1. Biodiversity:

We use different sampling techniques to work out the biodiversity present in habitats and ecosystems. Give a definition of biodiversity:

Underline the habitat from the following three which has high biodiversity. Explain why below.

- A British oak woodland
- A field of wheat grown by a farmer
- A commercial pine forest used to grow timber

Explanation:

An Oak woodland has a lot of species. There are lots of each of these species. Opposed to the others where there are lots of only one species.

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 $10m^2$ 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):

Distance down the shore (m)	Number of dog whelks observed in $1m^2$ quadrat			Estimated population in $10m^2$
	Quadrat 1	Quadrat 2	Quadrat 3	
10	0	2	1	100
20	1	2	1	133
30	4	6	3	433
40	5	6	6	567
50	7	5	6	634

Show your calculations here:

Now plot a line graph for the estimated population at each of the five stations down the shore. Complete your graph with a line connecting the points with a ruler. (You will need a sheet of graph paper to do this).

Describe the trend of the graph. How could we explain this? Increasing number of dog whelks further down the shore.

How could we increase the reliability of the population estimate that we have calculated?

Increase the number of quadrats sampled /number of repeats at each station.

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.