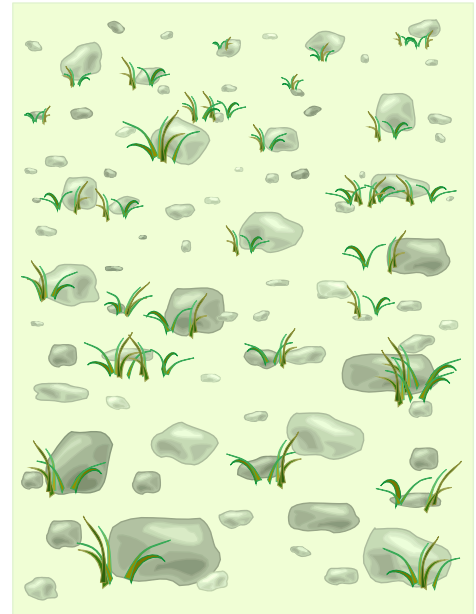


Blades of Grass

Have you ever wondered how many blades of grass are found in the yard around your home? Have you ever wondered how much of your "lawn" is weeds rather than grass? In this activity, you will estimate the number of blades of grass found on the school yard near our classroom.

For many years, scientists have tried to determine the number of plants or animals that live in a certain area. For example, plant ecologists might want to know how many trees exist in a tropical rain forest or biologists may wish to know how many bald eagles live in North America. Marine biologists may want to know how much sea grass is growing in Florida Bay.



To answer these kinds of questions, scientists have created an accurate method of estimating a population. This method is called sampling. Sampling involves counting a representative fraction of the population, then making a prediction of the whole population. When using sampling methods to estimate a population, you do not have to count each individual blade of grass, animal, or grain of sand to find the total number.

In this activity, you will collect a sample and estimate the total number of blades of grass and total number of weeds in a given area.

Objectives:

To accurately estimate (1) the number of blades of grass and (2) the number of weeds that exist in a square meter of a school yard through the use of sampling methods. We will also calculate the percentage of the lawn that consists of weeds.

Materials:

- 4 - Meter sticks
- String or yarn
- 4 - Tent stakes
- 2 - Metric rulers
- 3 - 10 cm x 10 cm quadrat squares

Procedure:

1. Locate a grassy area in the school yard that is at least one meter square.
2. Place the four meter sticks on the ground in such a way as to make a one-meter square.
3. Place the tent stakes in the ground at the corners and "rope off" your square with the string. This is a 1 m^2 (1 square meter) quadrat.
4. Randomly place the $10 \text{ cm} \times 10 \text{ cm}$ quadrat square (100 cm^2) somewhere within the larger quadrat.
5. Count the number of blades of grass within the 100 cm^2 area. Record your answer in the data table.
6. Now, count the number of weeds within the 100 cm^2 area and record that result in the data table.
7. Repeat steps 5 and 6 at another random location within the large quadrat.
8. Repeat steps 5 and 6 at a third location within the large quadrat. Record your data in the table.
9. Add the number of blades of grass in each of the three samples, and then divide by 3. Record your answer in the data table.
10. Add the number of weeds in each of the three samples, and then divide by 3. Record your answer in the data table.
11. You have obtained a representative sample numbers of blades of grass and number of weeds in the $10 \text{ cm} \times 10 \text{ cm}$ square. Now multiply these numbers by 100 to obtain the number of blades of grass and number of weeds in a square meter. Record your answers in the spaces provided below the data table.
12. Determine the estimated number of plants in your square meter by adding the estimated total number of blades of grass and the estimated total number of weeds. Record this answer in the space provided.
13. Calculate the percentage of weeds in your square meter quadrat by dividing the estimated total number of weeds by the estimated total number of plants and then multiplying by 100. Record this percentage in the space provided.

Blades of Grass

(Lab Activity Worksheet)

Group Members:

Data Collection:

Quadrat Number: _____

Square Number	Number of blades of grass	Number of weeds
1		
2		
3		
Average		

Data Analysis:

Total number of blades of grass (estimated):

$$\frac{\text{_____}}{\text{avg \# of blades of grass}} \times 100 = \text{_____}$$

Total number of weeds (estimated):

$$\frac{\text{_____}}{\text{avg \# of weeds}} \times 100 = \text{_____}$$

Total number of plants in 1 square meter (estimated):

$$\frac{\text{_____}}{\text{total blades of grass}} + \frac{\text{_____}}{\text{total \# of weeds}} = \text{_____}$$

Percent weeds in 1 square meter (estimated):

$$\left(\frac{\text{_____}}{\text{total \# of weeds}} \div \frac{\text{_____}}{\text{total \# of plants}} \right) \times 100 = \text{_____}$$

Questions:

1. Why do we take three representative samples in estimating the population of something?
2. What is a representative sample?
3. Instead of using a representative sample to determine the size of a population, why not just count the individuals to determine the total number?
4. How do you think the Florida Game and Fresh Water Commission determined that there are over one million alligators in the state?
5. You have been asked to determine the number of pencils in the school. How might you estimate the total number of pencils? List the steps that you will take to calculate the number of pencils. Include a description of how you will obtain an accurate sample.
6. Estimate the number of blades of grass that might exist in a football field. (Assume the field has the same kind of grass as in the school yard, and is roughly 2,000 square meters.)
7. Spotted Seatrout spawn over seagrass beds. The seagrasses provide protection for young Spotted Seatrout and many other kinds of fish. How might knowledge of the number and density of seagrass beds help fish biologists estimate the future number of Spotted Seatrout?