Distribution and biodiversity along a transect

Student activity • practical and reasoning

YEAR 11 / LESSON 105 / BIOLOGY ONLY

The question

How does plant occurrence change along an environmental gradient?

Record plant occurrence along replicated transects and distinguish richness from full biodiversity.

Equipment

- 8 m measuring tape, gridded 0.5 m quadrat and plant key
- Recording sheet and optional suitable light meter

Staff check the site for traffic, water, sharp litter, animal waste and unsafe ground. Stay inside agreed boundaries, wear suitable footwear and weather protection, avoid unknown plants and animals, and wash hands before eating. Keep tapes flat and visible to reduce trips.

Course coverage: Biology only: 4.3B–4.4B. Distribution and biodiversity using quadrats.

Plan, model or apparatus sketch

Draw and label the apparatus or biological model; identify one limitation.

Method and reasoning

Read the whole sequence before starting

YEAR 11 / LESSON 105 / BIOLOGY ONLY

1. Use an agreed safe 8 m transect from one habitat condition towards another, such as open ground to shade. Record the endpoints.

2. Place the same 0.5 m square quadrat at 0, 2, 4, 6 and 8 m using a fixed orientation. Record every identifiable plant species present.

3. For a chosen target species record percentage cover using the quadrat grid, applying the same estimation rule at each position.

4. Measure light at a standard height and orientation if a suitable meter is available; otherwise record the habitat condition qualitatively and do not invent numerical light data.

5. Repeat along five separated parallel transects through the comparable gradient, then compare occurrence, target cover and species richness.

6. Explain that richness is one component of biodiversity and does not alone measure relative abundance/evenness. Discuss confounders and limits of a short survey.

Cleanup

- Collect tapes and markers, leave organisms in place and check no litter remains.
- Wash hands before eating or drinking.

Record your evidence

Blank spaces are for your own work

YEAR 11 / LESSON 105 / BIOLOGY ONLY

Reference and task data

A systematic transect describes change across a gradient. Species richness is the number of species recorded for a defined sampling effort; biodiversity also includes relative abundance and broader variation. Presence/absence records cannot alone quantify evenness. Keep unknown species consistently labelled and verify identification later.

Distance / m	Species richness	Target cover / %	Light / notes
0			
2			
4			
6			
8			

Show your calculations, labelled model or correction here.

Explain and evaluate

Use evidence and show calculation steps where relevant

YEAR 11 / LESSON 105 / BIOLOGY ONLY

1. Why use fixed intervals?

2. What is species richness?

3. Why keep quadrat size constant?

4. Can richness alone describe evenness?

5. Why repeat parallel transects?

6. Does a light–cover correlation prove light is the only cause?