OCR
Oxford Cambridge and RSA

GCSE

Environmental and Land-Based Science

General Certificate of Secondary Education **J271**

OCR Report to Centres June 2016

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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

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

General Comments:

Most candidates had been entered for the appropriate tier and there were a wide range of responses and marks for the paper. However, there was also a large number of questions where there had been no attempt to answer the question on this foundation tier paper. There were a few instances where candidates did not engage with the paper at all and did not answer any questions.

Many candidates were well prepared for the range of questions and were able to attempt answers from a broad range of subject areas- showing a good understanding of the unit content by the teaching teams. There are still weaknesses in certain aspects, particularly the appropriate use of scientific and technical terminology.

Level of response questions are still a weak area with candidates often not writing in sufficient detail or using scientific terms to gain maximum credit. Candidates should be encouraged to include a range of information as well as to include more depth.

Poor handwriting makes it challenging to mark some responses and can lead to lost marks for these candidates.

Comments on Individual Questions:

1. A multiple choice question requiring the candidate to select two answers. Most achieved this correctly

2. This question on the alternative electricity production was answered correctly by the majority of candidates who cited a 'fuel crop'. A significant number incorrectly chose ground source heating.

3. Proving more challenge than anticipated, many did not correctly name sand, silt and clay as being the three main components of a loam soil. Some named aspects such as nutrients or air. A number of candidates only correctly named two components, omitting silt.

4.ai Not a common task on previous papers, the candidates needed to plot coordinates on a graph. A good majority did this correctly, although, additional time spent checking accuracy may have been beneficial.

4.aii A question requiring extension of the data, while many were able to draw the curve, they did not continue the growth line, typically plotting it too shallow. Whilst a range of responses were accepted, many predictions were too small. This was a common question with the higher paper. Candidates who attempted to calculate the answer mathematically were not penalised for not plotting the curve.

4aiii The reasons for the large increase in yield over the years was less well understood. There was confusion over the term yield (relating to output from a given area); many responses assumed more area had been grown. Similarly, better weather would not account for the increase in yield over time, although may impact one specific year. A wide range of responses were acceptable, typically focussing on better quality inputs, efficiency gains and better understanding of growing conditions.

4b Referring back to the data, candidates had to calculate 33.3% of 8.7 tonnes per hectare. This proved quite challenging for many candidates.

4c Attempted by most candidates, a wide range of potential responses were given credit. Most responses spoke about poorer soil growing conditions, lack of mechanisation or climate differences.

5. A poorly understood question. Although specifically named in the specification, few candidates demonstrated an understanding of the work of the Rare Breed Survival Trust (RBST). The majority of animals named were either non-native to the UK or were wild animals. While the expectation would be for candidates to be able to name animals such as sheep or cattle, some were able to name specific breeds.

6. The first level of response question in the paper; assessing the quality of written communication as well as the content of the response. This question was also common with the higher paper. Attempted by most candidates, many identified the opportunities the trees provided for additional wildlife habitats, many also saw aesthetic benefits and some also cited the impact of photosynthesis from the trees, although this was often exaggerated in answers. Fewer identified the cooling/ shading impact of trees, the impact on other air pollutants, the noise dampening effects and the impact on property values.

7. Seeking to test understanding of intensive and extensive production systems, this question was found to be challenging for many learners. Some confusing the production types, others have difficulty in naming any production system. Few candidates scored full marks.

8. Another level of response question, this time relating to the adaptations of the fox to make it successful. Many candidates only focussed on physical features, whereas better responses also spoke about behavioural adaptations, particularly to the urban environment. In a few cases candidates used the picture as the basis of annotations for the physical adaptations then wrote about behavioural aspects in the text box. All responses and styles were considered.

9. Testing an understanding of the nitrogen cycle, those that understood the process selected decay as relating to the description. Those who were less sure chose nitrification, presumably as nitrates were mentioned in the text.

10. A question looking at the usefulness of records from a weather station. The purpose of the weather station is to record historical data which may give an insight into trends. The typical weather station in such a scenario is not likely to be able to give a weather prediction for the day ahead. Most candidates who were successful on this question spoke about the understanding of when it is safe to plant after frosts, the need for watering in prolonged dry spells and the use of the data to ascertain the suitability of a specific crop for the location.

11. The third level of response question, asking candidates to describe how earthworms improve the soil. This question showed a large variance in the amount written, some longer descriptions did not gain additional points as they were repetitions of the same issue. Many candidates failed to use appropriate technical or scientific language in their descriptions. Few candidates scored very high marks on this question.

12. Generally well understood. The majority identified conduction as not being part of soil formation, although some weaker candidates tended to select ‘erosion’.

13. While fairly straightforward, many candidates were unable to identify ways large machines damage the soil beyond simply stating ‘compaction’. Pollution, if cited, needed to relate to the soil and had to include a specific example (such as oil spillage).

14. Most candidates were able to select the correct response from this multiple choice question; identifying the competition for light.

15.a Most candidates were able to provide the average pH from the samples provided.

15.b Slight more complex, the majority of correct answers centred around the issues of poor technique and of error in recording.

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

General Comments:

Most candidates had been entered for the appropriate tier paper allowing greater opportunity for them to received appropriate credit for their responses. Most candidates attempted most questions on the question paper.

Many candidates were well prepared for the range of questions and were able to attempt answers from a broad range of subject areas; showing a good understanding of the unit content although there are still some areas of weakness. This will be highlighted in the commentary relating to specific questions. There are opportunities for candidates to develop a greater technical and scientific vocabulary which may help them in achieving additional marks.

There are some weaknesses in content of answers for the level of response questions, often linked to the amount the candidate has written, although some longer responses were repetitive and did not cover sufficient range.

Poor quality of handwriting makes it more difficult to mark some responses.

Comments on Individual Questions:

Question No.

1. A multiple choice question requiring the candidate to select two answers to achieve one mark. Most achieved this correctly

2. The use of ICT was well understood by candidates, most identifying the improvements to accuracy, reduction in errors and the improvements of levels of monitoring when compared to manual systems.

3. ai This question required the extrapolation of data on a graph. Attempted by most candidates, the common reason for providing an incorrect answer was too much caution in drawing the curve. Those that calculated the result by mathematical means were also credited if correct.

3.aii The reasons for the large increase in yield over the years was less well understood. There was confusion over the term yield (relating to output from a given area); many responses assumed more area had been grown. Similarly, better weather would not account for the increase in yield over time, although may impact one specific year. A wide range of responses were acceptable, typically focussing on better quality inputs, efficiency gains and better understanding of growing conditions.

3.b Requiring the candidate to use the data. This question required the calculation of 33.3% of 8.7 tonnes per hectare. This proved quite challenging for many candidates.

3.c. A wide range of responses to the way in which GM might increase yield were allowed. This is a concept that seemed well understood.

4. The majority of candidates understood the needs of organic growing and identified herbicides as being the least likely technique to be chosen for weed control.

5. Most candidates saw the potential cost saving of installing a reservoir, although fewer could identify a valid second reason such as continuity of supply or the ability to control water quality.

6. The first level of response question in the paper; assessing the quality of written communication as well as the content of the response. This question was also common with the foundation tier paper. Attempted by most candidates, many identified the opportunities the trees provided for additional wildlife habitats, many also saw aesthetic benefits and some also cited the impact of photosynthesis from the trees, although this was often exaggerated in answers. Fewer identified the cooling/ shading impact of trees, the impact on other air pollutants, the noise dampening effects and the impact on property values.

7. A number of candidates had difficulty in describing the difference between conservation and preservation. An additional mark was also available to describe an initiative of a conservation organisation. Candidates often focussed on one aspect or the other in their responses.

8. A level of response question looking at the health and safety issues within the sector. Most candidates, if they answered the question successfully, identified the hazards associated with machinery, a lesser number also cited the risks in working with livestock. Some of the best answers identified issues of lone working in remote areas. The question also required potential solutions to the issues identified, some lost marks by failing to do so or writing in very generic terms.

9. ai While using some larger numbers, most candidates were able to complete this addition, those who were unsuccessful did not read the question in sufficient detail. NB of the incorrect answer was calculated it was used in the future linked questions in the marking of the paper.

9.aii A linked calculation defining the percentage of the total number of SSSIs. Some candidates failed to show their working and therefore could not be awarded that specific mark.

9.b This question required the interpretation and application of the previous two calculations. A range of responses were credited linked to the outcomes of the previous questions. The expected answer would identify that whilst the majority of SSSIs were being appropriate cared for under the current system there was a sizeable percentage where the current strategies were not having the desired effect.

10. A question that challenged many candidates who either had difficulty in identifying damage that would occur to the local habitat through this holiday development or the methods that could be used to reduce the damage. Whilst a wide range of solutions were possible, many responses were very generic.

11. Many candidates wrote extensively on this question the most common error was the describe aspects that did not relate to the field itself and to focus on the livestock. Some aspects, such as the change in balance of species if an area is overgrazed, were poorly understood.

12. Some candidates did not reach their full potential on this question by failing to identify immediate and longer term impacts. Clearly, this is a topic that is well understood by candidates. The highest performing candidates included the build-up of pest and disease problems as well as merely the availability of nutrients.

13. A level of response question which was completed extensively by some candidates but also too briefly by others. Better candidates included the potential for anaerobic digestion and mechanism for using fuel crops as well as solar and wind power.

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

General Comments:

Most candidates had been entered for the appropriate tier and there were a wide range of responses and marks for the paper. The majority of the questions were attempted by most of the candidates; however some candidates are still choosing not to even attempt the six mark questions. Candidates engaged in all aspects of the paper both the plant and animal sections and displayed a good understanding of the topics being examined. Candidates answered the data response questions well, coping with both the mathematical elements and including data in the analysis. They are also much better prepared for the questions on practical techniques and it was clear that most students had carried out activities that helped their understanding. Candidates are still struggling with the level of response questions and are not including sufficient scientific detail. They should also be encouraged to include a range of information as well as to cover some topics in more depth. Poor handwriting makes it difficult, and in some cases impossible, to mark responses and can lead to lost marks.

Comments on Individual Questions:

1a. Most candidates scored either 2 or 3 marks on this and could rearrange the sentences in chronological order.

1b. This was poorly answered with the majority of candidates recommending spring or summer for the root cuttings due to the high temperatures. Very few candidates understood the need for dormancy when taking root cuttings are taken in late autumn/ early winter.

2ai. Few candidates really understood the difference between organic and inorganic fertilisers. The stock answer was that organic is ‘natural’ and inorganic contains ‘chemicals’. Students don’t seem to appreciate that both types of fertilisers contain mineral elements which are chemicals. Some students also suggested that inorganic fertilisers could harm the plant. Most candidates did not write two differences they merely put the reverse argument down.

2b. A surprising number of candidates got this question wrong; including answers such as water, spray and baby bio.

2c. This question was well answered with most candidates picking up the mark; the most common mistake was 4.58kg when the candidates wrote down the highest yield rather than the plot number.

2d. This question was well answered with the majority of students being able to calculate a mean. Some students clearly did not have a calculator in the exam so made basic errors in the calculation. The most common mistake was not getting the full total before dividing it by 5.

2e. Very few students scored a mark on this question. Candidates failed to understand that some potatoes would grow even if no fertiliser was added and that too much inorganic fertilisers would not kill the plant.

2f. A small number of students misinterpreted the table and stated that all organic plots grew better. Good students noticed that plot 1 did not support the conclusion and most of these stated the yields as evidence. Few students mentioned the small scale of the investigation and therefore lack of validity.

3. Most candidates answered this well and there were some excellent responses worthy of six marks. The best answers directly linked the signs of ill health with the cause, whereas weaker candidates just made vague reference to both parts of the question without making a link between them. Good answers included technical terms like 'wilt' whilst poor answers would make reference to 'dry and crispy' leaves. Many students knew the signs of nutrient deficiency linked to specific nutrients and others gave specific examples of pests and diseases such as aphids and potato blight.

4. This was an easy question and most candidates scored both marks. The main problems occurred where candidates used different words to describe decay for both marking points for example 'rot' and 'go off' so only gained one mark. Other candidates did not read the question carefully and explained about the sell by date and how eating the fruit would make the customer ill.

5. More able students gave excellent responses to this, using specific examples for biological control. A significant number are still getting biological and non-biological control mixed up leading to loss of both marks. Weaker candidates did not understand the difference and made vague reference to natural methods, damage to the plants and damage to the environment.

6a.It was clear that the candidates all had practical experience of weighing small animals and could describe the techniques used. Good candidates described the whole process in detail from handling, to weighing to preventing the spread of disease, including how to ensure accuracy of results. Weaker candidates gave limited responses focussing on how to place the animals on the scales.

6b.This question was well answered with most candidates scoring 2 or 3 marks. Candidates are gaining confidence in using data to extend their answers and so are picking up the extra marks. Candidates still get confused between describe and explain and so some lost marks because they explained why the broilers grew faster than the layers rather than described it.

6c. A well answered, easy question. Some candidates made basic numerical errors because they did not have a calculator. Other candidates used the graph rather than the table for their calculations, so rounded up values were accepted as long as they showed their workings.

6d. Candidates had clearly carried out many scientific investigations and knew how to improve the investigation, including reliability and validity. Candidates lost marks by referring to feeding regimes and housing which were not mentioned in the stem.

6e. This question had the weakest responses out of the whole paper. Some candidates mentioned selective breeding but very few could explain how this would be carried out to get a high egg yield. Many candidates thought it was due to the fact that there were now more hens hence more eggs rather than a greater egg production per hen.

7. There was a wide variation in the standard of this response. There were a lot of low level responses referring to 'breaking down' grass and listing of the organs but not necessarily in the right order. Many candidates knew that rabbits re-ingested their faeces but few used the term caecotroph and although many mentioned the caecum, few could explain its function. Lack of scientific terminology was the main problem with the answers with few candidates using terms such as 'enzyme' or 'diffuse'; many just repeated the terms used in the stem.

8a. Most students interpreted the pie chart correctly.

8b. Better candidates made a direct comparison between the pie charts, mentioning both the first and second observation and making a direct comparison between the activities. Some candidates lost marks because they focused on an explanation rather than a description. Weaker candidates gave anthropomorphic descriptions such as the rabbit being 'lazy' or 'bored'.

8c. Many candidates failed to read the question carefully and did not appreciate that the observations were a week apart. Therefore, they lost marks by saying that the rabbit was tired from hopping around or that it had got old. Other responses that failed to score marks made vague references to the weather or laziness.

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

General Comments:

Most candidates are now being entered for the correct tier and there were some excellent responses by stronger candidates who gave detailed scientific answers including technical terms. Most candidates attempted the six mark questions and the majority wrote in detail, often continuing their answers on the additional paper. Candidates engaged in all aspects of the paper both the plant and animal sections and displayed a good understanding of the topics being examined. Candidates answered the data response questions well, coping with both the mathematical elements and including data in the analysis. They are also much better prepared for the questions on practical techniques and it was clear that most students had carried out activities that helped their understanding.

Comments on Individual Questions:

1. Stronger candidates knew the difference between biological and non-biological pest control and gave some excellent advantages and disadvantages including lack of resistance, effectiveness and time to act. A significant number of weaker candidates are still getting biological and non-biological control mixed up leading to loss of marks. Some just made vague reference to natural methods, damage to the plants and damage to the environment.

2a. This question was well answered with the majority of students being able to calculate a mean. Some students clearly did not have a calculator in the exam so made basic errors in the calculation. The most common mistake was not getting the full total before dividing it by 5.

2b. A small number of students misinterpreted the table and stated that all organic plots grew better. Good students noticed that plot 1 did not support the conclusion and most of these stated the yields as evidence. Few students mentioned the small scale of the investigation and therefore lack of validity.

2c.This question was well answered with stronger candidates using technical terms such as ‘flocculate’. Most candidates knew how each of the three components improved fertility and soil structure and gave good scientific explanations. Higher tier candidates are more willing to answer in depth and there were few ‘no response’ marks.

3. Many candidates gained the marks for describing the graph using data to be specific about when the levels of the two gases peaked. Few candidates could explain the reasons for these peaks with many explaining the increase in carbon dioxide as being due to the fruit rotting.

4. Most candidates answered this well and there were some excellent responses worthy of six marks. The best answers directly linked specific pests and diseases to the signs of ill health and a control mechanism. Many candidates specifically mentioned aphids and potato blight. Weaker candidates just made vague reference to signs of ill health without making a link between them and the cause or the control mechanism. Good candidates gave scientific responses explaining how aphids cause ill health whereas weaker candidates still write about aphids ‘eating leaves’. Weak candidates gave the stock answer of ‘spray chemicals’ as a control method.

5. This was not well answered with only the stronger candidates really understanding the concept of asexual reproduction. Weaker candidates mentioned taking cuttings and a significant number wrote about pollination and seed production.

6a. This question was well answered with most candidates scoring 2 or 3 marks. Candidates are gaining confidence in using data to extend their answers and so are picking up the extra marks. Candidates still get confused between describe and explain and so some lost marks because they explained why the broilers grew faster than the layers rather than described it.

6b. There were few issues with this question.

6c. Candidates had clearly carried out many scientific investigations and knew how to improve the investigation, including reliability and validity. Candidates lost marks by referring to feeding regimes and housing which were not mentioned in the stem.

6d. There were a wide range of responses to this question. Weaker candidates made vague references to mutations and deformities whilst stronger candidates gave specific effects of inheriting recessive alleles such as reduced fertility and deafness. Better candidates used scientific terms such as ‘gene pool’ and ‘alleles’.

7. There was a wide variation in the standard of this response. There were a few low level responses referring to ‘breaking down’ grass and listing of the organs but not necessarily in the right order. Many candidates knew that rabbits re-ingested their faeces and stronger candidates used the term caecotroph giving a detailed description of the function of the caecum. Lack of scientific terminology, such as ‘enzyme’ or ‘diffuse’, was an issue with some weaker candidates; many just repeated the terms used in the stem.

8a. Most candidates gained a mark on this question.

8b. This question was poorly answered on the whole with few candidates appreciating the long term evolutionary significance of laying eggs in spring, when day length is increasing so the chicks will hatch out when it is warm and there is plenty of food. Many candidates suggested that the extra day light hours would enable the chicks to search for food for longer or to be able to escape from predators easier. Weaker candidates wrote about why spring time was better for laying eggs, rather than for the hatching chicks, so that the hen could protect her eggs and the additional heat helped with the incubation process.

8c. Most candidates thought that the porous shell allowed loss or uptake of water. Some candidates gained a mark for linking porosity to gas exchange, although few then described the importance of oxygen for respiration or removal of carbon dioxide.

9. This was a straightforward question allowing candidates to use their knowledge of external parasites to gain two easy marks.

10. This was well answered with many candidates giving several arguments for and against. The main reason candidates lost marks was because they did not give an ethical issue for and against and instead described either two issues for or two against.

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

General Comments:

As an essentially practical science subject it is clear from the quality of some of the responses that some Centres have exposed candidates to a wide range of practical activities. This is particularly valuable for the quality of written communication questions giving candidates the opportunity to demonstrate the depth of their understanding.

Centres could assist candidates by working through the differences between the key command phrases used in exams such as describe, suggest and explain.

Comments on Individual Questions:

1a Mixed responses, many candidates seemed to have no experience of the plants identified in the specification.

1b Most candidates correctly identified the marigold.

1c It was apparent which candidates had actual practical experience of planting up. Candidates should be made aware that soil is not a suitable planting material for pot grown plants nor is soil the same thing as compost.

1d Candidates were generally able to calculate the profit margin on a single tub but then failed to multiply this up to find the profit on 25 tubs.

2a The different lifecycles were not well known.

2b While most candidates were able to give one correct example few could name one for each lifecycle.

2c Again these terms were not well known with many thinking evergreen related to the colour of the leaves rather than their retention of leaves throughout the winter months.

3a It was surprising how few candidates were aware that a glasshouse should ideally face south.

3b Candidate coped with this calculation of area much better than the previous calculation of profit margins.

4 As happens whenever we ask a question on this topic there was a lot of confusion between asexual and sexual reproduction. Many candidates seemed to think that seeds produced from self-pollinated or wind pollinated plants were asexual.

5a Very well answered although a calf “standing” without qualification is not a sign that it is healthy, sick animals will often stand. The way they are standing indicates that they are unwell.

5b No issues

5c While candidates were very good at identifying the features of good animal houses few went on to gain the higher marks for explaining how the characteristics of the housing differed for different classes of livestock.

6a The main misconception in this question was that the ovary was an egg.

6b Few full answers; most candidates concentrated on one aspect of the breeding process, usually mating, and ignoring embryo development and the birthing process.

7a Very well answered.

7b No issues; candidate's data interpretation skills have much improved since the specification began.

7c While most candidates were able to carry out the correct calculation they then failed to give their answer in pounds as the answer space required.

7d Most candidates gained the single mark for saying that profit was reduced but fewer went on to gain the additional mark for identifying why in their answers or using data to support their statements.

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

General Comments:

As an essentially practical science subject it is clear from the quality of some of the responses that some Centres have exposed candidates to a wide range of practical activities. This is particularly valuable for the quality of written communication questions giving candidates the opportunity to demonstrate the depth of their understanding.

Centres could assist candidates by working through the differences between the key command phrases used in exams such as describe, suggest and explain.

Comments on Individual Questions:

1a It was apparent which candidates had actual practical experience of planting up. Candidates should be made aware that soil is not a suitable planting material for pot grown plants nor is soil the same thing as compost. A number of candidates went into detail about where they would position each plant without explaining the planting process.

1b Generally well answered although a few candidates referred to general plant health issues such as pest damage rather than those more specific to plants in pots..

2ai The main misconception was that the propagator was warmer because it was smaller than the glasshouse.

2aii Very well answered.

2b While most candidates were able to give an advantage of plastic over glass , with safety being the most frequent, a number gave poorer light transmission as a disadvantage which was not accepted unless it was linked to yellowing with age, also a large number of candidates thought that glass had better heat retention than plastic.

2c Some good science knowledge was demonstrated in the answers to this question. Weaker candidates talked about dehydration or the plants being dry without explaining how the plants had “lost” the water.

2d No issues.

2e Well answered with most candidates getting at least one of the available marks usually for nutrient depletion.

3a Many candidates found this a challenging question, not realising that the other options were all possible with selective breeding.

3b While most candidates gained marks on this level of response question, few gave sufficient detail to justify a level 3 mark. One issue was the candidates failing to make clear which system they were talking about in their answers.

4b Very well answered

4b No issues

4c Some excellent detailed responses with several candidates giving more than the required three suggestions.

5a Again well answered but centres should remind candidates that if the question asks for a single response and they give more than one answer only the first will be marked.

5b A few candidates mistakenly talked about equipment hygiene in their answers rather than the building itself.

5c While most candidates got the idea that the antibiotic ended up in the milk. Few went on to talk about this leading to antibiotic resistant bacteria. Candidates should also be made aware it is not people who become resistant to the antibiotic.

5d There was a lack of knowledge of the range of legislation regulating the transport of livestock. While most candidates talked about not transporting sick animals and cleaning vehicles reducing the spread of disease few went on to talk about the role of paperwork, animal identification or standstill after movement.

6a While it was not necessary to express the answer as a ratio candidates should be made aware that if they do it must be expressed the correct way around.

6b A lot of candidates were unaware that the smaller the number the more efficient the food conversion.

6ci No issues

6cii Candidates should be made aware that if they make two statements one the converse of the other, they have only given one explanation not two. A few candidates described the data without any attempt at explanation.

7 Few full answers with most candidates concentrating on one aspect of the breeding process, usually mating, and ignoring embryo development and the birthing process.

B684/01/02 Environmental and Land-Based Science Portfolio

It has been pleasing to read and moderate work from such a diverse range of centres with candidates covering all abilities. This year has seen a further improvement of work in the upper ability range with some centres having some exceptional candidates and portfolios with work that many teachers of 'A 'level Biology or any other life science would be delighted if their candidates produced. Unfortunately, some of the candidates at the lower ability range are achieving very low marks often through failing to attempt each component needed for a complete portfolio. Many centres have been very ambitious in the way they contextualised their work, resulting in fascinating and really original scientific skills evidenced with extensive photographs and video clips annotated in detail in a most constructive way. The resulting Scientific Investigations have been to an exceptionally high standard.

Centres should take note of their own centre moderator's report feedback which is intended to offer specific guidance to the centre. This report is intended to provide advice to support continued improvement and encourage centres to adapt and modify their practice if required.

Those centres which have been adjusted need to take action to ensure they avoid adjustment in the future by acting on their moderator's report feedback.

The specification is intended to accommodate candidates of all abilities with some excellent profiles are being submitted from some very able candidates, also the weaker candidates have been able to develop a sound understanding of Environmental Land-Based Science and have performed well in all three elements and have been able to produce coursework portfolios which evidence their hard work skills and scientific knowledge. A great strength of the specification is that it enables candidates of all abilities can make worthwhile positive achievement by learning and applying life-long skills.

Far too many centres still fail to ensure each element of their portfolios contain a clear heading taken from the year's controlled assessment paper and then follow this with the heading of their own carefully contextualised version. Failure to do so could seriously harm the candidate's results.

Centres achieving the best reports and meeting close agreement with the moderators were those who made the candidates fully aware of the marking criteria. Candidates then used this knowledge at every stage of portfolio production enabling candidates to address the marking criteria in a logical sequence and then supporting the criteria with evidence including some first class photographic and video evidence.

Moderators generally saw few controlled assessment portfolios which contained work that was irrelevant or of poor quality irrespective of the candidates' ability. Portfolios resulted in a record of work showing positive learning experiences and many highly motivated candidates. A few centres submitted scrap books which were inappropriate for such controlled assessment even with the weaker candidates.

Centres often do not allow sufficient time for each element to be delivered at an appropriate depth to fully address the marking criteria. The coursework is 60% of the final award and should be allocated the appropriate time when planning the scheme of learning. The production of the candidate portfolios needs to be seen as an opportunity to reinforce or teach much of the specification content through first hand practical work. Time is needed to allow understanding to be developed in enough depth for candidates to produce high quality portfolios and gain real understanding of the subject.

Much more time needs to be devoted to the Practical Scientific Skills to enable candidates to be competent in the activities so aiding their understanding of the specification content. This then provides an excellent preparation for investigative work by allowing the candidates to become confident with their skills. They can then produce worthwhile investigations which can evolve naturally from a good skill base giving the confidence required to stimulated enquiry and a motivated approach to their Scientific Investigation.

Portfolios were originally designed to be electronic and although some centres submit some work in paper format it is strongly advised that centres use electronic format wherever possible. Weaker candidates gain a sense of pride from producing work which looks good. This again is evident in samples seen by the moderating team. The obvious pleasure of candidates is very evident; in particular those candidates who traditionally struggle with their coursework who now enjoy and can produce informative and attractive reports.

Almost all centres produced their portfolios in an electronic format but too many then submitted these as paper copies. In some cases, up to eight power point slides were submitted per A4 sheet making them almost impossible to moderate. These centres were asked to re-submit to allow moderators to read the presentations and allow accurate moderation. Some very imaginative work was produced and it was a pleasure to read. However, where the work was in paper format the clarity was compromised and the effort of the candidates not shown at its best. Where some parts of the work are produced on paper, the work may be scanned and incorporated in the e-portfolio.

As previously stated, centres must remember that the portfolio is part of a controlled assessment and need to take care to incorporate the controlled assessment task heading in each piece of work along with their own contextualised version.

Please be aware that the controlled assessment examination paper is for a specific entry period. Remember to check that you are following the appropriate controlled assessment paper.

Centres must use the electronic downloadable candidate record card to ensure each element is aggregated correctly and avoid unnecessary mistakes in addition and the need for moderators to send CW Amend forms. This year saw far fewer centres not doing this and so far fewer basic arithmetic errors occurred.

Element 1 Practical Scientific Skills

Centres should be congratulated for the way candidates addressed these skills. The marking criteria appeared, in most cases, to have been applied accurately. The way the tasks have been contextualised has in general been excellent and has shown practical scientific skills been used in a professional way. Centres are producing marks which are well differentiated and reward excellent practice appropriately. The range and imaginative ways centres have recorded skills is most pleasing and the advantages to candidates learning is most evident.

Centres are advised to carry out the skills in the first year of the course and those with weaker candidates might consider doing more than four and selecting the best. This enables the candidates with attendance problems to gain at least some marks from four skills. This greatly helps to avoid the very low marks seen too often this year from a few centres.

Far too many centres use photographs which are standard for a whole class. The portfolio must have some original evidence which should be annotated in detail and discussed within their evaluations.

Such evidence is motivational and makes the candidate think about how and why they perform a task and how they might amend or alter it in the light of their experience.

Skill (a) Demonstrates practical and scientific competence

Much of *Skill (a)* can only be assessed by the teacher observing the candidate at work. However, it is important that candidates incorporate an annotated series of photographs or video clips, to show the skill being performed. This evidence can then be used when evaluating the task in Skill (c). Too many centres still fail to fully develop this area and evidence is too often poor or general class pictures are used without identifying the skill being performed by the candidate.

Skill (b) Collect and process primary data

Most centres did this in a detailed and appropriate way. Where tasks did 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. Some most interesting and appropriate qualitative observations were recorded and converted into a form to produce meaningful quantitative data of a high professional standard. A few centres simply produced tables of observations not supported with data and were moderated downwards. Photographic information and annotation can help and motivate candidates.

Skill (c) Evaluate methods used and data collected.

The evaluation should be seen as a critical but constructive reflection on the practical skill tasks and procedure. For 5- 6 marks candidates need to do more than state outcomes or problems encountered. They need to evaluated the task and give reasons for the problems encountered or resulting outcomes. A few centres again this year treated the four tasks as mini investigations spending time writing these as full scientific experiments, this is not necessary.

Candidates only need to address the risk assessment in context of the task, followed by annotated visual evidence supported by the data. The evaluative comments should be clearly linked to the practical skills performed in the task. The evaluation of the data is important but the skill procedure is equally of importance. The task is really a way for candidates to acquire the skills needed to carry out the full investigation in a safe and effective way.

Candidates need to be encouraged to develop a constructive self-critical approach. They need to fully discuss their data and look at how they performed their skills. They need to show how and why they might improve their method and execution of the skill.

The practical scientific skills should be seen as the foundation for delivering key aspects of the specification. Centres may perform more than the required four and then select the best four for submission. This would help delivery of the specification and where centres have problems with absence this increases the chance of candidates having four skills. It should be remembered that even a low mark for a skill is better than not completing all four tasks and losing valuable marks. In the case of challenging learners, attempting skills as soon as possible when delivering the course, not only motivates the learner, but allows candidates maximum opportunity to access the marks.

Good skills were almost always followed by good investigations.

Element 2 Scientific Investigation.

Centres should take particular care to select a topic which provides an opportunity for candidates to perform an investigation that is original to them. Centres should plan to carry the investigation out at a suitable time of the year, so candidates can collect sufficient useful data. Selecting tasks which match the candidates ability helps ensure candidates can meet the criteria in a way suited to the candidates own style. Topics such as ecology or growing crops work best and enable good specification coverage. Where candidates devise slight variations on the field work or grow different crops, all candidates can gain positively from a shared learning experience.

A major problem is when all candidates perform a similar investigation, collecting the same or very similar data making it difficult for moderators to identify the originality of the work. It is essential that candidates collect their own primary data and clearly acknowledge where they use joint primary data. Where centres carry out more than one investigation, this will have a great benefit motivating all candidates within the teaching group. They could produce investigations which could be presented to the teaching group to motivate and extend the learning, ensuring that the controlled assessment is an effective learning tool and not just a task to meet the assessment requirements of the specification. Some centres still performed investigations which were more suited to a course in biology and only just acceptable for environmental and land based science.

Some topics investigated were contextualised in a most imaginative way and were really interesting and certainly provided some ideas for moderators to try for themselves.

Strand A Planning, using appropriate secondary data

Much of this mark band depends on teachers giving credit for truly original work. It is quite difficult to justify high marks when all candidates simply follow a typical field course activity. Moderators were pleased to note only a few centres produce laboratory based basic plant biology investigations where individual planning is almost impossible. Far too many candidates only collected limited amounts of secondary data and then failed to demonstrate how this data informed their individual plans. For candidates to obtain 9 or 10 marks, any potential procedural difficulties need to be identified clearly within the plan and candidates need to discuss and justify how they will ensure precision and make clear to the reader their justification for the process. Teachers are advised to annotate the degree of help provided for this strand. Candidates must write in a way which assumes the reader has no knowledge of the topic.

Where it is difficult to show originality, centres need to annotate to justify with good reason why high marks are awarded for individual working.

Strand B Collecting primary data.

Generally centres applied the marking criteria appropriately, 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 use of appropriate units is also essential.

Data needs to be tabulated and clearly labelled and dated. Photographic information or time lines can be invaluable.

Strand C Processing and analysing data

This strand is still addressed too simply and data collected in unexplained ways and is not used appropriately. To gain more than four marks candidates need to ensure that they have data which shows at least one trend/pattern. The candidates need to make a relevant comment about the trend shown by their data. For marks of 7-8, the conclusion should be clearly linked to a scientific model. Answers in this area tended to be vague and poorly supported by scientific knowledge and lacked depth of understanding and are not explained but simply described at quite a basic level.

The criteria for 9-10 marks are very demanding and candidates are expected to analyse their data in depth. They should fully explain the outcome linking it to the prediction and the scientific model on which the prediction was based.

It is important that very able candidates select a topic and plan an investigation, which is complex enough and will allow them to fully address the higher marking criteria. Equally weaker candidates are advised to focus on a task which offers an opportunity to clearly achieve valuable marks and not waste time on criteria which are well beyond their ability. Clearly, this needs sensitive guidance and no harm comes by attempting the higher mark bands if time allows.

Worryingly too many candidates are unable to draw a simple chart or graph and do not label or number their axis. The best work for all abilities comes where candidates identify interesting points by additional annotation. Some high grade candidates reference interesting points to particular photographs.

Strand D Evaluating the procedure and evidence

This strand is still the most frequently over marked strand or a strand where even able candidates fail to address the marking criteria accurately and in sufficient depth.

In some instances, it was quite difficult to identify strand D and the evaluative comments were found within strand C.

Candidates often suggest improvements to the investigation or make statements about inaccuracy or anomalous results but fail to fully explain with reasons why such results are anomalous and why modifications to the investigation might improve the accuracy of the outcomes. Such comments are often superficial and not clearly linked to the investigation or its outcome and the related science. This needs to be seen as a skill which has already been developed in the Practical Scientific Skill assessments. Modifications and amendments also need to be justified and discussed as reasoned arguments and concluded appropriately. For some reason the most able candidates are not happy discussing the investigations in a constructive and critical way, a skill so necessary in any life science. Again use of secondary data or photographic evidence is an invaluable way for candidates to support their evaluations.

Strand E Quality of scientific communication

Most reports were presented effectively and followed the format suggested within the marking criteria. In a few instances, particularly where power points had been transferred to paper for submission, page numbers appear to have vanished although the content page shows page numbers which related to the work on the relevant page.

The marking criteria were generally accurately applied for this strand.

It would be good to see much more imaginative presentation and the best work tended to be in Word or PowerPoint and where candidates made effective constructive use of photographic evidence ideally collected themselves. A worrying number of centres simply used limited internet sources common to all reports or a group set of photographs. This needs to be addressed and with modern photographic systems should not be too difficult.

Strand F Determination, initiative and interdependence

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.

This year fewer centres investigations appeared to have been rushed and lacking in depth. The detail with which some candidates performed Practical Scientific Skills was to a far higher standard than those shown in the main investigation. Do remember the marks available for the investigation are high and sufficient time needs to be allocated.

The investigation is an important area and careful choice of topic/topics and planning is required for candidates to gain the marks available. Congratulations to those centres who deliver the investigation as part of a one year course. Moderators are aware of this and find work with simple crops like radish or winter lettuce or even wheat seedling work well. Ecology organised for September also appears to be good but can be difficult to organise.

Soil based investigations can provide a good topic and can be performed in the long UK winter. Drainage and soil temperature can be a possible topic if suitable resources are available.

Element 3 Work-related Report

This year has seen some further improvement in the overall quality of the reports, and centres have encouraged candidates to address the marking criteria more effectively. It was very evident that where centres had prepared candidates prior to their chosen enterprise, candidates were able to gain marks more effectively.

Reports sometimes lacked clear structure, were often vague and lacked depth and detail. Candidates need to make more original comment so that the reader is better informed and understands more about the nature of the enterprise and the chosen job roles discussed.

In too many instances, the reports consisted of work on a topic where information had been gathered from the internet then simply copied and pasted into the report. Teachers and candidates need to carefully study element 3 in the controlled assessment paper .The main aim is "*to carry out research into the way in which science and technology are used in the work of an organisation in the land and environmental sector and the role of a practitioner within this organisation."*

Only a few centres used school based enterprises. Although they can be suitable, it is often difficult to obtain sufficient primary data from a practitioner. Where the nature of the group or administration difficulties occur in school, school based enterprises could be acceptable. However, the report needs to be related to a similar type of commercial organisation and an employee needs to visit the group to discuss their role within the organisation.

The best work came from centres where candidates visited an enterprise and were able to spend time with an employee and collect extensive information during the visit or subsequently secondary data from related web sites. The quality of the report produced clearly benefited where candidates visited the enterprise more than once.

Some centres effectively linked the report to the centres work experience week. They gave the candidate good pre-visit preparation ensuring all candidates were aware of the marking criteria and had full access to them, enabling them to collect and observe key factors.

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 well in advance of their visit and carefully plan the type of information they need to collect. To access high marks the data needs to be sufficiently detailed for the reader of the report to be fully informed.
(b) Reference to sources Most candidates are listing references in the bibliography but often fail to identify them within the report. They often lacking full detail and the date.

The data needs to be clearly linked to what happens at their enterprise and be discussed not simply stated with no relevance to their report. It is often hard to see candidates fully using the information or demonstrating its importance within the context of the report as a whole.
The best work, especially from weaker candidates, is where candidates are encouraged to prepare possible questions prior to a visit.

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 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. Too many candidates simply copy secondary data of no value. To gain marks, candidates must use and discuss the information fully relating how and why it is relevant to the enterprise studied.

(b) Reference and sources As with primary data, candidates must take care to use the references within their text; these should be detailed and dated. Visual material is often overlooked and should be included and used within the report .Where it is used it needs to be referenced.

Strand C Work carried out.

In far too many reports, candidates failed to inform the reader as to where the enterprise was sited. They often used a small google picture lacking any useful information to where it was in the UK or which job role they were looking at and how the job role was related to the whole enterprise/organisation.

In the criteria for Strand C, for 1-4 marks, candidates need to be aware and fully understand the meaning of ‘relevant statement’ and ‘identifies’.

For 5-6 marks, they need to explain in detail, not simply mention, the role of employees and their contribution within the organisation.

The purpose of the work and how it fits into the wider organisation tends to be poorly understood. Candidates clearly need to be guided to the role of organisations and how they might affect employees and consumers within the work place. How the job role fits into the enterprise and it importance within the enterprise may need to be explained to candidates before the visit and the production of the report.

For 7-8 marks, the term ‘analyses’ is poorly understood. Candidates need to be able to discuss fully the role of employees, the purpose of the work and its importance beyond the workplace. Candidates should discuss fully and clearly explain the factors influencing the location of the organisation and its impact on society. A good example of this is a garden centre providing

leisure, education and place for family social activity. The skill of discussion is clearly only applicable to the most able candidates. However, weaker candidates should still attempt to address this even if it only helps them to access the criteria for 5-6 marks.

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 personnel. The main problem in this section is that technical skills are not well identified or their importance understood and are often poorly explained. They are not really linked to the work place and the terms '*explain and analyse' not* understood by the candidates. Centres need to make candidates aware of the sorts of technology used at the enterprise prior to the visit. Candidates need to research such technologies and demonstrate an understanding of their importance.

Strand E Scientific Knowledge applied in the workplace.

This area is often very poorly addressed. Candidates need to understand an aspect of science and also be aware of the financial and regulatory factors that impact on the workplace. This key strand tends to be covered very superficially and many reports simply contain a reference to disease or health and safety with very little reference to the underlying science and how it impacts on the effective operation of the enterprise. Any science is often described very simply and not explained so lacks sufficient depth for 5-6 marks.

For 7-8 marks, candidates must analyse the science and clearly explain its importance to the enterprise. As previously stated analysis is a challenging concept and the skill needs to be developed prior to writing the report.

Financial data is often 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 where candidates clearly addressed all marking criteria in a logical way. Candidates need to understand that they are not required to produce elaborate power points. They need to effectively communicate information about the organisation by producing a logical report which makes full use of pictures and diagrams to help the reader understand the organisation. The report should use the correct scientific and technical terminology and has to be understood by someone who is not familiar with the area or the enterprise.

Administration of the coursework.

Centres are strongly advised to complete controlled assessment well ahead of 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 correct aggregation of the marks. Moderators found fewer arithmetical errors this year. However, there were still some centres that had not used the electronic version of the record card.

Moderators require a copy of the centre MS1 and CCS160. These can both be loaded into the administration tab of the repository. They should ideally be sent at the same time as the initial marks.

Annotation of coursework.

This is most helpful; some centres add this to the reports electronically whilst other find is easier to produce a brief set of comments for each candidate. Both are very effective and help the moderation process. Most centres have made good progress with this. Although another task to do, it avoids any misunderstanding as to how marks have been awarded.

A big thank you to the teachers who do extensive annotation. This is much appreciated by the moderators.

Presenting work in electronic format is much better for candidates and certainly is far more cost effective for centres especially when work is electronically produced and then sent as reams of paper. The repository is an efficient and effective way of submission of course work and can always be backed up with CD and/or memory flash drive.

Centres need to ensure that electronically submitted work is in the candidate's folder and is clearly labelled with the candidate's name and candidate number and that the record card is included.

Centres should be congratulated for their hard work. Please also check the moderator's report to the centre where constructive advice has been provided to help the centre move forward.

I am concerned that some centres this year only achieved very low marks. I would encourage them to contact OCR urgently to seek subject specialist advice.

I am delighted that so many centres are continuing to produce such good and worthwhile work and the candidates deserve continued praise as do the hard working teaching teams.

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