

# **Environmental and Land Based Science**

General Certificate of Secondary Education

Unit **B681/01/03** Management of the Natural Environment (Foundation Tier)

## **Mark Scheme for June 2012**

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

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For answers marked by levels of response:

- Read through the whole answer from start to finish**
- Decide the level** that **best fits** the answer – match the quality of the answer to the closest level descriptor
- To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

- Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

### Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
<b>not/reject</b>	answers which are not worthy of credit
<b>ignore</b>	statements which are irrelevant - applies to neutral answers
<b>allow/accept</b>	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in scoris to annotate scripts

Annotation	Meaning
	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt
	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

**Subject-specific Marking Instructions**

- a. If a candidate alters his/her response, examiners should accept the alteration.
- b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be worth 1 mark.

- c. The list principle:  
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick boxes:

Always check the additional guidance.

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.

If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.

Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

E.g. If a question requires candidates to identify a city in England, then in the boxes

<b>Edinburgh</b>	
<b>Manchester</b>	
<b>Paris</b>	
<b>Southampton</b>	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

<b>Edinburgh</b>			✓			✓	✓	✓	✓	
<b>Manchester</b>	✓	x	✓	✓	✓				✓	
<b>Paris</b>				✓	✓		✓	✓	✓	
<b>Southampton</b>	✓	x		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

Question		CBT	Answer	Marks	Guidance
1		1	A – be able to choose the most suitable shrubs	1	
2		2	<p>It is easy to see how much work has <input type="checkbox"/></p> <p>been done.</p> <p>Large machines are cheaper to buy. <input type="checkbox"/></p> <p>Less labour is needed. <input checked="" type="checkbox"/></p> <p>More hedges need to be planted. <input type="checkbox"/></p> <p>They get the job done more quickly. <input checked="" type="checkbox"/></p>	2	if 3 responses given – maximum 1 mark
3		3	D – sandy	1	
4		4	D – sand content	1	
5		5	A – fencing off the wall C – keeping machinery off the wall	2	
6	(a)	6	2007 – 17/03 / 17 <sup>th</sup> March 2008 – 14/03 / 14 <sup>th</sup> March	1	
	(b)	7	<p>(no because)</p> <p>data does not show a trend in that direction (owtte) / little difference between dates; and example of one animal where it is earlier; one where it is later;</p> <p>also</p> <p>not enough data with justification;</p> <p><b>OR</b></p> <p>(yes because)</p> <p>in 4 of the 5 cases, they arrive earlier with data provided e.g. earlier in 2011 than in 2007</p>	3	<p>1 mark for” no”, justified in terms of lack of overall pattern/trend</p> <p>2 marks for valid statements relating to the data to support conclusion</p> <p>maximum 2 marks for “yes” with the use of data correctly as justification.</p>

Question		CBT	Answer	Marks	Guidance
	(c)	8	<p><b>any two from:</b> do not rely on one year's data / one species data - take mean (average) data as a guide; do not use because the data shows it is difficult to predict when Spring occurs owtte; the garden may have different dates due to location; only use species as an indication/ look at weather forecast</p>	2	<p><b>allow</b> data relates to animals and gardener is wanting to plant seeds owtte</p> <p><b>allow</b> using frogspawn as a guide (as the first indicator)</p>
7		9	<p><b>any two from:</b> dark green leaves - maximum chlorophyll to absorb light / can photosynthesise at low light levels; able to climb up a tree to get to light (owtte); evergreen to absorb light in winter</p>	2	<p><b>allow</b> spreading habit to catch light <b>allow</b> use of tree to provide support/ support to grow to the light</p>
8	(a)	10	beef because it is the only consumer/animal / others are all producers/plants	1	<b>no marks</b> for beef on its own
	(b)	11	$30/750 \times 100$ = 4 (%)	2	<p>2 marks for correct answer 1 mark for correct working with incorrect answer</p>
	(c)	12	<p><b>any two from:</b> losses due to: death of plants/organisms / parts of plants not eaten so energy unavailable to next level owtte; respiration of organisms transfers energy as heat; inefficiency of processing material by organisms; losses in faeces/urine</p>	2	<p><b>allow</b> produces energy as heat <b>allow</b> reference to energy being used in regular activities</p>
9		13	<p><b>any two from:</b> may increase pests; disease problems; (broader range of plant species) increase risk of hybridisation with the crop; more complex management processes on the farm; more locations for weeds owtte/ competition with weeds at the edges of the field</p>	2	<p><b>allow</b> less land for production <b>allow</b> less profit if justified <b>ignore</b> references to machinery <b>ignore</b> references to the impact of hedges themselves on the growing crop</p>

Question		CBT	Answer	Marks	Guidance																																																					
10	(a)		14	studying the whole hedge would be too costly / take too much time	1	<b>allow:</b> sampling would still give reliable results																																																				
	(b)	(i)	15	insect species / insects more habitats / more plants to feed/live on	1 1																																																					
		(ii)	16	<b>C</b> – RSPB	1																																																					
11	(a)		17	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>J</th> <th>F</th> <th>M</th> <th>A</th> <th>M</th> <th>J</th> <th>J</th> <th>A</th> <th>S</th> <th>O</th> <th>N</th> <th>D</th> </tr> </thead> <tbody> <tr> <td>Nest</td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Feed</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> </tr> <tr> <td>Shrubs</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td>✓</td> <td></td> <td></td> </tr> </tbody> </table>		J	F	M	A	M	J	J	A	S	O	N	D	Nest			✓	✓	✓	✓	✓						Feed								✓	✓	✓	✓	✓	Shrubs						✓	✓	✓	✓	✓			2	all correct in table 2 marks 1 mark if one error made
	J	F	M	A	M	J	J	A	S	O	N	D																																														
Nest			✓	✓	✓	✓	✓																																																			
Feed								✓	✓	✓	✓	✓																																														
Shrubs						✓	✓	✓	✓	✓																																																
	(b)		17	hedge cutting Jan & Feb least impact on other activities or specific examples	1 1	<b>allow</b> ECF from previous question which prevents the naming of two months <b>allow:</b> nothing happening (in the hedge) owtte																																																				

Question	CBT	Answer	Marks	Guidance
12	18	<p><b>[Level 3]</b> Provides a very detailed description of a wide range of environmental impacts with detailed scientific explanations relating to intensive farming practices. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Provides a more detailed description of a limited range of environmental impacts with some simple explanations. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Provides a limited list <u>of changes</u> to the environment but without explanation. Alternatively, the candidate provides information of a specific change which is well explained. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p><b>[Level 0]</b> Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p><b>This question is targeted at grades up to C</b></p> <p><b>Relevant points may include:</b></p> <ul style="list-style-type: none"> <li>• reduction in range of habitats because of loss of hedgerows to create larger fields</li> <li>• potential imbalance in nutrients / nutrient deficiencies due to repetition of the same crop (monoculture)</li> <li>• reduction in biodiversity because range of habitats is reduced, including loss of bird species and pollinators</li> <li>• reduction in biodiversity because of increased use of farm chemicals</li> <li>• potential increase in pests and diseases due to lack of natural predators / high density of food for pests, including species of birds</li> <li>• poorer soil structure due to heavy machines and (possibly) lack of organic matter returning to soil</li> <li>• decrease in numbers of soil organisms due to reduction in level of organic matter and degradation of soil structure</li> <li>• pollution due to high rate of chemical use – pesticides in food chains, eutrophication</li> <li>• ability to devote other areas to nature reserves.</li> </ul> <p><b>accept</b> references to aesthetic changes to landscape requirements for less labour</p> <p><b>accept</b> references to pollution due to machine use</p> <p><b>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</b></p>

Question		CBT	Answer	Marks	Guidance
13	(a)	19	<p><b>[Level 3]</b> Provides detailed reasons for weed control with some scientific explanations related to competition leading to effects on yield and/or practical problems for the gardener. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Provides a limited range of reasons for control of weeds with some simple explanations. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Provides a limited list of reasons for control of weeds but without explanation. Answer may be simplistic. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p><b>[Level 0]</b> Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p><b>This question is targeted at grades up to D</b></p> <p><b>Relevant points may include:</b></p> <ul style="list-style-type: none"> <li>• weeds reduce yield due to competition for <ul style="list-style-type: none"> <li>– light</li> <li>– water</li> <li>– nutrients</li> <li>– space</li> </ul> </li> <li>• explained in terms of photosynthesis, water and nutrients needed for growth</li> <li>• weeds may decrease the value/quality of crop e.g. due to impurities – economic arguments</li> <li>• may harbour pest or disease problems which may affect crop</li> <li>• weeds may tangle up on machines/tools while harvesting.</li> </ul> <p><b>ignore</b> references to the strangulation of plants</p> <p><b>Use the L1, L2, L3 annotations in Scoris; do not use ticks</b></p>
	(b)	20	<p><b>two from:</b> hoeing/ digging/ pulling up; mulching; use of herbicide;</p>	2	<p><b>allow</b> weedkiller as an alternative word for herbicide. <b>ignore</b> the use of the word pesticide, this a too generic term.</p>

Question		CBT	Answer	Marks	Guidance
14		21	<p><b>[Level 3]</b> Provides a detailed description of a wide range of hazards including hazards to the individual and property and/or the environment. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks)</p> <p><b>[Level 2]</b> Provides a detailed description of a range of hazards. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks)</p> <p><b>[Level 1]</b> Provides a list of a limited number of hazards. Answer may be simplistic. Quality of written communication impedes communication of the science at this level. (1 – 2 marks)</p> <p><b>[Level 0]</b> Insufficient or irrelevant science. Answer not worthy of credit. (0 marks)</p>	6	<p><b>This question is targeted at grades up to F</b></p> <p><b>Relevant points may include:</b></p> <ul style="list-style-type: none"> <li>• risk of injury to self from chainsaw - sharp blade / fast moving / chain breaking / kickback / ref. to nails in tree</li> <li>• damage to self from tree - crushing when felled / cut materials could roll and trap person</li> <li>• damage to property due to tree falling</li> <li>• pollution risk while filling chainsaw with fuels/oil</li> <li>• noise and damage to ears</li> <li>• flying splinters and damage to eyes</li> <li>• vibration and 'white finger'</li> <li>• personal risks to operator when refuelling.</li> </ul> <p><b>Use the L1, L2, L3 annotations in Scoris; do not use ticks</b></p>
			<b>Paper Total</b>	<b>50</b>	

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