Quadrats Online: Teacher Notes

Elspeth Swan ©

Activity 1

Calculating species density

Objectives

After completing this activity, students will be able to:

- Determine species density using quadrats.
- Consider the techniques involved in using quadrats in the field.

Target audience

Levels 6 & 9

Duration

One 50-minute session

Materials

- Student worksheet
- ‘Calculating species density’ grassland map

Activity

How can we determine the density of different plants in a large area? This is a short activity designed to introduce students to quadrat sampling. It allows students to discuss the method involved before going out into the field.

Before beginning the activity

Explore student ideas about how we could measure the abundance of different species. What would we measure? How would we measure?

The following questions need to be considered before and during the activity.

What is the best size for the quadrats?

How many quadrats should be sampled?

How do we randomly select where to place the quadrat?

How do we decide if a plant lies inside or outside the quadrat?

All of the questions above are discussed in the overview to this learning object.

For this activity the size of the quadrats have been determined for you by the grid.

If the total area is 100 m^2, then each quadrat is 1 m^2.

Decide as a class how to choose the quadrats randomly. Perhaps use a random number table or a computer generated list of random numbers. Students should survey a minimum of 2 quadrats each and then average the numbers of each species. This will give a density in terms of the number of plants per square metre.

Carrying out the activity

1. Hand out a copy of the 'Calculating species density' grassland map.
2. Explain the symbols on the map to students.
3. Discuss the aim of the exercise, how many quadrats students will sample and how the quadrats will be chosen randomly.
4. Students should then carry out quadrat sampling and record results in the table provided.

Interpretation of results

1. Why was it important to choose the positions of the quadrats randomly?

If we want to ensure that we have an accurate representation of the ecosystem we need to eliminate bias. Students could give an example of any bias e.g. placing the quadrat next to a path or over an area that has plants that they like etc.

2. How did you decide whether a plant was inside or outside a quadrat?

This is up to the class to decide as a whole. As long as the class uses the same guidelines e.g. more than half of the plant has to be inside the quadrat to be counted. Allow students to discuss and come to a consensus themselves.

3. If you were working in the field, can you list any other difficulties you may need to overcome?

In the field students will need to consider site access and the effects of weather. The site itself may have obstacles to overcome such as rocks or large trees. Students will need to think about how to overcome any issues. It may be more difficult to decide whether plants around the edge of the quadrat should be counted.

4. How would you ensure that you did not damage the environment you were surveying?

Students need to ensure that they take care where they are walking in the field to avoid trampling plants. Nothing should be taken from the site. If anything has been moved, it needs to be returned to its original location. Nothing should be left behind at the site.

5. Do you think your results give an accurate representation of this grassland area?

Students should comment on the fact that the recommended size and number of quadrats was used and that the quadrats were placed at random, so the results should be a fairly good representation of the whole area.

Conclusion

6. Why are quadrats useful when studying an ecosystem?

Quadrats are useful because they are much smaller than the whole area being studied. It is far quicker to count the numbers of each plant in a small number of quadrats than in the whole area.

7. Could quadrats be used for any animal species?

Quadrats could not be used for animals that move fast or over large distances.