Year 9 Science: Ecosystems: biotic and abiotic factors, quadrats and transects

Name: _____ Date: _____

Try these without your notes first, then check the answer key.

Practice

1. Sort into biotic or abiotic: a dead kauri leaf, soil pH, a weta, rainfall, a fungus on a log.

2. Mosses grow thickly on the south side of a building but hardly at all on the north side. Suggest two abiotic factors that explain this, remembering New Zealand is in the Southern Hemisphere.

3. Six random 1 m² quadrats on a 300 m² lawn hold 2, 4, 1, 3, 0 and 2 clover plants. Estimate the clover on the lawn.

4. You want to know how plants change from a sunny paddock into the shade of bush. Would you use random quadrats or a transect? Say what you would measure.

5. Give one way a tohu and a scientific survey are alike, and one way they differ.

Fix the mistake

6. Correct this statement: "A fallen log or dead leaves are abiotic, because they are not alive any more."

7. Correct this statement: "Put the quadrats where there are lots of plants, so you get good data."

8. Correct this statement: "With 0.25 m² quadrats, multiply the mean per quadrat straight by the area of the field."

9. Correct this statement: "To see how plants change from the beach up a dune, scatter quadrats at random."

Answer key (for parents and tutors)

1. Sort into biotic or abiotic: a dead kauri leaf, soil pH, a weta, rainfall, a fungus on a log.
   Biotic: dead kauri leaf (recently living), weta, fungus. Abiotic: soil pH, rainfall.
2. Mosses grow thickly on the south side of a building but hardly at all on the north side. Suggest two abiotic factors that explain this, remembering New Zealand is in the Southern Hemisphere.
   In New Zealand the north side faces the Sun, so the south side gets less light and stays cooler and damper, which suits mosses that dry out easily.
3. Six random 1 m² quadrats on a 300 m² lawn hold 2, 4, 1, 3, 0 and 2 clover plants. Estimate the clover on the lawn.
   Total 12, mean 2 per m², and 2 × 300 = about 600 plants.
4. You want to know how plants change from a sunny paddock into the shade of bush. Would you use random quadrats or a transect? Say what you would measure.
   A transect, because you are looking at change across a boundary. Measure light, temperature and soil moisture at each quadrat, and record the plants and their cover.
5. Give one way a tohu and a scientific survey are alike, and one way they differ.
   Alike: both rely on repeated observation of patterns and use them to make predictions. Different: tohu are passed on over generations and tied to place, while a survey uses measured numbers taken with instruments at set times.
6. Correct this statement: "A fallen log or dead leaves are abiotic, because they are not alive any more."
   Recently living things count as biotic, because they still feed and shelter other organisms such as fungi, slaters and worms.
7. Correct this statement: "Put the quadrats where there are lots of plants, so you get good data."
   Place quadrats at random, because choosing spots on purpose biases the sample and overestimates the numbers.
8. Correct this statement: "With 0.25 m² quadrats, multiply the mean per quadrat straight by the area of the field."
   First divide the mean by 0.25 to get the number per m², otherwise the estimate comes out four times too small.
9. Correct this statement: "To see how plants change from the beach up a dune, scatter quadrats at random."
   Use a transect, with quadrats at regular distances along a tape, because random quadrats cannot show change along a line.