

GCSE Combined Science: Trilogy

Worksheet: Biodiversity

TIME 30 min	TOTAL 29 marks	CALCULATOR Allowed	DIFFICULTY Easy, Medium
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Topics: Biodiversity

NAME	CLASS	DATE
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- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Answer all questions in the spaces provided.
- In all calculations, show clearly how you work out your answer.
- The marks for questions are shown in brackets.

0 1

Many human activities are reducing biodiversity.

0 1 . 1

What is meant by **biodiversity**?

Tick (✓) **one** box.

The number of individuals of one species in a habitat

☐

The variety of all the different species of organisms on Earth, or within an ecosystem

☐

The mass of living material at each trophic level

☐

The number of different habitats in an area

☐

[1 mark]

0 1 . 2

A high biodiversity helps to keep an ecosystem stable.

Give **two** reasons why.

.....

.....

.....

.....

[2 marks]

0 1 . 3

Give **one** human activity that reduces biodiversity.

.....

.....

[1 mark]

0 2

Biodiversity is important for the stability of ecosystems and for the future of humans.

0 2 . 1

Complete the sentence.

Biodiversity is the variety of all the different of organisms on Earth, or within an

.....

.....

.....

.....

[2 marks]

0 2 . 2

Which **two** statements explain why a high biodiversity helps to keep an ecosystem stable?

Tick (✓) **two** boxes.

Species depend less on one other species for food.

☐

Species depend less on one other species for shelter.

☐

Every species has the same number of individuals.

☐

There are no predators.

☐

All the species compete for the same resources.

☐

[2 marks]

0 2 . 3

Give **one** reason why the future of the human species depends on maintaining a good level of biodiversity.

.....

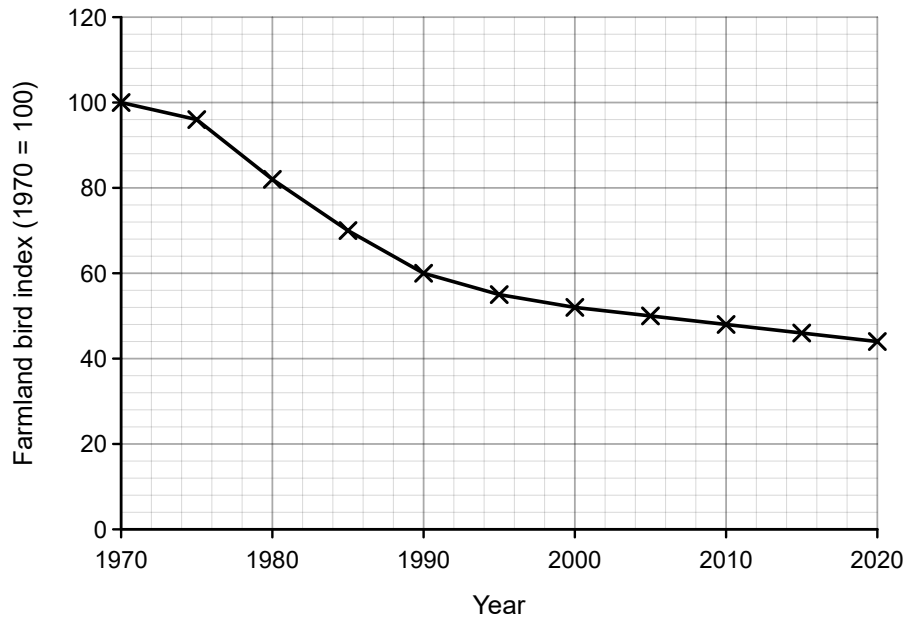
.....

[1 mark]

0 3

Figure 1 shows an index of the population sizes of farmland bird species in one country. The value of the index in 1970 is set at 100.

Figure 1



0 3 . 1

Give the value of the index in 1990.

.....

.....

.....

Index =

[1 mark]

0 3 . 2

Calculate the percentage decrease in the index between 1970 and 2020.

.....

.....

.....

Percentage decrease = %

[1 mark]

0 3 . 3

Describe how the index changed between 1970 and 2020.

.....

.....

.....

.....

[2 marks]

0 3 . 4

Suggest **two** changes in farming that could explain the change in the index.

.....

.....

.....

.....

[2 marks]

.....

0 4

Students surveyed the invertebrate animals in two ponds, A and B, using the same method. Table 1 shows the results.

Table 1

Species	Number found in pond A	Number found in pond B
water snail	34	112
mayfly nymph	21	0
dragonfly nymph	6	0
water boatman	18	4
freshwater shrimp	25	0
bloodworm	9	86
water louse	12	38

0 4 . 1

How many species were found in pond B?

.....

.....

.....

.....
[1 mark]

0 4 . 2

A student said: 'Pond B has a higher biodiversity than pond A because more animals were found in it.'
Explain why the student is wrong.

.....

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.....

.....

[2 marks]

0 4 . 3

Pond B receives run-off water from a farm.
Suggest why pond B has a lower biodiversity than pond A.

.....

.....

.....

.....

[2 marks]

0 4 . 4

Explain why an ecosystem with a high biodiversity is more stable.

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.....

.....

.....

[2 marks]

0 5

Students compared the biodiversity of plants in a hay meadow and on a sports field. They placed eight 1 m² quadrats in each area and recorded the number of different plant species in each quadrat. Table 2 shows the results.

Table 2

Area	Number of plant species in each quadrat
Hay meadow	12, 15, 11, 14, 13, 16, 12, 11
Sports field	4, 3, 5, 2, 4, 3, 4, 3

0 5 . 1

Calculate the mean number of plant species per quadrat in each area.

.....

.....

.....

.....

Means (hay meadow, sports field) =

[2 marks]

0 5 . 2

How many times greater was the mean number of species per quadrat in the hay meadow than on the sports field?
Give your answer to 2 significant figures.

.....

.....

.....

Number of times =

[1 mark]

0 5 . 3

Describe how the students should have decided where to place the quadrats.

.....

.....

.....

.....

[2 marks]

0 5 . 4

Suggest **two** reasons why the sports field has a lower biodiversity than the hay meadow.

.....

.....

.....

.....

[2 marks]

END OF QUESTIONS

Original practice questions written to match the specification. Not produced by, affiliated with or endorsed by AQA.

Mark scheme

GCSE Combined Science: Trilogy · Worksheet: Biodiversity · 29 marks

Question 1 (4 marks)

01.1 [1 mark]

Correct: The variety of all the different species of organisms on Earth, or within an ecosystem

01.2 [2 marks]

- species depend less on one other species for food (1)
- species depend less on one other species for shelter (1)
- species depend less on one other species for the maintenance of the physical environment (1)
- if one species is lost, other species can replace it / other food sources are available (1)

Any 2 of the points above.

01.3 [1 mark]

- deforestation (1)
- building (1)
- pollution (of air, water or land) (1)
- farming large areas with only one crop (1)
- destroying peat bogs (1)
- quarrying (1)
- overfishing / hunting (1)

Any 1 of the points above.

Question 2 (5 marks)

02.1 [2 marks]

Answer: species; ecosystem

- species (1)
- ecosystem (1)

02.2 [2 marks]

Correct: Species depend less on one other species for food.; Species depend less on one other species for shelter.

02.3 [1 mark]

- humans depend on other species for food, e.g. crops and fish (1)
- medicines are obtained from other species (1)
- materials, e.g. timber or fibres, come from other species (1)
- many crops depend on pollination by insects (1)
- stable ecosystems provide clean water, oxygen and fertile soil (1)

Any 1 of the points above.

Question 3 (6 marks)

03.1 [1 mark]

Answer: 60

- 60 (1)

03.2 [1 mark]

Answer: 56%

- $(100 - 44) \div 100 \times 100 = 56$ (%) (1)

03.3 [2 marks]

- the index decreased throughout the period (1)
- it decreased quickly between about 1975 and 1990, and then more slowly (1)

03.4 [2 marks]

- hedgerows were removed, so there were fewer nesting sites and less food (1)
- larger fields growing only one crop / fewer field margins (1)
- pesticides killed insects that the birds feed on (1)
- herbicides killed weeds whose seeds the birds eat (1)
- less winter stubble because crops are sown in autumn, so less food in winter (1)

Any 2 of the points above.

Question 4 (7 marks)

04.1 [1 mark]

Answer: 4

- 4 (1)

04.2 [2 marks]

- biodiversity is the variety / number of different species, not the number of individuals (1)
- pond A has more species (7) than pond B (4) (1)

04.3 [2 marks]

- pollution (e.g. from fertiliser / sewage / pesticides) from the farm (1)
- kills some species, so only species that can tolerate the pollution survive (1)

04.4 [2 marks]

- species are less dependent on one other species for food / shelter (1)
 - if one species declines, others can use other food sources / replace it, so population sizes stay fairly constant (1)
-

Question 5 (7 marks)

05.1 [2 marks]

Answer: Hay meadow 13.0; sports field 3.5

- hay meadow: $104 \div 8 = 13$ (13.0) (1)
 - sports field: $28 \div 8 = 3.5$ (1)
-

05.2 [1 mark]

Answer: 3.7

- $13 \div 3.5 = 3.7$ (1)

Notes: An answer of 3.71 (not given to 2 significant figures) scores 0 marks. Allow ECF from the previous part.

05.3 [2 marks]

- divide the area into a grid, e.g. by laying two tape measures at right angles (1)
 - use random numbers as coordinates for each quadrat (1)
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05.4 [2 marks]

- the grass is mown often, so other plants cannot grow tall, flower or produce seeds (1)
- trampling damages or kills many plants (1)
- herbicides or fertilisers may be used, so only a few species grow well (1)
- grass outcompetes other plant species (1)

Any 2 of the points above.
