

Food & Nutrition 2019 v1.1

General Senior Syllabus

This syllabus is for implementation with Year 11 students in 2019.

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1 Course overview

1.1 Introduction

1.1.1 Rationale

Technologies have been an integral part of society for as long as humans have had the desire to create solutions to improve their own and others' quality of life. Technologies have an impact on people and societies by transforming, restoring and sustaining the world in which we live.

Australia needs enterprising and innovative individuals with the ability to make discerning decisions related to the development, use and impact of technologies. When developing technologies, these individuals need to be able to work independently and collaboratively to solve complex, open-ended problems. Subjects in the Technologies learning area prepare students to be effective problem-solvers as they learn about and work with contemporary and emerging technologies.

Food & Nutrition is the study of food in the context of food science, nutrition and food technologies. Students explore the chemical and functional properties of nutrients to create food solutions that maintain the beneficial nutritive values. This knowledge is fundamental for continued development of a safe and sustainable food system that can produce high quality, nutritious solutions with an extended shelf life. The food system includes the sectors of production, processing, distribution, consumption, research and development. Waste management, sustainability and food protection are overarching principles that have an impact on all sectors of the food system. Students will actively engage in a food and nutrition problem-solving process to create food solutions that contribute positively to preferred personal, social, ethical, economic, environmental, legal, sustainable and technological futures.

Food & Nutrition is a developmental course of study. In Unit 1, students develop an understanding of the chemical and functional properties of vitamins, minerals and protein-based food, as well as food safety, spoilage and preservation. In Unit 2, students explore consumer food drivers, sensory profiling, labelling and food safety, and the development of food formulations. In Unit 3, students develop knowledge about the chemical, functional and sensory properties of carbohydrate- and fat-based food, and food safety, food preservation techniques and spoilage. In Unit 4, students develop an awareness of the interdisciplinary nature of food science, nutrition and technologies in relation to solving food and nutrition problems and improving safety, nutrition, convenience, transparency and accessibility for the consumer, as well as considering the wider impacts and implications of the solution.

Using a problem-based learning approach, students learn to apply their food science, nutrition and technologies knowledge to solve real-world food and nutrition problems. This includes: exploring problems; developing ideas; generating, communicating and testing solutions; and evaluating the process and solutions. Students will integrate and use new and existing knowledge to make decisions and solve problems through investigation, experimentation and analysis.

Food & Nutrition is inclusive of students' needs, interests and aspirations. It challenges students to think about, respond to, and create solutions for contemporary problems in food and nutrition. Students will become enterprising individuals and make discerning decisions about the safe development and use of technologies in the local and global fields of food and nutrition.

In Food & Nutrition, students learn transferable 21st century skills that support their aspirations, including critical thinking, creative thinking, communication, collaboration and teamwork, personal and social skills, and information & communication technologies (ICT) skills. Students become adaptable and resilient through their problem-solving learning experiences. These skills enable students to innovate and collaborate with people in the fields of science, technology, engineering and health to create solutions to contemporary problems in food and nutrition.

Assumed knowledge, prior learning or experience

Students will have prior knowledge of the Australian Curriculum: Technologies, which is core in Years 7 and 8. Similarly, students will have studied the P–10 Australian Curriculum: Science and P–10 Australian Curriculum: Health and Physical Education.

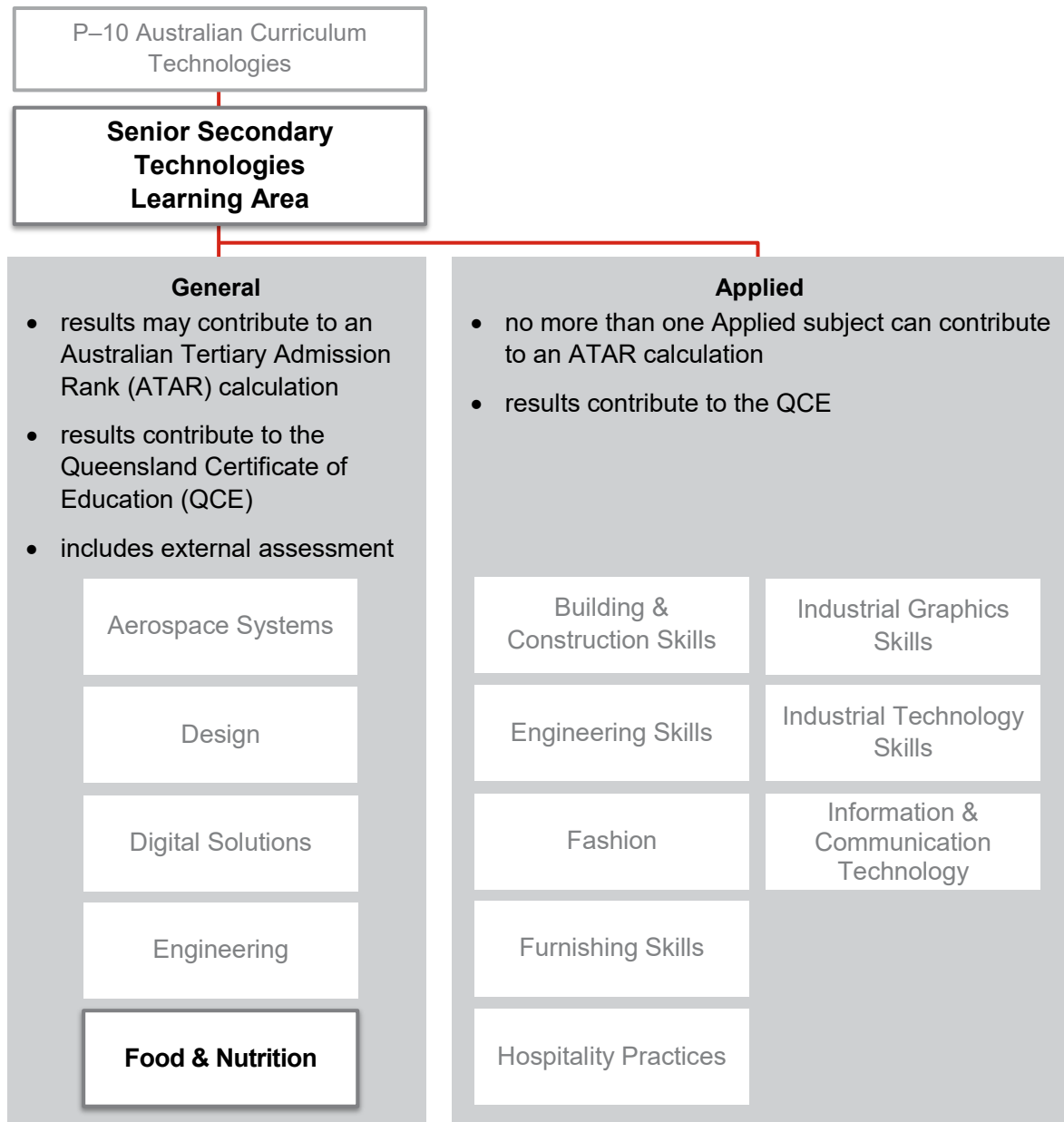
Pathways

Food & Nutrition is a General subject suited to students who are interested in pathways beyond school that lead to further education, training and employment. A course of study in Food & Nutrition can establish a basis for further education and employment in the fields of science, technology, engineering and health.

1.1.2 Learning area structure

All learning areas build on the P–10 Australian Curriculum.

Figure 1: Learning area structure



1.1.3 Course structure

Food & Nutrition is a course of study consisting of four units. Subject matter, learning experiences and assessment increase in complexity from Units 1 and 2 to Units 3 and 4 as students develop greater independence as learners.

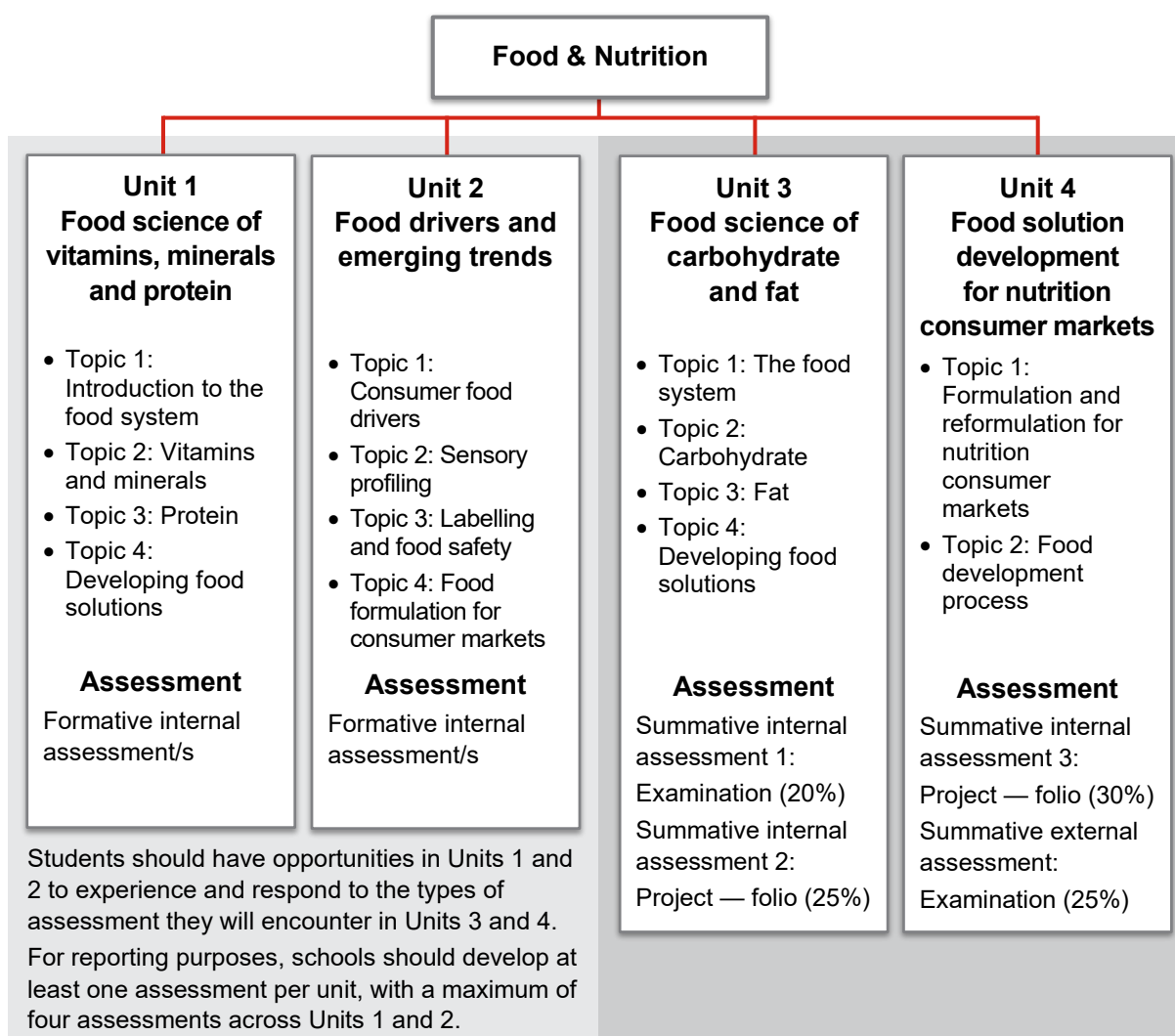
Units 1 and 2 provide foundational learning, which allows students to experience all syllabus objectives and begin engaging with the course subject matter. Students should complete Units 1 and 2 before beginning Unit 3. It is recommended that Unit 3 be completed before Unit 4.

Units 3 and 4 consolidate student learning. Only the results from Units 3 and 4 will contribute to ATAR calculations.

Figure 2 outlines the structure of this course of study.

Each unit has been developed with a notional time of 55 hours of teaching and learning, including assessment.

Figure 2: Course structure



1.2 Teaching and learning

1.2.1 Syllabus objectives

The syllabus objectives outline what students have the opportunity to learn. Assessment provides evidence of how well students have achieved the objectives.

Syllabus objectives inform unit objectives, which are contextualised for the subject matter and requirements of the unit. Unit objectives, in turn, inform the assessment objectives, which are further contextualised for the requirements of the assessment instruments. The number of each objective remains constant at all levels, i.e. Syllabus objective 1 relates to Unit objective 1 and to Assessment objective 1 in each assessment instrument.

Syllabus objectives are described in terms of actions that operate on the subject matter. Students are required to use a range of cognitive processes in order to demonstrate and meet the syllabus objectives. These cognitive processes are described in the explanatory paragraph following each objective in terms of four levels: retrieval, comprehension, analytical processes (analysis) and knowledge utilisation, with each process building on the previous processes (see Marzano & Kendall 2007, 2008). That is, comprehension requires retrieval, and knowledge utilisation requires retrieval, comprehension and analytical processes (analysis).

By the conclusion of the course of study, students will:

Syllabus objective	Unit 1	Unit 2	Unit 3	Unit 4
1. <u>recognise</u> and <u>describe</u> food and <u>nutrition</u> facts and <u>principles</u>	•	•	•	•
2. <u>explain</u> food and nutrition ideas and problems	•	•	•	•
3. <u>analyse</u> problems, information and data	•	•	•	•
4. <u>determine</u> solution requirements and criteria	•	•	•	•
5. <u>synthesise</u> information and data	•	•	•	•
6. <u>generate</u> solutions to provide data to determine the feasibility of the solution	•	•	•	•
7. <u>evaluate</u> and <u>refine</u> ideas and solutions to make justified recommendations for enhancement	•	•	•	•
8. <u>make decisions</u> about and use mode-appropriate features, language and conventions for particular purposes and contexts.	•	•	•	•

1. recognise and describe food and nutrition facts and principles

When students recognise, they identify or recall characteristics of facts and principles related to food and nutrition problems. When describing, students give an account (written or spoken) of the characteristics of food and nutrition facts and principles in a range of contexts.

2. explain food and nutrition ideas and problems

When students explain, they make an idea or problem clear by describing it in more detail and revealing relevant facts.

3. analyse problems, information and data

When students analyse, they dissect problems, information and data to ascertain and examine constituent parts and/or their relationships. They identify characteristics and constraints, the relationships between them, and the reasonableness of information and data related to the problem in order to develop a brief.

4. determine solution requirements and criteria

When students determine solution requirements, they establish, conclude or ascertain the needs of food and nutrition stakeholders. They decide or come to a resolution, to either clarify prescribed criteria or deduce self-determined criteria, which will be used to evaluate the solution.

5. synthesise information and data

When students synthesise, they combine and integrate information and data from research and experiments into a whole in order to create new understanding. When students develop ideas, they use new understandings to devise strategies and processes as alternative solutions to a food and nutrition problem. They choose a solution and elaborate, expand or enlarge their ideas in detail.

6. generate solutions to provide data to determine the feasibility of the solution

When students generate, they create a solution to provide data to determine the feasibility of that solution. A solution could be a set of experiments, a developed argument or a prototype, which is a sample or trial model of the solution.

7. evaluate and refine ideas and solutions to make justified recommendations for enhancement

When students evaluate, they appraise ideas and solutions by weighing up or assessing strengths and limitations against prescribed or self-determined criteria. When students refine ideas and solutions, they use data to make improvements relative to the criteria. When students make justified recommendations, they put forward a point of view or suggestion using supporting evidence to make enhancements.

8. make decisions about and use mode-appropriate features, language and conventions for particular purposes and contexts

When students make decisions about mode-appropriate features, language and conventions, they use written, visual, and spoken features to express meaning for particular purposes in a range of contexts. Written features include language conventions, specific vocabulary and language attributes such as annotations, paragraphs and sentences. Visual features include photographs, sketches, drawings, diagrams and motion graphics. Students use referencing conventions to practise ethical scholarship.

1.2.2 Underpinning factors

There are three skill sets that underpin senior syllabuses and are essential for defining the distinctive nature of subjects:

- literacy — the set of knowledge and skills about language and texts essential for understanding and conveying Food & Nutrition content
- numeracy — the knowledge, skills, behaviours and dispositions that students need to use mathematics in a wide range of situations, to recognise and understand the role of mathematics in the world, and to develop the dispositions and capacities to use mathematical knowledge and skills purposefully

- 21st century skills — the attributes and skills students need to prepare them for higher education, work and engagement in a complex and rapidly changing world.

These skill sets, which overlap and interact, are derived from current education, industry and community expectations. They encompass the knowledge, skills, capabilities, behaviours and dispositions that will help students live and work successfully in the 21st century.

Together these three skill sets shape the development of senior subject syllabuses. Although coverage of each skill set may vary from syllabus to syllabus, students should be provided with opportunities to learn through and about these skills over the course of study. Each skill set contains identifiable knowledge and skills that can be directly assessed.

Literacy in Food & Nutrition

Students develop food and nutrition literacy as they learn how to communicate ideas and solutions to a variety of stakeholders. Students will:

- read and interpret detailed written instructions for specific experiments, often including diagrams and procedural writings such as briefs
- prepare annotated drawings for prototypes and instructions for formulations
- write project outlines and reports for experiments with analysis and conclusions
- develop criteria for evaluations
- prepare detailed specifications for generation of a solution.

Food & Nutrition requires students to develop literacy skills that facilitate the effective communication of technical and scientific information, ideas and solutions to complex problems. Effective communication in Food & Nutrition requires students to learn how to organise and manipulate information in logical sequences to convey meaning to particular audiences for specific purposes. Students develop and enhance this capacity through their learning experiences and by documenting the problem-solving process in Food & Nutrition. Documenting the process will require students to learn how to present information in the form of diagrams, tables and graphs. They improve their ability to use knowledge of language conventions, textual features and mode-appropriate communication skills as they progress through the course of study.

These aspects of literacy knowledge and skills are embedded in the syllabus objectives, unit objectives and subject matter, and instrument-specific marking guides (ISMGs) for Food & Nutrition.

Numeracy in Food & Nutrition

Food & Nutrition gives students opportunities to interpret and use mathematical knowledge and skills in a range of real-life situations. Students:

- use numbers to calculate, measure and estimate
- interpret and draw conclusions from statistics and analysis
- measure and record throughout the process of generating ideas or experimentation
- develop, refine and test concepts
- calculate when formulating solutions and managing projects.

When using software, materials and equipment, students work with the concepts of number, scale, proportion, measurement and volume. These aspects of numeracy knowledge and skills

are embedded in the syllabus objectives, unit objectives and subject matter, and ISMGs for Food & Nutrition.

21st century skills

The 21st century skills identified in the following table reflect a common agreement, both in Australia and internationally, on the skills and attributes students need to prepare them for higher education, work and engagement in a complex and rapidly changing world.

21st century skills	Associated skills	21st century skills	Associated skills
critical thinking	<ul style="list-style-type: none"> analytical thinking problem-solving decision-making reasoning reflecting and evaluating intellectual flexibility 	creative thinking	<ul style="list-style-type: none"> innovation initiative and enterprise curiosity and imagination creativity generating and applying new ideas identifying alternatives seeing or making new links
communication	<ul style="list-style-type: none"> effective oral and written communication using language, symbols and texts communicating ideas effectively with diverse audiences 	collaboration and teamwork	<ul style="list-style-type: none"> relating to others (interacting with others) recognising and using diverse perspectives participating and contributing community connections
personal and social skills	<ul style="list-style-type: none"> adaptability/flexibility management (self, career, time, planning and organising) character (resilience, mindfulness, open- and fair-mindedness, self-awareness) leadership citizenship cultural awareness ethical (and moral) understanding 	information & communication technologies (ICT) skills	<ul style="list-style-type: none"> operations and concepts accessing and analysing information being productive users of technology digital citizenship (being safe, positive and responsible online)

Food & Nutrition helps develop the following 21st century skills:

- critical thinking
 - problem-solving using the problem-solving process in Food & Nutrition
 - demonstrating intellectual flexibility by being open to alternative ideas and new learning
 - reasoning by creating solutions to food and nutrition problems through logical steps
 - evaluating with purpose against criteria to judge the worth, credibility or strength of a solution

- collecting valid data to create new or different solutions to food and nutrition problems
- creative thinking
 - identifying alternatives and making new links in knowledge through experiential learning
 - generating and applying new ideas to create and identify strategies that enhance opportunities for developing solutions
 - using innovation to identify new ways of doing things
 - synthesising data and information to create new knowledge in order to solve a problem
- communication
 - manipulating specialised language, terminology, symbols and diagrams to communicate ideas and solutions in food and nutrition
 - transforming language and texts in food and nutrition to convey ideas and information in particular ways to suit different stakeholders and purposes
 - developing arguments to support a case, advocate for a particular cause or pitch solutions for food and nutrition problems
- collaboration and teamwork
 - relating to and interacting with others in experimental food and nutrition learning contexts
 - recognising and using diverse perspectives to enhance equity and integrity in food and nutrition problem-solving contexts
 - participating and contributing to create solutions in food and nutrition contexts
- personal and social skills
 - demonstrating adaptability and flexibility to create or enhance a solution to a food and nutrition problem
 - developing the ability to self-manage (time, planning and organising) in food and nutrition learning contexts
 - developing personal, social, ethical, moral, economic, environmental and legal understandings in food and nutrition problem-based learning contexts
- information & communication technologies (ICT) skills
 - accessing, capturing and analysing information, including primary and secondary data to solve problems in food and nutrition
 - manipulating data and information using digital technologies to identify trends, patterns or relationships to develop solutions.

These elements of 21st century skills are embedded in the syllabus objectives, unit objectives and subject matter, and ISMGs for Food & Nutrition.

1.2.3 Aboriginal perspectives and Torres Strait Islander perspectives

The QCAA is committed to reconciliation in Australia. As part of its commitment, the QCAA affirms that:

- Aboriginal peoples and Torres Strait Islander peoples are the first Australians, and have the oldest living cultures in human history
- Aboriginal peoples and Torres Strait Islander peoples have strong cultural traditions and speak diverse languages and dialects, other than Standard Australian English
- teaching and learning in Queensland schools should provide opportunities for students to deepen their knowledge of Australia by engaging with the perspectives of Aboriginal peoples and Torres Strait Islander peoples
- positive outcomes for Aboriginal students and Torres Strait Islander students are supported by successfully embedding Aboriginal perspectives and Torres Strait Islander perspectives across planning, teaching and assessing student achievement.

Guidelines about Aboriginal perspectives and Torres Strait Islander perspectives and resources for teaching are available at www.qcaa.qld.edu.au/k-12-policies/aboriginal-torres-strait-islander-perspectives.

Where appropriate, Aboriginal perspectives and Torres Strait Islander perspectives have been embedded in the subject matter.

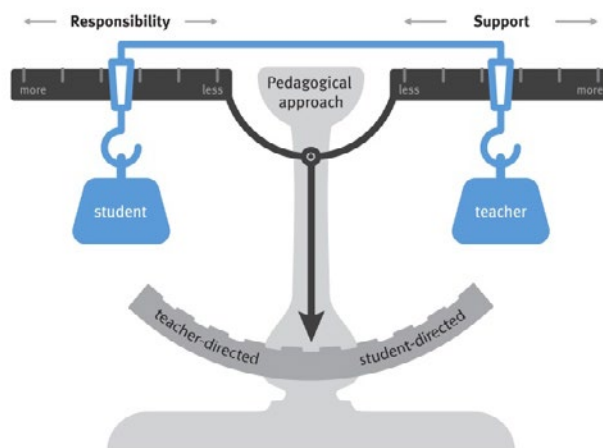
In Food & Nutrition, there is opportunity to explore traditional Aboriginal foods and Torres Strait Islander foods, including nutritional values and functions and the use of traditional foods in the formulation of new food solutions in Units 2 and 4. Researching, understanding and increasing the use of traditional Aboriginal foods and Torres Strait Islander foods are advantageous to the environment and its sustainability as ‘those foods ... have adapted to the climates of the land and for the most part don’t require chemical interventions to protect them from weeds and insect predators’ (Newton 2016). Innovation using traditional Aboriginal foods and Torres Strait Islander foods that are native to Australia can positively promote Australian culture, while also highlighting the knowledge and interconnected nature that Aboriginal peoples and Torres Strait Islander peoples have used to sustain their culture for over 50 000 years.

1.2.4 Pedagogical and conceptual frameworks

Problem-based learning framework

In the Technologies learning area, the problem-based learning framework (as represented in Figure 3) provides the overarching pedagogical basis for the implementation of subject-specific [problem-solving processes](#). Problem-based learning places students in real-world situations where they use skills associated with critical thinking, creative thinking, communication, collaboration and teamwork, personal and social interactions and information & communication technologies (ICT) in order to develop [solutions](#) that acknowledge personal, social, ethical, economic, environmental, legal and sustainability implications and impacts.

Figure 3: Problem-based learning framework in the Technologies learning area



In Food & Nutrition:

- problem-based learning is an active process of knowledge construction that uses open-ended problems as a stimulus for student learning
- problems that support problem-based learning should
 - challenge and motivate students to engage their interest
 - provide opportunities for students to examine the problem from multiple perspectives or disciplines
 - provide multiple possible solutions and solution paths
 - require students to comprehend and use a breadth and depth of knowledge during problem-solving
 - recognise students' prior knowledge
 - recognise students' stage of cognitive development
 - provide opportunities to allow all students to explore innovative open-ended solutions
 - relate to the real world
- the learning environment is organised to represent the complex nature of the problems students are required to solve, e.g. the learning area values collaboration using teamwork and brainstorming, as these are strategies used during real-world problem-solving
- the teacher is responsible for scaffolding student learning and cognition during problem-solving as a coach, guide or facilitator to maintain the independence and self-directedness of student learning
- self-directed learning does not mean students are self-taught; instead, teachers balance their participation so that students maintain responsibility for learning, e.g. students make decisions about the knowledge and skills they require to effectively problem-solve, supported by the teacher's questioning and cueing strategies
- the perception of student self-direction in the learning process is fundamental to problem-based learning.

Food & Nutrition problems

Central to problem-based learning is the provision or identification of suitably challenging, subject-specific, context-relevant, real-world problems. Student engagement with these problems facilitates student learning of food and nutrition subject matter. Problems suitable for Food & Nutrition:

- involve identified stakeholders
- relate to a need or opportunity pertaining to the sectors of the food system
- identify the teacher-specified constraints, available time, physical realities, legalities
- are resolved using the problem-solving process.

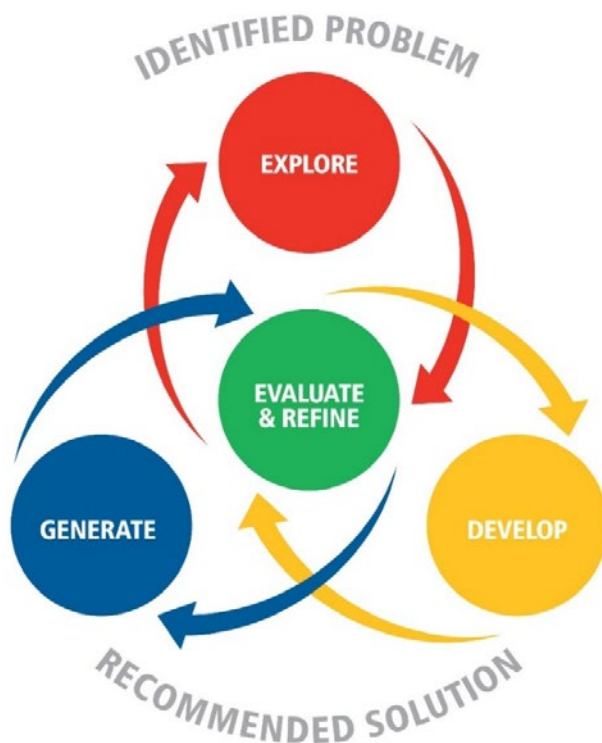
The problem-solving process in Food & Nutrition

The problem-solving process in Food & Nutrition is analytical and technical in nature. The process is iterative and proceeds through a number of phases, requiring students to explore problems, develop ideas, generate solutions and evaluate and refine solutions.

Problem-solving in Food & Nutrition requires students to recognise, describe, explain and analyse food problems. They develop solution requirements and use prescribed criteria or self-determined criteria to evaluate the solution. Students will use knowledge of food science, nutrition and technologies, acquired through experimentation and investigation, to develop ideas and alternative solutions and choose a proposed solution. After the proposed solution and data are generated, the criteria are used to evaluate and justify recommendations for future enhancements.

The problem-solving process in Food & Nutrition involves student engagement with the four phases of explore, develop, generate, and evaluate and refine.

Figure 4: Problem-solving process in Food & Nutrition



To explore the problem, students:

- recognise and describe facts and principles related to food and nutrition problems
- explain ideas and problems in a range of food and nutrition contexts
- analyse the needs of relevant stakeholders to identify essential characteristics and constraints of the problem
- develop a brief that determines the solution requirements, including
 - stakeholders' needs
 - principles of food science and food safety and legislation related to the problem
 - essential characteristics and constraints of the problem
- determine criteria against which to evaluate ideas and the solution both throughout the problem-solving process and at the conclusion of the project. Criteria are prescribed by the teacher in Unit 1 or determined by the student in Units 2, 3 and 4. Criteria address
 - solution requirements from the brief
 - impacts and implications of the solution — personal, social, ethical, economic, environmental, legal, sustainable and technological
 - feasibility of the quality, functionality and reliability of the solution.

To develop ideas, students:

- research required knowledge and processes from primary sources and secondary sources by
 - conducting interviews with relevant stakeholders
 - experimenting with chemical and functional properties
 - researching the latest trends, raw materials, food components and processing techniques
- synthesise information and data to develop ideas for alternative solutions
- determine which solution best meets the brief.

To generate solutions, students:

- create a solution, such as a
 - devised set of experiments to demonstrate a food science principle or process
 - developed argument to advocate for or against a food development project
 - prototype.
- test the feasibility of the generated solution and record data in graphical or tabular form.

To evaluate and refine, students:

- use prescribed or self-determined criteria and generate data to make judgments about the feasibility of the solution
- refine ideas and the proposed solution to match with criteria
- make justified recommendations about the solution for future enhancement
- communicate solutions by
 - presenting ideas verbally, visually or in writing to a specific audience or stakeholder
 - using mode-appropriate features, language and conventions for a particular purpose or context.

1.2.5 Subject matter

Subject matter is the body of information, mental procedures and psychomotor procedures (see Marzano & Kendall 2007, 2008) that are necessary for students' learning and engagement with Food & Nutrition. It is particular to each unit in the course of study and provides the basis for student learning experiences.

Subject matter has a direct relationship to the unit objectives, but is of a finer granularity and is more specific. These statements of learning are constructed in a similar way to objectives. Each statement:

- describes an action (or combination of actions) — what the student is expected to do
- describes the element — expressed as information, mental procedures and/or psychomotor procedures
- is contextualised for the topic or circumstance particular to the unit.

1.3 Assessment — general information

Assessments are formative in Units 1 and 2, and summative in Units 3 and 4.

Assessment	Unit 1	Unit 2	Unit 3	Unit 4
Formative assessments	•	•		
Summative internal assessment 1			•	
Summative internal assessment 2			•	
Summative internal assessment 3				•
Summative external assessment				•

1.3.1 Formative assessments — Units 1 and 2

Formative assessments provide feedback to both students and teachers about each student's progress in the course of study.

Schools develop internal assessments for each senior subject, based on the learning described in Units 1 and 2 of the subject syllabus. Each unit objective must be assessed at least once.

For reporting purposes, schools should devise at least *two* but no more than *four* assessments for Units 1 and 2 of this subject. At least *one* assessment must be completed for *each* unit.

The sequencing, scope and scale of assessments for Units 1 and 2 are matters for each school to decide and should reflect the local context.

Teachers are encouraged to use the A–E descriptors in the reporting standards (Section 1.4) to provide formative feedback to students and to report on progress.

1.3.2 Summative assessments — Units 3 and 4

Students will complete a total of *four* summative assessments — three internal and one external — that count towards their final mark in each subject.

Schools develop *three* internal assessments for each senior subject, based on the learning described in Units 3 and 4 of the syllabus.

The three summative internal assessments will be endorsed and the results confirmed by the QCAA. These results will be combined with a single external assessment developed and marked by the QCAA. The external assessment results for Food & Nutrition will contribute 25% towards a student's result.

Summative internal assessment — instrument-specific marking guides

This syllabus provides ISMGs for the three summative internal assessments in Units 3 and 4.

The ISMGs describe the characteristics evident in student responses and align with the identified assessment objectives. Assessment objectives are drawn from the unit objectives and are contextualised for the requirements of the assessment instrument.

Criteria

Each ISMG groups assessment objectives into criteria. An assessment objective may appear in multiple criteria, or in a single criterion of an assessment.

Making judgments

Assessment evidence of student performance in each criterion is matched to a performance-level descriptor, which describes the typical characteristics of student work.

Where a student response has characteristics from more than one performance level, a best-fit approach is used. Where a performance level has a two-mark range, it must be decided if the best fit is the higher or lower mark of the range.

Authentication

Schools and teachers must have strategies in place for ensuring that work submitted for internal summative assessment is the student's own. Authentication strategies outlined in QCAA guidelines, which include guidance for drafting, scaffolding and teacher feedback, must be adhered to.

Summative external assessment

The summative external assessment adds valuable evidence of achievement to a student's profile. External assessment is:

- common to all schools
- administered under the same conditions at the same time and on the same day
- developed and marked by the QCAA according to a commonly applied marking scheme.

The external assessment contributes 25% to the student's result in Food & Nutrition. It is not privileged over the school-based assessment.

1.4 Reporting standards

Reporting standards are summary statements that succinctly describe typical performance at each of the five levels (A–E). They reflect the cognitive taxonomy and objectives of the course of study.

The primary purpose of reporting standards is for twice-yearly reporting on student progress. These descriptors can also be used to help teachers provide formative feedback to students and to align ISMGs.

Reporting standards

A

The student, in a range of contexts, demonstrates: accurate and discriminating recognition and discerning description of food and nutrition facts and principles; discerning explanation of food and nutrition ideas and problems.

The student demonstrates: insightful analysis of relevant problems, information and data related to food and nutrition; astute determination of essential solution requirements and evaluation criteria for food and nutrition problems.

The student demonstrates: coherent and logical synthesis of information and data to develop ideas for solutions; purposeful generation of solutions to provide valid data to determine the feasibility of solutions; critical evaluation and discerning refinement of solutions to make astute recommendations for enhancement; discerning decision-making about, and fluent use of, mode-appropriate features, language and conventions for particular purposes and contexts.

B

The student, in a range of contexts, demonstrates: accurate recognition and effective description of food and nutrition facts and principles; effective explanation of food and nutrition ideas and problems.

The student demonstrates: considered analysis of relevant problems, information and data related to food and nutrition; logical determination of effective solution requirements and evaluation criteria for food and nutrition problems.

The student demonstrates: logical synthesis of information and valid data to develop ideas for solutions; effective generation of solutions to provide data to determine the feasibility of solutions; reasoned evaluation and effective refinement of solutions to make effective recommendations for enhancement; demonstrates effective decision-making about, and proficient use of, mode-appropriate features, language and conventions for particular purposes and contexts.

C

The student, in a range of contexts, demonstrates: appropriate recognition and description of food and nutrition facts and principles; appropriate explanation of food and nutrition ideas and problems.

The student demonstrates: appropriate analysis of problems, information and data related to food and nutrition; reasonable determination of some solution requirements and evaluation criteria for food and nutrition problems.

The student demonstrates: simple synthesis of information and relevant data to develop ideas for solutions; adequate generation of solutions to provide data to determine the feasibility of solutions; feasible evaluation and adequate refinement of solutions to make fundamental recommendations for enhancement; appropriate decision-making about, and use of, mode-appropriate features, language and conventions for particular purposes and contexts.

D

The student, in a range of contexts, demonstrates: variable recognition and superficial description of food and nutrition facts and principles; superficial explanation of food and nutrition ideas and problems.

The student demonstrates: superficial analysis of problems and information or data related to food and nutrition; vague determination of some solution requirements and evaluation criteria for food and nutrition problems.

The student demonstrates: rudimentary synthesis of information or data to develop ideas for solutions; partial generation of solutions to provide elements of data to determine the feasibility of solutions; superficial evaluation and refinement of ideas or solutions to make elementary recommendations; variable decision-making about, and inconsistent use of, mode-appropriate features, language and conventions for particular purposes and contexts.

E

The student, in a range of contexts, demonstrates recognition of food and nutrition facts and principles and explains some ideas.

The student demonstrates: the making of statements about a problem or information related to food and nutrition; identification of a criterion for food and nutrition problems.

The student demonstrates: unclear combinations of ideas about solutions; generation of elements of solutions; identification of a change to an idea or solution; unclear or fragmented use of mode-appropriate features, language and conventions.

2 Unit 1: Food science of vitamins, minerals and protein

2.1 Unit description

In this unit, students explore sectors of the food system and the nutrients that make up our food. They explore fundamentals of food science through practical investigation of the nutritional and scientific properties of vitamins, minerals and protein in foods. Students use the Food & Nutrition problem-solving process to build knowledge and develop and test ideas using a range of experimental techniques to create solutions. Students solve problems for consumer markets by defining and analysing the problem, developing ideas, and generating and evaluating a solution.

In Topic 1, students identify and understand relevant sectors of the food system and how food is developed, produced, processed, transported, stored and distributed. They become aware of the nutrients found in food, and their functions, sources and recommended values to support health. In Topic 2, students explore, through experimentation, how processing and preservation techniques affect the bioavailability of vitamins and minerals. Topic 3 provides students with the opportunity to discover, through experimentation, how protein-based food interacts with temperature and physical manipulation to produce nutritional food products. In Topic 4, students have the opportunity to solve a problem related to the formulation of a food solution using the chemical, functional and nutritional properties of vitamins, minerals and protein in foods.

Unit requirements

	Unit topic	Notional hours
Topic 1	Introduction to the food system	5
Topic 2	Vitamins and minerals	10
Topic 3	Protein	10
Topic 4	Developing food solutions	10
Assessment integrated within the unit		20

2.2 Unit objectives

Unit objectives are drawn from the syllabus objectives and are contextualised for the subject matter and requirements of the unit. Each unit objective must be assessed at least once.

Students will:

1. recognise and describe facts and principles related to the nutritional, chemical, functional and sensory properties of vitamins, minerals and protein-based food
2. explain food science ideas and problems related to vitamins, minerals and protein-based food
3. analyse problems, information and data related to the properties and processing of vitamins, minerals and protein-based food
4. determine solution requirements and criteria for vitamin, mineral and protein-based food problems
5. synthesise information and data for vitamin, mineral and protein-based food solutions
6. generate vitamin, mineral or protein-based food solutions to provide data to determine the feasibility of the solution
7. evaluate and refine ideas and solutions to make justified recommendations for enhancement of vitamin, mineral and protein-based food solutions
8. make decisions about and use mode-appropriate features, language and conventions for particular purposes and food and nutrition contexts.

2.3 Topic 1: Introduction to the food system

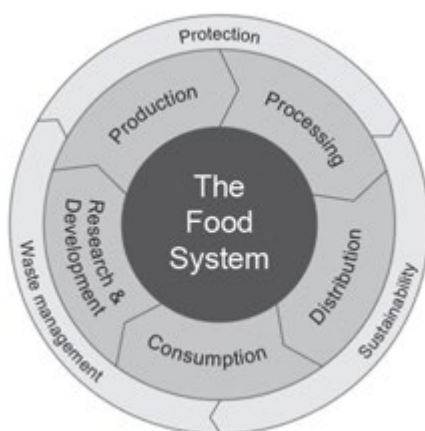
Guiding question: How do consumers access nutritional food?

Subject matter

In this topic, students will:

- recognise and describe the sectors of the food system (see Figure 5 below), including
 - production
 - processing
 - distribution
 - consumption
- research and development, e.g. a component of innovation, developing new products, or applied research in scientific or technological fields that facilitate future product development

Figure 5: The food system



- recognise and define the principles that affect all sectors of the food system, including
 - sustainability
 - waste management
 - protection, which involves protecting the food supply from contamination by food-borne illness and other foreign materials or chemicals during production, processing, distribution and storage
- explain that food is a chemically complex mixture of substances that contains nutrients, including
 - protein
 - carbohydrate
 - fat
 - fat-soluble vitamins A, D, E and K
 - water-soluble vitamins B1 (thiamine), B2 (riboflavin), B3 (niacin) and C
 - minerals calcium, sodium and iron
 - water
- describe relevant facts and principles about vitamins, minerals and protein, including
 - the functions of vitamins, minerals and protein in the body
 - nutrient reference value (NRV) of vitamins, minerals and protein in the diet
 - food sources of vitamins, minerals and protein
- recognise the health impacts of under- and over-consumption of vitamins, minerals and protein-based food
- investigate and critique the health benefits of different food models used to guide consumer choice regarding nutrients to maintain health, including the Australian Guide to Healthy Eating and the Smart Choices/Traffic Light System.

2.4 Topic 2: Vitamins and minerals

Guiding question: How can food processing and preservation alter the bioavailability of vitamins and minerals?

Subject matter

In this topic, students will:

- examine each sector of the food system related to vitamins and minerals, including:
 - production, by
 - recognising that foods rich in vitamins and minerals can be consumed raw, e.g. fruits and vegetables, or after processing and/or cooking, e.g. meat, dairy and grains
 - processing, by
 - explaining that processing and cooking improves the bioavailability of many nutrients and can deplete some levels of vitamins and minerals
 - investigating and explaining the effects of moist and dry heat cooking methods, including boiling, stewing, microwaving and steaming (moist heat), and grilling, roasting, baking and stir-frying (dry heat) on the retention of vitamins and minerals and the sensory properties of the food
 - explaining the distribution pathways required to process foods in ways that extend shelf life
 - explaining the reasons for and benefits of food processing to consumers, including convenience, cost, access to nutrients and minimisation of seasonality and pathogen growth cycles
 - reviewing the food processing techniques used to control the accessibility and the consumability of food sources, including: application of cold by chilling, freezing, freeze-drying; application of heat by blanching, boiling, braising; evaporation; pasteurisation; canning/bottling; ultra-high temperature (UHT); dehydration; change of pH through the addition of acid and alkali; and additives, e.g. salt, antioxidants
 - consumption, by
 - investigating the effects of physical manipulation, temperature and chemicals on vitamins by experimenting to identify the levels of vitamin C in foods, using iodine or vitamin C test strips to determine the effects of processing methods on vitamin C levels in fruits and vegetables
 - analysing information and data to determine the most appropriate method of food preparation to retain maximum vitamin and mineral quality in the food source
 - research and development, by
 - researching the development of innovative vitamin and mineral food sources, including golden rice and genetically modified bananas, to determine the health implications
 - waste management and sustainability, by
 - explaining that extending food shelf life, using correct storage methods and repurposing offcuts, by-products or waste fruit and vegetables can assist with sustainability, thus reducing waste
 - food protection, by
 - explaining that the factors that cause food spoilage in vitamin and mineral food sources are biological, chemical and physical changes, and spoilage can occur during processing or after production, through storage and handling. These changes include
 - biological changes caused by bacteria, yeast and moulds, such as fermentation and spore development
 - chemical changes of oxidation and ripening, causing odour development as a result of enzymatic reactions
 - physical changes of evaporation, discoloration and wilting
 - experimenting to understand and explain preservation processes of vitamin and mineral food sources, including salt-cured lemons, dried fruit and vegetables, pickled onions and sauerkraut, and frozen vegetables
 - explaining that some food sources, including meat and dairy, are perishable and require refrigeration
 - explaining that some food sources, including fruit and vegetables, are semi-perishable and,

Subject matter

- depending on climate, may require refrigeration
- explaining that some processed foods are non-perishable, e.g. canned or dried, and require only shelf storage until opened
- comparing the nutritive value, sensory properties and shelf life of food sources, including fresh, frozen, dehydrated and canned vegetables.

2.5 Topic 3: Protein

Guiding question: How can the chemical and functional properties of protein-based food and knowledge of food safety, spoilage and preservation techniques be used to develop protein-based food products?

Subject matter

In this topic, students will:

- examine each sector of the food system related to protein-based food, including:
 - production, by
 - recognising that food sources of protein are both animal-based (meat and dairy) and plant-based (legumes, nuts and grains)
 - explaining that proteins are comprised of amino acids
 - processing, by
 - explaining the cooking and processing techniques used to improve the palatability of protein-based foods, including: canning; dehydration; change of pH through the addition of acid and alkali; additives, e.g. salt, antioxidants; physical manipulation, e.g. tenderisation, aeration; and application of heat, e.g. grilling, roasting, poaching, braising and frying
 - investigating how denaturation of animal and plant protein-based food affects the sensory properties and structure of food, including
 - investigating foam formation and stability by dispersing gas in a protein matrix, including meringues, using egg whites as an animal protein source and aquafaba as a plant protein source
 - explaining the differences in the structure of animal and plant protein by comparing the beating time to form soft peaks
 - investigating how different coagulation methods affect sensory properties and food structure, including
 - use of acids, including coagulating casein from milk using an acid to formulate cottage cheese, and coagulating casein from milk using lemon juice to make ricotta
 - use of enzymes, including coagulating casein from milk using rennin as an enzyme to make junket
 - use of salt, including coagulating soy protein from soy milk using magnesium sulphate to make tofu
 - use of heat, including raw eggs being manipulated then cooked as part of a formulation, e.g. meringue, custard, frittata and quiche formulations
 - analysing the information and data from experimentation to explain the difference between denaturation and coagulation
 - recording and analysing experiment results and drawing conclusions
 - consumption, by
 - demonstrating the Maillard reaction by experimenting with the preparation of protein-based food sources including by frying, stewing, baking, roasting and grilling
 - comparing the sensory properties of taste, texture, flavour and colour for the meat samples prepared by the above processes

Subject matter

- research and development, by
 - researching the development of innovative protein-based food products, including synthetic meat and new soya products
- waste management and sustainability by
 - investigating methods of repurposing and waste management of protein-based food products, including
 - secondary meat products, e.g. mince; value-added products, e.g. flavoured sausages, pies and smallgoods; gelatine; animal feed; and fertilisers, e.g. bone meal
 - secondary milk products, e.g. yoghurt and probiotic drinks, whey protein-based products
- food protection, by
 - explaining that the factors that cause food spoilage in protein-based food are biological, chemical and physical changes, and spoilage can occur during processing, or after production, through storage and handling. These changes include
 - biological changes caused by bacteria, yeast and moulds, such as spore development
 - chemical changes of oxidation and odour development as a result of enzymatic reactions
 - physical changes of evaporation, drip loss and separation of tissues
 - recognising and explaining how protein-based foods deteriorate at different rates and explain how food composition influences this process
 - explaining that most protein-based foods are perishable and require refrigeration or appropriate storage, depending on processing, to maintain shelf life
 - determining the sensory properties of cured and smoked fish, thawed meat and milk products
 - comparing the nutritive value, sensory properties and shelf life of fresh, frozen, dehydrated and canned meat.

2.6 Topic 4: Developing food solutions

Guiding question: How can chemical, functional and nutritional properties and preservation techniques be used to develop vitamin, mineral and protein-based food products?

Subject matter

In this topic, students will:

- explore the problem by
 - responding to a prescribed brief to determine the solution requirements of a vitamin, mineral or protein-based food problem, considering
 - stakeholders' needs
 - principles of food science, food safety and legislation related to the context
 - essential characteristics and constraints of the problem
 - considering prescribed criteria against which to evaluate a solution, including
 - solution requirements from the brief
 - personal, social, ethical, economic, environmental, legal, sustainable and technological impacts and implications of the solution
 - feasibility of the quality, functionality and reliability of the solution
- develop ideas that respond to the brief by
 - researching required information, data and processes about the food and nutrition problem, using primary and/or secondary data techniques, such as
 - conducting interviews with target market consumers to collect primary data
 - experimenting with processing food components to develop ideas and to collect primary data
 - researching the latest trends, raw materials and processing techniques to develop a list of

Subject matter

- possible ideas
 - synthesising information and data to develop ideas for alternative solutions
 - determining which solution best meets the brief
- generate a solution to provide data for the target market problem, by
 - creating the solution
 - testing the quality, functionality and reliability of the generated solution, and recording data in graphical or tabular form
- evaluate and refine the solution, by
 - using prescribed criteria and generated data to make judgments about the feasibility of the solution
 - refining ideas and the proposed solution
 - making justified recommendations about the solution for future enhancement.

2.7 Assessment guidance

In constructing assessment instruments for Unit 1, schools should ensure that the objectives cover, or are chosen from, the unit objectives. If one assessment instrument is developed for a unit, it must assess all the unit objectives; if more than one assessment instrument is developed, the unit objectives must be covered across those instruments.

The suggested techniques for Unit 1 are an Examination and a Project — folio.

3 Unit 2: Food drivers and emerging trends

3.1 Unit description

In Unit 2, students explore the factors that determine what food solutions will be developed and made ready for marketing and consumption. These factors include consumer drivers and quality control standards, including food safety and labelling legislation. Students use the Food & Nutrition problem-solving process to build knowledge and skills that they can use to develop ideas related to consumer food drivers, sensory profiling and labelling legislation. Students will solve problems for consumer markets by defining and analysing the problem, developing ideas and generating and evaluating a solution.

In Topic 1, students evaluate traditional consumer drivers and their impact on the development of alternative food solutions to fulfil the future protein-based food demands of consumers. In Topic 2, students explain sensory profiling and analyse the impact of physical properties on consumer choice. In Topic 3, students analyse current labelling legislation and its relevance to consumer rights and the need for transparency in the food industry. In Topic 4, students will have the opportunity to solve a problem related to developing a protein-based food solution in response to consumer drivers.

Unit requirements

	Unit topic	Notional hours
Topic 1	Consumer food drivers	5
Topic 2	Sensory profiling	10
Topic 3	Labelling and food safety	5
Topic 4	Food formulation for consumer markets	15
Assessment integrated within the unit		20

3.2 Unit objectives

Unit objectives are drawn from the syllabus objectives and are contextualised for the subject matter and requirements of the unit. Each unit objective must be assessed at least once.

Students will:

1. recognise and describe facts and principles related to food systems, consumer demand, labelling and food safety
2. explain ideas and problems related to current and emerging consumer food markets
3. analyse problems, information and data related to current and emerging consumer food markets
4. determine solution requirements and criteria for specific consumer food market problems
5. synthesise information and data to develop ideas for solutions related to consumer food market problems
6. generate consumer market solutions to provide data to determine the feasibility of the solution
7. evaluate and refine ideas and solutions to make justified recommendations for enhancement of consumer food market solutions
8. make decisions about and use mode-appropriate features, language and conventions for particular purposes and food and nutrition contexts.

3.3 Topic 1: Consumer food drivers

Guiding question: Can consumers influence the development of new food products?

Subject matter

In this topic, students will:

- recognise that all sectors of the food system are influenced by consumer demand
- explain how consumers influence the range and development of foods within the food market
- analyse the impact of consumer-driven market trends on the range and development of foods
- investigate how traditional consumer food drivers influence consumer purchasing decisions about food. Traditional drivers include
 - convenience, including ease of consumption, storage, opening, preparation, accessibility and time-saving characteristics
 - budget, including the amount of money consumers are prepared to pay for quality, nutritious food products
 - perceived quality, including price versus quantity, nutritional properties, freshness and sensory properties of appearance, taste, texture, flavour and aroma
 - ethics and/or culture, e.g. cultural sensitivity, sustainability, organic production and food waste, animal welfare, genetically modified foods and fair-trade practices
- investigate and analyse traditional consumer drivers and their impact on the development, safety and ethics of alternative food products to fulfil consumers' future protein-based food requirements, including
 - genetically modified foods, including transparency of industry strategies
 - organic food compared to intensively farmed food
 - fortification and functional foods, including classifications and labelling, benefits of added or removed ingredients
 - entomophagy

Subject matter

- synthetic protein-based food such as new developments in food processing
- bush food protein-based sources
- investigate, identify and analyse consumer purchasing trends using primary and secondary data collection methods
- analyse information and data related to consumer drivers to identify needs or opportunities in food markets regarding protein-based food consumption
- investigate the terms ‘food sustainability’ and ‘ethical practices’ and how they relate to consumer decisions regarding protein-based food consumption.

3.4 Topic 2: Sensory profiling

Guiding question: Why are the sensory properties of food valuable in developing successful food products?

Subject matter

In this topic, students will:

- recognise that sensory profiling is used to
 - evaluate a range of existing food products
 - check that a final product meets its original brief
 - analyse a food prototype for improvements
 - gauge consumer response to a product
- recognise and describe the physical properties of food that determine consumer acceptance of raw and processed foods, including
 - appearance, such as shape, size, weight, colour
 - taste, such as sour, salty, bitter, sweet, umami
 - texture from mouthfeel
 - flavour and aroma from sensations perceived in mouth, throat and nose
- recognise and describe different methods of sensory profiling, such as
 - descriptive sensory profiling, which is used to determine whether a specific consumer group likes or prefers a particular product, including the
 - ranking test, where panellists are given two or more samples and rank them in preference order
 - paired preference test, where panellists are given two samples and choose the one they prefer
 - likeability test, where panellists taste a sample and score it on a nine-point hedonic scale from ‘dislike extremely’ to ‘like extremely’
 - triangle test, which is a discriminative method with many uses in sensory science, including gauging whether an overall difference is present between two products, selecting qualified panellists for a particular test and determining whether shifts in processing or ingredients have significantly changed a product
 - lexicons, which provide a tool for communication within the panel and provide a basis for understanding the differences among products in a category, drive the design of consumer research questionnaires and provide industry confidence that a product is within a brief
- analyse sensory profiling methods, through experimentation on various foods, to assess customer perception, including
 - developing the lexicon for sensory profiling of different versions of fruit, vegetable and protein-based foods
 - profiling a range of different fruit, vegetable and protein-based foods to compare the characteristics
 - recording and analysing experiment results, and drawing conclusions about the preferred sensory profiling tests for different fruit, vegetable and protein-based foods
- explain the chemical and physical properties of nutrients that determine appearance, taste, texture, flavour and aroma of foods, and consumer perceptions
- analyse the impact of the physical properties of food, such as shape and appearance, on retail

Subject matter

policy, consumer choice and food wastage

- investigate the physical properties of fruits and vegetables at various supermarkets using quality assurance standards
- research and develop ideas and strategies to solve the problem of using, rather than wasting, fruit and vegetables that do not meet quality assurance standards.

3.5 Topic 3: Labelling and food safety

Guiding question: How does legislation protect consumers?

Subject matter

In this topic, students will:

- comprehend and explain how food safety programs protect consumers, including hazard analysis and critical control points (HACCP)
- determine how the biological, chemical and physical changes that occur in foods after harvesting can lead to deterioration
- summarise the differences between non-perishable, semi-perishable and perishable foods
- explain critical control points (CCPs) relating to food safety and potential sources of contamination, including
 - biological hazards, e.g. pathogenic microorganisms, insects, animals
 - physical hazards, e.g. foreign objects such as plastics, glass, soil, heavy metals and pesticides
 - chemical hazards, e.g. naturally occurring chemical toxins in foods such as ciguatera, solanine, lectin, alkaloids, and triamines
- explain the purpose of Food Standards Australia New Zealand (FSANZ)
- analyse consumer rights and transparency issues related to food labelling legislation (FSANZ), including
 - genetically modified foods developed in Australia and other countries, and their impacts on consumers and the environment
 - country of origin labelling
 - health claims labelling
 - health star rating system
 - novel sources of protein-based food, including consumption of insects
 - food additives, including preservatives
 - ingredients and percentage labelling — quantity of base ingredients
 - use and storage instructions — accuracy and effectiveness
 - ethics surrounding third-party certifications, including
 - Heart Foundation
 - celebrity endorsements
 - RSPCA
 - Marine Stewardship Council.

3.6 Topic 4: Food formulation for consumer markets

Guiding question: Can changes in food formulations fulfil consumer demands?

Subject matter

In this topic, students will:

- explain how combining ingredients in appropriate ratios or structures, according to a formula or recipe, is known as food formulation
- recognise and describe how consumer food drivers influence food production for the
 - ethical food consumer, e.g. guaranteeing the authenticity of organic, sustainable, cruelty-free and fair-trade products
 - time-poor food consumer, e.g. the increasing availability of convenience food, ready-made food and delivered products
 - gourmet food consumer, e.g. the development of sophisticated, cultural, ethical, novel and contemporary food products
 - solo food consumer, e.g. the increasing need for single-serve food products
 - cultural food consumer, e.g. consumption of Australian native foods
- investigate the range of food products available for the above consumer food markets
- analyse research data and other information about consumer food drivers (listed above) to determine their relevance and application to current food markets
- explore the problem, by
 - recognising and describing facts and principles about consumer market problems
 - explaining ideas and problems in a consumer market context
 - analysing the problem stimulus to understand needs or opportunities and identify
 - relevant stakeholders
 - essential features, characteristics and constraints
 - developing a brief that determines the solution requirements considering the
 - stakeholders' needs
 - principles of food science, food safety and legislation related to the context
 - essential characteristics and constraints of the context
 - developing self-determined criteria against which to evaluate the solution, including
 - solution requirements from the brief
 - personal, social, ethical, economic, environmental, legal, sustainable and technological impacts and implications of the solution
 - feasibility of the quality, functionality and reliability of the solution
- develop ideas, by
 - researching required information and data about the food and nutrition problem, using primary and/or secondary data, such as
 - conducting interviews with target market consumers to collect primary data
 - experimenting with processing components to develop ideas and collect primary data
 - researching latest trends, raw materials, food components and processing techniques to develop a list of possible ideas
 - synthesising information and develop ideas for a solution
 - determining which solution best meets the brief
- generate a solution to provide data, by
 - creating the proposed solution
 - testing the quality, functionality and reliability of the generated solution, recording results in graphical or tabular form
- evaluate and refine the solution, by
 - using self-determined criteria and data to make judgments about the feasibility of the solution
 - refining ideas and proposed solutions
 - making justified recommendations about the solution for future enhancement.

3.7 Assessment guidance

In constructing assessment instruments for Unit 2, schools should ensure that the objectives cover, or are chosen from, the unit objectives. If one assessment instrument is developed for a unit, it must assess all the unit objectives; if more than one assessment instrument is developed, the unit objectives must be covered across those instruments.

The suggested techniques for Unit 2 are an Examination and a Project — folio.

4 Unit 3: Food science of carbohydrate and fat

4.1 Unit description

In Unit 3, students study the fundamentals of food science through practical investigation of the nutritional, scientific and sensory properties of carbohydrate- and fat-based food products. Students use the Food & Nutrition problem-solving process to build knowledge and skills that they can use to develop and test ideas, using a range of experimental techniques to create solutions. Students will solve problems for consumer markets by defining and analysing the problem, developing ideas and generating and evaluating a solution.

In Topic 1, students study the food system and food nutrients. In Topic 2, they investigate how the carbohydrate's chemical and functional properties respond to temperature and manipulation to create food products. Students also study food safety, preservation and spoilage-prevention techniques for carbohydrate-based foods. In Topic 3, students investigate how the chemical and functional properties of fats respond to temperature and manipulation to create food products. Students study food safety, preservation and spoilage-prevention techniques for fat-based food products and experiment with formulation processes. In Topic 4, students develop food solutions using the chemical and physical properties of carbohydrate and fat-based food.

Unit requirements

	Unit topic	Notional hours
Topic 1	The food system	3
Topic 2	Carbohydrate	10
Topic 3	Fat	10
Topic 4	Developing food solutions	12
Assessment integrated within the unit		20

4.2 Unit objectives

Unit objectives are drawn from the syllabus objectives and are contextualised for the subject matter and requirements of the unit. Each unit objective must be assessed at least once.

Students will:

Unit objective	IA1	IA2
1. <u>recognise</u> and <u>describe</u> facts and principles related to nutritional, chemical, functional and <u>sensory properties</u> of carbohydrate- and fat-based food	•	•
2. <u>explain</u> food science ideas and problems related to carbohydrate- and fat-based food	•	•
3. <u>analyse</u> problems, information and data related to carbohydrate- and fat-based food	•	•
4. <u>determine</u> solution requirements and criteria for carbohydrate- and fat-based food problems	•	•
5. <u>synthesise</u> information and data for carbohydrate- and fat-based food solutions	•	•
6. <u>generate</u> carbohydrate- and fat-based food solutions to provide data to determine the <u>feasibility</u> of the solution		•
7. <u>evaluate</u> and <u>refine</u> ideas and solutions to make justified recommendations for enhancement to carbohydrate- and fat-based food solutions	•	•
8. <u>make decisions</u> about and use mode-appropriate features, language and conventions for particular purposes and contexts.		•

4.3 Topic 1: The food system

Guiding question: How do consumers access nutritional food?

Subject matter
<p>In this topic, students will:</p> <ul style="list-style-type: none"> • explain the sectors of the <u>food system</u> (see Figure 5 in section 2.3), including <ul style="list-style-type: none"> - <u>production</u> - <u>processing</u> - <u>distribution</u> - <u>consumption</u> - research and development, e.g. a component of innovation, developing new products or applied research in scientific or technological fields that facilitate future <u>solution</u> development • recognise and define the principles that affect all sectors of the food system, including <ul style="list-style-type: none"> - <u>sustainability</u> - <u>waste management</u> - protection, which involves protecting the food supply from contamination by food-borne illness and other foreign materials or chemicals during production, processing, distribution and storage • explain how food is a chemically complex mixture of substances that contains <u>nutrients</u>, including <ul style="list-style-type: none"> - protein - carbohydrate - fat - minerals calcium, sodium, iron - fat-soluble vitamins A, D, E and K

Subject matter

- water-soluble vitamins B1 (thiamine), B2 (riboflavin), B3 (niacin) and C
- water
- explain relevant facts related to carbohydrate
 - the multiple functions of carbohydrate, including
 - providing heat and energy
 - regulating body processes
 - regulating the use of carbohydrate-based food
 - the classifications of carbohydrate
 - monosaccharide
 - disaccharide
 - oligosaccharide
 - polysaccharide
 - nutrient reference value (NRV) of carbohydrate in the diet
- explain relevant facts related to fat, including
 - the multiple functions of fat
 - providing energy
 - protecting bones and important body organs
 - providing a vessel for fat-soluble vitamins
 - the classifications of fat
 - saturated
 - monounsaturated
 - polyunsaturated
 - trans fat
 - NRV of fat in the diet
- recognise the impacts of over- and under-consumption of carbohydrate- and fat-based food on health
- investigate and critique the health benefits of different food models used to guide consumer choice regarding nutrients to maintain health, including the Australian Guide to Healthy Eating and the Smart Choices/Traffic Light System.

4.4 Topic 2: Carbohydrate

Guiding question: How can the chemical and functional properties of carbohydrate, knowledge of food safety and spoilage, and preservation techniques be used to develop food solutions?

Subject matter

In this topic, students will:

- examine each sector of the food system related to carbohydrate, including:
 - production, by
 - explaining that the production of carbohydrate-based food involves the planting, growing and harvesting of plant food sources
 - processing, by
 - recognising that some carbohydrate-based food sources can be consumed raw, e.g. most fruits and vegetables and some after processing, e.g. grains
 - explaining the distribution pathways required to process foods in ways that extend shelf life
 - explaining the reasons for and benefits of food processing to consumers, including convenience, cost, access to nutrients and minimisation of seasonality and pathogen growth cycles
 - using food science experiments, to identify how food components interact with the manipulation of temperature and chemical and functional properties of carbohydrate-based food, including
 - gelatinisation, by: explaining that gelatinisation occurs when liquids containing starch are heated; explaining that gelatinisation has three stages and is affected by the type of starch, temperature, and the quantity of tenderiser and type of acid used; experimenting with different types of starch to identify how they react in the gelatinisation process, including wheat flour, cornflour, potato starch and tapioca; recording and analysing results of experiments and drawing conclusions to determine which products would suit different formulations, comparing characteristics of appearance, taste, texture, flavour and aroma
 - crystallisation and nucleation, by: explaining crystallisation as a processing technique that is used to separate a solid dissolved in a solution from the liquid; explaining that nucleation is the formation of a crystal from a solution, a liquid or a vapour; demonstrating and comprehend crystallisation and nucleation, including super-saturated solutions, using sugar and water
 - caramelisation, by: recognising that caramelisation is a type of non-enzymatic browning; explaining that caramelisation is the oxidation of sugar
 - dextrinisation, by: explaining that dextrinisation is the process involving the browning of starch foods when they are subjected to dry heat and is defined as the breakdown of starch into dextrans or disaccharides; experimenting with carbohydrate-based food to demonstrate and comprehend dextrinisation, including dry heat application to starch-based end-products, e.g. roux and starch browning to change the end-product colour and flavour of a thickened liquid or food
 - gelification, by: defining gelification as the process of converting liquid substances into a solid gelatinous form with the help of a gelling agent, e.g. agar-agar, gelatine, carrageenan, gellan gum, pectin and methylcellulose carbohydrate; experimenting using gelling agents, e.g. using agar-agar to make soup noodles or cream cheese noodles
 - leavening, by: describing leavening as the expansion of dough or batter or baked products resulting in rising; explaining the purpose of leavening agents to improve the gas bubbles and rising of dough; recognising and explaining the effects of three different types of leavening agents, including biological agents, e.g. active dry yeast; chemical agents, e.g. baking powder and potassium bicarbonate; and physical processes, e.g. using air or steam; experimenting with different flours, e.g. plain flour, self-raising flour, bread flour, gluten-free flour; developing different versions of a leavened food, measuring the area, height and volume, photographing the internal texture and measuring the diameter of gas bubbles of each sample; recording results showing the impact of different flours and leavening agents; drawing conclusions to suggest the best leavening agents for different formulations
 - reviewing the food processing techniques used to control the access to and consumability of

Subject matter

- carbohydrate-based food sources, including: application of cold by chilling, freezing; application of heat by boiling, baking, microwaving; exposure to air through dehydration; change of pH through the addition of acid and alkali, addition of additives salt, sugar, antioxidants, yeast, baking powder, cream of tartar; and physical manipulation by aerating, kneading, rolling, shaping
- synthesising primary data from experiments to develop ideas about the formulation of a carbohydrate-based food solution
 - explaining the relationships between the structure and functions of carbohydrate and the effects of these in food processing and on food product quality
- distribution, by
- explaining that processing and preservation techniques can increase access to carbohydrate-based food sources for all consumers and will affect transport, storage and distribution
- consumption, by
- investigating carbohydrate-based foods, including breads and cake batters, through experimentation, comparing the sensory properties of appearance, taste, texture, flavour and aroma
- research and development, by
- investigating alternative ingredients, e.g. natural sweeteners and resistant starch
 - investigating alternative uses for carbohydrates, e.g. edible cutlery made of millet
- waste management and sustainability, by
- researching alternative methods of waste management for carbohydrate-based food waste, including secondary products resulting from, and by-products of, processing, e.g. using spent grains
- protection, by
- explaining the biological, chemical and physical changes that cause food spoilage in carbohydrate-based foods, including
 - biological changes caused by bacteria, yeast and moulds, such as fermentation and spore development
 - chemical changes of retrogradation and syneresis
 - physical changes such as evaporation of moisture in baked goods
 - explaining that carbohydrate-based food sources can be semi-perishable, e.g. fresh pasta, bread and baked goods
 - explaining that carbohydrate-based food sources can be non-perishable, e.g. processed foods such as crackers, dry pasta, flour and rice

4.5 Topic 3: Fat

Guiding question: How can chemical and functional properties of fat, knowledge of food safety and spoilage, and preservation techniques be used to develop food products?

Subject matter

In this topic, students will:

- examine each sector of the food system related to fat-based foods, including:
 - production, by
 - explaining the production of fat-based food products: the planting, growing and harvesting to produce plant sources of fat, and the raising of animals to produce animal sources of fat
 - processing, by
 - explaining the distribution pathways required to process foods in ways that extend shelf life
 - explaining the reasons for and benefits of food processing to consumers, including convenience, cost, access to nutrients and minimisation of seasonality and pathogen growth cycles
 - analysing relationships between the structure and functions of fat, and the effects of these in food processing and on food quality
 - comparing the difference between saturated and unsaturated fat
 - explaining the effects on health of saturated fat and trans fat
 - recognising and explaining chemical and functional properties of fat, including describing the sensory properties of appearance, taste, texture, flavour and aroma
 - investigating, using food science experiments, to identify the effects of temperature and manipulation on the chemical and functional properties of fat, including
 - dispersed systems, by: explaining the dispersed liquid–liquid system as an emulsion made from two liquids that do not normally mix, usually water-in-oil or oil-in-water mixtures; explaining that emulsions are not stable, that chemicals called emulsifiers are used to stabilise emulsions, and that emulsifiers are chemicals that have both lipophilic and hydrophilic bonds that build bridges between the aqueous and oil phases; describing the effect of chemical emulsifiers and physical shear on a dispersion of oil in water; experimenting with the effect of shear and emulsifier types on the stability of oil–water dispersions such as mayonnaise
 - viscosity, by comparing and contrasting the role of emulsifiers used for different applications, including salad dressing (water-in-oil emulsion) or mayonnaise (oil-in-water emulsion)
 - spherification, by explaining the differences between basic spherification and reverse spherification and conducting experiments using basic spherification, including salad dressing caviar
 - powderising, by conducting experiments to create powderised salad dressing
 - recording and analysing experiment results, and drawing conclusions to justify how the properties of fat contribute to the formulation of food products
 - revising and using sensory profiling to evaluate the quality of different fat-based food products produced in experiments, including appearance, taste, texture (mouthfeel and shortness), flavour and aroma
 - defining and justifying the preferred sensory profiling procedure to determine the quality of the particular types of fat-based food products
 - recording and analysing experiment results and drawing conclusions to justify food formulations and why they are altered to increase the functional and sensory properties of food products
 - distribution, by
 - explaining that processing techniques can increase accessibility of fat-based foods for all consumers, including isolated and remote consumers
 - consumption, by
 - experimenting with preparation of fat-based foods for consumption, comparing the sensory properties of appearance, taste, texture, flavour and aroma, including frying, stir-frying, baking and

Subject matter

- roasting
- research and development, by
 - researching the development of new or different fat-based products or emerging plant-based fat products, including coconut oil, avocado oil and nut oil products, and their effects on health
- waste management and sustainability, by
 - investigating the sustainability of fat-based food production to determine effects on the environment, including the differences between the production of animal- and plant-based food products
 - researching alternative waste management methods to limit and dispose of fat-based food waste, including to
 - explain that extending food shelf life and using correct storage methods can assist with sustainability and reduce waste
 - investigate secondary products made using fat, including animal feed and biodiesel
- protection, by
 - explaining that the oxidation of fat is referred to as rancidity and that odour development occurs as a result of enzymatic reactions
 - recognising and explaining how foods deteriorate at different rates and explain how food composition influences this process, including that
 - fat-based food sources can be perishable and require refrigeration, e.g. dairy and meat sources
 - fat-based food sources can be semi-perishable, e.g. coconut products, avocados, oil and other plant-based fat products, which, depending on climate, may require refrigeration
 - the preservation processes of fat-based food products include refrigeration, freezing and cooking
 - preservation techniques affect the sensory properties of appearance, texture, taste, flavour and aroma of foods, including rancidity in potato chip fat and bloom in chocolate-based food products.

4.6 Topic 4: Developing food solutions

Guiding question: How can chemical and functional properties of carbohydrate- and fat-based food, together with preservation techniques, be used to develop food solutions?

Subject matter

In this topic, students will:

- explore the problem, by
 - recognising and describing facts and principles about carbohydrate- and fat-based food problems
 - explaining ideas and problems in a range of carbohydrate and fat-based food contexts
 - analysing the problem stimulus to understand needs and opportunities, and identify the
 - relevant stakeholders
 - essential characteristics and constraints
 - developing a brief that determines the solution requirements of the food and nutrition problem, including considering
 - stakeholders' needs
 - principles of food science, food safety and legislation related to the context
 - essential characteristics and constraints
 - developing self-determined criteria against which to evaluate the solution, including
 - solution requirements from the brief
 - personal, social, ethical, economic, environmental, legal, sustainable and technological impacts and implications of the solution
 - feasibility of the quality, functionality and reliability of the solution
- develop ideas, by
 - researching required information, data and processes about the food and nutrition problem, using primary and/or secondary data, through methods such as
 - conducting interviews with target market consumers to collect primary data
 - experimenting with processing food components to develop ideas and collect primary data
 - researching latest trends, raw materials, food components and processing techniques to develop a list of possible ideas and collect secondary data
 - synthesising information and data to develop ideas for alternative solutions
 - determining which solution best meets the brief
- generate a solution to provide data, by
 - creating the solution
 - testing the quality, functionality and reliability of the generated solution, recording results in graphical or tabular form
- evaluate the solution, by
 - using self-determined criteria and generated data to make judgments about the feasibility of the solution
 - refining ideas and the proposed solution
 - making justified recommendations for future enhancement of the solution.

4.7 Assessment

4.7.1 Summative internal assessment 1 (IA1): Examination (20%)

Description

The examination assesses the application of a range of cognitions to provided items — questions, scenarios and problems.

Student responses must be completed independently, under supervised conditions, and in a set timeframe.

Assessment objectives

This assessment technique is used to determine student achievement in the following objectives:

1. recognise and describe facts and principles related to the processing, and nutritional, chemical, functional and sensory properties, of carbohydrate- or fat-based food
2. explain food science ideas and problems related to carbohydrate- or fat-based food
3. analyse problems, information and data related to the properties and processing of carbohydrate- or fat-based food
4. determine solution requirements and criteria for carbohydrate- or fat-based food problems
5. synthesise chemical, functional and nutritional information and data for carbohydrate- or fat-based food solutions
7. evaluate and refine ideas and carbohydrate- or fat-based food solutions to make justified recommendations for enhancement.

Note: Unit objectives 6 and 8 are not assessed in this instrument.

Specifications

Description

The examination in Food & Nutrition uses a combination of one extended response and a number of short-response questions related to Unit 3 topics. Teachers should ensure that students have sufficient opportunities to demonstrate the assessable objectives.

Short response

- is constructed using several items, which require a response to an unseen question, scenario or problem with unseen stimulus materials
- may require analysis, synthesis and/or evaluation to fully respond to a question, scenario or problem
- requires students to write in dot points, with some full sentences, constructing a response that may have paragraphs so that ideas are maintained, developed and justified
- can include other types of item responses, such as labelling, calculating and graphing food and nutrition data.

Extended response

- is constructed to include a minimum of one problem to a maximum of two problems. The problem must be from a different context to the project — folio for example, if the project-folio is using a carbohydrate-based food context, the examination must have a fat-based context
- is in response to an unseen problem with seen or unseen stimulus materials
- requires sustained analysis, synthesis and evaluation to fully respond to a problem
- requires students to write in full sentences, constructing a response comprising several paragraphs so that ideas are maintained, developed and justified.

Conditions

- Time: 2 hours plus perusal (10 minutes).
- Length: 800–1000 words in total, including
 - a number of short-paragraph response items of 50–250 words per item
 - 400 words or more for the extended response.
- Other:
 - unseen stimulus — materials (if used) must not be copied from information or texts that students have previously been exposed to or have used directly in class
 - when unseen stimulus materials are used, they will be succinct enough to allow students sufficient time to engage with them; stimulus materials that are lengthy, complex or large in number will be shared with students prior to the administration of the assessment instrument.

Summary of the instrument-specific marking guide

The following table summarises the criteria, assessment objectives and mark allocation for the objectives assessed in the examination.

Criterion	Objectives	Marks
Recognising and explaining	1 and 2	5
Analysing and determining	3 and 4	6
Synthesising and evaluating	5 and 7	9
Total		20

Note: Unit objectives 6 and 8 are not assessed in this instrument.

Instrument-specific marking guide

Criterion: Recognising and explaining

Assessment objectives

1. recognise and describe facts and principles related to the processing, and nutritional, chemical, functional and sensory properties, of carbohydrate- or fat-based food
2. explain food science ideas and problems related to carbohydrate- or fat-based food

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>accurate</u> and <u>discriminating</u> recognition and <u>discerning</u> description of facts and principles related to the processing, and nutritional, chemical, functional and sensory properties, of carbohydrate- or fat-based food • <u>discerning</u> explanation of food science ideas and problems related to carbohydrate- or fat-based food. 	4–5
<ul style="list-style-type: none"> • <u>appropriate</u> recognition and description of some facts and principles related to the processing, or nutritional, chemical, functional or sensory properties, of carbohydrate- or fat-based food • appropriate explanation of food science ideas and problems related to carbohydrate- or fat-based food. 	2–3
<ul style="list-style-type: none"> • <u>variable</u> recognition and <u>superficial</u> description of the processing, or nutritional, chemical, functional or sensory properties, of carbohydrate- or fat-based food • superficial explanation of food science ideas and a problem related to a carbohydrate- or fat-based food solution. 	1
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Criterion: Analysing and determining

Assessment objectives

3. analyse problems, information and data related to the properties and processing of carbohydrate- or fat-based food
4. determine solution requirements and criteria for carbohydrate- or fat-based food problems

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>insightful</u> analysis of relevant problems, information and data related to the properties and processing of carbohydrate- or fat-based food to identify essential characteristics and constraints • <u>astute</u> determination of <ul style="list-style-type: none"> – essential solution requirements from the brief – self-determined criteria that include the relevant impacts and implications, and the quality, functionality and reliability indicators for carbohydrate- or fat-based food problems. 	5–6
<ul style="list-style-type: none"> • <u>appropriate</u> analysis of problems, information and data related to the properties and processing of carbohydrate- or fat-based food to identify some of the characteristics and constraints • <u>reasonable</u> determination of some <ul style="list-style-type: none"> – solution requirements from the brief – self-determined criteria that include impacts and implications, and the quality, functionality or reliability indicators for carbohydrate- or fat-based food problems. 	3–4

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • makes statements about a problem or information related to a carbohydrate- or fat-based food problem • vague identification of some solution requirements and criteria for carbohydrate- or fat-based food problems. 	1–2
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Criterion: Synthesising and evaluating

Assessment objectives

5. synthesise chemical, functional and nutritional information and data for carbohydrate- or fat-based food solutions
7. evaluate and refine ideas and carbohydrate- or fat-based food solutions to make justified recommendations for enhancement

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>coherent</u> and <u>logical</u> synthesis of chemical, functional and nutritional information, and primary and secondary data for chosen solutions • <u>critical</u> evaluation and <u>discerning</u> refinement of ideas and carbohydrate- or fat-based food solutions against self-determined criteria to make <u>astute</u> recommendations for enhancements, justified by data. 	8–9
<ul style="list-style-type: none"> • <u>logical</u> synthesis of chemical, functional and nutritional information, and primary and secondary data for chosen solutions • <u>reasoned</u> evaluation and <u>effective</u> refinement of ideas and carbohydrate- or fat-based food solutions against self-determined criteria to make effective recommendations for enhancements, justified by data. 	6–7
<ul style="list-style-type: none"> • <u>simple</u> synthesis of chemical, functional or nutritional information, and primary or <u>secondary data</u> for chosen solutions • <u>feasible</u> evaluation and <u>adequate</u> refinement of ideas and carbohydrate- or fat-based food solutions against some self-determined criteria to make <u>fundamental</u> recommendations for enhancements, justified by data. 	4–5
<ul style="list-style-type: none"> • <u>rudimentary</u> synthesis of information and data for a chosen solution • <u>superficial</u> evaluation and refinement of ideas and a carbohydrate- or fat-based food solution against some criteria to make <u>elementary</u> recommendations for enhancements. 	2–3
<ul style="list-style-type: none"> • <u>unclear</u> combination of information about a solution for a carbohydrate- or fat-based food problem • identification of a change to an idea or solution. 	1
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

4.7.2 Summative internal assessment 2 (IA2): Project — folio (25%)

Description

This assessment focuses on a problem-solving process that requires the application of a range of cognitive, technical and creative skills, and theoretical understandings. Students document the iterative process undertaken to develop a solution to a food-related problem. The response is a coherent work that may include written paragraphs and annotations, diagrams, sketches, drawings, photographs, tables, spreadsheets and a prototype.

This assessment occurs over an extended and defined period of time. Students may use class time and their own time to develop a response to the food and nutrition problem.

Assessment objectives

This assessment technique is used to determine student achievement in the following objectives:

1. recognise and describe facts and principles related to nutritional, chemical, functional and sensory properties and processing of carbohydrate- or fat-based food
2. explain food science ideas and a problem related to the processing of a carbohydrate- or fat-based food solution
3. analyse a problem, information and data related to the properties and processing of carbohydrate- or fat-based food
4. determine solution requirements and criteria for a carbohydrate- or fat-based food problem
5. synthesise chemical, functional and nutritional information and data to develop ideas for a carbohydrate- or fat-based food solution
6. generate a carbohydrate- or fat-based food solution to provide data to determine the feasibility of the solution
7. evaluate and refine ideas and a solution to make justified recommendations for enhancement to a carbohydrate- or fat-based food solution
8. make decisions about and use mode-appropriate features, language and conventions to communicate development of the solution.

Specifications

Description

In Food & Nutrition, a folio involves individual students documenting the application of the problem-solving process in response to an identified real-world problem that requires a solution. The response will include the following folio and referencing conventions:

- headings that organise and communicate the student's thinking through the iterative phases of the problem-solving process
- a table of contents page
- a reference list and a recognised system of in-text referencing.

For this assessment, teachers will provide a contextual stimulus related to a carbohydrate- or fat-based food problem. Students identify a specific carbohydrate or fat-based food need from the stimulus as the focus of their problem-solving process. Examples of possible problems include situations in which a:

- traditional baking company has found its profits and market share are on a downward trend. The company has conducted market research, which has revealed that there is a demand for gluten-free products. Develop a solution for a gluten-free product
- healthy-snack food company wants to develop a line extension. The company wants to introduce a single-serve convenience snack food for young adults. Consider the range of products the company currently produces and the company ethos of producing healthy food. The snack food you develop should be easy to transport, not require refrigeration or preparation, and be able to be eaten on the run
- new company delivers packed ingredients and instructions for bread-making straight to consumers' homes. Customer feedback has indicated that the company's starter range of focaccia is too dense. The company has employed you, as a food scientist, to create a new formulation for this product range. Develop a solution that corrects the issue of the dense focaccia.

The folio includes the following assessable evidence:

- recognition and description of facts and principles related to the nutritional, chemical, functional and sensory properties of carbohydrate or fat-based food
- explanation of food science ideas and the problem related to the processing of carbohydrate-or fat-based food
- analysis of
 - the contextual stimulus, including stakeholder needs
 - information and data related to the properties and processing of carbohydrate- or fat-based food to identify essential characteristics and constraints and their relationship to the problem
 - the relevant personal, social, ethical, economic, environmental, legal and/or sustainability impacts and implications of the solution
 - the quality, functionality and reliability indicators for the carbohydrate- or fat-based food problem
- determination of
 - solution requirements to develop a brief
 - prescribed and self-determined criteria used to evaluate the solution
- synthesis of
 - food and nutrition information and data
 - primary experimental data about alternative ideas
 - alternative ideas to determine a proposed solution
- generation of the proposed solution for the carbohydrate- or fat-based food problem to provide data to determine the feasibility of the solution
- evaluation and refinement of ideas and the solution, using self-determined criteria and generated data to recommend and justify enhancements to ideas and the solution to the carbohydrate- or fat-based food problem

- communication of
 - the application of the problem-solving process in response to the carbohydrate- and/or fat-based food problem using written or visual features, e.g. annotations, diagrams, sketches, drawings, photographs, and a prototype
 - data using diagrams, tables, graphs and spreadsheets.

Contextual stimulus specifications

Stimulus materials will include contextual information about the stakeholder needs and may include company ethos or beliefs, product lines, processes and food components used to develop products, chemical and functional properties, legislation required, food safety considerations, data related to products or consumers and constraints that will have an impact on the problem solution.

Conditions

- Duration: 15 hours
- Length: 10–12 A3 pages
- Other
 - the table of contents and reference list are not included in the page count
 - schools should implement authentication strategies that reflect QCAA guidelines (see Section 1.3.2).

Summary of the instrument-specific marking guide

The following table summarises the criteria, assessment objectives and mark allocation for the objectives assessed in the project.

Criterion	Objectives	Marks
Recognising and explaining	1 and 2	5
Analysing and determining	3 and 4	7
Synthesising, generating and evaluating	5, 6 and 7	9
Communicating	8	4
Total		25

Instrument-specific marking guide

Criterion: Recognising and explaining

Assessment objectives

1. recognise and describe facts and principles related to the processing, and nutritional, chemical, functional and sensory properties, of carbohydrate- or fat-based food
2. explain food science ideas and a problem related to the processing of a carbohydrate- or fat-based food solution

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>accurate</u> and <u>discriminating</u> recognition and <u>discerning</u> description of facts and <u>principles</u> related to the processing, and nutritional, chemical, functional and <u>sensory properties</u>, of carbohydrate- or fat-based food • <u>discerning</u> explanation of food science ideas and a problem related to the <u>processing</u> of a carbohydrate- or fat-based food solution. 	4–5
<ul style="list-style-type: none"> • <u>appropriate</u> recognition and description of some facts and principles related to the processing, and nutritional, chemical, functional and sensory properties, of carbohydrate- or fat-based food • appropriate explanation of food science ideas and a problem related to the processing of a carbohydrate- or fat-based food solution. 	2–3
<ul style="list-style-type: none"> • <u>variable</u> recognition and <u>superficial</u> description of the processing, or nutritional, chemical, functional or sensory properties, of carbohydrate- or fat-based food • superficial explanation of food science ideas and a problem related to a carbohydrate- or fat-based food solution. 	1
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Criterion: Analysing and determining

Assessment objectives

3. analyse a problem, information and data related to the properties and processing of carbohydrate- or fat-based food
4. determine solution requirements and criteria for a carbohydrate- or fat-based food problem

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>insightful</u> analysis of a relevant problem, information and data related to the properties and processing of carbohydrate- or fat-based food to identify essential characteristics and constraints • <u>astute</u> determination of <ul style="list-style-type: none"> – essential solution requirements from the brief – self-determined criteria that include the relevant impacts and implications, and the quality, functionality and reliability indicators for the carbohydrate or fat-based food problem. 	6–7
<ul style="list-style-type: none"> • <u>considered</u> analysis of a relevant problem, information and data related to the properties and processing of carbohydrate- or fat-based food to identify characteristics and constraints • <u>logical</u> determination of <ul style="list-style-type: none"> – effective solution requirements from the brief – self-determined criteria that include the impacts and implications, and the quality, 	4–5

The student work has the following characteristics:	Marks
functionality and reliability indicators for the carbohydrate- or fat-based food problem.	
<ul style="list-style-type: none"> • <u>appropriate</u> analysis of a problem, information and data related to the properties or processing of carbohydrate- or fat-based food to identify some of the characteristics and constraints • <u>reasonable</u> determination of <ul style="list-style-type: none"> – some solution requirements from the brief – self-determined criteria that include impacts and implications, and the quality, functionality or reliability indicators for the carbohydrate- or fat-based food problem. 	2–3
<ul style="list-style-type: none"> • description of a problem or information related to a carbohydrate- or fat-based food problem • identification of a criterion for a carbohydrate- or fat-based food problem. 	1
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Criterion: Synthesising, generating and evaluating

Assessment objectives

5. synthesise chemical, functional and nutritional information and data to develop ideas for a carbohydrate- or fat-based food solution
6. generate a carbohydrate- or fat-based food solution to provide data to determine the feasibility of the solution
7. evaluate and refine ideas and a solution to make justified recommendations for enhancement to a carbohydrate- or fat-based food problem

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>coherent</u> and <u>logical</u> synthesis of chemical, functional, sensory and nutritional information, and a range of primary and <u>secondary data</u> to develop ideas for a chosen <u>solution</u> • <u>purposeful</u> generation of a carbohydrate- or fat-based food processing solution to provide <u>valid</u> sensory profiling data to determine the <u>feasibility</u> of the solution • critical <u>evaluation</u>, and <u>discerning</u> refinement, of ideas and the generated solution, against self-determined criteria and data, considering impacts and implications of the solution, to make <u>astute</u> recommendations for enhancements, justified by data. 	8–9
<ul style="list-style-type: none"> • <u>logical</u> synthesis of chemical, functional, sensory and nutritional information and primary and secondary data to develop ideas for a chosen solution • <u>effective</u> generation of a carbohydrate- or fat-based food processing solution to provide valid sensory profiling data to determine the feasibility of the solution • reasoned evaluation and effective refinement of ideas and a solution, against self-determined criteria to make effective recommendations for enhancements, justified by data. 	6–7
<ul style="list-style-type: none"> • <u>simple</u> synthesis of chemical, functional, sensory and nutritional information and primary or secondary data to develop ideas for a chosen solution • <u>adequate</u> generation of a carbohydrate- or fat-based food processing solution to provide <u>relevant</u> sensory profiling data to determine the feasibility of the solution • feasible evaluation and adequate refinement of ideas and a solution, against self-determined criteria to make fundamental recommendations for enhancements, justified by data. 	4–5

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>rudimentary</u> synthesis of information and data to develop <u>partial</u> ideas for a chosen solution • partial generation of a carbohydrate- or fat-based food processing solution to provide some sensory profiling data to determine the feasibility of the solution • <u>superficial</u> evaluation and refinement of ideas and a solution against some criteria to make <u>elementary</u> recommendations for enhancements. 	2–3
<ul style="list-style-type: none"> • <u>unclear</u> combination of information or ideas about a carbohydrate- or fat-based food problem • generation of parts of a solution • identification of a change to idea or solution. 	1
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Criterion: Communicating

Assessment objective

8. make decisions about and use mode-appropriate features, language and conventions for particular purposes and contexts

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>discerning</u> decision-making about and <u>fluent</u> use of <ul style="list-style-type: none"> – written and visual (if appropriate) features to communicate a solution – language for a technical audience – grammatically accurate language structures – referencing and folio conventions. 	3–4
<ul style="list-style-type: none"> • <u>variable</u> decision-making about and <u>inconsistent</u> use of <ul style="list-style-type: none"> – written and visual (if appropriate) features – suitable language – grammar and language structures – referencing or folio conventions. 	1–2
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

5 Unit 4: Food solution development for nutrition consumer markets

5.1 Unit description

In Unit 4, students solve food and nutrition problems to improve safety, nutrition, convenience, transparency and accessibility for nutrition consumer markets.

Currently, the food industry and its stakeholders recognise that the climate of consumer needs and wants is dynamic and constantly provides new opportunities in food solution development. Ipsos investigated shifting consumer purchase decisions and behaviours and found that consumers have changed in fundamental ways; their *Food CHATS* report (Ipsos 2016) showed that consumer purchase decisions are increasingly based on a mix of traditional consumer drivers (price, taste and convenience) and evolving consumer drivers (health, safety, social impact, experience and transparency). This creates new challenges and opportunities for food solution development, and industry success will be determined by how effectively these are managed.

Topic 1 focuses on the investigation of problems in nutrition consumer markets. Many current formulations of food have high-risk food components, such as salt, sugar, and saturated and trans fats, and are low in dietary fibre. Reformulating to improve the nutritional quality of food solutions presents significant challenges to the food industry, such as maintaining desirable sensory properties and shelf life of a food product. In Topic 2, students research and solve nutrition problems using information and data from relevant stakeholders. Students integrate this information with existing knowledge from Units 1, 2 and 3 to explore how food formulation and reformulation can contribute to solutions for different nutrition consumer markets, and support health and decrease chronic disease.

Using the Food & Nutrition problem-solving process, students formulate or reformulate a marketable food solution that addresses a need of a nutrition consumer market.

Unit requirements

	Unit topic	Notional hours
Topic 1	Formulation and reformulation for nutrition consumer markets	10
Topic 2	Food development process	25
Assessment integrated within the unit		20

5.2 Unit objectives

Unit objectives are drawn from the syllabus objectives and are contextualised for the subject matter and requirements of the unit. Each unit objective must be assessed at least once.

Students will:

Unit objective	IA3	EA
1. <u>recognise</u> and <u>describe</u> facts and <u>principles</u> related to the <u>food system</u> , <u>food formulation</u> , and a <u>nutrition consumer market</u>	•	•
2. <u>explain</u> ideas and problems related to current and emerging nutrition consumer markets	•	•
3. <u>analyse</u> problems, information and data related to current and emerging nutrition consumer markets	•	•
4. <u>determine solution</u> requirements and self-determined criteria for nutrition consumer market problems	•	•
5. <u>synthesise</u> information and data for solutions related to nutrition consumer market problems	•	•
6. <u>generate</u> nutrition consumer market solutions to provide data to determine the <u>feasibility</u> of the solution	•	
7. <u>evaluate</u> and <u>refine</u> ideas and solutions to make justified recommendations for enhancement	•	•
8. <u>make decisions</u> about and use mode-appropriate features, language and conventions for particular purposes and contexts.	•	

5.3 Topic 1: Formulation and reformulation for nutrition consumer markets

Guiding question: What formulation and reformulation opportunities exist for specific nutrition consumer markets?

Subject matter

In this topic, students will:

- recognise that a nutrition consumer market is represented by individuals and groups who purchase food products, goods and services for their own needs
- analyse the nutrition requirements of different nutrition consumer markets, including individuals or groups who are elderly, health-conscious, fitness-focused, pregnant, vegetarian or vegan, infant, allergic or food-intolerant, experiencing diet-related conditions or chronic disease, such as obesity, type 2 diabetes, coronary heart disease and diet-related cancer
- research the nutrition consumer markets to determine the nutrition requirements for formulating foods to support health
 - conduct interviews with stakeholders to collect primary data about their food choices
 - determine appropriate dietary choices for nutrition market consumers to maintain or improve health
- investigate emerging nutritional food trends, e.g. snack food products, gluten-free alternatives, probiotic products, lactose- and dairy-free alternatives, and sustainable use of by-products, to produce new food products, and understand their purpose
- explain that the purpose of formulation is to combine food components in appropriate ratios, processes or structures, according to a formula

Subject matter

- recognise that the purpose of reformulating food products is to produce a different combination of food components, structures or processes for a particular need
- explain the purpose of the food standards code related to the labelling of nutritional content, ingredients, the nutrition information panel, and Nutrient Profiling Scoring Criterion (NPSC)
- use the NPSC to analyse information and data on food packaging to determine the suitability for specific nutrition consumer markets
- investigate and determine how food formulations solve problems associated with food choices for different consumers
- recognise that food products considered unsuitable for specific nutrition consumer markets can be reformulated to achieve suitable nutritional value and palatability to meet consumer needs
- investigate needs or opportunities for formulating and reformulating products to enhance nutritional outcomes, including reducing salt, sugar and/or saturated fat, reducing additives or chemicals, increasing fibre, or using alternative food components
- develop a list of food products high in salt, fat, sugar, gluten and lactose and low in dietary fibre to reformulate or create new or line extension prototypes to solve problems for nutrition consumer markets
- research specific stakeholders and food products to collect primary and secondary data
- use data to develop ideas to solve problems related to food reformulations for specific nutrition consumer markets
- experiment and test ideas and solutions for food formulations for specific nutrition consumer markets, including quality, functionality and reliability
- record and analyse data to draw conclusions about the feasibility of a solution for a specific nutrition consumer market.

5.4 Topic 2: Food development process

Guiding question: How can the food development process solve current and future nutrition consumer market problems?

Subject matter

In this topic, students will:

- explore the problem, by
 - recognising and describing facts and principles related to nutrition consumer market problems
 - explaining ideas and problems in a range of nutrition consumer market contexts
 - analysing the problem stimulus to understand and identify
 - relevant stakeholders
 - essential characteristics and constraints of the problem
 - researching nutrition requirements of one of the following nutrition consumer markets
 - elderly
 - health-conscious
 - fitness-focused
 - vegetarian or vegan
 - pregnant
 - infant
 - consumers with allergies or food intolerance
 - consumers experiencing diet-related conditions or chronic disease, such as obesity, heart disease, type 2 diabetes or diet-related cancer
 - developing a brief that clearly determines the solution requirements, including
 - nutrition consumer market needs or opportunities
 - principles of food science, food safety and legislation related to the context
 - essential characteristics and constraints of the problem
 - developing self-determined criteria to evaluate the proposed solution, including
 - solution requirements from the brief
 - personal, social, ethical, economic, environmental, legal, sustainable and technological impacts and implications of the solution
 - quality, functionality and reliability of the solution
- develop ideas, by
 - researching required knowledge and processes from primary and/or secondary sources about the food and nutrition problem, through methods such as
 - conducting interviews with target market consumers to collect primary data
 - experimenting with the processing of food components to develop ideas and collect primary data
 - researching the latest trends, raw materials and processing techniques to develop possible ideas and collect secondary data
 - synthesising information and data to develop ideas for alternative solutions
 - determining which formulation or reformulation best meets the brief
- generate a solution to provide data, by
 - creating the solution
 - testing the quality, functionality and reliability of the solution, recording results in graphical or tabulated form
- evaluate the solution, by
 - using self-determined criteria and generated data to make judgments about the feasibility of the solution
 - refining ideas and a proposed solution
 - making justified recommendations about the solution for future enhancement.

5.5 Assessment

5.5.1 Summative internal assessment 3 (IA3): Project — folio (30%)

Description

This assessment focuses on a problem-solving process that requires the application of a range of cognitive, technical and creative skills and theoretical understandings. Students document the iterative process undertaken to develop a solution to a food and nutrition problem. The response is a coherent work that may include written paragraphs and annotations, diagrams, sketches, drawings, photographs, tables, spreadsheets and a prototype.

This assessment occurs over an extended and defined period of time. Students may use class time and their own time to develop a response.

Assessment objectives

This assessment technique is used to determine student achievement in the following objectives:

1. recognise and describe facts and principles related to the food formulation process
2. explain ideas and a problem related to food formulation for a nutrition consumer market
3. analyse a problem, information and data related to a specific nutrition consumer market
4. determine solution requirements and self-determined criteria for a selected nutrition consumer market problem
5. synthesise information and data to develop ideas for a solution related to a selected nutrition consumer market problem
6. generate a nutrition consumer market solution to provide data to determine the feasibility of the solution
7. evaluate and refine ideas and a solution to make justified recommendations for enhancement
8. make decisions about and use mode-appropriate features, language and conventions for particular purposes and contexts.

Specifications

Description

In Food & Nutrition, a folio involves individual students documenting the application of a problem-solving process in response to an identified real-world problem that requires a solution. The response will include the following folio and referencing conventions:

- headings that organise and communicate the student's thinking through the iterative phases of the problem-solving process
- a table of contents
- a reference list and a recognised system of in-text referencing.

For this assessment, students will identify an appropriate problem from one of the following nutrition consumer markets:

- elderly
- health-conscious

- fitness-focused
- vegetarian or vegan
- pregnant
- infant
- allergic or food-intolerant
- consumers experiencing diet-related conditions or chronic disease, such as obesity, heart disease, type 2 diabetes or diet-related cancer.

Examples of nutrition consumer market problems include:

- a diet food company has employed you to develop meals for their low-kilojoule range that will provide alternatives for either gluten-intolerant consumers or lactose-intolerant consumers. Develop a solution that will satisfy the needs of the selected consumer market
- a hospital specialising in stroke rehabilitation and related conditions has asked your company to develop a product that fulfils their patients' dietary needs, is tasty, easy for patients to eat unsupervised, and does not require utensils to eat. Develop a food solution to help these patients gain some independence
- a major supermarket has identified that their lactose-free food product range is very limited and research has shown that consumers would welcome a yoghurt with better quality taste and mouthfeel. Develop a lactose-free yoghurt that delivers improved mouthfeel and taste while still providing calcium.

The folio includes the following assessable evidence:

- recognition and description of facts and principles related to the food formulation process
- explanation of food science ideas and the problem related to food formulation for a nutrition consumer market
- analysis of
 - the problem stimulus, including stakeholder needs
 - information and data related to food formulation for a nutrition consumer market to identify essential characteristics and constraints, and their relationship to the problem
 - the relevant personal, social, ethical, economic, environmental, legal and/or sustainability impacts and implications of the solution
 - the quality, functionality and reliability indicators for the nutrition consumer market problem
- determination of
 - solution requirements to develop a brief
 - prescribed and self-determined criteria used to evaluate the solution
- synthesis of
 - food and nutrition information and data
 - primary experimental data about alternative solutions ideas
 - alternative solutions ideas to determine a proposed solution
- generation of the proposed solution for the nutrition consumer market problem to provide data to determine the feasibility of the solution

- evaluation and refinement of ideas and the solution, using self-determined criteria and generated data to recommend and justify enhancements to ideas and the solution to the nutrition consumer market problem
- communication of
 - the application of the problem-solving process in response to the nutrition consumer market problem using written or visual features, e.g. annotations, diagrams, sketches, drawings, photographs, or a prototype
 - data using diagrams, tables, graphs and spreadsheets.

Contextual stimulus specifications

Stimulus materials will include contextual information about the stakeholder needs from one of the specific nutrition consumer markets and may include company ethos or beliefs, product lines, processes and food components used to develop products, chemical and functional properties, legislation required, food safety considerations, data related to products or consumers and constraints that will have an impact on the problem solution.

Conditions

- Duration: 15 hours.
- Length: 10–15 A3 pages.
- Other:
 - the table of contents and reference list are not included in the page count
 - schools should implement authentication strategies that reflect QCAA guidelines (see Section 1.3.2).

Summary of the instrument-specific marking guide

The following table summarises the criteria, assessment objectives and mark allocation for the project.

Criterion	Objectives	Marks
Recognising and explaining	1 and 2	7
Analysing and determining	3 and 4	9
Synthesising, generating and evaluating	5, 6 and 7	10
Communicating	8	4
Total		30

Instrument-specific marking guide

Criterion: Recognising and explaining

Assessment objectives

1. recognise and describe facts and principles related to the food formulation process
2. explain ideas and a problem related to food formulation for a nutrition consumer market

The student work has the following characteristics:	Marks
<ul style="list-style-type: none">• <u>accurate</u> and <u>discriminating</u> recognition and <u>discerning</u> description of facts and principles related to the food <u>formulation</u> process and a <u>specific nutrition consumer market</u>• discerning explanation of food science ideas and a problem related to the nutrition consumer market.	6–7
<ul style="list-style-type: none">• accurate recognition and <u>effective</u> description of facts and principles related to the food formulation process and a specific nutrition consumer market• effective explanation of food science ideas and a problem related to a specific nutrition consumer market.	4–5
<ul style="list-style-type: none">• <u>appropriate</u> recognition and description of facts and principles related to the food formulation process and a specific nutrition consumer market• appropriate explanation of food science ideas and a problem related to a specific nutrition consumer market.	2–3
<ul style="list-style-type: none">• <u>variable</u> recognition and <u>superficial</u> description of the food formulation process related to a nutrition consumer market• superficial explanation of food science ideas and a problem related to a nutrition consumer market.	1
<ul style="list-style-type: none">• does not satisfy any of the descriptors above.	0

Criterion: Analysing and determining

Assessment objectives

3. analyse a problem, information and data related to a specific nutrition consumer market
4. determine solution requirements and self-determined criteria for a selected nutrition consumer market problem

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>insightful</u> analysis of a relevant problem, information and data related to a <u>specific nutrition consumer market</u> to identify essential characteristics and constraints • <u>astute</u> determination of <ul style="list-style-type: none"> – essential <u>solution</u> requirements from the brief – self-determined criteria that include the relevant impacts and implications of, and the quality, functionality and reliability indicators for, a selected problem that affects a nutrition consumer market. 	8–9
<ul style="list-style-type: none"> • <u>considered</u> analysis of a relevant problem, information and data related to a specific nutrition consumer market to identify essential characteristics and constraints • <u>logical</u> determination of <ul style="list-style-type: none"> – effective solution requirements from the brief – self-determined criteria that include the relevant impacts and implications of, and the quality, functionality and reliability indicators for, a selected problem that affects a nutrition consumer market. 	6–7
<ul style="list-style-type: none"> • <u>appropriate</u> analysis of a problem, information and data related to a specific nutrition consumer market to identify some characteristics and constraints • <u>reasonable</u> determination of some <ul style="list-style-type: none"> – solution requirements in the brief – self-determined criteria that include impacts and implications of, and the quality, functionality and reliability indicators for, a selected problem that affects a nutrition consumer market. 	4–5
<ul style="list-style-type: none"> • <u>superficial</u> analysis of a problem and information or data related to a specific nutrition consumer market to identify some characteristics or constraints • <u>vague</u> determination of some <ul style="list-style-type: none"> – solution requirements from the brief – self-determined criteria that include some of the impacts and implications of, and the quality, functionality or reliability indicators for, a selected problem that affects a nutrition consumer market. 	2–3
<ul style="list-style-type: none"> • description of a problem or information related to a nutrition consumer market • identification of a criterion for the consumer market. 	1
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Criterion: Synthesising, generating and evaluating

Assessment objectives

5. synthesise information and data to develop ideas for a solution related to a selected nutrition consumer market problem
6. generate a nutrition consumer market solution to provide data to determine the feasibility of the solution
7. evaluate and refine ideas and a solution to make justified recommendations for enhancement

The student work has the following characteristics:	Marks
<ul style="list-style-type: none"> • <u>coherent</u> and <u>logical</u> synthesis of chemical, functional and nutritional information, and a range of primary and <u>secondary data</u> to develop ideas for a chosen solution • <u>purposeful</u> generation of a <u>nutrition consumer market</u> solution to provide <u>valid</u> sensory profiling data to determine the <u>feasibility</u> of the solution • <u>critical</u> evaluation and discerning refinement of ideas and a solution, against self-determined criteria, to make <u>astute</u> recommendations for enhancements, justified by data. 	9–10
<ul style="list-style-type: none"> • <u>logical</u> synthesis of chemical, functional and nutritional information, and primary and secondary data to develop ideas for a chosen solution • <u>effective</u> generation of a nutrition consumer market solution to provide valid sensory profiling data to determine the feasibility of the solution • <u>reasoned</u> evaluation and effective refinement of ideas and the generated solution, against self-determined criteria, to make effective recommendations for enhancements, justified by data. 	7–8
<ul style="list-style-type: none"> • <u>simple</u> synthesis of chemical, functional and nutritional information, and primary or secondary data to develop ideas for a chosen solution • <u>adequate</u> generation of a nutrition consumer market solution to provide <u>relevant</u> sensory profiling data to determine the feasibility of the solution • <u>feasible</u> evaluation and adequate refinement of ideas and a solution, against self-determined criteria, to make <u>fundamental</u> recommendations for enhancements, justified by data. 	5–6
<ul style="list-style-type: none"> • <u>rudimentary</u> synthesis of chemical, functional and nutritional information, and primary or secondary data to develop ideas for a chosen solution • <u>partial</u> generation of a nutrition consumer market solution to provide some sensory profiling data to determine the feasibility of the solution • <u>superficial</u> evaluation and refinement of ideas and a solution, against some criteria, to make <u>elementary</u> recommendations for enhancements. 	3–4
<ul style="list-style-type: none"> • <u>unclear</u> combination of information or ideas about a nutrition consumer problem • generation of parts of a solution • identification of a change to an idea or solution. 	1–2
<ul style="list-style-type: none"> • does not satisfy any of the descriptors above. 	0

Criterion: Communicating

Assessment objective

8. make decisions about and use mode-appropriate features, language and conventions for particular purposes and contexts

The student work has the following characteristics:	Marks
<ul style="list-style-type: none">• <u>discerning</u> decision-making about and <u>fluent</u> use of<ul style="list-style-type: none">- written and visual (if appropriate) features to communicate about a solution- language for a technical audience- grammatically accurate language structures- referencing and folio conventions.	3–4
<ul style="list-style-type: none">• <u>variable</u> decision-making about and <u>inconsistent</u> use of<ul style="list-style-type: none">- written and visual (if appropriate) features- suitable language- grammar and language structures- referencing or folio conventions.	1–2
<ul style="list-style-type: none">• does not satisfy any of the descriptors above.	0

5.5.2 Summative external assessment (EA): Examination (25%)

General information

Summative external assessment is developed and marked by the QCAA. In Food & Nutrition it contributes 25% to a student's overall subject result.

The external assessment in Food & Nutrition is common to all schools and administered under the same conditions, at the same time, on the same day.

Description

The examination assesses the application of a range of cognitions to multiple provided items — questions, scenarios and problems.

Student responses must be completed individually, under supervised conditions, and in a set timeframe.

Assessment objectives

This assessment technique is used to determine student achievement in the following objectives:

1. recognise and describe facts and principles related to the food system, food formulation and nutrition consumer markets
2. explain ideas and problems related to current and emerging nutrition consumer markets
3. analyse problems, information and data related to current and emerging nutrition consumer markets
4. determine solution requirements and criteria for nutrition consumer market problems
5. synthesise information and data for solutions related to nutrition consumer market problems
7. evaluate and refine ideas and solutions to make justified recommendations for enhancement.

Note: Unit objectives 6 and 8 are not assessed in this instrument.

Specifications

Description

The examination in Food & Nutrition uses a combination of extended- and short-response questions related to Unit 4 topics.

Short response

- is constructed using several items, which are a response to an unseen question, scenario or problem with unseen stimulus materials
- may require analysis, synthesis and/or evaluation to fully respond to a question, scenario or problem
- requires students to write in dot points, with some full sentences, constructing a response that may have paragraphs so that ideas are maintained, developed and justified
- may require other types of item responses, such as drawing, labelling, graphing and tabulation of food and nutrition data.

Extended response

- is constructed to include a minimum of one problem to a maximum of two problems. If two problems are presented, they will be from different contexts. Students respond to one problem only
- requires students to respond to an unseen problem with unseen stimulus materials
- requires sustained analysis, synthesis and evaluation to fully respond to the problem
- requires students to write in full sentences, constructing a response of several paragraphs so that ideas are maintained, developed and justified.

Conditions

- Time: 2 hours plus perusal (10 minutes).
- Length: 800–1000 words in total or equivalent, including
 - short-paragraph response items of 50–250 words per item
 - 400 words or more for extended response.

Instrument-specific marking guide

No ISMG is provided for the external assessment.

6 Glossary

Term	Explanation
A	
accomplished	highly trained or skilled in a particular activity; perfected in knowledge or training; expert
accuracy	the condition or quality of being true, correct or exact; freedom from error or defect; precision or exactness; correctness; in science and technologies, the extent to which a measurement result represents the quantity it purports to measure; an accurate measurement result includes an estimate of the true value and an estimate of the uncertainty
accurate	precise and exact; to the point; consistent with or exactly conforming to a truth, standard, rule, model, convention or known facts; free from error or defect; meticulous; correct in all details
additives	substances added to food by the manufacturer that are not normally consumed alone as an ingredient; can improve flavour, appearance (colour) and nutritional value, and extend storage life and preserve flavour
adept	very/highly skilled or proficient at something; expert
adequate	satisfactory or acceptable in quality or quantity equal to the requirement or occasion
aeration	incorporation of air into a mixture in order to increase its volume and improve texture and flavour of certain foods and beverages
agar-agar	an algae-extracted, heat-resistant gelling agent
alkaloids	a large group of nitrogenous organic compounds of plant origin that have pronounced physiological effects on humans
amino acid	building blocks from which proteins are constructed
analyse	dissect to ascertain and examine constituent parts and/or their relationships; break down or examine in order to identify the essential characteristics, components or structure; determine the logic and reasonableness of information; examine or consider something in order to explain and interpret it, for the purpose of finding meaning or relationships and identifying patterns, similarities and differences
animal welfare	the physical and psychological wellbeing of animals (Brown, Hindmarsh & McGregor 2015)
annotated	made or furnished critical or explanatory notes, or comments to a picture, drawing, sketch or diagram
antioxidants	chemicals approved for the control of oxidation (rancidity) in food products, including butylated hydroxytoluene (BHT), butylated hydroxyanisole (BHA) and propyl-gallate

Term	Explanation
applied learning	the acquisition and application of knowledge, understanding and skills in real-world or lifelike contexts that may encompass workplace, industry and community situations; it emphasises learning through doing and includes both theory and the application of theory, connecting subject knowledge and understanding with the development of practical skills
Applied subject	a subject whose primary pathway is work and vocational education; it emphasises applied learning and community connections; a subject for which a syllabus has been developed by the QCAA with the following characteristics: results from courses developed from applied syllabuses contribute to the QCE; results may contribute to ATAR calculations
apply	use knowledge and understanding in response to a given situation or circumstance; carry out or use a procedure in a given or particular situation
appraise	evaluate the worth, significance or status of something; judge or consider a text or piece of work
appreciate	recognise or make a judgment about the value or worth of something; understand fully; grasp the full implications of
appropriate	acceptable; suitable or fitting for a particular purpose, circumstance, context, etc.
apt	suitable to the purpose or occasion; fitting, appropriate
aquafaba	the cooking liquid of chickpeas; can be used to replace egg whites for beating to a foam (Official Aquafaba Website)
aqueous	of, like, or containing water; watery
area of study	a division of, or a section within a unit
argue	give reasons for or against something; challenge or debate an issue or idea; persuade, prove or try to prove by giving reasons
aspect	a particular part of a feature of something; a facet, phase or part of a whole
assess	measure, determine, evaluate, estimate or make a judgment about the value, quality, outcomes, results, size, significance, nature or extent of something
assessment	purposeful and systematic collection of information about students' achievements
assessment instrument	a tool or device used to gather information about student achievement
assessment objectives	drawn from the unit objectives and contextualised for the requirements of the assessment instrument (see also 'syllabus objectives', 'unit objectives')
assessment technique	the method used to gather evidence about student achievement, (e.g. examination, project, investigation)

Term	Explanation
astute	showing an ability to accurately assess situations or people; of keen discernment
ATAR	Australian Tertiary Admission Rank
audience	individual or group for whom the response is designed and delivered
Australian Guide to Healthy Eating	food selection guide that visually represents the proportion of the five food groups recommended for consumption each day (Australian National Health and Medical Research Council, 2017)
authoritative	able to be trusted as being accurate or true; reliable; commanding and self-confident; likely to be respected and obeyed
B	
balanced	keeping or showing a balance; not biased; fairly judged or presented; taking everything into account in a fair, well-judged way
basic	fundamental
bioavailability	of or relating to the proportion of a drug or other substance that enters the circulation when introduced into the body and so is able to have an effect
biodiesel	biodegradable fuel produced from field crop oils, especially from recycled cooking oil
biological hazards	dangers posed to food safety by the contamination of food with pathogenic microorganisms or naturally occurring toxins
bloom	loss of shine on the surface of food, or the presence of a dull white coating; often occurs in chocolate
brief	an outline or description of a problem that clarifies the need, opportunity or challenge to be resolved to which students can apply some or all of the stages of the problem-solving process
browning	enzymatic browning occurs when enzymes react with oxygen, and phenols are oxidised to form a brown colour; non-enzymatic browning occurs when oxygen and heat causes amino acids to interact with sugars to provide brown colours
by-products	secondary or incidental products resulting from a process of manufacture
C	
calculate	determine or find (e.g. a number, answer) by using mathematical processes; obtain a numerical answer showing the relevant stages in the working; ascertain/determine from given facts, figures or information
caramelisation	a process used extensively in cooking for the resulting nutty flavour and brown colour; formed by the oxidisation of sugar when food is cooked
carrageenan	an extract of seaweed that is used in puddings, milkshakes and ice cream to stabilise the product and keep colour and flavour even

Term	Explanation
casein	a protein precipitated from milk, usually by rennet, that forms the basis of cheese
categorise	place in or assign to a particular class or group; arrange or order by classes or categories; classify, sort out, sort, separate
challenging	difficult but interesting; testing one's abilities; demanding and thought-provoking; usually involving unfamiliar or less familiar elements
characteristic	a typical feature or quality
chemical properties	in Food and Nutrition, different food constituents and how they react during processing and storage including the effects of enzymes, acids, alkalis, moisture and nutrients
chronic disease	group of diseases that tend to be long-lasting and have persistent effects (Australian National Health and Medical Research Council 2013)
ciguatera	poisoning caused by eating the toxic flesh of certain fish or shellfish
clarify	make clear or intelligible; explain; make a statement or situation less confused and more comprehensible
clarity	clearness of thought or expression; the quality of being coherent and intelligible; free from obscurity of sense; without ambiguity; explicit; easy to perceive, understand or interpret
class time	includes the time made available for students to independently respond to extended assessment tasks, and any associated and required teaching and learning time
classify	arrange, distribute or order in classes or categories according to shared qualities or characteristics
clear	free from confusion, uncertainty, or doubt; easily seen, heard or understood
clearly	in a clear manner; plainly and openly, without ambiguity
coagulation	occurs when denatured protein separates from other nutrients and solidify or semi-solidify; applying heat for a long period of time will cause the protein structure to create a network and trap liquid, which will form a gel
coherent	having a natural or due agreement of parts; connected; consistent; logical, orderly; well-structured and makes sense; rational, with parts that are harmonious; having an internally consistent relation of parts
cohesive	characterised by being united, bound together or having integrated meaning; forming a united whole
comment	express an opinion, observation or reaction in speech or writing; give a judgment based on a given statement or result of a calculation
communicate	convey knowledge and/or understandings to others; make known; transmit

Term	Explanation
compare	display recognition of similarities and differences and recognise the significance of these similarities and differences
competent	having suitable or sufficient skills, knowledge, experience, etc. for some purpose; adequate but not exceptional; capable; suitable or sufficient for the purpose; having the necessary ability, knowledge or skill to do something successfully; efficient and capable (of a person); acceptable and satisfactory, though not outstanding
competently	in an efficient and capable way; in an acceptable and satisfactory, though not outstanding, way
complex	composed or consisting of many different and interconnected parts or factors; compound; composite; characterised by an involved combination of parts; complicated; intricate; a complex whole or system; a complicated assembly of particulars
comprehend	understand the meaning or nature of; grasp mentally
comprehensive	inclusive; of large content or scope; including or dealing with all or nearly all elements or aspects of something; wide-ranging; detailed and thorough, including all that is relevant
concise	expressing much in few words; giving a lot of information clearly and in a few words; brief, comprehensive and to the point; succinct, clear, without repetition of information
concisely	in a way that is brief but comprehensive; expressing much in few words; clearly and succinctly
conduct	direct in action or course; manage; organise; carry out
consider	think deliberately or carefully about something, typically before making a decision; take something into account when making a judgment; view attentively or scrutinise; reflect on
considerable	fairly large or great; thought about deliberately and with a purpose
considered	formed after careful and deliberate thought
consistent	agreeing or accordant; compatible; not self-opposed or self-contradictory, constantly adhering to the same principles; acting in the same way over time, especially so as to be fair or accurate; unchanging in nature, standard, or effect over time; not containing any logical contradictions (of an argument); constant in achievement or effect over a period of time
constraints	limitations or restrictions that must be considered and accommodated when providing a solution to a problem, e.g. teacher-specified limitations, available time, physical realities, legalities
construct	create or put together (e.g. an argument) by arranging ideas or items; display information in a diagrammatic or logical form; make; build
consumability	a description of customers' end-to-end experience with a technology solution

Term	Explanation
consumer	a person who purchases or uses products, services or environments
consumer acceptance	consumer satisfaction and approval of certain product attributes, such as colour, taste, texture, consistency and personal product preferences
consumer drivers	factors influencing consumer demand or expectations for products or services
consumer food market	consumer demand for a particular food and nutrition product
consumer rights	Australian law (<i>Competition and Consumer Act 2010</i>) setting out consumer rights that are called consumer guarantees; includes rights to a repair, replacement or refund as well as compensation for damages and loss and being able to cancel a faulty service (Australian Competition and Consumer Commission n.d.)
consumption	the act of consuming
contrast	display recognition of differences by deliberate juxtaposition of contrary elements; show how things are different or opposite; give an account of the differences between two or more items or situations, referring to both or all of them throughout
controlled	shows the exercise of restraint or direction over; held in check; restrained, managed or kept within certain bounds
convenience	ability of a product to be agreeable to the needs or purpose of the consumer; well-suited with respect to facility or ease in use; favourable, easy, or comfortable for use
convincing	persuaded by argument or proof; leaving no margin of doubt; clear; capable of causing someone to believe that something is true or real; persuading or assuring by argument or evidence; appearing worthy of belief; credible or plausible
coronary heart disease	narrowing of the vessels, reducing the blood flow to the heart and potentially causing heart attack; occurs when plaque, a fatty substance, builds up in the arteries of the heart (National Heart Foundation, 2013)
country of origin labelling	packaged food statement identifying the country where the food was made, produced or grown, the country where the food was manufactured or packaged, and whether the food is a mix of ingredients imported into that country or a mix of local and imported ingredients (Australian Competition and Consumer Commission n.d.)
course	a defined amount of learning developed from a subject syllabus
create	bring something into being or existence; produce or evolve from one's own thought or imagination; reorganise or put elements together into a new pattern or structure or to form a coherent or functional whole
creative	resulting from originality of thought or expression; relating to or involving the use of the imagination or original ideas to create something; having good imagination or original ideas
credible	capable or worthy of being believed; believable; convincing

Term	Explanation
criterion	the property or characteristic by which something is judged or appraised
critical	involving skilful judgment as to truth, merit, etc.; involving the objective analysis and evaluation of an issue in order to form a judgment; expressing or involving an analysis of the merits and faults of a work of literature, music, or art; incorporating a detailed and scholarly analysis and commentary (of a text); rationally appraising for logical consistency and merit
critical control points (CCP)	points or procedures in the flow of food through a food service operation where controls can be applied to minimise a food safety hazard
critique	review (e.g. a theory, practice, performance) in a detailed, analytical and critical way
crystallisation	process of formation of solid crystals from a homogeneous solution or melt, or more rarely directly from a gas; often used as a technique to separate a solute from a liquid solution, bringing it into a pure crystalline phase
cultural food consumer	a consumer who likes to explore the food traditions of different cultural groups
cultural sensitivity	awareness of the existence of cultural differences and similarities, and respect for the fact that that these have an effect on values, learning and behaviour
curing	various preservation and flavouring processes, especially of meat or fish, by the addition of a combination of salt, sugar and either nitrate or nitrite (Science of Cooking)
cursory	hasty, and therefore not thorough or detailed; performed with little attention to detail; going rapidly over something, without noticing details; superficial
D	
decide	reach a resolution as a result of consideration; make a choice from a number of alternatives
deduce	reach a conclusion that is necessarily true, provided a given set of assumptions is true; arrive at, reach or draw a logical conclusion from reasoning and the information given
defensible	justifiable by argument; capable of being defended in argument
define	give the meaning of a word, phrase, concept or physical quantity; state meaning and identify or describe qualities
demonstrate	prove or make clear by argument, reasoning or evidence, illustrating with practical example; show by example; give a practical exhibition
denaturation	permanent change in the structure of protein; occurs when the bonds holding the helix shape are broken and the strands of the helix separate and unravel; a functional property of protein, useful in food preparation, e.g. whisking eggs or marinating a piece of meat (acid tenderises the meat before cooking)

Term	Explanation
derive	arrive at by reasoning; manipulate a mathematical relationship to give a new equation or relationship; in mathematics, obtain the derivative of a function
describe	give an account (written or spoken) of a situation, event, pattern or process, or of the characteristics of something
descriptive sensory profiling	evaluation of both the qualitative and quantitative sensory characteristics of a food product by a panel to generate data that describes the similarities and differences among a set of products
design	produce a plan, simulation, model or similar; plan, form or conceive in the mind
detailed	executed with great attention to the fine points; meticulous; including many of the parts or facts
determine	establish, conclude or ascertain after consideration, observation, investigation or calculation; decide or come to a resolution
develop	elaborate, expand or enlarge in detail; add detail and fullness to; cause to become more complex or intricate
devise	think out; plan; contrive; invent
dextrinisation	chemical change in the starch molecule caused by the breakdown of sugar chains in the molecule to form dextrans and causing browning to occur, e.g. toasted bread
dietary fibre	component of all plant materials, which is indigestible
diet-related cancer	cancers directly associated with dietary intake; includes mouth, upper throat, larynx, lung, stomach and bowel (Australian Institute of Health and Welfare 2017 n.d.)
differentiate	identify the difference/s in or between two or more things; distinguish, discriminate; recognise or ascertain what makes something distinct from similar things
disaccharide	composed of two monosaccharide units; examples include sucrose (glucose and fructose) and lactose (glucose and galactose)
discerning	discriminating; showing intellectual perception; showing good judgment; making thoughtful and astute choices; selected for value or relevance
discriminate	note, observe or recognise a difference; make or constitute a distinction in or between; differentiate; note or distinguish as different
discriminating	differentiating; distinctive; perceiving differences or distinctions with nicety; possessing discrimination; perceptive and judicious; making judgments about quality; having or showing refined taste or good judgment
discuss	examine by argument; sift the considerations for and against; debate; talk or write about a topic, including a range of arguments, factors or hypotheses; consider, taking into account different issues and ideas, points for and/or against, and supporting opinions or conclusions with evidence

Term	Explanation
disjointed	disconnected; incoherent; lacking a coherent order/sequence or connection
dispersed system	also a dispersion medium; consists of two media that do not mix, i.e. contains discrete elements of one medium dispersed in a continuous second medium; the two media can be of very different natures — gas, liquid or solid
dispersing	diffusing particles in a liquid
dispersion	system of dispersed particles suspended in a fluid
distinguish	recognise as distinct or different; note points of difference between; discriminate; discern; make clear a difference/s between two or more concepts or items
distribution	transporting, marketing, merchandising, and selling of a product
distribution pathways	movement of materials and goods by road, pipeline, air, rail and water
diverse	of various kinds or forms; different from each other
document	support (e.g. an assertion, claim, statement) with evidence (e.g. decisive information, written references, citations)
draw conclusions	make a judgment based on reasoning and evidence
drip loss	deterioration of meat due to the loss of meat juices, which are released from cut sections when stored or thawed
dry heat	cooking methods that use air or fat, e.g. roasting, grilling, baking, pan-frying and deep-fat frying; foods cooked using these methods have a rich flavour due to the caramelisation and browning of the food (The Culinary Cook 2017)
E	
effective	successful in producing the intended, desired or expected result; meeting the assigned purpose
efficient	working in a well-organised and competent way; maximum productivity with minimal expenditure of effort; acting or producing effectively with a minimum of waste, expense or unnecessary effort
element	a component or constituent part of a complex whole; a fundamental, essential or irreducible part of a composite entity
elementary	simple or uncompounded; relating to or dealing with elements, rudiments or first principles (of a subject); of the most basic kind; straightforward and uncomplicated
emerging food market	new trend in the food industry that changes according to consumer demand
emulsions	any colloidal suspension of a liquid in another liquid
end-product	final or resulting product

Term	Explanation
entomophagy	use of insects as a food source; insectivorous eating habits (European Food Information Council 2017)
enzymes	protein molecules found in food that act as biological catalysts causing food to change, e.g. ripening or browning
erroneous	based on or containing error; mistaken; incorrect
essential	absolutely necessary; indispensable; of critical importance for achieving something
ethics	moral principles that govern a person's or a group's behaviour
evaluate	make an appraisal by weighing up or assessing strengths, implications and limitations; make judgments about ideas, works, solutions or methods in relation to selected criteria; examine and determine the merit, value or significance of something, based on criteria
examination	a supervised test that assesses the application of a range of cognitions to one or more provided items such as questions, scenarios and/or problems; student responses are completed individually, under supervised conditions, and in a set timeframe
examine	investigate, inspect or scrutinise; inquire or search into; consider or discuss an argument or concept in a way that uncovers the assumptions and interrelationships of the issue
experiment	try out or test new ideas or methods, especially in order to discover or prove something; undertake or perform a scientific procedure to test a hypothesis, make a discovery or demonstrate a known fact
explain	make an idea or situation plain or clear by describing it in more detail or revealing relevant facts; give an account; provide additional information
explicit	clearly and distinctly expressing all that is meant; unequivocal; clearly developed or formulated; leaving nothing merely implied or suggested
explore	look into both closely and broadly; scrutinise; inquire into or discuss something in detail
express	convey, show or communicate (e.g. a thought, opinion, feeling, emotion, idea or viewpoint); in words, art, music or movement, convey or suggest a representation of; depict
extended response	an open-ended assessment technique that focuses on the interpretation, analysis, examination and/or evaluation of ideas and information in response to a particular situation or stimulus; while students may undertake some research when writing of the extended response, it is not the focus of this technique; an extended response occurs over an extended and defined period of time
Extension subject	a two-unit subject (Units 3 and 4) for which a syllabus has been developed by QCAA, that is an extension of one or more General subject/s, studied concurrently with, Units 3 and 4 of that subject or after completion of, Units 3 and 4 of that subject

Term	Explanation
extensive	of great extent; wide; broad; far-reaching; comprehensive; lengthy; detailed; large in amount or scale
external assessment	summative assessment that occurs towards the end of a course of study and is common to all schools; developed and marked by the QCAA according to a commonly applied marking scheme
external examination	a supervised test, developed and marked by the QCAA, that assesses the application of a range of cognitions to multiple provided items such as questions, scenarios and/or problems; student responses are completed individually, under supervised conditions, and in a set timeframe
extrapolate	infer or estimate by extending or projecting known information; conjecture; infer from what is known; extend the application of something (e.g. a method or conclusion) to an unknown situation by assuming that existing trends will continue or similar methods will be applicable
F	
factual	relating to or based on facts; concerned with what is actually the case; actually occurring; having verified existence
familiar	well-acquainted; thoroughly conversant with; well-known from long or close association; often encountered or experienced; common; (of materials, texts, skills or circumstances) having been the focus of learning experiences or previously encountered in prior learning activities
feasible	capable of being achieved, accomplished or put into effect; reasonable enough to be believed or accepted; probable; likely
fermentation	changes in food caused by growth of bacteria, yeast or mould; fermented products include alcohol, vinegar and some dairy products
fitness-focused	consumer market focusing on food product choices to meet specific fitness requirements
fluent	spoken or written with ease; able to speak or write smoothly, easily or readily; articulate; eloquent; in artistic performance, characteristic of a highly developed and excellently controlled technique; flowing; polished; flowing smoothly, easily and effortlessly
fluently	in a graceful and seemingly effortless manner; in a way that progresses smoothly and readily
foam formation	development of air bubbles in a stable structure by beating or whisking food components, e.g. egg white or aquafaba
food additive	substance added to food to enhance its flavour or shelf life
food allergies	abnormal reactions by the body to a food protein, where the reactions cause the immune system to produce antibodies that react with the allergen; severe symptoms include anaphylaxis; common foods that provoke allergies include peanuts, tree nuts, milk, eggs, sesame seeds, fish, shellfish, soy and wheat (Australasian Society of Clinical Immunology and Allergy 2016)

Term	Explanation
food components	an essential or characteristic part of a food
food drivers	factors that drive the choice and production of foods developed and produced by the food industry, e.g. consumers, economics, resources
food formulation	putting together food components in appropriate relationships or structures according to a formula or recipe
food-intolerant	consumer market focused on avoiding adverse reactions to a food or food component that does not involve the body's immune system
food processing	any activity to prepare food for sale, including chopping, cooking, drying, fermenting, heating, pasteurising, thawing and washing, or a combination of these activities (Food Standards Australia New Zealand 2015)
food product development	creation of products with new or different characteristics that offer new or additional benefits to the customer and/or manufacturer
food products	processed food sold to consumers
food spoilage	the decaying or decomposing of food
food standards	a set of criteria that a food must meet to be suitable for legal sale and human consumption; includes source, composition, appearance, freshness and permissible additives (Food Standards Australia New Zealand 2015)
Food Standards Australia New Zealand	FSANZ; an independent statutory agency established by the <i>Food Standards Australia New Zealand Act 1991</i> ; responsible for developing standards that regulate the use of ingredients, processing aids, colourings, additives, vitamins and minerals, the composition of some foods, foods developed by new technologies such as genetic-modification, and some labelling requirements for packaged and unpackaged food, e.g. specific mandatory warnings or advisory labels
food sustainability	processing and trading food in ways that contribute to local economies, protect the diversity of animals and plants, and avoid damage to natural resources
food system	the combined actions of people, processes and infrastructure to produce food for a population; includes production, processing, distribution, consumption and research and development, taking into account sustainability, food security and waste management
formative assessment	assessment whose major purpose is to improve teaching and student achievement
formula	in food manufacturing, recipe including ingredient quantities based on kilograms, grams or other weight measurements, listed as percentages so any batch size can be produced
formulation	putting together the food components in appropriate relationships or structures, according to a formula or recipe
fortification	addition of nutrients that are not naturally present in the food or the addition of amounts greater than those naturally present

Term	Explanation
fragmented	disorganised; broken down; disjointed or isolated
frequent	happening or occurring often at short intervals; constant, habitual, or regular
functional foods	foods or food components to which an existing ingredient or a new ingredient has been added to provide additional benefits, usually for disease prevention or improved health
functional properties	the physical and chemical characteristics of foods
fundamental	forming a necessary base or core; of central importance; affecting or relating to the essential nature of something; part of a foundation or basis
G	
gelatine	odourless, colourless protein substance obtained by boiling a mixture of water and the skin, bones, and tendons of animals; the preparation forms a gel when cool; mixed with food substances to make a gel
gelatinisation	process where starch and water are subjected to heat, causing the starch granules to swell and water to be gradually absorbed in an irreversible manner
gelatinous	having the nature of jelly; jelly-like
gelification	process of turning a substance into a gelatinous form; common gelling agents include agar-agar, gelatine, carrageenan, gellan gum and methylcellulose
gellan gum	water-soluble polysaccharide produced by fermentation; multifunctional gelling agent; can be used alone or in combination with other products to produce a wide variety of textures
gelling	to form a jelly to provide texture to a product
General subject	a subject for which a syllabus has been developed by the QCAA with the following characteristics: results from courses developed from general syllabuses contribute to the QCE; General subjects have an external assessment component; results may contribute to ATAR calculations
generate	produce; create; bring into existence
genetically modified foods	foods processed from organisms that have been developed after technological transfer of genetic material from one organism to another for the purpose of increasing yield or developing or enhancing specific qualities
gluten	a protein consisting of a mixture of glutelin and gliadin, present in cereal grains, especially wheat; chain-like protein molecules trap carbon dioxide and expand when heated, e.g. when baking
gluten-free	food products produced with flours or other ingredients not containing gluten
gourmet food consumer	consumer seeking food that meets high standards of quality, ingredients and overall performance; usually pays a premium to maximise enjoyment of food in terms of flavour and appearance

Term	Explanation
H	
hazard analysis and critical control points	HACCP; a system that identifies potential biological, chemical and physical hazards in food production and establishes preventative measures for control at these points; plan outlining this system for a food production process is called a HACCP plan (Hazard Analysis Critical Control Point Australia)
health claims	inferred relationship between a food and a health effect; a food must meet the nutrient profiling scoring criterion (NPSC) mandated in the Food Standards Code before a health claim can be made; includes two types of health claims: general-level — refers to a nutrient or substance in a food, or the food itself, and its effect on health; high-level — refers to a nutrient or substance in a food and its relationship to a serious disease or to a biomarker of a serious disease (Food Standards Australia New Zealand 2015)
health-conscious	consumer market focused on health-related, natural, unprocessed foods, including fresh, locally grown produce, eggs, poultry and meats (Kraft and Goodell 1993)
health impacts	aspects that have an effect on health
health star rating system	front-of-pack labelling system that rates the overall nutritional profile of packaged food and assigns it a rating from ½ a star to 5 stars; provides a quick, easy, standard way to compare similar packaged foods; the more stars, the healthier the choice (Commonwealth of Australia 2014)
Healthy Living Pyramid	simple visual guide to the types and proportion of foods that we should eat every day for good health; contains the five core food groups, plus healthy fats, according to how much they contribute to a balanced diet; based on the Australian Dietary Guidelines
hydrophilic	having a strong affinity for water
hypothesise	formulate a supposition to account for known facts or observed occurrences; conjecture, theorise, speculate; especially on uncertain or tentative grounds
I	
identify	distinguish; locate, recognise and name; establish or indicate who or what someone or something is; provide an answer from a number of possibilities; recognise and state a distinguishing factor or feature
illogical	lacking sense or sound reasoning; contrary to or disregarding of the rules of logic; unreasonable
impacts	in food technology, the influence or effects exerted by existing and emerging food and nutrition technologies on personal, social, cultural, environmental and economic needs; transformative potential of food and nutrition technologies in people's lives; relationship between the food system and society, and ethical and legal obligations of individuals and organisations regarding ownership, information, transparency, copyright, accessibility and equity issues, globalisation, food safety and food security issues
implement	put something into effect, e.g. a plan or proposal

Term	Explanation
implicit	implied, rather than expressly stated; not plainly expressed; capable of being inferred from something else
improbable	not probable; unlikely to be true or to happen; not easy to believe
inaccurate	not accurate
inappropriate	not suitable or proper in the circumstances
inconsistent	lacking agreement, as one thing with another, or two or more things in relation to each other; at variance; not consistent; not in keeping; not in accordance; incompatible, incongruous
independent	thinking or acting for oneself, not influenced by others
in-depth	comprehensive and with thorough coverage; extensive or profound; well-balanced or fully developed
infer	derive or conclude something from evidence and reasoning, rather than from explicit statements; listen or read beyond what has been literally expressed; imply or hint at
informed	knowledgeable; learned; having relevant knowledge; being conversant with the topic; based on an understanding of the facts of the situation (of a decision or judgment)
innovative	new and original; introducing new ideas; original and creative in thinking
insightful	showing understanding of a situation or process; understanding relationships in complex situations; informed by observation and deduction
instrument-specific marking guide	ISMG; a tool for marking that describes the characteristics evident in student responses and aligns with the identified objectives for the assessment (see 'assessment objectives')
integral	<i>adjective</i> necessary for the completeness of the whole; essential or fundamental; <i>noun</i> in mathematics, the result of integration; an expression from which a given function, equation, or system of equations is derived by differentiation
intended	designed; meant; done on purpose; intentional
intensively farmed food	a way of producing large amounts of crops or animal products by using chemicals (e.g. antibiotics) and/or contemporary technology
interdisciplinary	combining two or more academic disciplines into one activity (e.g. a research project)
internal assessment	assessments that are developed by schools; summative internal assessments are endorsed by the QCAA before use in schools and results externally confirmed contribute towards a student's final result

Term	Explanation
interpret	use knowledge and understanding to recognise trends and draw conclusions from given information; make clear or explicit; elucidate or understand in a particular way; bring out the meaning of, e.g. a dramatic or musical work, by performance or execution; bring out the meaning of an artwork by artistic representation or performance; give one's own interpretation of; identify or draw meaning from, or give meaning to, information presented in various forms, such as words, symbols, pictures or graphs
investigate	carry out an examination or formal inquiry in order to establish or obtain facts and reach new conclusions; search, inquire into, interpret and draw conclusions about data and information
investigation	an assessment technique that requires students to research a specific problem, question, issue, design challenge or hypothesis through the collection, analysis and synthesis of primary and/or secondary data; it uses research or investigative practices to assess a range of cognitions in a particular context; an investigation occurs over an extended and defined period of time
irrelevant	not relevant; not applicable or pertinent; not connected with or relevant to something
ISMG	instrument-specific marking guide; a tool for marking that describes the characteristics evident in student responses and aligns with the identified objectives for the assessment (see 'assessment objectives')
iterative	recursive; revisiting earlier parts of a process to further clarify meaning or refine ideas and solutions
isolated	detached, separate, or unconnected with other things; one-off; something set apart or characterised as different in some way
J	
judge	form an opinion or conclusion about; apply both procedural and deliberative operations to make a determination
justified	sound reasons or evidence are provided to support an argument, statement or conclusion
justify	give reasons or evidence to support an answer, response or conclusion; show or prove how an argument, statement or conclusion is right or reasonable
L	
labelling	slip of paper or other material for affixing to something to indicate its nature, ownership, destination, etc.
lactose	white crystalline disaccharide
lactose-free	dairy products that have had the lactose removed
learning area	a grouping of subjects, with related characteristics, within a broad field of learning, e.g. the Arts, sciences, languages

Term	Explanation
leavening	a chemical process used to make baked goods rise by the formation of gas, especially carbon dioxide, in the batter or dough, e.g. by using baking powder or yeast
leavening agent	substances such as air, steam, yeast, baking powder and baking soda, added to doughs and batters to cause formation of gas and expansion (rising)
lectin	any of a class of protein, chiefly of plant origin, that bind to certain sugars and cause agglutination of particular cell types
lexicon	in Food & Nutrition, a source list used to describe the sensory properties of food; similar to a specific technical dictionary
likeability test	food sampling test protocol; panellists are asked to taste a food sample and score it on a nine-point hedonic scale from 'dislike extremely' to 'like extremely'
lipophilic	having an affinity for lipids
logical	rational and valid; internally consistent; reasonable; reasoning in accordance with the principles/rules of logic or formal argument; characterised by or capable of clear, sound reasoning; (of an action, decision, etc.) expected or sensible under the circumstances
logically	according to the rules of logic or formal argument; in a way that shows clear, sound reasoning; in a way that is expected or sensible
M	
magnesium sulphate	inorganic salt (chemical compound) containing magnesium, sulphur and oxygen; used as a drying agent
Maillard reaction	chemical reaction between an amino acid and a reducing sugar, usually requiring the addition of heat, e.g. caramelisation of meat; a form of non-enzymatic browning
make decisions	select from available options; weigh up positives and negatives of each option and consider all the alternatives to arrive at a position
manipulate	adapt or change to suit one's purpose
manipulation	mixing, beating or kneading of food components in the processing stage of food production
marketable	readily saleable
mental procedures	a domain of knowledge in Marzano's taxonomy, and acted upon by the cognitive, metacognitive and self-systems; sometimes referred to as 'procedural knowledge'; there are three distinct phases to the acquisition of mental procedures — the cognitive stage, the associative stage, and the autonomous stage; the two categories of mental procedures are skills (single rules, algorithms and tactics) and processes (macro procedures)
methodical	performed, disposed or acting in a systematic way; orderly; characterised by method or order; performed or carried out systematically

Term	Explanation
methylcellulose carbohydrate	a complex carbohydrate that can absorb large quantities of water; used in the manufacture of low calorie foods such as imitation syrups and diet salad dressings; semi-synthetic, bulk-forming fibre laxative used for short-term treatment of constipation
mind map	a purposeful diagram used to visually organise information; allows the abstract relationships between ideas to be explored and refined; visual representations may include images, words and parts of words; usually a central idea or concept is placed in the middle and associated ideas arranged around it
minimal	least possible; small, the least amount; negligible
modify	change the form or qualities of; make partial or minor changes to something
moist heat	use of water, liquid or steam to transfer heat to food; methods include poaching, simmering, boiling, braising, stewing, pot roasting and steaming (The Culinary Cook 2017)
monosaccharide	a single carbohydrate unit and simplest form of sugar, examples include glucose, fructose and galactose
mouthfeel	a food product's physical and chemical interaction in the mouth, specifically the texture of the food in the mouth
multimodal	uses a combination of at least two modes (e.g. spoken, written), delivered at the same time, to communicate ideas and information to a live or virtual audience, for a particular purpose; the selected modes are integrated so that each mode contributes significantly to the response
N	
narrow	limited in range or scope; lacking breadth of view; limited in amount; barely sufficient or adequate; restricted
non-enzymatic browning	a chemical process that occurs in fruit and vegetables resulting in brown pigments; can be observed in fruit and vegetables and also in seafood
non-perishable	not subject to rapid spoilage; having a long shelf life without refrigeration
novel	new or innovative; in Food & Nutrition, any food that has been produced using new ingredients or processes not previously used, or that does not have a significant history of consumption
nuanced	showing a subtle difference or distinction in expression, meaning, response, etc.; finely differentiated; characterised by subtle shades of meaning or expression; a subtle distinction, variation or quality; sensibility to, awareness of, or ability to express delicate shadings, as of meaning, feeling, or value

Term	Explanation
nucleation	initial process in the formation of a crystal from a solution, a liquid or a vapour, in which a small number of ions, atoms, or molecules become arranged in a pattern characteristic of a crystalline solid, forming a site on which additional particles are deposited as the crystal grows
nutrient	substance that provides nourishment essential for the maintenance of life and for growth
Nutrient Profiling Scoring Criterion	NPSC; the Food Standards Code requires a food to meet the NPSC before a health claim can be made (Food Standards Australia New Zealand 2015)
nutrient reference value	NRV; a set of recommendations for nutritional intake based on currently available scientific facts (Australian National Health and Medical Research Council 2017)
nutrition	intake of food, considered in relation to the body's dietary needs (World Health Organisation)
nutrition consumer market	market specifically focusing on nutrient content of foods that aim to assist the nutritional status of the consumer, e.g. low salt, low fat and high fibre
nutrition information panel	mandatory information provided on packaging, communicating the average amount of energy, protein, fat, saturated fat, carbohydrate, sugars and sodium in the food, as well as any other claim that requires nutrition information, e.g. a health claim, such as 'high in calcium' (Food Standards Australia New Zealand 2015)
nutritious	providing nutrients for nourishment of the body
nutritive value	a simple measure of the nutrient content of a food
O	
obesity	medical condition in which excess body fat affects the health of the individual, often leading to heart disease, diabetes and other chronic disease
objectives	see 'syllabus objectives', 'unit objectives', 'assessment objectives'
obvious	clearly perceptible or evident; easily seen, recognised or understood
odour development	changes in smell caused by a wide range of organic compounds, some due to chemical reactions that change the structure of the compounds; may occur during storage due to the development of specific compounds as a result of contact with oxygen, moisture or heat, or during cooking from a reaction between sugars and amino acids (the Maillard reaction)
oligosaccharide	composed of three to nine monosaccharide units attached together in chains; may occur naturally in plants or form as a result of hydrolysing polysaccharides
open-ended problems	loosely structured and complex, having no one correct solution or solution path, and requiring students to comprehend and apply a breadth and depth of knowledge during problem-solving
optimal	best, most favourable, under a particular set of circumstances

Term	Explanation
organic	relating to a type of farming that minimises chemical fertilisers or pesticides, and the produce of such farming
organise	arrange, order; form as or into a whole consisting of interdependent or coordinated parts, especially for harmonious or united action
organised	systematically ordered and arranged; having a formal organisational structure to arrange, coordinate and carry out activities
outstanding	exceptionally good; clearly noticeable; prominent; conspicuous; striking
oxidation	irreversible process by which molecular oxygen combines with nutrients in food and decreases food quality through rancidity; can occur in peeled fruit and vegetables such as bananas, apples and potatoes, as well as fat and oils
P	
paired preference test	food sampling test protocol; panellists are given two samples and asked to compare one product to another, and to indicate which one is preferred
partial	not total or general; existing only in part; attempted, but incomplete
particular	distinguished or different from others or from the ordinary; noteworthy
pasteurisation	process designed to reduce the population of pathogenic bacteria in a product, sufficient to ensure product safety but with modest impact on the nutritional properties and flavour of the product
pathogen	microorganisms, such as bacteria, fungi and viruses which cause disease
pectin	natural gelling agent principally used in making jams and jellies
percentage labelling	food label indicating the proportion of a characterising ingredient or component contained in that food (Food Standards Australia New Zealand 2015)
perceptive	having or showing insight and the ability to perceive or understand; discerning (see also 'discriminating')
performance	an assessment technique that requires students to demonstrate a range of cognitive, technical, creative and/or expressive skills and to apply theoretical and conceptual understandings, through the psychomotor domain; it involves student application of identified skills when responding to a task that involves solving a problem, providing a solution or conveying meaning or intent; a performance is developed over an extended and defined period of time
perishable	having a short shelf-life; food that spoils quickly and needs careful storage
persuasive	capable of changing someone's ideas, opinions or beliefs; appearing worthy of approval or acceptance; (of an argument or statement) communicating reasonably or credibly (see also 'convincing')

Term	Explanation
perusal time	time allocated in an assessment to reading items and tasks and associated assessment materials; no writing is allowed; students may not make notes and may not commence responding to the assessment in the response space/book
physical changes	irreversible changes in the physical state of food or food products during food processing; may occur when substances are mixed but don't chemically react
physical properties	a food's size, shape, colour, volume, viscosity and elasticity
phytoestrogen	a naturally occurring plant nutrient that exerts an oestrogen-like action on the body e.g. soybeans, flax seeds
planning time	time allocated in an assessment to planning how to respond to items and tasks and associated assessment materials; students may make notes but may not commence responding to the assessment in the response space/book; notes made during planning are not collected, nor are they graded or used as evidence of achievement
polished	flawless or excellent; performed with skilful ease
polysaccharide	composed of long chains of 10 or more monosaccharide units; examples include starch, dextrin, cellulose and pectin
potassium bicarbonate	a colourless, odourless, salty substance, which occurs as a crystal or a soft white granular powder used for leavening in baking
powderising	transformation of any fatty ingredient into a flavoured powder
precise	definite or exact; definitely or strictly stated, defined or fixed; characterised by definite or exact expression or execution
precision	accuracy; exactness; exact observance of forms in conduct or actions
predict	give an expected result of an upcoming action or event; suggest what may happen based on available information
preservation	processing of food to eliminate or control conditions that cause spoilage, e.g. dehydration, canning, freezing, jam making, pickling, ultra-heat treatment
preservative	chemical used to assist preservation in the elimination or control of conditions that cause food spoilage
primary data	information collected by the individual conducting the research
primary processing	transformation of raw ingredients, by physical or chemical means, into food
principles	specific types of generalisations that deal with relationships; a proposition that serves as the foundation for a system of belief or behaviour or for a chain of reasoning
probiotic	food containing live bacteria which have health-promoting properties, e.g. probiotic yoghurt can colonise the intestines with beneficial bacteria

Term	Explanation
problem-solving process	consists of subject specific problem-solving processes (explore, develop, generate and evaluate) used to iteratively find solutions to difficult or complex problems or situations
processing	conversion (of agricultural commodities) into marketable form, e.g. a food product, by some special process
production	growing crops or nurturing animals for food products; action of making or manufacturing from food components or raw materials; process of being manufactured
proficient	well advanced or expert in any art, science or subject; competent, skilled or adept in doing or using something
project	an assessment technique that focuses on a problem-solving process requiring the application of a range of cognitive, technical and creative skills and theoretical understandings; the response is a coherent work that documents the iterative process undertaken to develop a solution and includes written paragraphs and annotations, diagrams, sketches, drawings, photographs, video, spoken presentations, physical prototypes and/or models; a project is developed over an extended and defined period of time
propose	put forward (e.g. a point of view, idea, argument, suggestion) for consideration or action
protein matrix	structure within a protein-based formulation or mixture, e.g. egg foam or bread dough
prototype	in Food & Nutrition, a trial solution to test an idea to inform further development; demonstrates the interaction of food components in formulations, its purpose is to identify if and how well a solution functions and can be tested by stakeholders
prove	use a sequence of steps to obtain the required result in a formal way
psychomotor procedures	a domain of knowledge in Marzano's taxonomy, and acted upon by the cognitive, metacognitive and self-systems; these are physical procedures used to negotiate daily life and to engage in complex physical activities; the two categories of psychomotor procedures are skills (foundational procedures and simple combination procedures) and processes (complex combination procedures)
purposeful	having an intended or desired result; having a useful purpose; determined; resolute; full of meaning; significant; intentional
Q	
QCE	Queensland Certificate of Education
quality assurance standards	expected benchmarks used by retailers to determine suitable quality in food products
R	
rancidity	state of decomposition in fat due to oxidation, having a rank, unpleasant, stale odour or taste

Term	Explanation
ranking test	food sampling test protocol; assesses food product by placing test samples in a rank order
realise	create or make (e.g. a musical, artistic or dramatic work); actualise; make real or concrete; give reality or substance to
reasonable	endowed with reason; having sound judgment; fair and sensible; based on good sense; average; appropriate, moderate
reasoned	logical and sound; based on logic or good sense; logically thought out and presented with justification; guided by reason; well-grounded; considered
recall	remember; present remembered ideas, facts or experiences; bring something back into thought, attention or into one's mind
recognise	identify or recall particular characteristics of information from knowledge; identify that an item, characteristic or quality exists; perceive as existing or true; be aware of or acknowledge
recommendation	a suggestion or proposal as to the best course of action
refine	to make partial or minor changes to something in order to improve it; modify in relation to selected criteria
refined	developed or improved so as to be precise, exact or subtle
reflect on	think about deeply and carefully
reformulation	formulate a mixture of ingredients in a different way; to alter or revise
rehearsed	practised; previously experienced; practised extensively
related	associated with or linked to
relevance	being related to the matter at hand
relevant	bearing upon or connected with the matter in hand; to the purpose; applicable and pertinent; having a direct bearing on
rennin	proteolytic enzyme used to coagulate milk to make cheese; also known as chymosin; may be produced from rennet (animal source) or microbial rennin produced from genetically engineered microorganisms
repetitive	containing or characterised by repetition, especially when unnecessary or tiresome
reporting	providing information that succinctly describes student performance at different junctures throughout a course of study
repurposing	convert for use in another format, medium, or product
requirements	necessary conditions identified from stakeholders' needs or wants; used to inform criteria against which to evaluate
resistant starch	starch that is resistant to digestion, passing through the digestive tract unchanged

Term	Explanation
resolve	in the Arts, consolidate and communicate intent through a synthesis of ideas and application of media to express meaning
retrogradation	decline or deterioration
reverse spherification	submerging a liquid with calcium content in a bath of sodium alginate, which results in perfectly shaped spheres of consistent size with a thicker membrane than with basic spherification; resulting spheres can be manipulated easily
ricotta	soft cottage cheese with a fresh, bland flavour; made from the whey obtained from the manufacture of other cheeses
routine	often encountered, previously experienced; commonplace; customary and regular; well-practised; performed as part of a regular procedure, rather than for a special reason
roux	paste mixture of fat and flour made by melting butter, then mixing evenly with flour and cooking briefly before adding liquid; forms the thickening foundation of many sauces
rudimentary	relating to rudiments or first principles; elementary; undeveloped; involving or limited to basic principles; relating to an immature, undeveloped or basic form
S	
safe	secure; not risky
saturated fats	fats in which all carbons contain a hydrogen, and therefore no double bonds exist
seasonality	dependence on the seasons of the year or some particular season
secondary cuts	parts of the animal which are harder to access; require slow cooking techniques or further processing to be palatable, e.g. brisket, chuck, shin, cheek and tail
secondary data	information collected by governments or organisations for other research purposes
secondary meat products	made using cast-off pieces or scraps which are further processed e.g. mince and smallgoods like sausage or salami
secure	sure; certain; able to be counted on; self-confident; poised; dependable; confident; assured; not liable to fail
select	choose in preference to another or others; pick out
semi-perishable	foods not requiring refrigeration but with limited shelf life
sensitive	capable of perceiving with a sense or senses; aware of the attitudes, feelings or circumstances of others; having acute mental or emotional sensibility; relating to or connected with the senses or sensation
sensory properties	properties that can be identified by organs of sense, e.g. taste, texture, colour and aroma

Term	Explanation
sequence	place in a continuous or connected series; arrange in a particular order
shear	strain produced by pressure in the structure of a substance or liquid, when its layers are laterally shifted in relation to each other; any real fluids (liquids and gases included) moving along solid boundary will incur a shear stress on that boundary
shelf life	length of time between packaging and use that a food product remains of acceptable quality to the user
show	provide the relevant reasoning to support a response
significant	important; of consequence; expressing a meaning; indicative; includes all that is important; sufficiently great or important to be worthy of attention; noteworthy; having a particular meaning; indicative of something
simple	easy to understand, deal with and use; not complex or complicated; plain; not elaborate or artificial; may concern a single or basic aspect; involving few elements, components or steps
simplistic	characterised by extreme simplification, especially if misleading; oversimplified
sketch	execute a drawing or painting in simple form, giving essential characteristics but not necessarily with detail or accuracy; in mathematics, represent by means of a diagram or graph; the sketch should give a general idea of the required shape or relationship and should include characteristics
skilful	having technical facility or practical ability; possessing, showing, involving or requiring skill; expert, dexterous; demonstrating the knowledge, ability or training to perform a certain activity or task well; trained, practised or experienced
skilled	having or showing the knowledge, ability or training to perform a certain activity or task well; having skill; trained or experienced; showing, involving or requiring skill
smallgoods	small meat products, generally made from secondary cuts, e.g. sausage or salami
Smart Choices/Traffic Light System	Queensland Government food strategy where foods and drinks are classified into three categories according to their nutritional value: green, 'have plenty' — encourage and promote healthy foods and drinks; amber, 'select carefully' — do not let these foods and drinks dominate choices and avoid large serve sizes; red, 'occasional' — limit availability of these foods and drinks (Queensland Department of Education and Training 2016)
smoked	treated with smoke and/or chemicals to add flavour
snack foods	small portions of food or drink; foods eaten as a light meal; can be packaged in individual serves

Term	Explanation
solanine	a glycoalkaloid found in species of plants of the nightshade family (Solanaceae), e.g. the blackcurrant-like fruits of black nightshade (<i>Solanum nigrum</i>), potatoes (<i>Solanum tuberosum</i>), tomatoes (<i>Solanum lycopersicum</i>), and eggplants (<i>Solanum melongena</i>); considered to be natural toxin
solo food consumer	person requiring single-serve products
solutions	ideas, concepts, products, systems, components or processes that have been developed through a problem-solving process
solve	find an answer to, explanation for, or means of dealing with (e.g. a problem); work out the answer or solution to (e.g. a mathematical problem); obtain the answer/s using algebraic, numerical and/or graphical methods
sophisticated	of intellectual complexity; reflecting a high degree of skill, intelligence, etc.; employing advanced or refined methods or concepts; highly developed or complicated
sous-vide	process in which food is placed in a vacuum sealed, plastic pouch and then placed in a water bath for longer than normal cooking times at a regulated temperature much lower than normally used for cooking: intended to cook the item evenly, ensuring that the inside is properly cooked without overcooking to retain moisture
specific	clearly defined or identified; precise and clear in making statements or issuing instructions; having a special application or reference; explicit, or definite; peculiar or proper to something, as qualities, characteristics, effects, etc.
spent grains	leftover malt and adjuncts, by-products of breweries
spherification	shaping liquid food products into small sphere-like shapes that resemble caviar, made using sodium alginate and calcium chloride; each drop of the alginate liquid forms into a small sphere in the calcium solution (molecularrecipes.com 2014)
sporadic	happening now and again or at intervals; irregular or occasional; appearing in scattered or isolated instances
spore development	reproductive body produced by bacteria, moulds and fungi; can survive at low nutrient levels, and is resistant to antibiotics and disinfectants; highly transmissible
stakeholder	someone who is affected by, is concerned with etc, an issue or enterprise
straightforward	without difficulty; uncomplicated; direct; easy to do or understand
structure	<i>verb</i> give a pattern, organisation or arrangement to; construct or arrange according to a plan; <i>noun</i> in languages, arrangement of words into larger units, e.g. phrases, clauses, sentences, paragraphs and whole texts, in line with cultural, intercultural and textual conventions
structured	organised or arranged so as to produce a desired result

Term	Explanation
subject	a branch or area of knowledge or learning defined by a syllabus; school subjects are usually based in a discipline or field of study (see also 'course')
subject matter	the subject-specific body of information, mental procedures and psychomotor procedures that are necessary for students' learning and engagement within that subject
substantial	of ample or considerable amount, quantity, size, etc.; of real worth or value; firmly or solidly established; of real significance; reliable; important, worthwhile
substantiated	established by proof or competent evidence
subtle	fine or delicate in meaning or intent; making use of indirect methods; not straightforward or obvious
successful	achieving or having achieved success; accomplishing a desired aim or result
succinct	expressed in few words; concise; terse; characterised by conciseness or brevity; brief and clear
sufficient	enough or adequate for the purpose
suitable	appropriate; fitting; conforming or agreeing in nature, condition, or action
summarise	give a brief statement of a general theme or major point/s; present ideas and information in fewer words and in sequence
summative assessment	assessment whose major purpose is to indicate student achievement; summative assessments contribute towards a student's subject result
superficial	concerned with or comprehending only what is on the surface or obvious; shallow; not profound, thorough, deep or complete; existing or occurring at or on the surface; cursory; lacking depth of character or understanding; apparent and sometimes trivial
super-saturated solution	solution that contains more undissolved solid solute than the liquid solution can dissolve
supported	corroborated; given greater credibility by providing evidence
sustainability	use of products or processes that help conserve an ecological balance by avoiding depletion of natural resources
sustained	carried on continuously, without interruption, or without any diminishing of intensity or extent
syllabus	a document that prescribes the curriculum for a course of study
syllabus objectives	outline what the school is required to teach and what students have the opportunity to learn; described in terms of actions that operate on the subject matter; the overarching objectives for a course of study (see also 'unit objectives', 'assessment objectives')
symbolise	represent or identify by a symbol or symbols

Term	Explanation
syneresis	separation of liquid from a gel on standing
synthesise	combine different parts or elements (e.g. information, ideas, components) into a whole, in order to create new understanding
synthetic meat	innovative food product created by muscle cell tissue culture in efforts to provided environmentally sustainable meat
system	<p>a group of interacting objects, materials or processes that form an integrated whole; systems can be open or closed; a system has properties and/or functions that can be described differently from its component parts; systems can be identified as four types:</p> <ul style="list-style-type: none"> • natural systems, e.g. an ecosystem including plants and animals • designed physical systems, e.g. buildings, road networks, aircraft, airports • designed abstract systems, e.g. mathematic equations, computer algorithms • human activity systems, e.g. a team task, flight crew, human–machine interface
systematic	<p>done or acting according to a fixed plan or system; methodical; organised and logical;</p> <p>having, showing, or involving a system, method, or plan; characterised by system or method; methodical; arranged in, or comprising an ordered system</p>
T	
tapioca	granular floury food substance prepared from cassava starch by drying on heated plates, processed into several forms as flakes, sticks, beads or pearls, used for making puddings and thickening foods
target market	particular group of consumers at which a product or service is aimed
technologies	materials, data, systems, components, tools and equipment used to create solutions for identified needs and opportunities, and the knowledge, understanding and skills used by people involved in the selection and use of these
technology	the development of products, services and environments, using various types of knowledge, including computational, design, systems, social, ethical, economic, environmental, and sustainability knowledge to meet human needs and wants; 'the know-how and creative process that may use tools, systems and resources to solve problems and enhance control over the natural and man-made environment in an endeavour to improve the human condition' (UNESCO 1985 cited in Ferguson 2009, p. 7)
tenderisers	enzymes that help break down the meat fibres to make the meat more palatable when cooked, usually derived from fruit, e.g. papain from papaya
test	take measures to check the quality, performance or reliability of something

Term	Explanation
third-party certifications	a verification system by an independent party that ensures specified requirements pertaining to a product, person or process have been met
thorough	carried out through, or applied to the whole of something; carried out completely and carefully; including all that is required; complete with attention to every detail; not superficial or partial; performed or written with care and completeness; taking pains to do something carefully and completely
thoughtful	occupied with, or given to thought; contemplative; meditative; reflective; characterised by or manifesting thought
time-poor	lacking free time
tofu	also bean curd; curd made from white soybeans, usually formed into small blocks, used in Asian cookery; bean curd
topic	a division of, or sub-section within, a unit; all topics/sub-topics within a unit are interrelated
Torres Strait Islander foods	foods traditionally eaten by Torres Strait Islander peoples
toxin	poison produced by a living microorganism
trans fats	fats that occur in animal fats naturally (including dairy), and as a result of processing in commercially prepared, partially hydrogenated margarines and solid cooking fats developed in part to help displace highly saturated animal and vegetable fats used in frying, baking and spreads; may raise blood LDL ('bad') cholesterol levels and at high consumption levels may also reduce HDL ('good') cholesterol levels
transparency	policy or practice of making all operations clearly manifest, and of being accountable to the public for all such operations
triamines	compounds containing three amino groups
triangle test	a food-sampling test protocol; a discriminative method used to gauge if an overall difference is present between two products that involves selecting qualified panellists for a particular test and determining whether shifts in processing or ingredients have significantly changed a product
type 2 diabetes	chronic disease characterised by insulin resistance and/or abnormal insulin secretion
U	
UHT	ultra-high temperature
umami	a taste characteristic, sometimes referred to as savoury; may be present as glutamate, an amino acid
unclear	not clear or distinct; not easy to understand; obscure
understand	perceive what is meant by something; grasp; be familiar with (e.g. an idea); construct meaning from messages, including oral, written and graphic communication

Term	Explanation
uneven	unequal; not properly corresponding or agreeing; irregular; varying; not uniform; not equally balanced
unfamiliar	not previously encountered; situations or materials that have not been the focus of prior learning experiences or activities
unit	a defined amount of subject matter delivered in a specific context or with a particular focus; it includes unit objectives particular to the unit, subject matter and assessment direction
unit objectives	drawn from the syllabus objectives and contextualised for the subject matter and requirements of a particular unit; they are assessed at least once in the unit (see also 'syllabus objectives', 'assessment objectives')
unrelated	having no relationship; unconnected
use	operate or put into effect; apply knowledge or rules to put theory into practice
V	
vague	not definite in statement or meaning; not explicit or precise; not definitely fixed, determined or known; of uncertain, indefinite or unclear character or meaning; not clear in thought or understanding; couched in general or indefinite terms; not definitely or precisely expressed; deficient in details or particulars; thinking or communicating in an unfocused or imprecise way
valid	sound, just or well-founded; authoritative; having a sound basis in logic or fact (of an argument or point); reasonable or cogent; able to be supported; legitimate and defensible; applicable
value-added	features added to a baseline product that are valued by the customer
variable	<i>adjective</i> apt or liable to vary or change; changeable; inconsistent; (readily) susceptible or capable of variation; fluctuating, uncertain; <i>noun</i> in mathematics, a symbol, or the quantity it signifies, that may represent any one of a given set of number and other objects
variety	a number or range of things of different kinds, or the same general class, that are distinct in character or quality; (of sources) a number of different modes or references
vegan	person who follows a diet that excludes any animal products from their diet, including milk, eggs and honey
vegetarian	person who excludes meat (and by-products derived from a slaughtered animal such as gelatine and rennet) and fish from their diet
viscosity	property of a fluid in resisting change in the shape or arrangement of its elements during flow, and the degree to which this property exists in a particular fluid

Term	Explanation
W	
waste management	responsibility for, and control of, disposal of any food substance or food packaging to minimise environmental and health impacts
whey	milk serum, separating as liquid from the curd after coagulation, as in cheese making
wide	of great range or scope; embracing a great number or variety of subjects, cases, etc.; of full extent
with expression	in words, art, music or movement, conveying or indicating feeling, spirit, character, etc.; a way of expressing or representing something; vivid, effective or persuasive communication

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8 Version history

Version	Date of change	Update
1.1	May 2018	Editorial edits
		Subject matter amendments
		IA1: Examination <ul style="list-style-type: none"> • Amendments to assessment objectives 1, 2, 3, 4, 5 and 7 • Removal of objective 8 from assessment • Amendment to the ISMG
		IA2: Project — folio <ul style="list-style-type: none"> • Amendments to assessment objectives 1, 2, 3, 4, 5 and 7 • The term, 'design', removed from the assessable evidence • Amendment to the ISMG
		IA3: Project — folio <ul style="list-style-type: none"> • Amendment to assessment objective 1 • The term, 'design', removed from the assessable evidence • Inclusion of contextual stimulus specifications • Amendment to the ISMG
		EA: Examination <ul style="list-style-type: none"> • Amendments to assessment objectives 1 and 5 • Specifications amendment — removal of multi-choice items • Removal of objective 8 from assessment
		Reporting standards <ul style="list-style-type: none"> • Amendments to standard C and E to align with subjects in the Technologies Learning Area.
		Glossary updated

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