

# **Mark Scheme for January 2013**

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.










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**Annotations**

Used in the detailed Mark Scheme:

<b>Annotation</b>	<b>Meaning</b>
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
<b>not/reject</b>	answers which are not worthy of credit
<b>ignore</b>	statements which are irrelevant - applies to neutral answers
<b>allow/accept</b>	answers that can be accepted
(words)	words which are not essential to gain credit
<u>words</u>	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
ORA	or reverse argument

Available in scoris to annotate scripts:

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt

	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

### Subject-specific Marking Instructions

- a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).
- b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

*e.g. for a one-mark question where ticks in the third and fourth boxes are required for the mark:*

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth  
1 mark.*

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth  
0 marks.*

<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

*This would be worth  
1 mark.*

- c. The list principle:  
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

## d. Marking method for tick-box questions:

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.

If there is at least one tick, ignore crosses and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

e.g. if a question requires candidates to identify cities in England:

Edinburgh	<input type="checkbox"/>
Manchester	<input type="checkbox"/>
Paris	<input type="checkbox"/>
Southampton	<input type="checkbox"/>

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
<b>Score:</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>NR</b>

## e. For answers marked by levels of response:

i. **Read through the whole answer from start to finish**

ii. **Decide the level that best fits** the answer – match the quality of the answer to the closest level descriptor

iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question		Answer	Marks	Guidance
1	(a)	Nucleus;	1	<b>ignore</b> chromosomes/DNA
	(b)	carry instructions (1); code for proteins/enzymes (1);	2	<b>allow</b> to decide characteristics <b>allow</b> named example eg; blue eyes <b>allow</b> named example eg; haemoglobin
	(c)	...circular carbohydrate molecules. <input type="checkbox"/> ...sections of cytoplasm. <input type="checkbox"/> ...sections of very long DNA molecules. <input checked="" type="checkbox"/> ...structures that make up chromosomes. <input checked="" type="checkbox"/> ...vacuoles that protect the DNA. <input type="checkbox"/>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
<b>Total</b>			<b>5</b>	

Question		Answer	Marks	Guidance
2	(a)	recessive;	1	allow any other clearly identified response eg underlining or shading
	(b)	one;	1	
	(c)	50%;	1	allow equal/half/1 in 2 reject 1:2
<b>Total</b>			<b>3</b>	

Question		Answer	Marks	Guidance
3	(a)	Otto	1	one mark for the correct answer if more than one name is given then candidate scores zero
	(b)	Vikram	1	one mark for the correct answer if more than one name is given then candidate scores zero
	(c)	Lauren	1	one mark for the correct answer if more than one name is given then candidate scores zero
	(d)	Sophie	1	one mark for the correct answer if more than one name is given then candidate scores zero
<b>Total</b>			<b>4</b>	

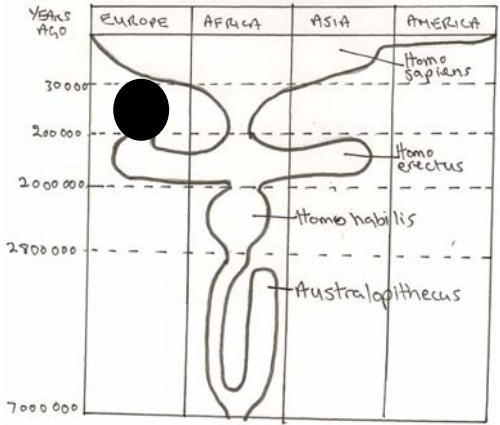
Question		Answer	Marks	Guidance
4	(a)	whether to have a termination/abortion; (1)  whether to have any more children; (1)	2	<b>allow</b> whether to have the baby or not <b>ignore</b> miscarriage <b>allow</b> whether to have a baby at all
	(b)	<b>any two from:</b> the risk involved (1); not worth having the test if you will have the baby anyway (1); the test is (ethically) wrong (1); the test is unnatural (against God) (1); the test can allow the parents to make a decision (1);	2	<b>allow</b> could be harmful to mother or baby  <b>ignore</b> parents do not want to know
<b>Total</b>			<b>4</b>	



Question			Answer	Marks	Guidance
5	(a)	(i)	Grace;	1	
		(ii)	Sandra	1	
	(b)		<p>Babies vaccinated with MMR are less likely to get measles.</p> <p>Jack caught a cold when visiting Michelle in hospital.</p> <p>People who eat lots of food are more likely to be overweight.</p> <p>Rain is more likely to fall on days that are most cloudy.</p>	<div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div>	<p>1</p> <p>if more than one box is ticked then box scores zero allow any other clearly identified correct response eg shading in the box</p> <p><b>accept</b></p> <div style="display: flex; flex-direction: column; align-items: center;"> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> </div>
	(c)		two correctly linked ideas; increase or decrease;	2	eg ice cream sales and hot weather ice cream sales increase in hot weather,
<b>Total</b>				<b>5</b>	

Question		Answer	Marks	Guidance	
6	(a)	<p>Antibiotics are much too expensive to use on a sore throat.</p> <p>Antibiotics do not work against viruses.</p> <p>Antibiotics never cure sore throats.</p> <p>Simon's sore throat is not caused by a bacterial or fungal infection.</p> <p>The antibiotic could make the infection last longer.</p> <p>The antibiotic is a placebo.</p>	<div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
	(b)	<p>to kill all bacteria; (1)</p> <p>to stop bacteria becoming resistant; (1)</p>		2	
	(c)	<p>A, D and G (in the three boxes); (1)</p> <p>A, D and G in correct order; (1)</p>		2	
	(d)	<p>It takes a lot of money to produce a new drug.</p> <p>The drug has not been tested on any living organisms.</p> <p>The drug is only 95% effective.</p> <p>The new drug has been extracted from a rare plant.</p> <p>The tests have not been repeated by other scientists.</p> <p>The work has not been peer reviewed.</p>	<div style="display: flex; flex-direction: column; align-items: center;"> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> </div>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
			<b>Total</b>	<b>8</b>	

Question		Answer	Marks	Guidance																								
7	(a)	any two from sweat; skin; tears; stomach acid; blood clots/scabs; saliva;	2	accept one way plus explanation for two marks																								
	(b)	<table border="1" style="margin-bottom: 10px;"> <tr><td>antibiotics.</td><td><input type="checkbox"/></td></tr> <tr><td>antibodies.</td><td><input type="checkbox"/></td></tr> <tr><td>toxins.</td><td><input checked="" type="checkbox"/></td></tr> </table> <table border="1" style="margin-bottom: 10px;"> <tr><td>platelets</td><td><input type="checkbox"/></td></tr> <tr><td>red blood cells</td><td><input type="checkbox"/></td></tr> <tr><td>white blood cells</td><td><input checked="" type="checkbox"/></td></tr> </table> <table border="1" style="margin-bottom: 10px;"> <tr><td>antibodies.</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>antigens.</td><td><input type="checkbox"/></td></tr> <tr><td>toxins.</td><td><input type="checkbox"/></td></tr> </table> <table border="1"> <tr><td>engulf</td><td><input checked="" type="checkbox"/></td></tr> <tr><td>increase the reproduction of</td><td><input type="checkbox"/></td></tr> <tr><td>protect</td><td><input type="checkbox"/></td></tr> </table>	antibiotics.	<input type="checkbox"/>	antibodies.	<input type="checkbox"/>	toxins.	<input checked="" type="checkbox"/>	platelets	<input type="checkbox"/>	red blood cells	<input type="checkbox"/>	white blood cells	<input checked="" type="checkbox"/>	antibodies.	<input checked="" type="checkbox"/>	antigens.	<input type="checkbox"/>	toxins.	<input type="checkbox"/>	engulf	<input checked="" type="checkbox"/>	increase the reproduction of	<input type="checkbox"/>	protect	<input type="checkbox"/>	3	4 correct = 3 3 correct = 2 2 correct = 1
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increase the reproduction of	<input type="checkbox"/>																											
protect	<input type="checkbox"/>																											
	(c)	160	1																									
<b>Total</b>			<b>6</b>																									

Question	Answer	Marks	Guidance					
<p>8 (a)</p>		<p>1</p>						
<p>(b) (i)</p>	<p><i>Homo sapiens</i> were found in four different continents.</p> <p><i>Homo erectus</i> was found in Asia.</p> <p><i>Australopithecus</i> was found in America.</p> <p><i>Homo habilis</i> was found in Europe.</p> <p><i>Australopithecus</i> were found in four different continents.</p> <table border="1" data-bbox="1205 758 1272 997"> <tr><td>✓</td></tr> <tr><td>✓</td></tr> <tr><td></td></tr> <tr><td></td></tr> <tr><td></td></tr> </table>	✓	✓				<p>1</p>	<p><b>Both</b> answers must be correct for mark</p>
✓								
✓								

Question			Answer	Marks	Guidance
8	(b)	(ii)	<p>...artificial selection. <input type="checkbox"/></p> <p>...gene therapy. <input type="checkbox"/></p> <p>...divergent evolution. <input checked="" type="checkbox"/></p> <p>...selective breeding. <input type="checkbox"/></p>	1	

Question			Answer	Marks	Guidance
8	(b)	(iii)	Homo sapiens	1	
	(c)		<p>The brain evolved to get smaller. <input type="checkbox"/></p> <p>The brain evolved to work more quickly. <input type="checkbox"/></p> <p>The brain evolved to get larger. <input checked="" type="checkbox"/></p> <p>This provided less room for other organs. <input type="checkbox"/></p> <p>This gave a better chance of survival. <input checked="" type="checkbox"/></p>	1	<b>both</b> answers must be correct for mark
	(d)		<p>Conclusions should not be drawn from new data. <input type="checkbox"/></p> <p>Scientists may fear losing respect from other scientists. <input checked="" type="checkbox"/></p> <p>Scientific theories never change. <input type="checkbox"/></p> <p>Some scientists are never wrong. <input type="checkbox"/></p> <p>Funding may be withdrawn from their research. <input checked="" type="checkbox"/></p>	2	if more than two boxes are ticked then each incorrect box loses one mark from the total for the question the candidate cannot score less than zero
			<b>Total</b>	<b>7</b>	

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