RECOGNISING ACHIEVEMENT

GCSE

Environmental and Land-Based Science

General Certificate of Secondary Education **J271**

OCR Report to Centres

June 2013

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support, which keep pace with the changing needs of today's society.

This report on the examination provides 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 specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

Reports should be read in conjunction with the published question papers and mark schemes for the examination.

OCR will not enter into any discussion or correspondence in connection with this report.

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OCR REPORT TO CENTRES

Overview

This is the first time candidates have been able to certificate for this new specification. Candidates' performance on the papers was very similar to performance in the January series.

The one area where centres can do most to improve their candidates' performance would be in the level of response questions. As these questions account for 18 of the available 50 marks, their impact on the final grade is, therefore, significant. The quality of these mini essays was generally poor, with little evidence of candidates balancing an argument or in fact covering all aspects of the question. It is suspected that these same candidates would be likely to construct much better essays in their English lessons, but fail to put these skills into practice in Science. A few more essays for homework may help.

Please ensure all candidates taking the paper version of the exam have access to a calculator, several candidates lost marks through difficulty with calculations. Those taking the computer-based test will already have access to an on-screen calculator.

The standard of the portfolios was generally very good, although some candidates may have disadvantaged themselves by spending too much time on the practical scientific skills element (some were almost investigations) to the detriment of the true investigation and the Work-related Report.

B681/01 Management of the Natural Environment (Foundation Tier)

General comments

The GCSE Environmental and Land-Based Science qualification (ELBS) contains a compulsory unit, B681 Management of the Natural Environment. This is available as a foundation tier paper and a higher tier paper, with a series of overlap questions to allow direct comparison.

This specification is now established and candidates now have the benefit of past papers.

As with previous series, the examination is available either in paper-based format (component 01) or in a computer-based test (CBT) format (component 03). While the questions are identical in both papers, the layout does differ and may affect the numbering within this document. The question numbers quoted are for the paper-based version.

The paper consists of a range of different styles of questions; short answer (which may include multiple-choice), data-response/calculation-based questions which help to test knowledge and understanding of the principles of topics, and also longer response questions which allow a candidate to write more expressively. This latter format is assessed using a level of response mark scheme, which also credits the quality of written communication. It is probably this type of question that shows the largest differential between the more able and less able candidates, and probably the area where there is the greatest scope for candidates to improve their overall marks.

The following commentary will give a review of each question – highlighting good practice as well as areas where there were misconceptions or where technique could be further improved. It is pleasing to note, however, that a general improvement in the extent of answers – the foreshortened responses, often seen in the legacy specification and noted in the past as being an area for improvement, are far less evident.

Comments on Individual Questions

1) A relatively straightforward multiple-choice question. Most candidates remembered to read the rubric and select two responses. Most identified at least one correct answer. The fact that forests are more space efficient tended to be selected by more of the higher attaining candidates.

2) This question required the candidate to write a short answer. Most were familiar with the advantage of getting work done more quickly but fewer were able to cite a correct second reason.

3) This question appeared to test accuracy of language; there is still a cost to water collection and re-use, which discounted the most common incorrect response. The greatest advantage to the farmer is the fact that they are less dependent on other water sources.

4) An overlap question with the higher tier paper, most candidates were able to identify the fact that field beans added nitrogen to the soil. A topic which seems to be well taught.

5) A three-part question, looking at the interpretation of information. A good proportion of candidates were able to identify the characteristics of the soils in part (a). The correct answer for part (b) proved more difficult. While lime would improve drainage, this would apply to a clay soil, not a peaty one, and while lime does change the pH of the soil, it makes it more alkaline rather than acid. Of the options given, the lime would have the effect of adding additional calcium, improving its availability to the plants.

6) This question focussed upon the advantages and disadvantages of alternative energy generation upon the farmland. While this word was emboldened, it was missed by many candidates who gave responses linked to the availability of the energy sources rather than the impact on the use of the land.

7) A straightforward question linked to the work of a conservation organisation. Most candidates were able to select one correct activity, only the higher-achieving candidates selected the correct two.

8) While candidates may not be over familiar with an aphid, they were able to use their knowledge and interpretation of the images to give a good response.

9) A short answer question which had a wide range of credit-worthy answers. There was a good general understanding of the way climate change might affect breeding opportunities, food sources and predators. Some candidates incorrectly suggested that birds hibernate in the UK but the majority cited migration to other climates.

10) A series of data and calculation-based questions. There was a good attempt by many at calculating the mean numbers from the data; however, many were less successful at the following questions relating to the reasons for the difference in populations and the likely effect on the soil of lower earthworm numbers.

11) The nitrogen cycle has often caused confusion for many candidates in previous papers. It is pleasing to note the improvement in the number of candidates able to select the correct area of the diagram – demonstrating their knowledge.

12) While candidates were usually able to demonstrate that they knew about samples and estimates, many were less able to explain their use when evaluating a population. The better responses identified the time issue and often linked it to destruction of habitat if a full count was to be completed.

13) A topic that is well understood my most candidates – weeds compete with a potato crop for water.

14) Looking at the changes in the popularity of foods, this series of questions proved to discriminate well between the weakest and strongest candidates. A good proportion of candidates were able to identify that Fair-trade food showed the largest increase, although the data for organic foods proved to be a good discriminator. Fewer were able to complete the percentage sales increase however.

15) Many candidates appear to be familiar with risk assessments and have knowledge of this particular task too. A number of candidates did not reach their full potential by failing to read the question accurately. The question asked for the stages of a risk assessment to be described. Again, the key word was emboldened. While many gave a good answer as to the type of hazards there might be in long grass they did not explain the process of the risk assessment in a logical order. The best responses also remembered to let others know of their findings, recording their assessment and reviewing it in the light of their experiences.

16) The final question on the paper looked at the development of landscapes. Again, it is clear that this was a familiar topic although some were hindered by the quality of their written communication. Many candidates tended to focus on one or perhaps two processes. Only the top performing candidates were able to give a good range.

17) There was evidence of good teaching within the subsequent 6 mark question asking the candidates to comment on the data. Most were able to describe the trends but some fell short of giving suggestions for these changes, limiting their potential marks.

B681/02 Management of the Natural Environment (Higher Tier)

General comments

The GCSE Environmental and Land-Based Science qualification (ELBS) contains a compulsory unit, B681 Management of the Natural Environment. This is available as a foundation tier paper and a higher tier paper, with a series of overlap questions to allow direct comparison.

This specification is now established and candidates now have the benefit of past papers.

As with previous series, the examination is available either in paper-based format (component 02) or in a computer-based test (CBT) format (component 04). While the questions are identical in both papers, the layout does differ and may affect the numbering within this document. The question numbers quoted are for the paper-based version.

The paper consists of a range of different styles of questions; short answer (which may include multiple-choice), data-response/calculation-based questions which help to test knowledge and understanding of the principles of topics, and also longer response questions which allow a candidate to write more expressively. This latter format is assessed using a level of response mark scheme, which also credits the quality of written communication. It is probably this type of question that shows the largest differential between the more able and less able candidates, and probably the area where there is the greatest scope for candidates to improve their overall marks.

The following commentary will give a review of each question – highlighting good practice as well as areas where there were misconceptions or where technique could be further improved. It is pleasing to note, however, that a general improvement in the extent of answers – the foreshortened responses, often seen in the legacy specification and noted in the past as being an area for improvement, are far less evident.

Comments on Individual Questions

1) A relatively straightforward multiple-choice question, the majority of candidates understood the needs of an earthworm.

2) A second multiple-choice question – this time relating to sampling. Most candidates identified the issues relating to the population not being evenly distributed, although the discriminators did distract a number who were less sure.

3) A common question with the foundation tier paper. A number identified that there would be no cost in collecting and using the water – which is incorrect – although probably a phrase in common parlance.

4) Another common question which caused few problems – most understood the role of legumes in adding nitrogen.

5) While the first two components of this question were common with the foundation paper, testing the candidate's knowledge of the property of soils, the third part was more complex. All the auction lots would be large enough for a caravan park. Lot 1 was both level and sandy.

6) A topic clearly understood by many. Grazing will affect the numbers of tree seedlings.

7) A short response question, and again typically well understood. Best answers were able to articulate the issues of land usage, pollution control, as well as visual impact. The focus of the question was on the environment and not the well-being of the animals.

8) A complex data analysis and response question requiring interpretation of information from a graph.

   High performing candidates were able to articulate the fact that tyre pressure affected compaction rates as well as the number of passes.

   Part (b) required the candidate to make a prediction using the graph and to extrapolate information − demonstrating a good understanding of the topic.

   The final part of the question required justification of the use of high tyre pressures – so knowledge of how these apply to the use of machines, typically linked to the reduction of the number of passes if the reach of the machines were larger, was required. The award of full marks required the use of data and a comparison with a lower-pressured machine with more 'passes'.

9) Another data-based question. Many erroneously did not calculate the mean weight of worms, merely selecting the largest total mass. This also affected their likely responses to the reason why the variation may happen.

   In part (b), the candidate was expected to describe the trend. It was noted that there was a lot of use of good scientific language within the responses, although some were not able to identify the fact that low concentrations had little effect on the population totals, and indeed the fact that soil 2 showed a slight increase in a sampling variation.

   Part (c) was more straightforward, allowing candidates to demonstrate their knowledge of the effect of reduced earthworm numbers on ecosystems.

10) Few candidates had problems with understanding the use of polythene sheets for weed control, but a significant number were unable to give a valid advantage and disadvantage.

11) This question allowed the candidate to reflect on the work of a conservation organisation which they were familiar with, so, as such, the responses were potentially quite wide ranging. While there was some confusion over the name of the organisation in certain cases (the incorrect title was not penalised), there was a large variation in understanding of the work done.

12) A longer response question giving candidates a good opportunity to demonstrate their understanding of the topic. Good answers were articulate, well ordered and able to give a good range of reasons. Some included topical information and in rare cases also quoted data. While not entirely necessary, it did help to re-enforce their arguments. Less able candidates again were sometimes hampered by their handwriting and general layout and in rare cases were unable to articulate the role of greenbelt land clearly.

13) A common question with the Foundation Tier paper. The response to this longer answer question was variable. While many candidates were clearly familiar with risk assessments, many misread the context of the question and failed to describe the stages of a risk assessment – instead merely described some of the hazards. The best answers put the stages in order, remembered to inform others of the assessment and reviewed the risk assessment in the light of future knowledge and experience. Those candidates that only listed potential hazards or how to solve them limited their potential marks.

14) The final question on the paper is a challenging topic, requiring the candidate to describe how to genetically modify an organism. While there was a superficial response by many who attempted this question, there were a couple of exceedingly extensive answers, clearly from centres who had taught this topic in some depth.

B682/01 Plant Cultivation and Small Animal Care (Foundation)

General Comments

Some candidates answering on paper were hampered by poor writing skills, which made their responses very difficult to read; the CBT option may have been much better for them. There were also a large number of no responses where candidates failed to even attempt the question.

Simple marks were lost because candidates did not read the stem of the question carefully and so did not appreciate what the question was about. In addition, some candidates struggled with command words such as 'describe', 'explain' and 'discuss', and many did not understand the term 'trend'. When describing graphs, many candidates describe the shape of the curve e.g. it went up then down, without really explaining what 'it' is. When the question asked for two factors, many candidates only mentioned one. The better candidates, however, numbered their responses 1 and 2.

Some candidates are still struggling with the level of response questions and are often not writing in sufficient detail or using scientific terms such as bacteria, fungi, soil texture and nutrients. Many candidates are still giving low level anthropomorphic responses and do not link their knowledge to real-life situations where yield and profit are important considerations.

Comments on individual questions

1. Very few candidates answered correctly, with most responses pointing to the seed.

2. The majority of candidates gained one or two marks, with most linking the holes in the leaves to the addition of slug pellets, and the wilted leaves to the water sprinklers. The main misconception was linking the slow growth of leaves to the addition of fertilisers.

3. This question was well-answered, with most candidates correctly identifying the stigma.

4. Some good candidates linked seed production to the need for pollination but most gave vague answers about incorrect conditions. 'Too hot' did allow many candidates to pick up one mark. A few candidates misread the question and commented on seed germination.

5. Good candidates gave level 3 answers relating storage conditions to the growth of fungi and bacteria. There were many level 1 answers such as 'gone black – store in the fridge'. Many candidates lost marks because they did not read the stem of the question and either did not describe the features of the carrot or did not describe how they should be stored. Some candidates misinterpreted the question and wrote about storing the carrots in the soil or with light and water so that they could continue to photosynthesise.

6. (a) Most candidates gained the description mark. Some candidates lost marks by not mentioning the increase then the decrease, or did not relate the graph to whitefly. Some candidates misread the graphs or talked generally about all three greenhouses. Some candidates misunderstood the role of wasps but credit was given to them eating/killing the whitefly but not stinging. Good candidates understood the principle of biological control and gained the mark for interpreting the time lag. A few candidates misread the stem of the question and commented on plastic wasps. This was a good discriminator at grade C.

6. (b) Many candidates related Martin's conclusion to the data. Some candidates did not understand the term repel or did not discuss the information merely stating that the conclusion was correct or incorrect or stating that the whitefly increased. Few candidates commented on the experimental design to gain the second mark.

7. (a) Able candidates read the stem of the question and understood what the graph was showing. Other candidates commented on the relative popularity of cats and dogs as pets. Many candidates lost marks because they did not understand the term 'trend' and just gave statements relating to the number of cats or dogs in a particular year. This was a good discriminator at F/G.

7. (b) There were a large number of 'no responses' on this question. Many candidates did not show their working so it is difficult for the Examiners to understand where they went wrong.

7. (c) Higher ability candidates answered this question very well using the term 'host', and clearly understood that a parasite feeds off a living host. Some low level responses such as sucking blood were credited. Many candidates did not know what a parasite was, with a range of responses given referring to treatments for diseases, bugs or repeating the stem about ticks and tapeworms.

7. (d) Most candidates gained one mark on this question and understood the threat of the spread of rabies. Higher ability candidates were able to explain the need for quarantine procedures. A small number misread the stem and wrote about rabbits.

8. Candidates found this question the most challenging of the three level of response questions, although there were some good level 3 responses which linked the data in the table to the uses of the fertilisers. Many candidates wrote what they had learnt without linking this to the table. Many still think that inorganic fertilisers contain chemicals but that organic ones do not and also that organic fertilisers cannot harm the environment. Too many suggested that inorganic fertiliser 'kills/ harms plants /animals'. Lower ability candidates did not understand that fast and slow referred to the release of nutrients rather than the growth of crops, and most students did not know what a trace element was.

9. This question was well-answered, with higher ability candidates suggesting that the cage should be secured for two marks. Some candidates did not read the stem and suggested transport by plane or train or even walking the dog or contacting the RSPCA. Unfortunately, many candidates also wanted to provide food and water for the dogs.

10. A few candidates linked the pH to nutrient availability and realised that there was low phosphorus. Many candidates are still confusing 'P' with potassium rather than phosphorus. Other candidates commented on the acidity or alkalinity killing the plants.

11. A wide range of responses were accepted, although many answers were anthropomorphic. 'Mating' was rejected, as was 'let them free' and 'fresh air'.

12. (a) There were many good responses, and a wide range of responses were accepted. Answers relating to 'pregnant turkeys', however, were rejected.

12. (b) It was clear that many students had weighed a small animal and so were confident with the procedure. Good candidates used the term 'calibrate' but most mentioned using specific objects such as bags of sugar.

12. (c) A few candidates made the link to grit as something that needs to be provided to turkeys that are kept indoors. Most candidates commented on eating grass and insects.

12. (d) Many candidates put the cross in the correct box and linked this to the maximum mass of the turkey. Some candidates failed to make the link to the commercial aspect of feeding turkeys if they are no longer putting on weight.

12. (e) A wide range of suggestions were accepted and there were some unusual but valid responses.

13. This was disappointing, with many candidates merely describing the routine care of a rabbit without relating it to pregnancy or lactation. Many related it to humans and advocated the use of towels and hot water as well as having vets on hand for the birth. Some candidates were handling the rabbit and kits excessively in order to comfort them. Few gave good explanations for their answers and merely stated about providing more food or healthy food without mentioning the need for specific nutrients. Some candidates did not realise that the kits would be feeding from the mother and provided them with rabbit food from birth.

B682/02 Plant Cultivation and Small Animal Care (Higher)

General Comments

Many candidates are still being entered for the incorrect tier and there were some very low level responses, with many finding the more challenging questions targeted at A and A* inaccessible. Candidates are still struggling with the level of response questions, writing in limited detail and not including scientific terms such as 'flocculation', 'lactating' and 'hybrid vigour'.

Candidates are losing marks because they do not read the stem of the question carefully and are unsure about command words such as 'describe', 'explain' and 'discuss'. When describing graphs, many candidates describe the shape of the curve e.g. it went up then down without really explaining what 'it' is.

Comments on individual questions

1. This was poorly answered. Many candidates scored one mark but those who did not got CO_2 and O_2 the wrong way around. Few candidates were able to balance the equation and some used the number 6 on its own in a box.

2 (a) This was well answered with the most common mistake being to place the L at 5au.

(b) Few candidates related this question to the concept of limiting factors. Many gained one mark for describing the general relationship between light and photosynthesis but few related the difference in the two graphs to the temperature.

(c) Most candidates gained one mark on this question for mentioning increasing temperature but few related this to the concept of enzyme activity. Most gave general answers relating to increased water availability and some gained marks for increasing CO_2. However, few mentioned it being a limiting factor.

3. (a) This question was well-answered, with most candidates getting the correct answer B.

(b) Most candidates gained one mark on this question. Higher ability candidates understood that the banana should decay to release nutrients and related this to their knowledge of organic fertilisers. Lower ability candidates thought that the bananas might grow and out-compete the tomatoes, affect the flavour of the tomatoes or release harmful toxins.

4 Very few candidates were able to relate the observations about the soil to methods of improvement. Few used the information provided on NPK levels and many added NPK without understanding the effect of soil pH. Able candidates related methods of improvement to the science, such as lime causing clay particles to flocculate and organic matter improving soil structure. Some candidates confused the use of lime and added lemons to their soil.

5. (a) Most candidates gained the description mark. Some lost marks by not mentioning the increase then the decrease, or did not relate the graph to whitefly. Some candidates misread the graphs or talked generally about all three greenhouses. Some candidates misunderstood the role of wasps but credit was given to them eating/killing the whitefly but not stinging. Higher ability candidates understood the principle of biological control and gained the mark for interpreting the time lag. A few candidates misread the stem of the question and commented on plastic wasps. This was a good discriminator at grade C.

(b) Many candidates related Martin's conclusion to the data. Some candidates did not understand the term repel or did not discuss the information, merely stating that the conclusion was correct or incorrect or stating that the whitefly increased. Few candidates commented on the experimental design to gain the second mark.

6. (a) Most candidates found this chart difficult to interpret. The most common response was four weeks, which candidates read as being when there was no germination. Some other candidates failed to relate the data to real life situations so chilled them for longer than necessary without realising the effect this would have on delaying planting.

(b) Very few candidates understood the term *vernalisation* or appreciated the importance of this process to prevent seeds from germinating when conditions are unsuitable for growth.

7 This question was well answer. The most common mistake was mixing up succulents and roughage.

8. This was disappointing, with many candidates merely describing the routine care of a rabbit without relating it to pregnancy or lactation. Many related it to humans and advocated the use of towels and hot water as well as having vets on hand for the birth. Some candidates were handling the rabbit and kits excessively in order to comfort them. Few gave good explanations for their answers and merely stated about providing more food or healthy food without mentioning the need for specific nutrients. Some candidates did not realise that the kits would be feeding from the mother and provided them with rabbit food from birth.

9. (a) Higher ability candidates were able to understand that calcium is required for development of the shell. Some candidates lost the mark by giving a general answer commenting on the correct nutrients. There were a significant number of candidates who thought that it was related to whether the egg was fertile or not.

9. (b) Higher ability candidates provided a description of the graph and linked this to an explanation. Some candidates lost marks because they either described or explained. The descriptions were sometimes insufficient to gain a mark e.g. there was a negative correlation or the mass of the egg decreases. The explanation often centred around whether the egg was fertile or not.

9. (c) This was poorly answered with a lot of 'no responses'. Higher ability candidates understood that the vent is used for excretion as well as reproduction; other candidates gave explanations relating to the relative difficulty of giving birth to live young compared to laying eggs.

10. Most candidates understood the difference between line and cross breeding, although some were still writing about breeding between different species. Few candidates used the correct scientific terms like 'hybrid vigour' and 'recessive alleles' to gain the higher A grades. A good response provided advantages and disadvantages for both line and cross breeding.

11. (a) Most candidates gained one mark for showing some correct working but few calculated the correct percentage increase.

(b) Most candidates understood the graph but many did not discuss it fully with a reason why the information could be correct or incorrect.

12. Most candidates gained a mark for writing about unwanted pregnancies, with higher ability candidates talking about changes in behaviour. No credit was given to candidates who talked about an animal's right to breed. However, credit was given if linked to natural behaviour. Some candidates did not know what spaying was and misinterpreted the question to be about spraying as a means of pest control.

B683/01 Commercial Horticulture Agriculture and Livestock Husbandry (Foundation)

Comments on Individual Questions

1 This question produced a good number of wholly correct answers. Cherry was the best recognised of the shrubs.

2 Not so well-answered with over half the candidates thinking that fleece would prevent weed growth.

3 Few candidates failed to realise that hardiness was the most important feature for hill breeds of sheep. The most commonly incorrect answer given was disease resistance.

4 Not well-answered although this is a version of a question we have asked several times before. Many candidates covered the safety aspects without covering the fundamentals of how the animal might be weighed.

5 Very few candidates gained all three marks. Surprisingly, a large number of candidates thought the rectum was only found in ruminants.

6 A poorly-answered question. Sadly, many candidates thought facing north meant the greenhouse would gain maximum sun throughout the day. Higher ability candidates thought about the impact of the building and tree, access to the greenhouse and electricity/water supply. No candidates gained maximum marks.

7 Very well answered with the majority of candidates gaining maximum marks.

8 Most candidates were aware that calcium was needed for bones but fewer linked anaemia with a possible lack of iron in the diet.

9 There were few completely correct answers, with several candidates confusing the two methods of pest control, resulting in lost marks.

10 Very well-answered, with the majority of candidates gaining maximum marks.

11 Most candidates realised that the soil might become deficient in nutrients over time; fewer gained the second mark for realising that there would also be a build-up in pests and disease. Several candidates lost marks by not linking the two problems to the fact that tomatoes were there for several seasons.

12 Not well-answered although examples of the use of peat as a soil improver or growing medium were allowed if the candidates did not use those exact words.

13 (a) & (b) Most candidates gained the maximum 4 marks.

13 (c) Most candidates correctly identified amateur gardeners- as they used the most peat. A few candidates, however, gave local authorities, as they used the least.

14 (a) Very well-answered.

14 (b) The few candidates who did not gain this mark did so because they said peat use had declined without noting it increased up to 2001.

15 (a) While most candidates were able to calculate the total figure, few could work out the missing percentage.

15 (b) Of the three possible correct answers, candidates were generally able to identify at least one. Most gave that peat alternatives were used more than peat in total, without comparing the different uses of each.

16 (a) Most candidates gained the first mark for saying that the figures fluctuated or words to that effect. Few gained the second mark for quoting figures from the table.

16 (b) Of the candidates that did not get this question correct, most did so because they gave the sale price of the eggs without calculating the profit.

17 Very well-answered with several candidates giving level 3 answers to this question. Better answers were well structured taking advantages and disadvantages of each system in turn although, inevitably, many of the answers were just reversals of each other. Most candidates covered economic and ethical differences but only the very best compared the environmental issues.

B683/02 Commercial Horticulture Agriculture and Livestock Husbandry (Higher)

Comments on individual questions

1 (a) Most candidates correctly identified the concentrate as being the best option for providing the production ration.

1 (b) Well-answered but candidates should be encouraged to avoid using the words they are trying to define in their answers. “A production ration is given to animals to produce something” would not be sufficient to gain the mark unless they gave an example of what might be produced e.g. milk.

2 Well-answered, with most candidates gaining three of the available four marking points.

3 Not well-answered, with very few candidates gaining 3 marks. Surprisingly, rectum was the most common incorrect answer with many candidates not even giving the rumen.

4 Generally well-answered. Although some of the types of mower given were not as per the specification, some candidate’s knowledge of brands and model numbers was impressive. Where answers such as “move the leaver” or “turn the button” without reference to what happened as a result (e.g. the wheels lowered or the roller raised) then credit was not given resulting in quite a few candidates gaining zero marks.

5 (a) Some very good answers seen where candidates applied their knowledge of grass cutting and common sense to this unfamiliar situation. Most answers only covered the differences in seasonal growth and weather conditions. Better answers explained the differences in use during the paying and closed season, and some candidates gained credit for explaining that different types of mowers might be used at different times of year. No candidates gained maximum marks on this question, which was targeted at up to grade A*.

5 (b) A challenging question, although many candidates were able to use their knowledge of the properties/uses of ryegrass to work out the correct answers. A few candidates lost marks by drawing more than one line between boxes.

6 Most candidates realised that the soil might become deficient in nutrients over time. Fewer gained the second mark for realising that there would also be a build-up in pests and disease. Several candidates lost marks by not linking the two problems to the fact that tomatoes were there for several seasons.

7 Some well-reasoned arguments were provided by candidates. Better answers covered both the practical and environmental advantages of the use of hydroponics over peat. Again, no candidates gained all six marks, but this question was targeted up to grade A.

8 (a) Generally well-answered.

8 (b)(i) Several candidates lost marks because they confused raised pH and increased acidity.

8 (b)(ii) Most candidates used the table to relate lowered pH to reduced solubility/availability of nutrients. Where candidates talked about raised pH in the previous question, 'error carried forward' responses were allowed. Several candidates talked about there being less nutrients in the solution or gave general answers such as "acid is not good for plant growth", which were not allowed.

8 (b)(iii) Candidates needed to mention both monitoring and adjusting the solution's pH to gain the mark.

9 (a) This question was answered well by most candidates.

9 (b) Some good common sense answers were seen by Examiners, with temperature, amount of exercise, diet and type of breed being the most common responses.

10 (a) While most candidates calculated the correct value, many put the decimal place in the wrong place.

10 (b)(i) Some very good answers were seen.

10 (b)(ii) Again, careless positioning of the decimal place penalised a number of candidates.

10 (c) Some very careless rounding up lost candidates marks.

11 This question was very well-answered, with many candidates giving excellent balanced arguments covering economic, environmental and welfare issues, thereby gaining maximum marks.

B684 Environmental and Land-Based Science Portfolio

This is the first year of this new specification for submission of the controlled assessment portfolios. The overall quality of the work presented was good across the whole ability range. Less able candidates often performed well in all three elements and most candidates accessed the marking criteria and demonstrated their ability in the subject. The more able candidates produced substantial portfolios which often contained work of a pleasing academic standard and original to the candidate; such portfolios were most interesting to read and very informative in nature.

Moderators saw few portfolios which contained work that was irrelevant or in an unacceptable format. Irrespective of the candidate's ability, portfolios resulted in a record of work which demonstrated positive learning experiences from highly motivated candidates who clearly enjoyed the subject and tasks set in the controlled assessment. The use of photographic evidence is to be strongly recommended as it provides a good record of the work carried out and supports candidates' descriptions and explanations of the tasks performed.

Centres need to be aware that coursework is now worth 60% of the qualification and candidates need time to fully address the marking criteria. The time spent producing the portfolios should be seen as an opportunity to reinforce or teach much of the specification content, and not simply to focus on the production of the portfolios.

Some confusion appears to exist with regard to the acceptable format for presenting candidate portfolios for moderation. This made the moderation process more difficult than in previous years. Wherever possible, work should be submitted electronically using the OCR Repository (component 01). If for any reason a centre is unable to produce electronic work for candidate, then the written work can still be scanned and submitted in that format. Almost all centres produced their portfolios in an electronic format and then submitted these as printed paper copies under component 02. In the worst cases, up to eight power point slides were submitted per A4 sheet making it almost impossible to read and moderate the work. Some very imaginative work was produced and it was a pleasure to read, however, where this was in paper format the clarity was compromised and the effort of the candidates not shown at its best.

Controlled Assessment

Almost all centres met the criteria for controlled assessment. In a few cases it was difficult for moderators to identify the controlled assessment task which candidates had attempted to contextualise. In the future, candidates **must** use the title given for each element within the controlled assessment paper and then give their own contextualised version.

Centres and candidates need to be aware that this part of the assessment is high control but performing the task and recording the work is performed under medium control.

Element 1 – Practical Scientific Skills

The method of assessing this component was new and centres should be congratulated for the way candidates addressed these skills.

Skill (a) – Demonstrates practical and scientific competence

Much of skill (a) can only be assessed by the teacher observing the candidate at work. It is necessary for candidates to incorporate an annotated series of photographs or video clips; this proves highly motivational to the candidate and gives evidence of the skill being performed.

Skill (b) – Collect and process primary data

Almost all centres did this in a detailed and appropriate manner. Where tasks do not lend themselves to collecting a range of graphical techniques, candidates gave numerical values for observations i.e. activity of livestock or depth of colour in leaves. This enabled candidates to produce relevant and informative graphical information. For 5 and 6 marks, better candidates converted data into percentages or food conversion rates.

Skill (c) – Evaluate methods used and data collected

The evaluation can be seen as a critical but constructive reflection on the task and procedure performed. For 5 and 6 marks, candidates need to do more that state outcomes or problems encountered. There is a need to evaluate the task and give reasons for the problems encountered.

Some centres treated the four tasks and mini investigations as full scientific experiments, spending too much time writing these. It is expected that these skill tasks contain a risk assessment followed by annotated visual evidence of the task being performed and supported by the data collected. This then needs to the evaluated and the process reflected on. In the best evaluations, evidence was clearly annotated and described in a visual format.

The practical scientific skills should be seen as the root for delivering key aspects of the specification and centres can perform more than the required four and then select the best four for submission. This would avoid centres only completing three out of the four skills and candidates losing valuable marks by being short of tasks to present.

In the case of challenging learners, attempting skills as soon as possible not only motivates the learner but allows candidates maximum opportunity to access the marks, reducing the possible problems resulting from poor attendance.

Element 2 – Scientific Investigation

Centres need to take particular care when selecting a topic for investigation, and in particular plan to carry these out at a suitable time of the year. When this is not addressed, the opportunities for contextualisation and collection of suitable primary data may become a challenge.

A few centres performed investigations which were more suited to a course in Biology and were only just acceptable for Environmental and Land-Based Science. Where all candidates perform similar investigations, it is essential that candidates collect their own primary data and clearly acknowledge where they use group primary data. Candidates need to highlight the specific data which they have collected within the group data. Where centres carry out more than one investigation topic, the whole class can benefit by candidates being more motivated when candidates select a topic best suited to their own interests. This can further benefit the teaching group by producing investigations that can be presented by the students to the teaching group to motivate and extend the learning. This ensures that the portfolio is an effective learning tool and not just a task to meet the assessment requirements of the specification.

Strand A – Planning, using appropriate secondary data

Far too many centres focused on the statement “selecting relevant questions without guidance” to award the marks in this strand. Many of these candidates collected limited amounts of secondary data and then failed to use this data to demonstrate how it informed their plan. To obtain higher marks, procedural difficulties need to be identified within the plan and candidates need to justify how they will attempt to ensure precision and make clear to the reader their justification for the procedures chosen. This needs to be supported by the secondary data.

Strand B – Collecting primary data

Most centres applied the marking criteria fairly, although in a few instances, teachers confused collecting large amounts of simple data with collecting an extensive range of accurate and precise data. It would be helpful if candidates showed or explained how they collected data and the procedures used to minimise error. The units used to record information need to be those normally used in scientific work, within the limits of the equipment that is available in schools. Where procedures are compromised by the availability of equipment, candidates need to state and discuss this in some depth.

Strand C – Processing and analysing data

The application of the first three marking criteria tended to be appropriate for 7−8 marks; the conclusion should be clearly linked to a scientific model when discussing their analysis. Many answers in this area tended to be vague and poorly supported by the relevant scientific knowledge. The criteria for 9−10 marks is very demanding and candidates are expected to analyse their outcomes based on the evidence and fully explain how this links, or fails to link as they might have expected, to the scientific model.

It is important that where high ability candidates are selecting and planning their investigation, that they consider carefully how contextualisation of the topic will enable them to fully address the higher marking criteria.

Strand D – Evaluating the procedure and evidence

In some instances it was quite difficult to identify strand D and evaluative comments had to be found within strand C or other parts of the investigation. Candidates often suggested improvements to the investigation or made statements about inaccuracy or anomalous results but failed to fully explain with reasons why such results were anomalous, and why modifications to the investigation might improve the accuracy of their outcomes.

Strand E – Quality of scientific communication

Generally, reports were well presented and followed the format suggested within the marking criteria. In a few instances, particularly where power points had been transferred to paper, page numbers appear to have vanished although the content showed page numbers that related to the work on the relevant page. Where it was evident that this problem had occurred, moderators allowed benefit of doubt for this year. Please endeavour to submit the portfolios electronically as this avoids important detail being lost in transcription.

Strand F – Determination, initiative and interdependence

As with the previous legacy specification, almost all centres appear to award these marks fairly and it is pleasing to see the number of diligent, highly motivated candidates who might not be the most academic being rewarded for their dedication, and some obviously very able candidates only gaining intermediate marks.

In the case of a few centres, the investigations appeared to have been rushed and lacked depth and detail, with some candidates having performed practical scientific skills to a far higher standard than those shown in the main investigation.

The best investigations are almost always where candidates choose to investigate the growth of a plant crop or livestock investigations.

Ecological investigations are also excellent and often required group work, so candidates need to take care to have some of their own data and be open about the need to work as a team i.e. when carrying out a profile line transect.

Element 3 – Work-related Report

This element of many portfolios tended to be most over-marked. Moderators often found it difficult to identify the topic chosen for the report. The structure of the reports was often vague, lacked detail and original comment. In the worst cases, the reports consisted of work on a topic where information had been gathered from the internet and simply copied and pasted into some sort of report.

Teachers and candidates need to carefully read the task in element 3 within the controlled assessment paper. This needs to be discussed and explained before candidates start to prepare their reports.

Some centres used school-based enterprises to try and address the marking criteria. It is found that the candidates often get confused and are unable to offer evidence to meet the marking criteria. Candidates should visit a work place to collect the primary data. If this is not practical, a practitioner should be invited into school to discuss their role and the organisation with the group.

The best work came from centres where candidates visited an enterprise and were able to spend time with an employee and collected extensive information during the visit or, subsequently, secondary data from related web sites.

Strand A – Collecting primary data

(a) Collecting primary data
The quality of primary data tends to depend on the nature of the visit. Candidates need to be prepared in advance of their visit and to carefully plan the type of information they need to collect and the questions they might ask. To access high marks, the information collected needs to be sufficiently detailed for the reader of the report to be fully informed. Primary data needs to be referenced appropriately.

(b) Reference to sources
Most candidates are listing references in the bibliography but often fail to identify them within the report; these references should be detailed and dated.

Strand B – Collecting secondary data

(a) Collecting secondary data
For 1-4 marks, candidates need to collect secondary data and clearly link it to the enterprise and the chosen job role. For between 5-8 marks, candidates need to select and *use* the secondary data, discussing its importance, application and validity to the chosen enterprise and job role. Simple copying of secondary data is of no value. To gain marks, candidates must use and discuss the information fully.

(b) Reference and sources
As with primary data candidates must take care to use the references within their accounts; these should be detailed and dated.

Strand C – Work carried out

Candidates need to understand the depth of information required. For 1–2 marks, candidates need to make a simple relevant statement, but for 3–4 marks, they need to identify and discuss. For 5–6 marks, candidates need to fully explain the information they have collected. For 7–8 marks, the material must be analysed in a critically constructive way. Please take time to address fully the marking criteria for strand C.

Strand D – Skills used in the work place

Candidates are required to identify technical skills and identify the expertise needed by an individual within a work place, and to be aware of the training and qualifications needed by the individual. The main problem in this strand is that technical skills are often poorly explained, not clearly linked to the workplace and the terms *explain and analyse* not understood or used appropriately.

Strand E – Scientific Knowledge applied in the workplace

Candidates need to understand an aspect of science and the financial and regulatory factors that impact on the workplace. This key strand tends to be covered very superficially and many reports simply contained a reference to disease or to Health and Safety, with very little reference to the underlying science. Any science presented was often described simply and not explained in sufficient depth in the context of the organisation- as is required for 5–6 marks. For 7–8 marks, candidates must analyse the science and clearly explain its importance to the enterprise, and how it enables the effective operation of the enterprise.

Financial data can be difficult to obtain and detailed personal information is not necessary, but candidates are expected to show an understanding of the importance of financial and regulatory factors on the effective operation of an enterprise.

Strand F – Quality of the presentation

The best reports were produced as power points, and candidates clearly addressed the marking criteria. Candidates need to understand that they are not required to produce elaborate power points. Candidates need to produce a logical report, which makes full use of informative pictures and diagrams to help the reader understand the organisation without visiting it. They must also use the correct scientific and technical terminology.

Planning

Each centre will have their own reasons for the timing of the three elements of the portfolio but in general, the best portfolios appear to be produced where the centre focuses on the skills in the first two terms and relate this to the specification content. Investigations are best carried out during the growing season between February and July, or in the case of a one year course, in September, and based on an ecological topic. The Work-related Reports are often done in the autumn term following candidates' work experience, when candidates have gained sufficient maturity to understand the workplace environment.

Administration of the coursework

Centres are strongly advised to complete coursework well ahead of the submission deadline of 15th May. Each candidate record card should be completed from the downloadable record card from the website and used in its electronic form to ensure the correct calculation of marks. Moderators found far too many arithmetical errors from centres that had not used the electronic version of the record card. Moderators also require a copy of the centre MS1 and CCS160. For component 01, these can both be loaded into the administration tab of the Repository. It is strongly recommended that the centre utilises the OCR Repository in future to submit candidate samples to the moderator. The system benefits both the centre and the moderator in terms of quality of presentation of the work, time and cost.

More information about the OCR Repository can be found at: http://www.ocr.org.uk/ocr-for/teachers/ocr-repository/

Annotation of coursework

The annotation of coursework is most helpful. Some centres add this to the reports electronically, whilst others find is easier to produce a brief set of comments for each candidate. Both methods are very effective and help the moderation process.

It is essential that centres plan in advance and make full use of OCR INSET. Where INSET is insufficient, a centre should consider taking advantage of a subject expert visit to help address their individual concerns.

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