

Science A
Twenty First Century Science

General Certificate of Secondary Education **J630**

Mark Scheme for the Components

June 2008

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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.

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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 870 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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GCSE Twenty First Century Science A (J630)

MARK SCHEMES FOR THE UNITS

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Guidance for Examiners

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Each separate marking point is indicated by a (1) at the end of that marking point.
4. Abbreviations, annotations and conventions used in the detailed Mark Scheme:

ORA = or reverse argument

NOT = point that is not given credit

AW/owtte = alternative wording/or words to that effect: allow any expression that is clearly equivalent

/ = Alternative and acceptable answers for the same marking point

point = point must be present to gain the mark

(description) = description which need not be present to gain the mark

E.g. mark scheme shows 'work done in lifting / (change in) gravitational potential energy'

work done = 0 marks

work done lifting = 1 mark

change in potential energy = 0 marks

gravitational potential energy = 1 mark

5. If a candidate alters his/her response, examiners should accept the alteration.
6. The list principle: if a list of responses greater than the number requested is given, you 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, i.e. 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.
7. Marking method for tick boxes:
If there is a set of boxes, some of which should be ticked and others left empty, then you need to judge the entire set of boxes.

E.g. 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). For a two-mark question, the rationale would be:

All boxes are indicated scores 0 marks.

All boxes blank scores 0 marks.

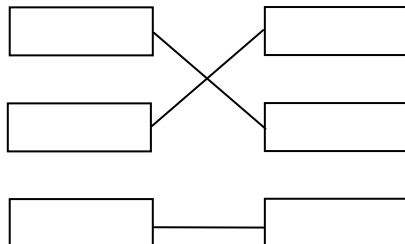
All four boxes correct scores 2 marks.

Three boxes correct scores 1 mark.

Two boxes correct scores 1 mark.

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	x	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	x		✓		✓	✓		✓	
Score:	2	2	1	1	1	1	0	0	0	NR

A211/01 Modules B1, C1, P1 Foundation

Question			Expected Answers	Marks	Rationale										
1	a	i		2	all links correct = 2 marks 1 or 2 links correct = 1 mark more than one line from a left hand box does not score that link										
		ii	Z (1)	1	allow mantle										
	b		<table><tr><th>supports Wegener</th><th>supports Willis</th></tr><tr><td>✓</td><td></td></tr><tr><td>✓</td><td></td></tr><tr><td></td><td>✓</td></tr><tr><td>✓</td><td></td></tr></table>	supports Wegener	supports Willis	✓		✓			✓	✓		3	count correct rows all correct = 3 marks one mistake = 2 marks two mistakes = 1 mark more than two mistakes = 0 marks a mistake is: <ul style="list-style-type: none">a tick in the wrong column of a rowno tick or two ticks in a row accept any clear and unambiguous response
supports Wegener	supports Willis														
✓															
✓															
	✓														
✓															
			Total	6											

A211/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale								
2	a	i	parallax (1)	1	allow answer clearly marked on list above (circle/underline etc.) allow incorrect spelling if answer unambiguous								
		ii	star A is further from Earth than B <table><tr><td></td></tr><tr><td>✓</td></tr><tr><td></td></tr></table> (1)		✓		1	accept any clear and unambiguous response more than 1 response = 0					
✓													
	b		radiation (1) light pollution (1) planets (1)	3	correct response must be in appropriate sentence								
	c	i	<table><tr><td>Bev</td><td>✓</td></tr><tr><td>Matt</td><td></td></tr><tr><td>Sahid</td><td>✓</td></tr><tr><td>Tracy</td><td></td></tr></table> (1) (1)	Bev	✓	Matt		Sahid	✓	Tracy		2	1 mark for each correct answer if 3 boxes ticked deduct 1 mark 4 ticks = 0 marks accept any clear and unambiguous response
Bev	✓												
Matt													
Sahid	✓												
Tracy													
		ii	<table><tr><td>Bev</td><td></td></tr><tr><td>Matt</td><td>✓</td></tr><tr><td>Sahid</td><td>✓</td></tr><tr><td>Tracy</td><td></td></tr></table> (1) (1)	Bev		Matt	✓	Sahid	✓	Tracy		2	1 mark for each correct answer if 3 boxes ticked deduct 1 mark 4 ticks = 0 marks accept any clear and unambiguous response
Bev													
Matt	✓												
Sahid	✓												
Tracy													
			Total	9									

A211/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
3	a	i	<div>close roads in the city centre <input checked="" type="checkbox"/> (1)</div> <div><input type="checkbox"/></div> <div>use electric trams instead of cars <input checked="" type="checkbox"/> (1)</div> <div><input type="checkbox"/></div>	2	1 mark for each correct answer if 3 boxes ticked deduct 1 mark 4 ticks = 0 marks accept any clear and unambiguous response
		ii	<div><input type="checkbox"/></div> <div><input type="checkbox"/></div> <div>... affects people with asthma <input checked="" type="checkbox"/> (1)</div> <div>... damages the environment <input checked="" type="checkbox"/> (1)</div>	2	1 mark for each correct answer if 3 boxes ticked deduct 1 mark 4 ticks = 0 marks accept any clear and unambiguous response
		iii	<div>...are not driving their cars into town <input checked="" type="checkbox"/> (1)</div> <div><input type="checkbox"/></div> <div>trams run on electricity <input checked="" type="checkbox"/> (1)</div> <div><input type="checkbox"/></div>	2	1 mark for each correct answer if 3 boxes ticked deduct 1 mark 4 ticks = 0 marks accept any clear and unambiguous response
	b			4	mark each side independently on each side: 3 correct links = 2 marks 2 or 1 correct links = 1 mark 2 lines from left box in link does not score that link
Total				10	

A211/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
4	a		64 (1)	1	accept any clear and unambiguous response
	b	i	25 (1)	1	accept any clear and unambiguous response
		ii	from 23 to 27 (1)	1	both values required - can be in either order
		iii	<div> <div>... heating boiler changed slightly</div> <div> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div>(1)</div> </div>	1	accept any clear and unambiguous response
			Total	4	

5	a		<div> <div> <div>alleles</div> <div>chromosomes</div> <div>genes</div> </div> <div> <div>long threads of DNA</div> <div>instructions for protein</div> <div></div> <div>different versions</div> </div> </div>	3	each correct link scores 1 mark more than one line from the same name (left box) does not score for that link
	b		<div> <div>one set comes from each parent</div> <div> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </div> <div>(1)</div> </div>	1	accept any clear and unambiguous response more than 1 response = 0
			Total	4	

A211/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
6	a	i	<div> <div></div> <div></div> <div> <div>Passed on to him from parents</div> <div>✓</div> </div> <div>(1)</div> </div>	1	accept any clear and unambiguous response more than 1 response = 0
		ii	<div> <div>being clumsy (1)</div> <div>forgetting things (1)</div> </div>	2	1 mark for each correct answer if 3 answers given deduct 1 mark 4/5 answers = 0 marks accept any clear and unambiguous response
		iii	<div> <div>one</div> <div> <div></div> <div>✓</div> <div></div> <div></div> </div> <div>(1)</div> </div>	1	accept any clear and unambiguous response more than 1 response = 0
	b		<div> <div>... whether or not to have children</div> <div> <div></div> <div>✓</div> <div></div> </div> <div>make plans to help him in the future</div> <div> <div></div> <div>✓</div> </div> </div>	1	both correct ticks required for 1 mark one or three ticks = 0 accept any clear and unambiguous response
	c	i	Nikki (1)	1	accept any clear and unambiguous response
		ii	Tony (1)	1	accept any clear and unambiguous response
		iii	Mark (1)	1	accept any clear and unambiguous response
		iv	William and Tony (1)	1	both required - either order accept any clear and unambiguous response
			Total	9	

A211/01

Mark Scheme

June 2008

A211/02 Modules B1, C1, P1 Higher

Question			Expected Answers	Marks	Rationale										
1	a		<table><tr><td>supports Wenger</td><td>supports Willis</td></tr><tr><td>✓</td><td></td></tr><tr><td>✓</td><td></td></tr><tr><td></td><td>✓</td></tr><tr><td>✓</td><td></td></tr></table>	supports Wenger	supports Willis	✓		✓			✓	✓		3	count correct rows all correct = 3 one mistake = 2 two mistakes = 1 more than two mistakes = 0 a mistake is: <ul style="list-style-type: none">a tick in the wrong column of a rowno tick or two ticks in a row accept any clear and unambiguous response
supports Wenger	supports Willis														
✓															
✓															
	✓														
✓															
	b	i	100 mm (1)	1	accept any clear and unambiguous response										
		ii	<table><tr><td>(C)</td><td>A</td><td>B</td><td>E</td><td>D</td></tr></table>	(C)	A	B	E	D	3	A before B (1) B before E (1) E before D (1)					
(C)	A	B	E	D											
			Total	7											

A211/02

Mark Scheme

June 2008

Question			Expected Answers		Marks	Rationale																								
2		a	<table><tr><td>Bev</td><td>✓</td></tr><tr><td>Matt</td><td></td></tr><tr><td>Sahid</td><td>✓</td></tr><tr><td>Tracy</td><td></td></tr></table> <div>(1)</div> <div>(1)</div>	Bev	✓	Matt		Sahid	✓	Tracy		2	1 mark for each correct answer If 3 boxes ticked deduct 1 mark 4 ticks = 0 marks accept any clear and unambiguous response																	
Bev	✓																													
Matt																														
Sahid	✓																													
Tracy																														
		b	<table><tr><td>Bev</td><td></td></tr><tr><td>Matt</td><td>✓</td></tr><tr><td>Sahid</td><td>✓</td></tr><tr><td>Tracy</td><td></td></tr></table> <div>(1)</div> <div>(1)</div>	Bev		Matt	✓	Sahid	✓	Tracy		2	1 mark for each correct answer if 3 boxes ticked deduct 1 mark 4 ticks = 0 marks accept any clear and unambiguous response																	
Bev																														
Matt	✓																													
Sahid	✓																													
Tracy																														
		c	<table><tr><td></td><td>can be done</td><td>cannot be done</td><td>should be done</td><td>should not be done</td></tr><tr><td>Bev</td><td>✓</td><td></td><td></td><td></td></tr><tr><td>Matt</td><td></td><td></td><td></td><td>✓</td></tr><tr><td>Sahid</td><td></td><td>✓</td><td></td><td></td></tr><tr><td>Tracy</td><td>(✓)</td><td></td><td>✓</td><td></td></tr></table>		can be done	cannot be done	should be done	should not be done	Bev	✓				Matt				✓	Sahid		✓			Tracy	(✓)		✓		4	one mark for each correct row if more than 1 tick in a row, that row scores 0 marks BUT if the row for Tracey has an extra tick (as shown in brackets on the mark scheme) the mark for that row may still be awarded as this is treated as neutral
	can be done	cannot be done	should be done	should not be done																										
Bev	✓																													
Matt				✓																										
Sahid		✓																												
Tracy	(✓)		✓																											
			Total	8																										

A211/02

Mark Scheme


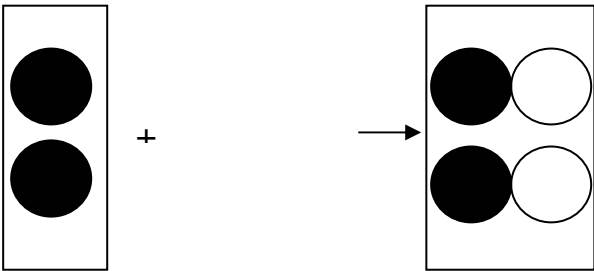


June 2008

Question			Expected Answers	Marks	Rationale
3	a		<div> <div>... levels and hospital admissions</div> <div> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div>(1)</div> </div>	1	accept any clear and unambiguous response
	b		<div> <div>each tram can carry eighty people</div> <div> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div>(1)</div> </div> <div> <div>trams run on electricity</div> <div> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div>(1)</div> </div>	2	accept any clear and unambiguous response 1 mark for each correct answer if 3 boxes ticked deduct 1 mark 4 ticks = 0 marks
	c			2	accept any clear and unambiguous response mark lines from left hand boxes all lines correct for 2 marks 2 correct lines = 1 mark 1 correct = 0 marks if two or more lines from a left hand box, treat that box as incorrect
			Total	5	

A211/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
4	a		carbon	1	accept 'C' for carbon
	b			1	atoms must be in correct order E.g. white-black-white white circles must be touching the black circle white circles must not touch each other accept <div style="display: inline-block; vertical-align: middle; text-align: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">C</div> <div style="margin: 0 5px;">instead of black circle</div> </div> and <div style="display: inline-block; vertical-align: middle; text-align: center;"> <div style="border: 1px solid black; border-radius: 50%; width: 20px; height: 20px; margin: 0 auto; display: flex; align-items: center; justify-content: center;">O</div> <div style="margin: 0 5px;">instead of white circle</div> </div>
	c			2	mark left box and right box independently. accept left box: 2 black circles, not touching each other = 1 mark accept <div style="display: inline-block; vertical-align: middle; text-align: center;"> <div style="border: 1px solid black; padding: 5px;">2 x </div> <div style="margin: 0 5px;">to represent 2 copies</div> </div> right box: 2 copies of a black circle and a white circle joined (one copy must not touch the other) = 1 mark accept <div style="display: inline-block; vertical-align: middle; text-align: center;"> <div style="border: 1px solid black; padding: 5px;">2 x </div> <div style="margin: 0 5px;">to represent 2 copies</div> </div>
			Total	4	

A211/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
5	a		64 (1)	1	accept any clear and unambiguous response if no value is chosen from the list, check the table above
	b	i	25 (1)	1	accept any clear and unambiguous response ignore any working out or units written after the number
		ii	from 23 to 27 (1)	1	both values required - can be in either order
		iii	<div> <div>... heating boiler changed slightly</div> <div> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div>(1)</div> </div>	1	accept any clear and unambiguous response
	c		<div> <div>range of test C does not overlap B</div> <div> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> </div> <div>(1)</div> </div>	1	accept any clear and unambiguous response
			Total	5	

A211/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale																
6	a		<div>only one dominant allele is needed</div> <div><div><div></div><div></div><div>✓</div><div></div></div>(1)</div>	1	accept any clear and unambiguous response																
	b		50%	1	accept any clear and unambiguous response																
	c		<table><tr><td>✓</td><td></td><td></td><td>(1)</td></tr><tr><td>✓</td><td></td><td></td><td>(1)</td></tr><tr><td></td><td>✓</td><td></td><td>(1)</td></tr><tr><td></td><td></td><td>✓</td><td>(1)</td></tr></table>	✓			(1)	✓			(1)		✓		(1)			✓	(1)	4	one mark for each correct row if more than 1 tick in a row, that row scores 0 marks
✓			(1)																		
✓			(1)																		
	✓		(1)																		
		✓	(1)																		
	d	i	Nikki (1)	1	accept any clear and unambiguous response																
		ii	Tony (1)	1	accept any clear and unambiguous response																
		iii	Mark (1)	1	accept any clear and unambiguous response																
		iv	William and Tony (1)	1	both required - either order accept any clear and unambiguous response																
	e		<table><tr><td></td><td>✓</td><td></td><td>(1)</td></tr><tr><td>✓</td><td></td><td></td><td>(1)</td></tr><tr><td>✓</td><td></td><td></td><td>(1)</td></tr></table>		✓		(1)	✓			(1)	✓			(1)	3	one mark for each correct row if more than 1 tick in a row, that row scores 0 marks				
	✓		(1)																		
✓			(1)																		
✓			(1)																		
			Total	13																	

A212/01 Modules B2, C2, P2 Foundation

Question			Expected Answers	Marks	Rationale
1	a	i	cotton (1)	1	accept any clear indication of correct answer.
		ii	<div>made from renewable sources</div> <div> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> </div> <div>(1)</div>	1	accept any clear indication of correct answer more than 1 tick scores 0
	b	i	kevlar (1)	1	accept any clear indication of correct answer.
		ii	<div>nylon sails absorb most water</div> <div>sail that absorbs water will be heavier</div> <div>sails that are strong absorb less water</div> <div> <input type="checkbox"/> F <input type="checkbox"/> T <input type="checkbox"/> T </div>	2	3 correct = 2 1 or 2 correct = 1 F and T written on top of each other does not score for that box
		iii	<div>resistance to stretch</div> <div> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> </div> <div>(1)</div>	1	accept any clear indication of correct answer more than 1 tick = 0
			Total	6	

A212/01

Mark Scheme

June 2008

15

Question			Expected Answers	Marks	Rationale								
2	a	i	Peter (1)	1									
		ii	Kate (1) Jane (1)	2	1 mark for each correct name in any order								
	b	i	3 (1)	1	allow ring around 3 in the table allow ring around stretch of 3.5 in table								
		ii	2.1 (1)	1									
		iii	<div>the samples may vary <table><tr><td>✓</td></tr><tr><td></td></tr><tr><td></td></tr></table> (1)</div> <div>errors reading the lengths <table><tr><td>✓</td></tr></table> (1)</div>	✓			✓	2	1 mark for each correct answer If 3 boxes ticked deduct 1 mark 4 ticks = 0 marks				
✓													
✓													
	c		<table><tr><td></td><td></td></tr><tr><td>....more flexible</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> (1)		more flexible	✓					1	accept any clear indication of correct answer more than 1 tick = 0
....more flexible	✓												
			Total	8									

3			<table><tr><td></td><td></td></tr><tr><td>they make antibodies</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td>they digest micoorganisms</td><td>✓</td></tr></table> (1)			they make antibodies	✓			they digest micoorganisms	✓	2	1 mark for each correct answer If 3 boxes ticked deduct 1 mark 4 ticks = 0 marks
they make antibodies	✓												
they digest micoorganisms	✓												
			Total	2									

A212/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale						
4	a		<table><tr><td></td><td></td></tr><tr><td>a safe form of the virus</td><td>✓</td></tr><tr><td></td><td></td></tr></table> (1)			a safe form of the virus	✓			1	accept any clear indication of correct answer more than 1 tick = 0
a safe form of the virus	✓										
	b	i	Jasmine (1) Jo (1)	2	1 mark for each correct name in any order						
		ii	Saleema (1) Jo (1)	2	1 mark for each correct name in any order						
		iii	Sam (1)	1							
			Total	6							

5	a		increases (1) positive (1)	2	answer must correctly complete the sentence 1 mark for each correct answer																					
	b		<table><tr><td></td><td>increase</td><td>decrease</td></tr><tr><td>poor diet</td><td>✓</td><td></td></tr><tr><td>stress</td><td>✓</td><td></td></tr><tr><td>alcohol</td><td>✓</td><td></td></tr><tr><td>exercise</td><td></td><td>✓</td></tr><tr><td>smoking</td><td>✓</td><td></td></tr><tr><td>cholesterol drugs</td><td></td><td>✓</td></tr></table>		increase	decrease	poor diet	✓		stress	✓		alcohol	✓		exercise		✓	smoking	✓		cholesterol drugs		✓	4	accept any clear indication of correct answer if both ticks and crosses used then ignore crosses 6 correct = 4 4 or 5 correct = 3 2 or 3 correct = 2 1 correct = 1
	increase	decrease																								
poor diet	✓																									
stress	✓																									
alcohol	✓																									
exercise		✓																								
smoking	✓																									
cholesterol drugs		✓																								
			Total	6																						

A212/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
6			<div> <div>signal from TV station to TV aerial</div> <div>cooking food quickly</div> <div>signal from remote control to the TV</div> <div>Mike watching his TV</div> </div> <div> <div>light</div> <div>infrared</div> <div>microwaves</div> <div>radio waves</div> </div>	3	<p>3 or 4 correct = 3 2 correct = 2 1 correct = 1</p> <p>look for job correctly linked to type of radiation more than one line from a left hand box is incorrect</p>
			Total	3	

A212/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale												
7	a		<table><tr><td>headaches</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr><tr><td>loss of concentration</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr></table>	headaches	✓	(1)				loss of concentration	✓	(1)				2	1 mark for each correct answer If 3 boxes ticked deduct 1 mark 4 ticks = 0 marks
headaches	✓	(1)															
loss of concentration	✓	(1)															
	b		<table><tr><td></td><td></td><td></td></tr><tr><td>students can benefit</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>				students can benefit	✓	(1)							1	more than 1 tick = 0
students can benefit	✓	(1)															
	c		<table><tr><td>... photons have more energy ...</td><td>F</td></tr><tr><td>... photons are ionising radiation.</td><td>F</td></tr><tr><td>Ionising radiation can cause cancer.</td><td>T</td></tr><tr><td>... radiation is used by mobile</td><td>T</td></tr></table>	... photons have more energy ...	F	... photons are ionising radiation.	F	Ionising radiation can cause cancer.	T	... radiation is used by mobile	T	3	all 4 correct = 3 3 correct = 2 2 correct = 1 1 correct = 0 F and T written on top of each other does not score for that box				
... photons have more energy ...	F																
... photons are ionising radiation.	F																
Ionising radiation can cause cancer.	T																
... radiation is used by mobile	T																
			Total	6													

A212/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
8	a			4	mark each box independently
			light radiated from the sun B (1)		
			does not reach Earth's surface A (1)		
			the Earth's atmosphere D (1)		
			warms the Earth's atmosphere E (1)		
	b			1	more than 1 tick = 0
			carbon dioxide ✓ (1)		
			Total	5	

A212/02 Modules B2, C2, P2 Higher

Question			Expected Answers		Marks	Rationale
1					1	more than one tick = 0
			strength and resistance to stretch	✓ (1)		
			Total		1	

2	a	i	Sajid (1)	1													
		ii	Jess (1)	1													
	b	i	3 (1)	1	allow ring around 3 in the table allow ring around stretch of 3.5 in table												
		ii	2.1 (1)	1													
		iii	<table><tr><td>The samples may vary.</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td>... errors reading the lengths.</td><td>✓</td><td>(1)</td></tr></table>	The samples may vary.	✓	(1)							... errors reading the lengths.	✓	(1)	2	1 mark for each correct answer If three boxes ticked deduct 1 mark four ticks = 0 mark
The samples may vary.	✓	(1)															
... errors reading the lengths.	✓	(1)															
			Total	6													

A212/02

Mark Scheme

June 2008

Question			Expected Answers		Marks	Rationale												
3	a		A (1) D (1)		2	Answers in any order.												
	b		<table><tr><td></td><td></td></tr><tr><td>smaller more reactive molecules</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td>join together to make long chains</td><td>✓</td></tr><tr><td></td><td></td></tr></table>				smaller more reactive molecules	✓			join together to make long chains	✓			1	both correct for one mark a tick in any other box = 0 marks		
smaller more reactive molecules	✓																	
join together to make long chains	✓																	
	c		<table><tr><td></td><td>dec</td><td>inc</td><td>stays same</td></tr><tr><td>increased crystallinity</td><td></td><td>✓(1)</td><td></td></tr><tr><td>plasticizer added</td><td>✓(1)</td><td></td><td></td></tr></table>			dec	inc	stays same	increased crystallinity		✓(1)		plasticizer added	✓(1)			2	mark each row separately one tick in correct place = 1 mark
	dec	inc	stays same															
increased crystallinity		✓(1)																
plasticizer added	✓(1)																	
	d		<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>gases put into the atmosphere</td><td>✓ (1)</td></tr><tr><td>may harm living things</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr></table>						gases put into the atmosphere	✓ (1)	may harm living things	✓ (1)			2	1 mark for each correct answer if three ticks deduct 1 mark four or five ticks = 0 marks		
gases put into the atmosphere	✓ (1)																	
may harm living things	✓ (1)																	
			Total		7													

A212/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale												
4	a		<table><tr><td></td><td></td></tr><tr><td>safe form of a virus</td><td>✓ (1)</td></tr><tr><td>immune system</td><td>✓ (1)</td></tr><tr><td>prevent epidemics</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>			safe form of a virus	✓ (1)	immune system	✓ (1)	prevent epidemics	✓ (1)					3	1 mark for each correct answer if four ticks deduct 1 mark if five ticks deduct 2 marks six ticks = 0 marks
safe form of a virus	✓ (1)																
immune system	✓ (1)																
prevent epidemics	✓ (1)																
	b	i	Jasmine (1) Jo (1)	2	1 mark for each correct name in any order												
		ii	Jo (1) Saleema (1)	2	1 mark for each correct name in any order												
		iii	Sam (1)	1													
	c		<table><tr><td></td><td></td></tr><tr><td>damages the immune system</td><td>✓ (1)</td></tr><tr><td>has a high mutation rate</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr></table>			damages the immune system	✓ (1)	has a high mutation rate	✓ (1)			2	1 mark for each correct answer if three boxes ticked deduct 1 mark four ticks = 0 marks				
damages the immune system	✓ (1)																
has a high mutation rate	✓ (1)																
			Total	10													

A212/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale						
5	a		<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>positive correlation</td><td>✓</td></tr></table> (1)					positive correlation	✓	1	more than one tick scores 0
positive correlation	✓										
	b		<table><tr><td>(E)</td><td>F</td><td>D</td><td>C</td><td>A</td><td>(B)</td></tr></table>	(E)	F	D	C	A	(B)	3	F before D (1) D before C (1) C before A (1)
(E)	F	D	C	A	(B)						
			Total	4							

6			<table><tr><td>signal from TV station</td><td>radio waves</td></tr><tr><td>cooking food quickly</td><td>microwaves</td></tr><tr><td>signal from remote control</td><td>infrared/IR</td></tr><tr><td>Mike watching his TV</td><td>(visible) light</td></tr></table>	signal from TV station	radio waves	cooking food quickly	microwaves	signal from remote control	infrared/IR	Mike watching his TV	(visible) light	2	accept radio - do not accept waves accept micro - do not accept waves accept reasonable variation of spellings of infra accept visible on its own 4 correct =2 2 or 3 correct =1 1 or 0 correct = 0
signal from TV station	radio waves												
cooking food quickly	microwaves												
signal from remote control	infrared/IR												
Mike watching his TV	(visible) light												
			Total	2									

A212/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale										
7	a		photons (1)	1											
	b		infrared radiation from the Earth (1) ... is absorbed by carbon dioxide in the atmosphere... (1) ... causing the Earth to be warmer (1)	3	1 mark for correct box in each column more than one box indicated in a column = 0 mark for that column										
	c		<table><tr><td></td><td></td></tr><tr><td>increase in amount of flooding</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td>difficulty in growing crops</td><td>✓</td></tr><tr><td></td><td></td></tr></table> (1) (1)			increase in amount of flooding	✓			difficulty in growing crops	✓			2	1 mark for each correct answer if three boxes ticked deduct 1 mark four or five ticks = 0 marks
increase in amount of flooding	✓														
difficulty in growing crops	✓														
			Total	6											

A212/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale								
8	a		<div>... photons have more energy ...<div>F</div></div> <div>... photons are ionising radiation.<div>F</div></div> <div>Ionising radiation can cause cancer.<div>T</div></div> <div>... radiation is used by mobile phones.<div>T</div></div>	3	all 4 correct = 3 3 correct = 2 2 correct = 1 1 correct = 0 F and T written on top of each other does not score for that box								
	b		<table><tr><td></td><td></td></tr><tr><td>students can benefit</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table> (1)			students can benefit	✓					1	more than one tick scores 0
students can benefit	✓												
	c	i	Mark (1)	1									
		ii	Veronica (1)	1									
			Total	6									

A213/01 Modules B3, C3, P3 Foundation

Question			Expected Answers	Marks	Rationale												
1	a		receptor (1) response (1) brain (1)	3	accept any other unambiguous positive indication on list												
	b		<table><tr><td></td><td>nervous</td><td>hormonal</td></tr><tr><td>hearing the horn</td><td>✓</td><td></td></tr><tr><td>face goes pale</td><td></td><td>✓</td></tr><tr><td>jumping back</td><td>✓</td><td></td></tr></table>		nervous	hormonal	hearing the horn	✓		face goes pale		✓	jumping back	✓		2	check line by line; if more than one ✓ per line, no credit 3 correct = 2 2 correct = 1 1 correct = 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
	nervous	hormonal															
hearing the horn	✓																
face goes pale		✓															
jumping back	✓																
			Total	5													

2	a	extinct (1)		1	accept any other positive unambiguous response e.g. underline										
	b	<table border="1"><tr><td></td><td></td></tr><tr><td>less food for the birds this year</td><td>✓ (1)</td></tr><tr><td>fewer chicks survived the winter</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr></table>				less food for the birds this year	✓ (1)	fewer chicks survived the winter	✓ (1)					2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark = 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
less food for the birds this year	✓ (1)														
fewer chicks survived the winter	✓ (1)														
	c	<table border="1"><tr><td></td><td></td></tr><tr><td>population of fish will increase</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr></table>				population of fish will increase	✓ (1)			1	deduct one mark for each incorrect tick if more than one tick used - minimum mark = 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used				
population of fish will increase	✓ (1)														
		Total		4											

A213/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale																				
3	a		A (1) B (1)	2	either order is acceptable accept other unambiguous indications e.g. circle A and B accept lower case mark answers on lines first																				
	b		<table><tr><td></td><td>selective breeding</td><td>natural selection</td><td>both</td></tr><tr><td>useful features</td><td>✓</td><td></td><td></td></tr><tr><td>variation</td><td></td><td></td><td>✓</td></tr><tr><td>better adapted</td><td></td><td>✓</td><td></td></tr><tr><td>passed on</td><td></td><td></td><td>✓</td></tr></table>		selective breeding	natural selection	both	useful features	✓			variation			✓	better adapted		✓		passed on			✓	3	check line by line; if more than one ✓ per line, no credit for that line 4 correct = 3 3 correct = 2 2 correct = 1 1 correct = 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
	selective breeding	natural selection	both																						
useful features	✓																								
variation			✓																						
better adapted		✓																							
passed on			✓																						
			Total	5																					
4	a	i	amber (1)	1	accept any other positive unambiguous response e.g. underline																				
		ii	sugar (1)	1	accept any other positive unambiguous response e.g. underline																				
	b		<table><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td>choose a healthy diet</td><td>✓</td><td>(1)</td></tr></table>										choose a healthy diet	✓	(1)	1	deduct one mark for each incorrect tick if more than one tick used - minimum mark 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used								
choose a healthy diet	✓	(1)																							
	c	i	Anna (1) Rajid (1)	2	either order is acceptable accept R for Rajid etc																				
		ii	Danny (1)	1	accept D for Danny; more than one name = 0																				
			Total	6																					

A213/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale												
5	a		nitrogen (1) fertile (1) disease (1)	3	accept any other unambiguous positive indication on list accept N for nitrogen												
	b	i	<table><tr><td>pesticides are used</td><td>✓</td><td>(1)</td></tr><tr><td>chemical weed killers are used</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>	pesticides are used	✓	(1)	chemical weed killers are used	✓	(1)							2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
pesticides are used	✓	(1)															
chemical weed killers are used	✓	(1)															
		ii	<table><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr><tr><td>meet the UK national standards</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr></table>							meet the UK national standards	✓	(1)				1	more than one response = 0 marks accept a clear response e.g. ✓ or X or shading etc ignore X if combination of ✓ and X used
meet the UK national standards	✓	(1)															
	c		<table><tr><td>his crop yield is lower</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr><tr><td>he spends less on pesticides</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr></table>	his crop yield is lower	✓	(1)				he spends less on pesticides	✓	(1)				2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
his crop yield is lower	✓	(1)															
he spends less on pesticides	✓	(1)															
			Total	8													

A213/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale																														
6	a			4	mark line by line; if more than one ✓ per line, no credit accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used																														
	b		<table border="1"> <thead> <tr> <th></th><th>for</th><th>against</th><th>neither</th><th>both</th><th></th></tr> </thead> <tbody> <tr> <td>Andy</td><td></td><td></td><td></td><td>✓</td><td>(1)</td></tr> <tr> <td>Betty</td><td>✓</td><td></td><td></td><td></td><td>(1)</td></tr> <tr> <td>Chris</td><td></td><td></td><td>✓</td><td></td><td>(1)</td></tr> <tr> <td>Dan</td><td>✓</td><td></td><td></td><td></td><td>(1)</td></tr> </tbody> </table>		for	against	neither	both		Andy				✓	(1)	Betty	✓				(1)	Chris			✓		(1)	Dan	✓				(1)	2	accept any other positive unambiguous response e.g. underline deduct one mark for each incorrect response if more than two given minimum mark 0
	for	against	neither	both																															
Andy				✓	(1)																														
Betty	✓				(1)																														
Chris			✓		(1)																														
Dan	✓				(1)																														
			Total	6																															

7	a		North America (1)	1	accept any other positive unambiguous response e.g. underline if more than one response no mark
	b		5.9 (1)	1	accept any other positive unambiguous response e.g. underline if more than one response no mark
			Total	2	

A213/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale										
8	a	i	D (1)	1	accept lead (Pb) accept other unambiguous indications e.g. circle D										
		ii	A (1)	1	accept open window accept other unambiguous indications e.g. circle A										
	b		<table><tr><td></td><td></td></tr><tr><td>cannot penetrate paper</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr><tr><td>stopped by dead skin cells</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr></table>			cannot penetrate paper	✓ (1)			stopped by dead skin cells	✓ (1)			2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used. Minimum mark 0. accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
cannot penetrate paper	✓ (1)														
stopped by dead skin cells	✓ (1)														
	c		<table><tr><td>amount of radiation</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>type of radiation</td><td>✓ (1)</td></tr><tr><td></td><td></td></tr></table>	amount of radiation	✓ (1)					type of radiation	✓ (1)			2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0 accept a clear response eg. X or shading etc ignore X if combination of ✓ and X used
amount of radiation	✓ (1)														
type of radiation	✓ (1)														
			Total	6											

A213/02 Modules B3, C3, P3 Higher

Question			Expected Answers		Marks	Rationale
1	a				2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
			less food for the birds this year	✓ (1)		
			fewer chicks survived the winter	✓ (1)		
	b				2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
			noise from the harbour	✓ (1)		
			feed on the same species of fish	✓ (1)		
			Total		4	

A213/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale												
2	a		A (1) B (1)	2	either order is acceptable accept other unambiguous indications e.g. circle A and B. accept lower case mark answers on lines first												
	b		<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>interpret evidence in different</td><td>✓ (1)</td></tr><tr><td>many different ideas</td><td>✓ (1)</td></tr><tr><td>no one knows the conditions</td><td>✓ (1)</td></tr></table>							interpret evidence in different	✓ (1)	many different ideas	✓ (1)	no one knows the conditions	✓ (1)	3	one mark for each correct tick deduct one mark for each incorrect tick if more than three ticks used - minimum mark 0 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
interpret evidence in different	✓ (1)																
many different ideas	✓ (1)																
no one knows the conditions	✓ (1)																
			Total	5													

A213/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
3	a	i	D (1)	1	accept any unambiguous indication of D
		ii	A C E	2	any order is acceptable 3 correct (2) 2 correct (1) 1 or 0 correct (0)
	b		A (1) B (1)	2	one mark for each correct response either order is acceptable accept any unambiguous indication of A and B
			Total	5	

4	a		<table><tr><td></td><td></td></tr><tr><td>protect the public's health</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td>looks after consumer interests</td><td>✓</td></tr><tr><td></td><td></td></tr></table>			protect the public's health	✓			looks after consumer interests	✓			(1)	2	one mark for each correct tick
		protect the public's health	✓													
		looks after consumer interests	✓													
			deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0													
			accept a clear response eg. X or shading etc													
			ignore X if combination of ✓ and X used													
	b	i	Anna (1) Rajid (1)		2	either order is acceptable										
		ii	Danny (1)		1	accept R for Rajid etc										
		iii	Danny (1)		1	accept D for Danny more than one name = 0										
			<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>possible consequences of</td><td>✓</td></tr></table>					possible consequences of	✓	(1)	1	more than one response = 0				
possible consequences of	✓															
						accept a clear response e.g. X or shading etc										
						ignore X if combination of ✓ and X used										
			Total		6											

A213/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale								
5	a		<div>LeftRight</div> <div><div>intensive</div><div>organic</div><div>manure</div><div>chemical fertiliser</div><div>large fields</div><div>small fields</div><div>non-renewable sources</div><div>recycles waste</div><div>increases wildlife habitats</div><div>reduces wildlife habitats</div></div>	4	<p>mark left and right hand sides independently</p> <p>(Left) two correct lines from intensive = 1 one, three or four lines = 0</p> <p>two correct lines from organic = 1 one, three or four lines = 0</p> <p>(Right) correct lines from manure and chemical = 1 any additional lines from manure or chemical = 0</p> <p>correct lines from large and small = 1 any additional lines from large or small = 0</p>								
	b	i	<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>meet the UK national standards</td><td>✓</td></tr><tr><td></td><td></td></tr></table> (1)					meet the UK national standards	✓			1	<p>more than one response = 0</p> <p>accept a clear response eg. ✓ or X or shading etc</p> <p>ignore X if combination of ✓ and X used</p>
meet the UK national standards	✓												
		ii	<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>nitrogen, phosphorus, potassium</td><td>✓</td></tr></table> (1)							nitrogen, phosphorus, potassium	✓	1	<p>more than one response = 0 marks</p> <p>accept a clear response eg. ✓ or X or shading etc</p> <p>ignore X if combination of ✓ and X used</p>
nitrogen, phosphorus, potassium	✓												

A213/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale												
5	c		<table><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>enough money to choose</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>believe organic food is healthier</td><td>✓</td></tr></table> (1) (1)					enough money to choose	✓					believe organic food is healthier	✓	2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0 accept a clear response eg. X or shading etc ignore X if combination of ✓ and X used
enough money to choose	✓																
believe organic food is healthier	✓																
			Total	8													

6	a		<table><tr><td></td><td></td></tr><tr><td>cannot penetrate paper</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td>stopped by dead skin cells</td><td>✓</td></tr><tr><td></td><td></td></tr></table> (1) (1)			cannot penetrate paper	✓			stopped by dead skin cells	✓			2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0 accept a clear response eg. X or shading etc ignore X if combination of ✓ and X used
cannot penetrate paper	✓														
stopped by dead skin cells	✓														
	b		<table><tr><td>amount of radiation</td><td>✓</td></tr><tr><td></td><td></td></tr><tr><td></td><td></td></tr><tr><td>type of radiation</td><td>✓</td></tr><tr><td></td><td></td></tr></table> (1) (1)	amount of radiation	✓					type of radiation	✓			2	one mark for each correct tick deduct one mark for each incorrect tick if more than two ticks used - minimum mark 0 accept a clear response eg. X or shading etc ignore X if combination of ✓ and X used
amount of radiation	✓														
type of radiation	✓														
	c		A and B	1	both correct for one mark accept A and C accept either order										
			Total	5											

A213/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale															
7	a		<table><tr><td></td><td>real risk</td><td>perceived risk</td></tr><tr><td>Andy</td><td></td><td>✓</td></tr><tr><td>Betty</td><td>✓</td><td></td></tr><tr><td>Chris</td><td>✓</td><td></td></tr><tr><td>Dan</td><td></td><td>✓</td></tr></table>		real risk	perceived risk	Andy		✓	Betty	✓		Chris	✓		Dan		✓	3	check line by line; if more than one tick per line, no credit for that line 4 correct = 3 3 correct = 2 1 or 2 correct =1 accept a clear response e.g. X or shading etc ignore X if combination of ✓ and X used
	real risk	perceived risk																		
Andy		✓																		
Betty	✓																			
Chris	✓																			
Dan		✓																		
	b		<table><tr><td></td><td></td><td></td></tr><tr><td>better safe than sorry</td><td>✓</td><td>(1)</td></tr><tr><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td></tr></table>				better safe than sorry	✓	(1)							1	more than one response = 0 marks accept a clear response e.g. ✓ or X or shading etc ignore X if combination of ✓ and X used			
better safe than sorry	✓	(1)																		
	c		fuel rod (1) chain reaction (1) control rod (1)	3																
			Total	7																

8	a		7mSv/year (1)	1	more than one response circled = 0 accept any unambiguous indication of 7mSv/year
	b		0.1 (1)	1	
			Total	2	

A214/01 Ideas in Context - Foundation

Question			Expected Answers	Marks	Rationale
1	a	i	any two from: car interiors (1) water pipes (1) cling film (1) food packaging (1) electric cable insulation (1) textiles (1)	2	any two of the products in the first paragraph one mark per product - if three or more products are listed, apply the list principle
		ii	they need to be strong / stiff ORA (1) otherwise the glass would fall out / would scratch easily / would wear away / security argument (1)	2	one mark for correct property of window frames one mark for the consequence
	b	i	any two from: to be more reliable / trustworthy (1) to account for outliers / anomalous results (1) in case one result is wrong / could be a mistake (1) to check whether the measurements are similar (1) to allow for differences between the samples (1)	2	the question is testing the specification statement 'can explain why repeating measurements leads to a better estimate of the quantity' any two points, for one mark per point ignore fair test or make more accurate or average
		ii	$(26+23+24+25+23+23)/6$; (1) = 24 (1)	2	one mark for correct method even if total is incorrect, one for answer giving 24 gets both marks without working
		iii	it is an outlier / it is different from the others / it is outside the range of the others / it is smaller than the other readings (1)	1	this is testing the understanding of the meaning of 'outlier' - the answer should either quote the term or describe its meaning

A214/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
1	c	i	children are at risk from phthalate toxicity / children do not break down phthalates / children put things in their mouths (more often) (1) benefit of use of items made from PVC / adults do break down phthalates (1)	2	one mark for a risk, one for relative benefit/reduced risk e.g. candidates who write 'children don't break it down but adults do', get (2) as a minimum response benefit and risk could both apply to child or to adult alone
		ii	for: rats or monkeys are different from humans / no data of phthalate build-up in humans / no evidence of harm from phthalates; (1) against: phthalates cause liver damage in rats / phthalates accumulate in monkey tissues (1) children's <u>livers</u> do not break down phthalates (1)	2	one point for and one against, each getting one mark candidates may not use these words – it is conveying these ideas which is important damage liver = neutral
			Total	13	

A214/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
2	a	i	no other available treatment (1)	1	allow 'may cure their cancer' owtte allow idea of 'its their only chance of survival'. accept 'their cancer has returned'
		ii	any two from: which cancers it is effective for (1) whether it will work for early cancers (1) proportion of patients for whom it will work (1)	2	any two points may be made in any order allow direct quotes from the article, 'what kind of cancers can be treated', 'the percentage of patients for whom it will work well' ignore side effects
		iii	any two from: compare new drug with existing treatments (1) large(r) sample/more patients (1) long(er) time (1)	2	any 2 points may be made in any order must be difference between phase 1 or 2 and phase 3 mention of 'side effects' or 'quality of life' is neutral
		iv	any two from: (monitor) side effects (over long time) (1) make sure it's safe / make sure side effects not serious (1) check effectiveness/how well it works / see if cancer comes back (1)	2	any 2 points may be made in any order note that the candidates are not taking material from the article, but producing their own thoughts which may be creditworthy
	b	i	Caroline (1)	1	
		ii	Dave (1) Robert (1)	2	either order
		iii	expensive (1) not licensed / not approved / not recommended (1)	2	one mark for each of the two points
	c		circle around top left X (high effectiveness, low cost) (1)	1	
Total				13	

A214/01

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
3	a	i	10 to 30 (1)	1	both required for the mark allow order reversed (30 to 10) not just B to E – must have numbers
		ii	identifies a value from the chart (1) compares with other rocks (1)	2	'all of the values in the chart are bigger than normal' or, 'even B is many times higher than usual' are both enough for both marks (2)
		iii	ring around E not enclosing any other letters (1)	1	
		iv	idea that there is no correlation / largest value not closest (1)	1	
	b	i	use of meteor dust / consulting other scientists / ask Dad (as he won a Nobel Prize) / idea of asteroid impact / linking to big Mexican crater / possible effect of volcanoes (1)	1	there are many possibilities – remember that it must come from the article, but should be anything which is not trivial and obvious
		ii	volcanoes / Deccan Traps; (1) craters not at right time / most mass extinctions coincide with large volcanic events (1)	2	allow direct quotes from the Earth scientist on these points. 'asteroid hit the Earth 300,000 years before dinosaurs became extinct' = 1 mark
	c	i	asteroid planet Sun (1)	1	all three in order given ignore mis-spellings accept named planet in correct place
		ii	1. asteroid orbits Sun / moon orbits planet; (1) 2. asteroid orbit circular/ comet orbit elliptical or oval / Comets have a tail / comets appear at regular intervals; (1)	2	accept named planet accept asteroid rocky / metallic OR comet icy/'dirty snowball'
		iii	kill us / destroy life on Earth / plants die (1) any detail e.g. dust blocks out Sun, choking dust/gas / forest fires / tsunamis / darkness / Earth gets cold / climate change (1) QWC (1)	2 1	first mark for effect second mark for explanation e.g. mass extinction due to new ice age = 2 marks allow one spelling mistake for 1 mark
			Total	14	

A214/02 Ideas in Context - Higher

Question			Expected Answers	Marks	Rationale
1	a	i	children are at risk from phthalate toxicity / children do not break down phthalates / children put things in their mouths (more often) (1) benefit of use of items made from PVC / adults do break down phthalates (1)	2	one mark for a risk, one for relative benefit/reduced risk e.g. candidates who write 'Children don't break it down but adults do' get (2) as a minimum response benefit and risk could both apply to child or to adult alone
		ii	for: rats or monkeys are different from humans / no data of phthalate build-up in humans / no evidence of harm from phthalates (1) against: phthalates cause liver damage in rats / phthalates accumulate in monkey tissues / children's <u>livers</u> do not break down phthalates (1)	2	one point for and one against, each getting one mark candidates may not use these words – it is conveying these ideas which is important damage liver = neutral
	b		it takes a long time to build up to toxic levels in the human body / it will take 50 years for effects to be noticeable (1) PVC has been used only since 1960s / PVC has not yet been used long enough (1)	2	first mark is for the slow build up in the human body or the long time needed to build up convincing evidence of harmful effects second mark is for the idea that not enough time has passed
	c		any two from: phthalates are soluble in fats (1) link between food and fat content (1) phthalates will move more into dairy foods (1)	2	any 2 points allow reverse argument e.g. 'tomatoes don't contain any fat' butter/cheese/foods containing fat = dairy foods third marking point is about movement of phthalates
	d		poly(ethene) cling film contains no phthalates so there is no risk / it is better to be safe than sorry / owtte (1)	1	reducing the risk is not enough - the risk has to be taken to a minimum

A214/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
1	e	i	$(26+23+24+24+23) \div 5$ / find the median (1) = 24 (1)	2	one mark for correct method, one for answer giving 24 gets both marks regardless of working candidates who include the outlier 33 will get an answer 25.5, which they may round to 25 or 26 - these would get one mark
		ii	best estimate for 0% is outside the range for 5% (1) best estimate for 5% is outside the range for 0% (1)	2	'the ranges do not overlap' / owtte gains both marks ' all of the second row is bigger than any in the first row' gains both marks 'all of the second row are bigger than the mean of the top row' or 'all of the first row are smaller than the mean of the second row' would each get one mark consideration of the range of one row of data is worth one mark, and two marks are obtained only if both ranges are considered and seen to be non-overlapping the idea that each value in the second row is bigger than the value immediately above it is worth zero marks
			Total	13	

A214/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
2	a	i	any two from: chance that drug may be effective for their cancer / nothing to lose (1) altruistic/research may benefit other people in the future (1) they could be paid to take part (1)	2	any 2 points
		ii	any two from: compare new drug with existing treatments (1) large(r) sample / more patients (1) long(er) time (1)	2	any 2 points may be made in any order must be difference between phase 1 or 2 and phase 3 mention of 'side effects' or 'quality of life' is neutral
		iii	any two from: (monitor) side effects (over long time) (1) make sure it's safe / make sure side effects not serious (1) check effectiveness/how well it works / see if cancer comes back (1)	2	any 2 points may be made in any order note that the candidates are not taking material from the article, but producing their own thoughts which may be creditworthy
	b	i	any four from: for: slows down/stops development of cancer (1) halves/reduces the risk of cancer returning (1) ethical argument based on idea that treatment should be available for all (1) against: expensive (1) not licensed (1) may have serious side effects (1) not tested on early stage breast cancer (1) ethical argument based on idea that money saved could treat more patients (1)	4	any 4 points maximum 3 marks for one argument alone 'for' and 'against' points may be written anywhere in the answer space as long as it is clear whether the point is 'for' or 'against' could have 'expensive' in both 'against' and 'for' sections provided that the 'for' bit makes it clear that the financial savings outweigh the expense. This may happen if candidates are using the answers from b(ii) here.

A214/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
2	b	ii	any two from: more patients will be cured so will not require further treatment (1) saving or earning money with justification (1) economic contribution qualified e.g. back to work quicker (1)	2	this is addressing Idea about Science 6 'Making Decisions about Science and Technology', section 6.7: <ul style="list-style-type: none"> can explain why different courses of action may be taken in different social and economic contexts the economic context needs to be clear in the answer any two points referring to economic benefits to family/NHS/society idea that money/time saved or earned will benefit the economy in some way
		iii	need to be safe / effectiveness compared with current treatments / value for money (1)	1	any point
			Total	13	

A214/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
3	a	i	10 to 30 (1)	1	both required for the mark allow order reversed (30 to 10) not just B to E – must have numbers
		ii	any two specific points about: different samples (from same location) will show variation e.g. uneven deposition (1) differences in instrumentation (1) variation of procedure (1) contamination of sample / layer may have been disturbed (by faults) (1)	2	any 2 marks for separate point 'it is only an average' or 'there are outliers' implies the variation mark 'faulty' is ok for one mark 'broken instruments' is neutral 'measured wrongly' is not enough
		iii	identifies a value from the chart (1) compares with other rocks (1)	2	'all of the values in the chart are bigger than normal' or, 'even B is many times higher than usual' are both enough for both marks (2)
		iv	no correlation (between concentration and distance from Chicxulub) (1) justifications e.g. similar positions (D, F or E, A and B) have different readings / places with similar readings (B, D or C, F) are far apart (1)	2	one mark is for 'no correlation' owtte e.g. 'data does not support this' one mark is for any justification based on the data - they can still get this mark even if they have not stated that there is no correlation
	b		use of meteor dust / consulting other scientists / ask Dad (as he won a Nobel prize) / idea of asteroid impact / linking to big Mexican crater / possible effect of volcanoes (1)	1	there are many possibilities – remember that it must come from the article, but should be anything which is not trivial and obvious

A214/02

Mark Scheme

June 2008

Question			Expected Answers	Marks	Rationale
	c		any one from no other researchers had reported these findings (1) asteroid impact on this scale had never been suggested before (1) no crater found at this time (1) limited amount of data (1) previously accepted/established theories (had worked well) (1)	1	any 1 point this question is addressing the specification statements: <ul style="list-style-type: none"> • can identify absence of replication as a reason for questioning a scientific claim • can suggest plausible reasons why scientists involved in a scientific event or issue disagree(d) • can suggest reasons for scientists' reluctance to give up an accepted explanation when new data appear to conflict with it. and any clear attempt to address one of these can gain the mark do not accept material lifted from the 'continuing debate' section of the insert as this was not available straight away
	d		any four from: overall comments covering both theories: both could be correct (1) not enough data available to make a definitive judgement (1) iridium can come from volcanoes/asteroids/both (1) craters: Chicxulub crater found (1) may be other craters not yet discovered (1) time coincidence: Chicxulub date not exact enough / Deccan traps better agreement in time (1) many extinctions in past have coincided with volcanic eruptions (1)	4	one mark for each separate point.
			QWC (1)	1	at least 10 words, no more than one spelling error in the first 2 lines
Total				14	

Grade Thresholds

General Certificate of Secondary Education
Science A (Specification Code J630)
June 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
A211/01	Raw	42	N/A	N/A	N/A	32	28	24	20	16	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A211/02	Raw	42	36	34	30	27	23	21	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A212/01	Raw	42	N/A	N/A	N/A	32	28	24	21	18	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A212/02	Raw	42	35	32	28	24	19	16	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A213/01	Raw	42	N/A	N/A	N/A	32	28	24	21	18	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A213/02	Raw	42	34	31	27	23	19	17	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A214/01	Raw	40	N/A	N/A	N/A	23	18	14	10	6	0
	UMS	34	N/A	N/A	N/A	30	25	20	15	10	0
A214/02	Raw	40	25	22	17	13	9	7	N/A	N/A	0
	UMS	50	45	40	35	30	25	23	N/A	N/A	0
A219	Raw	40	33	29	25	21	17	13	10	7	0
	UMS	100	90	80	70	60	50	40	30	20	0

A219 (Coursework) - The grade thresholds have been determined on the basis of the work that was presented for award in June 2008. The threshold marks will not necessarily be the same in subsequent awards.

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J630	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J630	2.2	13.5	35.6	63.2	81.4	92.4	98.0	99.8	100	111 111

117 993 candidates were entered for aggregation this series

For a description of how UMS marks are calculated see:

http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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Facsimile: 01223 552553