Agricultural and Horticultural Science

2011 Assessment Report

Government of South Australia

SACE Board of SA

AGRICULTURAL AND HORTICULTURAL SCIENCE

2011 ASSESSMENT REPORT

OVERVIEW

Assessment reports give an overview of how students performed in their school and external assessments in relation to the learning requirements, assessment design criteria, and performance standards set out in the relevant subject outline. They provide information and advice regarding the assessment types, the application of the performance standards in school and external assessments, the quality of student performance, and any relevant statistical information.

GENERAL COMMENTS

Marks, particularly in the examination, tended to be slightly higher this year, suggesting that students and their teachers considered the concerns raised in last year's assessment report and addressed them. In the examination a higher proportion of students gained over 50% of available marks, with even the lowest-scoring student substantially higher than last year. Particularly in the investigation, student work on average was considered to be of a higher standard than in previous years. Even with a smaller cohort of students completing the subject this year, there continue to be examples of excellence throughout the work presented, which reflects the vast range of student experiences, enthusiasm, and commitment to achieve at a high level.

SCHOOL ASSESSMENT

Assessment Type 1: Investigation

The investigation is the prime opportunity for students to demonstrate their learning of the key concepts and understandings of Topic 1: Experimental Design. As is usual for this subject, students generally chose investigation topics that linked directly to production issues. The majority of students presented their work in the traditional scientific report format, and carried out their research in a competent manner. Most students were able to develop their research question, collect data, and then satisfactorily analyse it and draw some meaningful conclusions. Several students struggled with discussing their results and observations, with some omitting this vital aspect of a scientific investigation. Teachers may need to stress to students the importance of this aspect of research, and provide guidance about the best way in which to present and interpret experimental data that has been collected. A reminder for students is to link their research findings back to their original hypothesis. Students should be directed to reflect on what their results indicate in light of their original hypothesis, which will in turn enable them to address the issue of making feasible recommendations. Some students need extra guidance in ways to adequately demonstrate this.

In addition, it was noted that this year the standard of referencing was lower than in previous years. Students, with guidance from their teachers, are encouraged to reference in a consistent manner, utilising appropriate sources of information. It does

seem a little unlikely that, for experimental investigations as detailed and intricate as many carried out, no external sources of information were utilised.

In the moderation samples provided this year, there was no evidence of any breaches of animal ethics. Both students and teachers are reminded of the need to carry out any animal investigations in an appropriate manner and are referred to the 'Ethical Study and Research' section near the front of the subject outline.

Assessment Type 2: Skills and Applications Tasks

Work submitted generally consisted of eight assessment activities, being in the main four tests and four practicals. Some essays were submitted. Several teachers still need to update tasks used in previous years to reflect the learning requirements and assessment design criteria from the current subject outline. Practicals ranged across the topics and often reflected the facilities available to students and schools. As with last year, it was felt that some of the practicals tended to be at the lower end of a Stage 2 standard, although they had been marked appropriately. Students in most cases had opportunity to demonstrate their ability in respect of all of the assessment design criteria, though teachers need to ensure that the assessment tasks allow for all criteria to be covered and demonstrated across the range of grades.

With the change to the use of the performance standards, teachers need to ensure that they map learning to the assessment design criteria. In at least two cases, teachers had not altered tasks to meet the new criteria, putting their students at a disadvantage when their work was moderated. Of concern this year was evidence of teachers getting students to complete work that appeared to be a 'double up' of tasks; for example, a test was very similar in nature to a practical activity. Teachers are encouraged to ensure that each assessment task is indeed different from others to provide a valid assessment across the full range of student learning.

When setting their tests, many teachers use the process of including past exam questions. This is useful because such questions have been determined to be at an appropriate Stage 2 standard. When teachers choose to create their own questions, they should aim to include a range of questions at varying levels from recall through to analysis and evaluation to enable all students to appropriately demonstrate their understanding and knowledge. Several tests moderated this year, as with the practicals, tended to be more at the lower end of a Stage 2 standard. This potentially disadvantages students as they may be unable to demonstrate achieving the higher levels in the performance standards.

EXTERNAL ASSESSMENT

Assessment Type 3: Examination

This year 57 examination papers were marked, which is down 60 on last year, a decrease of just over 50% — no doubt in part due to the change in SACE requirements from five subjects to four. The range of examination marks was from 21 to 114 out of a possible 120 marks. The mean score for the examination this year was again slightly increased to 55.9%.

Part 1: Short-answer Questions (Questions 1 to 12)

As in all years, the examination setters aimed to produce questions that vary in difficulty from easy knowledge through to difficult knowledge and problem-solving. This variation in question difficulty is reflected in the range of the question mean marks, as listed in the following table.

Question	Mean Mark	Maximum Mark	Mean Mark (%)
1	8.56	15	57.01
2	9.16	14	65.4
3	6.30	8	78.7
4	4.40	9	48.9
5	4.40	9	48.9
6	4.63	6	77.2
7	4.21	6	70.2
8	5.32	7	76.9
9	3.05	4	76.3
10	3.56	6	59.4
11	4.33	10	43.3
12	4.46	6	74.3

This year there were fewer stand-alone questions. The reduced number of questions generally had a greater number of parts linked and flowing from one to another.

It remains disappointing to see low marks in questions where all that is required for students is to know the definition of agricultural terminology presented in the subject outline. Students must ensure that they cover as a very minimum in their studies the agricultural terminology of the key concepts and understanding of the five topics.

In the examination, the encouragement remains, as in previous years, for students to read the question carefully before answering, so that their responses are relevant. Where diagrams or other stimulus materials are provided, these should be considered carefully to aid in answering the question. It was noted that too often students ignored information presented that would have aided their answers, either directly or as a memory aid in other questions of the paper.

Question 1

Part (a) was generally well answered, as was part (b)(i); however, few students were able to correctly answer part (b)(ii) by referring to chemical or enzyme-based digestion as occurs in the abomasum. Part (c)(i) tended to be only answered to an average standard, with students forgetting that ruminant digestion takes place in a series of steps. Likewise with part (c)(ii), many students forgot the role of the microbes in breaking down cellulose. The remaining parts of the question tended to be answered in a satisfactory manner.

Question 2

This question was generally well answered by the majority of students, although part (c) was poorly answered, indicating a lack of specific knowledge of the hormones utilised in artificial insemination programs. Part (g) was responded to in only an average manner, with many students not clear in their description of an oestrous cycle. Students needed to identify either the specific stages of the cycle or

at least that the female goes through both a sexually active and non-active period. Some students need reminding that *oestrus* (or heat) is not the same as the *oestrous cycle*.

Question 3

This question had the highest mean percentage for the examination paper. Students answered the question in a very competent manner, clearly demonstrating their knowledge of agricultural plants.

Question 4

This question had the joint second-lowest mean percentage of the exam. It required interpreting a graph and thinking about the potential applications of the information provided linked with other knowledge held. Part (a) was generally well answered, with parts (b) and (c) answered satisfactorily based on reading directly from the graph. In part (d), a few too many students misinterpreted 'application' as meaning 'technique' (for example, spraying) rather than 'use' (for example, fruit thinning). Part (e) was particularly poorly answered, with many students unable to apply their knowledge to a different set of circumstances; that is, at a high concentration, inhibition of shoots allows auxins to be utilised as a herbicide and thus, by killing competing weeds, soil nutrients will reman available for the crop to use.

Question 5

This question also had the joint second-lowest mean percentage of the exam. Students tended to struggle to identify basic plant anatomical features in the root as requested in part (a), and similarly struggled with the functions in part (b). Part (c) was poorly answered in general, but where students had incorrectly identified component B in part (a), credit was given if they now gave the correct materials transported. Explaining the two plant processes in part (d) was mostly answered satisfactorily, but few students were able to go on and achieve full marks by referring to the role of roots in the processes. The responses suggest that students need to spend more time on the plant anatomy section rather than just concentrating on the leaf.

Question 6

This question had the second-highest mean mark percentage of the exam. It was generally well answered by the majority of students. Some repetition of answers occurred in part (b), ignoring the instruction for *two* practices.

Question 7

The only drawing question of the paper in part (a) was poorly done by a majority of students. The diagrams tended to be inaccurate and showed a range of features other than the main ones of three body segments, six legs, and antennae. It was noted that *three* main differentiating features were often not identified. Part (b) was well answered.

Question 8

Only average knowledge of the invertebrate group platyhelminth (cestode was also correct) was demonstrated by the students in part (a), and this was reflected in poorer responses to part (b)(ii) than part (b)(i). Part (c) was generally well responded

to by a majority of students, but again some students did not read the question carefully and provided the same type of control method (chemical) for each invertebrate, rather than a *different* method for each.

Question 9

This was a question that tended to have poorer answers in part (a). Part (b) was generally well answered by a majority of students.

Question 10

Most students replied to part (a) using the terms 'acidity' or 'alkalinity', which in itself does not really address the question. Better students were able to give either the correct chemical formula, or at least mention the hydrogen/hydronium ion. In the absence of either of these responses, students needed to identify something about the acidity/alkalinity to *explain* it, such as a measure on a scale of 0 to 14. Most students were able to discuss nutrient availability linked to the soil pH in part (b) and finished off well in part (c), justifying the use of lime and increased surface area in contact with the soil following incorporation.

Question 11

This question had the lowest mean percentage for the examination paper. Part (a) was very poorly completed. Only a few students were able to identify one of the three steps, namely oxidation, mineralisation, or humification, and a majority of these students could not then go on to explain the process. Part (b) was generally completed satisfactorily. In part (c), students had difficulty in demonstrating the difference between infiltration and percolation, while in part (d) this year students struggled to appropriately explain the link between organic matter, cation exchange capacity and soil fertility.

Question 12

The majority of students answered this question satisfactorily.

Part 2 Extended-response Questions (Questions 13 and 14)

Each extended-response question is marked out of 20, with 16 marks being allocated for content and 4 marks for communication. In awarding a communication mark the following factors were taken into account:

- clarity and expression
- organisation and relevance
- correct use of agricultural and horticultural terminology.

Student answers to the extended-response questions were on average of a better standard this year than last, being the second year running showing improvement. However, it was noted that in many cases answers tended to be overly general rather than directly addressing the specific dot point being considered. Basic grammar and correct spelling of agricultural terms is an aspect that still needs to be further addressed by students. Agricultural and Horticultural Science does not penalise students for incorrect spelling of subject terminology, but this may need to be introduced in future years to ensure that students do give consideration to this aspect of their learning.

As with previous years, it remains imperative that, prior to the examination, students have as much practice as possible at writing this style of response from past papers, to address both writing style, and content knowledge and understanding. Students should be able to fully answer an extended-response question in about two to three pages of succinct writing. It is unnecessary for students to rewrite the question or to provide an introduction to their response. Both of these practices are time-wasting and receive no credit. Where possible if time allows, students should take the trouble to proofread their responses for clarity and completeness.

Question 13 was marked for 36 students, with a mean mark of 12.69, while 21 students attempted Question 14, with a mean mark of 12.90. Pleasingly, all students did at least attempt an extended-response question this year, with the lowest mark being 2 and the highest 19. Where students feel that they are short on time or lack the confidence to answer the given question, they are strongly encouraged to put down a set of relevant dot points which may gain them some marks for content only.

Question 13

More students (63% of the group) chose this extended-response question, perhaps feeling that it was the easier of the two, with the question focusing on aspects of crop production. The question was slightly broader and provided good opportunity for students who knew their work well to demonstrate their learning. Some students tended to use incorrect agricultural terminology in many situations. Where examples were given, too often the follow-up explanation was lacking in detail or non-existent. It was noted that often students gave responses that did not consider the information provided regarding a wet year. As a result, many answers that were right per se could not be awarded full marks as they were not appropriate to the specific situation asked for.

Generally, the first two dot points were addressed satisfactorily, but the third and fourth dot points tended to be less well done. Too many students did not take the hint of the macronutrient deficiency linked to a sandy loam. Additionally, it was evident that many students have forgotten the difference between macronutrients and micronutrients, with many examples given of micronutrient deficiencies. Many students found it hard to link the concept of the purpose of plant breeding programs with future possible variations in climate and industry requirements.

Question 14

Fewer students (37% of the group) chose this extended-response question, and of those that did, the marks tended proportionally to be better, reflected in the higher average mark. Marks for communication for this question tended to be slightly better than for Question 13. Better students read the question closely and provided succinct answers without duplicating their responses to another dot point.

Students tended to answer the first and third dot points well, but struggled with the issue of excess rainfall and its effect on livestock production. A smaller number of students than expected were able to describe the deficiency symptoms of a mineral, with most opting for vitamin deficiency. Many chose vitamin D and attempted to link this to overcast conditions. While the linkage was not completely correct, most who used this deficiency were able to correctly identify the symptoms and so gained the appropriate marks. As with Question 13, many students found it hard to discuss how breeding programs would assist with meeting future variations in climate and industry requirements.

OPERATIONAL ADVICE

Some of the operational points related to the teaching and learning of the subject have been referred to specifically above. In addition, teachers are recommended to refer not only to the subject outline, but also to the subject-specific pages of the learning area manual for additional guidance.

It was evident at moderation this year that a number of teachers had accidentally referred to the requirements of Agriculture and Horticulture subject for the investigation. When seeking information, teachers need to double-check the subject heading that the material is being drawn from.

As the moderation process has changed slightly, it is now requested that student work is bundled by assessment type, rather than by student. This will aid the moderators in their task. The inclusion of the approved learning and assessment plan (plus any addendums) should be included with work sent for moderation, and, vitally, a copy of task cover sheets should be attached to all student work.

To gain ideas to expand the opportunities made available to students in their learning, teachers are recommended to look at the exemplars and other support materials on the SACE website.

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