



# **General Certificate of Secondary Education**

## **Science B 4462 / Biology 4411**

**BLY1F                  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.

Further copies of this Mark Scheme are available to download from the AQA Website: [www.aqa.org.uk](http://www.aqa.org.uk)

Copyright © 2012 AQA and its licensors. All rights reserved.

#### COPYRIGHT

AQA retains the copyright on all its publications. However, registered schools / colleges for AQA are permitted to copy material from this booklet for their own internal use, with the following important exception: AQA cannot give permission to schools / colleges to photocopy any material that is acknowledged to a third party even for internal use within the school / college.

Set and published by the Assessment and Qualifications Alliance.

---

## 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.

**BLY1F****Question 1**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>1(a)</b>	has thorns / prickles / points	answer to be marked as a whole accept sharp points	1
	(these) hurt animal	allow frighten animal <b>only</b> accept prevent animal eating leaves if qualified by 'hurting' or 'frightening'	1
<b>1(b)</b>	camouflaged / looks like twig / disguised	answer to be marked as a whole allow blends in ignore too small to see	1
	(animal) cannot <u>see / detect</u> / recognise it	allow animal does not eat twigs <b>only</b> accept prevents animal eating it if qualified by 'seeing' or 'wrong food'	1
<b>1(c)</b>	red / colour	answer to be marked as a whole	1
	warns that insect might be poisonous / dangerous	allow inedible / tastes bad	1
<b>Total</b>			<b>6</b>

**BLY1F**

**Question 2**

question	answers	extra information	mark				
2(a)	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center; vertical-align: top;"><b>A</b></td> <td style="width: 50%; text-align: center; vertical-align: top;"><b>B</b></td> </tr> <tr> <td style="vertical-align: top;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">Antibiotic</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">Antitoxin</div> <div style="border: 1px solid black; padding: 2px;">Painkiller</div> </td> <td style="vertical-align: top;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">White blood cells produce this substance</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">This substance is used to kill bacteria</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">This substance lowers blood cholesterol levels</div> <div style="border: 1px solid black; padding: 2px;">This substance relieves only the symptoms of a disease</div> </td> </tr> </table>	<b>A</b>	<b>B</b>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">Antibiotic</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">Antitoxin</div> <div style="border: 1px solid black; padding: 2px;">Painkiller</div>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">White blood cells produce this substance</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">This substance is used to kill bacteria</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">This substance lowers blood cholesterol levels</div> <div style="border: 1px solid black; padding: 2px;">This substance relieves only the symptoms of a disease</div>	<p>1 mark for each correct line mark each line from left hand box</p> <p>two lines from left hand box cancels mark for that box</p>	3
<b>A</b>	<b>B</b>						
<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">Antibiotic</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">Antitoxin</div> <div style="border: 1px solid black; padding: 2px;">Painkiller</div>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">White blood cells produce this substance</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">This substance is used to kill bacteria</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">This substance lowers blood cholesterol levels</div> <div style="border: 1px solid black; padding: 2px;">This substance relieves only the symptoms of a disease</div>						
2(b)	<p>inactive</p> <p>rubella</p>	<p>allow weak / dead / un-living / safe</p> <p>apply list principle, but ignore measles and mumps</p>	<p>1</p> <p>1</p>				
<b>Total</b>		<b>5</b>					

**BLY1F****Question 3**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>3(a)</b>	60	correct answer gains <b>2</b> marks if answer incorrect evidence of using 40 gains <b>1</b> mark	<b>2</b>
<b>3(b)</b>	any <b>two</b> from <ul style="list-style-type: none"> <li>• climate change / described e.g. hotter summers / drought / seasons change</li> <li>• rise in sea levels / flooding</li> <li>• glacier melting / ice caps melting</li> <li>• forest fires</li> <li>• habitat destruction</li> <li>• effect on organisms</li> </ul> eg extinction / migration	ignore temperature rise / global warming  allow other environmental effects	<b>2</b>
<b>Total</b>			<b>4</b>

**BLY1F****Question 4**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>4(a)</b>	characteristics		1
	genes		1
	clones		1
	asexual		1
<b>4(b)(i)</b>	tissue culture	<p>accept other asexual methods eg runners / plantlets / dividing</p> <p>accept use of (named) organ e.g. root / leaf</p> <p>ignore cloning / asexual / stem cuttings / reproduction / genetic engineering</p> <p>do <b>not</b> accept seeds / sexual reproduction</p>	1
<b>4(b)(ii)</b>	embryo transplant / splitting <b>or</b> (adult cell / fusion) cloning	<p>ignore asexual</p> <p>do <b>not</b> accept clones</p> <p>do <b>not</b> accept sexual reproduction</p> <p>ignore genetic engineering</p>	1
<b>Total</b>			<b>6</b>



**BLY1F**

**Question 5**

question	answers	extra information	mark				
5(a)	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="text-align: center; vertical-align: top; width: 50%;"><b>A</b></td> <td style="text-align: center; vertical-align: top; width: 50%;"><b>B</b></td> </tr> <tr> <td style="vertical-align: top;"> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">FSH</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">LH</div> <div style="border: 1px solid black; padding: 2px;">Oestrogen</div> </td> <td style="vertical-align: top;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used in some contraceptive pills to stop eggs maturing</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used as a fertility drug to make eggs mature.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Causes the lining of the womb to break down</div> <div style="border: 1px solid black; padding: 5px;">Stimulates the release of eggs in IVF</div> </td> </tr> </table>	<b>A</b>	<b>B</b>	<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">FSH</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">LH</div> <div style="border: 1px solid black; padding: 2px;">Oestrogen</div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used in some contraceptive pills to stop eggs maturing</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used as a fertility drug to make eggs mature.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Causes the lining of the womb to break down</div> <div style="border: 1px solid black; padding: 5px;">Stimulates the release of eggs in IVF</div>	<p>mark each line from left hand box</p> <p>two lines from left hand box cancels mark for that box</p>	3
<b>A</b>	<b>B</b>						
<div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">FSH</div> <div style="border: 1px solid black; padding: 2px; margin-bottom: 10px;">LH</div> <div style="border: 1px solid black; padding: 2px;">Oestrogen</div>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used in some contraceptive pills to stop eggs maturing</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used as a fertility drug to make eggs mature.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Causes the lining of the womb to break down</div> <div style="border: 1px solid black; padding: 5px;">Stimulates the release of eggs in IVF</div>						

**Question 5 continues on the next page . . .**

**BLY1F****Question 5 continued**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>5(b)(i)</b>	implant		<b>1</b>
<b>5(b)(ii)</b>	any <b>one</b> from: <ul style="list-style-type: none"> <li>• lasts for 5 years / long(est)</li> <li>• cannot forget to take / replace it / lose it</li> <li>• (hormone) there all the time</li> </ul>	allow explanation for their method in (b)(i)  ignore expense ignore STDs ignore side effects	<b>1</b>
<b>5(b)(iii)</b>	any <b>one</b> from: <ul style="list-style-type: none"> <li>• needs surgery / operation</li> <li>• painful</li> <li>• infection</li> <li>• have to wait five years for a child <b>or</b> more difficult to have a change of mind</li> </ul>	accept correct disadvantage for wrong method in 5bi  allow it could go wrong  ignore expense ignore STDs ignore side effects	<b>1</b>
<b>Total</b>			<b>6</b>

## BLY1F

## Question 6

question	answers	extra information	mark
<b>6(a)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• arthritis</li> <li>• diabetes</li> <li>• high blood pressure</li> <li>• heart disease / heart condition / heart attack / blood vessel disease</li> </ul>	ignore eating disorder ignore cancer  accept worn joints  accept <u>high</u> blood sugar  ignore cholesterol  allow blood clots / strokes	2
<b>6(b)(i)</b>	$\frac{1}{4}$ or 0.25 or 25%	correct answer gains <b>2</b> marks  if answer incorrect, evidence of $1500 \div 6000$ gains <b>1</b> mark  25 without % gains <b>1</b> mark	2
<b>6(b)(ii)</b>	<u>majority</u> / <u>most</u> / high proportion of people in trial <u>lost mass</u> / <u>weight</u>	ignore good results / it worked	1
<b>Total</b>			<b>5</b>

**BLY1F**

**Question 7**

question	answers		extra information	mark		
7(a)	<table border="0" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center; vertical-align: top; border: none;"> <p><b>A</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Tests including a placebo</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Tests using very small ...</div> <div style="border: 1px solid black; padding: 5px;">Tests on animals</div> </td> <td style="width: 50%; text-align: center; vertical-align: top; border: none;"> <p><b>B</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used to find whether the drug is toxic</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">The first stage in the clinical trials of the drug</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used to find the optimum dose of the drug</div> <div style="border: 1px solid black; padding: 5px;">Used to prove that the drug is effective on humans</div> </td> </tr> </table>		<p><b>A</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Tests including a placebo</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Tests using very small ...</div> <div style="border: 1px solid black; padding: 5px;">Tests on animals</div>	<p><b>B</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used to find whether the drug is toxic</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">The first stage in the clinical trials of the drug</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used to find the optimum dose of the drug</div> <div style="border: 1px solid black; padding: 5px;">Used to prove that the drug is effective on humans</div>	<p>1 mark for each correct line</p> <p>mark each line from left hand box</p> <p>two lines from left hand box cancels mark for that box</p>	3
<p><b>A</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Tests including a placebo</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Tests using very small ...</div> <div style="border: 1px solid black; padding: 5px;">Tests on animals</div>	<p><b>B</b></p> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used to find whether the drug is toxic</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">The first stage in the clinical trials of the drug</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">Used to find the optimum dose of the drug</div> <div style="border: 1px solid black; padding: 5px;">Used to prove that the drug is effective on humans</div>					

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

## BLY1F

## Question 7 continued

question	answers	extra information	mark
7(b)	<p>any <b>three</b> from:</p> <ul style="list-style-type: none"> <li>• reference to reliability, eg only a small number of mice tested <b>or</b> trial too short <b>or</b> investigation not repeated</li> <li>• reference to control, eg mice given caffeine <u>not</u> coffee <b>or</b> 6 cups (equivalence) is more than 1 dose</li> <li>• (and) the effect on mice might not be same as on humans</li> <li>• (also) text suggests that the treatment improves memory loss (rather than delays it) <b>or</b> mice already have memory loss <b>or</b> experiment only showed improvement in memory <b>or</b> does not show <b>delays</b> Alzheimer's <b>or</b> experiment not done on old mice</li> </ul>	<p>Students have been informed that the headline is not justified</p> <p>allow only tested on mice</p> <p>accept text suggests disease cured</p> <p>allow reference to the fact that mice engineered to have it</p>	3
<b>Total</b>			<b>6</b>

**BLY1F****Question 8**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>8(a)</b>	3.75	accept answers in range 3.6 – 3.9	1
<b>8(b)</b>	(Paranthropus) aethiopicus		1
<b>8(c)</b>	(Homo) ergaster		1
<b>8(d)</b>	<p>any <b>two</b> from:</p> <ul style="list-style-type: none"> <li>• Homo erectus fossils found in other parts of the world</li> <li>• (too many) gaps in fossil record</li> <li>• Homo erectus on different branch of 'tree'</li> </ul> <p><b>or</b> no evidence of other 'humans' developing from Homo erectus</p> <p><b>or</b> no link shown between Homo erectus to Homo sapiens / modern humans</p> <p><b>or</b> (fossils show that) H. sapiens evolved from H. heidelbergensis / H. mauritanicus / H. ergaster</p>	<p>ignore references to H. floresiensis or not enough data</p> <p>allow <b>only</b> 50 fossils found in China</p> <p>ignore the two species were alive at the same time</p> <p>allow diagram shows they are not closely related</p>	2

**Question 8 continues on the next page . . .**

**BLY1F****Question 8 continued**

<b>question</b>	<b>answers</b>	<b>extra information</b>	<b>mark</b>
<b>8(e)</b>	any <b>two</b> from: <ul style="list-style-type: none"> <li>• 'religious' reasons</li> <li>• insufficient evidence at that time</li> <li>• Darwin was not a respected / well known scientist</li> <li>• mechanism of inheritance / variation not known at that time</li> </ul>	allow people did not wish to believe they had evolved from apes  allow took a long time to get evidence <b>or</b> communications not as good at that time  ignore <b>no</b> evidence / could not prove it  ignore references to Lamarck  allow (people) did not know about genes / genetics / DNA / chromosomes / mutations	<b>2</b>
<b>Total</b>			<b>7</b>

**UMS Conversion Calculator:** [www.aqa.org.uk/umsconversion](http://www.aqa.org.uk/umsconversion)