Sampling biodiversity

You are going to try three different methods to measure biodiversity and then evaluate each method for how accurate and reliable it is.

Sampling

Sampling is the name given to counting the number of different species and the number of individuals within each species. When the methods ask you to sample, you must count the number of individuals in the 5 most dominant species i.e. approximately 22,500* grass blades, 24 daisies, 10 dandelions , 9 buttercups, 3 mosses.

*count the number in one small square and multiply by the number of squares

A. Quadrat and transect

A transect is a fixed line that you sample along.
1. Mark out a straight transect line using a long measuring tape. The line should be several metres long.
2. Place a quadrat at one end of the transect line and sample the contents of the quadrat.
3. Then move the quadrat along the transect at regular intervals, sampling each time.
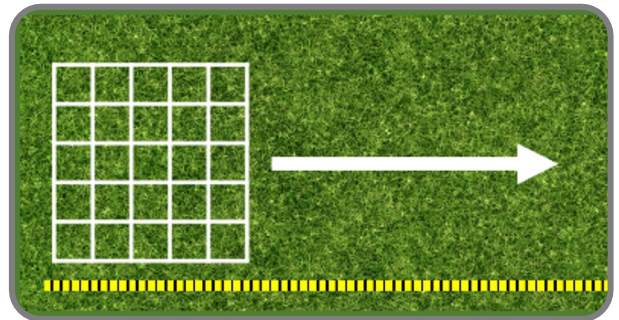

B. Quadrat and coordinates

1. Mark out two straight transect lines using long measuring tapes, from the same point, so that they are perpendicular to each other. The lines should be several metres long.
2. Using a random number generator, generate some coordinates. Then, place the bottom left hand corner of the quadrat at the coordinates, i.e. a 1 and 6 would mean you place the quadrat at the point of 1m and 6m.
3. Sample the contents of the quadrat, then move it to the next set of randomly generated coordinates.
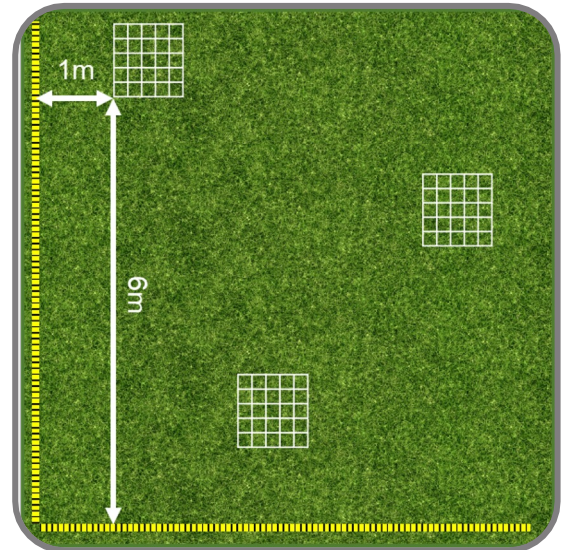
C. Throwing the hula-hoop

1. Stand near the spot you want to sample. Check there is no one in front of you, close your eyes and gently throw the hula hoop.
2. Sample the contents of the hula hoop, then from that location throw the hula hoop again, sampling at the next location.
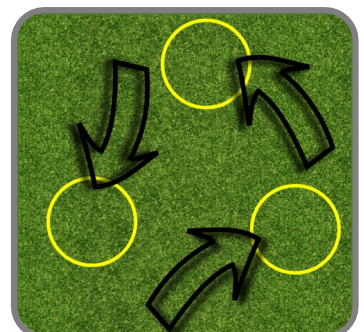
Evaluating sampling

1. Which method do you think most accurately measures biodiversity? Explain your idea.

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2. Which method do you think least accurately measures biodiversity? Explain your idea.

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3. How does the quadrat being divided into smaller squares help with counting species?

_____
_____

4. The transect method is an example of systematic sampling, whereas the hula hoop is an example of random sampling. Give an advantage for both random and systematic sampling.
Random

_____
_____

Systematic

_____
_____

5. What safety considerations must you think about when sampling.

_____
_____
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6. Explain why it would be challenging to use these methods to sample plant species in ponds or lakes.

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7. Challenge question: Can you calculate the total number of each species you sampled in the area you sampled? Do you think this is representative of the actual number and why?

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Evaluating sampling

1. Which method do you think most accurately measures biodiversity? Explain your idea.
Method B is most accurate because it randomly samples across the whole area. You must repeat the quadrat enough times to get a representative sample.

2. Which method do you think least accurately measures biodiversity? Explain your idea.
Method C, the hula hoop because it is open to bias (you choose where to throw the quadrat- it is not random).

3. How does the quadrat being divided into smaller squares help with counting species?
It means that you don't need to count every single blade of grass (or other high population plant). Instead, you can just count the number in a small square and multiply by the number of small squares.

4. The transect method is an example of systematic sampling, whereas the hula hoop is an example of random sampling. Give an advantage for both random and systematic sampling.
Random
Not affected by bias, the whole area has the potential to be sampled, rare species might be missed.

Systematic
Not affected by bias but only one strip of the area will be sampled, transect might not be representative of the whole area, good for looking at how things change across an area, e.g up a seashore.

5. What safety considerations must you think about when sampling.
Personal safety- is the area safe? Don't throw the hula hoop at anyone. Don't trip over the quadrat/ transect. Wash your hands after sampling.

6. Explain why it would be challenging to use these methods to sample plant species in ponds or lakes.
Deep water prevents you from sampling lake beds. Plants need light to grow so you won't find many if it's deep. Different methods are used to sample these areas.

7. Challenge question: Can you calculate the total number of each species you sampled in the area you sampled? Do you think this is representative of the actual number and why?
Credit valid student responses.