

## 4.2.1 Biodiversity

- (a) 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).
- (b) (i) how sampling is used in measuring the biodiversity of a habitat and the importance of sampling  
(ii) practical investigations collecting random and non-random samples in the field  
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.  
*M0.2, M1.3, M1.5, M1.4, M1.6, M1.7, M1.9, M1.10, M3.2 PAG3 HSW4, HSW5, HSW6*
- (c) how to measure species richness and species evenness in a habitat  
*M1.1, M1.5, M2.3, M2.4*
- (d) the use and interpretation of Simpson's Index of Diversity ( $D$ ) to calculate the biodiversity of a habitat  
To include the formula:  
$$D = 1 - (\sum(n/N)^2)$$
  
**AND** the interpretation of both high and low values of Simpson's Index of Diversity ( $D$ ).  
*M1.1, M1.5, M2.3, M2.4 HSW5*
- (e) how genetic biodiversity may be assessed, including calculations  
To include calculations of genetic diversity within isolated populations, for example the percentage of gene variants (alleles) in a genome.  
proportion of polymorphic gene loci =  
total number of loci/number of polymorphic gene loci  
Suitable populations include zoos (captive breeding), rare breeds and pedigree animals. *M1.1, M1.5, M2.3, M2.4 HSW5*
- (f) the factors affecting biodiversity  
To include human population growth, agriculture (monoculture) and climate change.  
*M1.3, M1.7, M3.1 HSW5, HSW10, HSW12*
- (g) the ecological, economic and aesthetic reasons for maintaining biodiversity
- Ecological, including protecting keystone species (interdependence of organisms) and maintaining genetic resource
  - economic, including reducing soil depletion (continuous monoculture)
  - aesthetic, including protecting landscapes.

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(h) in situ and ex situ methods of maintaining biodiversity

- In situ conservation including marine conservation zones and wildlife reserves
- ex situ conservation including seed banks, botanic gardens and zoos.

HSW7, HSW9, HSW10, HSW12

(i) international and local conservation agreements made to protect species and habitats.

Historic and/or current agreements, including the Convention on International Trade in Endangered Species (CITES), the Rio Convention on Biological Diversity (CBD) and the Countryside Stewardship Scheme (CSS).

HSW11, HSW12