

Organisation of an Ecosystem

Mark Scheme 1

Level	GCSE (9-1)
Subject	Combined Science – Trilogy - Biology
Exam Board	AQA
Topic	4.7 Ecology
Sub-Topic	Organisation of an Ecosystem
Difficulty Level	Gold Level
Booklet	Mark Scheme 1

Time Allowed: 59 minutes

Score: / 59

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.(a)	(i) to get data re position of seaweed / of organism	1
	in relation to distance from sea / distance down shore / how long each seaweed was exposed	1
	(ii) repeat several times <i>minimum = 2 repeats</i>	1
	elsewhere along the shore	

1

- (iii) bladder wrack is further up the shore (than the sea lettuce) / exposed for longer

ignore found in dry areas / on bare rock

1

sea lettuce (only) in rock pools / in the sea / (only) in water

1

- (b) gets more light / closer to light

allow better access to CO₂

1

- (so) more photosynthesis

allow 1 mark for light for photosynthesis

allow 1 mark for CO₂ for photosynthesis

ignore reference to oxygen for respiration

'more' only needed once for 2 marks

1

[8]

M3.(a) extremophile(s)

1

- (b) (i) common (periwinkle) and flat (periwinkle)

*either order, **both** required*

1

- (ii) (common and flat) both live in the same habitat / area / named area

allow habitats overlap the most

1

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

- would have wrong food
- would otherwise be exposed to (specific) predators

- cannot tolerate extended exposure to air **or** reduced submersion in seawater
allow cannot tolerate temperature / dehydration
- cannot tolerate high salt concentration (in rock pools)
allow low salt concentration (in rock pools)
- cannot compete with small periwinkle

2

[5]

M4.(a) (i) 5.2

award 2 marks for correct answer, irrespective of working or lack of it

award 1 mark for $62.4 \div 12$ only with incorrect or no answer

2

- (ii) the smaller the (mass of the) bird the more energy is needed (per gram of body mass)

allow converse

ignore figures

1

- (iii) smaller bird has larger surface area : volume / mass ratio

allow converse

1

so heat / energy lost more quickly

allow lose more heat / energy

*if (a)(ii) describes a trend of more energy with increasing body mass allow **one** mark for idea of more energy needed for flight*

1

- (b) larger birds spend less time feeding

accept converse

allow the less energy they need per day the longer they spend feeding

1

since they need less food per gram of body mass (to satisfy energy needs)

1

[7]

M5.(a) use of quadrat / point frame

allow description

1

randomly placed / random sampling

ignore reference to transects

1

(b) (i) 6

1

(ii) more light in A / in field / where sunny

ignore sun

1

more / better / faster photosynthesis in A / with more light

allow converse

1

(iii) use light meter / measure light intensity in both habitats

1

take many measurements at same time of the day

1

or

laboratory / field investigation with 2 batches high light and low light (1)

count or number of flowers in each (1)

counting point is dependent on investigation point

- (c) more glucose / energy available

allow other named product eg protein

allow if more energy produced

1

for growth

dependent on 1st mark

1

[9]

M6.(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]

M7.

(a) e.g.:

competition for light because potamogeton plants taller

competition for nutrients taller plants may have longer roots

each for 1 mark

4

(b) descriptions of:

measuring tape or similar quadrat

method of estimating cover (inside quadrat)

each for 1 mark

3

[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. (i) $0.25 \times 100 / 25$
gains 1 mark

but
1%

gains 2 marks

2

(ii) muscle contraction / limb movement / moving around / chewing
heartbeat / breathing / internal muscle activity
maintaining body temperature / keeps body warm
active uptake synthesising substances (*reject growth*)
any three for 1 mark each

3

[5]