



**General Certificate of Secondary
Education**

**Additional Science 4463 /
Biology 4411**

BLY2F

Unit Biology 2

Mark Scheme

2012 examination – January series

Mark schemes are prepared by the Principal Examiner and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation meeting attended by all examiners and is the scheme which was used by them in this examination. The standardisation meeting ensures that the mark scheme covers the students' responses to questions and that every examiner understands and applies it in the same correct way. As preparation for the standardisation meeting each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed at the meeting and legislated for. If, after this meeting, examiners encounter unusual answers which have not been discussed at the meeting they are required to refer these to the Principal Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

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MARK SCHEME

Information to Examiners

1. General

The mark scheme for each question shows:

- the marks available for each part of the question
- the total marks available for the question
- the typical answer or answers which are expected
- extra information to help the Examiner make his or her judgement and help to delineate what is acceptable or not worthy of credit or, in discursive answers, to give an overview of the area in which a mark or marks may be awarded.

The extra information is aligned to the appropriate answer in the left-hand part of the mark scheme and should only be applied to that item in the mark scheme.

At the beginning of a part of a question a reminder may be given, for example: where consequential marking needs to be considered in a calculation; or the answer may be on the diagram or at a different place on the script.

In general the right hand side of the mark scheme is there to provide those extra details which confuse the main part of the mark scheme yet may be helpful in ensuring that marking is straightforward and consistent.

2. Emboldening

- 2.1** In a list of acceptable answers where more than one mark is available ‘any **two** from’ is used, with the number of marks emboldened. Each of the following lines is a potential mark.
- 2.2** A bold **and** is used to indicate that both parts of the answer are required to award the mark.
- 2.3** Alternative answers acceptable for a mark are indicated by the use of **or**. (Different terms in the mark scheme are shown by a / ; eg allow smooth / free movement.)

3. Marking points

3.1 Marking of lists

This applies to questions requiring a set number of responses, but for which students have provided extra responses. The general principle to be followed in such a situation is that ‘right + wrong = wrong’.

Each error/contradiction negates each correct response. So, if the number of error/contradictions equals or exceeds the number of marks available for the question, no marks can be awarded.

However, responses considered to be neutral (indicated as * in example 1) are not penalised.

Example 1: What is the pH of an acidic solution? (1 mark)

Student	Response	Marks awarded
1	4,8	0
2	green, 5	0
3	red*, 5	1
4	red*, 8	0

Example 2: Name two planets in the solar system. (2 marks)

Student	Response	Marks awarded
1	Pluto, Mars, Moon	1
2	Pluto, Sun, Mars, Moon	0

3.2 Use of chemical symbols / formulae

If a student writes a chemical symbol / formula instead of a required chemical name, full credit can be given if the symbol / formula is correct and if, in the context of the question, such action is appropriate.

3.3 Marking procedure for calculations

Full marks can be given for a correct numerical answer, as shown in the column 'answers', without any working shown.

However if the answer is incorrect, mark(s) can be gained by correct substitution / working and this is shown in the 'extra information' column;

3.4 Interpretation of 'it'

Answers using the word 'it' should be given credit only if it is clear that the 'it' refers to the correct subject.

3.5 Errors carried forward

Any error in the answers to a structured question should be penalised once only.

Papers should be constructed in such a way that the number of times errors can be carried forward are kept to a minimum. Allowances for errors carried forward are most likely to be restricted to calculation questions and should be shown by the abbreviation e.c.f. in the marking scheme.

3.6 Phonetic spelling

The phonetic spelling of correct scientific terminology should be credited **unless** there is a possible confusion with another technical term.

3.7 Brackets

(.....) are used to indicate information which is not essential for the mark to be awarded but is included to help the examiner identify the sense of the answer required.

BLY2F**Question 1**

question	answers	extra information	mark
1(a)	B		1
1(b)	D		1
1(c)	A		1
Total			3


BLY2F**Question 2**

question	answers	extra information	mark
2(a)	3 (.0)	correct answer, irrespective of working gains 2 marks. if the answer is incorrect or there is no answer, award 1 mark for use of correct figures (0.5 and 3.5) [and no other figures]	2
2(b)	as faeces	if more than two boxes ticked deduct 1 mark for each additional tick	1
	as carbon dioxide from respiration		1
2(c)(i)	pigs kept inside are kept in small pens	if more than two boxes ticked deduct 1 mark for each additional tick	1
	pigs kept inside are kept warm in the winter		1
2(c)(ii)	any one from: <ul style="list-style-type: none"> • faster growth • need less food • ready for market sooner 	ignore bigger / less flavour / fatty ignore references to movement / energy ignore ethical arguments	1
Total			7

BLY2F**Question 3**

question	answers	extra information	mark
3(a)	fuel	allow oxygen allow suitable / relevant types of fuel eg petrol / kerosene / energy / diesel / fossil fuel	1
3(b)(i)	carbon dioxide / CO ₂ / CO2	apply list principle accept carbon monoxide / CO ignore sulfur dioxide	1
3(b)(ii)	air / atmosphere	apply list principle allow environment	1
Total			3

BLY2F**Question 4**

question	answers	extra information	mark
4(a)		the shape must be (roughly) circular and not shaded, for the mark accept the shape drawn in the key if it is not contradictory	1
4(b)	dominant		1
4(c)(i)	a half (50%)		1
4(c)(ii)	Some of B's sperm cells have an X chromosome		1
Total			4

BLY2F**Question 5**

question	answers	extra information	mark
5(a)	water	in this order only	1
	oxygen	accept correct chemical symbols allow H ₂ O / OH ₂	1
5(b)	allow light (in / through) / need light	do not accept attracts light ignore heat / moisture / carbon dioxide ignore so the plants can be seen accept the converse, ie the black plastic bag would not let light in (1)	1
	for photosynthesis / make sugar / glucose	so there would be no photosynthesis (1) do not allow make food unqualified	1
5(c)	Increase (in leaves / new leaves)	ignore growth unqualified	1
	(then) level off or number of (new) leaves (then) stays the same		1
	numerical statement eg max at 3 tablets / 5 (new) leaves	should refer to one of the first two marking points for every extra tablet get 1 extra leaf = 2 marks for every extra tablet get 1 extra leaf then it levels off = 3 marks	1
Total			7

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Question 6

question	answers	extra information	mark
6(a)	can develop into most other types of cell	comparisons are not required but should be credited	1
	each cell divides every 30 minutes	accept a clear indication of the statement even if incomplete	1
	low chance of rejection by the patient's immune system		1
6(b)	any three from: <ul style="list-style-type: none"> • cheaper / <u>only</u> costs £1000 • can collect many (stem) cells • adults give permission for their own bone marrow to be collected • safe 	this must be comparative ignore costs £1000 } <i>comparisons are not required but should be credited</i>	3
Total			6

BLY2F**Question 7**

question	answers	extra information	mark
7	any three from: <ul style="list-style-type: none"> • dead leaves / flowers / bluebells are decayed • idea that microorganisms do the decaying • minerals / ions / nutrients / named <u>released</u> (by decay / microorganisms) • (released) into soil or minerals / ions / nutrients taken up / in by (bluebell) roots (next year) 	ignore references to carbon cycle accept digested / decomposed / broken down / rotted for decay throughout ignore eating accept microbes / bacteria / fungi / mould / decomposers for microorganisms not mineral ions unqualified look for idea that minerals / ions / nutrients are in soil (eg released into soil or taken up from soil)	3
Total			3

BLY2F**Question 8**

question	answers	extra information	mark
8(a)(i)	the lower the temperature the shorter the time or the lower the temperature the more chance of frostbite	a trend is required accept reverse accept the lower the temperature the faster you get frostbite accept positive correlation but not directly proportional ignore wind speed	1
8(a)(ii)	any value from 5 to below 10	do not accept 10 allow less than 10 or < 10	1
8(b)	Muscles 'shiver' Blood vessels supplying the skin capillaries constrict	if more than two boxes ticked deduct 1 mark for each additional tick	1 1
Total			4

Question 9

question	answers	extra information	mark
9(a)	<p>any one from:</p> <ul style="list-style-type: none"> • 20 g (of apple) or (same) mass / amount / weight of apple • crushed (apple) • 10 drops (of solution) or (same) number / amount / volume of drops • apple or type of fruit 	<p>ignore control variables that are not given in the method, such as 'equally crushed' or same time</p> <p>do not accept volume of apple juice</p> <p>ignore volume / size</p> <p>do not accept 10 drops of amylase alone</p> <p>ignore type of apple</p>	1
9(b)	(may) have different volume / amount / sizes	<p>ignore reference to human error</p> <p>ignore don't know / can't measure size of drop</p>	1
9(c)	<p>amylase has no / little effect on cell / walls / apple or amylase does not breakdown / digest cell / walls / apple</p> <p>pectinase breaks down cell / walls / apple</p> <p>boiling breaks down cell / walls / apple</p>	<p>accept ideas that refer to shape of enzyme being 'incorrect'</p> <p>accept amylase <u>only</u> breaks down / digests starch</p> <p>allow digest for breakdown</p> <p>allow shape of pectinase fits cell / walls / apple</p>	<p>1</p> <p>1</p> <p>1</p>
9(d)	<p>11.6</p> <p>enzyme / pectinase destroyed / denatured / damaged / broken down</p> <p>only effect of boiling (relevant)</p>	do not allow kill	<p>1</p> <p>1</p> <p>1</p>
Total			8

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