

## 3.1 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.

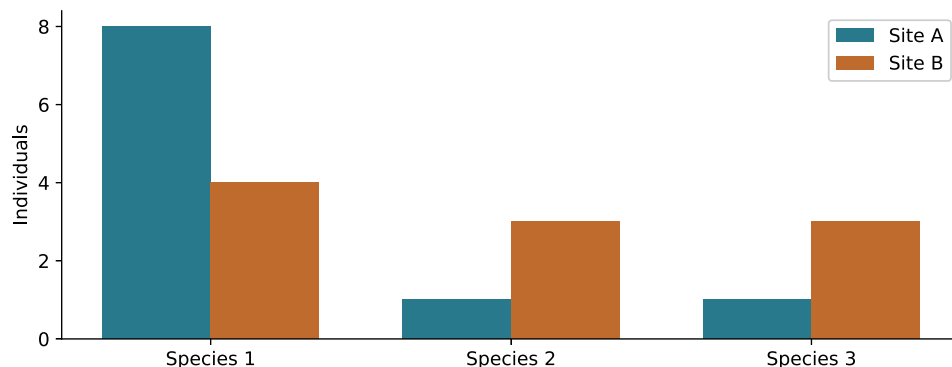
### 1 Key knowledge and worked examples

#### ■ 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

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

2.3 Decide whether this claim is true and justify: A larger total number of individuals always means greater species richness.

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

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.

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## Solutions

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**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.