



Rewarding Learning

**General Certificate of Secondary Education
2014**

Agriculture and Land Use

Unit 1

Soils, Crops and Habitats

[GAL11]

MONDAY 2 JUNE, 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.

1 (a)



wheat

maize



potato



clover

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[1] for each correct answer

[3]

(b) chickweed, dandelion

[2]

AVAILABLE MARKS

5

			AVAILABLE MARKS
2	(a) (i)	Place where a living organism lives (or implied) Do not accept: home	[1]
	(ii)	Any four from: <ul style="list-style-type: none"> • Divide area into grid • Random sampling • Use quadrats • Reference to representative sampling • Count the number of different species in each quadrat • Calculate the average number of species sampled • Use of key/how they will identify species 	[4]
	(b) (i)	Number of different species in a (specific) habitat or area . (Need both)	[1]
	(ii)	Plant hedges Prevent soil erosion Protect plant species	[3]
	(iii)	Any two from: <ul style="list-style-type: none"> • Potential medicines/insecticides/fungicide • Food/materials source/food chain • Insect pollination to sustain plant species • Ecotourism • Financial reward • Prevent extinction/protect priority species • Alternative valid response Not increasing number of species	[2]
	(c) (i)	protection/restoration/promote biodiversity of the natural environment/natural ecosystems/vegetation/wildlife Not conserving on its own	[1]
	(ii)	Any two from: <ul style="list-style-type: none"> • Environmental impact assessments • Training/Advice to community groups/planners/school groups • Ecological surveys/scientific observation/collecting data • Creating habitats/sites • Activities that would promote sustainability to the general public • Creating/maintaining IT databases of species • Planting • Clearing/clean up • Alternative valid responses 	[2]
			14

- 3 (a) (i) yellowhammer/Irish hare/red squirrel/lapwing/barn owl/
marsh fritillary butterfly
Accept alternative valid responses [1]
- (ii) wetland [1]
- (b) (i) The curlew population at Lough Neagh has **decreased** from 1950 to 1995 as more mechanised farming was developed. Government regulations help to control the use of fertiliser on farms. Therefore, there is less water **pollution**. Since 1995, the curlew population at Lough Neagh has **increased** because Lough Neagh became an Area of Special Scientific Interest (ASSI). [3]
- (ii) The population in 2010 was still lower than in 1950. [1]
- (c) Any **two** from:
- Increases population
 - Reduces damage to habitats/protects habitats
 - Promotes biodiversity
 - Habitat creation
 - Promotes environmentally friendly farming practices/specific example
 - Improved data collection/monitoring, e.g. statutory body governance
- Accept alternative valid response
- Not** counting [2]

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4	<p>(a) DNA genes transferred; from one species to another</p> <p>(b) GM crops increasing/non-GM crops decreasing</p> <p>(c) (i) Advantages: herbicide tolerance/resistant to disease/enhanced nutritional benefits/pest resistant/increased yield/increased tolerance of different conditions or climate</p> <p>(ii) Disadvantages: gene transfer to non-GM species/affects wildlife and plant diversity/possible allergies/cost of seeds/long term effects unknown/public perception can be negative/cost of specific input/could lead to (super) weeds resistant to herbicide/(super) pests resistant to pesticide</p> <p>(d) Weather use of greenhouses/polytunnel; to increase temperature/control environment/protect from wind or frost;</p> <p>use of protected cropping, e.g. maize under plastic; to increase temperature/protect from early frost;</p> <p>digging drainage channels; to protect fields from flooding;</p> <p>irrigation; to water crops in dry weather;</p> <p>selective breeding/selection of plants; drought resistant/thrive in wet conditions.</p> <p>Pests and diseases use of pesticide/herbicide; to reduce crop losses;</p> <p>crop rotation; breaks the cycle of disease;</p> <p>biological controls; to remove harmful pests (or described);</p> <p>scarecrow/bangers; keeps birds away;</p> <p>selective breeding/selection of plants; which are resistant to blight/other example of disease/pest.</p> <p>Accept other valid responses</p>	<p>[2]</p> <p>[1]</p> <p>[1]</p> <p>[1]</p> <p>[2]</p> <p>[2]</p>
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AVAILABLE MARKS
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5 Indicative content may include some of the following statements:

Production

- soil preparation/sowing seed
- variety of grass/crop
- fertilisers/slurry/manure spreading
- fencing off
- length of time between application of fertiliser and harvest/no residues of fertiliser
- soil sampling so appropriate fertilisers applied
- herbicide spraying

Harvesting

- timing/stage of growth
- weather
- mow down/cutting grass
- methods – self-propelled/precision chop/kemper header (for maize)
- put into rows (grass)
- wilt (grass)
- time of day
- length of cut
- take 2 plus cuts per year

Preservation

- additives/molasses
- in pit – rolled correctly/compacted/make anaerobic/remove air

Storage

- pit – cover with plastic – tyres
- bales – keep birds away
- anaerobic fermentation
- effluent containment

Band	Response	Mark
3	Candidates demonstrate a detailed and comprehensive knowledge and understanding of the process of silage making and present detailed methods on how farmers can achieve the best quality silage with maximum yield. Candidates include details on the production, harvesting and preservation of silage and demonstrate how entire process affects the quality of silage and yield (must discuss quality and yield to reach Band 3). 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.	[7]–[9]
2	Candidates demonstrate an adequate knowledge of the process of silage making and show their understanding that the quality and yield of silage can vary. Candidates include details on some of: production, harvesting, preservation and storage, but not all. 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 appropriate specialist vocabulary.	[4]–[6]
1	Candidates make general statements linked to the process of silage making and comment vaguely on quality and yield. They are not able to include details on production, harvesting, preservation or storage. 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.	[1]–[3]
	No creditable comments	[0]

			AVAILABLE MARKS
6	<p>(a) polytunnel/plastic mulch Accept: greenhouse</p>	[1]	8
	<p>(b) expensive; due to set-up costs/materials/labour;</p> <p>limited production capacity; due to expensive set-up costs/area available/cannot cover large areas</p> <p>more vulnerable to pests/diseases/fungus; due to controlled environment/heat/damp/lack of ventilation/crowding.</p> <p>Disadvantage must be linked to appropriate explanation</p>	[2]	
	<p>(c) (i) Two of: Potassium; phosphorus; magnesium; calcium Accept symbols Accept alternative valid responses</p>	[2]	
	<p>(ii) Any two from:</p> <ul style="list-style-type: none"> • (nitrogen is in all) proteins/amino acids • nitrogen/protein is needed for (normal) growth • nitrogen/protein is used for repair 	[2]	
	<p>(d) acts as a fertiliser/reduces waste/increase organic matter of soil</p>	[1]	
7	<p>(a) (i) Any two from:</p> <ul style="list-style-type: none"> • Colourful petals/attracts the insect • Nectar produced at the base of the flower • Pollen from other flowers is left • Position of anther means insects must brush against it going to nectary • Anther inside flower <p>Not scent Not sticky pollen Answer must use diagram</p>	[2]	
	<p>(ii) Any appropriate insect Do not accept bee/honey bee</p>	[1]	
	<p>(b) (2) <u>1</u> <u>4</u> <u>3</u></p>	[1]	
	<p>(c) Not using (certain) pesticides on land/more organic farming/more mixed farming/keeping colonies of bees/creating suitable habitats/planting wild flowers Accept alternative valid response</p>	[1]	

- 8 (a) (i) carbon dioxide + water + light energy → glucose + oxygen [2]
- (ii) leaves/leaf cells/chloroplasts
Accept stems [1]
- (b) Any two from:
 • oxygen production
 • rainforests are carbon dioxide absorbers/sink
 • rainforests release moisture to atmosphere
 • wildlife habitat/biodiversity [2]
- (c) • the number of bubbles given off/volume decreases with distance/allow
 converse
 • reduced photosynthesis/allow converse
 • any valid reference to data in table
 Accept correct reference to light intensity [3]

AVAILABLE
MARKS

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9 Indicative content may include some of the following statements:

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Acceptable environment impacts for any source:

- Reduced fossil fuel usage.
- No air pollution/lowers air pollution.
- Reduces carbon footprint.

Biomass:

- Competition with crops for land resource.
- Plant/animal waste used as energy source.
- Reference to anaerobic digestion.
- Oil production from rape seed/can be used as a fuel in diesel engines.
- Low environmental impact on wildlife/soils and area.
- Growing grass/willow or other appropriate crop.
- Cheap and readily available.
- If replaced, it can be a long term, sustainable solution.
- Grants available for growing willow.
- When burned it gives off atmospheric pollutants, including greenhouse gases.
- Only renewable if crops are replanted.
- No/limited income while crops are re-growing.
- Wide range of suitable locations.
- Reference to efficiency.

Tidal:

- Main sea lough that could be used is Lough Foyle/Strangford Lough.
- Problems with impact on wildlife.
- Ideal for islands.
- Potential to generate a lot of energy.
- Tidal barrage can double as a bridge and help prevent flooding.
- In future underwater turbines may be possible out to sea, and without dams.
- Construction of barrage is costly/maintenance of barrage is costly.
- Only a few estuaries are suitable.
- May reduce tidal flow and impede flow of sewage out to sea.
- Correct reference to efficiency.

Sun:

- Solar panels/solar farm.
- Photovoltaic (PV) panels. Alternative valid response.
- Grants available.
- Efficiency varies/dependant on facing direction of building/time of day.
- Expensive to set up.
- Low environmental impact.

Wind:

- Turbines/wind farm.
- Expensive to set up/maintenance cost.
- Grants available.
- Public objection/visual impact/sound pollution.
- Can kill birds.
- Turbines can be found singularly or together in wind farms.
- Accept positive comments on environmental impact.
- Efficiency dependant on location/wind speed/reliability.

Hydro-electric:

- Allow description of small scale through to reservoir sized project.
- Very expensive set up/maintenance.
- Difficult to find suitable sites.
- Flood an area/impact on habitats.
- Environmental issues such as sediment/impact on fish life cycle.
- Efficiency depends on speed/flow/volume of water.
- Example of site location.

Band	Response	Mark
3	<p>Candidates demonstrate a detailed and comprehensive knowledge and understanding of two sources of renewable energy which can be used effectively in NI. They evaluate the suitability of both sources by considering possible location, cost, efficiency and environmental impact.</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>Candidates demonstrate an adequate knowledge of two different sources of renewable energy and show their understanding of which would be most useful in NI with general statements. This evaluation does not cover possible location, cost, efficiency and environmental impact for both renewable energy sources.</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 appropriate specialist vocabulary.</p>	[4]–[6]
1	<p>General statements with no evaluation of renewable energy.</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]

Total**AVAILABLE
MARKS**

9

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