

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	Silver Level
Booklet	Mark Scheme 1

Time Allowed: 60 minutes

Score: / 60

Percentage: /100

Grade Boundaries:

M1.(a)	(i) counts / 12	1
	× 120 × 80 / × 9600	
	or	
	× area of field	1
	(ii) (more) quadrats / repeats	1
	placed randomly	
	<i>ignore method of achieving randomness</i>	1
(b) (i)	any three from: <ul style="list-style-type: none"> • temperature / warmth / heat • water / rain • minerals / ions / salts (in soil) <i>allow nutrients / fertiliser / soil fertility</i> <i>ignore food</i> • pH (of soil) • trampling • herbivores <i>ignore predators</i> • competition (with other species) • pollution qualified e.g. SO₂ / herbicide • wind (related to seed dispersal). <i>ignore space / oxygen / CO₂ / soil unqualified</i> 	3
	(ii) light needed for photosynthesis	1
	for making food / sugar / etc.	1
	effect on buttercup distribution eg more plants in sunny areas / fewer plants in shady areas	1
(c) (i)	fertiliser / ions / salts cause growth of algae / plants	1
	(algae / plants) block light	1

(low light) causes algae / plants to die

1

microorganisms / bacteria feed on / break down / cause decay of organic matter / of dead plants

do not allow germs / viruses

1

(aerobic) respiration (by microbes) uses O₂

do not allow anaerobic

1

- (ii) sewage / toxic chemicals / correct named example eg metals / bleach / disinfectant / detergent etc

allow suitable named examples eg metals such as Pb / Zn / Cr / oil / SO₂ / acid rain / pesticides / litter

ignore chemicals unqualified

ignore waste unqualified

ignore human waste / domestic waste / industrial waste unqualified

1

- (d) (i) 2

1

- (ii) more food

allow other sensible suggestion eg more species colonise from tributary streams after forest

1

- (iii) number of stonefly species decreases (from **A** to **B** / **B** to **C** / **A** to **C**) as more pollution enters river / less oxygen

allow fewer species in more polluted water

ignore none are found at site C

1

[19]

M2.(a) any **two** from:

- (volume of) peat compost has been steady and then declined **or** volume of peat compost has declined since 2005
allow 2007 instead of 2005
- (volume of) peat-free compost has increased (since 1999)
- (volume of) peat is higher than peat-free until 2005, then peat-free compost is higher (than peat)

	<i>allow 2007</i>		
	• total volume of peat and peat-free compost has increased.	2	
	(b) increases carbon dioxide (in the atmosphere)		
	<i>ignore methane</i>	1	
	(c) any one from:		
	• reduces biodiversity		
	• destruction of habitats		
	• disruption of food chains.	1	
			[4]
M3.(a)	(i) correct bar heights		
	<i>three correct 2 marks</i>		
	<i>two correct 1 mark</i>		
	<i>one or none correct 0 marks</i>		
	<i>ignore width</i>	2	
	(ii) (Stream Y)		
	has many sludge worms / bloodworms		
	or		
	has no mayflies / caddis or few shrimp		
	<i>allow 1 mark if invertebrate not named but correct association given</i>	1	
	which indicate medium or high pollution	1	
	(b) (i) suspended solids increase (as a result of sewage overflow)	1	
	then decrease downstream / return to original levels	1	
	oxygen levels decrease (after sewage overflow)	1	

and then rise again

1

(ii) any **three** from:

- mayflies decrease (to zero) near overflow
accept 'have died out'
- because oxygen is low **or** mayflies have high oxygen demand
- mayflies repopulate / increase as oxygen increases again
- can't be sure if dissolved oxygen or suspended solids is the cause

3

(c) they respire / respiration

aerobic respiration gains 2 marks

1

this requires / uses up the oxygen

1

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M4. Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also apply a 'best-fit' approach to the marking.

0 marks

No relevant content

Level 1 (1 – 2 marks)

There is at least one reason for deforestation

or

an attempt at a description of at least one way deforestation is affecting the atmosphere.

Level 2 (3 – 4 marks)

There is at least one reason for deforestation

and

a description of the way deforestation is affecting one gas in the atmosphere

or

the process that causes an effect.

Level 3 (5 – 6 marks)

There are reasons for deforestation

and

a clear description of the way deforestation is affecting one gas in the atmosphere

and

the process that causes this.

examples of the points made in the response

Reasons for deforestation

- timber for construction / furniture / boat building / paper production
- growing plants for biofuels for motor fuel / aviation / lawnmowers
- use of wood as a fuel
- land for building or agriculture to provide food, such as rice fields and cattle ranching

Effects of deforestation

- increase in carbon dioxide in atmosphere
due to burning
due to activities of microbes
less carbon dioxide taken in / locked up (by trees)
less photosynthesis
- increase in methane in atmosphere
due to rice production / cattle

extra information

ignore references to oxygen

accept explanations of the effect of water (vapour)

[6]

M5.(a) any **two** from:

ignore CO₂ release unqualified

- burning
- activity of microbes / microbial respiration

- less photosynthesis

or

trees take in CO₂

*do **not** accept CO₂ taken in for respiration*

or

less CO₂ locked up in wood

- CO₂ given off by clearing machinery

2

- (b) (i) range of different species

accept idea of variety of organisms or plants or animals

1

- (ii) any **two** from:

- organisms may produce substances useful to humans
*do **not** accept if food is only example*
- duty to preserve for future generations
- effect on other organisms, eg food chain effects
ignore effect on human food supply
- loss of environmental indicators

2

[5]

- M6.** (a) any **two** from:

- shorter distance between samples
ignore repeat investigation /measurements
- sample to greater height
- specify the size of each site
ignore longer transect

1

(b) (i) Parmelia 1

(ii) Evernia 1

(c) any **two** from:

- Lecanora does not extend over whole range of transect / does not grow everywhere / does not grow in town centre / does not grow in countryside
- Lecanora grows in a range of sulfur dioxide concentrations **or** Lecanora only grows in limited range of sulfur dioxide concentrations **or** Lecanora lives over large range of sulfur dioxide concentrations
- other factors eg different pollutant might also influence growth of Lecanora
- sulfur dioxide / pollutant concentration was not measured
ignore Lecanora does not give accurate measure of sulfur dioxide concentration
- amount of Lecanora not measured

2

[5]

M7. (a) 5 1

(b) any **one** from:

allow in either section

- more light
allow more sun / sunnier
- warm(er) / hot
- more water / lot of rain

1

increased / more photosynthesis

allow in either section

allow more biomass / carbohydrate / named (made)

*do **not** allow food*

allow enzymes / metabolism faster

NB for **2** marks this must be linked to heat

*to gain **2** marks more / increased must be mentioned at least once*

1

- (c) less pollution / named pollutant eg carbon dioxide / ☐fumes☐ / emissions

allow examples of effect of less pollution

eg less global warming / less acid rain

allow any relevant environmental effect

eg imported diseases

1

less fuel used / less transport / named transport

ignore 'less distance' / importing

allow 'less distance travelled' / 'less travel'

allow smaller carbon footprint once only for either mark

1

[5]

M8. (a) 3.2

*award **both** marks for correct answer irrespective of working
if answer incorrect*

$(55 + 55 + 1.2 + 5) - (110 + 3)$

or

$116.2 - 113$

or

$(55 + 55 + 1.2 + 5 + 90) - (110 + 93)$ gains 1 mark

2

- (b) any **one** from:

- less carbon dioxide taken in by trees

*ignore carbon dioxide released by trees **or** trees store carbon dioxide*

- less photosynthesis
- burning trees releases carbon dioxide
- decay releases carbon dioxide

1

[3]