

MARK SCHEME

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

B 7 - TEST 6

ECOLOGY

Advanced

Mark schemes

1.

- (a) the birds now arrive earlier (in the UK)
must imply both species of birds

1

the Sand martin (now) arrives before the Barn swallow

or

the Barn swallow (now) arrives later than the Sand martin

or

arrival time of the two birds has reversed

1

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

- warmer in UK earlier (in year)
or
colder abroad earlier (in year)
allow too hot / cold abroad earlier (in year)
ignore global warming
- insects / food appears earlier (in year in UK)
or
shortage of insects / food abroad earlier (in year)
accept feasible reference to competition for food
- new genes / mutation
allow evolution / natural selection
ignore adapted
ignore pollution

2

[4]

2.

any **six** from:

*only credit release of carbon dioxide **once** when linked to a correct process*

ignore references to burning

- (plants) photosynthesise
- (*plants*) take in carbon dioxide
- (*plants*) produce carbohydrates / fats / proteins
accept produce glucose
- (carbon compounds transferred by) feeding
- respiration
- breaks down carbon compounds / carbohydrates
accept glucose
- releases carbon dioxide
- organisms die / produce wastes / *excrete*
- (which are) decomposed / decayed by microorganisms
allow broken down
allow bacteria / fungi / microbes / decomposers
- (which) release carbon dioxide

[6]

3.

read 'the gas' or 'it' as carbon dioxide

(plants) photosynthesise

1

(plants) absorb carbon dioxide / CO₂ (from the air)

allow take in / use carbon dioxide / CO₂ (from the air)

1

(overall) more carbon dioxide / CO₂ is being released into the air than is being removed

*allow 470 (billion tonnes) released **but / and** 450 (billion tonnes) taken in*

1

(by) respiration (by all organisms / any named organism)

ignore breathing
ignore carbon

1

(and) combustion / burning

ignore carbon

1

(so) amount of carbon dioxide / CO₂ in air is increasing

allow 20 (billion tonnes) of carbon dioxide / CO₂ added to air each year

1

[6]

4.	(a) variation (between organisms within species)	
	<i>allow described example</i>	
	<i>allow mutation – but not if caused by change in conditions</i>	1
	those most suited / fittest survive	1
	genes / alleles passed on (to offspring / next generation)	
	<i>allow mutation passed on</i>	1
	(b) (i) any two from:	
	<i>allow converse</i>	
	• increase in latitude reduces number of (living) species	
	<i>ignore references to severity of conditions</i>	
	• increase in latitude reduces time for evolution (of new species)	
	• the less the time to evolve the fewer the number of (living) species	2
	(ii) any two from:	
	<i>do not accept intention or need to evolve</i>	
	• (increase in latitude reduces number of (living) species because) less food / habitats / more competition <u>at high latitude</u>	
	<i>allow only extremophiles / well-adapted species can survive</i>	
	• (increase in latitude reduces time for evolution (of new species) because) severe conditions act more quickly / to a greater extent on the weakest	
	• (the less the time to evolve the fewer the number of (living) species because) species that evolve slowly don't survive	2
		[7]
5.	(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]

6.

(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]

7.

(a) *idea:*
more (fossil) fuel burned (do not credit simply more people/cars/industry)
deforestation = less photosynthesis
deforestation = more respiration/burning
each for 1 mark

3

(b) *idea:*
climate change
for 1 mark

warmer/colder/drier/wetter
food production affected/starvation
mayor ecosystems destroyed/damaged
any two for 1 mark each

6

sea level rise

for 1 mark

low land flooded
less food grown/starvation
homes/factories flooded

any two for 1 mark each

Allow

polar ice caps melt
sea water expands

[9]

8.

- (a) **Level 3:** The method would lead to the production of a valid outcome. All key steps are identified and logically sequenced.

5–6

Level 2: The method would not necessarily lead to a valid outcome. Most steps are identified, but the method is not fully logically sequenced.

3–4

Level 1: The method would not lead to a valid outcome. Some relevant steps are identified, but links are not made clear.

1–2

No relevant content

0

Indicative content

- lay a transect line from the edge of the sea up to the stony beach
- place a quadrat at regular intervals
- on the same side of the transect line each time
- use quadrats that don't float
- count number of each species present (in the quadrat)
or estimate percentage cover of plant / seaweed / algae
- use a key to identify the individual species
- repeat another transect line parallel to the original / 5m further along the shore
- conduct at least three transect lines
- calculate the means for each distance up the shore

to access **level 3** the key ideas of using quadrats with transect lines and counting the number of each species need to be given to produce a valid outcome

- (b) toothed wrack

1

kite / bar is longest **and** deepest / widest / thickest

*do **not** accept if incorrect organism named
allow kite / bar has the greatest area*

1

- (c) any **three** from:
- more stable
 - more habitats
 - greater range of food sources
ignore more food unqualified
 - greater interdependence
 - sand / stony beach is (very) dry so plants can't grow there
 - fewer temperature fluctuations

3

[11]

9.

- (a) 2 640 000 (in remaining 24 years)

1

110 000 in each remaining year

or

2.64×10^6 in remaining 24 years

1

1.1×10^5

an answer of 1.1×10^5 scores 3 marks

1

- (b) (area of woodland =) 21 600

allow $16\ 800 + 4\ 800$

or $9\ 000 + 12\ 600$

or $4\ 800 + 4\ 200 + 12\ 600$

1

518 400 (bluebells)

allow their area $\times 4 \times 6$

an answer 518 400 (bluebells) scores 2 marks

1

(c)

Level 3: Relevant points are identified, given in detail and logically linked to form a clear account.	5-6
Level 2: Relevant points are identified, and there are attempts at logically linking. The resulting account is not fully clear.	3-4
Level 1: Relevant points are identified and stated simply, but their relevance is not clear and there is no attempt at logical linking.	1-2
No relevant content	0
Indicative content reducing pollution <ul style="list-style-type: none">• trees take in carbon dioxide• which will lower atmospheric greenhouse gases and reduce global warming (allow consequences of global warming)• trees act as noise absorbers• which will reduce noise pollution in the city• roots of trees will bind the soil• which will reduce local flooding and soil erosion• leaves on trees will trap PM2.5 / tiny particulates• which will reduce asthma/breathing difficulties of people increasing biodiversity <ul style="list-style-type: none">• new woodlands or new trees in parks / gardens will provide new habitats• for new species of plants and animals• linking woodlands• will allow animals to move into new areas• planting many new species of trees• will provide food and shelter for new species of insects/birds• could extend the scheme• to reintroduce species of plants or animals which no longer live in that area• could protect wildlife in the area• by legislation or community projects	

6

[11]