



General Certificate of Secondary Education

Science A 4405 / Biology 4401

BL1FP Unit Biology 1

Mark Scheme

2012 examination – June 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	Neptune, Mars, Moon	1
2	Neptune, 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 8 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.

BL1FP**Question 1**

question	answers	extra information	mark
1 (a)	a stimulus		1
1 (b)(i)	A		1
1 (b)(ii)	C	either order	1
	D		1
1 (b)(iii)	E		1
1 (c)	brain	allow spinal cord / CNS / <u>central</u> nervous system do not allow spine	1
Total			6

BL1FP**Question 2**

question	answers	extra information	mark
2 (a)(i)	7500	ignore units	1
2 (a)(ii)	<p>any two from:</p> <p>(differences in)</p> <ul style="list-style-type: none"> • age • gender / sex • activity / amount of exercise • metabolism / metabolic rate • genetic differences • body weight / mass / size / physique • pregnancy • proportion of muscle to fat 	<p>if examples given they must be correct</p> <p>allow job / lifestyle ignore fitness / health / medication</p> <p>allow BMR</p> <p>allow BMI</p>	2
2 (b)	<p>A</p> <p>more energy taken in than used</p>	<p>if box empty, allow in explanation</p> <p>accept more food taken in than used</p> <p>allow correct numbers if comparative</p> <p>ignore incorrect numbers if comparison correct</p>	<p>1</p> <p>1</p>

Question 2 continues on the next page . . .

BL1FP**Question 2 continued**

question	answers	extra information	mark
2 (c)	eat less (food / carbohydrates / fat / calories)	accept a medical treatment such as gastric band / slimming pills / liposuction	1
	exercise (more) or go to the gym	ignore balanced / healthy / diet allow go to weight watchers etc. ignore burn off more	1
Total			7

BL1FP**Question 3**

question	answers	extra information	mark
3 (a)(i)	sun	ignore light apply list principle	1
3 (a)(ii)	photosynthesis	apply list principle allow approximate spelling do not accept phototropism	1
3 (b)(i)	chemical		1
3 (b)(ii)	carbon dioxide		1
3 (b)(iii)	carbohydrates		1
3 (c)	As carbon dioxide from the caterpillar	if more than 2 boxes ticked deduct one mark for each additional incorrect box	1
	As faeces (droppings) from the blue-tit		1
Total			7

BL1FP**Question 4**

question	answers	extra information	mark
4 (a)	too cold / very cold or oxygen / microbes cannot reach it	allow not enough energy / heat / warmth ignore frozen	1
	for microorganisms / microbes / bacteria / fungi / enzyme / reaction (to work)	ignore other consumers	1
4 (b)	no longer exist or no more left or died out / all died	ignore died unqualified	1
4 (c)(i)	egg cell		1
4 (c)(ii)	nucleus		1
4 (c)(iii)	given an electric shock		1
4 (c)(iv)	womb		1
4 (d)	has mammoth genes / chromosomes	accept genetic information / DNA / alleles / nucleus accept converse	1
Total			8

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Question 5

question	answers	extra information	mark
5 (a)(i)	any one from: <ul style="list-style-type: none"> as a sleeping pill treating leprosy 	ignore cancer / AIDS do not accept morning sickness	1
5 (a)(ii)	thalidomide causes birth defects / abnormalities / described	in this order ignore kill / harm / damage baby	1
	to be (more) sure of not getting pregnant	allow to be certain there is no baby or in case one doesn't work	1
5 (b)(i)	oestrogen		1
	progesterone		1
5 (b)(ii)	any two from: <ul style="list-style-type: none"> reduce chances of <u>ovarian</u> cancer <u>more</u> effective (in preventing pregnancy) no pills (to remember) for 7 days (out of every 28) doesn't have to be taken at the same time every day 	allow only taken for 21 days (out of 28)	2
5 (b)(iii)	less chance of headaches or less chance of forgetting	ignore won't get headaches allow lower dose of hormone allow fewer side effects ignore only contains one hormone	1
Total			8

BL1FP**Question 6**

question	answers	extra information	mark
6 (a)	insects don't eat / damage crop	allow idea of insects carrying plant disease	1
6 (b)(i)	60		1
6 (b)(ii)	lower (yield)	accept 'higher' if answer clearly refers to wheat with transferred gene allow yield is only 52 or goes down to 52	1
	by 8 (arbitrary units)	accept ecf from (b)(i) for 2 marks	1
6 (b)(iii)	grow / use wheat without insect poison (gene)		1
	higher yield (in fields)	accept bigger crop / more wheat ignore grows better	1
6 (c)	(concerned about)	ignore unnatural / unethical / against religion unqualified accept specific examples given	1
	effect on populations of (wild) flowers / insects	ignore harms the environment	
	effect of <u>eating</u> GM crops on human health	allow harmful to humans if eaten	1
Total			8

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Question 7

question	answers	extra information	mark
7 (a)	don't kill pathogens / bacteria / viruses / microbes / microorganisms	allow don't contain antibiotics ignore antibodies / attack / fight allow <u>only</u> treat symptoms / pain ignore kill disease / germs	1
7 (b)	any two from: <ul style="list-style-type: none"> • age • gender • extent / severity of pain or how long had pain <u>before trial</u> • type of pain / illness / site of pain • (body) mass / weight / height • other medical issues / drugs taken / health / fitness • ethnicity 	accept 'the pain' for 1 mark, if neither extent or type given ignore pain threshold allow body size / physique	2
7 (c)(i)	75	ignore calculations / %	1
7 (c)(ii)	faster pain relief / decrease	allow pain relief sooner or it works quicker or more pain relief at start / in first $1 / 1\frac{3}{4}$ hours	1
7 (c)(iii)	decrease of pain higher / more decrease of pain is longer lasting	ignore more effective unless qualified by time $>1\frac{3}{4}$ hours allow effect lasts longer	1 1

Question 7 continues on the next page . . .

BL1FP**Question 7 continued**

question	answers	extra information	mark
7 (d)	<p>any three from:</p> <p>(Yes because)</p> <ul style="list-style-type: none">• rapid pain relief (from A)• long lasting pain relief (from B)• and it costs less• the sum of the pain relief (from A + B) is greater (than X) <p>(No because)</p> <ul style="list-style-type: none">• drug X gives more pain relief• (A + B / they) might interact with each other• could result in overdose• could be more / new side effects	<p>ignore yes or no</p> <p>if neither points gained allow (more) dangerous</p>	3
Total			10

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Question 8

question	information			mark
8	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.			6
0 marks	Level 1 (1-2 marks)	Level 2 (3-4 marks)	Level 3 (5-6 marks)	
No relevant content.	There is at least one example of an adaptation of either an animal or a plant. However it may not be clear how the adaptation helps the organism to avoid being eaten.	There is a description of an adaptation of at least one animal and at least one plant. It is clear how at least one of these adaptations helps the organism to avoid being eaten.	There are clear and detailed descriptions of a range of adaptations of named animals and named plants. It is clear how most of these adaptations help the organisms to avoid being eaten.	
examples of clear and detailed biology points made in response:				
<ul style="list-style-type: none"> • camouflage – the method of camouflage should be described plus a statement that the predator is less likely to see the prey • mimicry / warning colouration – the method should be described plus a statement that the predator is likely to confuse the prey with e.g. a poisonous organism • thorns / prickles / spines / horns – a statement that these are sharp and are likely to hurt a predator • long limbs / streamlining – a statement that these increase speed and make it more likely that prey will outrun predator • bad taste / poison – a statement that predator will find this unpleasant and 'spit out' prey / not attack same prey again • large ears / position of eyes – a statement that predators will be detected earlier so the prey can escape sooner 				
Total				6

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