



**General Certificate of Secondary Education
January 2013**

Science A / Biology

BL1FP

(Specification 4405 / 4401)

Unit: Biology 1

Final

Mark Scheme

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 events which all examiners participate in and is the scheme which was used by them in this examination. The standardisation process 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 standardisation each examiner analyses a number of students' scripts: alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, examiners encounter unusual answers which have not been raised 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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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. Boldening

- 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 boldened. Each of the following bullet points 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 | green, 5 | 0 |
| 2 | red*, 5 | 1 |
| 3 | 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, 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 or by each stage of a longer calculation.

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.

3.8 Ignore / Insufficient / Do **not** allow

Ignore or insufficient is used when the information given is irrelevant to the question or not enough to gain the marking point. Any further correct amplification could gain the marking point.

Do **not** allow means that this is a wrong answer which, even if the correct answer is given, will still mean that the mark is not awarded.

Quality of Written Communication and levels marking

In Question 9(a) 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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Question 1

| question | answers | extra information | mark |
|---------------------|---|--|-----------------|
| <p>1(a)</p> | <p>The diagram shows three boxes on the left: 'Toes on the back feet', 'Long tail', and 'Brown skin'. On the right, four boxes are stacked: 'For camouflage on branches ...', 'Helps the lizard to balance', 'Warning colours to deter', and 'Increases surface area'.</p> | <p>one mark for each line do not award mark for an adaptation if lines are drawn from it to more than one advantage</p> | <p>3</p> |
| <p>1(b)</p> | <p>escape (predators)</p> | <p>accept faster than swimming allow chase prey allow it stops them from drowning</p> | <p>1</p> |
| <p>1(c)</p> | <p>food territory</p> | <p>deduct one mark for each tick in excess of two</p> | <p>1 1</p> |
| <p>Total</p> | | | <p>6</p> |

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Question 2

| question | answers | extra information | mark |
|--------------|--|---|----------|
| 2(a)(i) | skin | | 1 |
| 2(a)(ii) | kidneys | accept kidney | 1 |
| 2(a)(iii) | lungs | accept lung | 1 |
| 2(b)(i) | multiply temperature by number of students at that temperature and add them up | allow $(36.8 \times 5) + (36.9 \times 3) + (37.0 \times 6) + (37.1 \times 7) + (37.2 \times 3)$ | 1 |
| | divide by number of students | allow 888 allow divide by 24 | 1 |
| 2(b)(ii) | 10 / ten | | 1 |
| 2(b)(iii) | so enzymes <u>work</u> (well) | ignore death / overheating / hypothermia allow body <u>reactions</u> work (well) | 1 |
| Total | | | 7 |

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Question 3

| question | answers | extra information | mark |
|------------------|---|---|-------------|
| 3(a) | pathogens | | 1 |
| 3(b)(i) | A disease affecting people in many countries | | 1 |
| 3(b)(ii) | birds fly / migrate OR human contact with birds more likely OR there are more birds (than pigs) | accept converse birds not contained / difficult to control movement | 1 |
| 3(c)(i) | antibiotics (only) kill bacteria OR antibiotics don't kill viruses | ignore flu is caused by a virus unqualified ignore virus resistant / immune | 1 |
| 3(c)(ii) | painkillers | accept any correct named painkiller, eg aspirin or paracetamol allow antivirals / Tamiflu ignore medicine / tablets | 1 |
| 3(c)(iii) | resistant bacteria | in this order | 1 1 |
| Total | | | 7 |

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Question 4

| question | answers | extra information | mark |
|-----------------|--|---|-------------|
| 4(a)(i) | 2 / two | allow F <u>and</u> G | 1 |
| 4(a)(ii) | C only | | 1 |
| 4(b) | any two from: <ul style="list-style-type: none"> • balanced diet / otherwise malnourished • (release) energy • build cells / growth / repair | ignore reference to health / strength or allow: <ul style="list-style-type: none"> • carbohydrates for energy (1) • fat for energy / insulation (1) • protein for growth / repair (1) | 2 |
| 4(c)(i) | health | do not allow energy / insulation / growth / repair allow reference to specific function of vitamin or ion, eg prevent scurvy / harden bones allow to prevent deficiency diseases ignore strength / fitness / prevent diseases | 1 |
| 4(c)(ii) | a smaller | | 1 |
| Total | | | 6 |

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Question 5

| question | answers | extra information | mark |
|-----------------|--|--|------------|
| 5(a) | mental (illness) | accept specific mental illnesses such as depression, paranoia schizophrenia or dementia allow brain damage do not accept cancer | 1 |
| 5(b)(i) | evidence on graph of attempt to continue line from 2001 <u>to 2014</u> 15 | range at 2014 from 13 to 16 inclusive accept any value between 13 and 16 consistent with attempt at straight line if there is no line accept only 15 | 1 1 |
| 5(b)(ii) | no because changing to Class C did not affect trend OR trend / use already falling before the change OR use higher when class B | only award this mark if there is an attempt at an explanation | 1 1 |
| Total | | | 5 |

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Question 6

| question | answers | extra information | mark |
|-----------------|--|---|----------|
| 6(a)(i) | 1800(g) | | 1 |
| 6(a)(ii) | triangular pyramid with four layers | accept ecf from (a)(i) allow inverted pyramid | 1 |
| | correctly labelled in order of food chain | | 1 |
| 6(b) | <p>any two from:</p> <ul style="list-style-type: none"> • (lost as) crab faeces / not all digested • (lost as) crab urine / urea • loss of carbon dioxide by crab • not all the limpet is eaten eg don't eat the shell • not all limpets are eaten (by crabs) | <p>allow waste / excretion for one mark if neither faeces nor urine are given</p> <p>accept (lost via) respiration</p> <p>allow not enough crabs to eat all the limpets / the limpet population</p> <p>ignore energy losses, such as movement</p> | 2 |
| Total | | | 5 |

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Question 7

| question | answers | extra information | mark |
|--------------|---|---|----------|
| 7(a)(i) | natural | | 1 |
| 7(a)(ii) | simple | | 1 |
| 7(a)(iii) | three billion | | 1 |
| 7(b) | any two from: <ul style="list-style-type: none"> • reference to religion • insufficient evidence / couldn't prove it / no proof • mechanism of inheritance / variation not known • reference to other theories • reference to Darwin's status | ignore no evidence allow genes / DNA not known about | 2 |
| 7(c)(i) | tree | | 1 |
| 7(c)(ii) | hippopotamus and pig | both required, either order allow hippo | 1 |
| 7(c)(iii) | new evidence from fossils | | 1 |
| Total | | | 8 |

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Question 8

| question | answers | extra information | mark |
|--------------|---|---|----------|
| 8(a) | any correct named physical environmental condition, e.g. light / water / rain / temperature / minerals / nutrients / space (between plants) | ignore carbon dioxide / climate / weather / sun / pollution | 1 |
| | genes / inheritance OR any correct named biotic factor e.g. predation / disease | ignore 'variety' | 1 |
| 8(b) | mass of crop also depends on number of pods (per plant) / size / mass of each pea | ignore number of plants | 1 |
| 8(c) | microorganisms / bacteria / fungi / decomposers / detritus feeders / named | | 1 |
| | decompose / rot / break down / decay / digest | ignore feed / eat | 1 |
| | (these organisms) respire | do not allow respiration by pea (plants) | 1 |
| | (decay / respiration / microorganisms etc) releases carbon dioxide | do not allow combustion / fossilisation | 1 |
| Total | | | 7 |

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Question 9

| question | answers | extra information | mark |
|--|--|--|--|
| 9(a) | 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 5, 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 a brief description of at least one of the stages (pre-inoculation, inoculation, post-inoculation). | There is a simple description of at least two stages and an explanation of at least one of them. | There is a clear description of all three stages and an explanation of at least two of them. |
| <p>examples of biology points made in the response:</p> <p><i>Pre-inoculation</i></p> <ul style="list-style-type: none"> • Petri dish and agar sterilised before use • to kill unwanted bacteria • inoculating loop passed through flame / sterile swab • to sterilise / kill (other) bacteria <p><i>Inoculation</i></p> <ul style="list-style-type: none"> • loop/swab used to spread/streak bacterium onto agar <p><i>Allow other correct methods, eg bacterial lawns</i></p> <ul style="list-style-type: none"> • lid of Petri dish opened as little as possible • to prevent microbes from air entering <p><i>Post-inoculation</i></p> <ul style="list-style-type: none"> • sealed with tape • to prevent microbes from air entering • incubate • to allow growth of bacteria | | | |

Question 9 continues on the next page

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Question 9 continued

| question | answers | extra information | mark |
|--------------|---|--|----------|
| 9(b)(i) | bacteria killed / destroyed | ignore fights / attacks / stops growth / got rid of | 1 |
| 9(b)(ii) | <i>Might be correct</i> largest area / space where no bacteria are growing | allow most bacteria killed | 1 |
| | <i>Might not be correct</i> (need more evidence as) D may be harmful to people / animals / surfaces or may work differently with different bacteria or disinfectants may be different concentrations or may not last as long | ignore ref to cost / dangerous or harmful unqualified ignore different amounts of disinfectant unless reference to different drop size ignore take longer to work allow reference to anomalous result or not repeated | 1 |
| Total | | | 9 |

UMS Conversion Calculator: www.aqa.org.uk/umsconversion