

## Overview:

Students will calculate the water use of their individual families and use the cumulative data from the class to analyze the water needs of their village.

## Objectives:

The student will:

- calculate the water needs of their individual families;
- determine the average per person water consumption in the village and the overall needs of the village during the winter months; and
- compare their findings to the village water storage capacity.

## GLEs Addressed:

### *Science*

- [5-8] SA1.1 The student demonstrates an understanding of the processes of science by asking questions, predicting, observing, describing, measuring, classifying, making generalizations, inferring, and communicating.
- [5] SA1.2 The student demonstrates an understanding of the processes of science by using quantitative and qualitative observations to create inferences and predictions.
- [5] SE1.1 The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by identifying a community problem or issue and describing the information needed to develop a scientific solution.
- [7] SE1.1 The student demonstrates an understanding of how to integrate scientific knowledge and technology to address problems by describing how public policy affects the student's life (e.g., public waste disposal).

## Materials:

- Pencils
- STUDENT WORKSHEET: "Water Wise"

## Activity Procedure:

Many villages throughout the Bering Strait School District pipe their water from local rivers or creeks and store this water in huge holding tanks for use during the winter months. Students may have experienced times of water rationing due to a late spring thaw, or because the existing water tank is no longer adequate to meet community demands.

1. Prior to this lesson, determine how village water needs are met during the year. If a water tank is used, establish its size. Determine how many people depend on that water supply and for approximately how many months per year. As a lesson extension, students may be asked to research this information.
2. Ask students where their water comes from, both in the summer months and during the winter. Ask if they have ever had to reduce their water usage due to a water shortage. Explain that, in this activity, students will determine how much water each of their families uses per day on average, and then use the average of that amount to compute the annual water needed for their village.
3. Hand out the STUDENT WORKSHEET: "Water Wise" and ask students to complete the first part independently. Complete the second part as a class.

## Answers to Student Worksheets:

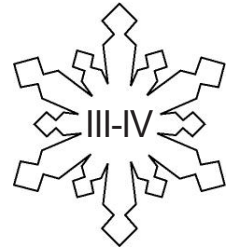
Answers will vary.

Name: \_\_\_\_\_

# Water Wise

## Student Worksheet (page 1 of 3)

Levels



### Section I:

1. Fill out the following table to determine approximately how much water your family uses each day.

| Activity                                 | Gallons/day   |   |   |   |                                    |                         |                           |   |       |
|--|---|---|---|---|------------------------------------|-------------------------|---------------------------|---|-------|
| Showers                                  | Number per day:<br>_____                            | x | Number of minutes:<br>_____               | = | Total minutes:<br>_____            | x                       | Average:<br>2 gal/min     | = | _____ |
| Baths                                    | Average:<br>Number per day: _____ x 30 gallons/bath |   |   |   | =                                  | _____                   |                           |   |       |
| Toilet flushes (average is 4 per person) | Number in family:<br>_____                          | x | Flushes per day:<br>_____                 | = | Total flushes:<br>_____            | x                       | Average:<br>2 gal/flush   | = | _____ |
| Teeth brushing                           | Number in family:<br>_____                          | x | Number of brushings per day:<br>_____     | = | Total brushings:<br>_____          | x                       | Average:<br>1/2 gal/brush | = | _____ |
| Hand washing                             | Number in family:<br>_____                          | x | Number of hand washings per day:<br>_____ | = | Total hand washings:<br>_____      | x                       | Average:<br>1/2 gal/wash  | = | _____ |
| Dishwashing by hand                      | Number of times dishes washed per day:<br>_____     | x | Minutes water runs per time:<br>_____     | = | Total minutes water runs:<br>_____ | x                       | Average:<br>2 gal/min     | = | _____ |
| Dishwasher                               | Number of loads per week:<br>_____ x 15 gal/load    |   |   |   | ÷                                  | 7 days per week = _____ |                           |   |       |
| Laundry                                  | Number of loads per week:<br>_____ x 35 gal/load    |   |   |   | ÷                                  | 7 days per week = _____ |                           |   |       |

**2. Total Daily Use by Household (Gallons per Day) =** \_\_\_\_\_

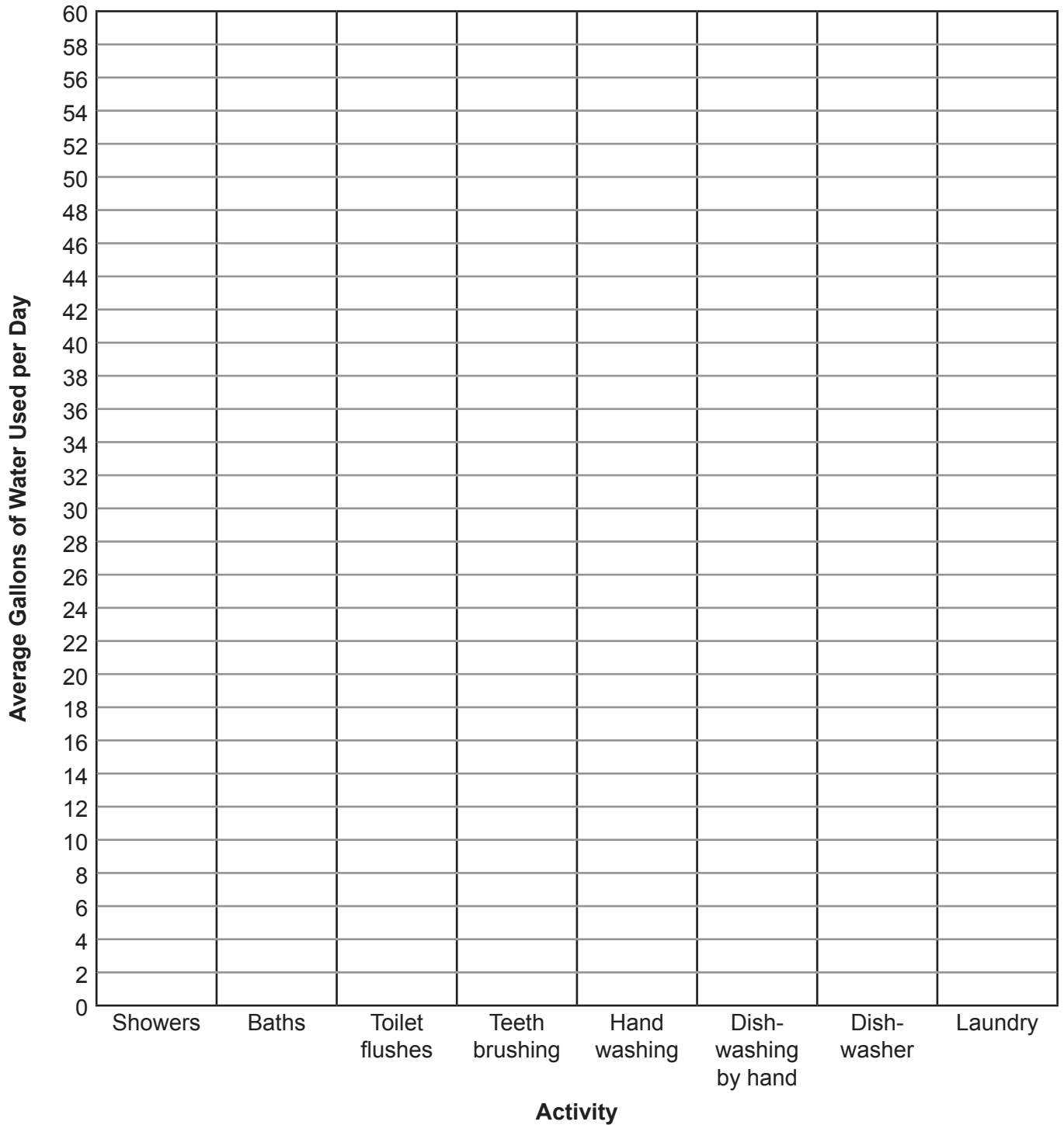
**3. Total Daily Use ÷ Number of People in the Home (Gallons per Person per Day) =** \_\_\_\_\_

Name: \_\_\_\_\_

# Water Wise

## Student Worksheet (page 2 of 3)

4. Make a bar graph of family water use per day by filling out the table below:



Name: \_\_\_\_\_

## Water Wise

### Student Worksheet (page 3 of 3)

#### Section II:

5. Work as a class to determine the average amount of water used per person within the households represented by the class. To do this, add the gallons per person per day results found for question 3 in the data table above for each student, then divide by the total number of students. Show all work below:
  
  
  
  
  
  
  
  
  
  
6. Determine the daily use for the village by multiplying the answer found in question 5 above by the number of individuals living in the village. Show all work below.
  
  
  
  
  
  
  
  
  
  
7. Determine the amount of water the village will need during the winter months by multiplying the daily water use of the village by the number of days the water supply is used. Assume the water supply must last from October 15 – April 15, or 180 days. Show all work below.
  
  
  
  
  
  
  
  
  
  
8. If the village depends on a storage tank for winter water supply, how large is the tank? \_\_\_\_\_  
(the classroom teacher will provide this information)  
Is the tank large enough to meet the water needs for the village? \_\_\_\_\_
  
  
9. If water use appears to exceed the water available to the village, what are some water-saving measures the village can follow to reduce their water needs? (Hint: Refer to the bar graph in question 4 to see where water use is highest.)

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