

## Lesson 10

# Carrying Capacities

What is a reservoir and how is it used?  
What is the name of the largest reservoir in the Farmington River Watershed?  
What are carrying capacities?

**GOAL** To understand the enormity of carrying capacities of reservoirs

**OBJECTIVES** Students will:

- ✓ identify and locate reservoirs on a watershed map
- ✓ conduct calculations to understand the size of a reservoir
- ✓ relate size of reservoir to school gym

**MATERIALS** watershed reservoir maps (selected\_dams\_map on CD), paper, plastic gallon jug for four groups, rulers, pencils, calculators

### CORE CURRICULUM CONTENT STANDARDS

- Math 1(2,3), 2(1,2), 3(1), 4(1), 5(1,3)
- Science 7(6,8), 8(1-3), 14(1-3)
- Social Studies 12(1,2,4,7,8), 13(5)

**VOCABULARY** reservoir, carrying capacity

### PROCEDURES

1. Begin by discussing the term reservoir with students. Ask students what they are and their purpose (*artificial lakes made by impoundments; storage for drinking water or flood control*).
2. Discuss carrying capacities of reservoirs (*amount of water they are able to hold*). Explain that Farmington River Watershed has ten reservoirs and three (Nepaug, Barkhamsted, and Whigville Reservoirs) are used solely for drinking water storage (*listed below*). They are able to store billions of gallons of water. Have students comprehend the enormity of the volume through math calculations.

3. Distribute watershed reservoir maps and have students identify the locations of the following reservoirs:

**Otis Reservoir - 5.8 billion gallons**

**Colebrook Reservoir - 32.1 billion gallons**

**West Branch Reservoir - 6.5 billion gallons**

**Barkhamsted Reservoir - 30.3 billion gallons**

**Lake McDonough - 2.9 billion gallons**

**Nepaug Reservoir - 9.5 billion gallons**

**Mad River Detention Reservoir - 3 billion gallons**

**Sucker Brook - 482 million gallons**

**Whigville Reservoir - 37 million gallons**

**Rainbow Reservoir - 4 billion gallons**

4. After completing activity, divide students into four groups. Provide each group with a one gallon jug, a ruler, paper, pencil and calculator. Assign two reservoirs listed above to each of the four groups.
5. Initially, have students practice calculations to determine how much space is needed for the Colebrook Reservoir (32.1 billion gallons).
- Have students calculate how much room is used by 32.1 billion jugs. Have them measure the volume of the gallon jug with a ruler. Measure and multiply the length, width and depth in inches. For example, if the amounts were 5 inches  $\times$  6 inches  $\times$  10 inches, the total would equal 300 cubic inches or .17 cubic feet/gallon.\* (\*300 inches  $\div$  (12in/ft  $\times$  12 in/ft  $\times$  12 in/ft) = .17 cubic feet) To calculate the amount of space used by the 32.1 billion containers, have students multiply .17 cubic feet/gallon  $\times$  32,100,000,000 gallons. This is an area of 5,457,000,000.
  - Have students calculate how many gallons would fit in school's gymnasium. Have them measure the volume of the gym and divide that number by the volume of one jug. For example, if the room is 20ft  $\times$  50ft  $\times$  50ft, the total volume equals 50,000 cubic feet. 50,000 cubic ft  $\div$  .17 cubic ft equals 294,118 gallons in one gym.
  - Have students measure how many gyms it would take to store the 32.1 billion gallons. 32,100,000,000 gallons  $\div$  294,118 gallons = 109,140 gyms filled with gallon jugs. This is the amount of space used by the Colebrook Reservoir to store the 32.1 billion gallons of water.
6. Have student groups continue with the other calculations for the remaining reservoir carrying capacities.

## **EXTENSIONS**

1. Have students visit one of the reservoirs to view its size. Instruct them to research and determine what water-related activities are allowed at each of the ten reservoirs.
2. Have students identify wildlife at each of the reservoir locations. Have them determine if particular species inhabit these areas.

## **RESOURCES**

Farmington River Watershed Association, August 2003, *State of the Farmington River Watershed Report*.

Haskin, Kathleen M., *The Ways of the Watersheds: An Educators Guide to the Environmental and Cultural Dynamics of New York City's Water Supplies*, 1995, Claryville, NY: The Frost Valley YMCA

## **GLOSSARY**

**carrying capacity** - the ability or amount that can be held or stored

**reservoir** - a natural or artificial pond or lake used for the storage and regulation of water