

# **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:

Annotation	Meaning
/	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 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)	<table border="1"> <thead> <tr> <th>human male</th> <th>human female</th> </tr> </thead> <tbody> <tr> <td>XY</td> <td>XX</td> </tr> </tbody> </table>	human male	human female	XY	XX	1	<b>allow</b> YX in first box <b>allow</b> lower case answers
human male	human female							
XY	XX							
	(b)	Y	1	<b>allow</b> the chromosome given above that is in the male box <b>not</b> the female box				
	(c)	<p>It causes both ovaries and testes to develop. <input type="checkbox"/></p> <p>It causes the ovaries to develop. <input type="checkbox"/></p> <p>It causes the testes to develop. <input checked="" type="checkbox"/></p> <p>It has no effect on the ovaries or the testes. <input type="checkbox"/></p> <p>It stops development of both ovaries and testes. <input type="checkbox"/></p>	1	if more than one box ticked (0) <b>allow</b> any other clearly defined correct response				
<b>Total</b>			<b>3</b>					

Question		Answer	Marks	Guidance
2	(a)	recessive	1	<b>allow</b> any other clearly identified response eg underling or shading
	(b)	50%	1	allow equal/half/1 in 2 reject 1:2
<b>Total</b>			<b>2</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 (1) whether to have any more children (1)	2	Allow whether to have the baby or not Ignore miscarriage Allow whether to have a baby at all
	(b)	<b>any two from</b> the (level of) 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)	2	Allow could be harmful to mother or baby  Ignore 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. <input type="checkbox"/></p> <p>Jack caught a cold when visiting Michelle in hospital. <input checked="" type="checkbox"/></p> <p>People who eat lots of food are more likely to be overweight. <input type="checkbox"/></p> <p>Rain is more likely to fall on days that are most cloudy. <input type="checkbox"/></p>	1	<p>if more than one box is ticked then box scores zero</p> <p><b>allow</b> any other clearly identified correct response eg shading in the box</p> <p><b>accept</b> X</p> <p><b>accept</b> <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>X</td></tr><tr><td> </td></tr><tr><td>X</td></tr><tr><td>X</td></tr></table></p>	X		X	X
X									
X									
X									
	(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>Antibiotic resistance begins with mutations in the genes of bacteria.</p> <p>It is the antibiotic that causes the genes to mutate.</p> <p>Mutations are not random and that is why bacterial resistance appears.</p> <p>Natural selection ensures that resistant bacteria survive.</p> <p>Only bacteria that do not develop antibiotic resistance can survive a course of antibiotic treatment.</p> <p>Sexual reproduction is required to produce a variation so that some bacteria are resistant.</p> <p>The process is helped because bacteria reproduce so quickly.</p>	<p>2</p>	<p>3 correct = 2 marks                  2 correct = 1 mark                  1 or 0 correct = 0 marks</p>
	(b)	<p>a cream that restores hair in bald men</p> <p>a drug that increases production of red bloodcells</p> <p>a drug that shortens the duration of flu symptoms</p> <p>a headache tablet</p> <p>a new cold cure</p> <p>a new contraceptive pill for men</p> <p>a rub-on cream for back pain</p>	<p>2</p>	<p>3 correct = 2 marks                  2 correct = 1 mark                  1 or 0 marks = 0 marks</p>

Question		Answer	Marks	Guidance
6	(c)	<p>Both the patient and the doctor would know that the drug was effective.</p> <p>Doctors do not want to give patients a treatment that is not expected to work.</p> <p>It is not morally correct to deceive patients into thinking they are taking an active drug when they are not.</p> <p>It is right that a few patients should suffer so that many patients can benefit.</p> <p>Neither the patient nor the doctor would know if the drug was effective.</p> <p>Patients with life threatening illnesses have the right to choose to have the active drug.</p> <p>The doctor would not know if the drug was effective.</p> <p>The patient would not know if the drug was effective.</p>	2	<p>3 correct = 2 marks</p> <p>2 correct = 1 mark</p> <p>1 or 0 marks = 0 marks</p>
<b>Total</b>			<b>6</b>	

Question			Answer				Marks	Guidance
7	(a)		Mutations in the individual's body cells	mutations in the individual's sex cells	Environment	Genes	2	1 mark for each row
		variation in an individual is <b>caused</b> by	✓		✓	✓		
		variation is <b>passed on</b> by		✓		✓		
	(b)			not involved in the production of new species	involved in the production of a new species	2	4 correct = 2 marks 3 correct = 1 mark 2 or 1 correct = 0 marks	
environmental change				✓				
mutations				✓				
natural selection				✓				
number of species already present			✓					
<b>Total</b>						<b>4</b>		

Question			Answer		Marks	Guidance
8	(a)	(i)	All the species named on the chart evolved from a common ancestor.	✓	1	both responses are required for 1 mark
			<i>Australopithecus</i> evolved from <i>Homo habilis</i> .			
			<i>Homo erectus</i> evolved from <i>Homo habilis</i> .	✓		
			None of the species evolved from a common ancestor.			
			Only one of the species lived in more than one continent.			

Question			Answer	Marks	Guidance
8	(a)	(ii)	divergent evolution	1	
	(b)		brain evolved to get larger (1) this gave better chance of survival (1)	2	
	(c)		<b>any two from</b> loss of respect (1) loss of funding (1) reluctant to deviate from their own position (1)  data about the issue may be open to different interpretations (1)	2	have their own points of view
<b>Total</b>				<b>6</b>	

Question			Answer	Marks	Guidance
9			<p>It agrees with other data to support the theory of evolution. <input checked="" type="checkbox"/></p> <p>It decreases our confidence in the theory but does not prove that it is wrong. <input type="checkbox"/></p> <p>It disagrees with other data that supports the theory of evolution. <input type="checkbox"/></p> <p>It increases our confidence in the theory but does not prove that it is correct. <input checked="" type="checkbox"/></p> <p>It makes no difference to our belief in the theory of evolution. <input type="checkbox"/></p> <p>It proves the theory of evolution is correct. <input type="checkbox"/></p>	2	<b>allow</b> any other clearly identified correct response eg shading in the box.
<b>Total</b>				<b>2</b>	

Question			Answer	Marks	Guidance
10	(a)	(i)	idea of removal of a food supply	1	<b>accept</b> no food left
		(ii)	<b>any one from</b> could be a predator; could compete (for food space etc); could be a pathogen/disease causing;	1	<b>accept</b> they could eat other living things/them they compete with others <b>or implication of competition</b> they give others a disease
		(iii)	idea that not enough time;  to evolve/adapt/change/become suited/get used to ;	2	cannot adapt fast enough = 2 marks cannot change fast enough = 2 marks
	(b)		example must <b>directly</b> involve humans e.g. hunting /fishing e.g. hunting of Dodo for food; habitat loss/deforestation (1)  example must be <b>indirect</b> e.g. global warming/climate change e.g. golden toad ; invasive alien species, e.g. rats from ships ate Dodo eggs; diseases (1)	2	<b>if candidate gives direct and indirect in same section then answer scores zero</b> there must be a credible example for each section <b>that is not living today</b> multiple examples must all be correct if candidate correctly explains <b>both direct and indirect with no examples</b> given, then scores 1 mark
			<b>Total</b>	<b>6</b>	

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