Maintaining biodiversity

4.7.3.6 · Ecology · revision notes

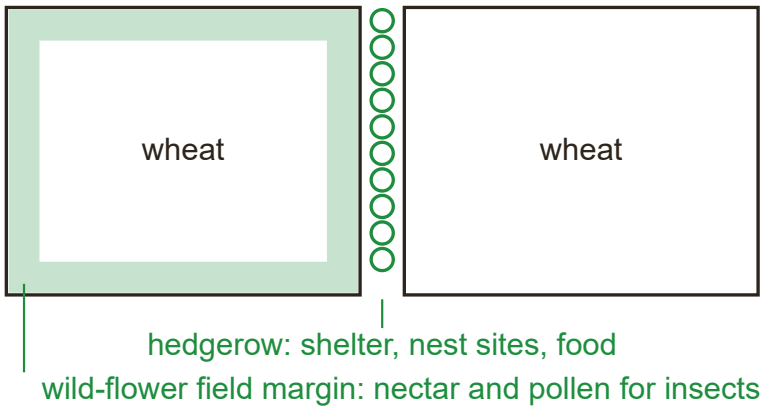
What people are doing to reduce the damage humans cause to ecosystems and biodiversity, and why this can conflict with other needs. Expect to explain how each programme helps and to evaluate given information, often in a 4 to 6 mark question.

Key facts

- Breeding programmes for endangered species
- Reintroduce field margins and hedgerows where only one crop is grown
- Recycle resources rather than dump waste in landfill
- Protection and regeneration of rare habitats
- Reduce deforestation and carbon dioxide emissions (governments)
- Conflicting pressures: cost, land for food and homes, jobs and income

Programmes to protect biodiversity

- Scientists and members of the public have set up programmes to limit the harm humans do to ecosystems and biodiversity.
- **Breeding programmes for endangered species**: animals are bred in captivity, e.g. in zoos, to increase their numbers, and some can be released back into the wild.
- **Protection and regeneration of rare habitats**: e.g. protecting areas as nature reserves and restoring damaged peat bogs or wetlands, so the species that live there can survive.
- **Reintroducing field margins and hedgerows** where farmers grow only one type of crop: these provide food, shelter and breeding sites for many wild plants, insects, birds and mammals, and link habitats together.



Hedgerows and field margins give wildlife food, shelter and places to breed on farmland.

- **Reducing deforestation and carbon dioxide emissions** (by some governments): this protects forest habitats and slows global warming.
- **Recycling resources** rather than dumping waste in landfill: less land is used for landfill and fewer new resources need to be extracted.

Positive and negative interactions

- Negative: pollution, destroying habitats, deforestation, removing hedgerows, and introducing species that outcompete native ones.
- Positive: the programmes above, plus actions such as using peat-free compost and cleaning up polluted rivers.

Conflicting pressures

- Protecting biodiversity can conflict with other needs, so decisions involve trade-offs.
- **Cost**: breeding programmes and habitat protection are expensive, and the money is also needed for other things.
- **Land and food**: hedgerows and field margins take up land that could grow crops, and a growing population needs food and homes.
- **Income and jobs**: people may depend on activities that damage habitats, such as logging, quarrying or farming.
- **Limits of the methods**: animals bred in captivity may have little genetic variation, may not survive in the wild, and cannot be released if their habitat has gone.

How to answer each type of question

Name ways to maintain biodiversity 2 marks **Grade 3**

1. Choose from the five programmes in the specification.
2. Be specific: 'breeding programmes for endangered species', not just 'zoos'.

Example. Give **two** ways in which people are trying to reduce the negative effects of humans on biodiversity.

Model answer. Any two from: breeding programmes for endangered species (1); protecting or regenerating rare habitats (1); reintroducing hedgerows and field margins (1); reducing deforestation or carbon dioxide emissions (1); recycling rather than landfill (1)

Explain how a method increases biodiversity 2 to 3 marks **Grade 5**

1. Say what the method provides: habitat, food, shelter, breeding sites or more individuals.
2. Say which organisms benefit.
3. Link to more species surviving, so higher biodiversity.

Example. A farmer grows only wheat. Explain how planting hedgerows around the fields could increase biodiversity on the farm. (3 marks)

Model answer. Hedgerows contain many different plant species (1). They provide food, shelter and nesting sites for insects, birds and small mammals (1). So more species can live on the farm, increasing biodiversity (1). Also credit: hedgerows link habitats, so animals can move between them.

Explain conflicting pressures

2 to 4 marks | Grade 7

1. State the conservation benefit.
2. State the competing need: money, land for food or homes, jobs, income.
3. Explain why the two conflict.

Example. Suggest why some farmers do not want to plant field margins of wild flowers. (3 marks)

Model answer. The margins take up land that could grow crops (1), so the farmer produces less food and earns less money (1). Planting and looking after the margins also costs money and time (1).

6-mark: evaluate a conservation programme

6 marks | Grade 8

1. Use the data to judge whether it worked (numbers before and after).
2. Give advantages: species protected, numbers increased, habitat protected.
3. Give disadvantages: cost, released animals may not survive, habitat may still be threatened.
4. Reach a justified conclusion.

Example. A captive breeding programme for a rare bird released 60 birds into a protected reserve over 10 years. Over the same time, the wild population rose from 12 to 85. The programme cost £2 million.
Evaluate the programme.

Model answer. Level-marked. A level 3 answer (5 to 6 marks) might include: the wild population rose from 12 to 85, so the programme appears to have worked; 12 + 60 = 72, which is less than 85, so some birds must be breeding in the wild; the reserve protects the habitat, so the birds can survive there; however, the programme was expensive and the money could have been used elsewhere; captive-bred birds may have little genetic variation; we do not know whether the population can survive without more releases. Conclusion: largely successful, because the population is much larger and is breeding in the wild, but it should be monitored.

Don’t lose marks

- Saying breeding programmes 'make more species'. They increase the number of individuals of an endangered species.
- Naming a method without explaining how it helps biodiversity.
- Ignoring the human side in 'conflicting pressures' questions: cost, food, land and jobs all matter.
- Writing a one-sided answer to an 'evaluate' question.

More tips

Memory tricks

- Five programmes: Breed, Protect, Hedge, Cut (deforestation and carbon dioxide), Recycle.
- Evaluate = for, against, conclusion. No conclusion, no top level.
- Hedgerows are wildlife corridors: food, shelter and a safe route between habitats.

Exam technique

- Quote data from the question when judging whether a programme worked.
- Use connectives such as 'however', 'on the other hand' and 'therefore'.
- End an evaluation with a clear judgement and the main reason for it.

What each grade needs

What you need to be able to do, from the first marks up to the top grade.

Grade 3

Name programmes that protect biodiversity

Breeding programmes, protecting rare habitats, hedgerows and field margins, reducing deforestation and carbon dioxide emissions, and recycling.

Grade 5

Explain how each programme helps biodiversity

Say what the programme does and which species or habitats it protects.

Grade 5

Describe positive and negative human interactions

For example, replanting hedgerows is positive, while removing them to make bigger fields is negative.

Grade 7

Explain conflicting pressures on maintaining biodiversity

Conservation costs money and uses land that people also need for food, homes, jobs and income.

Grade 8

Evaluate a conservation method using given data

Weigh the evidence of success against costs and limitations, then reach a justified conclusion.

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