OCR
RECOGNISING ACHIEVEMENT

GCSE

Science A (Twenty First Century Science)

General Certificate of Secondary Education **GCSE J630**

Report on the Units

January 2007

J630/MS/R/07J

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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.

The reports on the Examinations provide information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the syllabus content, of the operation of the scheme of assessment and of the application of assessment criteria.

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REPORTS ON THE UNITS

A211/01 – Twenty First Century Science A (B1, C1, P1) Foundation Tier

General Comments

The paper was well attempted and produced a high mean mark. Centres are reminded that questions on A211, A212 and A213 will all be objective style, although A214 will require extended writing. An overall impression gained by the markers is that candidates were generally clear about the Ideas about Science which are central to this paper, but their subject knowledge was often sketchy.

Candidates should be aware that the marking is done from scanned images of their scripts. Consequently, if candidates change their minds, any alterations must be made clearly and unambiguously. Any marks that are ambiguous – possibly made with the intention that the examiner could give credit for either of two possible responses, where only one is correct – will ***not*** gain credit on this paper.

In places it seemed as if candidates had rushed and not read the instructions in the questions, so answering a question of their own devising, or else not using the information they had been given, as in 7(b).

Comments on Individual Questions

1 Part (a), on sex chromosomes, was well-answered by most candidates. There were a few ambiguous letters which could have been X or Y (chromosomes), and these did not gain credit. In the less successful part (b), approximately equal proportions of the candidates thought that sperm and eggs contained one chromosome from each pair, and pairs of chromosomes.

2 About half of all candidates realised, in part (a), that identical twins were produced when the embryo divides after fertilisation. Part (b), with completion of sentences, was generally well done, although relatively few candidates knew that clones are produced by asexual reproduction.

3 Most candidates realised that tests on unborn babies are done to check for genetic disorders, but a significant number thought in part (b) that, when an unborn baby is diagnosed with cystic fibrosis, the action 'Do nothing, as interfering is against nature' corresponded with 'trust that everything will turn out all right' instead of 'certain actions are never justified because they are always wrong.'

4 This question was common with the higher tier. Candidates were generally successful in this question, and responses on Rosie's family tree were generally good.

5 All but the weakest candidates were able to find at least two fuels in the given text, but recognition of pollutant molecules sorted out the best candidates. The oxides of sulfur and carbon were generally recognised, but the subtle difference between the monoxide and dioxide of carbon proved more difficult. In (c), less than half of all candidates were able to identify sulfur as the element which combines with oxygen to make sulfur dioxide: the meaning of 'element' could be the issue here.

6 This question was common with the higher tier. Given that candidates had only four gases to choose to label the pie chart, it was disappointing that so few showed any recollection of the predominant gases in the atmosphere.

7 This question, identifying parts of the Solar System, was also generally poorly answered, given that the most difficult part was already linked to its description. Part (b), which tested the ability of candidates to sequence the three dates given, having already been informed that they were the ages of the Universe, Earth and Sun, found many candidates unaware that the Sun was younger than the Universe but older than the Earth.

8 Continental drift proved difficult here. On a foundation paper, two marks to be gained in parts where they should tick each true statement should suggest that there are two boxes to tick. Weaker candidates ticked only one box for each part.

9 In (a), about two-thirds of the candidates indicated that earthquakes happen at the edge of tectonic plates. In (b), as in question 8, weaker candidates ticked only one box, although most found one correct response in so doing.

10 This question was common with the higher tier. Whereas few candidates were aware that distant galaxies are moving away from our own galaxy, most candidates were able to identify galaxy B correctly from the graph. One mark was awarded for marking the graph in some way to show how that conclusion had been reached. Examiners were very flexible in their interpretation, but the number of candidates who made no visible mark on the graph was disappointing.

A211/02 – Twenty First Century Science A (B1, C1, P1) Higher Tier

General Comments

The paper was well attempted and produced a high mean mark. Candidates adjusted well to the change in format from last year, though some centres appeared to be still expecting discursive questions. Centres are reminded that questions on A211, A212 and A213 will all be objective style, although A214 will require extended writing.

Candidates should be aware that the marking is done from scanned images of their scripts. Consequently, if candidates change their minds, any alterations must be made clearly and unambiguously.

Comments on Individual Questions

1 As this was a higher tier question, candidates were not told how many of the statements about DNA were correct. Most candidates were able to identify two of the correct statements; the more able could identify all four. One common mistake was to state that genes are not part of DNA molecules. Some candidates annotated their papers to explain that, instead, a DNA molecule is only part of a gene. The other most common mistake was to not realise that genes code for making proteins. In part (b), the idea that one chromosome comes from each parent was much better understood.

2 Whilst almost all candidates appreciated that cystic fibrosis is inherited, interpreting the family tree was found to be more difficult.

3 This question overlaps with the lower tier paper, and was very well answered. The most common mistake occurred in part (b) where statements A and E were put the wrong way round.

4 This question was common with the lower tier. Candidates had problems with this question. Many candidates were not aware of the relative amounts of any of the different gases in the atmosphere, and gained no credit at all in part (a). More were aware that photosynthesis is the mechanism by which trees remove carbon dioxide from the atmosphere.

5 Asking candidates to consider a fuel as a vapour instead of a liquid or a gas appeared to create problems for many of the weaker candidates, and a wide range of gases was suggested. In part (a) (ii) candidates were more confident that nitrogen and oxygen would react, but the idea that some oxygen might be unreacted was accessible to only the most able. The chart in part (d) was generally well attempted. Many candidates clearly changed their minds as they progressed through the question. It is important that if candidates do change a response then the old response must be clearly crossed out or they could lose marks.

6 This question overlapped with the lower tier paper.
Whereas weaker candidates were not aware that distant galaxies are moving away from our own galaxy, most candidates were able to correctly identify galaxy B from the graph. One mark was awarded for marking the graph in some way to show how that conclusion had been reached. Examiners were very flexible in their interpretation, but the number of candidates who made no visible mark on the graph was disappointing.

7 This question was well answered.

8 Candidates were often not able to decide on a most suitable value for the age of the universe, and there is a suspicion that, as the question was at the top of the page, some candidates ignored it despite the alternatives being printed in bold. Part (b) was well attempted, but as it was targeted at grades A and A* the discriminators were made deliberately difficult to distinguish between, and few candidates were able to score full marks.

9 This question probed the candidates' ability for more original thought. Again, it was targeted at a fairly high level and was looking for the ability to make considered judgements about the development of the theory of plate tectonics in slightly unfamiliar circumstances.

A212/01 – Twenty First Century Science A (B2, C2, P2) Foundation Tier

General Comments

The paper was well attempted and produced a high mean mark. Centres are reminded that questions on A211, A212 and A213 will all be objective style, although A214 will require extended writing. An overall impression gained by the markers is that candidates were generally clear about the Ideas about Science which are central to this paper, but their subject knowledge was often sketchy.

Candidates should be aware that the marking is done from scanned images of their scripts. Consequently, if candidates change their minds, any alterations must be made clearly and unambiguously. Any marks that are ambiguous – possibly made with the intention that the examiner could give credit to either of two possible responses, where only one is correct – will ***not*** gain credit on this paper.

Comments on Individual Questions

1 This question was well answered, with a high proportion of candidates choosing the two correct statements in each list.

2 This question overlaps with the higher tier. Part (a) was well answered. In part (b), the overlap part, the majority of candidates realised that Jo did not support MMR vaccine, but only the very best realised that all of the other statements supported the vaccine.

3 Part (a), interpreting the bar chart, was generally well done, but in part (b) it was clear that many candidates did not understand what was meant by 'peer review'.

4 In part (a), it was surprising how many candidates were unaware that cotton came from plants; reassuringly, most seemed to know that wool came from sheep. In part (b), linking monomer molecule to polymer molecule was well done by many, but weaker candidates often left this part out. Part (c) was convincingly completed only by the best candidates, with weaker candidates' responses being a lottery of putting words into spaces.

5 Labelling cross-links, plasticiser and polymer chains in the diagrams was convincingly done only by C grade candidates.

6 This question was common with the higher tier. Many candidates interpreted the table correctly, but very few indeed – fewer than a random guess in fact! – could state that there was no clear pattern in the data.

7 In part (a), it was surprising that so many candidates were unable to allocate the three regions of the electromagnetic spectrum correctly, and only one third of all candidates knew which end of the spectrum had the highest energy photons.

8 Many candidates could identify where carbon is being taken out of the atmosphere, which arrow represented the action of decomposers, and knew that fossil fuels have contributed most to the increase in carbon dioxide over the past 200 years. Few could identify which arrow was photosynthesis; possibly they wanted the answers to (a) to (d) to use each of the numbers 1 to 4, rather than having one response twice.

9 Most candidates correctly identified the statement not recommended by the article, but weaker candidates struggled in part (b), where two words often seemed chosen at random from the four given to complete the sentences.

10 This question was common with the higher tier. In part (a), better candidates could name at least one of the two people who identified a risk from mobile phone transmitters, but parts (b) and (c), on correlation and cause, scored no better than pure guesswork.

A212/02 – Twenty First Century Science A (B2, C2, P2) Higher Tier

General Comments

The paper was well attempted and produced a high mean mark. Candidates adjusted well to the change in format from last year, although some centres appeared to be still expecting discursive questions. Centres are reminded that questions on A211, A212 and A213 will all be objective style, although A214 will require extended writing.

Candidates should be aware that the marking is done from scanned images of their scripts. Consequently, if candidates change their minds, any alterations must be made clearly and unambiguously.

Comments on Individual Questions

1 This question overlapped with the lower tier.
In part (a), most candidates identified Jo's as the statement which did not support vaccination, and many candidates scored full marks, though joining the boxes in part (b) was more difficult.

2 This question was well answered. In part (a), the most common errors were to confuse antigens and antibodies, and also to suggest that the safe form of a disease carrying organism is to be found in the blood rather than in a vaccine. All but the weakest candidates realised that toxins were produced by micro-organisms.

3 As this was a higher tier question, candidates were not told how many of the statements about double blind trials were correct. More able candidates realised that there were two correct and three incorrect statements, weaker candidates often also included 'Double blind trials use twice as many patients' as correct. Most candidates could identify the correct statement about peer review.

4 The disposal of plastics was well understood.

5 The task of joining the boxes to link the properties of plastics was generally well attempted, with many candidates scoring half marks or more. Many candidates clearly changed their minds as they progressed through the question. It is important that if candidates do change a response then the old response must be clearly crossed out or they could lose marks.

6 This question overlapped with the lower tier.
In general, candidates interpreted the table without difficulty. However, to realise that the table showed no clear pattern between chain length and tensile strength in part (b) (i), and to correctly recognise whether it is forces between molecules or within molecules which best explain melting points in part (c) (i), were much more difficult.

7 This question overlapped with the lower tier paper.
Most candidates identified either Tracey or Paul as having identified a possible risk from mobile phone transmitters; the more able candidates identified both. Candidates were much less secure when they had to identify statements about correlation, cause and the ALARA principle, but the most able candidates continued to score well in parts (b), (c) and (d).

8 Whereas on the lower tier candidates had to choose the correct name for each process in the carbon cycle, in this case they had to think of the names for themselves. Candidates found this task to be very stretching, and the question had the highest incidence of unattempted responses. Medium ability candidates could often quote the terms respiration and combustion, but often got them the wrong way round. The most able candidates scored highly.

9 This question was designed to be more stretching. As for question 3, candidates were not told how many of the statements about the electromagnetic spectrum were correct. More able candidates realised that there were three correct statements and two incorrect statements.

10 Again, this question was designed to stretch the more able candidates. However, it is to the credit of the lower ability candidates that they attempted the question as well as they did. Even though they were not able to identify the correct responses, the choices that they did make showed levels of careful thought.

General Certificate of Secondary Education
Twenty First Century Science (Specification Code J630)
January 2007 Assessment 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	**33**	**28**	**23**	**19**	**15**	**0**
	UMS	34	n/a	n/a	n/a	**30**	**25**	**20**	**15**	**10**	**0**
A211/02	Raw	42	**39**	**36**	**32**	**28**	**23**	**20**	n/a	n/a	n/a
	UMS	50	**45**	**40**	**35**	**30**	**25**	**23**	n/a	n/a	n/a
A212/01	Raw	42	n/a	n/a	n/a	**33**	**29**	**25**	**22**	**19**	**0**
	UMS	34	n/a	n/a	n/a	**30**	**25**	**20**	**15**	**10**	**0**
A212/02	Raw	42	**39**	**35**	**30**	**26**	**20**	**17**	n/a	n/a	n/a
	UMS	50	**45**	**40**	**35**	**30**	**25**	**23**	n/a	n/a	n/a

For a description of how UMS marks are calculated see;
http://www.ocr.org.uk/exam_system/understand_ums.html

Statistics are correct at the time of publication

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