



LEAKY FAUCET MYSTERY

Objectives:

The student will be able to:

- ◆ List how water resources can be managed to meet human needs;
- ◆ Describe how conservation is essential to water resource management; and
- ◆ Explain how much water can be wasted by a leaky faucet.

Suggested Grade Level:

6-8

Subjects:

Ecology, Math

Time:

Approximately 50 minutes

Materials:

- plastic cups
- graduated cylinders
- water
- thin nail
- stop watch or watch with second hand
- student sheet
- calculators

BACKGROUND INFORMATION

Water is a major limiting factor of the environment. Without water life cannot exist. Increasing pressure on water resources and widespread, long-lasting water shortages in many areas exist for three reasons. The first reason is that increases in human populations are putting great demands on natural freshwater sources. The second reason is that there is an unequal distribution of usable fresh water. The final reason is that existing water supplies are becoming more and more polluted, more used, and less available.

Water is not usable in all forms and is not evenly distributed. Only 3 percent of the world's water supply is drinkable. Only .5 percent is reachable. Scientists estimate that 30 - 50 percent of the water supply used in the United States is wasted. Leaky pipes and faucets waste up to 30% of the nation's water. Industries can practice conservation by cleaning and reusing the water needed to make products. Plastic sheets that line irrigation canals can prevent much water from seeping into the ground.

As much as half of the water now being used for domestic purposes can be saved by practicing certain conservation techniques. Water can be saved in the bathroom by using low-volume showerheads, taking shorter showers, stopping leaks, and by using low-volume or waterless toilets. Toilet flushing is the largest domestic water use. Each person uses 50,000 liters (13,000 gallons) of drinking quality water each year to flush toilets. Special water-conserving dishwashers, washing machines, and other appliances that greatly reduce water consumption are available today.

TERMS

conservation: planned management of natural resources (such as water) to prevent waste, destruction, or neglect.

ADVANCE PREPARATION

A. Gather materials.

B. Make sure the cups hold enough water to drip for one minute based on the size of the nail hole. The hole should simulate the approximate size of the drip that would come from a leaky faucet.

PROCEDURE

I. Setting the stage

A. If graduated cylinders are not available, make your own by using a larger cup marked off in specific measurements for the graduated cylinder. Be sure the top cup, the “drip cup,” does not slip inside the larger. If it does, use toothpicks placed close to the top to hold the “drip cup” in place. Show students the way to set up the equipment as seen from the drawing on the right of this page.

B. Provide a foam or plastic cup and a nail for each group. You may want to demonstrate to the students how to punch a single hole into the bottom of the cup.

C. Explain to the students they will be doing three trials to get an average volume.

II. Activity

A. Fill the cups with water.

B. Set the cup on top of the graduated cylinder.

C. Start timing.

D. Collect water drops in the cylinders for one minute.

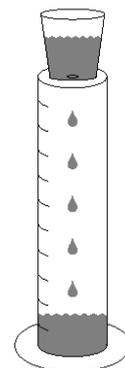
E. Measure the water volume collected from each cup.

F. Record the data on the student sheet.

G. Repeat three times.

H. Record the data in the student sheet. Fill out student sheet.

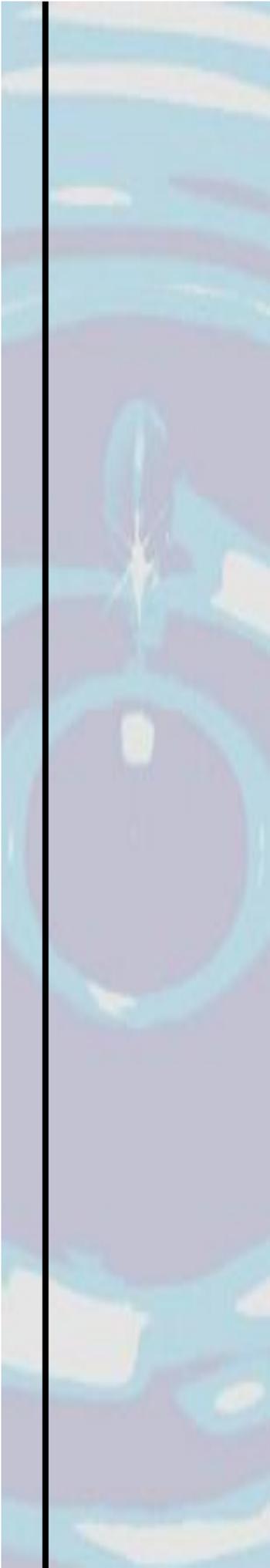
I. Have the students compute the volume of water that would be “wasted” from each cup after one hour, one day, one week, one month, and one year. Calculators should be provided to the students.



III. Follow-Up

A. Ask the students the following questions:

1. How does this activity relate to water that is wasted in a leaky kitchen faucet?



2. If you cannot stop the leak right away, what could you do with the water?

IV. Extensions

- A. Repeat the activity again but this time use the thin nail to make two small holes in the bottom of the cup. Repeat all steps from A though I. A larger collection container may be needed.
- B. Repeat the activity a third time but this time make three small holes in the bottom of the cup. Be sure to repeat all steps from A through I again. A larger collection container might be needed.
- C. Water mains in the city can break during times of excessive heat or drought due to ground shifting. Ask students to contact the water provider in their location to find out how often this occurs, how much water is often lost, and what is done about this problem.

R E S O U R C E S

Cunningham, William P. and Barbara Woodsworth Saigo, Environmental Science: A Global Concern, Wm. C. Brown Publishers, Dubuque, Iowa, 1995.

Project Wet: Curriculum and Activity Guide, Watercourse and Western Regional Environmental Education Council, 1995. Obtain from Project Wet: Water Education for Teachers, 201 Culbertson Hall, Montana State University, Bozeman, MT 59717-0057 (Fax: 406-994-1919; e-mail: rwwet@msu.oscs.montana.edu).

Thank you to the Environmental Protection Agency *Water Sourcebook* for this activity!

http://water.epa.gov/learn/kids/drinkingwater/wsb_index.cfm

LEAKY FAUCET

Directions:

1. Place the plastic cup on top of this graduated cylinder. Make sure someone holds it the whole time.

2. As soon as the water is poured in the cup, start timing for one minute.

3. At the end of one minute, move the cup off the cylinder. Put your finger over the hole.

4. Record your results.

5. Do three trials.

Trial #1- volume of water= _____

Trial #2- volume of water= _____

Trial #3- volume of water= _____

Total volume _____

Average volume

(divide by 3) in one minute= _____

6. Answer the following questions based on your trials:

A. How does this activity relate to water that is wasted by a leaky faucet?

B. If you cannot stop the leak right away, what could you do with the water?

C. Compute the volume of water wasted in the following time period.

One hour-

One day-

One week-

One month-

Two months-

One year-