

Activity 11.9 DRIPPING FAUCET

Pose the following problem to students:

If you brush your teeth twice a day and leave the water running when you brush, how many gallons of water will you waste in one day? In two days? In a week? A month? Any number of days?

Have students actually gather real data, if possible. Then compute the mean. Ask students to figure out the answers to the questions posed and justify their answers.

Source: Adapted from Williams, M., Forrest, K., & Schnabel, D. (2006). Water wonders (math by the month). *Teaching Children Mathematics*, 12(5), 248–249.

This environmental investigation involves real measurement and authentic data. Stern (2008) implemented this investigation with students and found that it aided their understanding of the difference between multiplicative and additive situations. Students in her class were challenged to figure out how many of the paper cups that they used for measuring would fill a gallon. The class figured out that 2 paper cups were equal to one-quarter gallon. Each student reasoned how many gallons he or she wasted in a day. For example, a student who wasted 5 paper cups of water reasoned that this would be two-fourths, plus a half of another fourth (or one-eighth). So, in total, five-eighths of a gallon of water is wasted per day. The class recorded what they knew in a table:

Paper cups of water wasted	1	2	3	4	5
Gallons of water wasted	$\frac{1}{8}$	$\frac{1}{4}$	$\frac{3}{8}$	$\frac{2}{4}$	$\frac{5}{8}$

The teacher encouraged students to rewrite the table with common denominators. Students recognized that the ratio of paper cups to gallons was $1:\frac{1}{8}$. Notice the connection to algebraic reasoning and to measurement. The formula $y = \frac{1}{8}x$ describes the number of paper cups (x) to gallons (y). This investigation also showed the students how to reason through measurement conversions with a nonstandard measure (the paper cup), which is a very challenging concept.

From Van de Walle et. al. (2014). *Teaching Student-Centered Mathematics Grades: Developmentally Appropriate Instruction for Grades 6 – 8 (2nd Ed.)*. Toronto: Pearson Education, Inc. (p. 212).