GCSE

Environmental and Land-Based Science

General Certificate of Secondary Education **GCSE J650**

Report on the Units

January 2010

J650/MS/R/10J

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

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B491/01 Foundation Tier – Plant Cultivation

General Comments

One of the main problems identified whilst marking this paper was that many students were clearly not reading the question properly so their answers did not match the question. Some students are also still not writing in sufficient depth in the last questions, which require longer responses, thinking that single word answers will suffice.

Comments on Individual Questions

1 This question was targeted at grade G students but it was not very well answered on the whole. Many students did not appreciate what standard garden tools are used for. Spades were typically being used for adding FYM to the soil but answers included hoes and rakes as well. Students may have been uncertain about the term tilth, in the second part, but they should understand that a rake is used in producing a good seed bed.

2 This question was targeted at grade E/F but few candidates scored two marks. There was some confusion about the type of pollen each flower produces and many students were uncertain about the structure of the anther and stigma in wind pollinated flowers. However, by a process of elimination most candidates scored one mark due to getting the correct answers for insect pollinated flowers being large, scented and producing nectar.

3 This question was targeted at grade E and was well answered on the whole. Response A was the best distracter with many candidates thinking that compost needs less watering.

4 This was an overlap question with the higher paper targeted at grade D and was poorly answered across both papers. Few candidates knew what was meant by the term phenotype and there was no general misconception because each of the possible responses was chosen with equal frequency.

5 Another overlap question targeted at grade D but this was answered better. Many candidates knew that the daughter bulbs would produce the same coloured flowers as the original bulb. The strongest distracter was response C with students thinking that they would produce smaller flowers than the original bulb.

6 This question was targeted at grade D/C and was an overlap with the higher paper. This was well answered with most candidates scoring either one or two marks. Students were able to interpret the diagrams to describe the process of pollination. The most common misconception was that picture B, of the pollen tube in the style, came first with the other pictures then being placed in the correct order.

7 This question was targeted at grade G and was well answered. Some students misread the question and opted for answer A because they have clearly been taught about large machinery and soil compaction. The other common misconception was response C that machines do not miss any areas.

8   Although this question was targeted at grade G few students gained all three marks. This was mainly because students either did not understand the concept of a hazard or that they failed to read the question properly. Some students just copied the top response down into the other three boxes. Most were aware of how to carry a garden fork although a large number thought that they should wear steel toecap boots! Many responses for the other two included spreading the FYM evenly over the plot and watering the plants in the greenhouse which showed a lack of understanding of the question. Responses such as wear goggles when using FYM were not credited although any mention of not getting manure near your eyes was. Responses such as remove broken glass or wear PPE in a glass house were not accepted.

9a   This was an overlap question with the higher paper and was targeted at D/D. Few candidates understood the role of sensors or did not study the diagram enough to realise that the sensors were in the water. For this reason, answers such as humidity and light were not credited. Some candidates did not read the question carefully and repeated temperature which was in the stem.

9b   This question was an overlap with the higher paper and was targeted at grade C/C. Few candidates understood the term 'mineral nutrient' and so many responded with answers such as light and water and then explained their importance in photosynthesis. Some candidates got confused between potassium and phosphorus but they were not double penalised if they got the mineral nutrient incorrect but the reason right.

9c   This was a grade G question but was often left blank because students did not understand what was expected of them by the cue sentence or were confused by the picture. Many described what the roots looked like or the fact that there was little room for them to grow. Candidates that did answer correctly were often using terms such as the roots 'sucking up' or 'drinking' the water.

10a   This was a difficult mathematical concept, targeted at grade C and distinguished on mathematical ability.

10b   This question was targeted at grade D/C and was an overlap with the higher paper. Many candidates misinterpreted the question and stated the advantages and disadvantages of the trial to the farmer, such as reducing his outgoings or taking up a lot of his time. Some candidates answered it very well and showed a good appreciation of how a scientific trial works.

11   This was targeted at grade F and the content is lifted directly off the specification. However, it was poorly answered with many candidates suggesting that runner beans reproduced using runners.

12a   Targeted at grade F, this was well answered on the whole with most candidates correctly identifying copper as being present in the smallest quantity. However, a surprising number of students got the answer incorrect.

12b   This question, targeted at grade F, was poorly answered with most candidates listing N, P and K as the trace elements. This was again due to the inability to interpret the question which clearly states that the trace elements are in addition to the N, P and K.

12c   Many candidates found the mathematical element of this question challenging. B was the strongest distracter with students failing to read the question and opting for the 'non nutrient material' on its own at 24.72%.

13 Although targeted at F/E and being lifted straight from the specification, few candidates gained two marks on this question. Some got the correct answers but the wrong way round and few could spell ovary, often using a hybrid of this and ovule.

14 This was targeted at grades G/F/E but many candidates found it challenging. A number of candidates got confused between the two types of fertilisers suggesting that organic ones were more expensive. Many candidates did not read the question properly and talked about organic **food** being more expensive. Common misconceptions included organic crops being healthier and growing bigger and organic fertilisers containing no chemicals. Those students who did answer mainly scored on the low level responses such as organic fertilisers being cheap, readily available and smelly. Some candidates gave excellent responses including the effect of organic fertilisers on soil structure, nutrient content and nutrient release.

15 Many students misinterpreted the question and thought that it was referring to a scientific trial, so mentioning ideas about the plant growth being measured and making it a fair test. Despite only expecting very low level responses, few candidates scored three marks on this question which was targeted at G/F/E. Even if candidates had no experience of growing tomato plants they should have looked after plants in a glass house and appreciated the need for watering, feeding and checking for pests. Removing tomatoes was not credited because students were expected to make the distinction between ripe or diseased tomatoes.

16 This question, again targeted at G/F/E, was well answered with most candidates scoring highly and interpreting the results of the experiment. Students are still confused about the difference between germination and growth and used the terms interchangeably. They were not penalised for this although no credit was given for light or nutrients as an important factor in germination. A few candidates misinterpreted the diagrams and talked about flowering and some talked vaguely about the test tube without mentioning the seeds. The most common reason for loss of marks was by students just repeating the information in the stem. Many students were also more concerned about the fridge being dark rather than cold.

B491/02 Higher Tier – Plant Cultivation

General Comments

As always there were a significant number of students who were wrongly entered for this paper and scored very low marks. Many of them had little basic knowledge of plant cultivation and there were a large number of no responses on some basic questions.

Comments on Individual Questions

1 This was an overlap question with the foundation paper targeted at grade D and was poorly answered across both papers. Few candidates knew what was meant by the term phenotype and there was no general misconception because each of the possible responses was chosen with equal frequency.

2 Another overlap question targeted at grade D but this was answered better. Many candidates knew that the daughter bulbs would produce the same coloured flowers as the original bulb. The strongest distracter was response C with students thinking that they produce smaller flowers than the original bulb.

3 This question was targeted at grade D/C and was an overlap with the foundation paper. This was well answered with most candidates scoring either one or two marks. Students were able to interpret the diagrams to describe the process of pollination. The most common misconception was that picture B, of the pollen tube in the style, came first with the other pictures then being placed in the correct order.

4 This question was targeted at grade B and was well answered on the whole with most candidates understanding that the cross would produce a red flower. The most common misconception was that the alleles were co dominant and therefore a pink flower would be produced.

5 This question was targeted at grade D/D and was an easy couple of marks for most candidates. However a significant number of students still did not know the structure and function of the reproductive organs of a flower.

6a Targeted at grade C, many students still confused the conditions needed for germination with those needed for photosynthesis. This meant that response A, carbon dioxide, proved to be a strong distracter. Many students also got confused with fruit ripening and thought B, ethene, would have an effect on seed germination.

6b This proved a difficult question which, although targeted at grade C, required some thought to discount options A, C and D. D, lack of space, was the strongest distracter.

7 This question, targeted at grade A/A, was well answered with students appreciating the need for a humid atmosphere and warm temperature in the unit. Student lost marks however, by giving vague responses about temperature or wet conditions without qualifying them. Any reference to roots was also not accepted. A few candidates gave higher level answers which included information about transpiration and water logging of the compost.

8a This was an overlap question with the foundation paper and was targeted at D/D. Few candidates understood the role of sensors or did not study the diagram enough to realise that the sensors were in the water. For this reason, answers such as humidity and light were not credited. Some candidates did not read the question carefully and repeated temperature which was in the stem.

8b This question was an overlap with the foundation paper and was targeted at grade C/C. Most higher level candidates understood the term mineral nutrient and many were able to identify potassium as necessary for good fruit and flower growth. Some candidates got confused between potassium and phosphorus but they were not double penalised if they got the mineral nutrient incorrect but the reason right.

8c Many candidates misinterpreted the question and mentioned use of ICT to keep records on tomato growth in their answers. However a lot of candidates gained both marks with the ideas about labour saving and accuracy/lack of human error/rapid response being the most popular. Any reference to controlling factors was not credited because it was in the stem of the question.

9a This was a difficult mathematical concept, targeted at grade C and distinguished on mathematical ability.

9b This question was targeted at grade D/C and was an overlap with the foundation paper. Some candidates misinterpreted the question and stated the advantages and disadvantages of the trial to the farmer such as reducing his outgoings or taking up a lot of his time. Some candidates answered it very well and showed a good appreciation of how a scientific trial works.

10a This question targeted at grade B/B was well answered by most candidates. The most common misconception is that self pollination is the same as cloning and so produces genetically identical offspring. Although the offspring will all be very similar and there will be little variation, they are not clones of the parent.

10b Targeted at grade A, candidates either answered this very well or left it blank. The main mistake in the responses occurred when students failed to read the question carefully and talked about adaptations of the plant to prevent self pollination such as having the stigma higher than the pollen. The question clearly asked candidates to explain what a **scientist** could do to prevent self-pollination.

11a This was a straightforward data response question targeted at grade D/C with most candidates interpreting the information correctly. However, some candidates got confused and thought that the larger figures when used as animals feed presented the better option referring to animals excreting on the field or the tops losing nutrients whilst being stored before being ploughed back in. The main reason why most candidates lost marks was for not describing **and** explaining the data, just doing one or the other.

11b Most candidates coped with the mathematical element of this question although some lost marks by failing to simplify the ratio into its lowest terms.

11c This question required some thought and although targeted at A* students was answered well by many candidates showing that they had a good understanding of the use of ratios for NPK on fertiliser packets.

12 This question was frequently left blank with students failing to name or describe a plant disease that they have studied. The students that did attempt it did so very well, clearly describing diseases that they had first hand experience of. Although damping off is specifically mentioned on the specification, students described a wide variety of different diseases that they had learnt about including club root and rust. Some students lost marks by not appreciating the difference between a pest and a disease and describing the effects of aphids on plants.

13 There were a variety of responses to this question, which was targeted at A/A*/A*; some excellent but some students had clearly not been taught about controlled atmosphere storage. Marks were lost where students mentioned conditions but failed to give a reason. There was still a lot of misconception that the fruit is photosynthesising during transport and so requires light and carbon dioxide. In addition, many candidates are still under the impression that the fruit should be stored in conditions similar to the tropical climate from which it came, namely warm and humid.

14 This question targeted at D/C/C was well answered. Most good candidates scored at least two marks. Marks were lost when candidates failed to explain fully that the new plantlet had to root in order to establish or that the runner would break off once it was established.

B492/01 Foundation Tier – Amenity Horticulture

General Comments

The B492 papers appear to be taken by a smaller proportion of candidates than some of the other optional papers, with candidates often, also taking B491. While it is noted that there may be overlapping themes, the 'Amenity Horticulture' papers look to apply the concepts learnt in a more commercial situation.

The Foundation and Higher papers have some questions in common which allows comparability, although it should be noted that there was a marked difference in the level of candidate response on common questions between the two papers. Questions asked fell into four categories: objective, short answer, data analysis and extended writing.

Questions requiring suggestions and opinions require factual support. Superficial answers do not gain credit. Awareness of the mark allocation is also important in such questions. These often have 3 marks which indicate that more than one idea or comment is needed and that elaboration is required.

Responses from candidates generally show a greater ability to answer questions throughout the specification which is encouraging. There is also an apparent improvement in the understanding of definitions and key terms.

Comments on Individual Questions

1   This question was aimed at G grade candidates. Many, but not all, were able to name the process as 'pricking out'.

2   Only stronger candidates were able to identify all three correct answers: fertiliser, heat, water.

3   The visual representation allowed good accessibility to the question which was generally answered well.

4   This question was not well answered - possibly not covered as well by certain centres. Soil based composts add more mass to the pot.

5   This concept was generally well understood. Most candidates identified the increased risk of pests and diseases.

6   An application of knowledge. Many students could identify likely flowering times although significant latitude was given.

7   This was an objective question common to both papers. Only higher performing candidates tended to gain the mark.

8   A wide range of responses were given credit, particularly those relating to the control of the environment and extension of the season.

9   Although not always expressed well, the concepts of strength and longevity were correctly mentioned by a majority of students.

10   This was a poorly answered question. Not all candidates were able to name an environmental condition, and of those that did, there was little understanding of the role of the computer linked to an actuator.

11   A wide range of responses were accepted provided they were summer flowering, non-permanent and low growing. Few candidates were able to name three plants despite probably using them in practical activities if not covered in theory lessons.

12   Some very creative answers given, although the more 'traditional' solutions such as staff recommendation and advertising/signage were acceptable answers.

13a Graded at G, this question was correctly answered by most candidates.

13b Also a G grade data response question. Candidates were less successful perhaps due to the need to compare across more columns.

13c Requiring interpretation of data, this question proved a good discriminator. Higher achieving candidates able to ascertain the likely growing conditions experienced by shady lawns.

13d Another data interpretation question, requiring the candidate to evaluate the likely use a family lawn would get.

13e Most candidates were able to compare the table to the barchart.

13f Higher candidates were able to identify that the new mixture had similarities to the existing mixture.

14 A disappointing question, a level of description was expected within the answers, which was sometimes missing. Some students therefore missed out on potential marks.

15 A common question which discriminated between stronger and weaker candidates. Good descriptions gained full marks.

16 A high scoring question for many candidates even if some of the descriptions were rather brief.

B492/02 Higher Tier – Amenity Horticulture

General Comments

The B492 papers appear to be taken by a smaller proportion of candidates than some of the other optional papers, often as a follow on to B491. While it is noted that there may be overlapping themes, the 'Amenity Horticulture' papers look to apply the concepts learnt into a commercial situation.

The Foundation and Higher papers have some questions in common which allows comparability, although it is noted that there was a marked difference in the level of candidate response on common questions between the two papers. Questions asked fell into four categories: objective, short answer, data analysis and extended writing.

It should be noted that questions requiring suggestions and opinions do require factual support, superficial answers do not gain credit. Awareness of the mark allocation is also important in such questions. These often have 3 marks which indicate that more than one idea or comment is needed and that elaboration is required.

There are still signs of areas of the specification not being adequately covered in certain centres, and clear signs of knowledge gained through practical tasks in others where candidates could talk about these aspects with authority. There was also some evidence of a number of candidates being incorrectly entered for this paper, although this specifically related to one centre.

Comments on Individual Questions

1 A common question. Candidates on this paper were able to appreciate the role of additional mass in the pot.

2 The responses were a little patchy as to its precise use.

3 Most candidates were able to identify the type of mower which will give the finest quality cut.

4 Although lifted straight from the specification, this is an area still not performing well amongst the candidates.

5 While weaker candidates still scored, only the very top students achieved high marks. Few suggested disconnecting the hose.

6 A patchy response - not all could identify the disadvantages.

7 A couple of good distracters meant that only stronger candidates scored full marks.

8 A common question, candidates on this paper were generally able to identify the advantages of steel and aluminium.

9 Another common question. ICT-based control systems are still poorly understood.

10 A high demand question although good candidates understood the pros and cons of protected production of hardy ornamental crops. Clearly this is a result of better teaching in centres.

11 Generally well answered and understood.

12a This question required the application of data. Well answered.

12b Once again a question requiring application of data. Strong candidates were able to understand the demands of a family lawn.

12c Stronger candidates again, were able to see the similarities to the other mixture.

13a Understanding of the affect of growing conditions on sales was patchy although responses to lifestyle (holiday times) were also permitted.

13b A relatively simple calculation completed correctly by all but the weakest candidates.

14 While it was clear that most candidates had knowledge of the internet, there was still a general lack of knowledge regarding the special challenges faced selling plants. The concept of improved profit margins was also not clearly understood.

15   A higher demand question. A lot of responses did not adequately answer the question. No credit was given for answers already given in the question.

16   A common question. Thorough answers gained both marks, although some were still disappointingly brief.

B493/01 Foundation Tier – Management of the Natural Environment

General Comments

Candidates on the whole did well and in most cases provided an answer to every question. It was pleasing to see a large number of candidates gaining marks for interpreting data (Q15).

This was a hard copy of an examination paper initially designed to be taken on-line. Consequently for questions 3, 4, 5, 7a, and 7b candidates had the opportunity to provide answers in two places. They could complete a sentence with the chosen answer, or select the letter (A, B, C, D) of the chosen answer to be written at the end of the question. This led to some difficulty marking the answers of a few candidates who completed both answering opportunities with different answers.

Some responses were difficult to decipher due to untidy handwriting. Candidates should be encouraged to write clearly and keep their work on the lines where possible.

Where questions required extended writing, many candidates struggled to articulate themselves clearly and concisely. This could be seen in Q9 where it was obvious that many candidates knew the answers but were unable to express them clearly enough to gain full marks. Responses to Q17 showed a similar shortfall with candidates failing to gain full marks due to lack of precision in their explanation.

Finally candidates need to be reminded to read the questions carefully and provide an answer to the question. For example in Q7a the majority of candidates selected response B (smell) as they missed the reference to autumn and winter in the question. Similarly in Q10 a significant number of candidates gave ways of saving energy, not how they had used energy as the question asked. In Q13 some candidates' answers ignored any reference to soil structure.

Comments on Individual Questions

1.   The first question was a gentle lead into the paper, targeted at grade G. Most candidates answered the question correctly. Those that answered incorrectly chose the more human distracters 'house' or 'home'.

2.   The second question also targeted at grade G was answered correctly by most candidates. The majority of wrong answers were attributed to the distracter 'food chain' indicating that virtually all candidates have some understanding of feeding relationships.

3.   This question was answered correctly by the majority of candidates. It was surprising to see how many times distracter D (perma culture) was selected. Candidates may have come across the concept but it is not a term mentioned in the specification.

4.   Another objective question that attracted a lot of correct answers. Candidates who chose to write the answer rather than select the letter of the correct answer generally got the answer wrong due to lack of clarity in writing upper and lower case letters.

5.   A well answered question where most candidates identified D (genetic modification) as the correct answer. All the other distracters got support.

6.   The idea of crop rotation appears to have been well taught as the correct answer of 'legume crop' was well supported. Organic crop was the most popular distracter.

7a   Few candidates selected the correct answer of C (water), the majority chose B (smell) as the answer. This is a correct response if the questions statement about the time of year is ignored. The answers to this question clearly illustrate the importance of reading the question.

7b   This question was answered much more successfully than 7a and the majority of candidates selected the right answer. All the distracters got support.

8.   A common question targeted at grades C/ D. Well answered although some candidates did not use the prescribed descriptors of 'good' and 'poor'. This was probably as the rubric of the question was designed for drag and drop. Where candidates did not use the prescribed descriptors they were given c

9.   Candidates were able to provide two instructions they would expect to be given by a teacher, but lack of clarity and vague answers meant that few gained full marks. General comments that teachers could have made such as: 'don't mess'; 'be careful'; 'don't misbehave'; 'hold things safely', were not specific enough to be given credit. Most candidates were able to provide an explanation of why the instructions were given.

10 This question was well answered as there was plenty of scope to provide acceptable responses. Some candidates gave general one word answers such as: 'light'; 'heat'; 'car'; 'computers'; 'phone'. These were given credit if correct. Some listed utilities, gas, electric, and water, which on its own did not score but could be credited if the reference was to hot water. There was some misinterpretation of the question by candidates who gave answers explaining how to save energy. This may have been due to the 'newspaper headlines' given in the stem of the question referring to reducing energy

11 Many candidates scored one mark for suggesting a reason for the difference in growth between the two groups of plants, but few managed to gain both of the available marks. There were too many general comments such as: 'they have got more support' and 'different environments surrounding them'. There was also a lack of reference to the two groups of plants with answers such as 'some are getting too much sunlight'. Candidates who came up with a correct answer for one point sometimes failed to score the second mark as they just repeated the opposite of the first point. As in the example 'close to the road there was more pollution', 'next to the field there was less pollution'.

12 A common question that generally produced relevant answers. Candidates should be made aware that if a question states 'explain' then short or single word answers such as 'slime', that are not explained cannot be credited with a mark. Good answers gave an adaptation and explained how it benefited the slug. For example 'the slug produces slime so it moves easier over the soil'. Answers involving the antennae were often vague or ambiguous.

13 This was a common question targeted at grades D and C. Candidates found it difficult and a number did not attempt the question. Good answers referred to the fact that the decrease in earthworms would reduce aeration and drainage. Other candidates correctly stated that the soil would not be turned of mixed. Few candidates referred to humus or leaf litter. Some candidates failed to score because they missed the point of the question and gave answers relating to the ghost slug, for example 'they would eat all the animals that were not welcome', while others gave answers about nutrients without reference to soil structure.

14 This question was aimed at grade D and any answer that referred to damage of plants or animals was acceptable. As a consequence lots of candidates achieved a mark. There were however a significant number who gave answers relating to air pollution from the fumes or CO^2 and greenhouse gases and global warming. The mark scheme did not credit these answers as the environmental impact of a hot flame gun in these instances is insignificant.

15ai This question required straightforward interpretation from a table of data. It was answered correctly by many candidates.

15aii The second question from the data table. Most candidates answered it correctly.

15aiii A third data question which was also received a high number of correct answers.

15b   This data response question did not gain as many correct responses as the previous three. Candidates did not always observe the change in sequence of birds in the two tables. As a consequence 'starling' was given as an incorrect answer.

15c   This question provided the opportunity to draw a bar chart. Candidates on the whole did not score well on the question. Many misinterpreted 10.5 (house sparrow) as 12.5, this included those that had plotted 2.32 (chaffinch) correctly. Bar charts were not well drawn, there was a lack of precision and some candidates did not use a ruler. The chart should have had bars that were not touching as these were discrete variables.

16   This question was not well answered, those candidates that attempted the question focused on how to cut the grass on a steep slope. There was misinterpretation of how to 'manage the site' and the question would have benefited from a clearer lead in so candidates were more clued into the response required.

17   This question was the least well answered on the paper. Candidates tended to either know what an intensive animal production system was or not. Poor answers referred to cruel conditions or confused intensive farming with organic farming. Good answers referred to the type of housing. Few went on to extend the answer for further marks by mentioning other factors such as management

18   The final question on the paper gave candidates the opportunity for extended writing. They were able to identify the hazards of falling rock and slippery surfaces but did not always give a third hazard that was required to gain a mark. Few were able to describe how the risks could be pointed out without the using of signs while there were lots of references to barriers, fencing, and netting on rocks, to reduce the risks.

B493/02 Higher Tier – Management of the Natural Environment

General Comments

This was a relatively small entry.

The majority of candidates responded well, supporting their entry to higher paper. There was a minority who did not appear to be at the appropriate standard to sit the higher tiered paper.

This was a hard copy of an examination paper initially designed to be taken on line. Consequently for Q5 candidates had the opportunity to provide answers in two places. They could complete a sentence with the chosen answer, or select the letter (A, B, C, D) of the chosen answer to be written at the end of the question. This gave the potential candidates to complete both answering opportunities with different answers.

A few responses were untidy and difficult to read. Candidates should be encouraged to write clearly and keep their work on the lines where possible.

Comments on Individual Questions

1   Q1 was a common question aimed at grades C/D. Most candidates selected the correct answers. As with the foundation paper some candidates wrote their own descriptions rather than use the prescribed descriptors of 'good' and 'poor'. Marks were awarded if the descriptions given were correct.

2   This was a straightforward objective question. It was well answered by the majority of candidates.

3a   The first part of this question was answered very well with most candidates getting it correct. It is obvious that the nitrogen cycle is well taught, and pleasing that candidates have retained an understanding of the cycle.

3b   The second question about the nitrogen cycle also received a good number of correct answers. The mark scheme was altered to accept answers anywhere between death and ammonium compounds as it was felt that decay could start once death had occurred.

4   In this question about trophic levels answers C (4) or D (5) were chosen by virtually all candidates. The selection of C as the answer could possibly have been due to 'dead leaves' being used as the first trophic level rather than leaves.

5   An objective question targeted at grade B. The correct answer A (conservation) was a popular choice. All the distracters were used but D (preservation) was the most commonly selected distracter.

6   A visual question that required candidates to apply their knowledge of pressure or soil compaction in order to choose the correct answer.

7a This question was targeted at grade C. All distracters were chosen and the variety of answers suggests a weak understanding of soil characteristics.

7b It was clear that many candidates knew the answer to this question but they struggled to clearly articulate their ideas and the answer was not well explained.

7c This was the least well answered question on the paper. It was targeted at A* and as a result very few candidates were able to provide the required answer.

8 A common question that saw a wide variety answers. Some of these were vague or poorly explained. Candidates should be made aware that if a question states 'explain' they need to provide an explanation to be credited with a mark. For example the response 'the slug has a slimy trail' did not gain a mark as it was not qualified.

9 There were a number of very good and concise answers to this question. For example 'there would be less earthworms to aerate the soil'. Most candidates identified damage to the soil structure due to less aeration and drainage.

10 A common question that generally produced relevant answers that related to possible damage to the environment. Most candidates referred to killing other organisms and there were fewer references to air pollution from fumes or CO_2 causing global warming compared to the foundation paper.

11a This question provoked some good responses referring to the need for the chemicals to be non-toxic. I would like to have seen greater use of terms such as specific or biodegradable.

11b There was a lot of potential to get this question right and most candidates scored a mark. The most common answer being that the Japanese jumping lice could start to feed on other plants.

12 It was encouraging to see that most candidates showed they had some idea of how energy passes through a food web. The first of the two available marks was easily achieved; the second was more difficult as the reasons given needed to be clearly explained. Most candidates correctly referred to loss of energy through respiration / movement.

13 Candidates did not always give enough detail to score well on this question. Few named **threatened species** and the mark scheme was extended to give credit any named wetland species. However there were too many general terms such as fish or birds and answers like 'fish because they can't live on land they need water to live and breathe in' were not specific enough to gain marks. a good answer was: Amphibians eg frogs they need water to lay their spawn or they wont survive'.

14a This data response question was a common question that was answered significantly better by candidates on the higher paper. There were lots of good graphs and most candidates used a ruler. Some misinterpreted 10.5 as 12.5

14bi A lot of candidates managed to complete the table of averages correctly.

14bii Similarly many candidates were able to put the birds in the correct order.

15 This question asked candidates to identify the greatest percentage increase in energy from renewable sources given on a graph. Virtually all candidates gave the incorrect answer 'wind' which precluded them from gaining either of the two marks available.

16 A common question that asked candidates to identify three risks and describe how the risks could be pointed out to the public without using unsightly signs. Candidates were able to give two risks but fell short of gaining a mark as three risks were required. There were some good suggestions as to how the risks could be pointed out.

17 This was a question that candidates answered well or not at all. There were a number of very good answers and it was pleasing to see how many candidates had a good understanding of nitrate pollution. Several used the term eutrophication.

18 In the final question candidates were asked to describe how ICT might be used to collect information. Many were able to identify ways of collecting data, usually with a temperature probe, but few expanded their answer to explain how the data would be processed.

B494/01 Foundation Tier – Care of Animals

General Comments

This paper followed the established format of previous series.

It included objective questions, short answer questions, data analysis and some questions requiring extended writing. These were in no particular order. In June the question styles will be grouped, in the order given above, starting with the objective questions.

The paper proved to be accessible to the whole ability range of the foundation candidates. Questions set on the lower demand section of the specification produced encouraging responses, particularly those that tested knowledge which was linked to practical work. Clearly most candidates had had experience in the care and handling of small animals.

Questions which tested science topics, such as digestion and reproduction, were not so well answered.

Some questions are set on the standard demand part of the specification to enable differentiation at D and C grades. In these questions a low grade answer will not achieve the mark. For instance, in a question that requires an explanation a one word answer will not suffice. Similarly if a description is asked for a list will not gain full credit. Candidates should be taught what the different command words require of them.

The questions tested variety of small animals and some required candidates to state the animal studied to facilitate marking. There was no evidence to suggest the study of one type of small animal rather than anther gave unfair advantage.

Comments on Individual Questions

1   A straightforward multiple choice question to introduce the paper. Most candidates realised that correct handling ensures the animal does not get hurt.

2   Not such an easy question. All the distracters were selected which suggested that many candidates had not seen a tapeworm or realised that it is a parasite. Reference to the scale provided should have alerted candidates to the fact that the tapeworm was not a micro-organism.

3   The answers required were hamster and rat. Such treats are not given to birds, fish or reptiles.

4   This question and Q5 were on science topics and they did not score well. In this question the most common error was to give digestion, rather than grinding as the function of the gizzard.

5   The diagram showing a bifurcate uterus was unfamiliar to many but even so it should have been possible for candidates to position the parts if they understood the process of fertilisation in a mammal.

6   Candidates must be taught to pay attention to the stem of any question. They are there to help cue the candidate to the required answer. In this case the question asked why protein was **important** in diet. This points to the main function which is tissue repair. It is true that protein provides energy but only when there is no carbohydrate available.

7   This question, testing standard demand, was common with the higher paper. Tetanus was the right answer. Salmonella was a frequently given answer. This can be spread to humans but they are not injected as a preventative measure.

8   A short answer question set directly on the specification. The expected answers were; as pets, for research or for showing. Those that gave 'for company' were credited with the pet mark. Some stated 'for breeding' which was not credited unless the reason for breeding was given.

9   This question required candidates to answer questions on the data provided. Candidates were not expected to be familiar with the data. Almost all candidates did attempt the questions which shows even the less able are willing to tackle the unknown. Part (a) was a straight forward reading from the bar chart. Part (b) required the candidates to realise that the 20% children who owned a rabbit were in a school of 1000, so 200 children had a rabbit. The answer to part (c) was 29, as 6% owned both a cat and a dog so 6 had to be taken from 35.

10   This question was also a type of data response in that the candidates were asked to give reasons why the Siamese and Persian were not suitable breeds for working people with young children living in a flat. The mark scheme provided for a variety of reasons. The Siamese proved easier to provide reasons for than the Persian. No credit was given for answers that did not relate to the given descriptions of the breeds in the question.

11   The question clearly referred to the container shown. Thus answers that said it would tip over were not credited as it was shallow and had a very broad base. The mark scheme expected answers that related to contamination of the water. The suggestion that small animals might drown was credited.

12   The answers given to this question indicated that not many candidates had been involved in showing their pets. A good number of candidates referred to the animal needing to be healthy and well-behaved. These were not credited as they were in the stem of the question which clearly stated **one** 'other' feature. The expected answers related to markings, colour and conformation of the breed. Clearly some candidates had shown their dogs so obedience and agility were allowed for dogs. Many candidates did not name the animal studied which led to loss of a mark if the feature was not on the mark scheme.

13   Health checks are obviously well taught. There were good answers from all ability ranges. A mark was awarded for the part checked and the observation e.g. 'check coat for parasites, bare skin or red patches'. Tests such as taking the temperature or giving vaccinations were not credited as these are not normally carried out by the owner.

14   Another well taught topic is health, safety, and the risks involved when handling animals. It was important in this question to state that the reason for washing **before** was to ensure that any infection was not given **to** the animal. Some answers indicated that if clean hands were not used, any scent on the hand s from a previous animal might provoke a reaction. This was given a mark.

15   In part (a), knowledge of why the cage shown was suitable for a small mammal was very good. Commonly given answers referred to suitable size, security and the presence of a sleeping area and an exercise wheel. In part (b) the type of equipment for food and water was needed. A water bottle and pottery bowl were the usual answers given. Other suitable answers were given marks but a water bowl, such as the one in the photograph for Q11 was not.

16   This was the least well answered question on the paper. It required an explanation; one word responses did not gain credit. Nor did generalizations such as 'succulent is wet concentrate dry'. Many considered that tinned dog food was 'succulent' i.e. had water, and that dog biscuits were a concentrate, because they were dry. The mark scheme required an explanation such as 'succulents contain water and are natural, e.g. lettuce', while concentrates are processed, dry foods.

17 This was a common question which gave candidates a chance for extended writing and some answers were detailed and well constructed. How the animals were housed while cleaning was taking place, details of cleaning materials and how they were used were given. Weaker answers gave only the bare outline. The mark scheme required that one mark be given for washing hands a point mentioned by very few candidates.

18 Another common question. Candidates were asked to match the parts of the digestive system with their functions. This did differentiate candidates at the standard demand. Most knew that the food entered the mouth and that waste was ejected through the anus. A common mistake was to confuse the functions of the small and large intestines.

19 This final question was also common with the higher paper. Symptoms have to be seen so comments such as 'the animal did not feel well' were not given marks. Eating a lot yet losing weight or pieces of worm seen in droppings were common correct answers. Vomiting and diarrhoea, in its various spellings, were only credited for one mark.

B494/02 Higher Tier – Care of Animals

General Comments

This paper followed the established format of previous series.

It included objective questions, short answer questions data analysis and some questions requiring extended writing. These were in no particular order. In June the question styles will be grouped, in the order given above, starting with the objective questions.

Centres need to appreciate that the higher paper is designed to differentiate between A*, A and B grades, not to identify C grades. There was evidence that some candidates would have done themselves more justice by taking the foundation paper. The wording of the higher paper not designed to cue weaker candidates.

In short answer questions the answer should be clearly relate to the question, many candidates give a short statement leaving the examiner to make connections to the mark scheme. In a question that requires an explanation a one word answer will not suffice.

When answering extended writing questions candidates need to be aware that they need to write sentences, not give one word responses.

It should also be noted that questions requiring suggestions and opinions do require factual knowledge; superficial answers do not gain credit.

It is important that candidates are taught the significance of 'command' words in the question stem. State, describe, explain and suggest all have specific and different meanings. They should also be aware of the mark allocation. A question with 3 marks indicates that more than one idea or comment is needed and that elaboration is required.

Questions set on the standard demand section of the specification produced encouraging responses, particularly those that tested knowledge which was linked to practical work. Clearly most candidates had had experience in the care and handling of small animals.

Questions which tested science topics, such as digestion, enzymes, and animal breeding, were not well answered by many candidates.

The questions tested a variety of small animals and some required candidates to state the animal studied to facilitate marking. There was no evidence to suggest the study of one type of small animal rather than anther gave unfair advantage.

Comments on Individual Questions

1   This question testing standard demand was common with the foundation paper. Tetanus was the right answer, but Salmonella was often given. This can be spread to humans but they are not injected as a preventative measure.

2   Another common question. Candidates were asked to match the parts of the digestive system with their functions. This did differentiate candidates at the standard demand. Most knew that the food entered the mouth and that waste was ejected through the anus. A common mistake was to confuse the functions of the small and large intestines.

3   A data response question. It required the candidates to realise that the 20% children who owned a rabbit were in a school of 1000, so 200 children had a rabbit. Weaker candidates just read 20 from the bar chart.

4   Another data response that provided no problems for most candidates.

5   The fact sheet given was central to the question so candidates did not need to have studied the tortoise. The reasons asked for referred to the tortoise. Humidity prompts fungal infection in tortoises. Calcium is used by the tortoise for their shell and bones. Heat is needed by the tortoise to raise its body temperature to enable it to function as it is cold blooded. Many candidates lost marks by making general comments; 'calcium is important in animal's diet' or 'heat is needed because the tortoise lives in a warm climate'

6   This proved to be one of the most difficult questions on the paper. Perhaps the amount of data acted to distract. The key point of the question was 'to minimise the effect on the environment'. Thus treatment needed to be in the cat for any other would upset the food web and therefore the environment.

7   A common question. It required an explanation one word responses did not gain credit. Nor did generalizations such as 'succulent is wet, concentrate dry'. Many considered that tinned dog food was 'succulent' i.e. had water and that dog biscuits were a concentrate because they were dry. The mark scheme required an explanation such as' succulents contain water and are natural eg lettuce, while concentrates have a high nutrient value and are processed dry foods.

8   This question was also common with the foundation paper. Symptoms have to be seen, so comments such as 'the animal did not feel well', were not given marks. Eating a lot yet losing weight or pieces of worm seen in droppings were common correct answers. Vomiting and diarrhoea, in its various spellings, were only credited for one mark.

9   Many candidates lost marks in this question by giving the advantage and disadvantage to the dog rather than to the owner. The advantage to the owner is ease of carriage and disadvantage is that they cannot see behind their backs. This did require careful observation of the photograph. Marks were given to those who suggested the dog might escape.

10   Those who knew about selective breeding scored well on this question, however, many candidates just gave a generalised answer such as' breed pale rats together' which did not gain the 3 marks. Selection of the offspring had to be mentioned and the idea given that this selection took place over successive generations.

11   This was a common question which gave candidates another chance for extended writing and some answers were detailed and well constructed. How the animals were housed while cleaning was taking place, details of cleaning materials and how they were used were given. Again, weaker answers gave only the bare outlines. The mark scheme required that one mark be given for washing hands a point mentioned by very few candidates.

12   This question, like the previous question was answered best by those candidates who had practical experience of caring for a small animal. Three marks were available for a wide range of points, isolation, little disturbance, extra food, special bedding etc. Many candidates gave only one point did not get full credit. As mentioned in the introduction it is important for candidates to look at the mark allocation.

13   The information in the diagram was provided as a stimulus for candidates to suggest how hormones controlled reproduction in the whip-tailed lizard. They were not expected to have been taught about this lizard. There were some very good responses. Those which were based on careful observation of the data gained most credit eg. 'peak in oestrogen causes ovulation', high progesterone/low oestrogen causes male-like behaviour and ovary (follicle) size increases as both oestrogen and progesterone gradually increase.

14   This question was based on the higher level demand of the specification but was answered by most candidates at the standard level. A list of health checks did not gain credit. What did were explanations giving reasons for the health checks eg check teeth to see if they are over grown **because** animals cannot chew food and will lose condition.

15   Enzyme action is covered in the science specifications and is clearly stated on the higher demand specification. It was not well known. There were, however, some notable exceptions with details of active sites and 'lock and key' action being quoted. Quoting examples of enzymes acting in the digestive system scored a maximum of 2 marks.

B495/01 Foundation Tier – Livestock Husbandry

General Comments

Candidates were generally well prepared for this paper with many candidates using their practical experience to good advantage when answering questions. There were still candidates who had probably been entered for the wrong tier. On the higher tier particularly, there were a few candidates who would have been better served if they had taken the foundation paper.

Candidates should be encouraged not to give one word answers where two lines are provided for the answer, this indicates a more detailed explanation is expected for the mark.

Comments on Individual Questions

1   As usual on this paper the first question was intended to be a nice easy start and as such caused little difficulty for all but the very weakest candidates.

2   Well answered with most candidates obtaining 3 out of the available 4 marks with the most common error being to suggest that good housing was expensive.

3   Most candidates realised that keeping the animals indoors meant they used less energy fewer realised that this also meant they had to eat less.

4   Very well answered, even though the term oviduct not fallopian tube is used in the specification.

5   Few foundation level candidates were aware of the term phenotype.

6   Approximately half the candidates realised that crossing two different pure breeds produces an F1 hybrid.

7   Some very good answers here but weaker candidates tended to give general signs of ill health rather than those particularly associated with parasites.

8   Apart from a few candidates who got their feed types the wrong way around most gave good answers. Either a particular food type eg concentrate or an example calf pellets was accepted.

9   Most candidates were able to give one sign of heat only better candidate gained the second mark. A good range of animals were used as examples although not all could be considered farm animals.

10   Candidates have seen variations of this question on many past papers and were able to give several sensible suggestions.

11a Some candidates mistakenly talked about general farm records rather than for the individual animal.

11b Several candidates said that records were less likely to be lost if on a computer rather than paper, this was not accepted unless reference was made to the ability to back-up data and store elsewhere.

12a & b It was obvious that several candidates did not have access to a calculator and found these questions more difficult as a consequence.

13   Candidates' abilities to read graphs were far better than their arithmetical skills.

14 Well   answered.

15   Candidates in this question did give more detailed answers and consequently gained more marks.

16   Some candidates gave rules for safe working rather than the particular hazards when working on a farm.

B495/02 Higher Tier – Livestock Husbandry

Comments on Individual Questions

1 Generally well answered although a few candidates did confuse the bladder with the uterus.

2 Most candidates obtained 2 marks but only the better candidates got all 3 marks.

3 This was not a well answered question with many candidates thinking that drinking milk containing antibiotic would make you ill.

4 Most candidates on the higher paper correctly identified black and white as the pig's phenotype.

5 A very well answered by the majority of candidates.

6a Very well answered.

6b Only draining fields was less well known as a means of reducing parasites. Weighing the animals might identify parasites but would not help reduce them on its own.

7a Most identified the advantage that the lambs would all be born at the same time but fewer got the second mark for suggesting a second advantage such as knowing when to put the ram in or know exactly when lambing would start.

7b Candidates recognised that scanning would tell the farmer that the ewe was either barren or carrying singles, twins or triplets but did not get the mark for suggesting how this would then influence the management of those ewes such as additional feeding etc.

8 Well answered by higher paper candidates.

9 Most candidate obtained 2 out of the 3 available marks. Some candidates lost marks by giving simplistic one word answers.

10a & b Candidates with access to a calculator generally scored better on this question.

11 Generally the percentage calculations were not well done with only half the candidates obtaining these marks.

11a 75% was the most common error.

11b 10% was a very common error.

12 Better candidates realised that the smaller the food conversion ratio the better.

13 Some very good well constructed answers to this question.

14a It was obvious which candidates had hands on experience of weighing an animal through the quality of their answers. A few candidates lost a mark by not addressing the safety aspect of the task.

14b Very well answered by the majority of candidates with all making at least one valid point.

Grade Thresholds

General Certificate of Secondary Education
Environmental and Land-Based Science (J650)

January 2010 Examination Series

Component Threshold Marks

Component		Max Mark	A*	A	B	C	D	E	F	G
B491/01	Raw	36				22	18	14	11	8
	UMS	34				30	25	20	15	10
B491/02	Raw	36	30	25	20	15	11	9		
	UMS	50	45	40	35	30	25	20		
B492/01	Raw	36				25	21	18	15	12
	UMS	34				30	25	20	15	10
B492/02	Raw	36	29	25	21	17	13	11		
	UMS	50	45	40	35	30	25	20		
B493/01	Raw	36				24	21	18	16	14
	UMS	34				30	25	20	15	10
B493/02	Raw	36	30	25	20	16	13	11		
	UMS	50	45	40	35	30	25	20		
B494/01	Raw	36				28	24	21	18	15
	UMS	34				30	25	20	15	10
B494/02	Raw	36	30	26	22	19	15	13		
	UMS	50	45	40	35	30	25	20		
B495/01	Raw	36				28	24	20	16	12
	UMS	34				30	25	20	15	10
B495/02	Raw	36	29	26	23	20	15	12		
	UMS	50	45	40	35	30	25	20		

Overall

	A*	A	B	C	D	E	F	G
UMS	270	240	210	180	150	120	90	60
Cumulative Percentage in Grade	0.0	0.0	0.0	0.0	33.3	66.7	66.7	100

The total entry for the examination was 3

Statistics are correct at the time of publication.

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