2019 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

Assessment Type 1: Investigations

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.

When submitting student work online it is important to include the relevant task sheet and highlighted performance standards that correlates with the grade allocated for each task.

The more successful responses commonly:

* included evidence of design often in the form of Practical Task Design pro formas completed by students with evidence of teacher feedback. This allowed for, and provided, direct evidence of student achievement of I1
* demonstrated support of I3 (laboratory performance) and A3 (collaboration) either by student evidence e.g. photos, annotations, written peer/collaborative and self-assessment or by teacher justification through written comments or use of assessment pro formas (see SACE website for examples, Stage 2 Nutrition support materials- subject advice and strategies: Teacher observation notes (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. Students were able to clearly identify the error, the effect on the data and the improvement required
* showed strong analysis of data that inferred meaning in terms of diet/health/nutritional value rather than restating results
* utilised and responded to clear and well scaffolded task sheets that provided students with opportunities to demonstrate higher order thinking and achieve at A band level
* 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:
* were provided with tasks that allowed students to demonstrate knowledge and apply understanding of concepts to real life scenarios
* 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 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:

* misunderstood the effects of random errors (precision and reliability) and systematic errors (accuracy and validity)
* did not include investigation design proposals, with teacher feedback, 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

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, especially option topic 1.

The more successful responses commonly:

* explored alternate arguments and information to reach a conclusion to a question
* 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 an exploration of a well formulated question to arrive at a conclusion
* did not adhered to the word count of 1500 words (including the source analysis)
* did not provide source analysis for the investigation
* 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 undertaken, however there were a variety of diet analysis and diet plans related to diet disorders. 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 and KU2) i.e. more questions worth 3-4 marks.

The more successful responses commonly:

* communicated effectively through the provision of thorough and organised answers incorporating nutritional concepts
* were able to show competency answering questions requiring lower order thinking skills such as ‘describe’, and ‘discuss’ to higher order thinking such as ‘apply’ and ‘critique’
* 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 Australian Guide to Healthy Eating (AGHE) graphs and info graphics) to assist student achievement through interpretation, analysis and application of information
* occurred when opportunity was provided for assessment across a range of performance standards. For example provision was made for application of concepts, interpreting and analysing data rather than only demonstrating knowledge and understanding.

The less successful responses commonly:

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

External Assessment

Assessment Type 3: Issues Investigation (for 10-credit subject)

The more successful responses commonly:

* discussed the contemporary issue investigated along with an evaluation of the group processes including group life and group roles
* included discussion on the effectiveness of the group and suggested improvements
* reflected on the researched information and used this information to justify and evaluate the effectiveness of the health-promoting activity proposed by the group
* included feedback sheets for the audience to evaluate the presentation
* analysed the researched information and personalised their response.

The less successful responses commonly:

* provided a recount of what the group did
* did not evaluate the health promoting strategy.

Assessment Type 3: Examination (for 20-credit subject)

The exam has a time length of 120 minutes. The exam is presented in 2 parts. Part 1 is short-answer and analytical questions which equate to 100 marks. Part 2 is the extended response which students choose the topic they have studied Option Topic 1 or Option Topic 2, this part is worth 20 marks, giving the total exam mark of 120 marks.

Part 1: Short-answer and Analytical Questions

Booklet 1

Question 1

1. The more successful responses commonly:

* were answered well identifying plain flour, oats, and self-raising flour as the ingredients that are of concern for a person who has coeliac disease due to containing its gluten component
* provided an appropriate alternative to the ingredient they identified in part (i), where the most common responses included almond flour, rice flour and gluten free flour alternatives.

The less successful responses commonly:

* needed to identify gluten and not just wheat
* got coeliac and lactose intolerance confused, providing an ingredient a lactose sufferer should avoid
* did not provide suitable alternatives to the ingredients they removed in this case from the recipe of banana bread.

1. The more successful responses commonly:

* discussed the flattening and damage of the villi, which decreases surface area and therefore reduces the absorption of nutrients in the small intestines
* identified a nutrient that is absorbed in the small intestine and its related deficiency
* included Iron and Calcium, leading to Anaemia and Osteoporosis respectively
* identified fibre as the nutrient deficiency and its subsequent diet related disorder as diverticular disease, when this nutrient is not absorbed in the small intestines.

The less successful responses commonly:

* didn’t link the detrimental effects of coeliac (loss of villi) to nutrient deficiency and rather talked about not eating products or an entire food group containing gluten so therefore missing out on these nutrients (which they can get them from other sources). It is important for students to understand the biological functions of the small intestine with relation to nutrient absorption and how this impacts a person with coeliac disease
* needed to make sure they identified a nutrient that is absorbed at this site and not something in the large intestine only.

Question 2

1. *The more successful responses commonly:*

* identified that the temperature of food can contribute to the growth of pathogenic bacteria, causing food poisoning.

The less successful responses commonly:

* needed to include the temperature range (5-60℃) that can cause this type of contamination, simply writing the danger zone wasn’t sufficient.

1. The more successful responses commonly:

* used the data from both axis (number of bacteria and time) in their responses when describing patterns of results from a graph. A good indication of when data is required is if the question is out of 2 marks and it specifies in the question ‘with reference to the graph’
* explained the trend as increasing
* correctly identified 7 hours from the graph.

The less successful responses commonly:

* did not use or refer to data. It is essential for students to use data to support their explanation and demonstrate the relationship between the two variables (number of bacteria and time).

1. The more successful responses commonly:

* were able to identify a successful strategy that would ensure the leftover pizza is safe to consume
* responded with placing the leftovers in the fridge/freezer to reduce growth (<5℃), reheat above 60℃ to kill bacteria, put in container to reduce oxygen supply and growth were the most common responses.

The less successful responses commonly:

* provided answers like ‘Sally could ensure that the leftovers are safe to eat by refrigerating her food overnight’ and ‘Sally could ensure that the leftovers are safe to eat by reheating the food the next day’ — the students knew what they were talking about but did not expand and explain why these strategies would ensure the safety of the leftovers
* needed to make sure they state specific temperatures when they talk about temperature and explain how this affects bacterial growth; as well as how a lack of oxygen or water availability can ensure the safety of her leftovers
* double dipped by saying fridge and freezer and provide the same explanation (that it reduces bacterial growth by making them dormant).

1. The more successful responses commonly:

* Noted reducing the impact to the environment and cardboard being easy to recycle were the most common advantages
* achieved at least 1 mark for identifying a suitable advantage of cardboard to Sally and the manufacturer
* were able to clearly explain how the advantage identified benefited Sally and the manufacturer specifically.

The less successful responses commonly:

* stated ‘cardboard has a reduced impact on the environment as it is easy to recycle’ which was not sufficient enough to achieve full marks
* did not explain or provide a statement when asked to. Their answer also needed to link back to either the benefit for the consumer or manufacturer
* gave the same reason for consumer and manufacturer.

Question 3

1. The more successful responses commonly:

* were able to calculate Mark’s BMR successfully
* included the calculations, which was awarded marks also

1. The more successful responses commonly:

* provided the correct answer of 4099kJ. Majority of students also showed their calculations, which were not awarded marks as the question did not ask this of students
* answered 409.9kJ or 410kJ – both were accepted as correct answers.

1. The more successful responses commonly:

* noted the development of obesity, type II diabetes and hypertension/atherosclerosis were the most common responses students provided.

The less successful responses commonly:

* did not clearly explain what component of a high energy diet contributes to the development of the diet related disorder they identified
* needed to make sure they explain how a high-energy diet contributes to their chosen disease — not just state the disease and identify what aspect of the high energy diet (e.g. sugar, saturated fat)

1. The more successful responses commonly:

* identified one alternative to Mark’s snack and drink choice and two alternatives to his lunch ingredients.

The less successful responses commonly:

* needed to ensure they provided an alternative in accordance to the Australian dietary guidelines. Replacing coke with juice or a flavoured milk, or the muffin with another baked good does not meet this requirement. Students also needed to ensure that the substitutions identified are still suitable for his bread roll or as a salad.

1. The more successful responses commonly:

* stated to see a nutritionist/dietician or take cooking classes to learn how to cook home cooked meals

The less successful responses commonly:

* needed to explain how their strategy would increase their knowledge of nutrition specifically to achieve the second mark
* needed to recognise the strategy needs to be from a credible source and cannot repeat the question as their explanation
* included reviewing the AGHE, which no marks were awarded for as the AGHE is part of the ADGs and the question specifically asked ‘other than the ADGs’.

Question 4

1. The more successful responses commonly:

* identified 24g of sugar was present in the smoothie bowl which left 1g of sugar for the rest of the day
* identified that this increases the risk of dental caries or diabetes in the long term
* noted the removal of honey. Most students identified a suitable alternative and generally justified it as being healthier due to containing less sugar.

The less successful responses commonly:

* did not explain the consequence of the high sugar content present in the smoothie bowl
* needed to ensure that the alternative provided is still suitable for the recipe in the question, and in this case the smoothie bowl.

1. The more successful responses commonly:

* gave the correct explanation of mechanical digestion
* gave the correct explanation of chemical digestion
* included key terms such as chewing, increased surface area, salivary amylase, complex and simple carbohydrates
* explained correctly digestion in the mouth.

The less successful responses commonly:

* lacked detail and gave very general answers achieving 2 or 3 out of 4 marks
* did not link chewing (mastication) to increasing surface area or breaking carbohydrates into smaller pieces for efficient chemical digestion to take place. Others did not identify salivary amylase and its role in breaking down complex carbohydrates (starch) into simple carbohydrates (maltose or disaccharides)
* showed misconceptions by students describing chewing as breaking down complex carbohydrates into simple carbohydrates, or saliva containing hydrochloric acid
* demonstrated limited understanding of human digestion in order to explain the physical and chemical roles in the part of the body that is mentioned in the question
* demonstrated limited use of key words when describing digestion, including enzyme names and the result of the process
* explained the whole process of digestion rather than just digestion in the mouth.

Question 5

1. The more successful responses commonly:

* were able to identify that food safety is important to reduce the chance of food-borne illnesses
* explained and justified that it was because the mother is immunocompromised and/or child has a weak immune system. It is important for students to understand that the woman’s immune system is compromised, which is why it is essential for them to store and prepare their food safely.

The less successful responses commonly:

* discussed the importance of storing and preparing food appropriately to reduce the loss of sensitive nutrients; however, the question specified why pregnant women need to store/prepare food safely and not to meet nutritional requirements.

1. The more successful responses commonly:

* noted folate and preventing the development of spina bifida, calcium and bone growth and iron and its role in the development of red blood cells/or preventing anaemia.

The less successful responses commonly:

* identified a macronutrient instead of a micronutrient as per the requirements of the question.

1. The more successful responses commonly:

* identified gaining all required nutrients for growth, antibodies to support immune function, sterile to prevent infections
* explained 2 different benefits to the infant well, instead of listing 4 points, to achieve full marks to this question.

The less successful responses commonly:

* gave a benefit to the mother rather than the infant (e.g. cheaper than purchasing formula) which was not awarded any marks
* many students also explained that breastfeeding enhanced the bond between the mother and infant; however it has not been proven that bottle fed infants lack this bond, which is why only 1 mark was awarded for this benefit.

Booklet 2

Question 6

1. *The more successful responses commonly:*

* correctly identified lactase as the enzyme found in the small intestine. Lactase only needed to be listed as it was worth one mark
* correctly identified glucose and galactose as the simplest substances that are broken down from lactose, but due to the scope of the question, the simplest substances found in the gastrointestinal tract could also be amino acids and fatty acids + glycerol
* were able to clearly explain the structural difference between simple and complex carbohydrates. Popular responses were able to explain that one or two sugar molecules/units/monosaccharides = simple, more than three = complex.

The less successful responses commonly:

* identified Lactose. Lactose is the sugar not the enzyme. Other incorrect responses that appeared were amylase and bile
* didn’t answer the question in regards to structure. They listed functional difference such as relating to glycaemic index. Incorrect responses linked simple = fast breakdown/high GI/fast energy release and complex = slow breakdown/low GI/slow energy release. Some other misconceptions were: hydrogen bonds, double bonds between molecules or confusing structural difference of proteins and fats.

1. The more successful responses commonly:

* correctly identified how wholegrain cereals improve the nutrition of this breakfast. Popular responses involved soluble/insoluble/resistant starch or B group vitamins.

The less successful responses commonly:

* talked about how fibre created bulky stools but did not elaborate on this. Some students listed many nutrients rather than explain just one. Some students explained the nutritional improvement from milk which was irrelevant or deviated to lifestyle issues.

Question 7

1. The more successful responses commonly:

* were able to state (1 mark) and explain (1 mark) two different benefits to a family consuming pre-prepared meals
* cheap — affordable for a large family, therefore they can still provide food on the table and pay for other expenses e.g. school fees
* convenient — working parents do not always have time to cook, therefore this is a quick and simple meal to put on the table
* easy instructions — children are able to prepare themselves.

The less successful responses commonly:

* stated they contain carbohydrates for energy for the children
* did not relate their answer to the family/children but it could be generalised to all people. Care needs to be taken to read and relate to the question.

1. The more successful responses commonly:

* were able to clearly explain the link between pre prepared meals and hypertension
* the more popular responses were able to link pre prepared meals, manufacturing processes, and high amounts of sodium. Other responses linked prepared meals contain high amount of saturated fat and sugar
* were able to link high salt to increased fluid in blood thus creating blood pressure. Few students made links to fat building up in the arteries causing a narrowing arteries or plaque deposits hardening. To achieve all three marks, students had to make a link to a specific Australian dietary guideline.

The less successful responses commonly:

* did not state the guideline or list guideline 3, or incorrectly stated guidelines. Other less responses did not link salt and hypertention.

1. The more successful responses commonly:

* were able to identify one additive from the instant noodles ingredient listing provided and give a correct explanation
* identified colour, flavour enhancer, anticaking agent or antioxidant, then explained reason it was added to the prepared meal e.g. flavour enhancer added to enhance taste to increase sensory appeal to the consumer to continue to buy and also to enhance flavour lost through production.

The less successful responses commonly:

* were not specific, not an additive or were not explained clearly. For example: flavour enhancer is just used to ‘improve taste’ and colour is used just to ‘improve colour’ - not very specific answers; or the explanation matched the additive
* were able to identify an additive but not able to provided its function for the second mark

The more successful responses commonly:

* were able to explain a social or environmental factor that affects children aged 5–12 years who frequently consume pre-packaged meals. Some popular responses revolved around:
* bullying because children gain weight from eating pre-packaged meals, therefore social isolation
* children will not have cooking skills etc. when older due to eating pre-packaged meals
* peer pressure to either eat pre-packaged meals or eat what other children eat when they go to parties/schools etc. who do not eat pre-packaged meals
* parents work long hours and therefore rely on pre-packaged meals for dinners.
* were able to clearly discuss and make the link on why preparing meals in the home using fresh ingredients can benefit the health of children aged 5-12
* noted: fresh ingredients contain nutrients (vitamins/minerals) for the growth and development which are low in saturated fat, salt, etc. to decrease diet-related disorders in future. It also helps develop good cooking skills, healthy eating habits, an understanding of fibre.

The less successful responses commonly:

* talked about diet factors, or repeated responses in early questions or did not provide reasoning
* were not specific with no real link back to how preparing meals in the home were elaborated on (e.g. what does it mean to prepare a meal at home, cook with family etc.?)
* repeated answers of the previous question or 7(a)
* needed more specific information about the benefits of a range of nutrients relevant to this life stage.

Question 8

1. *The more successful responses commonly:*

* were able to state the dependent variable. The correct answer was vitamin content (of B1 and E) in mg. Best practice is to be able to state the variable and units
* were able to clearly identify two factors that remain constant during the investigation, with a clear explanation
* noted:
* time — more time in boiling water = greater vitamin loss
* temperature of water = hotter will cause greater vitamin loss
* same broccoli plant used
* method
* utensils used.

The less successful responses commonly:

* stated vitamin loss which was incorrect. Students are advised to know which axis displays the dependent and independent variable. The graph could then confirm the answer
* were vague, or listed size of broccoli without any further explanation or justification
* would mention temperature but then state depending on the temperature ‘more or less’ vitamins will be lost
* some students stated a correct constant but were not able to identify why.

1. The more successful responses commonly:

* indicated boiled broccoli loses 0.1mg of vitamin B1. It was important students use data and correct units from the graph
* were able to state that boiling does not affect vitamin E. There is no loss of vitamin E. The clearer responses saw students using data to support their response.

The less successful responses commonly:

* did not use data from the graph. Some students misinterpreted the graph and looked at raw/boiled data separately, not realising it was the same broccoli before and after cooking.

1. The more successful responses commonly:

* were able to clearly explain the difference between vitamin B1 and vitamin E lost from broccoli during boiling
* clearly differentiate that B vitamins are water soluble and are destroyed by boiling, heat etc. Vitamin E is not leeched out of water.

The less successful responses commonly:

* claimed heat sensitivity as a response but did not relate directly to B vitamins and Vitamin E

The more successful responses commonly:

* were able to consistently identify one of the following: urine, faeces, perspiration, tears and blood.

1. The more successful responses commonly:

* were able to clearly state one function of vitamin E in the human body. Popular responses were the protection/formation of red blood cells, improve immunity, antioxidant, improves fertility
* were able to state one food source (not food group or similar) that contains vitamin E. Popular responses were: green leafy vegetables, spinach, nori, asparagus, avocados, eggs, nuts (almonds and walnuts).

The less successful responses commonly:

* incorrectly related vitamin E with improved skin. There is no concrete scientific base that it directly improves skin
* said broccoli or broccolini which was too close to the question. Other misconceptions were: celery, lettuce, cauliflower.

Question 9

1. The more successful responses commonly:

* were able to state and justify one ingredient modification that will increase nutrient density in the meal
* noted:
* to use wholemeal spaghetti instead of white as this would increase soluble fibre/ B vitamins
* add vegetables — increase fibre, decrease kJ. Other examples of add vegetables are: carrot — increase vitamin A, spinach — increase iron.
* said to swap beef for chicken breast, extra lean pork/turkey mince — reduce saturated fat. Swap canned tomatoes for fresh chopped tomatoes.

The less successful responses commonly:

* misread the question and suggested a different cooking method, or otherwise listed an ingredient but did not justify it correctly. Removing salt does not increase nutrient density
* did not justify the reason for the modification other than stating that it improved the nutrition.

1. The more successful responses commonly:

* were able to calculate 5 serves
* were able to correctly identify the importance of serving size in maintaining a healthy weight by suggesting:
* consume too much kJ energy intake will exceed energy output = weight gain (however serving size was never really defined by most students, some did make mention to RDI or portion size.)
* energy balance. Energy in vs energy out.

The less successful responses commonly:

* discussed nutrient dense vs energy dense. Did not relate to the question. Students needed to made a clear connection between energy in vs energy out or relate to AGHE.

1. The more successful responses commonly:

* give an example from AGHE of a food that should be eaten only sometimes and in small amounts. Popular responses ranged from chocolate, cake, cream, alcohol, soft drinks, fries
* were able to identify and explain one healthy eating campaign or food model other than AGHE that educates about healthy food choices
* suggested 2 and 5 fruit and vegetable campaign, swap it don’t stop it or food pyramid.

The less successful responses commonly:

* said olive oil but not technically a food
* did not give a proper heathy eating campaign or did not explain. Responses like 2 and 5 man with the face did not achieve a mark. The ‘2 and 5’ needed to be explained clearly to get the full 2 marks. Not just saying 2 fruit and 5 veg. Students should re-select and discuss an alternate food model/campaign or look to really extend the 2 and 5.

Question 10

1. The more successful responses commonly:

* were able to clearly identify obese by interpreting table.

The less successful responses commonly:

* misread the question but most did answer correctly.

1. The more successful responses commonly:

* discussed lifestyle factors like exercising or reducing portion sizes. Some went down the dietary response like reducing saturated fat intake to improve BMI.

The less successful responses commonly:

* were able to identify a strategy but unable to explain the strategy
* suggested: reduce saturated fat intake — yet did not explain why, or mentioned reduce saturated fat, but no mention on reducing overall energy intake
* just listed multiple strategies — one only and explain vs list many and explain none.

1. The more successful responses commonly:

* stated one advantage of using BMI as a diagnostic tool was that it was easy, cheap, non-invasive
* were able to identify why the BMI classification of athletes is pre-obese or obese. The better responses identified muscles are active working tissue and extra bulk adds to greater/heavier mass. Whilst ‘muscle weighs more than fat’ was accepted, more successful responses were able to clearly define why athletes rated differently on the scale
* were able to clearly identify and explain one diagnostic tool, other than BMI, that is used to elevate health. Students were able to identify a test, but found it hard to explain one
* were waist to hip ratio, waist circumference, skin fold test, blood test.

The less successful responses commonly:

* stated you just use ‘height and weight’ therefore..., ‘tells you what category your weight is in’ this does not give sufficient explanation or give reason to it being used as a diagnostic tool
* described what BMI was or gave its purpose vs an advantage of the BMI as a diagnostic tool
* did not provided clear explanations

Part 2: Extended Response

Option Topic 1 – Global Nutrition and Ecological Sustainability

Question 11

One environmental impact and one economic impact of rice production in Australia

Most successful answers:

* focussed and discussed rice being a monoculture (and issues associated with this), vast land requirement and thus leading to land degradation (clearing and soil issues) and heavy machinery
* noted that despite the stem containing important water information, students were tending to write ‘rice needs huge amounts of water’ and hence some responses here lacked credibility and depth for 2 marks
* identified a clear environmental impact and discussed it in detail e.g. deforestation and removal of vegetation due to land clearing leads to a loss of habitat, biodiversity and less absorption of carbon dioxide leading to increased greenhouse effect and climate change
* identified environmental impact: removal of vegetation leading to loss of biodiversity and habitat, overuse of pesticides leading to soil and water contamination, overuse of fertilisers leading to eutrophication, excess use of water for irrigation leading to poor flow downstream and disruption of river ecosystems
* identified economic impact: negative impacts = high cost of water in times of drought, cost of machinery and fossil fuels to power it, positive impact = high demand for rice overseas leads to increased income from exporting rice plus creation of jobs.

Less successful answers:

* gave misinformation in the economic impacts regarding flying vs shipping i.e. stating flying is okay and not impacting global warming!
* noted food miles but was not linked closely to the ‘rice production’ question to attain full marks
* simply restated the information given in the question that rice uses a lot of water without expanding on the environmental impact of this
* were too brief without discussing the impact, e.g. stating that water is costly.

How genetically modified organisms (GMOs) could benefit the health of individuals

Most successful answers:

* showed a clear understanding that a GMO had genes altered or inserted or removed to create a benefit to the crop or animal
* selected particular traits that were changed and linked them to a clear health benefit. Example 1 = inserting a gene for vitamin A production into ‘golden rice’ to prevent xerophthalmia and blindness in regions where vitamin A deficiency is common. Example 2 = inserting genes for pest resistance means less pesticides are used so there is less contamination of waterways with pesticides or less pesticide residue on crops. This leads to clean water being available for human consumption. Additional nutrients being added was a popular response, and the better answers gave examples such as Golden Rice with added vitamin A and its role in preventing eye diseases
* noted adding nutrients to crops, adding genes to increase yield so there are more fibre-rich and nutrient rich fruits and vegetables and grains available to reduce diet related disorders
* stated resistance to disease so less use of chemicals which makes it safer for human consumption. Adding genes to help reduce use of pesticides — successful responses articulated that this helped prevent run off into rivers and then the impact on native animals etc
* provided clear definition or understanding of GMO/process
* stated drought resistance so therefore more reliable yields (although the link with reliable yields was not often clear
* demonstrated they understood the latest GMO trend and then linked their answers closely to benefitting health of the individual
* showed deeper thinking for example, if the farmer was likely to have success in food production because of GMO then that is positive health impacts (mental health).

Less successful answers:

* mentioned GMOs have higher nutrient value but did not give specific examples or explain why they have higher nutrient value, nor the health benefits that come from that
* confused GMOs with adding nutrients to food or modifying food during processing e.g. lactose free milk. As well as confusion with fortification e.g. folate into bread
* noted inserting gene of 1 plant or animal into another to add desirable traits or genes
* stated generic GMOs increase nutrients in a food by adding a gene
* noted adding gene to help grow plants in less water — few then linked to Rice in Australia — using 50% less water.

Two ways that the processing, distribution and packaging of rice can be undertaken to ensure a sustainable food supply.

Most successful answers:

* discussed two clear methods of processing or packaging or distributing grains in a way that minimised environmental impact
* emphasised how the method reduced environmental impact
* statedto power processing or packaging machinery should use renewable sources of energy e.g. solar, wind, to reduce greenhouse gas emissions due to burning fossil fuels to reduce climate change
* identified recycling water e.g. greywater through wetlands for processing e.g. washing rice
* stated using renewable, biodegradable, recyclable packaging e.g. bamboo, hemp sacks
* said distributing food locally to reduce food miles and greenhouse gas emissions due to burning fossil fuels to reduce climate change.

Less successful answers:

* gave unrealistic options e.g. packaging rice in paper or glass
* discussed food production instead of processing, packaging, distribution. No credit was given for organic farming etc.
* did not seem to have a clear direction and responses lacked depth and breadth. Paper (cardboard) was popular answer and because of being recyclable etc. Again, they did not demonstrate depth of the advantages of this material and the fact it is renewable resource. Bamboo appeared and only few students citing plant-based packaging (corn-starch etc.)
* were not connected to the question. Air tight packages to keep pathogens out or vacuum packaging rice to keep safe were popular answers
* focussed too much on ‘food production’ methods to enhance the sustainability of food, which was not what the question asked
* discussed food miles but could have been expanded upon and show an understanding of the concept.

Two initiatives that the government could implement to support farmers in providing a secure and sustainable food supply.

Most successful answers:

* incorporated all three parts to their answer, including the role of the government, how farmers are supported and how the initiative leads to a secure and sustainable food supply
* named organisations (such as EPA or CSIRO) and explained how food security or sustainability could be possible for farmers
* endorsed organic farming
* noted a government initiative to control ‘Urban Sprawl’ and ensure fertile land is for a sustainable food supply and not housing developments
* identified providing farmers with financial or emotional (mental health) support during times of hardship
* noted educating the public on importance of buying local and buying Australian to support farmers
* noted policies around water use to ensure farmers have adequate water e.g. Murray Darling Basin Plan, water restrictions, desalination plant.

Less successful answers:

* discussed strategies that could be used by the government to provide a secure and sustainable food supply, but did not discuss how farmers are being supported
* gave two initiatives that were too similar e.g. provide money to farmers, provide machinery to farmers
* gave unrealistic options e.g. setting up organic farms for farmers to use
* stated funding, but tended to be too general rather than naming a specific initiative such as ‘Mental Health Support’
* were too general in the initiatives on the whole, rambled and lacked credibility. Many students thought the Government should give more water and land to the farmers. They did not discuss how this would be possible.

Option Topic 2 — Global Hunger

Question 12

Two reasons that explain how an unstable Government may threaten a country’s food security

More successful answers:

* showed a clear understanding of food security and linked the unstable government to that involved in war and destruction of farming land and infrastructure, men leave farms to fight, food taken to feed soldiers. War and conflict were common responses and could be discussed in depth and effectively, and thus more likely to have achieve maximum marks
* identified corruptness and discussed how governments would channel resources towards themselves and rich people and thus lower socio-economic peoples suffered
* said are more likely to have fewer trade agreements, may have trade embargoes against them and less import and export of food
* said may be in debt and growing cash crops instead of food crops
* noted trade issues resulting from an unstable government was able to be discussed well.

Less successful answers:

* briefly stated a point about the unstable government but did not explain the impact on food security
* provided two points that were too similar
* tended to have a list of responses for this question. Also, not linking to the question which a response for food security was
* discussed that Food Aid would be compromised.

Two health implications for an individual who relies on rice as a stable food.

More successful answers:

* identified that these staple foods are lack all the essential amino acids, vitamins A, B1, C, B12, D and iron and calcium and if there is difficulty cultivating the staple food, there is likely to be an energy deficit as well
* named the deficiency disorder, the nutrient that is deficient and the symptoms of the disorder
* discussed how the individual is affected in terms of their ability to work, look after children and therefore lack of contribution to the community
* said kwashiorkor, iron deficiency anaemia, scurvy, Beriberi, Xerophthalmia most common diet related disorders.

Less successful answers:

* understood that ‘malnutrition’ resulted from not consuming staple crops and were able to identify bad nutrition areas, but this was not enough to be awarded full marks. Some understood staples were carbohydrates and needed for energy
* did not name a disorder but discussed ‘malnutrition’ in a general sense
* did not expand on the implications of the deficiency for the individual, instead just identifying the nutrient that is lacking and naming the disorder it causes
* discussed a lack of fibre causing diverticular disease. This is not a global hunger disorder
* discussed rice being a high GI, carbohydrate rich food so consuming it as a staple food would lead to obesity, cardiovascular disease, type 2 diabetes. These are not global hunger disorders
* were confused by the phrase ‘difficulty cultivating’
* went off on the wrong tangent and discussed the reasons why staples could not be produced
* noted anorexia as a consequence of poor nutrition is not appropriate when discussing developing countries.

One education initiative aimed at women and explain how this will lead to an increase in food production within the community.

More successful answers:

* focused on one initiative that is aimed specifically at women e.g. family planning or literacy
* focused on food production specifically, growing and cultivating crops or animals
* clearly discussed how the initiative educates women and how that education leads to an increase in food production in the whole community
* literacy — to read and write hence understand more about farming and growing crops
* revolving loans — start a business — build capacity — pass on learnt information to community
* sanitation — less health concerns more people to work — cleaner water — due learning about hygiene etc.
* food preparation and safety —- sanitation making sure food properly stored and prepared, thus reducing food wastage — more food for all to eat (and health is better)
* pregnancy/family planning — less unwanted children less mouths to feed, women healthier — thus can work more
* farming/agriculture practices – women can support or work with men in the fields
* food for girls at school — girls get fed at school also education — thus long term can provide income through work due to better education.

Less successful answers:

* identified education of women — not all were then detailing or giving examples
* discussed an initiative but did not link it to women and/or education and/or impact on food production
* discussed several initiatives in brief without focusing on one in detail e.g. education about farming, food preparation, sanitation, family planning all in one answer
* discussed education initiatives linked to food preparation and storage rather than food production
* showed a misunderstanding about women’s role in developing nations e.g. staying at home to cook, clean and look after children without understanding they work in the fields
* did not discuss in enough detail for 4 marks.

Two ways in which relying on NGO during famine may have a negative impact on a community.

More successful answers:

* noted
* if food supplied local farmers cannot sell product so then go out of business and need the support also
* governments take the food or supplies — redistribute ineffectively
* food provided is unsuitable for the community with limited nutritional value or is culturally inappropriate food or food that the community does not know how to prepare
* impact of litter and waste on a community
* discussed two clearly different negative impacts on the community as it does not develop own strategies and loss of support for local food producers.

Less successful answers:

* stated
* NGO’s will run out of money thus not help any more
* NGOs provide food — but not education (short term not long-term help)
* NGO’s maybe corrupt
* unequal sharing of food/resources
* showed a misunderstanding about non-government organisations and the types of food provided e.g. fresh fruit and vegetables instead of staple foods such as grains and non-perishable items
* discussed two impacts that were similar e.g. depending on the NGO for food and depending on the NGO for money means the community does not develop own strategies.

Option Topic – Extended response general feedback

Students should be recommended to:

* write in separate paragraphs for each dot point rather than in one long continuous paragraph for all four dot points
* not waste time rewriting information from the question that is not essential to their answer, i.e., do not paraphrase the question at the beginning of each dot point
* only discuss as many points as the question requires. i.e., do not discuss 3 when it is only asking for 1
* not repeat information from previous dot points again
* relate their answers back to food security or sustainability when required by the question.