

Calculating Biodiversity

World Environment Day is celebrated on June 5 each year. Explore this year's theme by learning how to measure biodiversity using a quadrat.

Collect:

Paper
Pencil
Measuring tape or ruler
String

Create a quadrat.

Quadrat is a method used by ecologists to sample small areas and survey the organisms within that space.

1. Cut four pieces of string, each measuring 1 meter in length.
2. Select a random area in your house.
3. Using a ruler or measuring tape, measure a square on the floor with sides 1 meter (approximately 39 inches) in length.
4. Mark the measured floor with the strings, so it looks like a square frame.
5. Your quadrat is ready.

*A quadrat can be larger or smaller depending on the area that you want to sample.



Collect some data.

6. Using paper and pencil, write down how many different objects you see inside the quadrat. By recording this information, you create a diversity index called species richness.
7. Next, count the number of each individual object inside the quadrat to represent the abundance of each object. Ecologists call this data species evenness.

Calculate the biodiversity.

Here is an example of how data collected inside the house might look:

Side table= 1
Picture frame= 2
Lamp= 1
Rug = 1
Lego pieces = 10

In this example, there are 5 different types of objects (species richness) and 15 total objects (species evenness). One way to calculate a simple biodiversity index is by dividing the species richness by the species evenness.

$$\text{Biodiversity index} = \frac{\text{number of different objects (richness)}}{\text{total number of objects (evenness)}}$$

This should give you a number between 0 and 1. Using this index, numbers closer to 0 indicate a low biodiversity while numbers closer to 1 indicate a high biodiversity. For this example, the biodiversity index is 0.333.

Take it outside!

Try this methodology in your backyard or a local park to measure the biodiversity of organisms. Place a quadrat outside in a random area. Count the number of different species and the total number of each individual species inside the quadrat, such as plants, birds, insects, etc. After you finish collecting data in one area, randomly move your quadrat to another location to measure and compare biodiversity in more than one area.

How does it work?

The biodiversity index provides scientists an accurate and consistent way to compare the biodiversity of different areas. Biodiversity measures how many of a particular species are distributed in a specific area. It encompasses a variety of life and includes all living organisms. Each species plays a vital role in maintaining an ecological balance. High biodiversity makes the world's ecosystems more resistant to environmental changes and keeps ecosystems healthy by creating sustainability.

