Version 1.0

**General Certificate of Secondary Education**
**June 2013**

# Science A / Biology BL1HP

# (Specification 4405 / 4401)

# Unit 1: 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.

Further copies of this Mark Scheme are available from: aqa.org.uk



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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. 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 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 / ; e.g. 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 <u>not</u> 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 3 candidates 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.

Candidates 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.

**Question 1**

| question | answers | extra information | mark |
|---|---|---|---|
| **1(a)(i)** | lower percentage (of women) who died | allow fewer (women) died | 1 |
| | numerical reference to a pair of figures to show this | allow any difference in a pair of figures | 1 |
| **1(a)(ii)** | doctors were not transferring | ignore reference to nurses | 1 |
| | pathogens / bacteria / viruses / microorganisms / microbes | allow fungi<br>ignore disease / germs / infection | 1 |
| **1(b)** | any **three** from:<br>• lower percentage of patients died (when doctors washed hands or in ward A)<br>• large decrease or reference to proportional decrease<br>• little / no difference / similar to ward B<br>• continued drop (in ward A) | allow fewer for lower percentage<br>ignore raw data | 3 |
| **1(c)** | any **two** from:<br>• better understanding / knowledge of immunity<br>• better / new drugs<br>• sterilisation of equipment **or** isolation of patients **or** some infectious diseases wiped out **or** earlier identification / treatment of infections | accept ref to immunisation / vaccination<br>accept examples, e.g. antibiotics / penicillin (discovered)<br>allow better / new medicines<br>ignore references to general hygiene | 2 |
| **Total** | | | **9** |

**Question 2**

| question | answers | extra information | mark |
|---|---|---|---|
| **2(a)(i)** | idea of 'normal' food / diet | e.g. 'the same as usual' or 'the same as before'<br>allow balanced diet<br>allow none of the slimming programmes<br>ignore healthy diet | 1 |
| **2(a)(ii)** | for comparison | accept to show the test is valid<br>allow to show the effect of the slimming programmes<br>allow to see if the slimming programmes work<br>ignore idea of fair test / reliable<br>do **not** allow accurate / precise | 1 |
| **2(b)(i)** | (at first) large / rapid (loss / change of body mass)<br>then small (loss / change) / levelling off | accept 'loss of mass decreased' for **2** marks | 1<br>1 |
| **2(b)(ii)** | all lost body mass (compared to the control group) | | 1 |
| **Total** | | | **5** |

**Question 3**

| question | Answers | extra information | Mark |
|---|---|---|---|
| **3** | 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. | | 6 |

| **0 marks** | **Level 1 (1-2 marks)** | **Level 2 (3-4 marks)** | **Level 3 (5-6 marks)** |
|---|---|---|---|
| No relevant content. | For at least one process **either** the organism that carries it out **or** the carbon compound used **or** the carbon compound produced is described<br>**or**<br>for at least one organism **either** the carbon compound it uses **or** the carbon compound it produces is described<br>**or**<br>at least one process is named | For some processes (at least one of which is named) **either** the organisms involved **or** the carbon compounds used **or** the carbon compounds produced are described | For at least one named process an organism **and** either the carbon compound used for the process **or** the carbon compound produced by the process are described<br>**and**<br>for other processes (at least one of which is named) **either** the organism **or** the carbon compounds used **or** the carbon compounds produced are described (as in Level 2) |

**examples of biology points made in the response:**

- (green) plants photosynthesise
- photosynthesis takes in carbon dioxide
- (green) plants use carbon to make carbohydrate / protein / fat / organic compounds / named (e.g. enzymes / cellulose)
- animals eat (green) plants (and other animals)
- (green) plants respire
- animals respire
- respiration releases carbon dioxide
- (green) plants and animals die
- microorganisms decay / decompose / rot / break down / feed on dead organisms
- microorganisms respire

| **Total** | | | **6** |
|---|---|---|---|

**Question 4**

| question | answers | extra information | mark |
|---|---|---|---|
| **4(a)(i)** | rate of chemical reactions (in the body) | | 1 |
| **4(a)(ii)** | any **two** from:<br>• heredity / inheritance / genetics<br>• proportion of muscle to fat **or** (body) mass<br>• age / growth rate<br>• gender | <br><br>allow (body) weight / BMI<br><br><br><br>accept hormone balance **or** environmental temperature<br>ignore exercise / activity | 2 |
| **4(b)(i)** | 77 | correct answer with or without working gains **2** marks<br>allow **1** mark for 70/56 **or** 1.25 **or** 5 | 2 |
| **4(b)(ii)** | increase exercise<br><br>reduce food intake | accept a way of increasing exercise<br><br>accept examples such as eat less fat / sugar<br>allow go on a diet **or** take in fewer calories<br>ignore lose weight<br>ignore medical treatments such as gastric band / liposuction | 1<br><br>1 |
| **Total** | | | **7** |

**Question 5**

| question | answers | extra information | mark |
|---|---|---|---|
| **5(a)** | auxin | accept other named plant hormones | 1 |
| **5(b)(i)** | any **three** from:<br>• no (fusion of) gametes / fertilisation<br>• only one parent<br>• no mixing of genetic material<br>• no genetic variation **or** genetically identical offspring | <br>allow no meiosis **or** new cells only produced by mitosis<br>allow not two parents<br><br>allow clones | 3 |
| **5(b)(ii)** | more / many offspring / plants (produced from one parent plant) | allow less damage to parent plant<br><br>ignore speed / cost | 1 |
| **Total** | | | **5** |

**Question 6**

| question | answers | extra information | mark |
|---|---|---|---|
| **6(a)** | (substance / chemical) that affects body chemistry / chemical reactions in the body | | 1 |
| **6(b)** | statin / aspirin / neither recommended | no mark, may be implied. If no recommendation or implication, max 4 marks<br>answers should be comparative | |
| | any **five** from:<br>• argued evaluation in favour of aspirin or statin or neither | | 5 |
| | answers could include reference to<br>for statins: | accept converse for statins / aspirin but **not** as advantage of one **and** disadvantage of other | |
| | • more people in studies<br>• so data / findings more repeatable | accept reliable for repeatable<br>ignore accurate / precise | |
| | • reduces cholesterol but aspirin doesn't | allow reduces cholesterol but no evidence about aspirin | |
| | • aspirin (may) causes bleeding / poor clotting but statins do not | allow aspirin causes bleeding / poor clotting but no evidence about statins | |
| | • smaller (total) percentage suffer side-effects | | |
| | • monitored by doctor, aspirins not | | |
| | for aspirin: | | |
| | • cheaper | | |
| | • can be bought over the counter rather than prescribed | | |
| | • statins cause serious damage / muscle damage / kidney failure but aspirins do not | | |
| | similarities: | | |
| | • both have similar effect on reducing (non-fatal) heart attacks | allow (for aspirin) higher reduction of risk of heart attack | |
| | • incidence of side-effects low in both | | |
| **Total** | | | **6** |

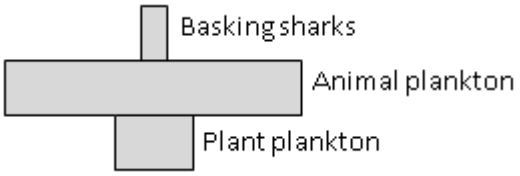
**Question 7**

| question | answers | extra information | mark |
|---|---|---|---|
| **7(a)** | | in this order only | |
| | **A** cytoplasm | | 1 |
| | **B** (cell) membrane | do **not** accept (cell) wall | 1 |
| **7(b)(i)** | synapse | | 1 |
| **7(b)(ii)** | (as) chemical | accept neurotransmitter or named<br>ignore references to how the chemical is passed<br>do **not** accept electrical | 1 |
| **7(c)** | | ignore references to synapses<br>accept 'nerve cell' for neuron(e) throughout<br>penalise 'nerve' for neurone once only | |
| | (from light-sensitive cell to connecting neurone) to sensory neurone | | 1 |
| | (sensory neurone) to brain / CNS | allow (sensory neurone) to relay neurone / spinal cord | 1 |
| | (brain / CNS) to motor neurone | allow (relay neurone / spinal cord) to motor neurone | 1 |
| | (motor neurone) to (eyelid) muscle | ignore effector | 1 |
| **Total** | | | **8** |

**Question 8**

| question | answers | extra information | mark |
|---|---|---|---|
| **8(a)** | Lamarck | ignore any first name(s) | 1 |
| **8(b)(i)** | variation / range of sword lengths (in ancestors) | accept mutation produced longer sword | 1 |
| | those with long swords get more food | accept those with short swords get less food | 1 |
| | swordfish (with long swords) survive **and** breed | allow have offspring for breed | 1 |
| | (survivors) pass on gene(s) / allele(s) (for long sword) | allow mutation for gene(s) / allele(s) | 1 |
| **8(b)(ii)** | any **one** from:<br>• more evidence (now)<br>• DNA / genes / mechanism of inheritance discovered | accept examples of evidence, e.g. more fossils<br>allow Lamarck's theory has been disproved<br>ignore religious arguments<br>ignore proof | 1 |
| **Total** | | | **6** |

**Question 9**

| question | Answers | extra information | mark |
|---|---|---|---|
| **9(a)** |  | if more than one box is ticked award no mark | 1 |
| **9(b)** | increasing / higher light / temperature<br><br>more / increased photosynthesis | ignore references to months other than February – April<br>do **not** accept mineral / ions increase<br>for both marks there must be a reference to 'more' at least once (e.g. 'more light for photosynthesis' gains **2** marks)<br>allow **1** mark for reference to light **and** photosynthesis without an idea of 'more' | 1<br>1 |
| **9(c)** | increase due to increase in plant plankton / food<br><br>decrease due to fall in plant plankton / food **or** decrease as eaten by (basking) sharks | ignore references to months other than April – July<br>allow decrease as eaten by predators / animals / fish | 1<br>1 |
| **9(d)** | <br>fall due to use / intake by <u>plant</u> (plankton)<br><br>increase due to decay / decomposition / breakdown<br><br>of dead (plant / animal) plankton | ignore ref to no change section of graph<br>for fall allow March / April ignore May / February<br>for increase allow any month in range August to November ignore December<br>allow of dead organisms / waste | <br>1<br>1<br>1 |
| **Total** | | | **8** |

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