WATER METER READER

OBJECTIVES

The student will do the following:

1. Determine how much water his or her family uses at home.

2. Observe, interpret data, infer, and use numbers to compare water usage to that of other students.

3. Construct a graph using collected data on water usage.

BACKGROUND INFORMATION

Water is a valuable resource. The average household uses 200 gallons of water per day. Water shortages are occurring in many parts of the world because of rising demand from growing populations, unequal distribution of useable freshwater, and pollution. We must all be conscious of the water we are using and learn ways to conserve water. By changing personal habits, such as running water while brushing teeth, people can save a lot of water.

Each household can monitor the amount of water it uses by reading its water meter. There are several types of water meters. The water company in your area should have directions on how to read a water meter. Families can use meter readings as a challenge to reduce water use. Read the meter, obtain an average water use, and strive as a family to reduce water use by 1-2 gallons per day or 10-20 gallons per week, etc.

As much as half of the water being used now for domestic purposes can be saved by practicing certain conservation techniques. Water can be saved in the bathroom by using low volume shower heads, taking shorter showers, stopping leaks, and by using low volume or waterless toilets. Toilet flushing is the largest domestic water use. Each person uses 13,000 gal (50,000 liters) of drinking quality water a year to flush toilets. Regulations in many areas now require water-saving toilets be used. An old toilet can conserve water by having a water-displacement device, such as a half-gallon milk jug filled with water or sand, placed in the storage tank. Special water conserving appliances such as dishwashers and washing machines are available now that reduce water consumption greatly.

Approximate volumes of home water usage are as follows:

Bath	100–150 L (30-40 gallons)
Shower	20 L (5 gallons) per minute
Washing clothes	75–100 L (20-30 gallons)
Flushing a toilet	10-15 L (3-4 gallons) or more
Dishwasher	50 L (15 gallons) per load
Cooking	30 L (8 gallons) per day
Watering a lawn	40 L (10 gallons) per minute

Different communities use several types of water meters. Meters have different numbers of dials. As water moves through the water pipes, the meter pointers rotate. To read a meter, find the dial that has the lowest denomination indicated. Record the last number that the pointer has passed. Continue this process. If the meter has more than one dial, the meter may be measured in gallons, cubic feet, or cubic meters.

<u>Terms</u>

cubic feet: the volume of a cube whose edges are a specified number of feet in length. (Example: 3 cubic feet would be a cube that is 3 feet long, 3 feet high, and 3 feet wide.)
cubic meters: the volume of a cube whose edges are a specified number of meters in length. (Example: 3 cubic

meters would be a cube that is 3 meters long, 3 meters high, and 3 meters wide.)

gallon: a unit of liquid capacity equal to four quarts (about 3.8 liters).

unit: a fixed quantity (as of length, time, or value) used as a standard of measurement; a single thing, person, or group forming part of a whole.

ADVANCE PREPARATION

A. Have students draw a picture of their water meter and bring it to class.

B. Have students bring to class a water bill from their households..

PROCEDURE

I. Setting the stage

    A. Discuss the different types of meters using the pictures the students bring to class. Discuss the bills that the family receives each month.

    B. Show students how to calculate how much water is used in a home using the Meter Reader Student Sheet.

    C. Fill in Day 1 together as a class so students know how to use the sheet.

II. Activity

    A. Have the students read their home water meters at the same time of the day for 7 days (one week).

    B. Have the students subtract the previous day's reading to find the amount of water used each day.

    C. Ask the students to record how water is used in their homes each day (bath, shower, clothes washing, dishwasher).

    D. Using graph paper, have student plot data daily. Label the vertical axis with the units used by your meter.

III. Follow-Up

    A. Have the students answer the following questions:

        1. What day did your family use more water? Why?

        2. What was the total amount of water used by your family during the week?

        3. What is the average amount of water used by each person in your family?

        4. Estimate a monthly and yearly average of water usage in your home.

        5. Would the family's water usage vary during the year? Why?

        6. How can your family conserve water?

IV. Extensions

    A. Have students find out the source of their water supply and trace it until it reaches their homes. Who determines if the supply is pure? How often is the water tested, and how is the wastewater treated?

    B. Have students visit home improvement shops to calculate the cost of water conserving products as well as
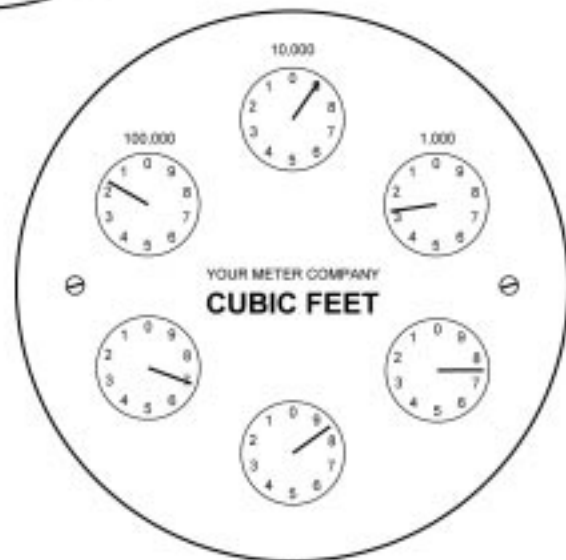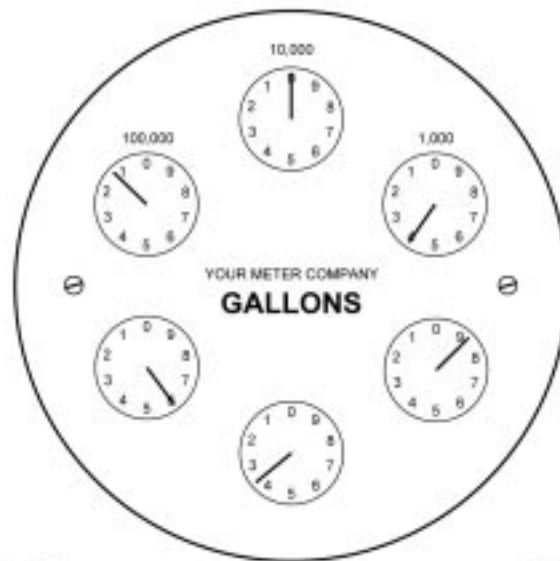
to determine where to obtain them.

C. Take a field trip to a water treatment plant.

RESOURCES

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

Home Water Usage

Your water meter probably looks like one of these. The first meter is read clockwise and measures water in gallons. The second meter measures water in cubic feet and is read in the same manner. (To convert cubic feet to gallons you must multiply the number on the meter by 7.5.) The third meter is read like a digital clock. Meters 1 and 2 have six dials, which are read clockwise. Begin with the "1000,000" dial and read each dial to the "1" dial. Remember that when the dial is between two numbers, you read the smaller number. Read and record the number shown on each meter.

Home Water Usage

Directions: Reda the dials from left to right. When the dial is between two numbers, read the smaller number. Write the numbers in the blanks below the dials.

1.

_____ _____ _____ _____ _____ _____

2.

_____ _____ _____ _____ _____ _____

3.

_____ _____ _____ _____ _____ _____

Directions: List how water is used in your home. Indicate how many times each occurred and how much water was used. Compute a total for each day and for the entire seven days.

Day 1 — Date _____
shower (25 gal)   x _____ showers   = _____ gallons
bath (35 gal)   x _____ baths   = _____ gallons
dishwasher (15 gal)   x _____ loads   = _____ gallons
laundry (20 gal)   x _____ loads   = _____ gallons
toilet (4 gal)   x _____ flushes   = _____ gallons
teeth (1 gal water runs)   x _____ brushings   = _____ gallons
meals (8 gal per day)   =   8   gallons
                                          Total Gallons _____

Day 2 — Date _____
shower (25 gal)   x _____ showers   = _____ gallons
bath (35 gal)   x _____ baths   = _____ gallons
dishwasher (15 gal)   x _____ loads   = _____ gallons
laundry (20 gal)   x _____ loads   = _____ gallons
toilet (4 gal)   x _____ flushes   = _____ gallons
teeth (1 gal water runs)   x _____ brushings   = _____ gallons
meals (8 gal per day)   =   8   gallons
                                          Total Gallons _____

Day 3 — Date _____
shower (25 gal)   x _____ showers   = _____ gallons
bath (35 gal)   x _____ baths   = _____ gallons
dishwasher (15 gal)   x _____ loads   = _____ gallons
laundry (20 gal)   x _____ loads   = _____ gallons
toilet (4 gal)   x _____ flushes   = _____ gallons
teeth (1 gal water runs)   x _____ brushings   = _____ gallons
meals (8 gal per day)   =   8   gallons
                                          Total Gallons _____

Day 4 — Date _____
shower (25 gal)   x _____ showers   = _____ gallons
bath (35 gal)   x _____ baths   = _____ gallons
dishwasher (15 gal)   x _____ loads   = _____ gallons
laundry (20 gal)   x _____ loads   = _____ gallons
toilet (4 gal)   x _____ flushes   = _____ gallons
teeth (1 gal water runs)   x _____ brushings   = _____ gallons
meals (8 gal per day)   =   8   gallons
                                          Total Gallons _____

Day 5 — Date _____
shower (25 gal)   x _____ showers   = _____ gallons
bath (35 gal)   x _____ baths   = _____ gallons
dishwasher (15 gal)   x _____ loads   = _____ gallons
laundry (20 gal)   x _____ loads   = _____ gallons
toilet (4 gal)   x _____ flushes   = _____ gallons
teeth (1 gal water runs)   x _____ brushings   = _____ gallons
meals (8 gal per day)   =   8   gallons
                                          Total Gallons _____

Day 6 — Date _____
shower (25 gal)   x _____ showers   = _____ gallons
bath (35 gal)   x _____ baths   =_____ gallons
dishwasher (15 gal)   x _____ loads   =_____ gallons
laundry (20 gal)   x _____ loads   =_____ gallons
toilet (4 gal)   x _____ flushes   =_____ gallons
teeth (1 gal water runs) x _____ brushings   =_____ gallons
meals (8 gal per day)   =   8   gallons
                                    Total Gallons _____

Day 7 — Date _____
shower (25 gal)   x _____ showers   = _____ gallons
bath (35 gal)   x _____ baths   =_____ gallons
dishwasher (15 gal)   x _____ loads   =_____ gallons
laundry (20 gal)   x _____ loads   =_____ gallons
toilet (4 gal)   x _____ flushes   =_____ gallons
teeth (1 gal water runs) x _____ brushings   =_____ gallons
meals (8 gal per day)   =   8   gallons
                                    Total Gallons _____