

GCSE

BIOLOGY

AQA - COMBINED SCIENCE

MARK SCHEME

B7

ADAPTATIONS & ECOLOGY

TEST 2

Mark schemes

- 1** (a) Leaf 1
- (b) Beetle 1
- (c) Community 1
- (d) Light intensity 1
- Wind direction 1
- [5]**
- 2** (a) 88 000
correct answer = 2 marks
allow 1 mark for 1.1 (in 1 m²)
or
allow 1 mark for answer = [candidate's value in 1m²] × 80 000 2
- (b) Place the quadrat in 100 random positions. 1
- (c) any **three** from:
must include at least one advantage and one disadvantage for full marks
- Advantages:
- less cost / free
 - less likely to kill other (harmless species of) plants
 - weedkiller may be toxic **or** may cause water pollution
 - weedkiller may accumulate up food chains
allow uneven distribution of ragwort so much wastage of weedkiller
- Disadvantages:
- volunteers may mistake other species for ragwort
 - volunteers may miss plants
allow weeds will grow back
 - some ragwort left to poison horses
 - time consuming
 - difficulties getting enough volunteers
if no other disadvantages; allow ref. to issues with volunteers – eg don't turn up / not careful / don't finish the job
- 3
- [6]**
- 3** (a) the variety of different species on Earth 1

- (b) carbon dioxide 1
- methane 1
- (c) any **two** from:
- drought
 - flooding
 - temperature change
allow temperature increase or decrease
 - rainfall change
allow rainfall increase or decrease

2

[5]

- 4** (a) Photosynthesis 1
- (b) Respiration 1
- (c) **C** 1
- (d) (it will) rise 1
- (e) water vapour 1
- methane 1
- (f) Microorganism 1

[7]

- 5** (a) both plots correct 1
- suitable line of best fit 1
- (b) allow range of 3–7 (units)
allow ecf from line of best fit given in 03.1 1

(c)

Advantage	Disadvantage
	✓
✓	
	✓

allow 1 mark for 2 correct

more than one tick in a row negates a mark

2

[5]

6

(a) Place more quadrats in the field

1

Place quadrats randomly

1

(b) 26 400

1

(c) transect

1

(d) as distance from the path increases the number of (ribwort) plants increases

1

steep rise from 0.5 to 3.0 between 2 and 4 m from path **or** numbers level off to about 4 plants from 10 m from the path

1

(e) The ribwort plants get walked on

1

[7]

7

(a) (placed) randomly

allow description of placement

1

sufficient number (of quadrats) used

1

count (dandelions) in each quadrat

1

use mean number of dandelions, area of quadrat and area of field to estimate population

accept (area of field / area quadrat) x mean number of dandelions per quadrat

1

(b) $(40 \times 145) / 0.25 = 23\ 200$

1

$(0.42 \times 23\,200 =) 9744$

allow 9744 with no working shown for 2 marks

allow ecf from correct attempt at the previous step) $\times 0.42$ for 1 mark

1

(c) **Level 2 (3–4 marks):**

A detailed and coherent explanation is given. Logical links between clearly identified relevant points are made to explain why dandelion growth may be limited.

Level 1 (1–2 marks):

Discrete relevant points are made. The logic may be unclear.

0 marks:

No relevant content

Indicative content

factors that may be considered:

competition for resources including:

- light
- water
- space
- mineral ions (allow nutrients / salts / ions from the soil)

reference to why growth may be limited:

- (light) energy for photosynthesis
- water as a raw material for photosynthesis / support
- surface area exposed to light
- sugar / glucose produced in photosynthesis
- (space) to grow bigger
- (space) for growth of root system
- (mineral ions) for growth
- (mineral ions / sugar) for production of larger molecules **or** named example

4

[10]

8

(a) any **two** from:

- the area of ocean with sea ice has reduced since 1979
 - the amount of ice follows the same pattern during a year
- allow ice reduces in the summer and increases in the winter*
- most ocean with sea ice in February / March
 - least ocean with sea ice in September / October
 - area of ocean with sea ice decreases from March to September each year
 - area of ocean with sea ice increases from September to February / March each year
 - decrease is greater between 1995 and 2016 compared with 1979 to 1995

allow other correct conclusions derived from the graph

2

(b)

Level 3: Relevant points (reasons/causes) are identified, given in detail and logically linked to form a clear account.	5-6
Level 2: Relevant points (reasons/causes) are identified, and there are attempts at logically linking. The resulting account is not fully clear.	3-4
Level 1: 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 <ul style="list-style-type: none">• deforestation has reduced the number of trees on the planet• which has reduced the amount of carbon dioxide that can be removed from the atmosphere• increased combustion releases more carbon dioxide into the atmosphere• therefore there is a build-up of carbon dioxide in the atmosphere• (build up) allows short-wavelength radiation to pass into the Earth's atmosphere• and absorbs long-wavelength• causing an increase in global temperature• the increase in temperature causes ice to melt	

6

[8]

9

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]

10

(a) 6

1

(b) only one species present

1

(c) (abiotic)

any **one** from:

- temperature
- exposure to the air / moisture / water / tides
- waves / wind
- rock type / substrate

1

(biotic)

any **one** from:

- competition
- predators
- food

1

(d) select location for transect at random / to be representative

1

transect / tape measure / line from top of shore / beach to sea

1

counting which species touched transect / regular use of quadrat along transect to count species

ignore repeat unqualified

1

repeat at other locations on same beach/shore

allow repeat at another time of year

or repeat at low / high tide

1

[8]