# HOW MUCH WATER DO YOU USE?

*Grades* **7-12**

➤ **OBJECTIVES**

- Identify ways in which water is used.
- Analyse a family's water use with a focus on ways to reduce water consumption.

➤ **INTERDISCIPLINARY SKILLS**

Science, Mathematics, Critical Thinking

➤ **ESTIMATED TIME**

- Part A - 10 minutes to explain the chart; 30 minutes for follow-up discussion after the survey has been completed.
- Part B - 20 minutes

➤ **MATERIALS**

❑ Activity handout

## TEACHING STRATEGY

### Part A - Detective Work

1. Tell students that today's activity is designed to make them aware of how much water individuals and families use on a weekly basis.
2. Distribute the copies of the story, "The Case of the Mysterious Renters," and the survey. (Note: The story is designed to "liven up" the exercise. Teachers who feel that their students are too advanced for this story may choose to distribute just the water survey.)
3. Have students conduct the survey at home for a full week. Be sure students write down their hypotheses before completing their surveys.
4. Explain how to fill out the survey. Explain how to make tally marks each time the activity takes place. (It might be interesting, for extra credit, to compare weekday and weekend water use.)
5. After students have completed the survey, discuss the results.

### Part B - Brainstorming About Water Conservation

1. Have students look at their water use surveys. Ask them to consider what their families could do to reduce the amount of water they use. How much water would that conserve? If everyone in the class followed that practice, how much water would it save in a year?
2. Give each student a copy of the "Water Conservation Tips." Look it over as a group to see how it compares with your list. Suggest that students take it home and post it in the bathroom or kitchen.

NOTES

## Supplementary Activities

- Have students write an article for the school newspaper describing ways people can conserve water and why it is important.
- Have students write a brief newsletter for their parents reporting on the results of the survey. Honor those who used the least amount of water. Include water conservation suggestions.
- Have students conduct a survey of water conservation devices in their homes.

# The Case of the Mysterious Renters

## SCENARIO

*Mrs. Jackson has called the water detectives to help her solve a serious problem. She has heard that the detectives have an excellent record for solving mysteries.*

"What seems to be the problem?" asked one of the water detectives.

"Well," said Mrs. Jackson, "as you know, I rent out several apartments to college students. I never allow more than four students to stay in one apartment. But, in Apartment 319, I just know that there are more than four people. I just can't prove it."

One of the water detectives interrupted her with a question, "Have you ever tried making surprise visits?"

"Yes," she answered, "but every time I go there, four people or less are at home. Those college students come and go at all hours of the day and night. There is no way for me to keep track of how many students actually share the apartment."

"Very interesting," said one of the detectives. "I think we can help you, but first we'll need to see last month's water bill for the apartment."

"How will that help?" asked Mrs. Jackson.

"We'll be able to see how many gallons of water were used last month," said another water detective.

Mrs. Jackson found the bill. It revealed that last month the occupants used 15,000 gallons.

"Let's see," said one of the detectives. "Last month was September, which has 30 days. If we divide 15,000 gallons by 30 days, we know that they used 500 gallons a day."

"Yes," said Mrs. Jackson, "but is that a little or a lot?"

"We'll have to investigate and get back to you. We'll do a survey to find out how much the average person uses," said the detective.

With that, the water detectives left Mrs. Jackson with a promise to return soon with an estimate of how many people were sharing the apartment. The water detectives decided that they needed to do some research to determine how much water people use in one day. In order to come up with an estimate, they decided to find out how much water their own families use in one day. Here's how:

ASSIGNMENT

**1.** Record the facts of the case.

a. The people in the apartment used _____ gallons of water in September.

b. September has _____ days.

c. The average number of gallons of water used per day was

_____ gallons.

**2.** Form a hypothesis.

a. How many gallons of water a day do you think a person uses?

_____ gallons

**3.** Fill out the water survey.

**4.** Record your conclusions.

a. How many total gallons of water did your family use in one day?

_____ gallons

b. What is the average number of gallons of water used per person per day in your family?

_____ gallons

c. Based on your results, how many people do you think are living in Mrs. Jackson's apartment?

_____

d. Compare your answer with the answers of others in your class.

_____

_____

_____

# SURVEY:
# How Much Water Do You Use?

▶ DIRECTIONS This is a survey to find how much water you use in your home during one full week. Place a tally mark in the Times Per Day column every time someone in your family does the activity.

| ACTIVITY | TIMES PER DAY | | | | | | | WEEKLY TOTAL | WATER PER ACTIVITY* | TOTAL WATER USED |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sun | Mon | Tues | Wed | Thurs | Fri | Sat | | | |
| Toilet Flushing | + | + | + | + | + | + | = | _____ | x 5 gallons | = _____ |
| Short Shower (5-10 minutes) | + | + | + | + | + | + | = | _____ | x 25 gallons | = _____ |
| Long Shower (>10 minutes) | + | + | + | + | + | + | = | _____ | x 35 gallons | = _____ |
| Tub Bath | + | + | + | + | + | + | = | _____ | x 35 gallons | = _____ |
| Teeth Brushing | + | + | + | + | + | + | = | _____ | x 2 gallons | = _____ |
| Washing Dishes with Running Water | + | + | + | + | + | + | = | _____ | x 30 gallons | = _____ |
| Washing Dishes Filling a Basin | + | + | + | + | + | + | = | _____ | x 10 gallons | = _____ |
| Using Dishwasher | + | + | + | + | + | + | = | _____ | x 20 gallons | = _____ |
| Washing Clothes | + | + | + | + | + | + | = | _____ | x 40 gallons | = _____ |
| | | | | | | | | GRAND TOTAL | | = _____ |

NOTE: *Another significant seasonal water use is lawn and garden watering. This survey deals with daily water use in the home, but most of us use additional amounts of water at school, at work, and other places throughout the day.*

** These are estimated values.*

ASSIGNMENT

To find average use per person in your family, divide the grand total by the number of people in your family.

The answer is: _____

## ▶ FOLLOW-UP QUESTIONS

**1.** In your home, which activity happened most often?

_____

_____

_____

**2.** Which activities use the most water each time they occur?

_____

_____

_____

_____

**3.** What other activities at home consume large amounts of water?

_____

_____

_____

_____

_____

_____

**4.** Why might your answer differ from that of your classmates?

_____

_____

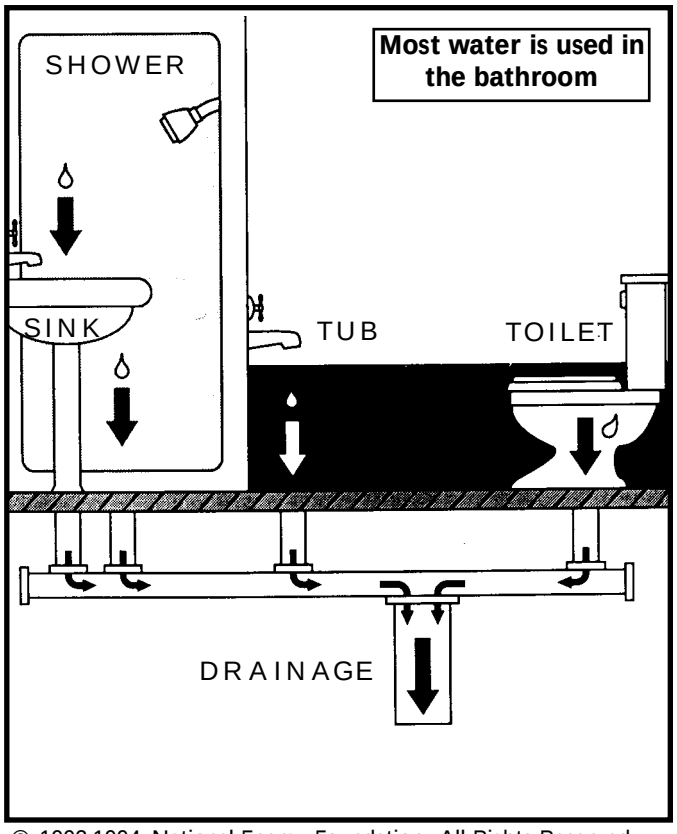
_____

_____

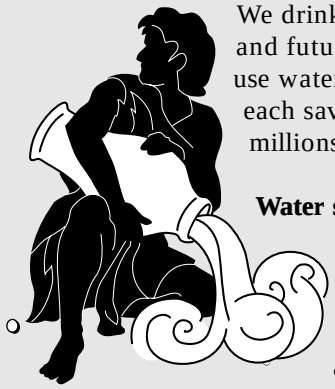
_____

_____

**WATER USE IN THE BATHROOM**



# ALL WATER IS RECYCLED...



We drink the same water that Brontosaurus, Cleopatra, and George Washington did, and future generations will drink that same water. That's why it's important that we use water wisely and protect water supplies whenever and wherever possible. If we each save a small amount of water each day, our combined savings will add up to millions of gallons each year.

**Water saved is money saved!** Water conservation can save on water and sewer fees. Also, when you use less water, your fuel bills are lower. Even if you use well water, saving water reduces both electric costs and the waste load going into your septic system. Each day, as you drink water and use water, think of things you could do to help conserve and protect it. For starters, here is a list of household water conservation tips. What other tips would you add?

# WATER CONSERVATION TIPS

## Bathroom

Two-thirds of the water used in the average home is used in the bathroom, mostly for flushing toilets, showering, and bathing.

- ☑ **Turn off the water when you are not using it.** Don't let it run while you brush your teeth or shave.
- ☑ **Flush the toilet less often**. Put used tissues, trash, hair, paper towels, etc. in the wastebasket instead of flushing them.
- ☑ **Fix leaks and drips**. This is often simply a matter of changing a washer.
- ☑ **Retrofit older plumbing fixtures with flow-reducing devices.**
- ☑ **Take shorter showers**. Less than 5 minutes is adequate; any longer is recreation.
- ☑ **Take baths**. If you like to linger, a partially filled tub uses less water than a shower.

## Kitchen and Laundry

- ☑ **Use appliances efficiently.** Run full loads in the dish or clothes washer or, if your appliance has one, use a load selector.
- ☑ **Buy a water saver**. Select new appliances that are designed to minimize water use.
- ☑ **Clean vegetables and fruit efficiently**. Use a vegetable brush to expedite cleaning.
- ☑ **Use garbage grinders as little as possible**. Start a compost pile or give leftovers to a dog, cat, chicken, horse, etc.
- ☑ **Keep a bottle of drinking water in the refrigerator**. Avoid running the tap just to cool water for drinking.

## Lawn and Garden

- ☑ **Water the lawn and garden only when necessary**. Early morning or evening are the best times. Let grass grow higher in dry weather. Mulch your trees and plants. Avoid watering driveways and sidewalks.
- ☑ **Deep-soak your lawn**. Allow the moisture to soak down to the roots where it does the most good. A light sprinkling evaporates quickly.
- ☑ **Plant drought-resistant trees and plants**. Many beautiful trees and plants thrive with less watering, particularly native species.
- ☑ **Wash your car sensibly**. Clean the car with a pail of soapy water and use the hose only for a quick rinse.