

Organisation of an ecosystem: practice questions

8 questions • 28 marks • mark scheme at the back

For AQA GCSE Biology 8461 and Combined Science: Trilogy 8464. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

Name

Total / 28

- 1** A student counted the number of dandelions in 8 quadrats: 3, 8, 5, 8, 6, 4, 8, 6. (a) **[5 marks]**
Calculate the mean, and give the mode and the median number of dandelions per quadrat. (3) (b) Each quadrat has an area of 0.25 m^2 . The field has an area of 200 m^2 . Estimate the number of dandelions in the field. (2)

Answer =

- 2** A student wants to investigate the effect of light intensity on the distribution of a plant species in a woodland. The light intensity falls from the edge of the woodland into the middle. Describe a method the student could use. Include how the student would make the results valid and safe. **[6 marks]**

- 3** In a stable community, the numbers of hares and lynx rise and fall in cycles. Each time, the peak in the number of lynx is a short time after the peak in the number of hares. (a) State which animal is the predator. (1) (b) Explain why the number of lynx peaks after the number of hares. (3) **[4 marks]**

- 4** Describe how the carbon in a dead leaf can become the carbon in the glucose of a new plant. **[3 marks]**

- 5** Explain why the water cycle is important to land plants and animals. **[2 marks]**

- 6** Triple only **[3 marks]**

A student left 60 g of dead leaves to decay. After 20 days, the mass of leaves remaining was 36 g at 25 °C and 52 g at 10 °C. Calculate the mean rate of decay at each temperature, in g per day.

Answer =

7 Triple only

[3 marks]

A gardener wants waste to decay quickly in a compost heap. Explain how the conditions in the heap can be changed to speed up decay.

8 Triple only Higher tier

[2 marks]

Over 30 years, the mean summer temperature in an area has increased. A butterfly species is now found 50 km further north than it was 30 years ago. Suggest why the distribution of the butterfly has moved north.

Mark scheme

One mark for each point unless a maximum is given. Words in brackets are not needed for the mark.

1. [5]

- (a) mean = $48 \div 8 = 6$ (1)
- mode = 8 (1)
- median = 6 (1) (middle values 6 and 6)
- (b) $6 \div 0.25 = 24$ per m² (1)
- $24 \times 200 = 4800$ dandelions (1) allow 4800 with no working for 2 marks; allow ecf from their mean

2. [6]

Level 3 5-6	A clear, logical method using a transect and quadrats at regular intervals, with measurement of light intensity, repeated or random sampling, and results processed. Control variables and a safety point are included.
Level 2 3-4	A method which uses a transect or quadrats and records the number of plants and light intensity, but with some detail or sequence missing.
Level 1 1-2	Simple statements about counting plants or measuring light, with no clear method.

Indicative content

- lay a tape measure / transect from the edge into the woodland
- place a quadrat at regular intervals, for example every 2 m
- count the number of the plant species in each quadrat
- measure the light intensity at each position with a light meter
- repeat the transect / use more than one transect and calculate means
- same size of quadrat, same time of day, same person counting
- plot a graph of number of plants against distance or light intensity
- safety, for example wear gloves / avoid harmful plants / wash hands afterwards

3. [4]

- (a) lynx (1)
- (b) when there are many hares there is more food for the lynx (1)
- so more lynx survive and breed, and the number of lynx increases (1)
- breeding takes time, so the rise in lynx lags behind the rise in hares (1)
- the lynx then eat more hares, so hare numbers fall, and then lynx numbers fall from lack of food (1)
- Max 3 for (b)

4. [3]

- microorganisms / decomposers break down the leaf / decay (1)
- carbon is released as carbon dioxide by respiration (of the microorganisms) (1)
- carbon dioxide is taken in by a plant / used in photosynthesis to make glucose (1)

5. [2]

- it provides fresh water (1)
- which plants and animals need to survive / for photosynthesis / for cells (1)

6. [3] Triple only

- $(60 - 36) \div 20$ or $24 \div 20$ (1)
- 25 °C: 1.2 g per day (1)
- 10 °C: $(60 - 52) \div 20 = 0.4$ g per day (1)

7. [3] Triple only

- keep it warm (1) because the decomposers' enzymes work faster / respiration is faster (1)
- keep it moist / add water (1) because microorganisms need water to grow and be active
- turn it / mix it to add air / oxygen (1) for aerobic respiration of the decomposers
- ignore 'heat it' unqualified; do not accept boiling / very high temperatures
- Max 3

8. [2] Triple only Higher tier

- the area in the south is now too warm for the butterfly to survive / breed (1)
- the area further north is now warm enough / has suitable conditions (1)