



*Rewarding Learning*

**General Certificate of Secondary Education  
2016**

---

## **Agriculture and Land Use**

Unit 1  
Soils, Crops and Habitats

**[GAL11]**

**FRIDAY 27 MAY, AFTERNOON**

---

**MARK  
SCHEME**

## General Marking Instructions

### Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

### The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

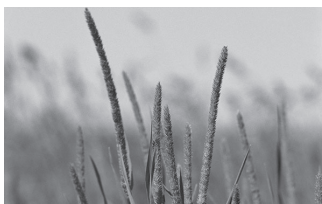
The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.



© Nigel Cattlin / Science Photo Library

scutch grass



© Wolfgang Hoffmann / Science Photo Library

timothy



© vsanderson / iStock / Thinkstock

white clover



© Matt Johnston / Science Photo Library

perennial ryegrass

All 4 correct [3], 2/3 correct [2], 1 correct [1] [3]

(b) (i) greater yield; disease resistance; drought resistance/tolerate wet or cold conditions; better silage/nutrient improvement; more grass per acre Any valid point [2]

(ii) agronomist/plant breeder/crop scientist [1]

6

2 (a) oats/barley/potatoes/maize/wheat/apples/corn [1]

(b) hay/silage/haylage/drying [1]  
Accept bales/silo(pit)/fermentation **not** additives

(c) (i) the amount of grass increases to a maximum during May; and then decreases (to December); [2]

(ii) 30 [1]

(d) (i) Any suitable month from April to August [1]

(ii) highest nutritional level; maximum growth; suitable weather; to allow further cuts in the summer [2]

(iii) docks/creeping buttercup/dandelion/chickweed/thistle/nettle Any valid point [1]

9

			AVAILABLE MARKS	
<b>3</b>	<b>(a)</b>	community of organisms; and their environment (described)	[2]	
	<b>(b)</b>	<b>(i)</b> a non-living factor	[1]	
		<b>(ii)</b> light/rainfall/soil pH/temperature/humidity/drainage/aspect/wind Any valid point	[1]	
		<b>(iii)</b> Measure light using a lux meter or light meter/rainfall using a rainfall gauge/soil pH using a pH probe/temperature using a thermometer;	[1]	
		<b>(iv)</b> repeat measurement (and calculate an average);	[1]	
	<b>(c)</b>	<b>(i)</b> Any <b>two</b> from: <ul style="list-style-type: none"> <li>• early spring growth to get light before trees come into leaf/grow before tree canopy closes/flowers early;</li> <li>• grow at low temperatures;</li> <li>• grow in wet (soil);</li> <li>• like rich soil;</li> <li>• energy store in bulb.</li> </ul>	[2]	
		<b>(ii)</b> DAERA/Forest Service/National Trust/UWT Any valid point	[1]	
		<b>(iii)</b> Any <b>two</b> from: hawthorn/beechn/ash/holly/crab apple/gorse/blackthorn/cherry/oak/hazel/dogrose/guelder rose/rowan	[2]	11
<b>4</b>	<b>(a)</b>	<b>(i)</b> carbon dioxide; oxygen	[2]	
		<b>(ii)</b> sun/light	[1]	
	<b>(b)</b>	<b>(i)</b> <b>X</b> placed on green part of the leaf	[1]	
		<b>(ii)</b> <ul style="list-style-type: none"> <li>• chlorophyll is green/chlorophyll not present;</li> <li>• (no chlorophyll) no photosynthesis.</li> </ul>	[2]	6
<b>5</b>	<b>(a)</b>	to make proteins; for growth	[2]	
	<b>(b)</b>	<b>(i)</b> <b>A</b> Nitrogen fixation <b>B</b> Nitrification <b>C</b> Denitrification	[3]	
		<b>(ii)</b> bacteria	[1]	
		<b>(iii)</b> reduces level of nitrates in the soil;	[1]	7

## 6 Crop production

- More soil erosion;
- Floods damage crops;
- More pests/diseases;
- Less yield explained;
- More yield explained;
- Wider range of crops grown;
- Difficult in harvesting/planting;

### Weather pattern

- Warmer winters;
- Wetter winters;
- Summer rainfall reduced (more intense rainfall)/more drought;
- More extreme/unsettled weather;
- Warmer summers;

### 'Reducing risk of flooding'

- Plough across the gradient of the ground (rather than up and down to slow water runoff);
- Create areas which are allowed to flood;
- Do not overstock ground to help prevent soil erosion;
- Water harvesting/on farm storage, e.g. reservoirs/dams;
- No drainage of upland areas;
- Cleaning of rivers in **lowland** areas/**downstream**;
- Maintain hedges/plant trees;
- Don't leave ground bare;

Or any other acceptable answer.

Band	Response	Mark
3	<p>Candidate shows detailed and comprehensive knowledge including at least 2 effects of climate change in NI on crop production, at least 2 effects of climate change on weather patterns and gives at least 1 method of reducing the risk of flooding downstream.</p> <p>Quality of written communication is excellent. Relevant material is organised with a high degree of clarity and coherence. Presentation, spelling, punctuation and grammar are of a high standard with appropriate use being made of specialist vocabulary.</p>	[7]–[9]
2	<p>Candidate shows an adequate knowledge of at least 2 effects of climate change in NI on crop production, at least 1 weather pattern.</p> <p>Quality of written communication is good. Relevant material is organised with some clarity and coherence. Presentation, spelling, punctuation and grammar are of a reasonable standard to make meaning evident. There is some use of specialist vocabulary.</p>	[4]–[6]
1	<p>General statements about the effects of climate change in N.I.</p> <p>Quality of written communication is basic. The organisation of material may lack clarity and coherence. Presentation, spelling, punctuation and grammar are at a basic level with little use of appropriate specialist vocabulary.</p>	[1]–[3]
	No creditable comments.	[0]

[9]

9

			AVAILABLE MARKS			
7	(a) (i)	increases yield/valid comparison; by 3 tonnes/correct reference;	[2]	10		
		(ii) 12.5 – 7.5 [1] (5 × 50 tonnes) = 250 [1] tonnes [1]	[3]			
	(iii)	it has other nutrients in it; organic matter increased; structure of soil improved; less runoff/leaching; slower release;	[1]			
	(iv)	Any <b>two</b> from: <ul style="list-style-type: none"> <li>• known nutrient content applied</li> <li>• easier to transport/spread</li> <li>• there is no smell/no residue so grazing can take place quicker</li> <li>• easier to store</li> </ul> Any valid point	[2]			
	(b)	(i)	reduces waste to landfill/reduces need for artificial fertiliser production/can hold more water/can hold more nutrients/improve soil structure		[1]	
		(ii)	no need to buy fertiliser/no cost for disposal of plant waste		[1]	
8	(a)	<ul style="list-style-type: none"> <li>• pollen tube/grows (down to ovule);</li> <li>• male gamete/nucleus travels down (pollen) tube;</li> <li>• the male gametes/nuclei and the female gametes/nuclei/ovule;</li> <li>• join/fuse;</li> <li>• forms seed.</li> </ul>	[4]	8		
		(b)	less pollination; less yield/profit		[2]	
		(c)	(i)		wind	[1]
			(ii)		grasses/hazel/plantain/wheat/barley/maize Any valid point	[1]

## 9 Indicative Content

**Equipment;** any **three** from;

Soil sample, Bunsen burner, crucible, tripod, tongs, pipe clay triangle, balance, safety goggles, heatproof mat, oven

**Method of drying soil;**

- Weigh (and record) dry soil sample;
- Heat strongly/burn/temperature over 400 °C;
- to constant mass;
- record final mass of soil sample;
- find difference in mass;
- repeat for reliability;
- safety mark (allow goggles)

**Calculation:**  $\frac{\text{Difference in mass}}{\text{Original mass}} \times 100 = \% \text{ organic matter};$

Band	Response	Mark
3	<p>Candidate shows detailed and comprehensive knowledge of the method to find the percentage organic matter in a dry soil sample by listing at least 2 pieces of relevant equipment, set out at least 2 steps of the method in an organised way and show how they would use their results to calculate percentage organic matter content.</p> <p>Quality of written communication is excellent. Relevant material is organised with a high degree of clarity and coherence. Presentation, spelling, punctuation and grammar are of a high standard with appropriate use being made of specialist vocabulary.</p>	[7]–[9]
2	<p>Candidate shows an adequate knowledge of the method of how to find the percentage organic matter in a soil sample by listing at least <b>1 piece equipment</b>, at least 1 step for the method and attempt to show how to calculate organic matter content</p> <p>Quality of written communication is good. Relevant material is organised with some clarity and coherence. Presentation, spelling, punctuation and grammar are of a reasonable standard to make meaning evident. There is some use of specialist vocabulary.</p>	[4]–[6]
1	<p>General statements about the method of how to find the organic matter content in a soil sample</p> <p>Quality of written communication is basic. The organisation of material may lack clarity and coherence. Presentation, spelling, punctuation and grammar are at a basic level with little use of appropriate specialist vocabulary.</p>	[1]–[3]
	No creditable comments	[0]

[9]

**Total**

AVAILABLE  
MARKS

9

**75**