6.1 Biodiversity, conservation and sampling evidence

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS evenness • species richness

Objective

Biodiversity, conservation and sampling evidence. Original classroom practice for IB SL; not an official IB paper.

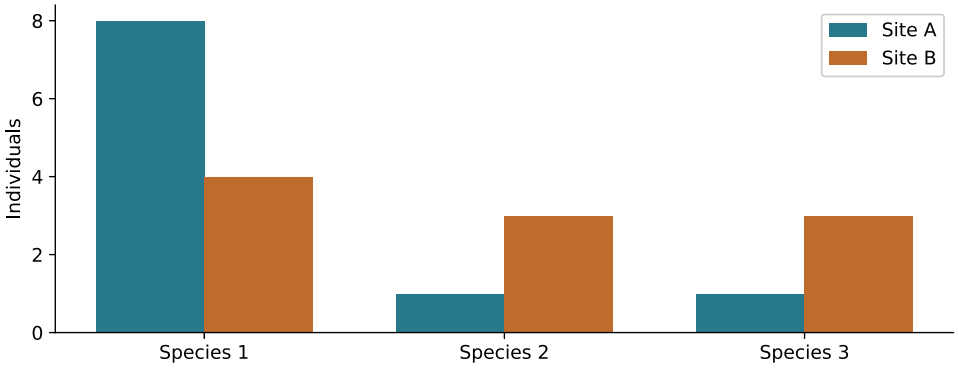
1 Key knowledge and worked examples

What would explain this observation?

- A site with many individuals can still be dominated by one species. Abundance, richness and **evenness** describe different features of biodiversity.

Build the model

- **Species richness** counts species.
- Evenness concerns relative abundance.
- Conservation can protect habitats, populations or genetic diversity; a management judgement must state the conservation goal.
- species richness: The number of species recorded.
- evenness: How evenly individuals are distributed among species.



Choose evidence that can test it

- Compare surveys with similar area, effort, season and identification rules.
- A diversity index is meaningful only with its formula and conventions specified.
- Habitat fragmentation can affect movement and gene flow even when total area changes little.

In the lab: Use non-destructive field sampling approved by the school. Identify organisms with a suitable key and record uncertain identifications rather than inventing species. Combine ecological evidence with stakeholder perspectives on land use.

Work from known quantities

- Known: site A has counts 8, 1 and 1; site B has 4, 3 and 3.
- Both have richness 3 and total abundance 10.
- The most abundant species occupies 80% in A and 40% in B.
- B is more even under these counts.

Your turn: A survey records 6, 5, 3 and 2 individuals in four species. Find species richness.

Check the conclusion and its limits

- An index cannot by itself explain the cause of a difference.
- A newly recorded species may reflect improved observation rather than a recent ecological arrival.

Not true: A larger total number of individuals always means greater species richness. Richness counts how many species are present, not how many individuals. Ten thousand individuals of one species give richness 1, while ten species with one individual each give richness 10.

Key:

- Species richness counts species.
- Compare surveys with similar area, effort, season and identification rules.
- Watch for: an index cannot by itself explain the cause of a difference.

Write from a richness of 5

- Counts are 9, 9, 9, 1 and 1.
- Find the species richness. The total number of individuals is a different quantity.

2 Practice

2.1 Two sites have three species each. Which can still differ? Choose one answer.

- **A** They must have identical conservation value
- **B** The definition of a species must change
- **C** Their evenness [1]

2.2 A survey records 6, 5, 3 and 2 individuals in four species. Find species richness. Show the relation, substitution and units. [2]

2.3 Decide whether this claim is true and justify: Richness counts how many species are present, not how many individuals. [2]

2.4 The number of species recorded: write the technical term. [1]

3 Exam-style questions

3.1 Site A has counts 9,1,0; B has 4,3,3. Compare richness and dominance. Explain one sampling limitation. [4]

Solutions

2.1 C Richness counts species only; evenness describes how individuals are shared among them. Two sites can both have three species while one is dominated by a single species and the other is balanced - different evenness, same richness.

2.2 All four species have nonzero counts, so richness=4.

2.3 True. True. Richness counts how many species are present, not how many individuals. Ten thousand individuals of one species give richness 1, while ten species with one individual each give richness 10.

2.4 species richness. species richness means The number of species recorded.

3.1 A richness 2, B richness 3; largest shares 90% and 40%. B is more even in these samples. Comparable effort and detection matter; a zero observation does not prove absence.