INVESTIGATE BioLab

How can you determine the size of an animal population?

Chapter 4

Preparation

Problem

How can you model a field-measuring technique to determine the size of an animal population?

Objectives

In this BioLab you will:

- **Model**, using a simulation, the procedure used to measure an animal population.
- **Collect** data on a modeled animal population.
- **Calculate** the size of a modeled animal population.

Materials

paper bag containing beans
permanent marker (dark color)
calculator (optional)

Safety Precautions

CAUTION: ***Always wear goggles in the lab. Wash hands thoroughly with soap and water after working with plant material and after cleanup.***

Skill Handbook

Use the **Skill Handbook** if you need additional help with this lab.

Procedure

1. Use the data table on the next page.
2. Reach into your bag and remove 20 beans.
3. Use the marker to color these beans. These will represent your *caught* and *marked* animals.
4. When the ink has dried, return the beans to the bag.
5. Shake the bag. Without looking into the bag, reach in and remove 30 beans.
6. Record the number of marked beans (recaught and marked) and the number of unmarked beans (caught and unmarked) in your data table as trial 1.
7. Return all the beans to the bag.
8. Repeat steps 4 to 7 four more times for trials 2 to 5.
9. Calculate averages for each of the columns.
10. Using average values, calculate the original size of the bean population in the bag by using the following formula:

    M = number initially marked

    CwM = average number caught during the trials with marks

    Cw/oM = average number caught during the trials without marks

$$\text{Calculated Population Size} = \frac{M \times (CwM + Cw/oM)}{CwM}$$

11. Record the *calculated population* size in the data table.
12. To verify the *actual population size*, count all the beans in the bag and record this value in the data table.
13. **Cleanup and Disposal** Make wise choices as to how you will dispose of the beans. Can some of them be recycled?