# Nutrition Subject Assessment Advice

## Overview

Subject assessment advice, based on the previous year’s assessment cycle, gives 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, and the quality of student performance.

Teachers should refer to the subject outline for specifications on content and learning requirements, and to the subject operational information for operational matters and key dates.

# School Assessment

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 are encouraged to take time at the start of the year to provide guidance and scaffolding for students to be able to successfully analyse and interpret results and apply nutritional theory to their findings, and thus present correct reports. The development of clear, well-structured and informative task sheets that allow students to demonstrate knowledge and apply understanding of concepts to real life scenarios is also advised.

The more successful responses commonly: commonly:

* demonstrated evidence of I3 (laboratory performance), A1 (nutrition investigation design) and A3 (collaboration) either by student evidence eg photos, annotations, written peer/collaborative and self-assessment or by teacher justification through written comments or use of practical task design/assessment proforma (see SACE website for examples- stage 2 sciences subject advice- individual and collaborative performance –practical skills assessment)
* included clear and insightful evaluations of procedures, random and systematic errors and addressed reliability and validity of results obtained
* showed strong analysis of data that inferred meaning in terms of diet/ health/ nutritional value rather than restating results. Data was presented in a variety of formats, logically analysed and then clearly explained
* utilised and responded to clear and well scaffolded task sheets that provided students with opportunities to demonstrate higher order thinking and achieve in the A band
* made use of tables and sub headings to present data, evaluated sources of systematic and random errors and subsequently provided clear explanations and suggested improvements
* used clear, correct and appropriately sized graphs and tables to display findings of investigations in the results section of the report, accompanied by brief statements of the main patterns and trends in the data
* provided clear links between nutritional theory and the investigation being carried out. This nutritional theory was then referred to in discussions and analysis to connect to the aims and outcomes of the investigation. Often research was used and referenced to support findings

illustrated evidence of critical thinking and problem solving to form evaluation and analysis in the higher grade bands

* provided sufficient detail in the report to allow replication
* used scientific and subject specific terminology correctly and appropriately.

The less successful responses commonly:

* did not include investigation design proposals, with teacher feedback, with the final report thus limiting evidence of I1
* featured graphs that were poorly formatted and that did not correctly display results/data
* used personal pronouns in analysis and discussion
* did not clearly address all aspects of evaluation, including random and systematic errors and improvements connected to the practical undertaken. If evaluation of errors was evident it tended to be very generic with little reference to improvement of the procedure
* included limited analysis of information. Data was presented but clear connections to nutritional understanding and information was minimal
* provided limited evidence of A3 (collaboration) and I3 (Laboratory performance) from the teacher and/or the student, to support the assessment decision
* consisted of discussion that tended to repeat or restate data rather than analysing and/or elaborating on results and connecting to the hypothesis/aim and background nutritional information.

Issues Investigation

A range of interesting and contemporary topics were presented this year. Issues investigations were presented two ways with some completed in class under timed, supervised conditions after undertaking research and compiling notes; while others were provided with an extended time period to complete the investigation independently. A number of teachers are using the issues investigation as an opportunity to further explore and increase understanding of the option topics.

The more successful responses commonly: commonly:

* included sources analyses which supported and provided evidence of student achievement of I2. By doing this, the students clearly summarised the relevance, bias and the credibility of a source
* demonstrated students’ critical literacy and knowledge of nutrition by presenting different points of view and then concluding with their own informed decision
* synthesised students’ own arguments from research rather than paraphrasing sources
* refined a question from a broad, contemporary topic that provided scope for multiple points of view to be explored
* used credible, up-to-date sources of information such as journal articles rather than generic web pages
* included a correctly presented bibliography and reference list that included a range of resources.

The less successful responses commonly:

* provided an information report on a topic rather than presenting an issues investigation
* failed to meet word limit specifications
* used limited and/or generic sources of information.

Assessment Type 2: Skills and Application Tasks

Timed tasks under supervision, such as tests and trial examinations were the most common form of assessment undertake. It is important that teachers prepare skills and applications tasks that provide a range of well-structured and clear questions that provide opportunities for analysis, demonstration of knowledge and understanding, problem solving and application of knowledge to real life scenarios, in order to provide students with the opportunity to apply knowledge and show higher order thinking required at A band level (KU1 & KU2).

The more successful responses commonly: commonly:

* provided thorough answers incorporating nutritional concepts
* applied knowledge to evaluate and solve problems
* used clear, subject specific terminology
* explained answers in depth and specific to the question asked
* included a range of support materials (for example, the AGHE, graphs and info graphics) to assist student achievement through interpretation, analysis and application of information.

The less successful responses commonly:

* did not follow the explicit directions of a question (describe, determine, state etc.)
* provided limited information or only answered part of the question
* were unable to demonstrate higher order thinking due to question design
* occurred when students were not clear as to which specific features were being assessed in a task/ question.

Assessment Type 3: Investigation (10 credit)

All investigations were broadly researched and well written with a range of contemporary topics investigated.

Investigations were undertaken in a variety of formats including:

* supervised in an 80 minute time frame with notes being organised in advance
* undertaken as a research task with an extended time frame.

Assessment Type 3: Examination (20 credit)

Part 1: Short-answer and Analytical Questions

Question 1

(a) This question proved to be quite challenging for the majority of students. Most students identified that smell can help detect if bread is spoiled or stale or that it can help to determine if a consumer is likely to purchase the bread product. Some students seemed to be distracted by the term ‘fresh’, immediately comparing fresh to stale bread. A complete answer needed to mention and link how the sense of smell can trigger a particular desire or how it can act as a stimulant.

The most successful students wrote about how the sense of smell can trigger memories, induce hunger and mouth-watering.

(b) Most students were able to clearly explain that the sense of sight can identify the visible changes of a food (e.g. food spoilage) and provide an example. The example needed to be a specific food item with an explanation of the visible change that may occur, indicating that the food is no longer safe. The most appropriate response was the colour of raw meat. The most common response was the development of mould on bread. Although mould is not necessarily unsafe to the consumer, this answer was accepted as an example of how sight can help to determine if a food is safe to consume.

(c) Students generally responded well to this question with a broad range of answers.

Students who were successful identified a psychological factor (e.g. beliefs, values, attitudes, emotions, past experiences, habits, and self-concept) and a suitable food source that was relevant to the factor identified.

Students who were less successful identified social, economic or physical traits of food or physiological factors.

Students who did not identify a valid psychological factor but provided a suitable food example to the factor listed were still awarded the one mark for the food example. Some factors that were incorrectly listed were more suited to social factors such as advertising, peer pressure and sensory rather than the psychological factors. Those that mentioned religious influence as a psychological factor usually gave the food choice of a prohibited meat. Past experiences of being sick and wanting a desired body image or self-concept were also accepted if well explained.

Question 2

(a) Responses to this question indicated that many students were not aware of the site where soluble fibre is broken down in the human digestive tract. Some students correctly identified the large intestines, where soluble fibre is fermented by bacteria. Other students identified the large intestine but did not mention the bacteria or incorrectly explained that enzymes break down the soluble fibre. Many students incorrectly identified and explained the sites of carbohydrate digestion or other sites of the digestive tract.

(b) Students generally addressed this question well. Students who were successful identified a function of soluble fibre and explained how this alleviated constipation. Some students incorrectly stated that soluble fibre decreases the rate of initial digestion to maximise absorption or provides a feeling of fullness to prevent overeating and weight gain. These answers do not explain how soluble fibre helps to prevent constipation. The majority of students identified the bulking and softening properties of soluble fibre, explaining how this can promote easy expulsion of faeces.

(c) This question was answered well by the majority of students. Specific examples of foods high in soluble fibre were required to answer this question. (e.g. flesh of fruit/vegetables, brown rice, wholegrain pasta, wholegrain bread, apple, lentils, oats etc.). Students who were unsuccessful identified a food group (e.g. fruit, vegetables) rather than a specific food item or two examples of foods in the same food group (e.g. two fruit or two vegetables). The skin of fruit and vegetables was also not accepted as this is a source of insoluble fibre, or any ingredients/component of foods (e.g. pectin, barley, wholegrain, fruit core etc.).

(d) (i) Most students successfully identified a cause of diverticular disease however did not demonstrate their understanding of its contribution to this diet related disorder. The main causes identified included straining, lack of exercise or an insufficient intake of water and fibre. To be successful students were required to identify the cause and then explain how this assists in the development of diverticular disease. Many students were able to link the pouches to low fibre, but were unable to give information about how that can bring on the pouches.

(ii) The majority of students were able to identify suitable symptoms of diverticulitis. Students were awarded two marks if four correct symptoms were identified, 1 mark if 2-3 symptoms were identified and 0 marks if 0 or 1 correct symptom was identified. The most common symptoms included abdominal pain, diarrhoea, vomiting, nausea and blood present in stools. Headaches, fatigue or weakness were only accepted if the student identified three more specific symptoms. Marks were not awarded for irrelevant symptoms or listing a condition (e.g. constipation/hernia).

Question 3

(a) (i) This was answered well by all students. Students were able to successfully identify that the proportion of sample with bacteria (%) was the dependent variable being measured. Students who were not successful identified the dependent variable as the number of testing days or the temperature.

(ii) The majority of students successfully graphed the data using a line (bar graph was not accepted). A line graph was the preferred option as both variables were numerical and the data was continuous; however a significant number of students also produced a column graph which was also accepted. Marks were awarded for a title, labelled axes, an even scale, a legend and the data plotted on the same set of axes. Some students placed the dependent and independent variable on the wrong axis.

(iii) Most students were successful in identifying a valid variable that was required to be kept controlled throughout the investigation. The most common controlled variables identified included the size of the chicken, the source of the chicken and the time of the investigation. Some incorrect responses were the temperature or the storage conditions as the controlled variables. A mark was rewarded for explaining the importance of the variable whether or not it needed to be controlled. However the importance needed to be specific - having an impact on the rate of bacterial growth. No mark was awarded if the importance was stated as providing accurate or reliable results.

(iv) The majority of students did not use data from the graph or table to identify and explain the trend of bacterial growth. The most successful students explained why greater bacterial growth resulted at a higher temperature of 30 degrees Celsius with reference to the danger zone. They were also able to use values (%) from the graph to identify the changes in bacteria growth across the 10 days.

(v) The majority of students demonstrated a correct understanding of the effect of an increasing sample size. Students who were successful explained that an increasing sample size reduces the effect of random errors and outliers, increasing the precision and reliability of the data. Marks were not awarded for stating that an increased sample size reduces random errors (and NOT the effect) and increases the accuracy of the data.

(vi) This question was well answered by most students who were able to identify a valid systematic error that may have been present in this investigation (e.g. the fluctuation/calibration of the temperature/incubator/-thermometer/measuring apparatus) and explain its impact on the accuracy of the data or the true value. Many students also identified that a systematic error impacts all the data where the investigation needs to be repeated with new equipment. Marks were not awarded if precision or reliability was mentioned.

(b) (i) This question was answered well. Students who were successful identified a principal of canning and explained how this could extend the shelf life of the product. The common principals identified included heat treatment, filling to the top to reduce oxygen exposure and the addition of preservatives (e.g. salt, sugar, food acids, antioxidants). If students stated the addition of preservatives, a specific preservative was required as well as the explanation of how it extends the shelf life. The weaker responses did not clearly explain how the identified principal preserved and extended the shelf life of a canned good. Some student identified light as a principal to extend the shelf life, linking it to reducing the rate of bacterial growth which is incorrect.

(ii) The majority of students clearly identified a specific disadvantage of using cans as a packaging method. Common responses were that cans are heavy and difficult to carry for the elderly/injured etc., cans are not resealable and nutrient loss occurs. Most clearly explained why or how this is a negative factor for consumers.

But quite a few students did not provide an example to assist their explanation eg. Environmental – not biodegradable therefore contributes to landfill. Marks were lost for listing a few disadvantages within one disadvantage rather than explaining the one disadvantage.

Question 4

(a) (i) This question was answered very well by all students who were able to successfully use the formula that was provided. Students who were successful showed their working out and rounded off their final answer to the nearest whole number.

(ii) The majority of students were able to achieve at least one mark for this question. Students who were successful identified a factor that could contribute to the difference in BMR between males and females and explain why. The most common factors identified included: greater muscle mass in males, the different rates of kilojoules burnt every hour (1.0 and 0.9) or greater adipose tissue in females. Students who were successful were able to explain that muscle tissue is a faster metabolising tissue burning more kilojoules per hour than fat tissue, contributing to the difference in kilojoules burnt every hour during the day.

(b) This question was answered well by the majority of students. A complete response clearly explained how the energy intake, energy expenditure (BMR + the thermic effect of food + exercise) and energy balance of an individual are calculated and included an explanation of what a positive and negative energy balance would result in. It was important for students to specify that energy intake was due to the intake of food or nutrients. The majority of students were able to identify that the energy intake is calculated with the addition of all kilojoules from the food consumed that day.

Question 5

(a) (i) & (ii)

Many students did not answer this question in relation to the NIP, instead they referred to labels in general and included answers such as ingredients list, allergens, and name of company. Correct responses included amount per serve, amount of nutrients for Energy in kJ, Sugars in g following the Carbohydrates, and servings per package.

(b) (i) Students were able to identify that the Lite Butter has less fat and some mentioned saturated fat as the reason, how it links to build up in arterial walls. However quite a few students did not use data in their response which was required for this questions. Students who were awarded full marks showed their knowledge in linking high saturated fat intake with increased risk of cardiovascular disease, using data from the table.

(ii) The most successful responses to this question addressed lifestyle factors such as smoking, alcohol use, reduced physical activity and stress levels. Some students discussed high fat and salt diets which did not address a lifestyle factor but rather a dietary factor. Some students simply stated ‘not enough exercise’ as their answers and did not relate it back to an increase in cholesterol and or a sedentary lifestyle, so only one mark was awarded in this case.

(c) (i) The majority of students suggested that the manufacturer emphasises the word ‘lite’ on the food label as the lite version would be more appealing or seem healthier. Some students were not able to answer this effectively, simply stating that it emphasises it is lite.

(ii) Many students were able to identify that as paper is lightweight and recyclable it is an advantage to the environment, in paper being biodegradable etc. Some students were not specific enough in detailing how paper was an advantage for the environment resulting in responses that simply identified that paper was better without explaining why.

Question 6

(a) As this question asked students to explain the reasons for the difference in the daily micronutrient requirements, no marks were awarded for explaining the function of protein. Some students also lost marks for not using the examples from the table, which was specified in the question. Most students were able to explain well the role of iron and calcium in the body of the two males and account for the differences in their needs due to their ages; increased iron to build red blood cells to carry oxygen due to increased blood volume with growth and increased calcium due to rapid skeletal growth and therefore peak bone mass. Zinc was less commonly addressed in the responses to this question with some students unable to specify the function of zinc in supporting increased muscle growth and to metabolise protein to support tissue growth and repair.

(b) (i) Many students responded to this question by stating the role and function of protein but did not make it specific to the 70 year old. Correct responses included stimulating muscle protein, production of antibodies, source of energy, muscle contraction and movement and maintenance and repair.

(ii) Many students clearly identified the link between cost and pensions and noted that due to the high price in meat/steak people aged 70 years and older may not be able to purchase much of it. A complete response to this questions required students to describe that with a decreased income, the amount of protein from meat would decrease, and therefore they would need to buy more food to replenish the protein missed from not eating meat.

(c) (i) The most successful responses to this question clearly made a link between high amounts of saturated fat, salt and sugar with discretionary foods which links to diet related problems. Some responses however were very general, saying that it promotes bad eating habits and the students will want more of this type of food. This does not explain a nutritional reason and thus could not be rewarded full marks.

(ii) Environmental factor - in responses where there was overlap with the parental influence, marks were not awarded as it was too similar to the answer for the previous question.

Social factors: many responses linked their responses to being at school and seeing what peers eat or going to events such as parties. Most of the social factors discussed were well described. Some students chose to discuss economic hardships but no marks were awarded if they could not link it to social or environmental factors.

Question 7

1. (i) (ii) (iii)

Many students found this question quite challenging and were not able to successfully demonstrate an understanding of HACCP. Some incorrect responses were checking the label requirements and FSANZ. Successful responses included; greater satisfaction among customers and employees due to preventative measures in place, management of food safety risks across the food preparation procedures, easy to follow and knowledge of food safety.

1. (i) (1) (2)

This question also proved quite challenging with many students not being able to identify how the control points can be monitored. For example, some students identified the process of heating until boiling to kill microorganisms but did not mention the use of a thermometer for monitoring the temperature. This question allowed students to think about and respond to processes that are in place to monitor good food preparation practices. Successful responses mentioned using a thermometer to monitor the temperature, a stop watch to ensure the correct cooking time and correct procedures for cleaning equipment.

(ii) (1) (2)

This question asked students to describe two principles of food preparation used in the recipe. However, many students misinterpreted the question and discussed high heat, air tight jars, freezing, and refrigeration to keep chutney free of microorganisms. Some students who were able to state a preservation method used in the recipe did not specifically state how this particular principle reduced the microorganisms. An example of a successful response was high sugar content preserves chutney by reducing the available water for microorganisms.

(iii) Many students repeated information that had been used in previous answers, using freezing, fridge and canning as strategies. The most appropriate response was storing in a cool and dry place.

1. (i) (ii)

Many students were able to identify the reasons for additives being less common in domestic cooking. Some successful responses included; less storage time, food eaten straight away, fresh ingredients used and people concerned about health.

Question 8

(a) (i) Most students were able to correctly answer this question and determine a percentage of the upper limit for sodium. Successful responses showed all calculations and rounded the answer to the nearest whole number.

(ii) Many students correctly identified why sodium is an important ingredient in sports drinks making the link between sodium and the fluid balance in cells, reducing cramps, and replenishing what is lost through perspiration. Some students wrote that sodium provides energy and makes the drink more appealing which is incorrect.

(iii) (1) (2)

Most students correctly stated hypertension and kidney failure as possible effects of the over consumption of sodium. Some students confused over consumption of sodium with obesity and some also mentioned dehydration and excessive thirst which are incorrect.

(b) (i) The majority of students answered this question correctly. The given formula proved useful however some errors occurred when the wrong value was used or the student failed to round off to the nearest whole number.

(ii) Successful responses to this question explained that the drink would provide a short spike in energy levels but that energy is not sustained and there is a rapid decrease to low energy levels. Many students incorrectly stated that the drink would provide high/large amounts of energy for the first two hours.

(iii) Students responses to this question discussed how the knowledge of carbohydrates in a serving of food is more helpful than just the impact on blood glucose levels alone.

Part 2: Extended-response Questions on Option Topics

Option Topic 1: Global Nutrition and Ecological Sustainability

Question 9

*Two environmental issues associated with farming cattle*

This dot point was generally addressed very well.

The more successful responses commonly: commonly:

* discussed methane and successfully explained its connection to global warming.
* provided appropriate responses around the issues of excess animal faeces or fertilizers/pesticides on crops, which contribute to eutrophication.
* included discussing deforestation and the resulting increase in carbon dioxide and land degration, either in the form of compaction of soil or overgrazing
* went on to discuss run off because of land degradation, causing eutrophication in the waterways. Waste contaminating waterways was also a common response. Students were generally able to use appropriate terminology to address this dot point.

*One benefit of building a diary-processing plant for a local community*

Many students identified the improved access to dairy for the local community, with less food miles for transportation resulting in higher quality products with greater nutritional value.

The more successful responses commonly: commonly:

* focused on one benefit as specified in the question and discussed it in details.

The less successful responses commonly:

* mentioned several different benefits rather than one and did not explore the full ramifications of the benefit e.g. more jobs but did not discuss this further
* failed to link the economic benefit of building a dairy processing plant to job creation and economic growth for the town.

Appropriate benefits identified by the students include:

* Economic benefits - more jobs, more money in the local economy, less need to spend money on travel, cheaper milk supply due to lower transport and storage costs.
* Social benefits - less travel to jobs further away so more time with family and in the local community, people do not have to leave the local community to seek jobs elsewhere, improved psychological health of the community as the community becomes more self-sustaining and higher rates of employment.
* Nutritional benefits - less nutrients lost due to long transportation times or need to ultra-heat treat or powder the milk (e.g. vitamin B2), ready supply of calcium, vitamin D, protein.

• One recent trend that can help to achieve a sustainable yield of cattle feed.

Students who identified a specific type of farming i.e. GMO, intercropping or crop rotation were often able to link the method chosen with increased yield, pest resistance or soil fertility. The overwhelming majority of students discussed GMOs.

The less successful responses commonly:

* focused on how to achieve a sustainable yield of cattle instead of cattle feed or did not identify a specific trend and gave a very general response.

Many students were able to go into quite a bit of depth around how GMOs are made and what beneficial characteristics they have that can help to achieve higher sustainability – i.e. herbicide resistance, needing less water, higher nutritional value and longer shelf life.

*One strategy that government organisations could implement to promote increased consumption of plant-based foods while providing a secure food supply*

This proved to be the most challenging part of this question. Many students focused on how to promote increased consumption of plant-based foods or how to provide a secure food supply but not both. Many students did not include what government organisations could do and simply went straight into the strategy. Few students identified real campaigns, such as the Go for 2 and 5, as feasible marketing strategies but rather tried to come up with their own strategies such as making meat more expensive.

The more successful responses commonly:

* addressed all three parts of the question
* included government funding of the Stephanie Alexander Gardens or the Community Garden Grant Program which grow vegetables and fruit for the local community. The skills are transferable to home gardens thus resulting in a secure food supply.

Option Topic 2: Global Hunger

Question 10

*Two examples of how food security is threatened in developing countries affected by war*

Many students wrote about the dangers of landmines, gunfire and bombing while working in the fields, reducing access to farming land. Infrastructure damage was often explained well, with the impact of poor transport facilities or irrigation systems identified as contributing factors to famine. A common misconception by students was that only men worked on the farms and when they were taken to fight in the wars the females were not capable of looking after the farms. Corrupt governments were identified, but often the explanation of how this impacts on food security was lacking.

The more successful responses commonly:

* discussed the mechanism by which land/infrastructure is destroyed and how this affected food security, the mechanism by which trade is affected e.g. by trade sanctions, embargoes, the loss of workforce and the food aid or crops being intercepted by corrupt authorities and redistributed to the army.

*One nutritional consequence of a deficiency disorder caused by hunger, and the impact of the disorder on the individual and the community*

The main deficiency orders discussed were protein deficiency diseases such as Kwashiorkor and Marasmus, anaemia and scurvy. Most students identified the causes and symptoms of the disease identified, however many struggled to link it to the community and future food supply. A common misconception was anaemia is caused by protein deficiency.

The more successful responses commonly:

* named the deficiency disorder, the nutrient that is deficient and the symptoms of the disorder and discussed how the individual is affected physically, psychologically, socially, as well as how the community is specifically affected.

The less successful responses commonly:

* did not name a disorder but discussed ‘malnutrition’ in a general sense and did not expand on how the community is affected in terms of social and economic consequences.

*One economic initiative that could increase individual and/or community access to an adequate food supply*

This proved to be the most challenging part of this question for many students.

The more successful responses commonly:

* discussed specific details about micro-loans, devoting funds to infrastructure or revolving loans and related these to an adequate food supply.

The less successful responses commonly:

* discussed an initiative that was not economic, e.g. donating food or seeds or tools. Some emotive language was evident and some responses lacked correct terminology such as ‘infrastructure’.

*One educational strategy that may reduce chronic hunger and improve future food security for a community*

Most students identified the importance of education in breaking the poverty cycle.

The more successful responses commonly:

* identified specific educational strategies, e.g. different farming techniques, specific education for women – birth control, literacy etc. and how this would affect the broader community. Most answers centred around education on farming techniques and how these can be passed down through the generations and how families and children could be taught to grow their own food.
* focussed on one educational strategy and discussed it in detail, relating it to future food security for a community e.g. educating women about contraception results in fewer mouths to feed and more food to go around for the community.

The less successful responses commonly:

* listed many educational strategies but did not focus on one in detail as stated in the question and did not relate the strategy to future food security.

General observations

* Students do not need to rewrite the dot point as a lead in sentence to an answer.
* Repetition of the same information is not awarded any marks.
* Some students structured their response as an essay, including an introduction and conclusion, with the 4 dot points making up the four paragraphs in the “body” of the essay. Marks were only awarded for addressing the information requested in the four dot points. All answers should relate back to food security or sustainability when required by the question.