoodborneIllnessContaminants/BuyStoreServeSafeFood/ucm077094.pdf>

Drinking Water Standards & Risk Management, EPA

<http://water.epa.gov/drink/standardsriskmanagement.cfm>

Naturally Occurring Healthy Ingredients in Water	Sample of Monitored Contaminants in Water
Calcium	Inorganic Chemicals
Magnesium	Arsenic, mercury, copper
Potassium	Fluoride, lead , cyanide
Sodium	Organic Chemicals (including pesticides)
Fluoride (added to prevent cavities)	Benzene, Simazine, Styrene, Dioxin, Dichloromethane
	Microorganisms
	Giardia lamblia
	Legionella
	Disinfectants
	Bromate
	Chlorine
	Radioactive Materials
	Radium
	Uranium

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History and Water

- Identify key steps in a text’s description of a process related to history/social studies (e.g., how a bill becomes law, how interest rates are raised or lowered). (CCSS.ELA-Literacy.RH.6-8.4)
- Describe how a text presents information (e.g., sequentially, comparatively, causally). (CCSS.ELA-Literacy.RH.6-8.5)
- Determine the meaning of words and phrases as they are used in a text, including vocabulary specific to domains related to history/social studies. (CCSS.ELA-Literacy.RH.6-8.4)

DID YOU KNOW?

Growing food...

Droughts have played a very important role in shaping human history. In fact, they are so important to human history that they are some of the first ever recorded climatic events, and are even thought to have sparked human migration out of Africa 135,000 years ago!

Eating food...

Water is of supreme importance to agriculture, and drought affects the ability of farmers to produce enough food. Likewise, drought leads to potential dehydration in humans, especially throughout history.

LESSONS IDEAS

What is the history of drought and how has it affected human history? Have students research a specific drought period in history and discuss the impacts on agriculture.

Discuss various cultures around the world and compare and contrast the history of drought.

Local watersheds help shape human history. A great way to connect students to this history is to examine the Chesapeake Bay watershed. Have the students research this history and discuss the various reasons why local watersheds are so important.

INFORMATION AND CURRICULUM

History of North American Drought, NOAA
www.ncdc.noaa.gov/paleo/drought/drght_history.html

The Drought of 2012 Lesson, PBS.org
www.pbs.org/newshour/thenews/materials/Drought2012.SSLessonPlan.pdf

Mapping a Watershed History, Longwood
www.longwood.edu/cleanva/images/Sec7.mapwatershed.pdf

Learn the Issues, Chesapeake Bay Program
www.chesapeakebay.net/issues

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Science and Water

- Cite specific textual evidence to support analysis of science and technical texts. (CCSS.ELA-Literacy.RST.6-8.1)
- Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic. (CCSS.ELA-Literacy.RST.6-8.5)
- Analyze the author’s purpose in providing an explanation, describing a procedure, or discussing an experiment in a text. (CCSS.ELA-Literacy.RST.6-8.6)

DID YOU KNOW?

Growing food...

While soil, sun, and feed crops are all important to agriculture, none of it is possible without water. Water is the largest input on farms. Crops need plentiful water, and animals all need water to grow.

Eating food...

Not consuming enough water leads to dehydration, and while the effects of extreme dehydration are well known, less known is chronic dehydration. Unfortunately, most Americans live in this state, and over time, your body becomes less sensitive to thirst signals.

Water makes up about 83% of the volume of your blood, making dehydration all the more serious.

LESSONS IDEAS

Water is very important to biological systems and the earth. Our bodies are about 57% water. The earth is covered by 70% water, 96.5% of which is contained in the oceans. Of the remaining fresh water, most of it is stored in glaciers. Just a very small percentage is actually usable by humans.

Watch the NFL video on the importance of drinking water and staying hydrated.

Have students research the ecology of the Chesapeake Bay Watershed, and write reports on the importance of keeping it clean.

INFORMATION AND CURRICULUM

Global Warming/Drought, Wunderground
www.wunderground.com/earth-day/2013/increased_risk_of_drought_under_global_warming

Water on Earth’s Surface, USGS
ga.water.usgs.gov/edu/earthwherewater.html

NFL Science Video on Water, NFL
www.nbclearn.com/nfl/cuecard/50683

Chesapeake Bay Program
www.chesapeakebay.net/discover/baywatershed

Watersheds, Bridge Ocean Education Center
www2.vims.edu/bridge/DATA.cfm?Bridge_Location=archive0203.html

Eyes on the Bay, MD DNR
mddnr.chesapeakebay.net/eyesonthebay/lesson_plans.cfm

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Math and Water

- Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them). (CCSSM.6.EE.4)
- Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. (CCSSM.7.RP.1) Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. (CCSSM.8.SP.1)

DID YOU KNOW?

LESSONS IDEAS

INFORMATION AND CURRICULUM

Growing food...

An astonishing 50 billion bottles of water are produced each year just in the United States! That averages to 1,500 bottles consumed each second. Bottled water is 1,000 times more expensive than tap water. 2 liters of tap water a day costs just 50 cents for the entire year!

Using the price difference between bottled water and tap water, have the students calculate the annual cost of drinking 2 liters per day of bottled water and compare that to tap water

Bottled Water Production Data, TreeHugger
www.treehugger.com/clean-water/the-us-consumes-1500-plastic-water-bottles-every-second-a-fact-by-watershed.html

Great Algebra Sample Lesson, Algebra.com
www.algebra.com/algebra/homework/word/unit_conversion/Unit_Conversion_Word_Problems.faq.question.157300.html

Eating food...

Believe it or not, humans are supposed to drink about 182.5 gallons of water each year. This is based on the recommended 64 ounces a day, or eight 8 oz glasses. However, Americans do not drink the recommended amount. In fact, the average American drinks 44 gallons of soda a year and just 58 gallons of water, less than 1/3 the recommendation.

Have the students record how much water they drink each day for a week, then graph the student's numbers. Compare this to the recommended amount and discuss ways to drink more water and less soda.

Use CDC data on sugar drink consumption and analyze.

Interactive Math Lesson on Water, TV411
www.tv411.org/science/tv411-whats-cooking/water-math-lesson

Consumption of Sugar Drinks in US - Data, CDC
www.cdc.gov/nchs/data/databriefs/db71.htm

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Language Arts and Water

- Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments. (CCSS.6.RL)
- Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. (CCSS.6.W)
- Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation. (CCSS.6.SL)

DID YOU KNOW?	LESSONS IDEAS	INFORMATION AND CURRICULUM
<p>Growing food... Water is precious to life and is thus celebrated through many art forms around the world. Many people in other countries struggle with access to this precious necessity – some 2.6 billion living in a water insecure place.</p>	<p>Have students pick their favorite poem about water and read it aloud to the class. Then have students create their own poems about water.</p> <p>Complete the Global Water Crisis mini unit and discuss water issues around the globe.</p>	<p>Collection of Poems About Water, PoemHunter www.poemhunter.com/poems/water/</p> <p>Global Water Crisis Mini Unit, Water.org static.water.org/docs/curriculums/WaterOrg%20MidCurric8.pdf</p>
<p>Eating food... Staying hydrated is one of the most important things a child can do to stay healthy. This is a priority for both the Team Nutrition and the Let's Move Campaigns. Especially important is choosing water over sugared beverages, like soda or juice with added sugar.</p>	<p>Have students read the opening page to this document as a complex text. Test their understanding and review concepts and vocabulary words.</p> <p>Provide the “Make Water Available” poster to students. Have them read and discuss key points. Then have them pick a day of the week to focus on drinking water, and create materials to distribute throughout the school promoting this day.</p>	<p>Make Water Available Poster, Team Nutrition/USDA www.fns.usda.gov/tn/Resources/nutritionandwellness/water.pdf</p> <p>5 Simple Steps to Success, Let's Move Campaign www.letsmove.gov/sites/letsmove.gov/files/pdfs/TAKE_ACTION_KIDS.pdf</p>