



## **General Certificate of Secondary Education**

# **Additional Science 4463 / Biology 4411**

**BLY2F      Unit 2 Biology**

## **Mark Scheme**

*2008 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 candidates' 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 candidates' 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 candidates' 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 candidates 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)

| Candidate | 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)

| Candidate | Response               | Marks awarded |
|-----------|------------------------|---------------|
| 1         | Pluto, Mars, Moon      | 1             |
| 2         | Pluto, Sun, Mars, Moon | 0             |

### 3.2 Use of chemical symbols / formulae

If a candidate 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.

### 3.8 Unexpected Correct Answers not in the Mark Scheme

The Examiner should use professional judgement to award credit where a candidate has given an unexpected correct answer which is not covered by the mark scheme. The Examiner should consult with the Team Leader to confirm the judgement. The Team Leader should pass this answer on to the Principal Examiner with a view to informing all examiners.

**BLY2F****Question 1**

|       | <b>answers</b>   | <b>extra information</b> | <b>mark</b> |
|-------|--|--------------------------|-------------|
| (a)   | <b>A</b> nucleus   |                          | 1           |
|       | <b>B</b> (cell) membrane   |                          | 1           |
|       | <b>C</b> cytoplasm   |                          | 1           |
| (b)   | any <b>two</b> from: <ul style="list-style-type: none"><li>• (contain) mitochondria</li><li>• many (mitochondria)</li><li>• respiration (occurs in mitochondria)</li></ul> |                          | 2           |
| total |  |                          | 5           |

**BLY2F****Question 2**

|          | <b>answers</b>   | <b>extra information</b>   | <b>mark</b> |
|----------|--|--|-------------|
| (a)      | 4000   | award <b>both</b> marks for correct answer, irrespective of working<br><br>1500 + 2000 + 500 gains <b>1</b> mark   | 2           |
| (b)      | day 2 (no mark)<br><br>any <b>two</b> from:<br><br><ul style="list-style-type: none"> <li>• more (water in) breath / breathing</li> <li>• more (water in) sweat / sweating</li> <li>• less (water in) urine</li> </ul> | max <b>1</b> mark if correct day not identified or if no day given<br><br>accept a lot of sweating<br><br>if no other marks awarded allow <b>1</b> mark for more water lost on day 2 | 2           |
| (c)(i)   | respiration  |  | 1           |
| (c)(ii)  | cools / removes heat owtte   | ignore 'maintains body temperature' unqualified  | 1           |
| (c)(iii) | osmosis  |  | 1           |
| total    |  |  | 7           |

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**BLY2F****Question 3**

|       | <b>answers</b>  | <b>extra information</b> | <b>mark</b> |
|-------|-----------------|--------------------------|-------------|
| (a)   | characteristics |                          | 1           |
| (b)   | genes           |                          | 1           |
| (c)   | chromosomes     |                          | 1           |
| (d)   | mitosis         |                          | 1           |
| (e)   | <u>a</u> sexual |                          | 1           |
| total |                 |                          | 5           |

**BLY2F**

**Question 4**

|         | <b>answers</b>  | <b>extra information</b>   | <b>mark</b> |
|---------|---|--|-------------|
| (a)(i)  |   | <p>both correct = <b>2</b> marks<br/>one correct = <b>1</b> mark</p> <p>extra line from a statement cancels the mark</p>   | 2           |
| (a)(ii) | <p>1<sup>st</sup> space: carbon dioxide</p> <p>2<sup>nd</sup> space: glucose / sugar / starch / carbohydrate</p>  | <p>allow CO<sub>2</sub> (ignore superscript)</p> <p>do <b>not</b> allow CO alone</p>   | 1<br><br>1  |
| (b)(i)  | <p>any <b>one</b> from:</p> <ul style="list-style-type: none"> <li>• move lamp or change distance between lamp and plant</li> <li>• change wattage / power of (light) bulb</li> <li>• change voltage / power supply to the (light) bulb</li> <li>• change the number of lamps</li> <li>• put translucent material between lamp and plant</li> </ul> | <p>ignore measure the distance</p> <p>do <b>not</b> accept just “change bulb”</p> <p>accept examples, eg tracing paper / filters</p> <p>do <b>not</b> accept <u>coloured</u> filters</p> | 1           |

**continued ...**



**BLY2F****Question 4 continued ...**

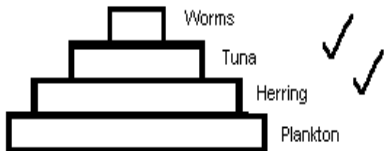
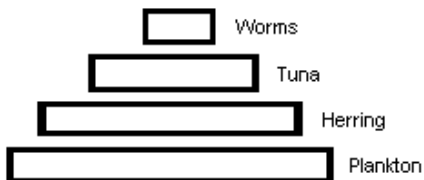
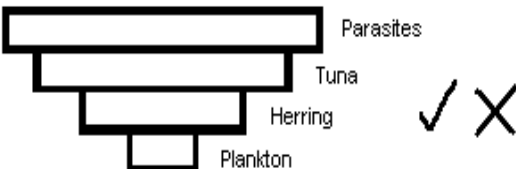
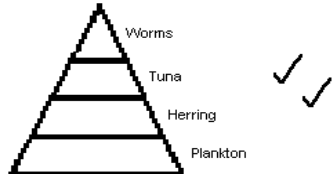
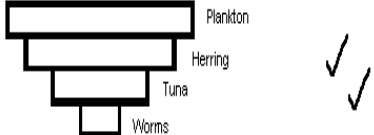

|          | <b>answers</b>   | <b>extra information</b>  | <b>mark</b> |
|----------|--|---|-------------|
| (b)(ii)  | rises  | ignore numbers  | 1           |
|          | levels off   |   | 1           |
| (b)(iii) | idea that it levels off<br><b>or</b><br>does not increase at all light intensities<br><b>or</b><br>it only increases to a certain amount | answers should relate to<br>photosynthesis and <b>not</b> to bubbling | 1           |
| total    |  |   | 8           |

**BLY2F****Question 5**

|         | <b>answers</b>  | <b>extra information</b>   | <b>mark</b> |
|---------|---|--|-------------|
| (a)     | A carbohydrase  |  | 1           |
|         | B isomerase   |  | 1           |
| (b)     | less needed (to get same effect)  |  | 1           |
| (c)(i)  | they all work at atmospheric pressures  | accept any clear indication of correct statement(s) identified   | 1           |
|         | they work well at 25 – 45 °C  |  | 1           |
| (c)(ii) | any <b>two</b> from: <ul style="list-style-type: none"> <li>• they are easily broken down by high temperature or the wrong pH</li> <li>• they are soluble in water, so it may be difficult to separate them from products</li> <li>• they are expensive to buy</li> </ul> | accept any clear indication of correct statement(s) identified<br><br>accept for <b>2</b> marks if written as two separate disadvantages | 2           |
| total   |   |  | 7           |

**BLY2F**

**Question 6**

|               | <b>answers</b>  | <b>extra information</b>   | <b>mark</b> |
|---------------|---|--|-------------|
| <p>(a)(i)</p> | <p>a triangular-shaped pyramid, with 4 layers – widest at the bottom</p>  | <p>either in blocks or as a triangle</p>   | <p>1</p>    |
|               | <p>labels in food chain order (from widest part)<br/>ie<br/>plankton—herring— tuna — parasitic / worms</p>  | <p>upside down labelled pyramid with producer at top gains <b>2</b> marks</p>  | <p>1</p>    |
|               | <p>eg</p>  <p>eg</p>  <p>eg</p>  | <p>upside down labelled pyramid with producer at bottom gains <b>1</b> mark for labels</p> <p>unlabelled upside down pyramid = <b>0</b> marks</p> <p>accept separate boxes</p> <p>correct food chain with correct arrows if given gains <b>1</b> mark</p> <p>eg</p>  <p>eg</p>  <p>eg</p>  |             |

continued...

**BLY2F****Question 6 continued...**

|         | <b>answers</b>  | <b>extra information</b>   | <b>mark</b> |
|---------|---|--|-------------|
| (a)(ii) | any <b>two</b> from: <ul style="list-style-type: none"> <li>waste / excreted / urine / faeces / CO<sub>2</sub> (from tuna)</li> <li>respiration (of tuna)</li> <li>movement (of tuna) / hunting</li> <li>used for heat (production) (of tuna)</li> <li>not digested / absorbed</li> </ul> | from / of tuna not required but do not accept if of / from other organisms<br><br>ignore used in reproduction<br><br>if a mark is not awarded for respiration / movement / heat allow <b>1</b> mark for energy (unqualified) | 2           |
| (b)(i)  | 40  | award <b>both</b> marks for correct answer, irrespective of working<br><br>allow (290 – 50)/6 <b>or</b> 240/6 for <b>1</b> mark<br><br>allow 48.3 / 48 $\frac{1}{3}$ / 48 for <b>1</b> mark                                  | 2           |
| (b)(ii) | cost of food / protein  |  | 1           |
| (c)     | any <b>one</b> from: <ul style="list-style-type: none"> <li>concern about animal welfare <b>or</b> examples <b>or</b> cruel to tuna <b>or</b> unethical <b>or</b> lack of space</li> <li>poorer flavour / quality</li> </ul>  | allow immoral<br><br>ignore not natural  | 1           |
| total   |   |  | 8           |

**BLY2F****Question 7**

|         | <b>answers</b>  | <b>extra information</b>   | <b>mark</b> |
|---------|---|--|-------------|
| (a)(i)  | <b>D</b>  |  | 1           |
| (a)(ii) | <b>A</b>  |  | 1           |
| (b)(i)  | air / oxygen (can enter)  | ignore other factors entering or leaving   | 1           |
|         | for (aerobic) <u>respiration</u>  | do <b>not</b> accept anaerobic respiration   | 1           |
| (b)(ii) | (more) minerals / nutrients /salt(s) / ions<br><b>or</b><br>named mineral / element available | ignore fertility / fertiliser<br><br>allow symbols<br><br>allow eg mulching / reducing weeds<br><b>or</b> retain water | 1           |
| total   |   |  | 5           |