



*Rewarding Learning*

**General Certificate of Secondary Education  
2012–2013**

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**Double Award Science: Biology**

Unit B1

Higher Tier

**[GSD12]**

**TUESDAY 14 MAY 2013, MORNING**

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**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.

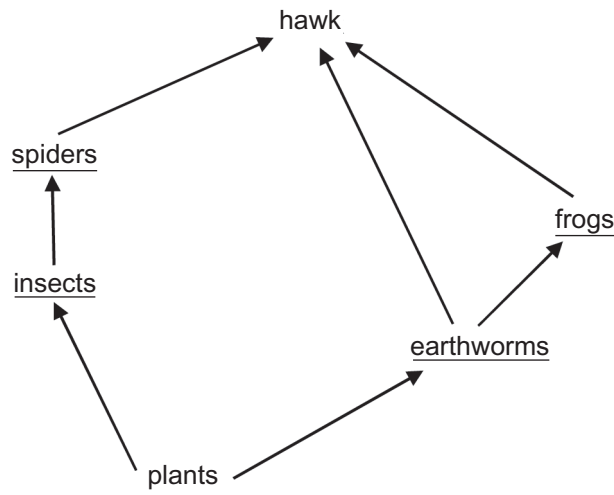
The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

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 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.

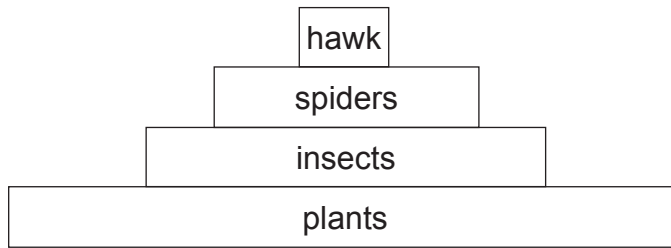
1 (a)



1 mark for all 7 links;  
1 mark for arrows correct direction from plants;  
2 marks for organisms correct  
plants bottom and hawk at top [1]  
earthworms on right and spiders on left [1]

[4]

(b)



plants at the bottom;  
insects, spiders and hawks in correct order;  
correct shape

[3]

(c) (i)  $10\,000 \times 20/100 = 2000$ ; (1 for correct method)  
 $2000 \times 20/100 = 400$ ;

[2]

(ii) movement/reproduction/excretion respiration (or heat)

[1]

(iii) less steps  
less trophic levels  
less energy lost because less trophic levels

[1]

AVAILABLE  
MARKS

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- 2 (a) (i) in the blood/plasma/bloodstream [1]
- (ii) lowered/reduced/decreases [1]
- (iii) Any two from
- more respiration of glucose;
  - faster uptake of glucose
  - glucose converted to (or stored as) glycogen;
  - glucose converted to (or stored as) fat [2]
- (b) Any two from
- convert glycogen to glucose;
  - convert fat to glucose;
  - less respiration of glucose;
  - less uptake of glucose by liver;
  - (more) glucose released to blood; [2]
- (c) (i) lock and key [1]
- (ii) enzyme will only react when glucose is present/  
enzyme specific to glucose [1]
- (iii) more enzyme molecules/more glucose react the darker the colour  
intensity or strength of colour  
dye becomes darker, more glucose  
more glucose changes quicker [1]
- 3 (a) (i) ● more greenhouse gasses;  
● radiation trapped/more rays trapped;  
● earth's atmosphere warms up/earth's temp increase [2]
- (ii) more storms/changing weather conditions/coastal flooding sea  
levels rising/polar ice melting/climate change/desertification [1]
- (b) emissions up, emissions down; [1]  
up until 2007/up to max 135/  
2009 level is lower than 2003 [1]
- (c)  $93 + 2 + 2 = 97\%$ ;  $100 - 97 = 3\%$ ;  
railways + shipping = 3% railways twice shipping railways 2% [3]
- (d) (i) use public transport/use railway/more efficient engines/hybrid or  
electric cars/walk/cycle/drive more economically/car pool [1]
- (ii) electricity generation/(domestic) heating/agriculture (animals)  
factories/industry/waste management  
burning fossil fuels/landfill [1]

AVAILABLE  
MARKS

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4 (a) (i) **Indicative Content:**

- A ● Use the same amount of fruit pulp
- B ● Add no pectinase (control)
- C ● Add pectinase to other
- D ● Stir/mix pectinase with fruit pulp
- E ● Put pulp/mixture in funnel/into filter
- F ● Measure the time taken to produce a certain volume of fruit juice/how much produced in a certain time
- G ● Repeat for reliability/repeat expts
- H ● Keep temperature/pH same/same thickness of filter paper  
do both expts at same time/same size funnel/same mixing or stirring

Response	Mark
Candidates use appropriate terms throughout and give at least five points from the indicative content to describe how to carry out an investigation to see how quickly fruit juice is released from fruit pulp with and without pectinase. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5–6]
Candidates use some appropriate terms throughout to partially describe how to carry out an investigation to see how quickly fruit juice is released from fruit pulp with and without pectinase. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3–4]
Candidates give one or two points and partially describe how to carry out an investigation to see how quickly fruit juice is released from fruit pulp with and without pectinase. They use limited spelling, punctuation or grammar skills.	[1–2]
Response not worthy of credit.	[0]

[6]

(ii) temperature/pH/stirring/amount or conc. pectinase [1]

(iii) washing powders/other commercial uses [1]

			AVAILABLE MARKS	
	(b) (i)	protease/peptidases/pepsin; molecules separate; all three different types (amino acids allowed for 1 mark)	[3]	15
	(ii)	stomach and small intestine 1 mark each ileum or duodenum (as alt. for s. intestine)	[2]	
	(iii)	small intestine/ileum/at villi	[1]	
	(iv)	(presence of) villi/large surface area/thin (epithelium)/ permeable (walls)/good blood supply/presence of lacteals	[1]	
5	(a)	950–999 ppm; increases yield by quarter or 25%/yield 125%; any higher causes health problems	[3]	5
	(b)	temperature/light/protection from weather e.g. frost/minerals/water/ sun/fertiliser	[1]	
	(c)	cost of adding carbon dioxide/fuel/heating/greenhouse/lighting/ fertiliser/how much profit	[1]	
6	(a) (i)	large surface area/thin/permeable/good blood supply/presence at alveoli/moist/short diffusion distance	[1]	9
	(ii)	diffusion gradient/conc. gradient	[1]	
	(b) (i)	photosynthesis	[1]	
	(ii)	any two from <ul style="list-style-type: none"> <li>● thin (cell wall);</li> <li>● large surface area</li> <li>● layer of moisture</li> <li>● permeable</li> </ul>	[2]	
	(c) (i)	glucose; alcohol + carbon dioxide (need both) [1]	[2]	
	(ii)	<ul style="list-style-type: none"> <li>● increased enzyme activity</li> <li>● <u>more</u> carbon dioxide</li> </ul>	[2]	

**7 (a) Indicative Content:**

- A ● Nitrates are the only form of nitrogen plants can absorb
- B ● Nitrates used to produce proteins/growth in plants
- C ● Ploughing increases the nitrogen fixing/nitrifying bacteria in the soil
- D ● Nitrogen fixing bacteria produce nitrates (from Nitrogen)
- E ● Ploughing peas/beans increases material for decay/compost
- F ● Nitrifying bacteria turn ammonia into nitrates
- G ● (Ploughing aerates the soil) therefore less denitrifying bacteria/denitrification
- H ● Ploughing increases (rate of) nitrification/N-fixing
- I ● (Ploughing aerates the soil) – rate of active transport increases in roots
- J ● Farmer needs to use less fertiliser/manure
- K ● Economic – buy less fertiliser  
– save time on spreading fertiliser

Response	Mark
Candidates use appropriate terms throughout and give at least five points from the indicative content to describe and explain the advantages of crop rotation. They use good spelling, punctuation and grammar skills. Form and style are of a high standard.	[5–6]
Candidates use some appropriate terms throughout and give 3 or 4 points to describe or explain the advantages of crop rotation. They use satisfactory spelling, punctuation and grammar. Form and style are of a satisfactory standard.	[3–4]
Candidates give one or two points and partially describe or explain the advantages of crop rotation. They use limited spelling, punctuation or grammar skills.	[1–2]
Response not worthy of credit.	[0]

[6]

**(b) (i)** less run off/less fertiliser into stream [1]

**(ii)** Any 3 from [3]

- plants/algae die;
- decomposition of plants/algae;
- by bacteria/microbes/microorganisms;
- bacteria use up oxygen

**(iii)** die/decrease in numbers/population declines/suffocate  
decline in biodiversity/oxygen starved [1]

**Total**

11

**70**

**AVAILABLE  
MARKS**