OCR
Oxford Cambridge and RSA

GCSE

Environmental and Land-Based Science

General Certificate of Secondary Education **J271**

OCR Report to Centres June 2015

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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:

It is apparent within these papers that the majority of Candidates have been entered for the appropriate tier which has enabled them to demonstrate their potential far more accurately as they are have been able to respond to a range of questions designed to meet their specific level.

It is pleasing to report that there were fewer cases of Candidates failing to engage with the paper at all, although there is still a relatively high level of unanswered questions. In these cases the potential to maximise marks was missed.

It is pleasing to see the improvements in answering the data related questions, although potential marks were missed by the lack of appropriate engagement with the longer (6 mark) level of response questions. Other reasons for a loss of potential marks were the inaccurate or lack of use of scientific terms and the challenges faced in interpreting some of the handwriting.

Areas of the specification which has been answered poorly in previous examination series were attempted far better by this cohort; demonstrating the additional focus on these areas from by Centres.

Comments on Individual Questions:

Question No.

1 This initial question was answered well by the majority of Candidates.. Most saw the opportunity that land owners had to use otherwise less productive land

2a While the bird itself would not be familiar to the majority of learners it was not a barrier to answering this series of questions as it dealt with general concepts of a new organism establishing itself in an area. Most successful Candidates were able to identify factors such as availability of foods, or lack of predators as contributory factors. Issues such as changes in climate were also allowed. Few Candidates were able to gain both marks, often the focus was on one specific factor.

2b Candidates were required to interpret geographic distribution from a diagram to be able to suggest reasons for the distribution of the bird. Many simplistic answers were credited, such as references to being warmer in the south east and references to food sources. A few higher performing candidates described the nature of the microclimate in a city (London) and how this might provide warmer conditions/ artificial ecosystems. A wide variety of other plausible answers were credited, including the birds being fed by people in cities. Few achieved both available marks.

2ci A simple calculation to estimate the increase in population numbers, higher level candidates were significantly more successful in being able to answer this percentage increase calculation.

2cii Again requiring an application of their previously taught knowledge, this was attempted by most candidates and a large number gained one mark. The mark scheme did not expect the learners to know anything about the diet of these parakeets but took the broad concepts as the basis of responses. Few candidates could cite two valid reasons.

3. Attempted by the majority of candidates, the question required them to describe three environmental factors. Some marks were lost by candidates who produced a list (with no description) or by identifying factors with no environmental dimension.

4a. A common question across both the foundation and higher tier papers. Attempted by most candidates, typically only those scoring highly on this paper had good levels of success. This question tested knowledge of producers and levels of consumer. Many weaker candidates erroneously added the hawk as the producer (due to the number provided in the box) thus not demonstrating understanding of the food web. The other common mistake was to omit to combine all the primary consumers (for example) and include them as one item.

4b. Another common question, using the data from the table in 4a but this time testing the understanding of biomass. Most were able to answer this correctly although a few were distracted by the concept of the pyramid of number.

4c An application of the data from the previous parts of the question. This proved challenging. Many did not appreciate that the fledglings would continue to have an impact on the area and indeed be potential food for predators. Answers were not well articulated.

5 Testing the Candidates' knowledge of the benefits of large farm machinery, this 6 mark, level of response question provided the opportunity for a range of responses. The question provided guidance about the need to write about three aspects (efficiency, environmental impact, health and safety) but typically only the first of these was commented upon in depth, sometimes quite extensively.

Where the other two were mentioned, responses which did not highlight any advantages were not creditworthy.

The inability to cover all three areas resulted in limitations to the potential marks achieved.

6ai Orchid sampling results formed the basis of this series of questions. The initial question requiring the mean per quadrat to be calculated produced some surprising results. An unexpected number of responses calculated the mode and a lesser number the median result.

6aii A calculation of the predicted number of orchids, proved challenging to learners (Markers used the Candidate's result from the previous question as the basis for this calculation).

6bi Interpretation of soil conditions from a description; the text describes the orchids as growing in chalky subsoil which would affect pH. This was not picked up by many, most opting for a pH of 7. The correct response (pH 9) was correctly identified by some of the stronger candidates.

6bii The second part of the question used the same information to predict other soil characteristics. The sloping nature of the site implies that it would be well drained. Stronger candidates may also have been able to deduce this from the chalk subsoil.

6biii Conservation organisations: A straight test of knowledge, a surprising number of opting for RBST (rare breed survival trust).

6c Despite the question specifically requiring candidates to use the information sheet a number ignored this. Of those addressing the question correctly, there were many answers which picked up the easier marks but there was a lack of application of the information to formulate the response (which was needed to gain the full three marks).

7. A level of response question, common to both tiers. A large number failed to respond to the emboldened word ‘microclimate’ and wrote about the impact of hedges on biodiversity. These were not creditworthy answers. This was a common error across all abilities on this paper. Few scored more than 2 marks.

8a A relatively simple calculation, testing the knowledge that soils are made up of sand, silt and clay thus the data should add up to 100%. This was answered correctly by most who attempted the question.

8b Using the data to identify soil type in a soil triangle proved challenging for the majority although it is a standard technique. Relatively few correct responses were recorded.

8c Using the soil triangle to identify the percentage of each soil component was completed marginally more successfully. A wide possible range of correct responses were credited, although a number of responses did not add up to 100%

8d Attempted by most candidates, a number did not think widely enough about their knowledge of soil management. The addition of some form of organic matter was rarely mentioned as being a way of increasing the water holding capacity of a soil although it is the most common technique.

9. The final question on the paper, a level of response question aimed at allowing candidates to demonstrate their knowledge of the conservation of a natural environment. A few spoke about the needs for setting up a caravan park but the majority were correctly focussed upon the topic. A number of weaker candidates did not attempt this question at the end of the paper and thus lost the potential of up to 6 marks.

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

General Comments:

Candidates generally responded well to the paper which allowed those of differing abilities to demonstrate their knowledge. Some questions targeted at the upper range of abilities showed the depth to which Centres had been teaching the topics. It is pleasing to report that there were less apparent instances of Candidates being entered onto an inappropriate tier paper.

All Candidates engaged with the paper, although there were some instances of questions not being attempted which may limit the potential marks. It would appear that candidates had enough time to complete the paper and perhaps there should be a focus on utilising some of this additional time in the crafting of the 6 mark questions as it is perceived that some marks have been missed by the briefness of responses in certain cases.

Data related questions have been tackled well and there is also evidence that candidates are able to apply their calculations to form conclusions in latter questions. Candidates should be encouraged to use technical and scientific language accurately and to ensure that questions have been thoroughly read. This latter issue caused some to miss out on a number of valuable marks by not correctly addressing the question.

Also worthy of note is the fact that areas of the specification which has been answered poorly in previous examination series were attempted far better by this cohort; demonstrating the addition focus on these areas by Centres..

Comments on Individual Questions:

Question No.

1 The majority of candidates understood and were able to match a specific plant to its ecosystem. While markers disregarded lines that had been crossed out (made in error) a couple of candidates had made convoluted lines which increased the risk of their response being misinterpreted.

2 A more challenging question, few were able to score both marks. While many understood the properties of clay soils, there was a less clear understanding of how this would affect the way the area would be farmed (reduction in tractor passes, low impact tyres, soil slower to warm up etc.).

3a This question required the use of data from a graph; interpreting the results and describing what was occurring. This produced a variety of erroneous responses, the most common being that the wind itself had indeed stopped in zone D. High performing candidates understood that minimum wind speeds were need to obtain any power output (zone A) and that the turbine itself was turned off the prevent damage (zone D.)

3b Candidates needed to use the data from the graph as the starting point to answer the question. This more challenging question highlighted the fact that the turbine would only be working at 50% efficiency in that scenario. The stronger answers also suggested potential solutions to the issue.

4 A topic that proved to be well understood by the cohort, ICT helps to optimise the growing conditions. Attempted by all candidates, the overwhelming majority understood this concept.

5 This longer answer question required the candidate to demonstrate their understanding of soil compaction, how it impacted an area and how the management of this issue could be balanced with the needs of the population. Most were able to identify the issues, although the methods to reduce impact were many and varied. While not always the most practical on cost or aesthetic grounds the mark scheme embraced concepts which required the use of concrete paths for example as well as the use of the more acceptable bark chippings or re-routing of paths. Descriptions of erosion were variable and some a bit too simplistic to be given much credit.

6a A common question overlapping with the foundation tier paper. Most answered this question well, indicative of their correct entry onto the higher tier. Common errors were placing the hawk in the producer box (pre-populated with a '1' in the organism column) thus producing an inverted hierarchy. Other common errors were neglecting to total up all relevant organisms at a certain level.

6b Again a common question, most were able to use the correct data to identify the appropriate pyramid of biomass.

6c The third part of this question was not well answered. There was a widespread misunderstanding about the nature of organic pest control. Few understood that any shift in population at any trophic level would eventually reach an equilibrium.

7ai A relatively simple data evaluation question, answered correctly by most candidates. This helps to set the scene and focus the candidate for the following parts of the question which use this broader data set.

7aii While candidates were able to identify the country with the largest range fairly easily; they were less able to suggest reasons why this variance occurs. Pollution was cited as the most common reason but two suggestions were needed to achieve full marks.

7b A more complex question, using information from another topic area within the unit. While the expected answer was Wales, (due to a broad range, and low nitrate or phosphate levels), other incorrect answers were credited if valid for the incorrectly chosen country. That said, this was a subject area the cohort found to be difficult.

7c Another topic area within the unit (management of Nitrate Vulnerable Zones) and one that showed a general weakness in knowledge. Some answers however were exemplary..

8 This question also features on the foundation tier paper. Some able students missed a number of marks by writing about the ecological impact of planting a hedge rather than the impact on the microclimate. The very best answers included issues relating to shading, the reduction in transpiration due to change of wind speed and issues about frost pockets being created. Some answers were lacking the use of appropriate scientific terms.

9 Another longer response question, this time based on the practical task of sampling an area.

The quality of responses were variable, some able to describe how the task should be completed together with a rationale for sampling and how this could be done appropriately. Weaker Candidates understood about the use of quadrats but produced an answer which would not give an accurate result.

10a A challenging question testing the understanding of how both parties benefit from the symbiotic relationship. There were numerous different responses, demonstrating a variance in the understanding of the nitrogen cycle and the specific roles within this. Only the higher performing Candidates were able to gain both marks.

10b A good majority understood that one function of crop rotation would be to assist pest and disease control, although a significant number considered that allowing the farmer to have variety in the crops they grew was the most compelling reason

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. A few candidates did not engage with the paper at all and did not answer any questions.

On the whole, candidates scored better on the second half of the paper, the animal section, than on the plant section at the start.

Many candidates showed poor use of scientific and technical terms such as pricking out and litter size and need to learn to use these in the correct context. The candidates are, however, getting better at including data in their answers and so are picking up these additional marks.

Candidates are still struggling with the level of response questions and are often not writing in sufficient detail or using scientific terms. They should also be encouraged to include a range of information and to cover some in more depth. Many candidates are just repeating the same information in different way.

Poor handwriting makes it difficult, and in some cases impossible, to mark responses and this can lead to lost marks.

Comments on Individual Questions:

Question No.

1a. Most candidates correctly identified the varieties of apple, with C being the most common incorrect answer. A significant minority of candidates did not interpret the question correctly and answered with characteristics such as 'large' or colours such as 'green'.

1b. Very few candidates knew what 'mutation' meant but those who did, generally knew a possible cause. There were a lot of references to disease and breeding and vague statements about appearance. There were also a large number of no responses.

2ai. This was well answered on the whole with many students understanding that gametes contain half the number of chromosomes compared to somatic cells.

2aii. Better candidates understood the concept of genetics and were able to apply their knowledge in this question. However, the majority of candidates failed to score on this question, with answers ranging from 1 to 265 with no real pattern or misconception emerging.

2b. This question was well answered with most candidates picking up both marks.

2c. This question was poorly answered with only a handful of candidates scoring full marks. Many of the candidates described sowing seeds in a glasshouse in detail although students are still writing about soil rather than compost. However, a significant number of students failed to read the stem and sowed the seeds directly into the flower bed, restricting them to two marks overall. Candidates are still under the impression that all seeds need light to germinate and that this is provided by the glass house. A small number of responses described taking cuttings. Very few candidates mentioned pricking out or potting on and those that did rarely used the correct terminology. In the final stage, candidates generally repeated the stem rather than writing in detail about the process of planting out.

3a. This question was well answered with a large number of candidates scoring full marks and a pleasing number including data. Weaker candidates did not understand the data presented and others lost marks because they did not fully explain the trend, making statements such as 'carrots went down' rather than 'the magnesium content of carrots went down'. Another common mistake was when candidates wrote 'the magnesium content decreased in them all except peas' (one mark) rather than 'the magnesium content decreased in them all except peas which went up (two marks). Some candidates made correct statements based on the data such as 'bananas have the most magnesium' but did not score any marks because they did not include a trend.

3b. This was an overlap question and there were some very pleasing answers with most students understanding what was meant by validity. Some candidates confused reliability with validity and included lack of repeats in their answers.

3c. Very few candidates knew how to recognise magnesium deficiency in plants, with most making vague statements about colour change

4. This was an overlap question. Many candidates were able to explain the difference between cross and self pollination although a significant minority thought that self pollination was carried out by wind whereas cross pollination required 'help' from insects. Other candidates thought that self pollination was asexual reproduction that would produce clones. Candidates still confuse 'seeds' with 'pollen', writing about seeds being blown by the wind and also confusing pollination and seed dispersal, which is not on the specification. Good responses included anthers and stigmas hanging outside the flower and mechanisms to attract insects for cross pollination. Very few candidates knew how to prevent self pollination and consequently a small minority gained the full six marks on this question. Candidates who did not read the question properly lost marks because they gave the advantages and disadvantages of cross and self pollination instead.

5a. Very few candidates were able to complete this calculation but there were no common misconceptions.

5bi. This question was answered correctly by the majority of candidates with the most common incorrect answer being 'meat' which demonstrates that these candidates do not understand the term 'nutrient'.

5bii A well answered question with a range of creditworthy responses. The main reason that candidates lost marks was that they gave unqualified answers such as 'for nutrients' and 'part of their five a day' rather than giving specific examples of nutrients or benefits.

5c. A good range of responses in this question including reference to allergies and portion sizes. Weaker candidates merely repeated the stem, stating that it did not provide enough information.

6a. Most candidates gained two marks on this question with the majority interpreting the information on gestation period and litter size. Some candidates lost marks because they just wrote down information from the table such as 'the Syrian hamster is pregnant for 17 days' rather than making a comparison such as 'the gestation period is shorter'. A large number of students also lost marks because they expressed their answer incorrectly, stating 'the Syrian hamster gives birth quicker' or 'the Syrian hamster had bigger offspring'.

6b. Most candidates gained both marks on this question.

6c. This question was well answered with candidates giving a range of relevant responses. Weaker candidates did not interpret the question correctly and stated that the buyers would need to know about gestation periods and litter sizes.

6d. Most candidates failed to access this question and either wrote about what the mother does once she has given birth or merely repeated the information in the table regarding gestation periods. Many of those candidates who did answer the question were not familiar with the correct scientific terms such as oviduct, uterus and gamete. A large number of candidates were unable to identify a mammal and candidates wrote about hens, tortoises and turtles.

7a. Most candidates answered this correctly and understood that it was not possible to have 0.2 of a goldfish.

7b. Well answered by most candidates, the most common distracter was 'gravel to eat', although some candidates thought that fish needed statues to swim through. There are still some candidates who are losing marks by putting the wrong number of ticks, either one or three.

8a. Many candidates did not appear to understand the principles behind selective breeding and those who did found it hard to relate it to the scenario in the question. A large number of candidates described breeding a wolf and a dog together and a significant number tried to breed domestic dogs to make wolves.

8b. Most candidates scored one mark on this question, suggesting a relevant characteristic that Patrick's dog should have. Stronger candidates were able to explain the importance of the chosen characteristic.

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

General Comments:

Many candidates are being entered for the incorrect tier and there were some very low level responses with many finding the more challenging questions at A and A* inaccessible. Candidates are still struggling with the level of response questions, writing in limited detail and failing to use the correct scientific terminology.

Comments on Individual Questions:

Question No.

1a. Most candidates scored one mark on this question, stating that magnesium was absorbed through the roots. Able candidates understood that the magnesium needed to be in solution or that it was taken up using active uptake. A significant number of weaker candidates thought that magnesium was absorbed during photosynthesis.

1b. Very few candidates were able to calculate a percentage increase for magnesium content with the most common incorrect answer being 4%, which is just the relative increase.

1c. This was an overlap question and there were some very pleasing answers with most students understanding what was meant by validity. Some candidates confused reliability with validity and included lack of repeats in their answers.

2a. This question proved to be challenging to some candidates who did not make the connection between germination and release of energy. A significant minority of students correctly identified what would happen to the temperatures but only a small number of good candidates gave a creditworthy explanation for this temperature increase.

2b. Most students thought that a change in room temperature would affect the results because temperature affects germination. However, they did not appreciate how a vacuum flask works.

2c. Few candidates could explain the term seed dormancy and just referred to making the conditions suitable for germination such as warm temperatures and water. Stronger candidates gave some excellent responses with named examples of species.

3. This was an overlap question. Many candidates were able to explain the difference between cross and self pollination although a significant minority thought that self pollination was carried out by wind whereas cross pollination required ‘help’ from insects. Other candidates thought that self pollination was asexual reproduction that would produce clones. Candidates still confuse ‘seeds’ with ‘pollen’, writing about seeds being blown by the wind and confusing pollination and seed dispersal, which is not on the specification. Good responses included anthers and stigmas hanging outside the flower and mechanisms to attract insects for cross pollination. Very few candidates knew how to prevent self pollination and consequently only a small minority gained the full six marks on this question. Candidates who did not read the question properly lost marks because they gave the advantages and disadvantages of cross and self pollination instead.

4. This question caused difficulty for a number of candidates. Some did not use the correct letter, using A and B instead. Others failed to appreciate that there should only be one allele in each gamete. Of those candidates who knew how to carry out a monohybrid cross a small minority were not able to work out the correct gametes and so did not end up with the correct ratio. Frustratingly, a number of students achieved the correct cross but lost two marks because they got the gametes for A and B the wrong way round.

4b. Stronger candidates knew what 'mutation' meant and gave good descriptions as well as possible causes. However, with weaker candidates there were a lot of references to disease and breeding and vague statements about appearance.

5a. Candidates found this question difficult and many were unable to interpret the graph. The most common distracters were B and D.

5b. Most candidates knew that the rate of photosynthesis was greater on day 1 but often failed to answer the question because they just stated this fact and consequently did not score marks. Candidates often referred to 'Sun' which was not given credit rather than light or heat which are creditworthy answers. Other candidates lost marks because they did not make a comparison, making statements such as 'day 1 was warm' rather than 'day 1 was warmer'.

6a. Most candidates gained both marks on this question, describing some of the changes in hormone levels. Some candidates lost marks because they did not name the hormones and just made general statements. Other candidates did not understand what ovulation meant and described negative and positive ovulation.

6b. Candidates lost marks on this either because they did not plot 36.6^{O}C accurately enough or because they did not show the decrease in temperature to be between 62 and 63 days.

6c. Most candidates scored some marks on this question but very few gained all six. Weaker candidates described lactation and behaviour changes but better candidates included scientific detail on colostrum, placenta and the amniotic sac. A small minority of candidates were not able to identify a mammal correctly.

7a. Many candidates still did not understand why roughage is needed as part of a healthy diet. The main misconceptions included: helping with digestion, for strong bones, for growth.

7b. This question was well answered by most candidates, showing that they understood how carnivores can gain nutrients by eating all the contents of the herbivore.

7ci. This calculation proved difficult for many candidates but there were no common misconceptions.

7cii. Very few candidates could identify the type of feeding but most were able to state an advantage of feeding a ration.

8. Most candidates scored some marks on this question however many responses were very superficial, mentioning obvious health and safety regulations. Few candidates were able to write in detail about the legal requirements for transporting small mammals such as passports, health checks and vaccinations.

9. Most candidates scored both marks on this question, stating a range of different risks. Some candidates lost marks because they merely stated why the housing was poor rather than how this proved to be a risk to the rabbit.

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

General Comments:

A well answered paper with candidates demonstrating the value of carrying out practical work in developing knowledge and understanding.

Centres should ensure candidates have access to a calculator in the exam room as many lost marks through careless calculations.

Comments on Individual Questions:

Question 1

a) Well answered with space/room being the most popular answer

b) Some candidates gave soil rather than compost for this answer, which was not acceptable.

c) No issues

d) Poorly answered; any action such as labelling the tray or watering would have been acceptable

Question 2

Some good answers with many candidates recognising that if a leaf is damaged the plant can grow a new one but can die if the stem is damaged.

Question 3

Poorly answered, biological pest control was not well understood.

Question 4

a) i) Some careless reading of the graph

a) ii) Many candidates failed to follow the instruction to include figures from the chart.

b) This question was directed at the environmental consequences of peat use but many candidates gave answers referring to cost.

Question 5

Again it was sadly evident that many candidates did not have access to a calculator.

Question 6

a) While the question stated that the figures in the box were percentages of each nutrient many candidates used the traditional ratio of nutrients and both calculations were credited. Partial credit was given for a correct method with the wrong answer.

b) Only better candidates related nitrogen needs to growth in the different seasons.

c) Well answered with many candidates being able to apply their knowledge of soil properties to this question.

Question 7
Many candidates were able to give reasons for using cloches but few candidates described how they are actually used.

Question 8
a) It was evident that a lot of candidates did not know that hydroponics means growing the plants in water.

b) Candidates were able to name a few different advantages of hydroponics even if they did not explain what hydroponics are in part a).

Question 9
Some very good answers covering the whole range of maintenance tasks.

Question 10
Some very good answers but many were limited in the range of impacts they covered. A few candidates discussed nutritional content of the feeds, others the range of foods on offer. Better candidates talked about maintenance/production ratios and a few about the age of the animal and its differing food needs.

Question 11
Good use was made of the stimulus material. Candidates should be made aware that explain means that their answer should be in two parts. The “building looks unstable” will not get the mark. “The building looks unstable and could fall down injuring the cattle” would get the mark.

Question 12
Very well answered.

Question 13
Most candidates mentioned the pig being outside.

Question 14
Some good answers but many candidates lost marks by not explaining why it was important for the farmer to recognise when the animal was on heat.

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

General Comments:

A well answered paper with candidates demonstrating the value of carrying out practical work in developing knowledge and understanding.

Centres should ensure candidates have access to a calculator in the exam room as many lost marks through careless calculations.

Comments on Individual Questions:

Question 1
Not well answered, with many candidates thinking biological control is free.

Question 2
Most candidates understood the impact of temperature on the rate of photosynthesis.

Question 3
Many candidates centred their answers on cost rather than environmental impact.

Question 4
The reasons for hardening off were well known.

Question 5
Well answered with the majority of candidates giving at least one good advantage.

Question 6

a) As some candidates seemed to have been taught that the numbers on fertilizer bags were ratios (which is the traditional way) rather than percentages, both methods were allowed. Answers which showed calculations and were partially correct were given 1 mark.

b) Only better candidates realised that growth of the lawn would be reducing in autumn and therefore less nitrogen would be needed.

c) It was pleasing to see candidates applying their knowledge of soils to this question with some excellent answers talking about leaching in sandy soils or higher nutrient levels in clay.

Question 7

a) Generally well answered although many candidates incorrectly gave 2 as their answer. Many candidates used a diagram to help them calculate the answer.

c) The main issue with the candidates responses to this question was that they thought the candle was not a pesticide giving answers such as ‘its cheaper’ than using pesticides. Better candidates focused on the cost of not using candles, through increased pest damage to the crop later on in the season.

Question 8

a) Some candidates lost marks by not using figures from the graph in their answers; otherwise this was a well answered question.

d) A good range of answers with increased carbon dioxide released being the most popular answer, although habitat loss and loss of a non-renewable resource were other acceptable answers.

Question 9
In previous years, candidates frequently confused asexual with sexual propagation. This year's candidates gave much better answers.

Question 10
A challenging question which tested the candidates understanding of hormones and pruning. Most knew that auxin was involved but few were aware that it inhibited bud development below the growing point.

Question 11
No issues.

Question 12
The main issue with candidate responses to the question is that frequently they did not refer to the different roles of both the hormones.

Question 13
a) & b) Both these questions were very well answered.

Question 14
a) Not well answered with most candidates getting only 2 out of the 4 available marks.

b) Well answered, although few candidates were aware of the role of bacteria/protozoa in providing protein for ruminants.

Question 15
Some excellent answers, with better candidates describing various aspects of nutrition at different stages in the animal life, as well as the role of different nutrients in the diet.

Question 16
The main issues with the answers to this question were that candidates discussed the advantages of rare breeds without relating this to a decline in intensive production. The most commonly given correct answer was that farmers would keep fewer animals extensively, and that the added value of rare breeds would compensate for the loss of quantity.

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

This year the overall quality of coursework portfolios was good with some centres producing work of an exceptionally high standard. Some centres have been very ambitious in the way they contextualised their work, resulting in fascinating and really original investigative work evidenced with amazing photographs and video clips annotated in detail in a most constructive way. The report needs to be viewed along with the centre moderator's report. Those centres whose marks have not been adjusted will find some comments do not apply but can be viewed as good advice for the future.

Those centres that have been adjusted need to take action to ensure they avoid downward moderation next year. Some excellent work was submitted from very able candidates and the weaker candidates have been able to develop a real understanding of Environmental Land Based Science.. A great strength of the specification is that it enables candidates of all abilities to make worthwhile positive achievement by learning and applying life- long skills.

For each element, centres must take care to record the controlled assessment heading and follow this with their own version, carefully contextualised to fully address the controlled assessment heading. Some centres only just met the criteria for the 2015 controlled assessment paper. Please check the 2016 paper prior to producing the work.

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

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 sufficient time should be allocated 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 and this needs time to allow understanding to be developed in enough depth for candidates to produce high quality portfolios and gain real understanding of the subject. Time devoted to the scientific skills allows good specification coverage. 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 where ever possible. Candidates gain a sense of pride from producing work which is informative and attractive. However, please try to avoid the production of more complex styles of power point slides.

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. . In some cases up to eight power point slides were submitted per A4 sheet making them almost impossible to moderate. Where some parts of the work is 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 and then use 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 and that some revision may take place each year.

Centres must use the electronic downloadable candidate record card to ensure each element is aggregated correctly and avoid unnecessary mistakes in addition.

Element 1 Practical Scientific Skills

Centres should be congratulated for the way candidates addressed these skills and the marking criteria appear 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 being 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.

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 however important that candidates incorporate an annotated series of photographs or video clip, to show the skill being performed. This evidence can then be used in producing the reflection of the task in the evaluative statements. Too many centres still fail to fully develop this area and evidence is too often poor or general class pictures are used without evidence or 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 and were moderated downwards.

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 and 6 marks candidates need to do more than state outcomes or problems encountered. A few centres again this year treated the four tasks as mini investigations and spent 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 and 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 of procedure is of equal importance and 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.

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. Good skills were almost always followed by good investigations.

Element 2 Scientific Investigation.

Centres should take particular care when selecting a topic for investigation to choose one which provides an opportunity for candidates to perform an investigation that is original to them, and in particular plan to carry these out at a suitable time of the year, so candidates can collect sufficient useful data. Selecting tasks which match the candidate's ability helps ensure the criteria can be met in a way suited to the individual's 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 similar investigations, 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. Carrying out more than one investigation can have a great benefit by motivating all candidates within the teaching group. Producing investigations which could be presented to the teaching group can motivate and extend the learning, ensuring that the coursework 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 strand 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. Some individual aspect of the visit needs to be planned and addressed within a more general fieldwork study .Too many candidates only collected limited amounts of secondary data and then failed to demonstrate how this data informed their individual plans. To obtain 9 or 10 marks any potential procedural difficulties need to be identified within the plan and candidates need to justify how they will ensure precision and also clearly justify 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.

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.

Strand C Processing and analysing data

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

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

It is important that where very able candidates are selecting and planning their investigation they select topics for investigation which are complex enough to allow them to fully address the higher marking criteria.

Strand D Evaluating the procedure and evidence
This is the most frequently over marked 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 evaluative comments had to be 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. 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.

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.

The marking criteria were generally accurately applied for this strand.

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. The positive reward of well annotated individual photographic evidence was seen in better portfolios. .

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 too many investigations appeared to have been rushed and lacking in depth and detail with some candidates having performed practical scientific skills to a far higher standard than those shown in the main investigation. This was a shame as the ability of the candidates was clearly much higher than the marks candidates had the time to access. 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 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.

Element 3 Work-related Report
This year has again seen some 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, they 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 and simply copied and pasted into some form of report. Teachers and candidates need to carefully study element 3 in the controlled assessment paper .The main aim is being able "*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."*

Some centres used school based enterprises and although this could be a suitable topic it is often difficult to obtain sufficient primary data from a practitioner. Where the nature of the group or administration difficulties occur 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 with the candidates. Candidates need to collect primary data during this visit to the centre.

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 and secondary data from related web sites. Where candidates can visit more than once this clearly benefits the quality of the report.

Some centres effectively linked the report to the centres work experience week and 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, often lacking full detail and being dated.

(c) The data needs to be clearly linked to what happens at their enterprise and be discussed not simply stated with no relevance.

It is often hard to see candidates fully using the information or demonstrating its importance within the context of the report as a whole.

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 marks of 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 impressive secondary data is 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.

Strand C Work carried out.

In far too many reports candidates failed to inform the reader as to where the enterprise was sited or what it did' which job role they were looking at and how it related to the whole enterprise/organisation. In skills (a) (b) and (c) candidates need to be aware and fully understand the meaning of :-' Relevant Statement' and ' Identifies'. The marks for 5-6 need to explain, in detail, 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 hinterland. Some enterprises are much easier when it comes to seeing these important and tenuous connections and candidates need to have the role of the broader links and their importance explained before the visit and the production of the report.

For 7 and 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 being 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. The main problem in this section is that technical skills are not well identified or their importance understood and are often poorly explained, not really linked to the work place and the terms *explain and analyse* are not understood by the candidates. Centres need to make candidates aware of the sorts of technology used at the enterprise prior to the visit and not simply take understanding for granted.

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 and lacks sufficient depth for 5-6 marks.

For 7-8 marks candidates must analyse the science and clearly explain its importance to the enterprise. 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 and enterprise.

Strand F Quality of the presentation.

The best reports were produced as power points and candidates clearly addressed all marking criteria in a logical way. Candidates need to understand that they are not required to produce elaborate power points, but need to make an effective communication about the organisation by producing a logical report which makes full use of pictures and diagrams to help the reader understand the organisation without visiting it, and uses the correct scientific and technical terminology. The report 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 coursework well ahead of submission deadline of 15th May. Each candidate record card should be completed from the downloadable record card from the interchange and used in its electronic form to ensure correct aggregation of the marks. Moderators found far too many arithmetical errors this year from centres that had not used the electronic version of the record card. Moderators also require a copy of the centre MS1 and CCS160. These can both be loaded into the administration tab of the repository.

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 and help avoid any misunderstanding as to how marks have been awarded.

A big thanks to those 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 submitting coursework and can always be backed up with CD and or memory flash drive.

Centres need to ensure that electronically submitted work has work in candidate folders, named and with candidate number, the candidate record card and each file clearly labelled.

Centres should be congratulated for their hard work. Please also check the moderators report to the centre where constructive advice has been provided to help the centre move forward.
I encourage all centres to consider INSET especially those who encountered problems as indicated in their centre reports.

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

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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Head office
Telephone: 01223 552552
Facsimile: 01223 552553