GCSE

Environmental and Land-Based Science

OCR Report to Centres

January 2012

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

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

This report on the examination provides information on the performance of candidates which it is hoped will be useful to teachers in their preparation of candidates for future examinations. It is intended to be constructive and informative and to promote better understanding of the specification content, of the operation of the scheme of assessment and of the application of assessment criteria.

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

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

© OCR 2012

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

CONTENTS

General Certificate of Secondary Education

Environmental and Land-based Science (J650)

OCR REPORT TO CENTRES

Overview

Centres may opt to take these examinations as on-line Computer-Based Tests (CBTs). Just below half the candidates in the cohort sat the CBTs this session.

An advantage of the CBT format is the facility to edit answers clearly to ensure that candidates convey the required meaning clearly and concisely.

There is no evidence of a difference in the quantity or quality of the extended prose response between the paper and the CBT versions of the exam.

Candidates should be made aware that there is a calculator icon available on-line.

The options are very comparable in terms of style of papers and outcomes. As might be expected, B491 and B493 attract the largest entries.

There remains an issue over the entry policy for the higher tier in some of the options. This appears to be more of a problem in the large entry options.

The overall response to the examination papers was very pleasing, with evidence of excellent teaching going on in centres. All Principal Examiners refer to the evidence of good practical experience enhancing the performance in the theory papers. The best candidates showed a good knowledge and understanding of the specification and were able to use correct scientific terminology in their answers. There was some evidence to suggest that candidates in the specialist options are being taught the required science and specialist knowledge rather than general knowledge.

Many average candidates could improve their performance by careful reading of the stem of the questions and noting the requirements of the key command words – 'suggest', 'describe' and 'explain' all require different responses.

Candidates should also note the mark allocation of each question – two or three marks indicate that more than a one word answer is expected.
Data questions were well answered.

B491/01 Plant Cultivation (Foundation Tier)

General Comments

There were some excellent scripts showing students to have a very good understanding of the principles of plant cultivation as well as an appreciation of experimental and exam technique. Most students answered in extended prose and there was little difference in the quantity or quality of response between the paper and the CBT versions of the exam.

Comments on Individual Questions

1   A significant number of candidates did not recognise the picture of the plough or fully appreciate how it is used to prepare soil on a large scale. The specification clearly mentions soil cultivation by machine and so even those Centres without direct access to such machinery still need to cover this topic.

2   The basic structure of a flower was still not known by a large number of candidates. The most common mistakes are when candidates confuse the ovary for the ovule and the anthers for the stigma. Few candidates could explain clearly why the flower was insect pollinated. Few made reference to the petals being large and brightly coloured and just talked about the flower in general. Some candidates thought that wind pollinated flowers would not have any petals at all. Better candidates talked about the anther and stigma being inside the flower.

3   Many candidates are still using incorrect terminology when answering questions on genetics, choosing the terms 'stronger' and 'weaker' rather than 'dominant' and 'recessive'. Of those that did get the terminology correct, the majority were able to understand that tall growth was dominant.

4   This question was well answered on the whole with students understanding the meaning of an inorganic fertiliser. The most common distracter was the pelleted poultry manure.

5   This question was poorly answered by candidates. Many did not read the question and gave an answer relating to the release of nutrients, which was clearly mentioned in the stem. Other candidates were stating advantages of FYM, such as cheap and readily available, rather than giving a reason for adding it. However, the candidates that did answer it correctly gave some excellent responses relating to soil structure.

6   Candidates found this mathematical question challenging, failing to appreciate that the values were percentages in a 10Kg bag. The most common incorrect answer was 37.5Kg

7   This question was well answered by the majority of candidates. Those candidates who did answer incorrectly gave a range of responses.

8   This question was well answered with runner being the most common distracter.

9   Aimed at grades G and F, this question should have allowed candidates to pick up some easy marks. However, many candidates lost one or two marks by failing to relate the behaviour shown to the specific hazard in the question. For example, a young man with a walkman could be distracted at any time but candidates had to relate this to his inability to listen to instructions or heed any dangers whilst carrying out the activity. Children can fall over and hurt themselves anywhere, however if they are in a glasshouse the added danger is falling into, and breaking, the glass. The gardener could get some of the pesticide on his

clothes but the real danger would be inhaling it, getting it on his skin or in his eyes. Most candidates were aware of the problems of lifting. However, many stated that this could result in the back breaking!! Some candidates also misread the question and explained how the task could be carried out more safely such as by bending his knees.

10   Most candidates got the first part of the question correct. However, they found the calculation more challenging. Most candidates understood how to get the answer but many failed to read the graph properly or did the simple calculation incorrectly. The most common incorrect answers were 12 and 15%.

11   Most candidates gained the mark for this question, realising that the apples should be stored in a cool, dry environment and in a sealed container. However, a few did not understand the concept of storing apples for a long period of time and suggested the fruit bowl and some even put them in the freezer.

12   This question scored highly with most candidates able to interpret the graph.

13   Parts **(a)** and **(b)** were answered well with most candidates gaining these marks. Part c was poorly understood with candidates not understanding the term 'thinning out'. Many candidates talked about thin onions, whilst others thought the 5–10cm was referring to the depth of planting. A few of the better candidates mentioned the idea of reducing competition. In the final part, the majority of candidates appreciated that wet conditions could lead to rot although a few still thought that the onions were still growing.

14   The most common distracter was temperature with candidates thinking that closing the vents would decrease rather than increase the temperature.

15   This question was poorly understood. Candidates are still unsure what is meant by the term 'humidity' and confuse it with temperature. Most of the responses referred to thermometers and switching heating on and off. Candidates insist on using the term ICT rather than specifically mentioning sensors and computers. Very few candidates appreciated the need for the vents to be opened in response to internal conditions rather than just using a timing system.

16   Few candidates gained the mark for conditions necessary for seed germination with a variety of distracters chosen. Few candidates could also label the root as the radicle, with the most common misconception being the plumule.

17   Candidates struggled with how to express their response to this question. In a number of cases they seem to have got the correct idea but not explained it sufficiently to gain the marks. Candidates sowed seeds at a number of different depths without specifying how many depths and what they were. They also failed to state that they would sow more than one seed at each depth. Very few candidates controlled the other variables in the investigation. Finally few candidates grasped what was being investigated and ended up measuring the height of the plants and even weighing the yield rather than measuring the number of seeds which germinated.

18   This was answered well by most candidates, although, some would not give specifics and would rather ask the neighbour what to do before they went away. Many candidates were overly concerned about the amount of light reaching the baskets and were trying to move them around each day.

19   The main problem with this question was that candidates failed to read the stem of the question and so talked about double digging and adding manure. However, most students gained at least 2 of the 3 marks ,mentioning the use of forks, rakes and hoes. Candidates failed to score if they just listed all the tools they would need.

B491/02 Plant Cultivation (Higher Tier)

General Comments

There were some excellent scripts, showing students to have a very good understanding of the principles of plant cultivation as well as an appreciation of experimental and exam technique. Most students answered in extended prose and there was little difference in the quantity or quality of response between the paper and the CBT exams. However, far too many Centres are still entering unsuitable candidates for the higher tier papers. These candidates are scoring very poorly and do not appear to have even a basic grasp of the concepts and would often fail to gain a grade C on the foundation. More careful targeting of candidates to papers is needed to give the candidates the best opportunity to succeed.

Comments on Individual Questions

1   Few candidates gained both marks on this question. Most candidates chose pH as a correct response but many thought that carbon dioxide would be needed rather than oxygen. All of the other distracters were also chosen with relative frequency.

2   Only the better candidates identified the bulb. Candidates do not seem to have a good understanding of the mechanism of asexual reproduction or the structure of each organ. All of the other answers were chosen with the same frequency showing that there was no specific misconception.

3   Most students worked out that the cloche would decrease both insect and wind pollination, with C being the most commonly chosen incorrect response.

4   This was well answered with most candidates having a knowledge of damping off sufficient to enable them to treat it correctly.

5   This was well answered. Those candidates who answered incorrectly gave a range of responses.

6   This question was poorly answered by candidates. Many did not read the question and gave an answer related to the release of nutrients, which was in the stem. Other candidates were stating advantages of FYM such as cheap and readily available rather than giving a reason for adding it. However, the candidates that did answer it correctly gave some excellent responses relating to soil structure.

7   This question was well answered, with students well prepared in the advantages of inorganic fertilisers. One of the main problems was candidates not explaining their answers in sufficient detail. For example, they would mention organic fertilisers being quick release or containing large quantities or known quantities without specifying what they were releasing or contained.

8   Candidates found this mathematical question challenging, failing to appreciate that the values were percentages in a 10Kg bag. The most common incorrect answer was 37.5Kg

9   Most candidates scored one mark on this question being able to explain that the levels of nitrate went up and phosphate and potassium went down. Fewer candidates read the question and included data, and of those that did, many were confused by the bar charts. Most candidates were able to work out the ratio although some lost the mark by not giving it in its lowest form.

10 This was a difficult question and most candidates just repeated the stem of the question, stating that minerals were unavailable in acidic and alkaline conditions. However, some Centres had clearly taught this section very well and these candidates were able to talk about the solubility of different ions, the toxicity of aluminium ions in acidic soils and even cation exchange surfaces.

11 The most common distracter was temperature, with candidates thinking that closing the vents would decrease rather than increase the temperature.

12 Most candidates understood the use of capillary matting and sprinklers, although some confused capillary matting and hydroponics. A range of good quality answers were given in response to both methods, including the problems of leaf scorching and water logging.

13 Many candidates incorrectly chose leaf A because it lost the greatest mass without really appreciating what the experiment was showing or what humidity meant. Those candidates who correctly chose D did not always gain the mark because they gave incorrect reasons thinking that the plant absorbed water through its leaves or that it was heavier at the start.

14 This question was poorly understood. Candidates are still unsure what is meant by the term humidity and still get it mixed up with temperature. Most of the responses referred to thermometers and switching heating on and off. Candidates insist on using the term ICT rather than specifically mentioning sensors and computers. Very few candidates appreciated the need for the vents to be opened in response to internal conditions rather than just using a timing system.

15 This question scored highly with most candidates able to read the figures off the graph. The most common incorrect answer was 15% due to poor graphical skills.

16 A significant number of candidates left this question out completely, showing a lack of knowledge about aphids. Some candidates even thought they were a type of weed competing with the crop. Again the most common misconception is that they are a large pest that will physically eat the leaf. Other misconceptions include the lack of nutrients or glucose leading to a decrease in photosynthesis or causing wilting.

17 Most candidates gained the mark for this question. However, a large number of candidates chose options B or C, using hydrogen and carbon dioxide.

18 Although few candidates expressed the answer to this question well, most of them appreciated that offspring from seed would show genetic variation. However, a significant minority thought that the seeds would all be genetically identical presumably because they had been produced by a bulb and a number of candidates did not read the question correctly and stated the advantages of growing from bulbs.

19 Few candidates could label the root as the radicle with the most common misconception being the plumule.

20 Candidates struggled with how to express their response to this question. In a number of cases they seem to have got the correct idea but not explained it sufficiently to gain the marks. Candidates sowed seeds at a number of different depths without specifying how many depths and what they were. They also failed to state that they would sow more than one seed at each depth. Very few candidates controlled the other variables in the investigation. Finally, few candidates grasped what was being investigated and ended up measuring the height of the plants and even weighing the yield rather than talking about the number of seeds that germinated.

21   This question was well answered on the whole, although too many candidates are still unfamiliar with the basic structure and function of the flower. The most common misconception was that the anther was where the pollen was taken to and the stigma where the pollen was produced.

22   Few candidates picked up the key word 'phenotype' in the question and consequently failed to score on this question. Either they did not read the question carefully or they are still confused by this term.

23   Very few candidates scored all three points on this question because they were not using the correct terminology. The most common misconception is that self pollination has the same outcome as asexual reproduction. Therefore, all the F2 offspring would be identical to the parents and be tall. Very few candidates expressed their answer in the form of a Punnett square, so candidates doing the CBT version were not at a disadvantage. Some of the better candidates understood that the presence of heterozygotes in the F1 would lead to some small plants in the F2.

B492/01 Amenity Horticulture (Foundation Tier)

General Comments

The B492 paper of the GCSE Environmental and Land-Based Science specification is an optional paper. This paper, based around amenity horticulture gives an applied focus to the scientific principles within this qualification, often looking at topics from a commercial context.

The paper consists of 36 marks; a mixture of multiple choice, short answer, calculations and longer response questions, giving candidates a range of opportunities to demonstrate what they know. A number of questions are common between the higher and foundation papers allowing for a comparison of performance for those achieving a C grade.

It is acknowledged by the examiner that the teaching coverage of the whole specification has improved during the life of this qualification, with fewer examples of candidates being unable to provide answers on topics.

While it is acknowledged that there are numerous individual situations, the comments below highlight general trends in the way questions were answered by this cohort of candidates.

Some centres took this examination on paper copies. The question numbers quoted relate to the CBT version.

Comments on Individual Questions

1   A Good general introduction, most candidates were able to identify that glasshouses give plants better growing conditions. Weakest candidates erroneously chose the fact that glasshouses give plants more light.

2   Lawnmower design: Despite being similar to a previous question in a paper, a significant number of candidates were unable to identify the cylinder mower.

3   Reasons for a fuse: This was a topic not well understood. Higher grade candidates were able to identify the prevention of damage by excessive current flow.

4   Lawn seed types: Answered by all candidates, this required the application of knowledge to descriptions. Of these, the identification of ryegrass being the most hardwearing (and suitable for football) proving to be the most challenging. Surprisingly a number of candidates did not associate the situation under trees to be shady.

5   Stages of growing seeds: This question, putting the stages in order, showed differences in performance of different centres.

6   Properties of compost (common question). This concept proved difficult for many candidates. Soil based composts are noticeably heavier when wet, and not suited to hanging baskets.

7   Definition of 'perennial'. Still a concept not understood by many candidates, although there is evidence that it has been taught far more effectively in most centres.

8   Advantages of greenhouse frame types: The mark scheme allowed for a very generous interpretation of 'strength' and 'longevity'. Stronger candidates were credited for references related to light transmission (slimmer glazing bars), or the ability to form complex shapes. Candidates' knowledge of heat conductivity was not credited as often the issue is heat retention. (A common question with the higher tier paper.)

9 Hanging basket care: This question differentiated the level of knowledge candidates had on the topic. Responses receiving credit identified the need for appropriate temperature, monitoring of water levels and making observations to detect nutrient deficiencies. Credit was not given for generic comments. Responses such as 'water every day' or 'water day and night' were not credited as this is poor practice and could lead to over-watering.

10 hazards while carrying out a task: The question asked for three hazards and was not appreciated by some candidates who identified what the students in the picture should do. (A question common with the higher tier paper.)

11 Plant Breeding: An accessible question; any three characteristics of a plant that could be changed were given credit.

12 Christmas trees – weed control: Data response questions. Most candidates were able to identify 'mowing' as the cheapest treatment and could calculate the price difference between two techniques whilst using information from the table.

13 Reasons for choosing weed killer: This was only expressed well by higher performing candidates, namely that it is the most effective.

14 Damage to the trees: Credit was only given to candidates who could describe the damage that would occur, although wide ranging answers were allowed.

15 Cost of weed killer application: A more complex calculation requiring two stages of multiplication. Only higher grade candidates typically arrived at the correct answer. Units of currency were required (but both £ and p were accepted).

16 Garden centres v supermarkets: A common question with the higher tier paper. The responses showed a lack of understanding on the part of many candidates. Good candidates related their answers to the profitability or return on sales space at different times of year and the fact that garden centres are specialist retailers.

17 Replanting of long term crops: Numerous answers were possible and even variance in weather conditions allowed. Strong answers related reasons linked to nutrient use, pest and diseases in the soil and lack of plant vigour.

18 Care of an established shrub border: The question related to the care and maintenance of established shrubs. Good answers related to monitoring and action against weeds, nutrient deficiencies, pests and diseases plus routine pruning or dead-heading. Poor responses failed to give any detail or used generic phrases. It is not necessary to water an established shrub bed every day, and not normally practical to list shrubs and/ or replace soil. This final question on the paper gave good scope for candidates to use experiences from the practical tasks they have met during the course.

B492/02 Amenity Horticulture (Higher Tier)

General Comments

The B492 paper of the GCSE Environmental and Land-Based Science specification is an optional paper. This paper, based around amenity horticulture gives an applied focus to the scientific principles within this qualification, often looking at topics from a commercial context.

The paper consists of 36 marks; a mixture of multiple choice, short answer, calculations and longer response questions, giving candidates a range of opportunities to demonstrate what they know. A number of questions are common between the higher and foundation papers allowing for a comparison of performance for those achieving a C grade.

It is acknowledged by the examiner that the teaching coverage of the whole specification has improved during the life of this qualification with fewer examples of candidates being unable to provide answers on topics.

While it is acknowledged that there are numerous individual situations, the comments below highlight general trends in the way questions were answered by this cohort of candidates.

Some centres took this examination on paper copies. The question numbers quoted relate to the CBT version.

Comments on Individual Questions

1   Reasons for using turf: A relatively accessible starter question. Most candidates were able to identify the time saving element for this choice.

2   Reasons for a fuse: This was a topic not well understood. Higher grade candidates were able to identify the prevention of damage by excessive current flow.

3   Carbon dioxide enrichment: Most candidates were able to conclude that high light levels and the correct temperature were needed to make enrichment effective.

4   ICT use: Unlike previous papers most candidates were able to identify the human benefits of computer controlled environments; slightly less were able to identify the adherence to the blueprint.

5   Horticultural fleece: Aimed at D and C grades, this was well answered by most candidates. This type of fleece is designed to allow plants to grow underneath so will not stop weed growth.

6   Properties of compost (common question): This concept proved difficult for many candidates. Soil based composts are noticeably heavier when wet, and not suited to hanging baskets.

7   Propagation from runners: A poorly understood question although the strongest candidates were able to describe the process.

8   Advantages of greenhouse frame types: The mark scheme allowed for a very generous interpretation of 'strength' and 'longevity'. Stronger candidates were credited for references related to light transmission (slimmer glazing bars), or the ability to form complex shapes. Candidates' knowledge of heat conductivity was not credited as often the issue is heat retention. (A common question with the foundation tier paper.)

9   Peat based composts: The ethical and environmental issues relating to the use of peat were not well described by candidates. At this point in time alternatives are not clearly cheaper.

10   Hazards while carrying out a task: The question asked for three hazards and was not appreciated by some candidates who identified what the students in the picture should do. (A question common with the foundation tier paper.)

11   Choice of plants for site: good responses by most candidates demonstrating experience no doubt from discussions in practical sessions.

12   Christmas trees, weed control data response questions:

    1   Cost of weed killer application: A more complex calculation requiring two stages of multiplication, a good discriminating question. Units of currency were required (but both £ and p were accepted). (A common question with the foundation tier paper.)
    2   Reason for weed killer use: it was not widely identified that weeds would also affect the shape of the plant (which would be important to the quality of a Christmas tree).

13   Alternative weed killer: Higher performing candidates were able to identify the opportunity of using two chemicals to get the required spectrum of control.

14   Prediction of weed killer performance: This question required no knowledge of the chemical but an understanding of how to read trends. Some candidates erroneously looked for a changing trend within the chemical (i.e. down the column), whereas the answer lay in the effect on weeds of chemicals (i.e. along the row).

15   Garden centres v supermarkets: A common question with the foundation tier. The responses showed a lack of understanding on the part of many candidates. Good responses related their answers to the profitability or return on sales space at different times of year and the fact that garden centres are specialist retailers.

16   Risk assessment: A good discriminator question. Good candidates were able to articulate clearly the stages in a risk assessment, identifying hazards, assessment of risks, evaluation of current practice, implementation and future review.

17   Biological and chemical control: A well answered final question. Candidates seemed well briefed on the differences between the two methods, although many incorrectly assumed that biological control would be free. Management of conditions is more critical with biological control.

B493/01 Management of the Natural Environment (Foundation Tier)

General Comments

The overall response to this examination paper showed evidence of the excellent teaching going on in Centres.

All questions were attempted and the majority of answers were plausible even when not specific enough to gain full marks. Candidates appeared to follow instructions and there was no misinterpretation of questions. Data questions were well answered. There were some good responses to extended writing questions and good use of subject specific vocabulary. As with the examination in January 2011, the question about the nitrogen cycle proved to be the most challenging.

Advice for improving the performance of future candidates can be summarised as follows:

- Consider the structure of wording in answers to extended writing questions. Ensure the answer conveys the required meaning clearly and concisely. This can be done easily on the CBT version as the answer can be edited easily.
- In written questions, note the command words; suggest, describe and explain all require slightly different responses.

Comments on Individual Questions

Note: Individual question numbers are in some instances different on the CBT examination to the paper examination. The following questions are identified by the number on the CBT examination followed by the identifier on the paper examination.

1/1. A clear visual question to start the paper. Virtually all candidates gained one mark and the majority identified both correct answers.

2/2. Candidates showed excellent understanding of the term chemical weathering. The majority selected the correct answer of acid rain. There were very few incorrect answers although all distracters were chosen.

3/3. This was a well answered question with the majority of candidates demonstrating the ability to match the birds pictured to their correct written description.

4/4. Candidates scored very well on this question. A wide understanding of the terms used to describe organisms in a feeding relationship was seen.

5/5. Many candidates were able to identify the best description of an organically grown food. Distracters (a) and (b) were the most popular incorrect answers while distracter (d) was very seldom selected.

6.1/6(a) This was an overlap question that was, as expected, answered better by higher tier candidates. At foundation level the majority of candidates selected sand as the answer. Silt was the second most popular response while gravel, humus and the correct answer of clay were chosen by few candidates. This suggests that candidates were either not familiar with the particle size of soil components or not confident with the meaning of the terms clay and silt.

6.1/6(b)   The response to the second part of question 6 was much better than the first. More than half the respondents were able to correctly identify humus as the organic component of soil. Clay was the most commonly chosen distracter and sand the least selected.

7.1/7(a)   Many candidates were able to state that one type of pollution being made by the power station in the photograph was air pollution. Others correctly identified visual pollution as an alternative response. Some candidates failed to gain a mark as they tried to identify the pollutant rather than stating the type of pollution.

7.2/7(b)   More than half of respondents answered this question correctly although it was not as well answered as the first part of question seven. Noise pollution was the most popular response followed by visual and smell. As with part 1(a) some candidates tried to identify the pollutant or give the effect it could have on the environment rather than naming the type of pollution.

8/8.   This question was generally well answered. Most candidates were able to name two things that weeds and crops compete for. A few candidates missed the word 'other' in the stem of the question and gave light as an answer. Food was not given credit.

9.1/9(a)   In the answer to this question few candidates gave a clear and concise reason why crops were covered with polythene. Many cited the unqualified generality that they help plants to grow.

10/10.   To attain full marks candidates had to give valid reason(s) why soil in the limestone valley allows more plants to grow than sand in a dune. Many realised that soil nutrients and water retention were key factors. Unfortunately they were not all able to express this clearly enough to gain full marks. Sands lack of stability was credited as a worthy answer.

11/11.   Candidates gained one mark for saying that earthworms make burrows in soil. The second mark was for saying how the burrows improve soil. More than half the candidates succeeded in doing this. A number tried to expand the questions reference to humus by saying that earthworms improve soil fertility.

12.1/12(a)   This question gained fewer marks than expected as candidates found it difficult to select the fossil fuels from the pie chart. Common mistakes were the total for the three largest sectors on the pie chart and the total for coal only.

12.2/12(b)   Most candidates commented that coal will run out in the next twenty years. Some expanded this to explain that it was a finite resource.

13/12(c)   Candidates needed to give two correct responses to gain a mark for this question. Many were able to do so with solar and wind being the most popular answers.

14.1/13(a)   This data question required the identification of information from a simple list. Virtually all candidates gained a mark by identifying 1300 as the correct answer.

14.2/13(b)   To gain a mark for this question the candidates had to undertake the addition of a five digit number and a six digit number. Over three quarters of respondents carried this out successfully. Those who missed the mark tended to give the answer as the total for listed buildings or scheduled ancient monuments alone.

15/14(a)   Most candidates were able to use the table to identify the year in which the number of breeding pairs of red kite went down.

16/14(b)   The bar chart was completed correctly by many candidates. The few that failed to gain a mark did not complete all the bars, missing data for years 2000 and 2002. A few made the carless mistake of plotting one of the bars incorrectly.

17/14(c)   About half of the respondents were able to correctly estimate the number of breeding pairs of red kites in 1999.

18/15.   In this extended answer question, most candidates gained at least one mark for the comment that large powerful machines are faster than horses. Many received a second mark for explaining that machines could do more work. The third mark came from a variety of reasons often relating to the amount of manpower required. Costs less was not accepted as correct as large powerful machines are expensive to purchase and maintain.

19/16.   The answers to this food web question were generally quite good and many candidates attained full marks. It was pleasing to see the word 'competition' used in several answers. Some answers were long and muddled, the candidates had the right idea but found it difficult to convey clearly and concisely.

20/17.   This was an overlap question and the least well answered on both the foundation and higher level papers. Although most candidates attempted the question very few were able to gain even one mark. The common response was to reiterate the information on the diagram of the nitrogen cycle without adding any additional information to explain how nitrogen was converted into nitrates.

B493/02 Management of the Natural Environment (Higher Tier)

General Comments

There were only a small number of candidates entered for this exam. The majority of these were entered at the appropriate level. The overall response to this exam paper was very pleasing. Candidates attempted all questions with very few omissions. Objective questions were well interpreted and instructions were adhered to. As last year, responses to data questions were encouraging. Answers to the extended writing questions showed improvement in clarity and meaning. Sentence structure was generally better and there was some good use of subject specific vocabulary.

The CBT exam was particularly successful as there was no problem with legibility.

Advice for improving the performance of future candidates can be summarised as follows:

- On the CBT exam use the facility to edit to ensure that long answers convey the required meaning clearly and concisely.
- Improve understanding of the nitrogen cycle.

Comments on Individual Questions

Note: Individual question numbers are in some instances different on the CBT examination to the paper examination. The following questions are identified by the number on the CBT examination followed by the identifier on the paper examination.

1.1/1(a) The exam started with an overlap question. Higher tier candidates scored significantly better than foundation candidates. More than half of respondents were able to identify clay as the soil component with the smallest particles

1.2/1(b) Most candidates identified humus as the organic component of soil.

2/2. This question was well answered, suggesting candidates had a good understanding of how landscapes were formed. It also showed candidates' knowledge of some key scientific words. Virtually all respondents scored one mark by correctly identifying erosion as a physical factor that affects the formation of a landscape. Many also gained the second mark for choosing deposition as another factor.

3/3. This question tackled a part of the course that candidates do not always recall well, but in this series the majority of candidates scored full marks by identifying both activities that are allowed by open access legislation.

4/4. Most candidates scored highly indicating that they were familiar with the use of ICT. Most were able to select all three correct terms to complete the passage.

5/5. There were a high number of correct responses to this question suggesting that Centres had dealt effectively in the teaching of the beneficial effects of adding lime to soil. Most candidates scored one of the two available marks and many correctly identified both beneficial effects. The first distracter was seldom chosen.

6/6. This overlap question gained much better marks by candidates on the higher tier paper. A greater ability to construct a clearly articulated answer that addressed both marking points meant that many candidates gained full marks.

7.1/7(a) This question did not attract many good answers. Most candidates made brief reference to coal running out in the next twenty years.

7.2/7(b) Candidates showed an excellent understanding of energy generation methods by providing two energy sources not given on the pie chart. The popular answers were wind and solar, although there were examples of viable alternatives such as bio-mass and geothermal.

8.1/8(a) The answers to this question were very comprehensive. Candidates responded to the key word 'explain' and provided answers that could be awarded full marks. Many said that the caterpillar tracks distributed the tractors weight reducing its pressure on the ground. They went on to explain that this reduced the harmful effect of soil compaction.

9.1/9(a) This was a difficult question. Most candidates provided an answer and it was pleasing to see that the majority of these were plausible if not correct. About one third of respondents did provide a correct example of a grassland ecosystem.

9.2/9(b) Candidates made a good attempt at this question and provided a wide variety of answers. However, not all of these gained a mark as they did not directly answer the question; the main fault being that they described one of the habitats without reference to the other.

10/10. Most candidates provided a plausible answer to this question even if it was too vague to gain full marks. The main fault was a general reference to herbicides polluting waterways and killing wildlife without any qualification. A number of candidates incorrectly described eutrophication as a consequence of herbicide getting into waterways. Good answers talked about the effect of herbicide on aquatic plant life and the build up of concentration through trophic levels.

11/11. Answers to this question indicated that candidates had a good understanding of organic farming practice. There were some innovative answers along with the stock responses of biological control and crop rotation.

12/12(a) Completing the bar chart correctly was achieved by most candidates. A few lost the mark by omitting to draw the bars for years 2000 and 2002.

13.1/12(b) Most candidates were able to correctly estimate the number of breeding pairs in 1999.

13.2/12(c) Over half of respondents correctly calculated the average number of chicks per breeding pair. A number made the mistake of dividing the total number of chicks by the number of years to get an average of eighteen. This is an example of where candidates could have benefited from checking their answer. By taking a little time to consider the answer they would have realised that eighteen was incorrect.

14.1/13(a) This question was answered well indicating that Centres have taken the time to school students in the calculation of pay-back time. Over half of all candidates correctly responded by calculating the payback time as 26 years.

14.2/13(b) Most candidates provided an answer to this difficult question aimed at grade A. Over a third of respondents managed to calculate the correct answer.

15/14. This data question was also attempted by virtually all candidates. Most answers were plausible and again over a third of respondents calculated the correct percentage.

16/15. In this extended writing question, candidates were asked to describe three ways in which nitrates become available to plants. Responses were generally poor making it the least well answered question on this year's paper. Most answers were a reiteration of the diagram without any additional information being supplied to explain the processes. Very few candidates achieved all three marks.

17/16. Answers to this question indicate that risk assessment is being taught well in many Centres. Candidates showed a good understanding of risk management and provided a variety of worthy answers.

18/17. The final question elicited some good responses. Most candidates tried to give three distinct answers and explain why each of these could result in a decline in bird numbers. Answers were generally well presented and well articulated. Many candidates identified that removing hedges reduces available habitats and the use of pesticides reduces availability of food. It can also cause harm by building up in food.

B494/01 Care of Animals (Foundation Tier)

General Comments

As in previous exam series, the questions were organised in the paper by type – objective, short answer, data and extended writing. The questions within each section were arranged with an increasing level of difficulty.

The candidates' overall performance did not vary significantly from last year but there was evidence that more science is being included in the teaching of the option.

Candidates do need to respond to the command word of a question; explain requires an explanation, list requires a list while describe requires descriptions, not one word answers.

Candidates dealt with the data questions well. This is particularly commendable as these questions are often set in unfamiliar situations. It is pleasing to note that this does not put off the weaker candidates from attempting an answer.

There were some good responses in the final questions that required extended writing, especially in Q20 when the candidates could use their practical experience to advantage.

The new specification places more emphasis on extended writing and candidates should be encouraged to continue to develop their writing skills.

Comments on Individual Questions

1   A straight forward question to start the paper. The correct answer was C, the plastic box with air holes, which most candidates got correct. All the other options provided chances for the rat to escape.

2   Another straight forward question with good visual clues. The majority of candidates rightly chose C, the mirror and bell.

3   When handling pets both the handler and pet must feel safe and secure. Only option C satisfied this criterion. The bird and spider could have easily escaped and the rabbit, although secure, was handled without gloves and held too close to the handler's face so any infections could be transmitted.

4   This question tested knowledge of nutrition and diet – basic biology which non-scientists found quite testing. Energy was the right answer. Growth was a strong distracter.

5   An encouraging number of candidates correctly identified B, the gizzard, as the part of the bird's digestive system where grit aids digestion. The crop, A, was a commonly selected distracter.

6   A novel question type that required candidates to use a key to select an appropriate pet for an elderly person living in a town flat. The questions if answered on the given evidence led to the miniature poodle. A surprising number of candidates got it wrong, many suggested fox terrier and some dogs that were not in the key.

7   The negative stem of this question did not confuse most candidates so D, worms, was the correct common choice.

8   Fish have not been a frequent topic in past examinations and perhaps not surprisingly correct responses to this question were low. Placing a fish tank near a window is not a good idea as it would soon 'green up' with algae and be prone to temperature fluctuation. Painting the back of the tank black would help over come the effect of light, while polythene plants and a polystyrene mat for the aquarium were neutral distracters.

9   This was a common question straight from the standard demand specification and candidates scored well.

10   This was also a common question straight from the standard demand specification but from a section that many candidates find difficult. Candidates find precise definitions and examples of concentrate and succulent foods difficult to recall. The answer expected was B, high in protein and high in water content.

11   By contrast the routine health checks for animals is well known by candidates. The chicken shown clearly had an overgrown beak. A wide range of checks on birds were credited on the mark scheme.

12   Not all candidates have the practical experience of taking small animals to show but the knowledge that correct markings, conformation to type and fitness are important in show animals was sufficient to gain the marks in this question.

13   The reasons for including a wheel in a mouse cage are for exercise and to prevent boredom. The mark scheme allowed for many ways of expressing the latter: for enrichment, keep mouse occupied, for entertainment, fun and play were some of the statements that gained the mark.

14   The advantages of using a bottle rather than a bowl for providing small animals with water were well known. The fact that there is no contamination with bedding or waste, and that there is no chance of spillage were the common responses. That the bottle saves space in the cage was allowed. That there is less chance of drowning was not.

15   A common question with the higher tier paper. The specification states that candidates should have knowledge that animals are used for hunting. It is expected that this would be supported by some examples. Any named hound or terrier was allowed together with other dogs used in hunting. Shooting, as indicated in the stem, is a separate activity from hunting; thus pointers and retrievers were not credited, nor were Pit Bulls and Alsatians, which were often given.

16   A common question set at C/D level on straightforward facts but one that was prompted by an unusual approach that required reference only to the mouth. The mouth is where food enters, within it are teeth that might cut food from a source and break it up into smaller pieces. The tongue and saliva aid swallowing and the saliva also starts the process of starch digestion with enzymes. The mouth does have other functions such as breathing, fighting and cleaning but these were not credited as the stem clearly prompted digestion. Storage and the tasting or sampling of food did gain marks.

17/18   Two questions that required candidates to extract data, firstly from a pie chart and then a table. This they did well.

19   This was a common data response question. Data response questions often ask for conclusions to be made from data but this question, in two parts, specifically asked for one trend and a pattern to be given. Many candidates clearly did not understand the meaning of 'trend'. A trend is a change over time so the answer,' the slow increase of the numbers of procedures using mice over the seven years' gained the mark. A comment about the trend in rats and fish also gained credit. Candidates found a pattern easier to identify usually citing the increase in procedures with fish finally overtaking the slowly declining procedures using rats.

20   Candidates responded well to this question. It was evident from the answers that many had practical experience of handling small animals. Explanations had to include at least a hazard to the animal and one to the handler. Hazards to the animal include injury, and stress. Hazards to the handler include being bitten, scratched or being infected by a disease.

21   There were some interesting responses to this question. To gain a mark both the risk and how the risk might be overcome were needed. Thus: 'travelling to show might cause injury so transport in a secure travelling box', 'noise and other dogs might cause stress at the show so make sure the dog is properly trained' or 'washing and grooming the animal might cause stress so be gentle and use warm water and correct combs and brushes'. A common risk to animals at show is the catching of infections from other animals but this was rarely mentioned. Isolation after the show and vaccination are ways of controlling this risk.

22   The responses to this common question were good. Only weak candidates gave over-eating as a reason for being overweight (the question asked for other reasons). The other reasons are a medical problem, an inherited defect in digestion or physiology, the provision of a poor diet – wrong type of food or too much of one food and not enough of another and finally the most likely cause, and the one most mentioned, a lack of exercise.

B494/02 Care of Animals (Higher Tier)

General Comments

The questions were organised in the paper by type – objective, short answer, data and extended writing. The questions within each section were arranged with an increasing level of difficulty.

The responses to both the objective and short answer questions were good. No particular question posed a common problem to candidates. Q6 and Q12 on diet showed a lack of knowledge which would be considered basic in a biology paper.

Candidates dealt with the data questions well. Data questions are often set in unfamiliar situations and it is encouraging that this does not put off candidates from attempting an answer.

There were some very good responses in the final questions that required extended writing. The new specification places more emphasis on extended writing and candidates should be encouraged to continue to develop their writing skills. When asked to comment upon or discuss in long answers, candidates must include information to back up their ideas. When explanations are required, as in Q18, these must relate the cause and effect.

Comments on Individual Questions

1   A common question, straight from the standard demand specification on which candidates scored well.

2   This was also a common question straight from the standard demand specification but it is a section that many candidates find difficult. Candidates find precise definitions and examples of concentrate and succulent foods difficult to recall. The answer expected was B, high in protein and high in water content.

3   The transport of livestock is a recognised welfare issue and, on the evidence of the number of correct answers, one that is well covered in centres. The transporting box lacked holes in the lid, option A.

4   An encouraging number of candidates selected B as the ideal temperature at which to maintain the goldfish tank. It is important that candidates have some concept of what different ranges of temperatures mean – thus 5°C is near to freezing and 30°C a temperature reached only on the very hottest of days in the UK.

5   This question required knowledge of reproduction and the ability to accurately interpret statements. Some of the statements given were true for some small mammals and birds but not for all of them. There were three true statements: A; courtship stimulates mating; D males have a penis; and F, fertilisation is internal.

6   The study of vitamins in diet is part of basic biology but this question scored below the average for the paper and showed a negative co-relation to the final grade. B, night blindness was the correct answer. A, anaemia was the main distracter.

7   A novel style of question that tested different parts of the specification within one animal feature – the leg of birds. Candidates responded well to the question, most scoring 2 marks. The least well known leg condition was that crusty scales are the result of mites. The extra toe is most likely to be a mutation and the long leg the result of selective breeding. The curved toe could result from an injury or growth fault.

8   A common question based on the foundation specification which states that candidates should have knowledge that animals are selected for different purposes. One purpose given in low demand is hunting. It is expected that this would be supported by some examples. Any named hound or terrier was allowed together with other dogs used in hunting. Shooting, as indicated in the stem of the question, is a separate activity from hunting, thus pointers and retrievers were not credited. Nor were Pit Bulls and Alsatians, which were often given.

9   Another common question set at C/D level on straightforward facts but one that was prompted by an unusual approach as it only required reference to the mouth. The mouth is where food enters, within it are teeth that might cut food from a source and break it up into smaller pieces. The tongue and saliva both aid swallowing and the saliva also begins the process of starch digestion with enzymes. The mouth does have other functions such as breathing, fighting and cleaning but these were not credited as the stem clearly prompted digestion. Storage and the tasting or sampling of food did gain marks.

10   The first part of this question asked for suitable records that should be kept by breeders. 'Breeders' was a key word so expected answers concerned breeding details such as date of mating, numbers of offspring, quality of offspring and pedigree details as well as health records such as diseases had and vaccinations. Prizes at show and distinguishing features were also allowed. Some candidates lost marks by repeating details already given on the record card. Part (b) required an explanation as to why ICT was advantageous for record keeping. Answers needed to be specific and detailed, thus safer and easier were not credited. Easier to update or easier to search and send to others were common responses that were awarded marks.

11   Coprophagy is not a specification topic but with the information given in the question it was hoped that candidates would use their own knowledge of digestion to give an explanation for the rabbit eating their soft faeces. The reason, to maximise their fibrous diet, was well appreciated; the explanation less so. The candidates needed to indicate that bacteria digest cellulose in the caecum and that the products of this digestion are not absorbed in the end gut to get the second mark.

12   This question was the least well answered in the paper. Possibly candidates who had kept birds were better able to give the correct answer, a lack of calcium. However, the importance of calcium in the diet of animals is explicitly stated on the specification.

13   Part **(a)** of the question required candidates to realise that moving animals made accurate measuring of their mass difficult. In part **(b)** suggestions were needed for further improving the accuracy and reliability of weighing. Repeat weighing was a common answer. Using a digital balance or using a balance with more scale divisions also gained credit.

14   This was a common data response question. Data response questions often ask for conclusions to be made from data but this question, in two parts, specifically asked for one trend and a pattern to be given. Many candidates clearly did not understand the meaning of 'trend'. A trend is a change over time so the answer,' the slow increase of the numbers of procedures using mice over the seven years' gained the mark. A comment about the trend in rats and fish also gained credit. Candidates found a pattern easier to identify usually citing the increase in procedures with fish finally overtaking the slowly declining procedures using rats.

15   The first part of this data response question required candidates to extract data from a table. The second part asked candidates to estimate a percentage from raw figures – a useful skill to develop. Both parts discriminated well.

16   Most candidates suggested the pie chart best represented the data given. However, reasons were limited to such comments as, 'it is easier to see' or 'the percentages are clearer'. The data given was of separate percentages not continuous data. So the pie chart was the most appropriate (a bar chart using separate columns could also be used). Histograms or line graphs are used to show continuous data on the x axis.

17   The responses to this common question were good. Only weak candidates gave over-eating as a reason for being overweight (the question asked for other reasons). The other reasons are a medical problem, an inherited defect in digestion or physiology, the provision of a poor diet – wrong type of food or too much of one food and not enough of another and finally the most likely cause, and the one most mentioned, a lack of exercise.

18   The question required candidates to provide an explanation why poorly ventilated animal houses led to an increase in disease. Three marks were available so a full explanation of cause and effect was needed. Without ventilation the heat and water released from animals increases the humidity which provides the ideal breeding ground for pathogens. Once infection has occurred it builds up in the absence of ventilation and so spreads from animal to animal. Not many candidates scored full marks.

19   Any question requiring definitions must be carefully explained so there is no ambiguity. Many answers were expressed in general terms so failed to distinguish clearly between line breeding and inbreeding. Line breeding is the mating of animals of the same breed that are not very closely related, for example cousins. In breeding is breeding within the close family for example brother and sister or father and daughter. Answers indicated that there is confusion about the meaning of the terms, 'species' and 'breeds'.

B495/01 Livestock Husbandry (Foundation Tier)

Candidates were able to use a good range of practical experience when answering this paper. Candidates entered for the higher tier performed particularly well.

One area of weakness that centres could work on is in answering questions which require an understanding of basic scientific method. Questions requiring this skill have been set on many occasions but candidates performed particularly poorly on this question this series.

Fewer candidates were entered for the wrong tier.

Foundation Tier

1   A few candidates gave the Hereford (A) as their answer but otherwise most candidates correctly identified the Belgian Blue as the modern beef breed.

2   Some very good answers although a significant number of candidates ignored the fact that this was a dairy cow and gave very general answers relating to size etc.

3   Very well answered.

4   No issues.

5   Most candidates recognised that this was a definition of genotype although a few confused this with phenotype.

6   Poorly answered with many candidates giving examples of concentrates as a bulk feed.

7   Many candidates failed to score any of the available marks here. Mastitis and lice were the most well-known with many thinking ringworm was a worm rather than a fungus.

8   Most candidates were aware of the link between badgers and TB. Mastitis was the most common incorrect answer.

9   No issues.

10 Several candidates focussed on the piglets rather than the sow or referred to weight gain without linking to healthy development of the piglets.

11 No issues; candidates are familiar with this style of question.

12 Some really detailed answers to this question for a good range of livestock.

13 The freezing of sperm in liquid nitrogen was well known. Very few candidates were aware that diluting the sperm many more cows can be inseminated from a single bull's ejaculation.

14 Some very good suggestions; specifically the security of the building for pigs and being draughty or too hot in summer.

    (a) No issues.

    (b) Candidates frequently gave the answer as a percentage rather than as a number.

16 **(a)** Only the weakest candidates failed to read the graph correctly.

(b) Weaker candidates tended to talk about the shape of the graph rather than what the graph was showing about the relationship between colostrum and lamb mortality.

17 **(a)** No issues.

(b) Not well answered; some careless reading of the graph even with a +/- 10 allowance.

18 Very few candidates achieved maximum marks, although, this style of question has been used many times before. Candidates appear not to be able to suggest or understand the concept of using controls in an investigation which would have given them a number of marks.

19 No issues.

B495/02 Livestock Husbandry (Higher Tier)

Candidates were able to use a good range of practical experience when answering this paper. Candidates entered for the higher tier performed particularly well.

One area of weakness that centres could work on is in answering questions which require an understanding of basic scientific method. Questions requiring this skill have been set on many occasions but candidates performed particularly poorly on this question this series.

Fewer candidates were entered for the wrong tier.

Higher Tier

1   Well answered; the most common error was to suggest C, the problem being in this photograph was that the halter was hanging loose.

2   Very well answered; the most common mistake was to put AI before super ovulation.

3   Most candidates were aware of the link between TB and badgers.

4   No issues.

5   Well answered.

6   Higher candidates had few problems with this question.

7   Similar problems to those identified on the foundation paper.

8   Some candidates gave problems such as disease spreading, without saying what it was about the environment that encouraged this.

9   The needs of the sow were well understood but fewer candidates went on to discuss the need to regulate the boar's feed to prevent him getting too fat.

10   **(a)**   Many candidates talked about weight and feed without relating this to the breeding sow. Many candidates gave dates of serving litter size and health records as sensible suggestions.

 (b)   Automatic food supply and temperature control were the most commonly given answers. Some candidates talked about the use of ICT in scanning and controlling light in poultry houses. The most common error was to give examples such as recording data rather than suggesting replacements for tasks that would normally be carried out manually.

11   Many candidates gave 'hybrid' rather than 'hybrid vigour' as their answer.

12   Common question as foundation Q13.

13   Some careless reading of the graph.

14   Generally well answered although a few candidates missed the mark for part **(b)** by suggesting Estradiol increased throughout the pregnancy rather than after weeks 17/18 as shown on the graph.

15   Some confusion between 'extensive' and 'intensive' but those candidates who realised that this was a question about the problems of extensive pig rearing, gave good answers. The most common reason given was the increased likelihood of sows crushing their piglets in extensive systems.

16   **(a)**   Some suggestions of how the farmer might hurt himself without suggesting how to minimise the risk, or suggestions about wearing items of PPE without stating how they made the task safer.

   (b)   Candidates answers were frequently limited to the need for passports and ear tags or gave too general answers such as having the correct paperwork or "safe" trailer. Better candidates realised this was a long journey with increased restrictions such as the need for suitably qualified drivers.

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

For staff training purposes and as part of our quality assurance
programme your call may be recorded or monitored