

Money Down the Drain

Adapted from: “Money Down the Drain” in Project WET: Curriculum and Activity Guide. Bozeman: The Watercourse and the Council for Environmental Education, 1995.

Grade Level: Basic, Intermediate

Duration: 50 minutes

Setting: Classroom

Summary: This exercise demonstrates that the suggestion “money down the drain” actually does occur. Students will learn that wasting water can be financially and environmentally wasteful.

Objectives:

Calculate the amount of water wasted by letting the faucet drip. Analyze the financial benefits of fixing leaking faucets.

Vocabulary: conservation

Materials (Included in Module):

- Washers for a faucet
- Master copy of “Money Down the Drain Worksheet” easy and difficult versions

Additional Materials (NOT Included in Module):

- 3 Containers to collect dripping water (must be able to hold at least 1 gallon) each
- Calculators (optional)
- 6 stop watches or wall clock with second hand

ACADEMIC STANDARDS:

7th Grade

4.8.C Explain how human activities may affect local, regional and national environments.

- describe what effect consumption and related generation of wastes have on the environment.

10th Grade

4.8.C Analyze how human activities may cause changes in an ecosystem.

- analyze and evaluate changes in the environment that are the result of human activities.

BACKGROUND: As the nation’s population increases, it is vital that we learn how to efficiently make use of the available water supply to prevent water shortages. In particular, we need to eliminate wasteful water use (not to mention refrain from 20-minute showers, leaving the faucet on while brushing teeth, watering the lawn every day, and frequent car washings). Every month, residential households and commercial institutions waste water through leaky pipes, hoses and faulty washers in faucets. Household water lost in such a manner may total over 100 gallons of water per day!

The emphasis of this activity revolves around teaching the students about **conservation** or the preservation of limited natural resources. Prevention of such wastes is beneficial to both the municipal consumer’s pocketbook and the environment. A sewage plant will eventually treat the wasted water leaking from faucets and pipes. Treating the wasted water will require energy that could be otherwise used for more efficient purposes. The sewage plant in turn charges the household for the amount of wasted water they have discharged to the sewage plant. If a consumer loses 100 gallons of water a day to leaky faucets and faulty pipes for 30 days, then the sewage plant has no choice but to treat 3,000 gallons of water,

adding \$10.50 to the water bill every month. In addition, energy and resources are required to collect and pre-treat the water at a water authority. This wasteful action also harms the environment. Municipal water sources typically receive their water supply from natural water sources such as local rivers, lakes, reservoirs, and even oceans (via desalinization plants). Water must be collected from such natural water sources to replace the water that drips out of a faulty faucet or leaks from a pipe. Consequently, natural waterways lose additional water to such wasteful causes. The natural habitats of such waterways are continuously altered as more water is drained from them. In extreme situations, waterways already limited in water supply may even dry out. In this exercise, we will examine a very easy, practical, and affordable technique to preventing wasteful water loss: simply replacing faulty washers that cause faucets to leak.

OVERVIEW: Students will learn how much water can be saved per month by simply replacing or repairing faulty faucets; a simple method that prevents wasteful water loss.

PROCEDURE:

Teacher Preparation:

Right before class, turn a faucet on so that a steady drip occurs from it. Place an empty container underneath it, ideally something that will make a lot of noise as the water drips into it.

Use an already leaking faucet or intentionally allow a faucet to leak into a bucket while discussing the background information listed above. At the end of the background discussion, notice the leaking faucet and show the students the amount of water that has been collected in the bucket.

Exercise:

1. Ask students to be quiet and listen for a moment. Hopefully they hear the dripping of the water. Tell students that what they are hearing is money going down the drain. Indicate they are going to learn about how a dripping faucet can be both environmentally and economically wasteful. Ask students if they have leaky faucets at home. If so, do they think it is worth fixing? You may want to keep the faucet dripping while you talk about the background information – to see how much water you collect in that time.
2. Find three working faucets (if you have that many). You can use more if you have that many in the classroom. Do not turn the faucets on until you are ready to begin the exercise. Place underneath each faucet a container of which you know the volume. You will collect the dripping water in this container.
3. Divide your class into groups. Assign groups to each faucet. Instruct them to complete the “Money Down the Drain” worksheet and the answer sheet for their faucet.

4. Position the collection containers under each faucet. Turn the faucet on slightly, making sure the water comes out in droplets and not a stream.
5. After the worksheets are finished, have the two groups working at the same faucet compare answers. The two groups should take the average of the two data sets. Have the students collect the average data sets from the remaining two faucets.

DISCUSSION:

- Ask students to share their calculations from their worksheets for the amount of money that could be saved by fixing the faucets alone. Was this amount significant or not? Stress that their calculated figure was for one month. How much money could be saved in one year? Can the students think of anything else they would rather do with that money than wasting it down the drain?
- Ask students if they can explain non-financial reasons for fixing faulty washers within leaky faucets. *Drawing water from natural waterways strains the current communities that inhabit them. Removing water from an aquatic community disrupts the habitat of the area. In addition, wasted water requires additional energy so that it can be retrieved, and treated before and after it is used. Thus, water taken from natural waterways should be efficiently used rather than wasted down the drain.*
- Ask students if they think that pipes that run underground to supply towns and homes with water leak? This is often a major loss of water. Some water lines in many communities are very old (maybe even 80 years old) and have eroded with age. When designing a water system, project planners will calculate a 10 to 20 percent water loss factor to adjust for unaccountable leaks. With these leaks, if you needed to fill a 1000mL container of water, how much water would need to be sent by the water authority to ensure that your containers is entirely filled? (*Assuming a 10% loss – 1100mL sent, assuming 20% - 1200 mL sent.*) Do you think water customers are affected by leaking underground pipes? *Yes, often the cost of the loss of water is passed on to customers in their bill. Why aren't these leaks fixed? Often these leaks are expensive to fix (which would end up costing the water customer again in the long run). To fix pipes, extensive excavations are sometimes needed, and small leaks can be difficult to pinpoint and find.*

EVALUATION:

- Calculate how much water is lost from dripping faucets (step 2).
- Identify financial and ecological reasons why leaking faucets should be fixed (step 3 and discussion).

EXTENSIONS AND MODIFICATIONS:

- Have students locate leaky faucets within your school. If any are found, calculate how much water is lost from dripping faucets at school (or home).
- Ask a custodian to demonstrate how easy it is to replace a washer within a faulty faucet. Additionally, find out how much a new washer costs? (*under a dollar*)
- Have students investigate other potential ways in which water is wasted...possibilities include long showers, leaving the faucet on while dishwashing and brushing teeth, frequent car washes and lawn watering, etc. Use the information and fact sheets in the water conservation section of the module resource guide. Would students use as much water if they had to gather it themselves?

NOTES (PLEASE WRITE ANY SUGGESTIONS YOU HAVE FOR TEACHERS USING THIS ACTIVITY IN THE FUTURE