



**General Certificate of Secondary  
Education**

**Science A 4405 / Biology 4401**

**BL1FP            Unit Biology 1**

**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.

## **Quality of Written Communication and levels marking**

In Question 7(b) students are required to produce extended written material in English, and will be assessed on the quality of their written communication as well as the standard of the scientific response.

Students will be required to:

- use good English
- organise information clearly
- use specialist vocabulary where appropriate.

The following general criteria should be used to assign marks to a level:

### **Level 1: Basic**

- Knowledge of basic information
- Simple understanding
- The answer is poorly organised, with almost no specialist terms and their use demonstrating a general lack of understanding of their meaning, little or no detail
- The spelling, punctuation and grammar are very weak.

### **Level 2: Clear**

- Knowledge of accurate information
- Clear understanding
- The answer has some structure and organisation, use of specialist terms has been attempted but not always accurately, some detail is given
- There is reasonable accuracy in spelling, punctuation and grammar, although there may still be some errors.

### **Level 3: Detailed**

- Knowledge of accurate information appropriately contextualised
- Detailed understanding, supported by relevant evidence and examples
- Answer is coherent and in an organised, logical sequence, containing a wide range of appropriate or relevant specialist terms used accurately.
- The answer shows almost faultless spelling, punctuation and grammar.

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**BL1FP****Question 1**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>1(a)</b>	C		<b>1</b>
<b>1(b)</b>	B		<b>1</b>
<b>1(c)</b>	E		<b>1</b>
<b>1(d)</b>	D		<b>1</b>
<b>1(e)</b>	F		<b>1</b>
<b>Total</b>			<b>5</b>

**BL1FP****Question 2**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>2(a)</b>	diagram to show root growing down	allow single lines <b>or</b> not attached <b>or</b> open ends for both marks  all branches must go down	1
	diagram to show shoot growing up	all branches must go up	1
<b>2(b)</b>	gravity		1
<b>2(c)</b>	Auxin		1
<b>2(d)(i)</b>	rooting / cuttings	accept other suggestions, eg fruit set / ripening  do <b>not</b> accept weed killers	1
<b>2(d)(ii)</b>	any <b>three</b> from: <ul style="list-style-type: none"> <li>• light</li> <li>• water / moisture</li> <li>• nutrients / ions / minerals</li> <li>• space / area</li> </ul>	ignore sun / energy  accept one named mineral ignore nutrition / food  ignore soil / land / territory / volume ignore reference to gases	3
<b>Total</b>			<b>8</b>

**BL1FP****Question 3**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>3(a)</b>	lemur(s)		1
<b>3(b)</b>	gorilla(s)	in either order	1
	chimpanzee(s)	accept chimps	1
<b>3(c)(i)</b>	(Charles) Darwin	accept (Alfred) Wallace  if first name given it must be correct	1
<b>3(c)(ii)</b>	variation	in this order	1
	environment	allow phonetic spellings	1
	survive		1
	generation		1
<b>Total</b>			<b>8</b>



**BL1FP****Question 4**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>4(a)(i)</b>	251.2	award <b>2</b> marks for correct answer, irrespective of working.  if incorrect or no answer $62.8 \times 4$ or equivalent gains <b>1</b> mark	<b>2</b>
<b>4(a)(ii)</b>	31.2	allow ecf from (a)(i); answer to (a)(i) – 220	<b>1</b>
<b>4(b)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• overweight / obesity <b>or</b> increased BMI</li> <li>• (Type 2) diabetes</li> <li>• high blood pressure</li> <li>• cardiovascular / heart disease <b>or</b> heart problems <b>or</b> disease of blood vessels <b>or</b> clogged arteries</li> <li>• high cholesterol</li> <li>• arthritis / worn joints</li> <li>• tooth decay</li> </ul>	allow get fat ignore get heavier  allow high blood sugar	<b>2</b>
<b>Total</b>			<b>5</b>

## BL1FP

## Question 5

question	answers	extra information	mark
5(a)(i)	(compost produced) quicker / faster / takes less time	it = tumbler bin  answers should be comparative eg <b>only</b> 6 weeks = 1 mark 6 weeks = 0 marks	1
5(a)(ii)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• takes less space</li> <li>• cheaper (to buy)</li> <li>• don't need to turn / rotate it</li> </ul>	it = fixed bin  references to space and cost should be comparative  do <b>not</b> accept unqualified data	2
5(b)(i)	any <b>two</b> from: <ul style="list-style-type: none"> <li>• faster rise (in tumbler)</li> <li>• higher (in tumbler) <b>or</b> 2 correct number readings</li> <li>• levels off (in tumbler) <b>or</b> continues to rise in fixed</li> </ul>	it = tumbler bin ignore eg faster compost	2
5(b)(ii)	microorganisms / microbes / decomposers	allow bacteria / fungi / detritus feeders / worms / other named examples of detritus feeders / mould	1
	aerobic	allow air(y) allow oxygen(ated)	1

Question 5 continues on the next page . . .

**BL1FP****Question 5 continued**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>5(b)(iii)</b>	faster respiration / decay / <b>or</b> microorganisms / microbes / decomposers work faster (in tumbler)	allow converse allow bacteria / fungi / mould	1
	so more heat produced (in tumbler)  <b>OR</b>  more air / more oxygen(ation) (in tumbler) (1)  so more respiration / faster decay / bacteria work faster (in tumbler) (1)	ignore heat produced by friction	1
<b>Total</b>			<b>9</b>

## BL1FP

## Question 6

question	answers	extra information	mark
6(a)(i)	addictive	allow addicting / addict / addicted / addiction or similar  allow phonetic spelling do <b>not</b> accept / additive / addition	1
6(a)(ii)	junction / gap / space between neurones	allow nerve cells / nerves for neurones  allow idea where neurones / nerve cells / nerves meet / join	1
6(b)(i)	tablet with no drug	accept answers that convey this idea eg fake / dummy / sugar pill  allow injection with no drug  ignore drugs that don't work.	1
6(b)(ii)	for comparison	accept to see if drug / it works  allow to see psychological effect <b>or</b> make sure, it is not all in the mind  allow as a control  ignore 'to make test fair / unbiased'	1
6(b)(iii)	Neither doctors nor volunteers		1

Question 6 continues on the next page . . .

**BL1FP****Question 6 continued**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>6(b)(iv)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• age (range)</li> <li>• sex / gender (mix)</li> <li>• previous smoking habits <b>or</b> eg number smoked (before trial) <b>or</b> length of time smoked</li> <li>• number in the group</li> <li>• other drugs being taken <b>or</b> general health <b>or</b> height / weight / BMI / lifestyle / fitness</li> </ul>	ignore factors already controlled  ignore reference to all smokers <b>or</b> all want to give up	<b>2</b>
<b>6(c)</b>	higher percentage / number of smokers who had stopped smoking (than Drug B)	answers must refer to data and be comparative  allow best results / most effective  ignore best drug unqualified  ignore references to 12 weeks / 1 year	<b>1</b>
<b>Total</b>			<b>8</b>

**BL1FP****Question 7**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>7(a)(i)</b>	fusion / joining / combining of gametes / egg <b>and</b> sperm / sex cells	accept fertilisation  allow fusion / joining / combining DNA from two parents  ignore meeting / coming together / mixing of gametes etc	1
<b>7(a)(ii)</b>	(mixture of) genes / DNA / genetic information / chromosomes	ignore nucleus / inherited information but allow second mark if given	1
	from both parents / horse <b>and</b> zebra	dependent on sensible attempt at 1 <sup>st</sup> mark	1

**Question 7 continues on the next page ...**

**BL1FP****Question 7 continued**

<b>7(b)</b>	Marks awarded for this answer will be determined by the Quality of Written Communication (QWC) as well as the standard of the scientific response. Examiners should also refer to the information on page 2, and apply a 'best-fit' approach to the marking.		
<b>0 marks</b>	<b>Level 1 (1–2 marks)</b>	<b>Level 2 (3–4 marks)</b>	<b>Level 3 (5–6 marks)</b>
No relevant content	There is simple description of the early stages of adult cell cloning. However there is little other detail and the description may be confused or inaccurate.	There is an almost complete description of the early stages of the process and description of some aspects of the later stages. The description may show some confusion or inaccuracies.	There is a clear, detailed and accurate description of all the major points of how adult cell cloning is carried out.
<b>Examples of Biology points made in the response could include:</b>			<b>6</b>
<ul style="list-style-type: none"> <li>• skin cell from zorse</li> <li>• (unfertilised) egg cell from horse</li> <li>• remove nucleus from egg cell</li> <li>• take nucleus from skin cell</li> <li>• put into (empty) egg cell</li> <li>• (then give) electric shock</li> <li>• (causes) egg cell divides / embryo formed</li> <li>• (then) place (embryo) in womb / uterus</li> </ul>			
<b>Total</b>			<b>9</b>

**BL1FP****Question 8**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>8(a)</b>	both lead to reduction / fall (in measles cases)	can be implied	1
	measles vaccine caused a big drop <b>or</b> correct use of figures		1
	MMR wipes out measles <b>or</b> drops to (almost) zero <b>or</b> doesn't fall as much as measles vaccine <b>or</b> correct use of figures.		1
<b>8(b)</b>	mump(s)	either order	1
	rubella / german measles	allow phonetic spelling	1
<b>8(c)</b>	white blood cells	allow lymphocytes / leucocytes ignore memory cells	1
	(wbc) produce antibodies	ignore antitoxins / antigens / antibiotics / engulfing	1
	in future / if re-infected antibody production rapid / fast(er) / quick(er)	allow ecf from antitoxins / antigens / antibiotics ignore engulfing ignore reference to specificity	1
<b>Total</b>			<b>8</b>

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