

Life Sciences, Grade 11, Population Ecology

Written questions

Question 1: Foundational Concepts of Ecology

1.1 Define the following terms in the context of ecology:

- a) Population
- b) Community
- c) Ecosystem
- d) Biome
- e) Biosphere

1.2 Differentiate between a "species" and a "population" using examples.

1.3 Briefly explain the study of "Ecology" and its core focus.

Question 2: Population Dynamics and Counting Methods

2.1 Identify and explain the four main factors that influence population size.

2.2 A researcher uses the Petersen Index to estimate a fish population. In the first sample, 80 fish are marked. In the second sample, 100 fish are caught, and 20 of them are marked. Calculate the estimated total population size (N).

2.3 Discuss two precautions that must be considered when using the mark-recapture method to ensure reliable results.

2.4 Describe the difference between a "lag phase" and a "log/exponential phase" in a logistic (S-shaped) growth curve.

Question 3: Population Fluctuations and Interspecies Relationships

3.1 Explain the concept of "Carrying Capacity" and how "Environmental Resistance" relates to it. Provide examples of factors that contribute to environmental resistance.

3.2 Distinguish between "density-dependent" and "density-independent" factors that affect population size, providing one example for each.

3.3 Compare and contrast "Parasitism" and "Mutualism" as types of symbiotic relationships, including an example for each.

3.4 Describe the main characteristic of a "Commensalism" relationship, providing an example from the notes.