

1. Biodiversity:

We use different sampling techniques to work out the biodiversity in habitats and ecosystems. Circle the correct definition of biodiversity below:

- The amount of variety of organisms in a certain habitat or ecosystem
- The amount of a single species in a habitat or ecosystem

A field of wheat grown by a farmer is an example of a low biodiversity habitat. Explain why below:

There are a lot of plants but only one species. High biodiversity has lots of species present in large numbers.

Name three reasons protecting biodiversity is important:

1. Source of food
2. Source of materials for industry
3. Source of new medicines

2. Estimating abundance with quadrats:

Sampling using a quadrat helps us to estimate the number of each species present. Put the steps below in the correct order to show how you would estimate abundance using a quadrat:

Order	
3	Count the number of the species of interest present in the quadrat
4	Record your results
1	Lay out a "study area" of a known area where we want to calculate the population estimate e.g. 10m ² .
5	Repeat for at least three quadrats in the study area.
2	Randomly place the quadrat in the sampling area
6	Use the calculation to species abundance. Number of species sampled X $\frac{\text{Total area studied (marked study area)}}{\text{Total sample area (area of quadrats)}}$

3. Sampling - Using a transect

Sometimes we use a transect when sampling. A transect is what (underline the correct statement below)?

- A line drawn down a slope or across habitats with different conditions (e.g. light and shade)
- A line drawn randomly across a field
- A line to follow when you can't find where to sample.

Use the data in the table below to calculate the estimated number of dog whelks in a 10m² area of the shore at 5 stations. Station 1 is at the top of the shore, station 5 is nearest to the sea.

Show your calculations on the worksheet below (Station 1 has been done for you):

Position on shore	Number of dog whelks observed in 1m ² quadrat			Estimated population in 10m ²
	Quadrat 1	Quadrat 2	Quadrat 3	
Station 1	0	2	1	100
Station 2	1	2	1	133
Station 3	4	6	3	433
Station 4	5	6	6	567
Station 5	7	5	6	634

Show your calculations here:

Station 1 –

Dog whelks sampled = 0 + 2 + 1 = 3

Total area studied = 10m x 10m = 100m²

Total sample area = 1m² x 3 = 3 m²

3 X (100 / 3) = 100

Number of a species
sampled X

Total sample area (marked
sample area 10m²)
Total area sampled (Area
of quadrats)

From your calculations, which zone on the beach has the highest abundance of dog whelks? Give one reason you think why this might be.

More prey /Less predation/ Less well adapted to drying out/ More suitable habitat

Sampling QER

Scientists wanted to estimate the population of the dog whelk (*Nucella lapillus*) in the middle of the rocky shore in Aberystwyth. Describe how they could do this and ensure that their results were reproducible.

Use these bullet points to help write an answer to the QER question above.

- Measure out a known area e.g. 10m by 10m.
- Use a quadrat of a known size e.g. 1m².
- Randomly select places to sample within the grid e.g. using numbers out of a hat, random number selector software.
- Place quadrat on ground and count the number of individuals present.
- Repeat this a minimum of three times for the sample area.
- Calculate species abundance using equation:

$$\text{Number of species sampled} \times \frac{\text{Total area studied (marked study area)}}{\text{Total sample area (area of quadrats)}}$$