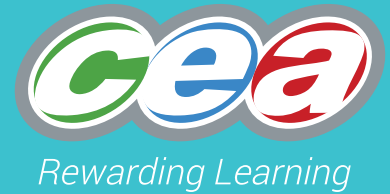


GCSE



CCEA GCSE TEACHER GUIDANCE
**Double Award Science
Practical Manual**

Unit 7: Practical Skills

B4: Use quadrats to investigate
the abundance of plants
and/or animals in a habitat

Use quadrats to investigate the abundance of plants and/or animals in a habitat

When investigating the number of plants and animals in a habitat, it is not practical or possible to count every individual organism. Therefore we must sample the area. This means that we count the organisms in a smaller area within the habitat and use this number to estimate the total number in the entire habitat.

A quadrat is used to sample plant distribution in a habitat. This is a square frame with sides of 1m giving an area of 1 m² or with sides of 50 cm giving an area of 0.25 m². By using a quadrat it is possible to obtain samples from areas of the same size and shape from across the habitat.

RANDOM SAMPLING is a method of selecting a sample from a population in such a way that every possible sample that could be chosen has the same probability of actually being chosen. In order to ensure that the sample is truly random the personal element must be removed. Students cannot choose where to lay the quadrat within the habitat. This choice must be random.

Random Sampling

Apparatus

- Quadrat
- Random number table/random number generator

Method

1. Draw a map of the area to be sampled.
2. Divide it into uniform sections and number the sections. Grid lines are best for a uniformly shaped habitat.

| | | | | | | | | | |
|---|---|--|--|--|--|--|--|--|--|
| 1 | 2 | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

Gridlines over a map of a regularly shaped habitat

3. Number the squares.
4. Use a random number generator or random number table to select the squares to sample in.
5. The quadrat can be thrown within the chosen square and a sample recorded.
6. Repeat in the next randomly chosen square.
7. When samples have been taken in the required number of squares an average count for each species under investigation can be calculated.

Results

Results should be recorded in a suitable table

A sample table is shown

| Species | Number in sample 1 | Number in sample 2 | Number in sample 3 | Number in sample 4 | Number in sample 5 | Total number in 5 samples |
|---------|--------------------|--------------------|--------------------|--------------------|--------------------|---------------------------|
| 1. | | | | | | |
| 2. | | | | | | |
| 3. | | | | | | |
| 4. | | | | | | |
| 5. | | | | | | |

If a 1 m² quadrat is used:

- the total number of species 1 for 5 quadrats is found,
- divide 5 m² into the total area of the habitat,
- multiply by the number of organisms to find an estimate number in the entire habitat.

Percentage cover

It is often not possible to count the number of individual organisms so it is better to look at the percentage cover. This is the percentage within the quadrat that is cover by a type of plant. This percentage is then used to estimate the total number of organisms within the entire habitat.