

10. ESTIMATING AND COUNTING POPULATIONS

Introduction

This is a teacher-directed activity. If you plan to have your students participate in Activity 11, that activity will go more smoothly with this work done as preparation. If you are not able to use both activities, this work will give students a basic background for counting and estimating a population. The outcome of the first part of this activity will develop materials for a bulletin board display.

Objective

The student will identify specific populations and compare two methods for counting populations.

Materials

Stack of old magazines (one per student)
Scissors
Drawing paper
Markers or crayons
Ruler
Pencil
Student Worksheet 10

Teacher Instructions

1. Review definition of a population with your students. (*A population is a group of the same kind of organisms in a given space at a given time. Remind students that organisms are living things, both plants and animals.*)
2. Instruct students to search through magazines until they each locate a picture that personifies the definition of a population. Students should cut out the picture, identify and count the population and record this information on the drawing paper. (For example, one student may have twenty-five trees; another, three people.)
3. Students may then staple their population pictures and numbers information onto the bulletin board.
4. Briefly discuss and compare the completed bulletin board with the definition of a population. Do the students' examples fit the definition?

5. Discuss the problems a scientist might have in counting populations in nature. (Possible answers: Animals move, too large of a space to cover, small-sized organisms, too many, only a very few.)
6. Distribute Student Worksheet 10. The two methods of population counting which students will practice are the actual counting method and the grid method.
7. On Student Worksheet 10 there is an illustration of a small section of a pond community. Pictured are three different populations—pond lilies, cattails, ducks. Students should identify populations and record the information on the chart below the illustration. (See Student Worksheet 10.)
8. Students should then count each population and record the data in the appropriate space on their chart beside the words “actual count.”
9. Discuss the following questions:
 - a. Which population was the easiest to count? (Ducks) Why? (Large, only a few of them. In an actual pond, however, these animals would be flying.)
 - b. Which population was the most difficult to count? (Cattails) Why? (Too many, varying sizes.)
 - c. Can anyone think of a way to count cattails without counting each individual one? (Estimation)

The following directions introduce the grid method of estimating populations.

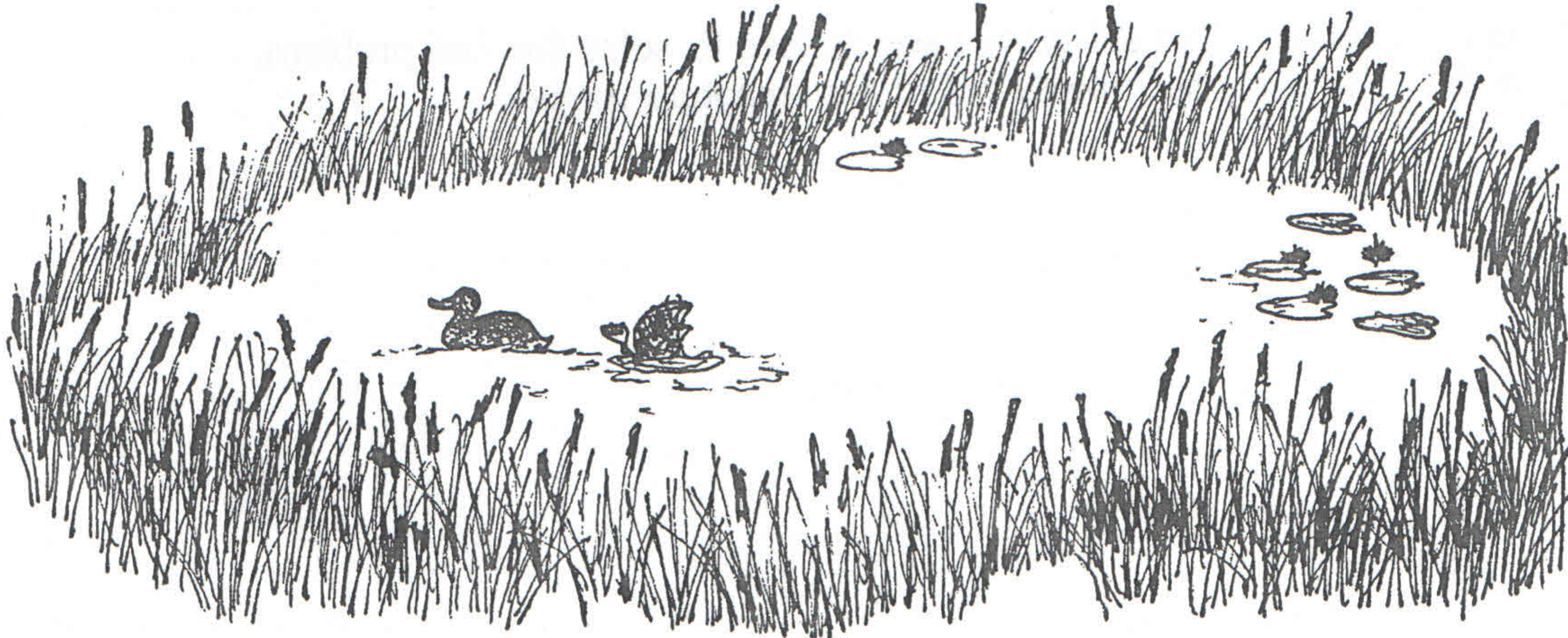
10. Using the rulers, students should measure the length of the pond (about 6 inches) and the width of the pond (about 2 inches).
11. Students should draw a rectangle encompassing the boundaries of the pond and then mark off a grid of one inch squares.
12. To use the grid method for estimation, students will count the population of cattails in any one grid. They will then multiply that number by the total number of squares in the entire grid. (Example: 10 cattails \times 12 grid squares = 120 cattails.)
13. Students should use the grid method to estimate all three of the assigned populations and record the data on the chart under the grid. (It will be possible to get a zero or 12 population count for the ducks, for instance, by this method. This problem will be discussed in question 6c on the student worksheet.)
14. Discuss the answers to these questions from the student worksheet to close the activity:
 - a. When did this grid method of counting populations work? (It was successful for cattails—a large, stationary population.) When did it not work? (It did not work for ducks. The results were either too large or too small.)
 - b. Which population counting method (actual count or grid) would you consider to be more accurate? (Answers will vary. It depends on the situation, location, and species being counted.) Why?
 - c. Why must ecologists use the grid method to count some populations? (It

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This activity will teach you about counting a population. You will compare two methods, actual count method and grid method, which are used by ecologists to assess the populations in a community.



Population name			
Actual count			
Grid count			

1. The picture shown above is an illustration of a small section of a pond community. Identify the three most abundant populations that you can see. Record the name of each population on the chart below the picture.
2. The first method for counting a population is called *actual count*. Count each population one by one. Record that data beneath the identified group on the chart beside the words "actual count."
3. Answer these questions:
 - a. Which population was the easiest to count? Why?

- b. Which population was the most difficult to count? Why?

- c. Suggest a way to count the most difficult population without counting each individual one.

would take forever, and still be inaccurate, to count all the grass plants in the front lawn.)

- d. When would the grid method not work? (It would not work with animals that are alive and moving or when there are only a small number of a species present.)
- e. Describe a solution that scientists have devised to solve this last problem. (Banding or tagging, technically called the recapture method.)