

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

Available in scoris to annotate scripts

Annotation	Meaning
	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

Used in the detailed Mark Scheme:

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

Subject-specific Marking Instructions

- If a candidate alters his/her response, examiners should accept the alteration.
- 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.

eg For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

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

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

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

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

<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, eg 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 boxes:

Always check the additional guidance.

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. If there are no ticks, accept clear, unambiguous indications, eg shading or crosses.

Credit should be given for each box correctly ticked. 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.

Eg If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

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		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

Question		Answer	Marks	Guidance					
1	(a)	10°C	1						
	(b)	(at regular intervals because) temperature changes through the day/year idea; (different locations because) temperature is different at different places/locations; QWC Answer addresses question & is clearly expressed;	3	ignore 'it is more reliable' ideas B: use of averages (for reliability) allow : look for patterns/track changes					
	(c)	any 2 from more people idea; more cars / factories / power plants /CO ₂ / greenhouse gases; central heating / fuels burned;	2	allow : Buildings trap heat ignore : pollution					
	(d) (i)	any 2 from took readings from different regions/locations; may have errors in measuring devices; took readings at different times (of day / year);	2	ignore : different equipment allow human error					
	(ii)	any 2 from other scientists read / discuss / review the work; other scientists collect (more) data / compare; other scientists check (calculations);	2	allow repeat the work					
	(e)	no measurements taken / recorded; equipment was not available;	2	ignore : references to measuring temperature ignore : reference to technology unless qualified					
	(f)	0.4 – 0.8	1						
	(g)	correlation <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr><tr><td> </td></tr><tr><td> </td></tr><tr><td> </td></tr></table> at least 8 million <table border="1" style="display: inline-table; vertical-align: middle;"><tr><td>✓</td></tr></table>	✓				✓	2	
✓									
✓									
Total			15						

Question		Answer	Marks	Guidance
2	(a)	all tall plants <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	1	
	(b)	(tall because) all the offspring are tall	1	
	(c) (i)	15	1	
	(ii)	3:1	1	ignore: 15:5 reject: 1:3
	(d)	more plants <input checked="" type="checkbox"/> repeat experiments <input checked="" type="checkbox"/> <input type="checkbox"/>	1	both required
	(e)	gene	1	
Total			6	

Question		Answer	Marks	Guidance					
3	(a)	deeper rock is older	1						
	(b)	any two from same rocks (layers); in same order; similar depth of (layers); same age of layers;	2	ignore: references to cliffs rather than rock layers reject: same depth of layers					
	(c)	fit together similar fossils <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>		✓	✓			2	
✓									
✓									
	(d)	any two from earthquakes; volcanoes; sea floor spreading; mountain (formation);	2	accept Tsunami					
Total			7						

Question		Answer	Marks	Guidance				
4	(a)	similarity: straight lines idea / same speed; difference: bounce / reflect / refract from ionosphere / needs satellite (to retransmit);	2	allow: both bounce off something allow: both spread out.				
	(b)	signal loses quality <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td>✓</td></tr> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td> </td></tr> </table>	✓				1	
✓								
	(c)	optical fibres <table border="1" style="display: inline-table; vertical-align: middle;"> <tr><td> </td></tr> <tr><td> </td></tr> <tr><td>✓</td></tr> <tr><td> </td></tr> </table>			✓		1	
✓								
Total			4					

Question		Answer	Marks	Guidance
5	(a)	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; width: 100px; height: 20px; margin-bottom: 10px;"></div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 10px;">receptor</div> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 100px; height: 20px; margin-left: 10px;"></div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 100px; height: 20px; margin-left: 10px;"></div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; padding: 2px 5px; margin-right: 10px;">effector</div> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 100px; height: 20px; margin-left: 10px;"></div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 100px; height: 20px; margin-left: 10px;"></div> </div> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border-left: 1px solid black; border-right: 1px solid black; width: 100px; height: 20px; margin-left: 10px;"></div> </div> <div style="border: 1px solid black; width: 100px; height: 20px;"></div> </div>	2	
	(b)	sweating/vasodilation	1	accept blood flows near skin surface reject blood vessels move to surface
	(c) (i)	leg twitched (owtte)	1	
	(ii)	nerves transmit impulses electrically owtte	1	
Total			5	

Question		Answer	Marks	Guidance
6	(a)	<p>Level 3 (5–6 marks) Describes steps in selecting and breeding foxes across several generations. Quality of written communication does not impede communication of the science at this level.</p> <p>Level 2 (3–4 marks) Explains how foxes are selected for the breeding programme and recognises need to breed suitable foxes together. Quality of written communication partly impedes communication of the science at this level.</p> <p>Level 1 (1–2 marks) Identifies characteristic of foxes that should be selected for the breeding programme. Quality of written communication impedes communication of the science at this level.</p> <p>Level 0 (0 marks) Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p>This question is targeted up to level 1 Merit</p> <p>Indicative scientific points may include:</p> <p>Selecting foxes for the programme</p> <ul style="list-style-type: none"> • start with wild foxes • choose suitable foxes • observing behaviour / idea of testing behaviour • suggests suitable traits eg calm / not aggressive/gets on with people better. • Idea of rejecting foxes that are too aggressive. <p>Breeding</p> <ul style="list-style-type: none"> • Idea of breeding 'ideal foxes' together • Looking at offspring / observing behaviour. <p>Subsequent generations</p> <ul style="list-style-type: none"> • Foxes are SELECTED after EACH generation • 'Ideal' foxes are bred together again after EACH generation • Idea that this is repeated across many generations. <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>

Question		Answer	Marks	Guidance
	(b)	longer legs: run to catch prey faster/ run to avoid predators faster; aggressive behaviour: kill prey / fight to survive / fight for mates	2	
	(c)	natural selection; Darwin;	2	
	(d)	any three from: less time taken observing / doesn't have to watch foxes all the time / no need for cameras in dens; foxes not hurt / injured / stressed idea; more information / data from DNA / faeces; personal safety;	3	
		Total	13	

Question		Answer	Marks	Guidance	
7	(a)	telescopes / suitable instruments were not invented; Ptolemy's ideas matched what people could see with the naked eye;	2	ignore: reference to technology allow resistance to new ideas from religion	
	(b)	<p>Level 3 (5–6 marks) Describes most features of the solar system AND how Galileo improved on Ptolemy. Quality of written communication does not impede communication of the science at this level.</p> <p>Level 2 (3–4 marks) Describes features of the solar system and how Galileo improved on Ptolemy. Quality of written communication partly impedes communication of the science at this level.</p> <p>Level 1 (1–2 marks) Describes features of the solar system OR how Galileo improved on Ptolemy. Quality of written communication impedes communication of the science at this level.</p> <p>Level 0 (0 marks) Insufficient or irrelevant science. Answer not worthy of credit.</p>	6	<p>This question is targeted at grades up to level 1 Merit</p> <p>Indicative scientific points may include:</p> <p>The solar system</p> <ul style="list-style-type: none"> • The Sun is the centre of the solar system • The Earth goes around the Sun • The planets also go around the Sun. <p>Moons</p> <ul style="list-style-type: none"> • The moon goes around the Earth • Other planets have moons which go around them. <p>Improvement</p> <ul style="list-style-type: none"> • No need for 'invisible spheres' • Explained the movement of wanderers. <p>Use the L1, L2, L3 annotations in Scoris; do not use ticks.</p>	
	(c)	(i)	Ali	1	
		(ii)	Di	1	
			Total	10	

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