ESA21
Environmental Science Activities for the 21st Century

Home Water Use

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Water Use in the Industrialized World



If you're like most people in the developed world, you don't think much about water. Clean, drinkable water is delivered into your residence almost invisibly, and it's always there when you turn on a faucet. As such, most North Americans don't see the need for water conservation, particularly those who live in areas where freshwater supplies are abundant. But as populations grow and water supplies stay roughly constant, more and more pressure is being brought to bear on rivers, reservoirs, and groundwater aquifers and the need for conservation has become almost universal. These efforts are particularly crucial in areas with arid climates, low water supplies, and/or frequent droughts.

Water is used for a wide variety of things in the modern world. It's used in large quantities in agriculture and livestock production, to generate electricity in thermoelectric power plants, and in numerous industrial processes. Another major category is municipal water use, the use of water in homes and businesses. To get an overview of water use in the United States, review the material below from the United States Environmental Protection Agency (EPA).

How We Use Water in These United States (PDF) (189 KB)
United States Environmental Protection Agency
http://esa21.kennesaw.edu/activities/water-use/water-use-overview-epa.pdf

As described in the EPA document, agricultural irrigation and thermoelectric power generation use a great deal of water, but while you cannot reasonably control the amount of water used to grow your food or generate your electricity, you can exert control over your personal water use and affect the quantity used for municipal supply. In a typical home, water is used for cleaning (humans, clothes, dishes, vehicles), drinking, sanitation (flushing toilets), and watering vegetation. The brochure below from the U.S. EPA describes the breakdown of water use in a typical home and offers simple suggestions for improving water efficiency. Review it before proceeding.

Using Water Wisely in the Home (PDF) (235 KB)
United States Environmental Protection Agency
http://esa21.kennesaw.edu/activities/water-use/using-water-wisely-epa.pdf

Activity: Water Use Calculator

Through the provided introductory materials, you should now have a good idea of the various ways you use water in your daily life, and some simple steps you could take to reduce your overall water use. In this activity, you will be asked to examine your current water use and then examine several lifestyle changes that could reduce your overall water usage. To do this you'll be using an online water calculator from the Southwest Florida Water Management District that asks you to provide some information about water-using activities and uses this information to calculate your overall water use.

Water Use Calculator
Southwest Florida Water Management District
http://www.swfwmd.state.fl.us/conservation/thepowerof10/

Use the water calculator to examine water use in your household, completing the Activity Sheet as you progress. Consult the materials below to gain ideas for simple changes that can result in significant reductions in water use prior to completing the corresponding section of the Activity Sheet.

Using Water Efficiently: Ideas for Residences (PDF) (956 KB)
United States Environmental Protection Agency
http://esa21.kennesaw.edu/activities/water-use/water-cons-brochure-epa.pdf

Water-Efficient Landscaping (PDF) (1,679 KB)
United States Environmental Protection Agency
http://esa21.kennesaw.edu/activities/water-use/water-cons-landscaping-epa.pdf

H_2OUSE: Water-Saver Home
California Urban Water Conservation Council
http://www.h2ouse.org

Activity: Drips and Leaks

Losses from drips and leaks can form a significant but often overlooked use of water in the home. While slow drips and small leaks can seem inconsequential, the water losses incurred from these sources over time can be rather large, as was shown in the background material provided above from EPA. To examine how much water can be lost this way we'll be using a "drip calculator" from the American Water Works Association. Access the calculator using the link below and answer the appropriate questions on the Activity Sheet.

Water-Wiser Drip Calculator
American Water Works Association
http://www.awwa.org/resources-tools/public-affairs/public-information/dripcalculator.aspx
Copyright © 2004, American Water Works Association. For additional information related to water issues, contact AWWA at www.awwa.org or call 800-926-7337.

If this exercise encourages you to examine your home for leaky pipes and toilets, please consult the resources above for tips and techniques for identifying sources of water loss.

ESA 21: Environmental Science Activities

Activity Sheet
Water Use

Name:

Instructor:

Estimating Water Usage:

Provide the required information and enter the information about your household's annual water usage from the water use calculator in the table below. To calculate the percentage for each category, simply divide the value in each category by the Total Household Use and multiply by 100 (to convert proportion to percentage).

	Per Capita Daily Use (gallons)	**Percentage of Total**
Showers		
Baths		
Toilet flushes		
Running Water		
Hand Washing Dishes		
Dishwasher		
Laundry		
Lawn Watering		
Other Outdoor Uses		
Total Household Use		

Which category was the greatest percentage of your water use? Was this surprising?

Many people in rural areas in developing countries must still carry water from its source to their homes. If you were to carry the amount of water used per person in your household on an average day, and a gallon of water weighs approximately 8.3 lbs, how many pounds of water would you need to carry each day?

Water Use Analysis:

Enter the per-person Gallons of Water Used in the House values from the calculator in the table below.

	Per Day	Per Month	Per Year
Your Household			
U.S. Average	**100 gal**	**3,000 gal**	**35,000 gal**

How did your household's water usage compare to the U.S. average?

Analyzing Changes:

Examine how small changes in lifestyle would affect your household's total water usage. Return to the water calculator and make a reasonable change that would reduce your overall water usage - describe the change in the table below. Press "Calculate" after making the change, calculate the number of gallons saved per year, and enter it in the table. Reset the calculator to its original values, and repeat the procedure for two additional changes.

Change	Reduction in Annual Water Use (gal)

Seeing the reductions in water use that occur as a result of these changes, would you be willing to immediately implement any of them? Explain why or why not.

Losses from Drips and Leaks:

Open the WaterWiser Drip Calculator, enter the values in the table below in the "# of drips per minute" box, hit the "Now Calculate" button, and enter the results in the table. Let's assume that your home has leaks like those listed. For each of the drip rates, add the Daily Waste from leaks to your Total Per Capita Daily Use from the Water Calculator. This would be your new Total Daily Water Use. Then calculate the percentage of the total water used that is due to the leak. As you did previously, simply divide the Daily Waste value by the Total Household Use and multiply by 100 (to convert proportion to percentage).

Total Per Capita Daily Use from Calculator: _____ gallons

Drips per Minute	Daily Waste (gal)	New Total Daily Water Use (gal)	Percentage of Total Due to Leak
5			
10			
15			
30			
60			

Compare the percentages of water use due to the leak to the percentages for the other categories (Bathroom, Toilets, Faucets, etc.) from your initial run of the water calculator. For each drip rate, list the category with the closest percentage.

Drips per Minute	Percentage of Total Due to Leak (gal)	Category with Closest Percentage from Initial Run of Water Calculator
5		
10		
15		
30		
60		

Does seeing the potential losses in leaks cause you to check your home for leaking pipes and toilets? Explain why or why not.