

LESSON OVERVIEW

As a homework assignment, students measure the volume of water flowing from their showerheads at home. In school, they calculate how much water they could save by installing low flow showerheads. Students can receive free low flow showerheads by returning a completed form to the teacher. Students are encouraged to take the *40 Gallon Challenge* to conserve water in a variety of ways.

ARIZONA DEPARTMENT OF EDUCATION ACADEMIC STANDARDS

(Please refer to the Arizona Department of Education Academic Standards table for details about the ADE standards addressed by this lesson.)

LEARNING OUTCOMES

Students will be able to:

- measure the water consumption of their showers at home and determine if they have a low flow showerhead.
- calculate the amount of water that could be saved by using a low flow showerhead versus a high volume showerhead.
- calculate the amount of water that could be saved by using a timer to limit the length of time spent in the shower.
- request a free low flow showerhead from Tucson Water.
- describe at least three additional ways to conserve water.

MATERIALS

- Shower Flow Kit (flow measurement bag, shower timer, parent permission form) (provided)
- *Student Worksheet: How Does Your Shower Flow?* (provided)
- Wristwatch or timer (at home)
- Chalkboard, overhead projector or Smart Board
- Calculators (optional)

ADVANCED PREPARATION

- Obtain Shower Flow Kits upon completion of *El Tour de Agua* classroom presentation (one per student).
- Photocopy *Student Worksheet: How Does Your Shower Flow?* (one per student).
- Prepare the overhead projector or Smart Board (optional).
- Learn about the *40 Gallon Challenge* at <http://www.40gallonchallenge.org>.

DURATION

One homework assignment, plus one 50-60 minute class period

PROCEDURE

1. Distribute a Shower Flow Kit to each student.
2. The first part of this lesson is a homework assignment using a home shower. Suggest that students ask a parent or sibling to assist them, as two sets of hands are helpful. One person can be the “filler” and the other the “timer.”
3. Use the flow measurement bag as described in the *Student Worksheet*. (OPTIONAL: For increased accuracy, have students empty the bag and repeat steps 1 through 4 and average the results.)
4. Students should record the showerhead flow rate in Question 1 on the *Student Worksheet*.
5. Students should keep track of the length of time they spend in their next shower. They should record this in Question 2 on the *Student Worksheet*.
6. In class following the homework assignment, make a tally of the class shower flow results (using categories of 1, 2, 3, 4, 5, and >5 gallons per minute). As students raise their hands for each category, count the number of students, and record the tally using a chalkboard, overhead projector or Smart Board.
7. Repeat the tally process with the class for shower duration results (using categories of 1-5, 6-10, 11-15, 16-20, and >21 minutes).
8. Have each student complete the Shower Flow Bar Graph and Shower Duration Graph on their *Student Worksheet* using the numbers recorded from each tally.
9. Students should answer the remaining questions on the *Student Worksheet*. Review how to calculate an average if necessary. Decide if calculators are permissible.
10. Students interested in receiving a free low flow showerhead (based on their showerhead flow results) should ask a parent/guardian to contact the Outreach Education Coordinator at (520) 670-1442 or outreach@eeexchange.org.
11. Take the *40 Gallon Challenge*! Encourage your students to conserve water in a variety of ways. Learn more at <http://www.40gallonchallenge.org>.

EXTENSION

Have students use their flow measurement bags to determine the flow rate for kitchen and/or bathroom sinks. If the flow rate is too high, encourage students to install faucet aerators. These devices are inexpensive to purchase, easy to install, and result in savings of both water and money! (One free aerator will be included with each showerhead requested.)

EL TOUR DE AGUA POST-VISIT LESSON

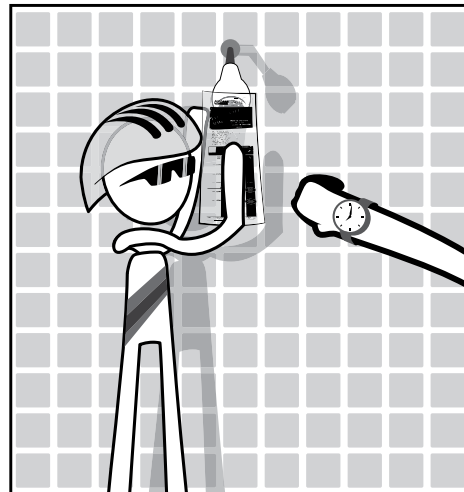
Student Worksheet: How Does Your Shower Flow?

Name _____ Teacher _____

Directions

A. Calculate your showerhead's flow rate by completing the following steps:

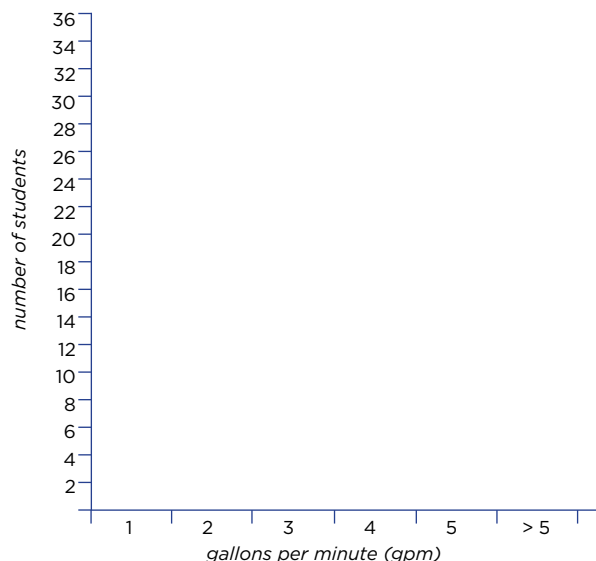
1. Ask a parent or sibling to assist you, as two sets of hands are helpful. One person can be the "filler" and the other the "timer."
2. Gather the top of the Shower Flow bag around the shower pipe, making sure the showerhead is inside the bag. Hold the bag in place loosely so that air may escape while filling with water.
3. Quickly turn on the cold water to full flow.
4. Let water run for exactly 5 seconds. (Use a wristwatch or timer.)
5. Quickly turn off the water. Observe the water level on the bag. The graduation nearest to the water level shows the flow rate in gallons per minute (gpm). (For increased accuracy, empty the bag and repeat steps 1 through 4 and average the results.)
6. Record the flow rate of your showerhead in Question 1.



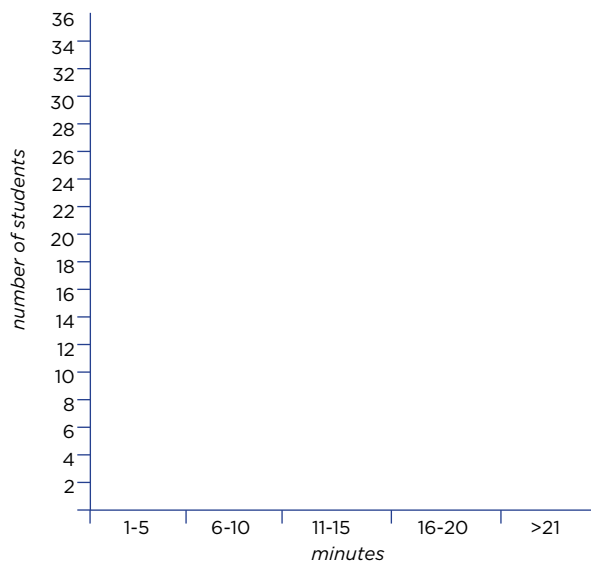
B. Take a shower and time it! When you are dry, record your shower duration in Question 2.

C. Complete the following graphs after sharing class results.

SHOWER FLOW BAR GRAPH



SHOWER DURATION BAR GRAPH



D. Complete the following questions.

1. What is the flow rate of your showerhead? _____ gallons per minute
2. How much time did you spend in the shower? _____ minutes
3. Considering the flow rate of your showerhead and the length of time you spent taking a shower, how much water did you use? _____ gallons
Show your work:

4. If you take the same length shower with this showerhead every day for one year, how much water would you use? _____ gallons
Show your work:

5. If the water utility charges approximately \$2 per 1000 gallons of water used, how much does your year of showers cost? \$ _____
Show your work:

6. a. How many people are in your family, including you? _____

b. If everyone in your family showered 10 minutes every day for a year using your showerhead, how much water would be used? _____ gallons per minute (gpm)
Show your work:

c. How much would it cost? \$ _____
Show your work:

7. a. How much water would be saved over a year if your family replaced the showerhead with a 2 gallon per minute (gpm) flow rate showerhead? _____ gallons (If you already have a showerhead at home, calculate how much you are already saving as compared to a 5 gpm showerhead.) Show your work:

b. What would one year of showers cost? \$ _____
Show your work:

8. How much water would your family save over a year if you had a 2 gpm showerhead, and each member only showered 5 minutes a day? _____ gallons
Show your work:

9. Calculate the average length of time spent in the shower for your class. _____ minutes
Show your work:

10. Using the average class shower time, calculate the total amount of water which would be used if everyone in your class took a shower using a 5 gpm flow rate showerhead. _____ gallons
Show your work:

11. Using the average class shower time, calculate the total amount of water which would be used if everyone in your class took a shower using a 2 gpm flow rate showerhead. _____ gallons
Show your work:

12. In addition to installing a low flow showerhead and taking shorter showers, what are three additional ways you can save water at home?