

Populations and communities · supported focus

Supported focus · HL

Supported scope

- Supported HL focus. First assessment 2025; current subject brief acquired; full Biology guide not acquired. Remaining guide, assessment and practical requirements retain their recorded holds.
- State model conditions and distinguish fictional data from measurements.

Ecology · 1.1

Reasoning

A field edge looks richer in plants than its centre. Choosing only the richest patches would build the desired result into the sampling method. Start with a prediction. State the quantities or features you would compare, then decide what evidence could distinguish two explanations.

Ecology · 2.1

Reasoning

A population consists of organisms of one species in a defined area. Random quadrats estimate density without deliberately selecting patches. A transect investigates change along an environmental gradient. quadrat: A defined area used for sampling; population: Organisms of one species in a defined area.

Ecology · 3.1

Reasoning

Estimate total abundance by multiplying mean density by area, with consistent units. This assumes sampled areas represent the habitat. Patchiness and too few samples widen uncertainty. Choose coordinates with random numbers before visiting the patches. Record quadrat area and counting rules. For a transect, use fixed distances and measure a relevant abiotic variable. Do not damage habitats or sample unsafe locations.

Ecology · 4.1

Reasoning

State the known values and their units. Choose the relation because its assumptions fit this case, then rearrange before substitution. Known: five 0.25 square metre quadrats contain 3, 4, 6, 5 and 2 plants. Mean count $= 20/5 = 4$. Density $= 4/0.25 = 16$ plants per square metre. Estimated abundance in 100 square metres $= 16 \times 100 = 1,600$ plants.

Ecology · 4.2

Reasoning

Mean count is 6 in a 0.5 square metre quadrat. Find density per square metre. Use the same sequence: known quantities $\rightarrow$ model $\rightarrow$ relation $\rightarrow$ substitution $\rightarrow$ unit and interpretation.

Ecology · 5.1

Reasoning

Quadrats suit organisms that do not move quickly. A food chain arrow shows the direction of energy transfer, not the direction a predator travels. Return to the original observation. Explain what the result supports, which conditions it assumes, and one way to test a competing explanation.

Ecology · 5.2

Reasoning

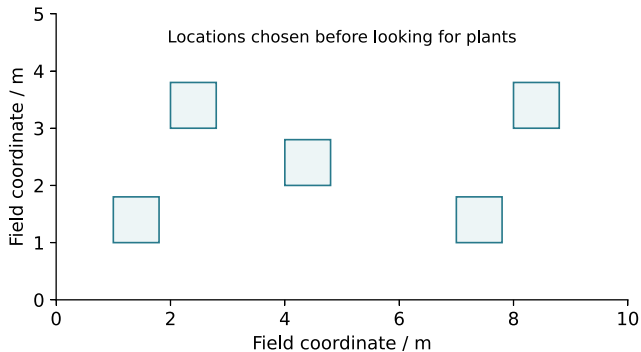
Sampling only the most crowded patches gives an unbiased population estimate. This claim is false: Quadrats suit organisms that do not move quickly. A food chain arrow shows the direction of energy transfer, not the direction a predator travels.

Ecology · 5.3

Reasoning

Sampling populations without choosing the answer: Estimate total abundance by multiplying mean density by area, with consistent units. This assumes sampled areas represent the habitat. Patchiness and too few samples widen uncertainty.

Ecology · diagram



- Original teaching diagram: Sampling populations without choosing the answer
- Use the labels and the stated model together.

Ecology · original transfer

Your turn

Two fictional sites have mean quadrat counts 6 and 9, but areas 0.25 and 0.50 m². Compare density; propose a defensible sampling design.

Ecology · transfer reasoning

Method and interpretation

Densities=24 and 18 plants/m². The larger raw count has lower density. Random or stratified random positions, equal sampling effort and repeats reduce location bias; record uncertainty before extrapolation.

Check yourself

- Explain population using the stated model.
- Explain quadrat using the stated model.
- Change one value in the original transfer; explain which assumption still matters.