

9.1 Biodiversity, conservation and sampling evidence

Name: _____ Class: _____ Date: _____

Total: 10 marks

KEY WORDS evenness • species richness

Objective

Biodiversity, conservation and sampling evidence. Supported HL concept preparation; original classroom practice, not an official IB paper or assessed learner work.

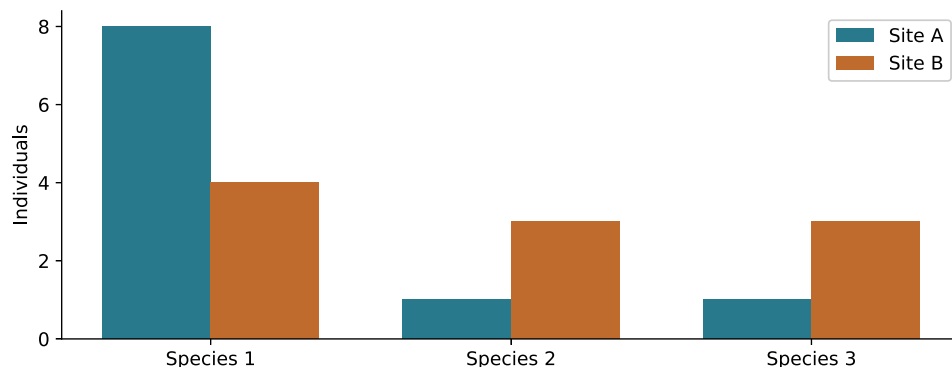
1 Key knowledge and worked examples

■ 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.
- Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

■ 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.
- 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

- State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution.
- 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.

Example:

A survey records 6, 5, 3 and 2 individuals in four species. Find species richness. Use the same sequence: known quantities → model → relation → substitution → unit and interpretation.

■ 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.
- Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Warn:

A larger total number of individuals always means greater species richness. This claim is false: 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.

Key:

Biodiversity, conservation and sampling evidence: 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.

2 Practice

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

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

[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: A larger total number of individuals always means greater species richness.

[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 A 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.

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

2.3 False. 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.

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

3.1 A richness2, B richness3; largest shares90% and40%. B is more even in these samples. Comparable effort and detection matter; a zero observation does not prove absence.