How biodiversity may be considered at different levels

To include habitat biodiversity (e.g. sand dunes, woodland, meadows, streams), species biodiversity (species richness and species evenness) and genetic biodiversity (e.g. different breeds within a species)

Biodiversity is the range of species in an area, the range of habitats and the variety of alleles. Biodiversity maintains a balanced ecosystem for all organisms.

A habitat is the area in which an organism lives.

Habitat biodiversity is the number of different habitats found within an area. In general, the greater the habitat biodiversity, the greater the species biodiversity will be within that area.

Abundance is the frequency of occurrence of plants in a particular area.

Species biodiversity includes species richness and species evenness. An area with the same number of species can have different species biodiversity. The more the species evenness and the species richness, the greater the species biodiversity.

Genetic biodiversity is the variety of alleles in a species. The genes may be the same for all individuals within a species. However, for many genes, different versions of alleles exist. The more variety in alleles, the greater the genetic biodiversity.

Greater genetic biodiversity within a species allows for better adaption to a changing environment, and is more likely to result in individuals who are resistant to disease.

How sampling is used in measuring the biodiversity of a habitat and the importance of sampling To include how sampling can be carried out i.e. random sampling and non-random sampling (e.g. opportunistic, stratified and systematic) and the importance of sampling the range of organisms in a habitat It is difficult to count every organism to measure the biodiversity of a habitat as not all of the species of a have been found.

It is difficult to count every organism to measure the biodiversity of a habitat as not all of the species have been found, some organisms may be extinct and new species are being formed as evolution is on-going

A sample can be taken instead. This is a representative group of organisms reader selected from a population. A sample gives an estimate of the number of organisms in an area and measure the number characteristic of an organism like height.

Random sampling is an unbiased method as the object or doesn't decide when and where to take the measurements. A grid is marked out on the area using two tapernical uses raid at right angles Random numbers taken using a random number generator is used to determine the value y coordinate on the grid. The bottom left hand corner of the quadrat is placed at the coordinate and the percentage cover is measured of teach species investigated. The sample is repeated many times at different times of the teach

Opportunistic sampling isn't representative of the population as it uses organisms that are conveniently available.

Stratified sampling is where the population is divided into strata based on a particular characteristic e.g. gender. A random sample is then taken from each of the strata proportional to its size.

Systematic sampling identifies different areas within an overall habitat (changing in species over different areas) which are then sampled separately. It's often carried out using a line or belt transect. A line transect is where a line is measured along the ground between two poles and samples are taken at regular intervals. A belt transect is where two parallel lines are marked and samples are taken of the area between the two areas at regular intervals.

Sampling is important because it informs scientists of the species present and gives an idea of the biodiversity in the habitat. From this the effects of environmental change, human activity, disease and climate change can be measured.

Sampling the range of organisms in a habitat is important because it prevents sampling bias and chance. By having a large sample size, there is a lower probability that chance will influence the result so the results would be more reliable.

Practical investigations collecting random and non-random samples in the field

Animals can be collected for study later but must be handled carefully and used for as short a period of time as possible and then released:

- A pooter Catches small insects by sucking on a small mouthpiece which draws insects into the holding chamber via the inlet tube. A filter before the mouthpiece prevents them getting sucked into the mouth.
- Sweep nets Catch insects in long grass
- Pitfall traps Catches small, crawling invertebrates. A hole is dug in the ground and covered with a roof structure to prevent water getting into the hole. The trap is left overnight so nocturnal species are also sampled.
- Tree beating Invertebrates in trees and bushes. A white cloth is stretched out under the tree/bush and it is shaken.