

Investigation into factors affecting the abundance and distribution of a species

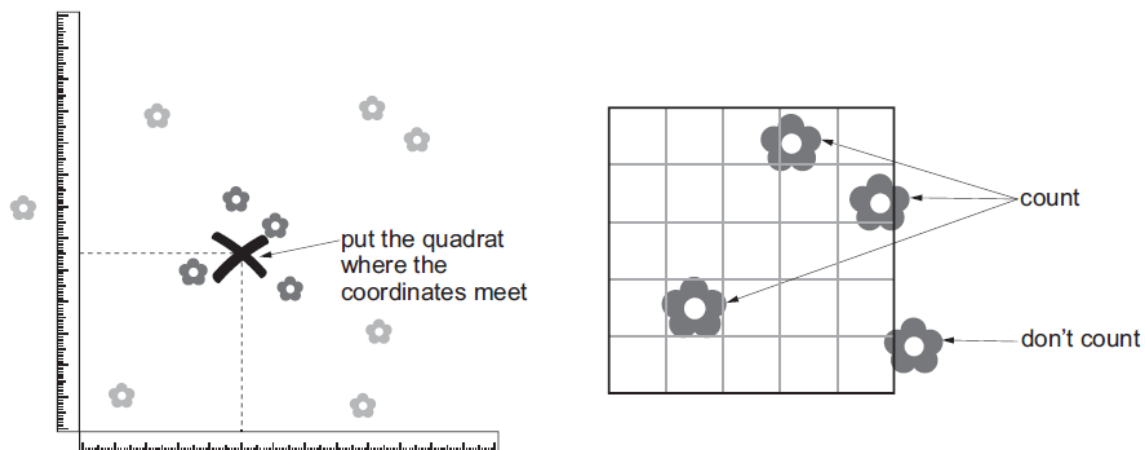
Introduction

Daisies are a common plant species that can be found on a school field. Using quadrats for random sampling allows you to estimate the numbers of daisy plants growing in this habitat. This technique also reduces sampling bias. A simple calculation can then be used to estimate the total number of daisy species in the entire school field habitat.

Apparatus

2 × 20m tape measures
2 × 20 sided dice
1 m² quadrat

Diagram of Apparatus



Method

1. Lay two 20m tape measures at right angles along two edges of the area to survey.
2. Roll two 20 sided dice to determine the coordinates.
3. Place the 1 m² quadrat at the place where the coordinates meet.
4. Count the number of daisy plants within the quadrat. Record this result.
5. Repeat steps 2-4 for at least 25 quadrats.

Analysis

1. Use the following equation to estimate the total number of daisy plants in the field habitat:

$$\text{Total number of daisy plants in the habitat} = \text{total number in sample} \times \frac{\text{total area (m}^2\text{)}}{\text{total sample area (m}^2\text{)}}$$

Where:

total area = 400 m²

total sample area = number of 1 m² quadrats used

Risk Assessment

Hazard	Risk	Control measure
Some plants have thorns, sting or are poisonous	Adverse skin response	Cover skin at all times
Biting and stinging insects	Adverse skin response	Cover skin at all times. Use insect repellent.
Tripping	Strains and sprains	Care where walking

Teacher/Technician notes

Students could compare data for mown and unmown areas.

This practical activity is effective at developing practical fieldwork skills. Students can discuss the need for a large sample of data in ensuring that there is confidence in a valid conclusion. Also, students can describe the importance of random sampling techniques in reducing/eliminating bias.

Alternative methods of generating coordinates can be used, such as using a random number generator or random number tables.

Working scientifically skills covered

2. Experimental skills and strategies

Apply knowledge of a range of techniques, instruments, apparatus and materials to select those appropriate to this experiment.

Recognise when to apply a knowledge of sampling techniques to ensure any samples collected are representative

Make and record observations and measurements using a range of apparatus and methods.

3. Analysis and Evaluation

Carrying out and representing mathematical analysis.