

Biodiversity

Human Effect on Ecosystem

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.7 Ecology
Sub-Topic	Biodiversity – Human Effect on Ecosystem
Difficulty Level	Gold Level
Booklet	Mark Scheme 1

Time Allowed: 60 minutes

Score: / 60

Percentage: /100

Grade Boundaries:

M1.(a)	reduces biodiversity	1
	peat is being used faster than it forms <i>allow peat is non-renewable</i>	1
	(b) decay / decomposition / rotting of peat	1
	by microorganisms / bacteria / microbes / fungi / decomposers introduced when peat is mixed with air	1
	that respire using substances in peat as reactant	1
	and using oxygen that is introduced when peat is mixed with air	1
		[6]

M2.Level 3 (5–6 marks):

A full explanation is given that is coherent and logically structured, linking effect of increase in carbon dioxide to climate change and effects on biodiversity.

Level 2 (3–4 marks):

An attempt is made to link the effects of rising carbon dioxide levels to climate change and biodiversity. The logic may be inconsistent at times but builds towards a coherent explanation.

Level 1 (1–2 marks):

Discrete relevant points made. The logic may be unclear and attempts at reasoning may not be consistent.

0 marks:

No relevant content.

Indicative content

- rise in carbon dioxide increases atmospheric temperature / causes global warming
- global warming causes extreme weather patterns
- such as rise in sea levels
- increased or decreased rainfall
- frequency of storms / droughts
- rise in sea levels means habitats will change due to flooding
- rise in sea levels could increase salt in soil
- increased rainfall will increase water levels
- severity of storms / droughts could affect photosynthesis
- consequences of changes are loss of or damage to habitats
- which will affect animal and plant distributions
- by increasing migration or species dying off
- which decreases biodiversity

[6]

M3.(a) any **two** from:

- fewer trees to take in carbon dioxide for photosynthesis
- decomposers / microorganisms respire (as they decay debris) releasing carbon dioxide
- burning of wood releases carbon dioxide
allow carbon dioxide released by burning fossil fuels in vehicles / factories

2

- (b) Marks awarded for this answer will be determined by the Quality of Communication (QC) as well as the standard of the scientific response. Examiners should also refer to the information on page 5, and apply a 'best – fit' approach to the marking.

0 marks

No relevant content.

Level 1 (1 – 2 marks)

There is a brief description of some steps in the process but the order is not clear with little biological vocabulary used.

Level 2 (3 – 4 marks)

There is a reasonably clear description of the process involving many of the steps and using some biological vocabulary.

Level 3 (5 – 6 marks)

There is a clear, logical and detailed scientific description of the process using appropriate biological vocabulary.

examples of biology points made in the response:

- this contains mineral ions (and organic matter)
- this increases growth of algae / water plants
- the plants / algae (underneath) die
- due to lack of light / photosynthesis / space
- decomposers / microorganisms feed on decaying matter **or** multiply rapidly
- the respiration of decomposers uses up all the oxygen
- so invertebrates die due to lack of oxygen
- this is called eutrophication

6

[8]

- M4.** (a) (i) kills / gets rid of / reduces methane bacteria
allow kills / gets rid of / reduces bad bacteria
ignore acts like antibiotic

1

- (ii) less food converted to methane
allow can keep more cattle without further environmental damage
ignore energy

1

more growth / meat / muscle / milk produced / more profit / fatter animals
ignore references to bacteria and disease

1

- (b) absorbs energy / heat radiated by Earth
allow absorbs / traps energy / heat / from Earth
*do **not** allow absorbs energy / heat from Sun*

1

some energy / heat reradiated
ignore reflected
*do **not** allow reradiates energy / heat from Sun*

1

leading to global warming / enhanced greenhouse effect
accept effects of global warming eg melting ice caps
accept methane is a greenhouse gas
ignore references to ozone

1

[6]

M5. (a) increased human population
increased standard of living
each for 1 mark

2

(b) nutrients absorbed by plants not replaced
each for 1 mark

2

(c) increased release of carbon dioxide into atmosphere when trees are burned
reduced rate of carbon dioxide removal from atmosphere
increased carbon dioxide absorbs more of energy radiated by Earth
global rise in temperature
each for 1 mark

4

[8]

M6. Cogently argued based on biological principles, for **and**
against introduction of caterpillar
maximum of 4 pros e.g.
fewer chemicals used therefore less expense
less chemical damage to other plants
consequent benefits to food chains
fewer farm animals poisoned therefore more economic
countryside more varied therefore more attractive to tourists
tourists bring economic advantages
greater variety of habitats therefore greater variety of species

any 4 for 1 mark each

4

cons e.g.
danger to livelihoods if crops destroyed by caterpillar
relatively low chance of success since only one third of schemes
effective world-wide
unlikely to be natural predators therefore ecological balance affected

any 2 for 1 mark each

2

cogently argued case **gains up to 2 marks**

2

[8]

M7. (a) e.g.
timber
agriculture
roads / urban development / buildings
any two for 1 mark each

2

(b) *ideas that (accept reverse arguments)*
increased carbon dioxide content since less during photosynthesis
and locked-up as wood burning increases carbon dioxide content
increased activity of microbes increases carbon dioxide content
oxygen content reduced water vapour content reduced
any five for 1 mark each

5

[7]

M8. pros e.g.:

gum trees survive therefore less soil erosion
therefore food webs not disrupted
if no culling, whole Koala population may die
easier to cull because Koalas are difficult to catch

cons e.g.:

Koala's 'right to life' / ethical issue
better to transfer to reserves on mainland than kill
could use tranquillisers to catch without killing
could allow population to stabilise naturally

max 4 of the above; max 3 pros or cons.

[4]

M9. (a) 3060 (kJ)

1

(b) (i) 22060 (kJ)

1

(ii) photosynthesis

1

(c) faeces / undigested food

reference to movement and respiration are neutral

urine / urea

2

*accept excretion / waste / droppings if
both of the mark points are not gained*

(d) any **two** from

- control ripening

- herbicides
- prevent over ripening in transport
- stimulate root growth
- *other growth references are not neutral*
- use in tissue culture to produce large numbers of plantlets

2

[7]