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Nutrition

2016 Chief Assessor’s Report

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## Overview

Chief Assessors’ 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.

## School Assessment

As in past years, most teachers made use of the support material available on the SACE website. Teachers are advised to refer to the subject outline released by the SACE Board at the beginning of each school year and, if needed, update their learning and assessment plans.

Teachers are reminded that the issues investigation (within the investigations folio) is the only task for which there is a word-count requirement (maximum of 1500 words).

Assessment Type 1: Investigations Folio

For a 20-credit subject, students conduct at least three practical investigations with practical reports, and one issues investigation.

**Practical Investigations**

Teachers should encourage students to not only construct a relevant prediction, but also to provide some justification for it in the form of background information that is linked to nutrition. Often, the precursor to a prediction is an issue, question, or problem that might ask what is happening or why something is happening. Placing the issue, question, or problem in a nutritional context in an introduction provides scope later in the discussion for students to link their investigation findings or results to the broader nutritional context, thereby giving them an opportunity to demonstrate achievement at higher levels across the specific features being assessed.

**The more successful responses**

* Provided clear links between nutritional theory and the investigation being carried out (demonstrating their knowledge and understanding of nutritional theory), and used nutritional theory to connect to the aims and outcomes of investigations through all parts of their reports.
* Provided effective analysis and evaluation of the data from the investigations and applied nutritional knowledge to formulate relevant conclusions, as well as suggest improvements and reflect on errors.
* Included a justified hypothesis, detailed information on how variables that *should* be controlled *would* be controlled and why this was necessary, what type of data would be suitable, how it would be collected, and how the data would be analysed and used to validate or falsify the hypothesis.
* Provided sufficient detail to allow replication, and also ensured use of repeated measurements to improve reliability and validity.
* Made use of tables or subheadings to evaluate sources of systematic and random errors, with clear explanation of why something was problematic and with suggested improvements.
* Were in response to tasks other than simple experiments (such as observational studies or case studies); these more complex tasks gave students the opportunity to demonstrate significant understanding of relationships between key ideas, such as the links between diet and health.
* Had a prediction that underpinned the investigation in the form of a formal research hypothesis, a clarifying statement, or a specific question — an important part of the scientific process is the ability to formulate a relevant prediction.
* Displayed relevant findings of investigations in the results section of their reports, accompanied by brief statements of the main patterns and trends in the data.
* Used the discussion section to interpret the investigation findings and evaluate procedures (with suggestions for a range of appropriate improvements), and provide a brief conclusion about the evidence presented.

**The less successful responses**

* Had not received feedback from the teacher at the design-proposal stage to identify issues with the hypothesis, and whether or not any data generated could be used to address the hypothesis.
* Were often the result of beginning with a poor hypothesis.
* Showed evidence that students struggled with connecting the practical results to ‘why’ they may have occurred — in many cases students repeated what had been written in the results section.
* Omitted to clearly address all aspects of evaluation, including random and systematic errors, and improvements specifically connected to the practical undertaken and the results that were found.
* Had designs that lacked sufficient detail.
* Placed summary data tables and graphs in appendices — raw data should not be included in the results section of a report; if it must be included, it should be placed in an appendix.
* Had limited analysis of information, often comprising little more than restating findings, and limited evaluation of procedures or justification of suggested improvements.
* Often failed to explain why a procedure was flawed or how a suggested change would improve the outcome.
* Avoided discussing the two key concepts of the reliability of data and the validity of measures taken.

**General information**

Design proposals that have been assessed should be submitted for moderation along with the final report. The inclusion of evidence demonstrating students’ design of the practical helped in the moderation of their work.

Teachers are encouraged to provide evidence to support assessment decisions for specific features I1 (design), I3 (laboratory performance), and A3 (collaboration). Many teachers chose to combine assessment of I1 and A3 within one practical. When this is done, teachers need to provide opportunities for students to submit independently generated designs for assessment; collaboration can then be used as a strategy to refine a chosen design and undertake data collection. Evidence that supports student achievement for A3 and for I3 could be in the form of a grid reflecting the key features of A3 and I3. Teachers can use this to record their observations of student performance. Self-assessment and/or peer assessment are also useful ways to provide evidence of performance.

The specific feature I1 was often generously assessed.

Teachers are encouraged to continue to develop clear and informative task sheets that encourage students to use the discussion section of reports to explain findings of investigations in a nutritional context, and to consider sources of error, validity, and reliability to allow achievement at higher levels against the performance standards.

When teachers specified a low word-limit for practical reports, this impacted on students’ ability to show evidence of their learning for analysis and evaluation. In addition, teachers are urged to avoid assessing too many specific features within one task.

Teachers are encouraged to provide guidance and scaffolding at the beginning of the year for students to learn how to analyse and interpret results and apply nutritional theory to their findings and then to reduce scaffolding for practicals undertaken later in the year.

**Issues Investigations**

Issues investigations were presented in two ways. Some teachers undertook the issues investigation as a two-part exercise: the first part focused on specific feature I2 and the second part was most commonly completed as a timed in-class exercise. In an alternative strategy, teachers gave students free choice of subject and an extended timeline for submission, in which the report followed the format of an article.

**The more successful responses**

* Could be developed when students narrowed down a broad topic to an open-ended question that provided scope to present evidence for multiple points of view; for example, questions such as ‘Why are more people selecting grass-fed beef?’ or ‘Is sugar better for you than fat?’ are too broad to be dealt with effectively within the word-limit, but a question such as ‘Is grass-fed beef nutritionally superior to grain-fed beef?’ is a more suitable question.
* Demonstrated students’ critical literacy and knowledge of nutrition by presenting different points of view and then concluding with their own informed conclusion.
* May have demonstrated the critical and logical selection of information, in part, by providing source analyses — when these were required, the articles were annotated and students had clearly summarised the relevance, credibility, and bias of the article.
* Included a correctly presented list of the sources used.
* Adhered to the word-limit specified in the subject outline for the issues investigation, and included any source analyses that may have been part of the task in this word-count.

**The less successful responses**

* Resulted when students failed to narrow the topic.
* Indicated that students had not discussed their chosen question with the teacher to ensure that the issue allowed for opposing points of views to be expressed. This often led to students falling into the trap of presenting a research assignment rather than an issues investigation.

Assessment Type 2: Skills and Applications Tasks

Timed tasks under supervision, such as tests and trial examinations were the most common form of assessment undertaken in Assessment Type 2.

A summative trial examination can be considered as a summative task to assess all topics for students and simulate the end-of-year examination as practice for the students, although students often provide better evidence of learning through small, single-topic tasks.

**The more successful responses**

* Were produced when the tasks had a range of question styles, not just multiple-choice questions, that enabled student to demonstrate higher-level skills in analysis, evaluation, and application — multiple-choice questions may not provide students with the opportunity to show broad and deep knowledge and understanding.
* Demonstrated achievement at higher levels across the performance standards by responding to questions demanding cognitive complexity.
* Showed skills in graphing and analysing data.
* Demonstrated an understanding of the option topics as well as the core topics.
* Communicated effectively when completing extended-response questions.

**The less successful responses**

* Provided limited evidence of effective communication in extended-response questions (or were not provided with much opportunity to do so).
* Indicated that students were not familiar with the requirements of the performance standards.
* Resulted when students were not clear as to which specific features were being assessed in a task and which parts of an assignment or test question the specific features related to.

**General information**

Teachers should ensure that task descriptions and specific features being assessed in the learning and assessment plan directly correlate with the information on the task sheet to avoid confusion.

## External Assessment

Assessment Type 3: Examination

Students undertake one 2-hour written examination on the core topics and investigation skills (100 marks) and respond to one of two questions (20 marks) on the option topics. In terms of general advice, students are encouraged to thoroughly read question stems to ensure their response addresses all aspects of a question and are not simply paraphrasing the information presented in the question.

Part 1: Short-answer and Analytical Questions

Question 1

Most students were able to provide at least one correct example of the responsibilities of FSANZ. A higher number of students identified pregnant women as the target for supplementation and made the connection to the prevention of neural tube defects. Similarly, most students were able to provide appropriate examples of foods that do not require labelling.

Question 2

This question was answered well by many students. The majority of students correctly identified socio-economic status (SES) as the factor that had the most impact on diabetes prevalence, and then most students correctly identified the body type as android/endomorph. Although many students did not follow up with an adequate explanation of how this body type was a risk factor for type 2 diabetes, most successfully described appropriate lifestyle factors to manage the condition. Most students successfully identified the body mass index (BMI) category as obese, and also were able to identify one issue with use of BMI, e.g. BMI does not take into account body composition.

**The more successful responses**

* Used data to support their answer for parts (a) and (b).
* Made a link between how income affects a person’s capacity to, for example, purchase nutrient-dense food, or participate in activities, such as sport or gym memberships.

**The less successful responses**

* Misinterpreted part (f)(ii) about using waist circumference to assess health status.

Question 3

Students generally responded well to this question with a broad range of answers provided.

**The more successful responses**

* Identified a barrier and described its impact, e.g. economic barrier of limited income or social barrier of living alone (isolated) with few supports (recently widowed), and then provided appropriate strategies that would lead to improved nutritional outcomes for the elderly woman.

**The less successful responses**

* Did not provide specific strategies that matched the identified barriers.

Question 4

Successful responses in parts (a) and (b) made good use of data, and recognised that boys require higher amounts of energy/protein than girls; many also made the connection to higher energy use due to activity levels. A broad range of responses was provided in part (d), with almost all students able to successfully discuss two factors. Similarly, virtually all students were successful in part (e), with the most popular campaign discussed being Go for 2 & 5.

**The more successful responses**

* Included those that discussed micronutrient profiles of different vegetables (with examples), including phytonutrients, and emphasised how eating a broad range of different colours and types would ensure adequate intake of all required micronutrients.

**The less successful responses**

* Were generic in nature and lacked specific examples.

Question 5

Most students were able to describe the mechanism of damage for part (a), and correctly identify ‘gluten free’ in part (c). However, in part (b), while most were successful in connecting gluten to coeliac disease, very few provided examples of gluten food sources.

Question 6

Question 6 was very well done by most students, including the graphing component of the question. Students are reminded to use a ruler to draw connecting lines and to label all axes of the diagram. Virtually all students were successful in stating one factor to be held constant, and identifying X as the most popular milk.

**The more successful responses**

* In part (a), correctly gave two functions of calcium, with the most common answers being muscle contraction and relaxation, and calcium’s role in the formation of the hard structures of bone and teeth; transmission of nervous impulses was also a common (correct) response.
* In part (b), correctly identified milk type B and then proceeded to use the data to justify their choice.
* In part (c), commonly focused on the degradation of specific micronutrients when exposed to light as a reason for why milk is no longer packaged in glass bottles; other popular reasons included the negative environmental impacts associated with the manufacturing and recycling of glass, and the poorer durability of glass (especially during processing and transport).

Question 7

Most students were successful in part (c) in naming glycogen as the storage form of glucose in animals and identifying that the liver and muscles are storage sites. However, few students were able to correctly identify the structure of glucose (part (a)) and many incorrectly gave fructose and galactose as responses to part (b). Successful responses identified the bottom left figure as glucose for part (a) and included any two of sucrose, lactose, or maltose for part (b).

Question 8

This question, on an aspect of digestion, proved to be the most challenging of the examination.

**The more successful responses**

* In part (a), described the production of short-chain fatty acids (SCFAs) via fermentation and then linked SCFAs to specific functions, e.g. reduction of colonic pH protects the lining of the colon from damage or development of polyps, or enables increased absorption of dietary minerals. Another correct response described how readily fermentable fibre, such as pectin and gums, increases absorption of water, thereby softening stools and allowing easier transit through the colon.
* In part (b), focused on the role of insoluble fibre in the large intestine. They described the role of this type of fibre in providing bulk to stools, and speeding up the passage of food (gut transit). Students were more successful with part (b).

**The less successful responses**

* Were generic, and often included the role of fibre in the small intestine rather than the large intestine.

Question 9

**The more successful responses**

* Commonly described how water moistens food to lubricate it for digestion through the production of saliva, or described how water, by making up to 75% of faecal matter, allows for the easy elimination of faeces and reducing the risk of constipation or impaction. A few students discussed the role of water in lubrication and cushioning of joints and protection of vulnerable structures, or its role as a solvent (dissolves substances needed by cells, e.g. amino acids, glucose, minerals, vitamins, and hormones), and also removes cellular waste products via filtration and production of urine in the kidneys. Successful responses also discussed the role of water in thermoregulation, e.g. production of sweat to lower core temperature (which can increase due to metabolism).

**The less successful responses**

* Simply stated two benefits of adequate water intake without providing any further detail.

Question 10

This question was well done by most students. The majority of students were able to describe how LDL cholesterol could contribute to hypertension, by linking the plaque development (involving LDL cholesterol) seen in atherosclerosis to the narrowing of blood vessels, and the consequent increase in arterial resistance that, over time, will raise blood pressure. Most students correctly identified two functions of sodium in the human body in part (b). The calculation in part (c) also presented little difficulty for the majority of students, who successfully calculated the total daily energy intake to be 12 269 kJ, and used this to determine the difference between actual and required daily energy intake to be 5502 kJ.

Most students were able to provide a basic outline of how exercise reduces blood pressure in part (e). Successful responses included linking exercise to improved circulation, as well as the role of exercise in improving insulin sensitivity or how it increases BMR (basal metabolic rate).

**The more successful responses**

* In part (d)(i), identified breakfast as the meal with the most potential to reduce blood pressure, as it has the largest sodium value (1837 mg).
* Reflected the *Australian Dietary Guidelines* relating to the limiting of salt and saturated fat intake (Guideline 3), by providing specific food examples, e.g. reduced-salt varieties of common breakfast foods.

**The less successful responses**

* Identified a single food (e.g. bacon and egg roll) rather than a meal in part (d)(i).

Question 11

A large number of students scored very well on this question. Most students were successful with the calculations in part (b), but students are reminded to round up to the nearest whole number when asked to do so.

**The more successful responses**

* Focused on food safety issues, the most common response describing how food might not be heated evenly throughout, leading to the possibility that some parts may not have been heated above 60°C and thus any microbes could reproduce and potentially be a source of food poisoning. Two other issues were using a container that is not microwave safe which could lead to toxic chemicals (e.g. bisphenol A) or metals being released into the food, or food covers being released inappropriately and causing steam burns. Strategies to avoid food safety issues were also well done.

Part 2: Extended-response Questions on Option Topics

Students were required to answer either Question 12 or Question 13, corresponding to the option topic that they had undertaken as part of their course work. Nearly all students attempted this part of the examination, with varying degrees of success. As in past years, fewer students (approximately 31%) attempted Question 12 compared to Question 13 (approximately 69%).

Each extended-response question was marked out of 20. Communication was worth 4 marks, and the remaining 16 marks were allocated for content. Both questions were structured with four parts; each part was worth 4 marks, with each well-expressed idea or piece of information worth 2 marks. To achieve maximum communication marks, a response was required to be clear, well expressed (using appropriate nutrition terminology), well organised (i.e. with a sequential flow of information), and relevant to the part being addressed.

It was evident that this section of the examination continues to be challenging for many students in terms of *comprehension* of the question and content *knowledge*. Successful students demonstrated sound knowledge, understanding, and application, and provided relevant detail linked to the question stem and the dot point being addressed.

Students are advised to avoid paraphrasing the question, and not to use introductory and concluding statements; these practices add nothing to the quality of the discussion and waste valuable time. Students need to demonstrate depth and breadth of knowledge and are to be discouraged from recycling answers used in previous dot points.

It would be helpful for students to use 5 to 10 minutes to plan their response, including carefully reading the question and highlighting or noting the key terms in each dot point. Students are also encouraged to leave sufficient time in the entire examination to adequately answer the extended-response question, as many responses were incomplete.

Question 12: Option Topic 1: Global Nutrition and Ecological Sustainability

*Dot point one*

A small number of students focused on defining sustainability rather than discussing two food production practices and their negative impact on sustainability of freshwater supplies. Some students simply did not realise that the emphasis was on fresh water.

**The more successful responses**

* Described two different food production practices (for example, irrigation and use of chemicals such as fertilisers) that provided scope to describe two different negative environmental impacts (for example, salinity issues and eutrophication of waterways).

*Dot point two*

**The more successful responses**

* Discussed two examples of food production practices that could help ensure a sustainable and secure world food supply.
* For higher-achieving students, often described practices that were different from those they had used in dot point one (thus showing breadth and depth of knowledge).
* Commonly discussed monoculture (focus on intensification of chemicals and water to ensure a higher yield), or various examples of genetic modification (e.g. pest-resistant crops, or crops engineered to survive high salinity, or livestock engineered for rapid or larger growth).
* Described the practice but also linked it to sustainability and security of food supply.

*Dot point three*

Most students described two government initiatives to help protect fresh water from contamination, although some did not fully discuss how protecting freshwater supplies would ensure a sustainable and secure world food supply. Responses were wide ranging, including the role of the Environmental Protection Authority, government initiatives to discourage littering (both positive and punitive measures), funding of wetland schemes, upgrades to waste management programs (e.g. through SA Water), and funding of research programs that specifically target improved waterways (such as SARDI research into reducing algal blooms). Successful responses also described how initiatives would protect freshwater supplies to ensure sustainable and secure food supply.

*Dot point four*

Many students provided good details of initiatives but did not link them with securing fresh water for the future.

**The more successful responses**

* Were again wide ranging, with many strategies suggested, for example, using recycled water to reduce dependence on natural waterways, investment in capture and storage systems for recycled water and rainwater, investing in grey-water schemes to treat contaminated water that could be reused, or investing in more efficient ways to prepare foods that need to be washed or rinsed at the manufacturing plant.

**The less successful responses**

* Discussed food production rather than the required food manufacturers.

Question 13: Option Topic 2: Global Hunger

*Dot point one*

Students addressed all aspects of this dot point very well. The most common political decisions discussed were:

* corruption
* the decision to go to war or to close borders
* denying entrance of aid organisations to the country or region
* inequitable distribution of agricultural lands
* encouraging the growth of cash crops
* misuse of aid.

Excellent links were made as to how these decisions could threaten a population’s secure food supply.

*Dot point two*

Most students found this dot point challenging, as it was clear that they did not understand that the focus was on *issues* associated with long-term food aid programs. In other words, students were being encouraged to think about broader implementation issues rather than having to simply provide a description of specific programs. Successful responses raised the problem of dependency on donations, inefficiencies in delivery efforts (such that food itself may not be the problem and sometimes cash can be better), the fact that it is a donor-driven system and recipients have little to no control over what is provided (there may be cultural or religious sensitivities that fail to be considered). Other issues include the use of food aid to further political interests of a donor nation, for example, tying aid to specific conditions, or providing aid to ‘friendly’ nations.

*Dot point three*

This dot point was also challenging with many students making vague statements that simply paraphrased the question, with no discussion as to how the low status of women had led to unequal access to food.

**The more successful responses**

* Discussed how the low social status of women has arisen (e.g. religion, culture, hierarchical systems) and how this has led to unequal access to food (e.g. no education, low income, eating last, no independence to purchase food). They also discussed specific strategies to improve the status of women (e.g. education to get a job, access to revolving loans) and linked the higher status of women to improved access for all people to food, as women could contribute to their families’ wealth (and this would lead to improved access to food), or contribute to food production if they were farmers.

**The less successful responses**

* Provided strategies that were unrealistic (e.g. generally giving everyone equal portions of food), without addressing the key issue of low social status, and did not link how the strategy would increase social status (e.g. how education improves social status by allowing access to jobs, income, and financial independence).

*Dot point four*

This dot point was very well done. Many students discussed specific aid organisations and their programs, but it should be noted that they were only required to discuss two programs offered to women. Micro-financing and revolving loans, as well as specific education programs focusing on sanitation, water, food safety and storage, and breastfeeding programs, were discussed in the more successful responses. The link was quite well made that these programs were aimed at the mother to benefit their children; for example, micro-financing and revolving loans would help a woman earn an income, which means more food, better access to health care, and so on for the children. Immunisation and child sponsorship were also discussed, but the link through the mother was not stated very often.

## Operational Advice

School assessment tasks are set and marked by teachers. Teachers’ assessment decisions are reviewed by moderators. Teacher grades/marks should be evident on all student school assessment work. It was pleasing that most teachers were consistent with the performance standards and that evidence was seen to support the teachers’ grades.

Moderators appreciated the effort that most teachers put in to preparing excellent teacher materials and the requested student samples. The confirmation process went more smoothly when teachers included an approved learning and assessment plan (LAP), addendums that detailed and justified any approved changes to the LAP, and a set of task sheets where the specific features being assessed matched those ticked on the LAP and/or addendum. Moderators also found it very helpful when a cover sheet with an overall summary of assessment decisions for all tasks, indicating the performance standards used, was included as well as individual grades for each task. Student materials should be sorted by assessment type. Teachers should refer to packing instructions in the subject operational information on the Nutrition minisite.

Teachers are urged to ensure that they use the correct performance standards and that task sheets reflect this; there was a significant minority of schools assessing specific feature AE3, which is not in the subject outline.

LAPs are required from each assessment group. Where multiple teachers combine to form a single assessment group, it is advised that the teachers undertake internal moderation to ensure consistency of marking standard.

Teachers are reminded that it is also essential to submit a Variations — Moderation Materials form in their teacher pack where assessment tasks have been modified for students, a breach of rules has occurred, or student samples have missing work that has been seen and marked by the teacher. Teachers are encouraged to put processes in place that will reduce the likelihood of marked work going missing.

Teachers need to be aware that the results they submit to the SACE Board are used in moderation, and so they should take care to avoid errors when submitting them.

Some teachers went to great lengths to remove student names and school names from work, and many schools also sought to preserve anonymity by ensuring that school names did not appear on student work. These actions are a matter of choice for the school, but it is not essential to de-identify student work, nor to submit work that is devoid of teacher feedback, for the school assessment component. Teachers’ comments on students’ work are encouraged as they help moderators to verify decisions that teachers have made about the standard of that work.

## General Comments

Teachers should refer to the subject outline and support materials on the Nutrition minisite for information and advice about each of the school assessment types. New teachers are encouraged to seek clarification and advice early in the year by attending clarifying forums and contacting the designated SACE Officer — Curriculum.

Nutrition

Chief Assessor