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Examiners' Report/ Principal Examiner Feedback

March 2010

GCSE

360Science

GCSE Additional Science Multiple Choice Paper B2 (5015)

GCSE Biology Multiple Choice Paper B2 (5027)

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5015 Additional Science/ 5027 Biology (Multiple Choice B2) Examiners' Report

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General Comments

Candidates appeared to find this paper quite challenging, particularly at Foundation level where the responses to a large number of questions were quite disappointing. This is despite the fact that a fair number of the questions asked were simple recall items where candidates' understanding, even with F grade knowledge, should have allowed them access to the correct answer.

Foundation Tier (Questions 1-16)

A very disappointing 26% of Foundation tier candidates were able to distinguish between animal and plant cells. Although covered in Key Stage 3 and repeated in Key Stage 4 the diagrams shown in question 1 clearly presented a problem for the majority with a larger percentage of candidates (46%) deciding that cells 1 and 4, both plant cells, were animal cells. It is important that candidates are able to distinguish between the different cell types of different organisms and this is best done by relating their structure to their function. This, of course, would include the basic components of both animal and plant cells as highlighted in B2 3.1 of the specification.

The focus of question 4 remained on cells and this presented a similar challenge for 66% of candidates who were unable to arrive at the correct response. The majority of candidate responses were spread across options A, B and C with the incorrect option A attracting nearly as many candidates (33%) as the correct option D (34%). Again, the function of the cytoplasm requires minimal scientific understanding and recall questions of this simplistic nature should have given a much more positive outcome overall.

Candidates were able to respond much more positively to question 5 where 77% were able to correctly identify rowing as the activity causing the greatest increase in pulse rate. This is very pleasing considering the chart was not as straight forward as it may first appear to be – the candidates that did respond correctly were able to identify the calculation that was necessary in order to arrive at the correct response.

Similar percentages were obtained for questions 7 and 8 – candidates are clearly familiar with questions related to exercise possibly due to their frequent appearance in previous examination series and as a result of practical activities carried out in the classroom. Just over half of candidates, however, were able to identify the reason why the pulse rate increases with exercise (question 6) with 35% wrongly understanding that the reason is because the blood uses more oxygen.

Candidates understanding of chromosome distribution following asexual reproduction is very disappointing. Only 24% of candidates understood that each daughter cell would contain the same number of chromosomes as the parent cell (22) for question 9 with 61% opting for 11 chromosomes. As candidates are not required to know the details of meiosis at this level it can be assumed that the majority of candidates

believed that as the cell splits into two, half of the parent cell chromosomes go into one daughter cell with the other half going into the other. An equally disappointing 20% of candidates knew that plasmids were made of DNA with 64% wrongly choosing option A – enzymes as the correct answer.

Responses to questions 13 to 16 were more pleasing with a fair number of candidates being able to effectively analyse the data given. Question 14, which was probably the most tricky for candidates at this level as it involved a calculation from the information given, proved to be less challenging than most of the other questions in this section with 68% of candidates correctly concluding that levels of sulphur dioxide had fallen by 90 $\mu g/m^3$. Less candidates (47%) were able to identify the type of relationship between the algae and the fungi as interdependent – over a third of candidates were under the impression that 'conservation' was the correct response in this case.

Common Tier (Questions 17-24)

The responses to these questions were varied across both Foundation and Higher tiers although, as expected, Foundation tier candidates found this section slightly more challenging. Statistics indicate that the Higher tier candidates did not perform as well as expected despite the questions in this section requiring a fairly basic understanding that should not have posed such a problem for candidates at Higher level.

Analysis of the graph was carried out well by both Foundation and Higher tier candidates – it is very clear that they are being taught well in order to tackle this type of question and candidates seem to be improving on their scientific understanding of what graphical information shows.

Questions 21 to 24 appeared to be answered more successfully by Foundation tier candidates than those taking the Higher paper. Although the percentage of correct responses for each of the questions in this section are higher for the Higher tier candidates the difference between these and those obtained for the Foundation tier candidates is fairly small. For example, only 60% of Higher tier candidates understood that decomposers were responsible for breaking down sewage to release nutrients with 59% of Foundation tier also arriving at this correct answer. Similarly for question 22 a disappointing low 60% of Higher tier candidates understood photosynthesis as the process that releases oxygen whereas a fairly pleasing 51% of Foundation tier candidates chose the correct option in this case.

Higher Tier (Questions 25-40)

Question 25 was answered well with 74% of candidates understanding that by eating more locally produced food and recycling waste would help to reduce environmental pollution. This was despite the first statement worded in such a way to make candidates 'think' about whether this option was also a factor in reducing pollution. A large proportion of candidates show a good understanding of the effect of CFCs which is pleasing as previously candidates have shown confusion on the environmental effect of these pollutants. Question 28 also answered well – 78% of

candidates were clear on how global biodiversity and global temperatures were effected by combustion. The statistics for this particular question also show candidates familiarity with these scientific terms.

Despite responding poorly on the questions related to photosynthesis on the overlap questions, the majority of candidates were correctly able to state why the hydrogen carbonate indicator turned yellow in question 29. 81% of candidates identified that respiration uses oxygen and produces carbon dioxide which was very pleasing particularly as this scientific understanding was tested using a context not tested previously and likely to be unfamiliar to most candidates. However, almost half the number of candidates were able to arrive at the correct response for question 30 which demanded an understanding of both respiration and photosynthesis and how these processes act together to balance gases. Only 41% of candidates were able to answer correctly in this case. A similar statistic was obtained for question 32. Although previously both Foundation and Higher tier candidates have not found questions related to the carbon cycle particularly challenging, this question presented a challenge to 58% of candidates whose incorrect responses were spread almost equally across options A, B and D.

Surprisingly, only 45% of candidates were able to correctly identify that muscles would be carrying out mainly aerobic respiration during the low intensity activity with 25% incorrectly understanding that aerobic respiration was mainly carried out during high intensity activity. This is disappointing as it does imply that candidates scientific understanding of aerobic and anaerobic respiration is slightly confused despite showing good understanding of their differences in previous examination papers. This is further reinforced by a fairly disappointing 44% of candidates being able to arrive at the correct response for question 34 – a greater percentage (46%) chose option C where candidates mistakenly thought that the high intensity exercise had to stop at 12 minutes due to insufficient oxygen to change the lactic acid to glucose and carbon dioxide.

Questions 37 to 40 proved to be very good A/B grade discriminators, particularly questions 38 and 40 where only the very able candidates, as expected, were able to arrive at the correct responses. 63% of candidates were able to identify the events in meiosis which is very pleasing and proving a greater general understanding of this type of cell division than what they have shown in some previous examination series.

Grade Boundaries – March 2010

Multiple Choice Papers – GCSE Additional Science

Raw Mark Grade Boundaries

5015/5027	Max mark	A*	A	B	C	D	E	F	G
H	24	20	18	15	13	10	8		
F	24				16	13	11	9	7

5017/5037	Max mark	A*	A	B	C	D	E	F	G
H	24	17	15	12	10	7	5		
F	24				15	12	10	8	6

5019/5047	Max mark	A*	A	B	C	D	E	F	G
H	24	15	13	11	9	6	4		
F	24				16	13	10	8	6

Uniform Mark Grade Boundaries for these units

	Max UMS	A*	A	B	C	D	E	F	G
H	40	36	32	28	24	20	18		
F	27				24	20	16	12	8

Note: On higher tier papers, the "allowed" grade E is calculated as half a grade width

Structured Papers - GCSE Additional Science

Raw Mark Grade Boundaries

5016/5028	Max mark	A*	A	B	C	D	E	F	G
H	30	17	14	11	9	7	6		
F	30				18	15	12	10	8

5018/5038	Max mark	A*	A	B	C	D	E	F	G
H	30	21	17	13	10	7	5		
F	30				22	18	15	12	9

5020/5048	Max mark	A*	A	B	C	D	E	F	G
H	30	21	19	16	14	11	9		
F	30				20	16	12	9	6

Uniform Mark Grade Boundaries for these units

	Max UMS	A*	A	B	C	D	E	F	G
H	40	36	32	28	24	20	18		
F	27				24	20	16	12	8

Note: On higher tier papers, the "allowed" grade E is calculated as half a grade width

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