

Quadrats Online: Teacher Notes



Elsbeth Swan ©

Activity 3

Nested Quadrats

Objectives

After completing this activity, students will be able to:

- Determine the size of quadrats to be used in a grassland ecosystem.
- Develop skills in using quadrats for use when working in the field.

Target audience

Level 9

Duration

One 50-minute session

Materials

- Student worksheet
- 'Nested Quadrats' grassland map
- Ruler

Activity

When percentage cover is the only factor to be measured when quadrat sampling, quadrat size is relatively unimportant. However, if plant abundance or frequency is being measured then quadrat size is critical. Data from a series of nested quadrats is plotted on a graph to determine the smallest area within which all the species in the community are adequately represented.

How can we determine the size of quadrats to use when surveying a grassland ecosystem? This is a short activity designed to introduce students to Nested Quadrats. It allows students to discuss the method involved before going out into the field.

Before beginning the activity

Students should have completed either of the activities 'Calculating species density' or 'Investigating changes along a transect'. In each of these activities, the quadrat size was provided without any real explanation as to how it was chosen.

Explore student ideas about how we could decide what size quadrat to use. What problems may arise if the quadrats were too small? What if the quadrats were too large?

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

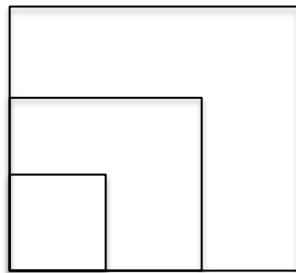
Carrying out the activity

1. Distribute the 'Nested Quadrats' grassland map.
2. Students need to draw a vertical and horizontal axis with 1 cm graduations on the map.
3. Use a random number generator e.g.

http://www.mathsgoodies.com/calculators/random_no_custom.htm

to generate two random numbers that will become the x and y coordinates of the corner of your nested quadrats. (The location of the corner will depend on where the coordinates are situated so that the nested quadrats will fit on the map).

4. Explain the symbols on the map to the students.
5. Students should begin by drawing a 1 cm x 1 cm square as their first quadrat on the map and then recording the number of different plant species in this quadrat in the results table provided.
6. Quadrat length should be increased by 1 cm each time and the number of species present should be recorded. Each smaller quadrat is included in the larger ones. Each quadrat has a side length 1 cm larger than the previous. The corner that the quadrats share has been positioned on the map using the random number generator.
7. Students will then graph 'quadrat length vs. number of plant species present'. The size of the quadrat that should be used is determined where the graph levels off. As there are no additional species included, larger quadrats are not necessary.
8. This activity can now be carried out in the field.



Post activity discussion

1. Did everyone obtain the same result for the optimal size of the quadrats?
2. Discuss any reasons that may explain this.
3. How would such an activity differ if out in the field?
4. What problems may be encountered when out in the field?

Conclusion

Explain how nested quadrats are used to determine the size of quadrats that should be used to sample an ecosystem.

Nested quadrats are a series of quadrats increasing in size, with the smaller quadrats sitting inside the larger quadrats. The number of different plant species occurring inside each quadrat is counted and graphed against the length of the quadrat. The size of the optimal quadrat to be used is determined where the graph becomes horizontal. This ensures that the ecosystem has been represented adequately.