

ACTIVITY 18 WORKSHEET

We'll Form a Bucket Brigade

◆Background

Human beings require a minimum of 2.4 L (about 2/3 gallon) of water per day to sustain life. However, the average American uses about 100 times more water than this every day at home. An average family of four in the United States might use about 900 L of water per day for the following purposes:

Approximate daily water use by a family of four in the U.S.

Use	Liters per day
Drinking and cooking	30
Dishwasher (3 loads per day)	57
Toilet (16 flushes per day)	363
Bathing (4 baths or showers per day)	303
Laundry clothes	130
Watering houseplants	4
Rinsing garbage into disposal unit	13
Total daily use:	900 L ≈ 225 gal

(A reminder: 1 gallon = 3.8 L; 26.3 gallons = 100 L.
The total daily water use of 900 L is equal to about 237 gallons.)

Materials

Each group will need

- a schoolyard or parking lot with a water source
- two 122 L (32 gallon) trash cans
- empty milk jugs and/or buckets (as many as possible)
- 100 L of water (If possible, use the same water that you used for the "All the Water in the World" activity.)
- a watch or clock with a second hand
- a meter stick (optional)

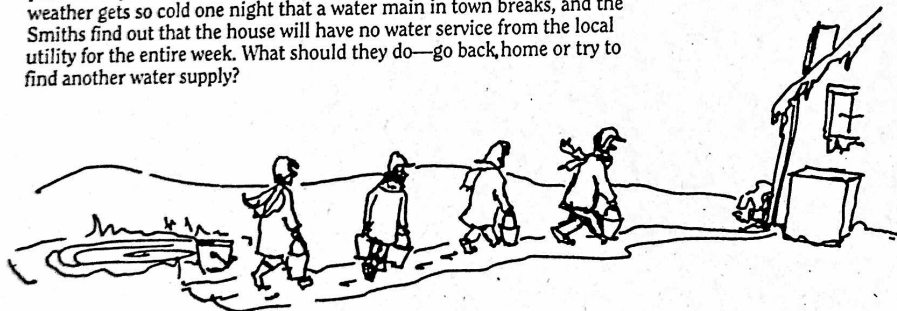
Note: You can do this activity inside a building, but try to choose a place where some spilled water will not be a problem.

◆Objective

This activity provides a real-life model for how much water a family typically uses, allowing participants to experience firsthand how much effort is required to transport water, and shows that when people really want to, they can sharply reduce their water usage.

The story begins:

One cold January, the Smith family rent a house in the mountains for a ski vacation. The house, though old, has all the comforts of home—three bathrooms, a complete laundry room, dishwasher, and garbage disposal, plus a newly installed solar hot water heating system. Unfortunately, the weather gets so cold one night that a water main in town breaks, and the Smiths find out that the house will have no water service from the local utility for the entire week. What should they do—go back home or try to find another water supply?



Mr. Smith learns from a neighbor that there is an unfrozen spring 100 m from the house that could still be used for drinking water. Mrs. Smith, who is a mechanical engineer, discovers that if the municipal water line coming into the house were shut off, the water in the storage tank for the solar water heater could be routed directly into the plumbing system. The water system in the house will work as long as the storage tank is kept filled with water from the spring.

Mr. and Mrs. Smith discuss the decision with their two children: Alice, 14, and Sam, 12. The family decided to form a "family bucket brigade" from the spring to the house, fill the storage tank each day, and continue their vacation. The storage tank can hold about 900 L of water.

The class' role:

For this part of the activity, you will pretend to be one of the Smiths, who need to carry 225 gallons of water 100 m to the house.

Procedure

1. Place the two trash cans 100 m apart. (You can measure the distance with a meter stick or estimate it—100 m is about 150 paces for an average-size person.) If you cannot go 100 m in a straight line on the school yard, set up a curving course. Choose one student to be time keeper.

2. Place 40 gal of water in one of the trash cans. This will be the "spring."

3. Let the whole class be the Smith family, equip each person with as many buckets and milk jugs as he or she can carry, and have them transfer the 40 gal of water to the house (represented by the other trash can) 100 m away. Have the students transfer all the water just one time.

Record the time when the Smiths begin carrying the water.

_____ am/pm

Record the time when the Smiths finish moving the first 40 gallons of water from the spring to the house.

_____ am/pm

How long did it take them? _____ minutes

4. The Smiths may feel a little tired, but so far they have only carried about 1/5 of the water required to fill the tank. A full tank is the amount that is typically used in one day.

We're stopping after one transfer—the point is to show that while the distance of transferring (100 m) is not very far, moving a typical family's water supply even a short distance is a lot of work.