

## HOW CAN WE HELP MAINTAIN OUR WATER SUPPLY?

# Conserving Water

### **VIRGINIA SOL**

- *Science* 6.5
- *Social studies* CE.1, CE.9
- *Language arts* 6.1, 7.1
- *Math* 6.8, 6.10, 6.18, 7.17, 7.18
- *Technology* C/T8.1, C/T8.4

### **OBJECTIVES**

- Discuss different uses of water
- Discuss how clean water is supplied to our homes
- Record an inventory of home water use
- Compare amounts of water used in different activities
- Discuss consequences of overusing or wasting water
- Compare the consequences of overusing water from wells and from utility services
- Discuss a local issue relating to water supply
- Suggest ways to conserve water
- Take actions to reduce water use at school and in the community

### **MATERIALS**

- Copies of Home Water Use Inventory Sheet
- Copies of Family Water Conservation Tips Sheet

### **TIME NEEDED**

One or two class periods

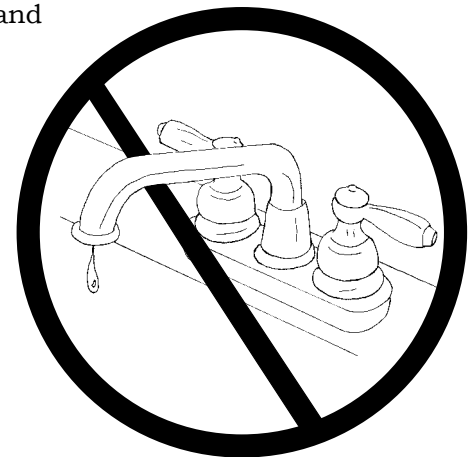
*What are the consequences of wasting water and how can we help avoid them?*

**W**ater is a valuable and expensive resource. People use water for many purposes, including agriculture and power generation as well as personal needs. Students use large amounts of water every day for drinking and washing and when using the toilet. Their families use additional water when cooking and when washing dishes and clothes. They may use additional water in their yards and gardens for irrigation and car washing. They also use water for recreation.

Tap water probably comes to the students' homes either from surface sources, such as nearby lakes and rivers, or from groundwater. In rural areas, wells bring water up to homes from groundwater in underground aquifers. Your local water district should be able to provide information about how water gets to homes in your community. Water leaving a home is called wastewater. It must be cleaned before it can be used again.

Wastewater is generally treated by septic systems in rural areas and by wastewater treatment plants in larger communities.

Water from septic systems eventually leaches back down into groundwater. If septic systems or treatment plants become overloaded, they are not able to clean wastewater properly.



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Municipal utility services treat water before it is used and clean water before it is reused. The utilities charge their customers for these services. For example in Prince Edward County, Virginia the rate for water within the town of Farmville is \$14.30 for the first 3000 gallons and then \$2.20 per 1000 gallons. Outside of Farmville the rate is increased by 50%. The town also charges the same rate again for removal of wastewater. You should try to use the actual rate charged by the utility service in your own local area.

If water comes from a utility service, wasted water means wasted money. There are other financial consequences of wasting water. Homes using well water must pay for energy to pump the water. All homes must pay for energy to heat hot water. There are many other consequences of overusing water, including the following.

- Overusing water can overload a septic system.
- In drought, wells can run dry.
- In drought, imposed water restrictions impact everyone.
- Low stream and river levels hurt both recreation and ecosystems.
- Overusing water means less water for other people.
- Low water supplies create a need for new supply reservoirs.

Some localities have special water supply issues to deal with. One important example is the Lake Gaston pipeline project to supply water into tidewater Virginia. A 76-mile pipeline carries water from Lake Gaston on the Virginia – North Carolina border to the Norfolk reservoir system. (For more information on the 15-year legal battle between North Carolina and Virginia Beach over the inter-basin transfer of water from Lake Gaston to Virginia Beach, see: Virginia Beach Department of Public Utilities at [www.vbgov.com/dept/putility/gaston](http://www.vbgov.com/dept/putility/gaston).)

People can become active in conserving water. A good way to start is to simply turn off running water whenever it is not being used. Shower times can be shortened and the amount of water used in bathing can be reduced. Households can install low-flow showerheads that have smaller holes. A large amount of water is used every time a toilet is flushed. Some of this water can be saved by placing sealed bottles into a toilet tank so that less water is flushed. More water-saving ideas are listed later in this lesson plan.

This lesson plan is adapted from the Taking Stock of Water Use activity from Waterways: Links to the Sea.

### LESSON INTRODUCTION

Ask students to think of the many ways they use water in their daily lives. List the different

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uses suggested by students. Ask students to try and estimate the amount of water they use each day.

Discuss with the students how tap water is related to natural water resources. Ask students where they think their tap water comes from and how they think the water gets to their homes. Also ask students about where they think water goes to from their sink or toilet. Lead students to the idea that water comes to our homes from lakes and streams or groundwater and is later returned there again. Talk to the students about how wastewater must be cleaned before it is reused.

### ACTIVITY PROCEDURES

Assign students to inventory water use in their home for two consecutive days. Give each student several copies of the Home Water Use Inventory sheet to post in their homes. Ask the students to involve their whole family in the monitoring.

Have students bring their completed Home Water Use Inventory sheets back to school and discuss these in small groups and then as a class. Compare and discuss the amounts of water used for each different activity. Ask students to think about differences in water use by different families. Discuss why different families may have used water differently. Lead the class and combine the total amounts of water used for each activity from all the inventory sheets for the whole class. Convert these total amounts for two days into the total amount of water used per day for each

activity. Organize the students to work together to make a large-size bar graph of this class information with total number of gallons per day on the y-axis and different activities on the x-axis. Display this graph outside the classroom to be seen by others in the school community. Have students write a summary of the amounts of water used per day for different activities.

Ask the class whether the amount of water we use could be reduced. Lead a discussion of the environmental and economic consequences of using more water than we need to. Remind the students that some families receive water from public utilities and some families have wells. Explain the financial cost of obtaining water from utilities. If there is any particular local issue or debate over water supply, discuss this with the students.

Have the students work in small groups to write a list of ways that water could be saved. After discussing different suggestions of ways to save water, give students the Family Water Conservation Tips sheet (located at the end of this lesson).

Ask students to share their list of ways to save water and the Family Water Conservation Tips sheet with their families at home.

### QUESTIONS

- What procedure did you use to determine the water used by your family?
- How much water did your family use for each activity?

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- How do the amounts of water used by your family for each activity compare with the amounts used by other families?
- What similarities do you notice about the amounts of water used by different families?
- What surprises you in the data we have collected about how much water we use for different activities?
- What are some of the environmental and economic consequences from using more water than we need to?
- Using the information we have collected, how could the amount of water used in a community most easily be reduced?
- In times of drought, how do people feel differently about wasting water?

### ASSESSMENTS

- Written summaries of amounts of water used per day for different activities.
- Written list of suggestions for water conservation.
- Group skills during discussions and graphing work.
- Science journal assignment summarizing the work and learning achieved from this activity.

### EXTENSIONS

- Encourage students to think of other ways that water is used around their homes and

then monitor these uses in addition to those listed on the Home Water Use Inventory.

- Discuss indirect uses of water. Remind students of such indirect uses as water used growing the food we eat, water used to make our clothes, and water used in producing energy.
- Have students make a collage, including pictures from newspapers and magazines, showing different ways that water is used.
- Have students use a computer spreadsheet to present water usage data.
- Have students compare water usage before and after implementing water conservation practices.
- Invite someone from the local water service to speak to the class about water delivery systems and wastewater treatment. Have the person discuss the problem of municipal water leaks and consequences of wasting water.
- Visit a local water treatment or wastewater treatment plant if there is one close to the school. Ask a person to talk to students about water treatment, the costs of water treatment, the problem of municipal water leaks, and consequences of wasting water.
- Use the Internet to search for information about consequences of wasting water and water conservation strategies.
- Organize an action project to educate the school or local community to reduce water usage.

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### RESOURCES

*For the teacher...*

- Easy Street. Project WET.
- Every Drop Counts. Project WET.
- Measuring that Leak. Activities for Elementary School Science.
- Money Down the Drain. *Project WET*.
- Taking Stock of Water Use.  
*Waterways: Links to the Sea*.
- The Long Haul. *Project WET*.
- Water and the Environment book containing Water - The Essential Resource poster.  
American Geological Institute.  
[www.agiweb.org/pubs](http://www.agiweb.org/pubs)
- Water Efficiency Program. U.S. EPA Office of Water. [www.epa.gov/owm/genwave.htm](http://www.epa.gov/owm/genwave.htm)
- Water Meter. *Project WET*.

### STUDENT HANDOUTS

*Home Water Use Inventory*

*Family Water Conservation Tips*

# Home Water Use Inventory

(ADAPTED FROM *Taking Stock of Water Use FROM Waterways: LINKS TO THE SEA.*)

Number of water users in the household: \_\_\_\_\_

**BATHROOMS** (Please Post)

Place a check mark in the proper column each time an activity is performed.

Activity	Gallons per use	Day 1	Day 2	Total uses	Total Gallons
Flushing older toilet	5				
Flushing newer toilet (water-saving design)	2				
Tub bath	35				
5-minute shower	25				
Brushing teeth with water running	5				
Brushing teeth with water not running	1/2				

**KITCHEN** (Please Post)

Place a check mark in the proper column each time an activity is performed.

Activity	Gallons per use	Day 1	Day 2	Total uses	Total Gallons
Washing dishes with water running	30				
Washing dishes using basin	10				
Dishwasher use	20				
Meal preparation	5				
Top-loading clothes washer	30				
Front-loading clothes washer	10				

# Family Water Conservation Tips

**(ADAPTED FROM TAKING STOCK OF WATER USE FROM  
WATERWAYS: LINK TO THE SEA)**

## **TOILET:**

*People use more water flushing the toilet than any other way.*

- Don't use the toilet as a wastebasket.
- Flush only when necessary.
- Save water on each flush by displacing the water in the tank with two half-gallon plastic jugs filled with water and pebbles for weight.
- Check for leaks and have them repaired. (Check for leaks by adding a water-soluble vegetable dye to the water in the tank, but don't flush. If there is a leak, some color will show up in the water in the bowl within a few minutes.)

## **BATH AND SHOWER:**

- Take showers instead of baths, and make showers shorter.
- Install a water-saving showerhead and have your hot water tank wrapped with insulation. (Contact your utility company for more information on wrapping your water tank.)

## **SINK:**

*Don't let water run down the drain while you do the following:*

- Brush teeth, shave, or wash;
- Wash and rinse dishes;
- Wash fruits and vegetables; or

- Wait for water to get cold to have a drink. (Keep a container of drinking water in the refrigerator instead.)

## **GENERAL HOUSEHOLD:**

- Wash only full loads of dishes and clothes.
- Use low-volume or conservation settings if your machines have them.
- Do a home leak-check on all faucets and water lines and repair any leaks.
- Water the garden and lawn at dawn when the day is cool (so less water evaporates) and only when needed.
- Use "trickle" irrigation instead of sprinkling.
- Mulch the garden to retain moisture in the soil.
- Consider planting drought-resistant native plants that don't require watering.
- Collect rain water or drops from an air conditioner for yard use.
- Wash the car using a bucket. Use a hose only when rinsing and always use a nozzle on the garden hose.
- Wash the dog or car on the lawn.
- Sweep walkways and driveways instead of hosing them.
- Recycle aluminum. (Manufacturing aluminum from recycled cans rather than from virgin ore can reduce water usage by 97%.)

## NOTES