

11. A FIELD STUDY: COUNTING POPULATIONS

Introduction

Populations are all of the living things of one kind in the same habitat. Begin this lesson by reviewing the definition of a population and have the students give as many examples of populations as you think necessary to be sure the students understand the idea of population. If possible, have each student give an example.

Objective

The student will be able to define population, give examples of populations, and discuss why populations are difficult to count.

Materials

Student Worksheet 11
Populations of the school's grades
Your list of local plant and animal populations
Large newsprint and markers

Teacher Instructions

IMPORTANT: Read "Health and Safety in the Field" first.

1. You will need to compile a list of populations native to the local community in order to complete this activity. Choose plants and animals which live around the school area and list them on the worksheet before it is duplicated. (A list of sample populations follows.) Equal numbers of plants and animals are helpful. This activity uses the school population by grade level. Usually the school secretary will have this information.
Suggested items for population lists: grass, dandelions, maple, oak, pine, beech, other trees, robins, crows, flies, mosquitoes; frogs, skunk cabbage, horsetails, water striders, (if near a pond); bluets, butterflies, pedestrians, squirrels, ferns, plantain, gnats, slugs, clover. Remember, populations may be any size, but must be of living things.
2. Pupils begin by counting the students in their group and record that information on the worksheet. Provide them with the population information for their school. Students should then complete the definition of a population.
3. Students should be placed into teams, groups of two, and assigned a population to count outside the school building. This teaming will go smoothly if you have a master sheet listing all the populations already prepared. (See Table 11a.)

Name _____

Date _____

4. The second method for counting a population is called the *grid method*. To make a grid, follow these steps:
- Place your ruler against the bottom edge of the pond picture. Draw a line long enough to include all of the pond edges.
 - Put your ruler against the right edge of the pond picture. Draw a line up until you are above the top edge of the pond.
 - Connect the top, bottom, and sides to complete a rectangle around your drawing.
 - Divide your rectangle into sections one inch square. You now have a grid.

Count the total squares in your grid. There are _____ in my grid.

5. To use your grid for counting populations, you will count the population in only *one* square.
- Choose one square at random. For this first example, count the water lilies in that square.

There are _____ water lilies in my square.

There are _____ total number of squares in my grid picture.

- To estimate the water lily population in the entire pond, multiply the number of water lilies in one square times the total squares in the grid. Record this data on the chart beside the words "grid count."
 - Repeat this process for cattails and ducks and record the data.
6. Answer these questions from your grid method work.

- When did this grid method of counting populations work? When did it not work? _____

- Which population counting method (actual count or grid) would you consider more accurate? Why? _____

- Why must ecologists use the grid method to count some populations? _____

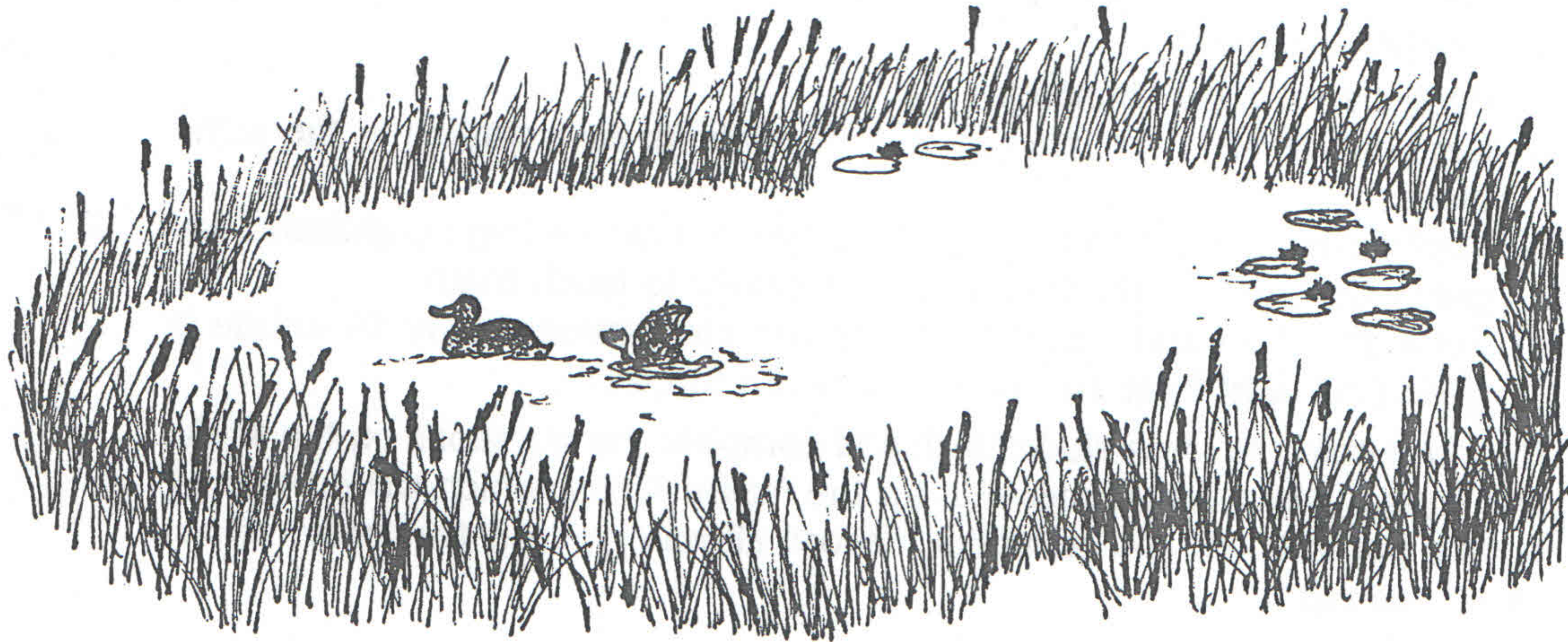
- When would the grid method not work? _____

- What is another method that scientists use for counting moving populations when the grid method won't work? _____

Name _____

Date _____

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1. Count the number of pupils in your class.

Girls _____
Boys _____
Total _____

2. What is the population of your school?

Grade _____
Grade _____
Grade _____
Grade _____
Total _____

3. What is a population? _____

YOUR ASSIGNMENT:

As a class you will be divided into teams of two pupils each. Each team will be assigned to count a certain population found in the area around the school within a certain time. You must count only in that area and only within the time limit.

Record your results on the chart below.

Your names	Plant or animal populations	Total number

Students may pick partners or you may assign them. Avoid having more than one team counting the same population. Make sure all students know what their populations look like.

4. Discuss the rules for counting.
 - a) Set boundaries of the area so that all students are counting in the same place.
 - b) Briefly discuss what to do if students are counting a large population, i.e. grass. See Activity 10. This is an opportunity to teach math.
 - c) Set a time limit and a signal that will end the outside activity. (A whistle is good.) Allow at least 10 minutes to return to class.
5. Upon returning to class students should complete the questions on the worksheet page while the teacher sets up the Master Chart, which will include all teams, populations, and numbers. Record all numbers on the master chart exactly as reported.

Table 11a. SAMPLE MASTER CHART

PLANTS			ANIMALS		
Team	Population	#	Team	Population	#
Fran/Tom	grass	4,682,102	Mary/Kay	frogs	6
Sue/Jen	maple trees	28	Jim/Bill	mosquitoes	87
Jake/Pat	dandelions	523	Heidi/Molly	robins	0

6. Discuss the numbers of populations and the reasons why the variety occurs. (Sizes of plants and animals, i.e., flies vs. cows or trees vs. grass; abiotic factors in the community like temperature, soil, wind, water.)
7. Discuss questions 6–9 on the student worksheet (see answer section that follows).

Answers

6. How do the following populations affect each other?
 - A. robins and B. earthworms
 - A. caterpillars and B. trees
 - A. cats and B. mice

(One eats the other; the prey decreases in numbers; some predators have to move to find more food.)
7. What would happen if the A population became very large? (It would starve or move, and deplete the B population.)
8. What would happen if the B population became very large? (More predators could exist in that area; population B could become pests; whatever they eat would decrease; some would die, move, or adapt.)
9. When do you think each pair of populations in list A and B is in balance? Explain your answer. (This is a question for speculation; listen to all answers.)