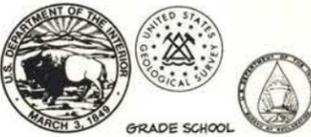


WATER: The Resource That Gets Used & Used & Used for Everything!



Water Resource Education



Water truly is a resource that gets used and used for everything. The same water can be utilized many times. This poster depicts 12 water uses which are labeled in bold red letters, beginning with mining and ending with transportation. Withdrawals (water removed from the river or ground), distribution, and returns (water returned to the river or ground) are depicted by the blue arrows. The poster is folded into 8 1/2" x 11" panels; front and back panels can easily be photocopied.

From the mountains, the river flows through a reservoir and past urban, rural, and industrial settings in which various uses of water are depicted. Water is available from surface sources—rivers, ponds, and lakes—and from ground-water sources called aquifers.

Recreation, Hydroelectric Power generation, Nature's Needs, and Transportation are instream uses, which means that the water remains in the river. Consequently, very little water is consumed. The water can be reused farther downstream. Mining, Public Supply, Commercial, Domestic, Wastewater Treatment, Agriculture, Thermoelectric Power generation, and Industrial are offstream uses, which means that the water is withdrawn from a source such as the river or ground. But only a part of the water withdrawn is actually consumed, so the remaining part is returned to the river or ground and can be used again. Different offstream uses consume different proportions of the water they withdraw.

INSTREAM USE

Recreation

Water is used for recreational activities such as boating, rafting, kayaking, swimming, and fishing.



Hydroelectric Power

Hydroelectric powerplants use water to generate electricity. Falling water turns the plant's turbine generators.



Nature's Needs

Water is necessary to maintain life on our planet. Water supports all forms of life. Water forms and cleans stream and river channels. It surrounds and supports life in streams, rivers, lakes, and reservoirs. Nature's Needs include wetland communities, stream habitats, and fish reproduction.



Transportation

Water provides a means for transporting goods and materials. Many rivers in the United States serve as major transportation networks.



Student Activity

THE VALUE OF WATER

Introduction

Water conservation is important in all States and for all individuals. Because water has so many uses, the more water we conserve, the more water there is available for other uses. The following exercise demonstrates the quantity of water used by your students and encourages them to think about water conservation.

Objectives

Students will:

1. Identify and name the ways we use water.
2. Discuss why water is essential for day-to-day living and how water contributes to Americans' standard of living.
3. Identify how the students and their families can conserve water.

Materials Required

1. Water dollars (adjacent poster panel)
2. Collection box
3. Water Use Chart (adjacent poster panel)
4. One 2-liter soft drink container.

Teacher Preparation

1. Copy five pages of the water dollars on the adjacent poster panel for each student.
2. Label a cardboard box "Water Bank" and place it where the students can see it.
3. Fill the 2-liter soft drink container with water and place it next to the "Water Bank."

Procedure

Explain to the students that they are going to examine how each of them uses water by playing a water game. In order to learn about water use, each student will be required to pay for the water they use with the water play money.

—List on the chalkboard as many uses of water that the students can think of. The poster provides some general categories. Have the students identify the type of water use for each item on the list—in water, on water, and with water. Example: students swim in water, boat on water, and wash with water.

—Pass around the 2-liter soft drink container. Explain to the students that the soft drink container contains 2 liters of water.

—Give each student five sheets of water dollars and have them cut out the play money and write his or her name on each dollar. Note that on each page there are three 1-liter, three 5-liter, two 10-liter, and two 20-liter water dollars—a total of 78 liters of water dollars per page. Students will start with a total of 390 water dollars. They will be required to make "change" for certain water uses.

—Each time a student uses water at school or his or her family uses water at home, it will cost the listed amount of water dollars specified on the "Water Use Chart" on the adjoining panel. Have students pay before using water at school and in the morning after using water at home. Place payments in the cardboard box labeled "Water Bank."

—Have the students keep a record of how their dollars are spent.

Interpretive Questions

Have each student count the number of water dollars he or she has remaining on the fourth day. Discuss the possible consequences of running out of water dollars. Use the following questions for discussion:

1. What if there are no water dollars left?
2. What can you do to get more water dollars?
3. Is it fair to share water dollars with someone who used all of theirs?
4. How could you have saved water dollars? If you played the game again would you play any differently?
5. Who used the fewest water dollars and why?

Have the students identify the uses of water they feel are the most important and then discuss ways to conserve water. Other water-saving ideas not on the "Water Use Chart" include:

- Sweeping patio or driveway instead of washing it.
- Install water-saving shower heads.
- Only get water in restaurants when you are going to drink it.

Learning Experience

Play the water game for 3 more days. Follow the same procedure, except do not list the water uses on the chalkboard. This time, at home and at school, have the students try the water-saving ideas identified by the class. Each time a student uses water at school or his or her family uses water at home, this usage will cost the student the dollar amount identified on the Water Use Chart. If water-saving measures are introduced, refund to the students the dollar amounts listed in the column titled "Potential Savings." As before, each student begins with 390 water dollars. On the fourth day, have the students compare the water dollars they had remaining after playing the water game the first time with the water dollars remaining after playing the game the second time.

Time Required

Eight days.

Extension

For grades K-2 give the students only 156 liters of water dollars (two pages) and ask them to pay only for water use at school.

To determine the amount of water out of a faucet, shower head, or hose, use a calibrated bucket and watch and measure the volume of water that flows out in one minute. Your actual figures may differ from those listed on the Water Use Chart.

This activity was adapted from Southern Arizona Water Resources Association's, "A Sense of Water," pages 85-86.

WATER USE CHART

Use category	Water used*		Water dollars required **	Potential savings (dollars) **	Water-saving suggestions ***
	Amount in liters	Assumptions			
Drinking	3	Daily requirement	3	—	
Toilet device	20	Per flush	20	5	Tank displacement
Brushing teeth	40	Leave water on for 2 minutes	40	35	Turn off water while brushing
Washing hands	20	Leave water on for 1 minute	20	15	Turn off water while soaping hands
Shower	100	5-minute shower	100	40	Take 3-minute shower
Washing clothes	120	1 load	120	20	Washing full loads could save as much as 17%
Washing dishes	100	1 load, automatic dishwasher	100	17	Washing full loads could save as much as 17%
Washing car	100	5 minutes to complete	100	60	Turn off water when not washing
Lawn watering	250	Apply 2.5 centimeters to 10 square meters	250	150	Use native plants or plants that thrive on little water. Save as much as 60%

*Chart is based on the flow of water from a faucet, shower head, or hose of 20 liters per minute.

**Students give 1 water dollar for each trip to the drinking fountain. Five dollars are required for 5 liters of water used, 20 water dollars are required for 20 liters of water used, etc. Saving 5 liters of water saves 5 water dollars, saving 35 liters saves 35 water dollars, etc. Savings are given back to the students as refunds.

***Source: Denver Water Department, Colorado River Water Conservation District.

Poster Series

This poster is the first in a series of water-resources education posters developed through the Water-Resources Education Initiative. The Water-Resources Education Initiative is a cooperative effort between public and private education interests. Partners in the program include the U.S. Geological Survey, Bureau of Reclamation, and the U.S. Fish and Wildlife Service of the U.S. Department of the Interior, the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, the Groundwater Foundation, and the National Science Teachers Association.

The other completed posters in the series are entitled "How Do We Treat Our Wastewater?", "Wetlands: Water, Wildlife, Plants, & People!", "Ground Water: The Hidden Resource!", "Water Quality: Potential Sources of Pollution", "Navigation: Traveling the Water Highway", and "Hazardous Waste: Cleanup and Prevention." The posters in the series are designed to be joined to create a wall mural. A schematic of the wall mural including the topics for the completed and planned posters is displayed on this panel. The light-shaded spaces indicate the completed posters. The dark-shaded space is this poster.

OCEANS or BIODIVERSITY	WATERSHEDS	HAZARDOUS WASTE
WETLANDS	WATER USE	WASTEWATER TREATMENT
NAVIGATION	GROUND WATER	WATER QUALITY

Water-resources topics of all completed posters are drawn in a cartoon format by the same cartoonist. Posters are available in color or black and white. The reverse sides of the color posters contain educational activities: one version for children in grades 3-5 and the other with activities for children in grades 6-8. The black-and-white posters are intended for coloring by children in grades K-5.

ORDERING INFORMATION

Copies of all seven posters in the series (color for grades 3-5 and 6-8 or black-and-white) can be obtained at no cost from the U.S. Geological Survey. Write to the address below and specify the poster title(s) and grade level(s) desired. A limited number of color and black-and-white posters entitled "Water: The Resource That Gets Used & Used & Used for Everything" are also available in Spanish by writing to the address below.

U.S. Geological Survey-Branch of Information Services
P.O. Box 25286
Denver Federal Center
Denver, CO 80225
Telephone: 1-800-435-7627

OFFSTREAM USE

Public Supply

Public-supply use refers to water withdrawn by public and private suppliers and delivered to a variety of consumers for domestic, commercial, and industrial uses and thermoelectric power generation.

Domestic and Commercial

A subcategory of Public Supply is domestic and commercial water use. Domestic water use is for normal household purposes such as drinking, cooking, bathing, washing clothes, dishes and cars; and watering lawns and gardens. Commercial water use is for schools, hotels, motels, restaurants, office buildings, retail and other commercial facilities, and civilian and military institutions. Domestic and commercial water uses are similar in that both are largely dependent on public water supplies and the resulting wastewater is disposed of largely through communal sewer systems. Moreover, both are concentrated in urban and suburban areas.

Wastewater Treatment

The wastewater resulting from domestic, commercial, and industrial uses is cleaned at wastewater-treatment facilities and returned to a water source. Cleaning and returning water to be reused is an important concept in water use.

Agriculture

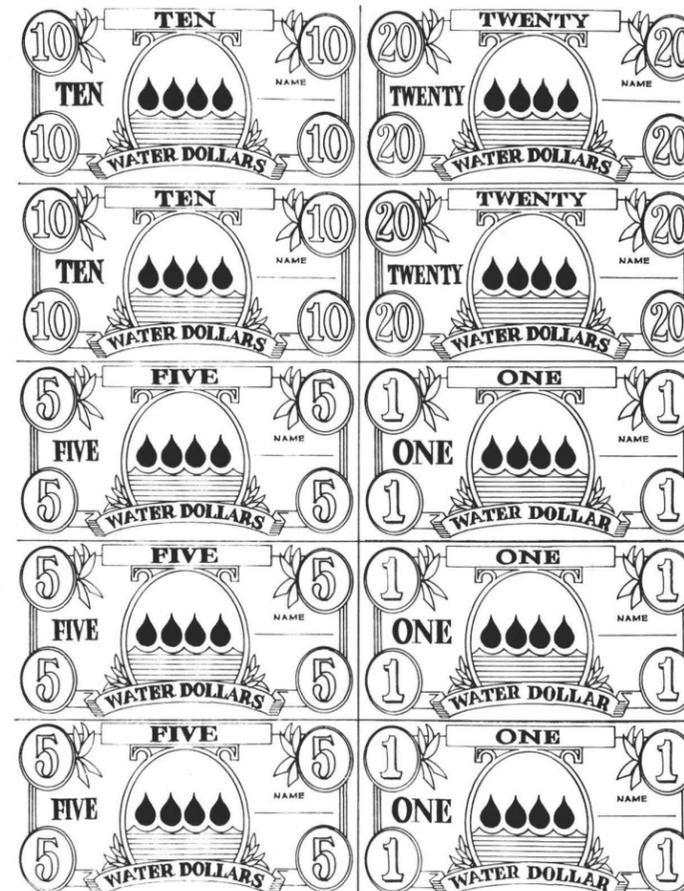
In agriculture, water is used for irrigation and livestock. Irrigation includes the water people put on fields, trees, crops, pastures, and golf courses. In raising livestock, water is used for livestock drinking water, dairy operations, and fish farming (aquaculture).

Thermoelectric Power

Thermoelectric power is the production of electricity by steam using fossil fuel, nuclear, or geothermal energy. Water is used primarily for cooling, so very little is consumed.

Industrial and Mining

Industries use water for manufacturing. The largest water-using industries in the United States include those that manufacture steel and other metals, chemicals and chemical products, paper and paper products, and refine petroleum. Before petroleum is refined, it must be mined, and this process also requires water. The mining of minerals also requires water for such steps as milling and washing.



DEFINITIONS

- Aquaculture** - Farming of organisms that live in the water, such as fish, shellfish, and algae.
- Aquifer** - An underground layer of porous or fractured rock filled with water that is the source of water to a well or spring.
- Consumed** - That part of water withdrawals that is evaporated, stored in food, drunk by people or animals, or somehow removed from the local environment.
- Ground water** - Underground water that moves through porous or fractured rocks and soils, supplying water to wells and springs.
- Instream use** - The use of water that does not require removing water from a river, stream, lake, pond, or surface-water source. Instream use generally consumes very little water.
- Offstream use** - Water removed or taken from a ground- or surface-water source. Offstream uses usually consume water, reducing the amount available for other uses.
- Return flow** - Water that is not consumed, but is returned to a surface- or ground-water source, and available for reuse.
- Surface water** - Water that is on the Earth's surface, such as in rivers, streams, reservoirs, lakes, and ponds.
- Water table** - The top of the water within an aquifer.
- Withdrawal** - Water removed from the ground- or a surface-water source for use.

ACKNOWLEDGMENTS

The following individuals contributed to the development of this poster:

Project Chief, Principal Author, and Layout: Stephen Vandas,
U.S. Geological Survey,
Denver, Colorado

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Denver, Colorado,
under contract to the American Water Resources Association

U.S. GEOLOGICAL SURVEY

The U.S. Geological Survey (USGS) is the Nation's principal earth-science information and research agency. The USGS monitors the quantity, quality, and use of the Nation's water resources, assesses onshore and offshore energy and mineral resources, conducts research in earth hazards, manages the Nation's civilian mapping program, and applies new technologies to the study of the Earth. Providing the scientific information necessary to answer questions related to earth science is the primary mission of the USGS. This scientific information is available to any interested individual or organization.

U.S. DEPARTMENT OF THE INTERIOR

As the Nation's principal conservation agency, the U.S. Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This responsibility includes fostering the wise use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to ensure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in island territories under United States administration.