Food and Technology

Victorian Certificate of Education **Study Design**

Victorian Curriculum and Assessment Authority
2010

Updated February 2014

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Latoya BARTON
The sunset (detail)
from a series of twenty-four
9.0 x 9.0 cm each, oil on board

Liana RASCHILLA
Teapot from the *Crazy Alice* set
19.0 x 22.0 x 22.0 cm
earthenware, clear glaze. lustres

Kate WOOLLEY
Sarah (detail)
76.0 x 101.5 cm, oil on canvas

Christian HART
Within without (detail)
digital film, 6 minutes

Merryn ALLEN
Japanese illusions (detail)
centre back: 74.0 cm, waist (flat): 42.0 cm
polyester cotton

James ATKINS
Light cascades (detail)
three works, 32.0 x 32.0 x 5.0 cm each
glass, flourescent light, metal

Lucy McNAMARA
Precariously (detail)
156.0 x 61.0 x 61.0 cm
painted wood, oil paint, egg shells, glue, stainless steel wire

Tarkan ERTURK
Visage (detail)
201.0 x 170.0 cm
synthetic polymer paint, on cotton duck

Nigel BROWN
Untitled physics (detail)
90.0 x 440.0 x 70.0 cm
composition board, steel, loudspeakers, CD player, amplifier, glass

Chris ELLIS
Tranquility (detail)
35.0 x 22.5 cm
gelatin silver photograph

Kristian LUCAS
Me, myself, I and you (detail)
56.0 x 102.0 cm
oil on canvas

Ping (Irene VINCENT)
Boxes (detail)
colour photograph

Tim JOINER
14 seconds (detail)
digital film, 1.30 minutes

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Food and Technology

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IMPORTANT INFORMATION

Accreditation period

Units 1–4: 2011–2016

The accreditation period commences on 1 January 2011.

Other sources of information

The *VCAA Bulletin VCE, VCAL and VET* is the only official source of changes to regulations and accredited studies. The *VCAA Bulletin VCE, VCAL and VET*, including supplements, also regularly includes advice on VCE studies. It is the responsibility of each VCE teacher to refer to each issue of the *VCAA Bulletin VCE, VCAL and VET*. The *VCAA Bulletin VCE, VCAL and VET* is sent in hard copy to all VCE providers. It is also available as an e-newsletter via free subscription on the Victorian Curriculum and Assessment Authority's website at www.vcaa.vic.edu.au

To assist teachers in assessing School-assessed Coursework in Units 3 and 4, the Victorian Curriculum and Assessment Authority publishes online an assessment handbook that includes advice on the assessment tasks and performance descriptors for assessment.

The current year's *VCE and VCAL Administrative Handbook* contains essential information on assessment processes and other procedures.

VCE providers

Throughout this study design the term 'school' is intended to include both schools and other VCE providers.

Photocopying

VCE schools only may photocopy parts of this study design for use by teachers.

Introduction

RATIONALE

VCE Food and Technology focuses on the importance of food in our daily lives from both a theoretical and practical point of view. The study enables students to apply their theoretical understanding of the relationship between food and technology as they develop skills in food preparation.

The food sector is dynamic, diverse and creative. Innovative food products are continually being introduced into the marketplace in response to changing social and consumer demands. Contemporary society is aware of the links between food, food processing, nutrition, health and well-being, and issues associated with these have become a high priority for consumers. VCE Food and Technology challenges students to make these links and provides them with the opportunities to acquire knowledge and skills to make informed choices when selecting, storing, purchasing, preparing and consuming foods that will contribute to a healthy lifestyle. Students also consider the importance of environmental issues and sustainability practices in food production, as well as the important role of technology in food product development and the way food is produced, processed, packaged and marketed.

Through this study students develop knowledge of the physical, chemical, sensory and functional properties of food and are able to apply this knowledge when using food in a practical situation. They develop and apply the knowledge and skills to prepare food safely and hygienically. Students use the design process, critical thinking and problem-solving skills to develop food products to suit specific situations or to meet the needs of individual consumers and their lifestyles. In this process, they also develop independent and cooperative learning skills.

The study may provide a foundation for pathways to food science and technology, consumer science, home economics, child care and education, community services and aged care, the hospitality and food manufacturing industries, and nutrition and health studies.

AIMS

This study is designed to enable students to:

- extend their understanding of food and develop an understanding of current trends in food and technology, and their relevance to the food consumer in contemporary society
- develop and apply an understanding of the functional properties of food and their impact on food preparation and processing

- use theoretical knowledge to develop practical skills in the preparation and processing of food
- acquire and apply knowledge of the principles of food hygiene and safety, including safe food handling and the selection and safe use of tools and equipment
- understand the role of technology in food product development and in food preparation, processing and packaging, and recent technological developments in ingredients, processing techniques, tools and equipment
- understand the food product development and production processes and related sustainability issues
- develop and use critical and creative thinking, adaptability and problem-solving skills in the application of the design process to achieve solutions related to food.

STRUCTURE

The study is made up of four units:

Unit 1: Food safety and properties of food

Unit 2: Planning and preparation of food

Unit 3: Food preparation, processing and food controls

Unit 4: Food product development and emerging trends

Each unit deals with specific content contained in areas of study and is designed to enable students to achieve a set of outcomes for that unit. Each outcome is described in terms of key knowledge and key skills.

A glossary defining terms used across Units 1 to 4 in the VCE Food and Technology study design is included on pages 33–35 under 'Advice for teachers'.

ENTRY

There are no prerequisites for entry to Units 1, 2 and 3. Students must undertake Unit 3 prior to undertaking Unit 4. Units 1 to 4 are designed to a standard equivalent to the final two years of secondary education. All VCE studies are benchmarked against comparable national and international curriculum.

DURATION

Each unit involves at least 50 hours of scheduled classroom instruction.

CHANGES TO THE STUDY DESIGN

During its period of accreditation minor changes to the study will be announced in the *VCAA Bulletin VCE, VCAL and VET*. The *VCAA Bulletin VCE, VCAL and VET* is the only source of changes to regulations and accredited studies and it is the responsibility of each VCE teacher to monitor changes or advice about VCE studies published in the *VCAA Bulletin VCE, VCAL and VET*.

MONITORING FOR QUALITY

As part of ongoing monitoring and quality assurance, the Victorian Curriculum and Assessment Authority will periodically undertake an audit of VCE Food and Technology to ensure the study is being taught and assessed as accredited. The details of the audit procedures and requirements are published annually in the *VCE and VCAL Administrative Handbook*. Schools will be notified if they are required to submit material to be audited.

SAFETY

This study may involve the handling of potentially hazardous substances and the use of potentially hazardous equipment. It is the responsibility of the school to ensure that duty of care is exercised in relation to the health, hygiene and safety of all students undertaking the study. Particular care should be taken with regard to students with allergies to foods that may be used in Food and Technology classes.

It would be beneficial for Food and Technology teachers to have competence in safe food handling, for example through completion of training in a nationally recognised VET unit of competence in workplace hygiene and/or food safety. Information is available from the National Training Information Service (NTIS: www.ntis.gov.au).

USE OF INFORMATION AND COMMUNICATIONS TECHNOLOGY

In designing courses for this study teachers should incorporate information and communications technology (ICT) where appropriate and applicable to the teaching and learning activities.

EMPLOYABILITY SKILLS

This study offers a number of opportunities for students to develop employability skills. The 'Advice for teachers' section provides specific examples of how students can develop employability skills during learning activities and assessment tasks.

LEGISLATIVE COMPLIANCE

When collecting and using information, the provisions of privacy and copyright legislation, such as the Victorian *Information Privacy Act 2000* and *Health Records Act 2001*, and the federal *Privacy Act 1988* and *Copyright Act 1968,* must be met.

Assessment and reporting

SATISFACTORY COMPLETION

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's performance on assessment tasks designated for the unit. Designated assessment tasks are provided in the details for each unit. The Victorian Curriculum and Assessment Authority publishes online an assessment handbook that includes advice on the assessment tasks and performance descriptors for assessment for Units 3 and 4.

Teachers must develop courses that provide opportunities for students to demonstrate achievement of outcomes. Examples of learning activities are provided in the 'Advice for teachers' section.

Schools will report a result for each unit to the Victorian Curriculum and Assessment Authority as S (Satisfactory) or N (Not Satisfactory).

Completion of a unit will be reported on the Statement of Results issued by the Victorian Curriculum and Assessment Authority as S (Satisfactory) or N (Not Satisfactory). Schools may report additional information on levels of achievement.

AUTHENTICATION

Work related to the outcomes of each unit will be accepted only if the teacher can attest that, to the best of their knowledge, all unacknowledged work is the student's own. Teachers need to refer to the current year's *VCE and VCAL Administrative Handbook* for authentication procedures.

LEVELS OF ACHIEVEMENT

Units 1 and 2

Procedures for the assessment of levels of achievement in Units 1 and 2 are a matter for school decision. Assessment of levels of achievement for these units will not be reported to the Victorian Curriculum and Assessment Authority. Schools may choose to report levels of achievement using grades, descriptive statements or other indicators.

Units 3 and 4

The Victorian Curriculum and Assessment Authority will supervise the assessment of all students undertaking Units 3 and 4.

In VCE Food and Technology the student's level of achievement will be determined by School-assessed Coursework, a School-assessed Task and an end-of-year examination. The Victorian Curriculum and Assessment Authority will report the student's level of performance on each assessment component as a grade from A+ to E or UG (ungraded). To receive a study score, students must achieve two or more graded assessments and receive S for both Units 3 and 4. The study score is reported on a scale of 0–50; it is a measure of how well the student performed in relation to all others who took the study. Teachers should refer to the current year's *VCE and VCAL Administrative Handbook* for details on graded assessment and calculation of the study score. Percentage contributions to the study score in VCE Food and Technology are as follows:

- Unit 3 School-assessed Coursework: 18 per cent
- Unit 4 School-assessed Coursework: 12 per cent
- Units 3 and 4 School-assessed Task: 40 per cent
- End-of-year examination: 30 per cent.

Details of the assessment program are described in the sections on Units 3 and 4 in this study design.

Unit 1: Food safety and properties of food

In this unit students study safe and hygienic food handling and storage practices to prevent food spoilage and food poisoning, and apply these practices in the preparation of food. They consider food preparation practices suitable for use in a small-scale food operation, such as in the home, a school setting or in a small food business. Students consider the selection and use of a range of tools and equipment suitable for use in food preparation.

Students examine the links between classification of foods and their properties, and examine changes in properties of food when different preparation and processing techniques are used. Students apply this knowledge when preparing food. They investigate quality and ethical considerations in food selection. Students use the design process to meet the requirements of design briefs to maximise the qualities of key foods.

AREA OF STUDY 1

Keeping food safe

This area of study provides students with an understanding of the work practices involved in preparing food hygienically to prevent food spoilage and food poisoning, and the principles of working safely when preparing food. Students examine causes of food spoilage and poisoning, and the requirements for the correct storage of food. They use tools and equipment safely to produce quality outcomes in food production.

Outcome 1

On completion of this unit the student should be able to explain and apply safe and hygienic work practices when storing, preparing and processing food.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 1.

Key knowledge

This knowledge includes:

- principles of food hygiene and safe food handling in a small-scale food operation
- causes of food spoilage and food poisoning

- storage practices to ensure safety and maximise the quality of food
- safe and hygienic use of tools and equipment to produce quality outcomes.

Key skills

These skills include the ability to:

- identify causes of food spoilage and food poisoning
- implement safe and hygienic work practices in a small-scale food operation
- analyse safety and hygiene risk points in food preparation, and identify actions required to eliminate risks
- apply understanding of storage techniques that will ensure food safety and maximise the quality of food
- select, use, clean and store appropriate food preparation and processing tools and equipment safely.

AREA OF STUDY 2

Food properties and preparation

In this area of study students develop an understanding of the classification of foods and explore the physical, sensory and chemical properties of key foods. Students investigate the importance of the functional properties of foods and their impact on food preparation and processing. They apply this knowledge for optimal results when preparing food and using the design process. They investigate quality and ethical considerations in food selection such as fair trade and intensive farming practices.

Outcome 2

On completion of this unit the student should be able to analyse the physical, sensory, chemical and functional properties of key foods, and select, prepare and process foods safely and hygienically to optimise these properties using the design process.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 2.

Key knowledge

This knowledge includes:

- the design process (including the design brief, criteria for evaluation, research, the design plan and evaluation of processes and products) and its role in planning, and safely and hygienically preparing and processing foods in a way that maximises the qualities of key foods
- plant or animal origin, structure, and classification of key foods, including cereals, fruits, vegetables, nuts and legumes, meats, seafood, dairy foods and eggs
- considerations in food selection, including food quality and ethical issues such as fair trade and intensive farming practices
- physical, sensory and chemical properties of selected key foods
- functional properties of selected key foods and their role in food preparation and processing
- changes in physical and sensory properties of selected key foods during preparation and processing.

Key skills

These skills include the ability to:

- use the design process to plan and safely and hygienically prepare and process key foods to maximise quality
- identify the major nutrients of selected foods within each of the key food classifications
- make informed decisions about food selection
- prepare selected key foods to demonstrate functional properties in food preparation and processing, including denaturation, coagulation, aeration, Maillard reaction, dextrinisation and gelatinisation
- compare physical and sensory properties of selected key foods before and after food preparation and processing.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and key skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and key skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and key skills should not be assessed separately.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Teachers should select a variety of assessment tasks for their assessment program to reflect the key knowledge and key skills being assessed and to provide for different learning styles.

For this unit students are required to demonstrate achievement of two outcomes. As a set these outcomes encompass both areas of study.

Demonstration of achievement of Outcomes 1 and 2 must be based on the student's performance on a selection of assessment tasks. Where teachers allow students to choose between tasks they must ensure that the tasks they set are of comparable scope and demand.

Assessment tasks for this unit are selected from the following:

- production work and records of production
- designing and developing a solution in response to a design brief, including production work
- tests (short and/or extended answer)
- practical tests
- short written reports (for example, media analysis, report or comparative analysis on a food testing activity, industry visits, or product evaluation)
- oral reports supported by visual presentations (for example, multimedia)
- online publication/communication (for example, blog/wiki/website/podcast/vodcast).

Unit 2: Planning and preparation of food

In this unit students investigate the most appropriate tools and equipment to produce optimum results, including the latest developments in food technology. Students research, analyse and apply the most suitable food preparation, processing and cooking techniques to optimise the physical, sensory and chemical properties of food.

Students work both independently and as members of a team to research and implement solutions to a design brief. They use the design process to respond to challenges of preparing food safely and hygienically for a range of contexts and consumers, taking into account nutritional considerations, social and cultural influences, and resource access and availability. Students also explore environmental considerations when planning and preparing meals.

AREA OF STUDY 1

Tools, equipment, preparation and processing

In this area of study students investigate various methods used in the preparation, processing, cooking and presentation of foods for optimum results. Students examine tools and equipment including the latest technological developments. They examine the effects on the physical, sensory and chemical properties of key foods when applying different methods of preparation and techniques of cooking. Students apply a range of skills to safely and hygienically prepare and process foods.

Outcome 1

On completion of this unit the student should be able to use a range of tools and equipment to demonstrate skills and implement processes in the preparation, processing, cooking and presentation of key foods to maximise their properties.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 1.

Key knowledge

This knowledge includes:

- appropriate selection and safe and hygenic use of tools and equipment for food preparation and processing
- technological developments in tools and equipment for domestic use, such as the latest advances in cookware and appliances

- properties of key foods, including cereals, fruits, vegetables, nuts and legumes, meats, seafood, dairy foods and eggs
- suitability of food preparation and processing, wet and dry cooking techniques and presentation methods that optimise properties of key foods, including nutrient content, appearance, aroma, flavour and texture.

Key skills

These skills include the ability to:

- examine, compare and select suitable tools and equipment for preparation and processing of food
- investigate technological developments in tools and equipment, and analyse their impact on food preparation
- apply a range of food preparation, processing, cooking and presentation techniques safely and hygienically to maximise properties of key foods, including the nutrient content, appearance, aroma, flavour and texture
- demonstrate a range of wet and dry techniques of cooking foods.

AREA OF STUDY 2

Planning and preparing meals

In this area of study students examine the impact of social and cultural influences when planning and preparing meals, and prepare foods to suit specific nutritional needs. They investigate the impact on planning of resource availability and environmental considerations. Students work individually and in teams applying their knowledge and problem-solving skills, using the design process, to plan and prepare meals to meet specifications outlined in design briefs for a range of contexts. They evaluate the outcomes of their planning and production activities.

Outcome 2

On completion of this unit the student should be able, individually and as a member of a team, to use the design process to plan, safely and hygienically prepare and evaluate meals for a range of contexts.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 2.

Key knowledge

This knowledge includes:

- the design process (including the design brief, criteria for evaluation, research, the design plan and evaluation of processes and products) and its role in planning and evaluating meals in small-scale food operations, such as home prepared meals
- safe and hygenic food preparation and processing in meal preparation
- nutritional considerations when planning, including basic nutritional requirements and special nutritional requirements, such as reduced fat, high fibre, food allergies and food intolerances
- social and cultural influences that have an impact on meal planning, such as
  - lifestyle of consumers at a specific stage of the life span, for example childhood and adolescence
  - purpose of the meal
  - beliefs and customs
  - use of Australian indigenous ingredients
  - vegetarianism

- the impact of resources on planning, such as access to ingredients, skills, equipment, time, and budget
- environmental considerations in planning to minimise waste and effectively use resources such as consideration of food miles and use of seasonally available ingredients
- food preparation techniques and ingredients suitable for specific purposes, including retaining and improving nutritional value of food
- methods of evaluating planning and production activities.

Key skills

These skills include the ability to

- use the design process to plan and prepare meals to meet the requirements of specific design briefs, such as
  - special nutritional considerations
  - alterations to recipes to improve nutrient values of food products
  - particular social or cultural influences on consumers
  - the impact of resource availability and access
  - quick and easy nutritionally balanced home prepared meals
- research and develop strategies to minimise food waste and resource use
- research and implement appropriate food preparation and processing techniques safely and hygienically to improve nutritional value
- evaluate the outcomes of planning and production activities
- work independently and as a member of a team.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit.

The key knowledge and key skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and key skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and key skills should not be assessed separately.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Teachers should select a variety of assessment tasks for their assessment program to reflect the key knowledge and key skills being assessed and to provide for different learning styles.

For this unit students are required to demonstrate achievement of two outcomes. As a set these outcomes encompass both areas of study.

Demonstration of achievement of Outcomes 1 and 2 must be based on the student's performance on a selection of assessment tasks. Where teachers allow students to choose between tasks they must ensure that the tasks they set are of comparable scope and demand.

Assessment tasks for this unit are selected from the following:

- production work and records of planning and production
- designing and developing a solution in response to a design brief, including production work

- tests (short and/or extended answer)
- short written reports (for example, report or comparative analysis on a food testing activity, industry visits, or product evaluation)
- oral reports supported by visual presentations (for example, multimedia)
- online publication/communication (for example, blog/wiki/website/podcast/vodcast).

Unit 3: Food preparation, processing and food controls

In this unit students develop an understanding of food safety in Australia and the relevant national, state and local authorities and their regulations, including the Hazard Analysis and Critical Control Points (HACCP) system. They investigate the causes of food spoilage and food poisoning and apply safe work practices while preparing food.

Students demonstrate understanding of key foods, analyse the functions of the natural components of key foods and apply this information in the preparation of foods. They investigate cooking techniques and justify the use of the techniques they select when preparing key foods. Students develop an understanding of the primary and secondary processes that are applied to key foods, including food processing techniques to prevent spoilage. They also preserve food using these techniques.

Students devise a design brief from which they develop a detailed design plan. Evaluation criteria are developed from the design brief specifications. In preparing their design plan, students conduct research and incorporate their knowledge about key foods, properties of food, tools, equipment, safety and hygiene, preparation, cooking and preservation techniques. They make decisions related to the specifications of the brief. In developing the design plan, students establish an overall production timeline to complete the set of food items (the product) to meet the requirements of the brief for implementation in Unit 4.

AREA OF STUDY 1

Maintaining food safety in Australia

In this area of study students develop an understanding of the roles and responsibilities of and the relationship between the national, state and local authorities that govern food laws and standards to maintain food safety in Australia, including the production of safe food and the labelling of manufactured products. Students examine the causes of food spoilage and food poisoning and the practices followed to prevent them occurring. They investigate how the HACCP system is used in the food industry to ensure that safe and hygienic food is produced.

Outcome 1

On completion of this unit the student should be able to explain the roles and responsibilities of and the relationship between national, state and local authorities in ensuring and maintaining food safety within Australia.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 1.

Key knowledge

This knowledge includes:

- causes of food spoilage and food poisoning
- safety and hygiene practices to prevent food spoilage and food poisoning
- the roles and responsibilities of and the relationship between national (Food Standards Australia New Zealand – FSANZ and Australian Quarantine and Inspection Service – AQIS), state and local authorities in ensuring a safe food supply, including
  - development and implementation of a Food Safety Plan for a food premise
  - action in response to unsafe and/or unhygienic food production premises
  - food product recall
- Food Standards Code in Australia including food labelling regulations, nutrition content claims and health claims
- purpose of the HACCP system, and the role of each of the steps in ensuring food safety.

Key skills

These skills include the ability to:

- describe and apply relevant safety and hygiene practices in food preparation to prevent food spoilage and food poisoning
- identify the various authorities in Australia and explain their roles, responsibilities and relationship in ensuring a safe food supply is available to consumers
- identify and justify the information on a food label according to the Food Standards Code
- explain the purpose of the steps in the HACCP system, including corrective actions required for identified risks and hazards.

AREA OF STUDY 2

Food preparation and processing

In this area of study students demonstrate understanding of key foods and the primary and secondary processes that are applied to them. They examine the natural food components of key foods and analyse how their functional properties may have an impact on food preparation and processing techniques. Students explore and apply a range of cooking, food preparation, processing and preservation techniques of key foods, while following food safety and hygiene requirements.

Outcome 2

On completion of this unit the student should be able to analyse preparation, processing and preservation techniques for key foods, and prepare foods safely and hygienically using these techniques.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 2.

Key knowledge

This knowledge includes:

- the primary and secondary processing that occurs from the point of origin to the consumer for one of each type of the following foods: cereals, fruits, vegetables and dairy foods
- the physical, sensory and chemical properties of key foods, including cereals, fruits, vegetables, nuts and legumes, meats, seafood, dairy foods and eggs

- functions of natural food components of key foods, including acids, enzymes, alkalis, proteins, starches and sugars, fats and oils and their impact on food preparation and processing
- techniques of cooking key foods, including dry methods (roasting, baking, grilling, frying), wet methods (boiling, poaching, steaming, stewing), and microwave cooking
- preservation techniques to prevent spoilage of food, including freezing, dehydration, use of sugars, use of acids and heat processing (bottling).

Key skills

These skills include the ability to:

- analyse the reasons for primary and secondary processing of one of each of the following key foods: cereals, fruits, vegetables and dairy foods
- use preparation techniques safely and hygienically that utilise the properties of key foods in the production process
- analyse the functions of the natural components that have an impact on the outcome of the final product
- assess the impact of processing and preparation techniques on the properties of food
- select, justify and safely and hygienically use particular cooking techniques for key foods
- preserve key foods using a range of food preservation techniques including freezing, dehydration, use of sugars, use of acids and heat processing (bottling).

AREA OF STUDY 3

Developing a design plan

In this area of study students develop a design plan to meet the requirements of a specific design brief. They initially develop a design brief and evaluation criteria drawn from the design brief. They then investigate its specifications, consider and justify food item choices and develop a design plan to be implemented in Outcome 1, Unit 4. Students research aspects related to their design brief that may include the functional properties of ingredients, relevant processing techniques, tools and equipment, safety and hygiene practices, and specific needs of the consumer/s. They incorporate the findings of their research and exploration in the design plan. After making and recording decisions about the proposed four to six food items that will comprise the product, students develop an overall production timeline.

Outcome 3

On completion of this unit the student should be able to develop a design brief, evaluation criteria and a design plan for the development of a food product.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 3.

Key knowledge

This knowledge includes:

- the components of a design brief, including context and specifications (considerations and constraints)
- development of criteria for evaluation that relate to the design brief
- the role and importance of components of a design plan

- exploration of ideas and research that leads to an outline of a proposed set of four to six food items (the product) as a response to a design brief
- properties of ingredients (including physical, sensory, chemical, and functional) to be used in the preparation of the proposed food items
- food preparation and techniques of cooking, and preservation techniques suitable to produce a high-quality product that meets the specifications in the design brief
- tools and equipment suitable for preparing and processing the proposed food items to meet the specifications in the design brief
- food safety and hygiene requirements necessary to produce the proposed food items
- methods of developing an overall timeline for production of the four to six food items (the product).

Key skills

These skills include the ability to:

- develop a design brief, including context and specifications (considerations and constraints)
- develop criteria for evaluation from the design brief
- develop a design plan that results in the proposed production of a set of food items appropriate to meet the requirements of the design brief, including:
  - conducting relevant research to formulate ideas to propose a set of four to six food items (the product) to meet the context and specifications of the design brief
  - making, documenting and justifying decisions about appropriate food items to meet the context and specifications in the brief through ongoing evaluation
  - explaining the properties of main ingredients and processes, including two or three different food preservation techniques, and tools and equipment required to produce high-quality products
  - identifying and recording food safety and hygiene requirements
  - developing an overall production timeline to ensure the completion of the product in the allocated time.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit. The Victorian Curriculum and Assessment Authority publishes online an assessment handbook for this study that includes advice on the assessment tasks and performance descriptors for assessment.

The key knowledge and key skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and key skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and key skills should not be assessed separately.

To demonstrate satisfactory completion of Unit 3, Outcome 3, students must present evidence of the development of a design brief, evaluation criteria and a design plan.

Assessment of levels of achievement

The student's level of achievement in Unit 3 will be determined by School-assessed Coursework, a School-assessed Task and an end-of-year examination.

Contribution to final assessment

School-assessed Coursework for Unit 3 will contribute 18 per cent.

The School-assessed Task for Units 3 and 4 will contribute 40 per cent.

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 30 per cent.

School-assessed Coursework

Teachers will provide to the Victorian Curriculum and Assessment Authority a score representing an assessment of the student's level of achievement.

The score must be based on the teacher's rating of performance of each student on the tasks set out in the following table and in accordance with the assessment handbook published online by the Victorian Curriculum and Assessment Authority. The assessment handbook also includes advice on the assessment tasks and performance descriptors for assessment.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Where teachers provide a range of options for the same assessment task, they should ensure that the options are of comparable scope and demand. Teachers should select a variety of assessment tasks for their program to reflect the key knowledge and key skills being assessed and to provide for different learning styles.

Outcomes	Marks allocated*	Assessment tasks
Outcome 1 Explain the roles and responsibilities of and the relationship between national, state and local authorities in ensuring and maintaining food safety within Australia.	20	Any one or a combination of: • a report (oral, short written) • a multimedia presentation • a test (short and/or extended answer) • an annotated visual display • a case study • a media analysis.
Outcome 2 Analyse preparation, processing and preservation techniques for key foods, and prepare foods safely and hygienically using these techniques.	40	Any one or a combination of: • production activities • a report (oral, short written) • a multimedia presentation • an essay • a test • an annotated visual display • a production portfolio • online publication/communication (for example, blog/wiki/website).
Total marks	**60**	

*School-assessed Coursework for Unit 3 contributes 18 per cent.

School-assessed Task

Assessment for Food and Technology includes a School-assessed Task. The student's level of performance in achieving Outcome 3 in Unit 3 and Outcome 1 in Unit 4 will be assessed through a School-assessed Task using criteria published annually and available on the Food and Technology study page on the Victorian Curriculum and Assessment Authority website. Details of the School-assessed Task for Units 3 and 4 are provided on page 37 of this study design.

Unit 4: Food product development and emerging trends

In this unit students develop individual production plans for the proposed four to six food items and implement the design plan they established in Unit 3. In completing this task, students apply safe and hygienic work practices using a range of preparation and production processes, including some which are complex. They use appropriate tools and equipment and evaluate their planning, processes and product.

Students examine food product development, and research and analyse driving forces that have contributed to product development. They investigate issues underpinning the emerging trends in product development, including social pressures, consumer demand, technological developments, and environmental considerations. Students also investigate food packaging, packaging systems and marketing.

AREA OF STUDY 1

Implementing a design plan

In this area of study students apply design and product development processes. They develop individual production plans for the four to six food items proposed in Unit 3, Outcome 3. Using the design plan, students use appropriate tools and equipment to safely and hygienically implement a range of preparation, processing, preservation and presentation techniques. This range should include complex processes, which are hands-on processes resulting from a series of decisions about critical variables that directly affect the outcome of combining ingredients, equipment and techniques that result in a food item. As a result of ongoing evaluation, students make and record modifications as required. Students conduct and record results of sensory analysis for each food item including appearance, aroma, flavour and texture. They present and evaluate the product using the sensory analysis and the evaluation criteria devised in Unit 3, Outcome 3. They evaluate the effectiveness and efficiency of production activities in relation to their individual food item production plans.

Outcome 1

On completion of this unit the student should be able to safely and hygienically implement the production plans for a set of four to six food items that comprise the product, evaluate the sensory properties of the food items, evaluate the product using the evaluation criteria, and evaluate the efficiency and effectiveness of production activities.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 1.

Key knowledge

This knowledge includes:

- planning processes to implement a design plan, including production plans comprising a sequence of operations for a set of four to six food items
- properties of foods (including physical, sensory, chemical and functional properties)
- complex processes, food preparation, processing, preservation and presentation techniques to implement the design plan and individual production plans
- food safety and hygiene practices to implement production plans
- methods of recording evidence of the four to six food items produced
- methods of evaluating food items, the product, processes and production activities.

Key skills

These skills include the ability to:

- develop individual production plans for each of the four to six food items (the product)
- use appropriate food preparation, processing, preservation and presentation techniques, including complex processes
- apply safe and hygienic work practices appropriate to the implementation of the plan
- record information about decisions and modifications made relevant to the production
- analyse sensory properties of food items produced
- evaluate the product using previously developed criteria and the sensory analysis
- evaluate the effectiveness of planning, safety and hygiene practices, and efficiency of production activities.

AREA OF STUDY 2

Food product development

In this area of study students investigate the impact of primary food production on the environment and changes being made to achieve more sustainable farming practices. They also investigate environmental issues in food manufacturing and packaging. Students consider the types of food product development and the driving forces related to these developments. They examine the process of commercial food product development from the design brief and planning stage to the prototype, production, packaging, labelling, marketing and evaluation of the final product. Students explore new and emerging foods and innovations in food product development as a result of social pressures, consumer demands and expectations. They explore the impact of technology on food production and packaging, and the development of new food products.

Outcome 2

On completion of this unit the student should be able to analyse driving forces related to food product development, analyse new and emerging food products, and explain processes involved in the development and marketing of food products.

To achieve this outcome the student will draw on key knowledge and key skills outlined in Area of Study 2.

Key knowledge

This knowledge includes:

- sustainable farming practices as driving forces in food production and the reasons for managing the use of water and chemicals, prevention of land degradation and adoption of organic farming methods
- driving forces related to the development of food products, including social pressures, consumer demands, technological developments and environmental considerations
- the process of food product development, and quantitative and qualitative analysis of new food products
- types of food product development, including Me-toos and line extensions
- new and emerging foods, including functional foods and foods to meet particular dietary requirements and food intolerances
- innovations and emerging technologies in food product development, including genetic modification, high pressure processing, microencapsulation and membrane technology
- the purposes of packaging and packaging systems, including Aseptic packaging and Modified Atmosphere Packaging (MAP)
- environmental issues associated with food manufacturing and food packaging
- food product marketing and promotional strategies, including ethical food marketing to children.

Key skills

These skills include the ability to:

- analyse environmental issues in food production, including effects of the use of water, land and chemical resources and reasons for the adoption of more sustainable farming practices
- identify the driving forces related to the development of new and emerging food products, and analyse foods that have been developed as a result of these driving forces
- describe the food product development process and the role of each aspect of the process in the development of the new product
- describe and analyse the types of food product development, including Me-toos and line extensions
- investigate and explain innovations and emerging technologies in food product development, including genetic modification, high pressure processing, microencapsulation and membrane technology, and evaluate the impact of these developments
- investigate the purposes of packaging and describe packaging systems, including Aseptic and Modified Atmosphere Packaging (MAP)
- describe environmental issues associated with food manufacturing and food packaging
- evaluate marketing strategies for food products and their effectiveness in providing information to the consumer.

ASSESSMENT

The award of satisfactory completion for a unit is based on a decision that the student has demonstrated achievement of the set of outcomes specified for the unit. This decision will be based on the teacher's assessment of the student's overall performance on assessment tasks designated for the unit. The Victorian Curriculum and Assessment Authority publishes online an assessment handbook for this study that includes advice on the assessment tasks and performance descriptors for assessment.

The key knowledge and key skills listed for each outcome should be used as a guide to course design and the development of learning activities. The key knowledge and key skills do not constitute a checklist and such an approach is not necessary or desirable for determining the achievement of outcomes. The elements of key knowledge and key skills should not be assessed separately.

Assessment of levels of achievement

The student's level of achievement for Unit 4 will be determined by School-assessed Coursework, a School-assessed Task and an end-of-year examination.

Contribution to final assessment

School-assessed Coursework for Unit 4 will contribute 12 per cent.

The School-assessed Task for Units 3 and 4 will contribute 40 per cent.

The level of achievement for Units 3 and 4 is also assessed by an end-of-year examination, which will contribute 30 per cent.

School-assessed Coursework

Teachers will provide to the Victorian Curriculum and Assessment Authority a score representing an assessment of the student's level of achievement.

The score must be based on the teacher's rating of performance of each student on the tasks set out in the following table and in accordance with the assessment handbook published online by the Victorian Curriculum and Assessment Authority. The assessment handbook also includes advice on the assessment tasks and performance descriptors for assessment.

Assessment tasks must be a part of the regular teaching and learning program and must not unduly add to the workload associated with that program. They must be completed mainly in class and within a limited timeframe. Where teachers provide a range of options for the same assessment task, they should ensure that the options are of comparable scope and demand. Teachers should select a variety of assessment tasks for their program to reflect the key knowledge and key skills being assessed and to provide for different learning styles.

Outcomes	Marks allocated*	Assessment tasks
Outcome 2 Analyse driving forces related to food product development, analyse new and emerging food products, and explain processes involved in the development and marketing of food products.	40	Any one or a combination of: • a test (short and/or extended response) • a written report • analysis of a case study • structured questions • a multimedia presentation • an oral presentation.
Total marks	**40**	

*School-assessed Coursework for Unit 4 contributes 12 per cent.

School-assessed Task

Assessment for Food and Technology includes a School-assessed Task worth 40 per cent of the total mark. For this component teachers will provide to the Victorian Curriculum and Assessment Authority a grade representing an assessment of the student's level of performance in Outcome 3 in Unit 3 and Outcome 1 in Unit 4, according to criteria published annually and available on the Food and Technology study page on the Victorian Curriculum and Assessment Authority website.

Outcomes	Assessment tasks
Unit 3 **Outcome 3** Develop a design brief, evaluation criteria and a design plan for the development of a food product. **Unit 4** **Outcome 1** Safely and hygienically implement the production plans for a set of four to six food items that comprise the product, evaluate the sensory properties of the food items, evaluate the product using the evaluation criteria, and evaluate the efficiency and effectiveness of production activities.	A design folio that includes: A design brief **and** Evaluation criteria **and** A design plan including Research and ideas **and** An outline of food items, properties of main ingredients, processes, tools and equipment, safety and hygiene requirements to produce food items **and** An overall timeline for production of food items Individual food item production plans **and** Production work accompanied by photographic and written records of progress and modifications **and** An evaluation of the sensory properties of the food items, the product using evaluation criteria, efficiency and effectiveness of production activities.

End-of-year examination

Description

The examination will be set by a panel appointed by the Victorian Curriculum and Assessment Authority. All the key knowledge and key skills that underpin the outcomes in Units 3 and 4 are examinable.

Students will not be required to demonstrate practical skills in food preparation and processing techniques using tools and equipment; however, their knowledge and understanding of these is examinable.

Conditions

The examination will be completed under the following conditions:

- Duration: one and a half hours.
- Date: end-of-year, on a date to be published annually by the Victorian Curriculum and Assessment Authority.
- Victorian Curriculum and Assessment Authority examination rules will apply. Details of these rules are published annually in the *VCE and VCAL Administrative Handbook*.
- The examination will be marked by assessors appointed by the Victorian Curriculum and Assessment Authority.

Contribution to final assessment

The examination will contribute 30 per cent.

Further advice

The Victorian Curriculum and Assessment Authority publishes specifications for all VCE examinations on the Victorian Curriculum and Assessment Authority website. Examination specifications include details about the sections of the examination, their weighting, the question format/s and any other essential information. The specifications are published in the first year of implementation of the revised Units 3 and 4 sequence together with any sample material.

Advice for teachers

DEVELOPING A COURSE

A course outlines the nature and sequence of teaching and learning necessary for students to demonstrate achievement of the set of outcomes for a unit. The areas of study broadly describe the learning context and the knowledge required for the demonstration of each outcome. Outcomes are introduced by summary statements and are followed by the key knowledge and key skills which relate to the outcomes.

Teachers must develop courses that include appropriate learning activities to enable students to develop the key knowledge and key skills identified in the outcome statements in each unit.

For Units 1 and 2, teachers must select assessment tasks from the list provided. Tasks should provide a variety and the mix of tasks should reflect the fact that different types of tasks suit different knowledge and skills and different learning styles. Tasks do not have to be lengthy to make a decision about student demonstration of achievement of an outcome.

In Units 3 and 4, assessment is more structured. For some outcomes, or aspects of an outcome, the assessment tasks are prescribed. The contribution that each outcome makes to the total score for School-assessed Coursework is also stipulated.

Unit 3 Outcome 3 and Unit 4 Outcome 1 are assessed by a School-assessed Task. The School-assessed Task will initially be assessed by teachers using criteria published by the Victorian Curriculum and Assessment Authority and will be subject to external review.

Teachers should be very aware of the ethical values and considerations that are inherent in all aspects of the study and which underpin the major concepts on which the study is based. The cultural sensitivities of students should also be considered in all discussions when topics are being introduced or addressed through classroom activities.

One of the most important issues for teachers to consider when planning a course is to ensure that food production activities are embedded into the course and provide an important focus for student learning. When developing the course, it is essential to ensure that students have the opportunity to apply their theoretical understanding of the key knowledge in each unit through a broad range of practical activities.

Another issue to consider is the need to provide the opportunity for key knowledge and skills of at least two outcomes to be acquired concurrently. For example, in Unit 1, the key knowledge and skills for Outcome 1, 'Keeping food safe', could be taught concurrently with Outcome 2, 'Food properties and preparation'. By participating in production work, students have the opportunity to develop a clear understanding of the knowledge and skills linked to food safety.

The focus of the design process in Unit 1 is on maximising the qualities of key foods which can be included in the specifications in the design brief. In this unit, some design briefs could be mainly teacher-initiated with some student input. It is also important to be aware that the design process does not need to be used for every production activity.

Units 1 and 2 provide teachers with flexibility in the delivery of their course. For example, in Unit 1 Outcome 2 students are required to identify nutrients of 'selected' foods within each of the key food classifications; in studying the key food 'fruit', students could identify the nutrients present in one or two classifications of fruit such as in the pomme and citrus groups. Students could work in small teams to research this aspect of the key knowledge and share their findings with other members of the class in the form of an oral or a visual presentation.

Some teachers may be concerned about the inclusion of nuts as one of the key foods given the concern about nut allergies within the community and the policy of some schools to be 'nut free'. However, it is possible for students to develop a theoretical understanding of this important key food through research into their origin, structure and classification, without using nuts in production work.

In Unit 2, Area of Study 1 'Tools, equipment, preparation and processing', students are required to develop knowledge of technological developments in tools and equipment for domestic use such as a micro-plane grater, silicon bakeware or steamer oven. Information on new tools and equipment can be found in many food magazines or food equipment manufacturing and retail companies' websites. In addressing this outcome, it would be sufficient for students to undertake research into new technological developments rather than being required to develop skills in the use of this equipment. However, a simple classroom activity of evaluating the outcome of a production activity, such as the preparation of cupcakes using silicon bakeware in comparison with traditional cake tins, would be desirable. Alternatively, a teacher demonstration of new tools and equipment would enable students to develop an understanding of technological developments in tools and equipment.

In completing Unit 2, Area of Study 2 'Planning and preparing meals', students are required to plan, prepare and evaluate meals for a range of contexts. The use of the term 'meals' should be interpreted in its broad sense and could include just one of the components of a meal such as an entrée, a main course or a dessert dish for a specific occasion. It is important to expose students to a broad range of foods to extend their knowledge and experience in the use of a wide variety of ingredients. Teachers are also encouraged to introduce students to Australian indigenous ingredients, many of which are available through a number of online suppliers listed in the Resources, available on the VCE Food and Technology page of the VCAA website.

Unit 3, Area of Study 1 'Maintaining food safety in Australia', requires students to develop a general understanding of the roles and responsibilities of Food Standards Australia New Zealand (FSANZ) in ensuring a safe food supply, and the relationship of the national authority to both state and local authorities. This outcome also requires students to develop knowledge of the Food Standards Code and its use by FSANZ in ensuring food safety. In particular, teachers should address Standard 1.2 Food Labelling and Standard 1.1.1 Nutrition, Health and Related Claims in sufficient detail for students to gain an understanding of the underpinning principles relating to these standards, including nutrition content claims and health claims. Students should also develop understanding of Standard 3.2 Food Safety Requirements, in particular the development of a food safety plan and food product recalls. Documentation of school or canteen food safety plans would be a useful resource for this area of study.

Unit 3, Area of Study 2 'Food preparation and processing', includes a focus on food preparation and processing from point of origin to the consumer. In this area of study students are required to develop knowledge of the stages in primary and secondary processing of cereals, fruit, vegetables and dairy foods. While the general principles of primary and secondary processing are similar for each of these

key foods, the specific stages for each may vary. However, it should be noted that for the purposes of this study, the storage of the key food (for example, wheat in a silo) or the transportation of the key food are not considered primary or secondary processes, as the food is not subjected to any additional process to make it safe to eat or to alter its form when stored or transported.

Teachers should note that heat processing (bottling) is included as a preservation technique in Unit 3 Outcome 2. While some teachers will have the facilities for students to bottle foods such as fruit using a traditional preserving unit, bottling can also be undertaken using a microwave oven. It is essential that teachers are aware that only foods that have a high acid content or that have been pre-cooked should be preserved using bottling. Vegetables are not suitable for bottling as they have a low acid content, and pathogenic bacteria present on or in these foods may not be destroyed and could cause food poisoning.

To help students develop a clear understanding of the links between the key knowledge and skills in Unit 3 Outcome 2, learning should be consolidated by participation in production work. For example, by completing a production activity based on the preparation of a home-made pasta and Bolognese sauce, students can develop knowledge of the physical, chemical and sensory properties of the key foods cereals, meat and vegetables. This would also enable them to develop their knowledge of the functional properties of cereals and proteins as well as wet methods of cooking. The pasta and meat sauce could also be dehydrated enabling students to demonstrate skills in dehydration as a preservation method. Alternatively, the Bolognese sauce would be suitable to freeze.

In relation to Unit 3, Area of Study 3 'Developing a design plan' (Outcome 3) and Unit 4, Area of Study 1 'Implementing a design plan' (Outcome 1), teachers should be aware that students are required to design and produce a set of four to six food items (the product) in order to meet the requirements of these outcomes.

In Unit 4, Outcome 1 students are required to record photographic evidence of the four to six food items they have produced. While some students may elect to photograph the various stages in the production of their food items, this is not a requirement for the school-assessed task. However, students are required to analyse the sensory properties of each of the food items produced as a part of their evaluation process.

To ensure that Unit 4, Area of Study 2 'Food product development' is addressed in detail, it is suggested that this outcome be taught alongside the School-assessed Task during Term 3. Much of the key knowledge in this outcome links directly to the work students will undertake in their School-assessed Task, especially the process of food product development. Students should be able to make relevant connections between the two areas of study.

One of the important areas of key knowledge covered in this area of study is sustainability in primary food production. Students should develop an understanding of how sustainable agricultural and horticultural practices, including organic farming methods, can ensure the long-term viability of Australia's primary food production industry.

Current trends in the food industry, particularly those relating to functional foods and their claimed impact on health, is another key focus of this area of study. A wide range of new and emerging foods is now available in both urban and rural areas that are easily accessible, such as bread fortified with folic acid or Omega-3 fatty acids, yellow table spreads that contain plant sterols (claimed to assist in reducing cholesterol absorption) or orange juice enriched with iron. A variety of resources relating to functional foods are listed in the VCE Food and Technology Resources list on the VCAA website to assist teachers in developing appropriate learning activities for students. The journal *food Australia* <www.foodaust.com.au> frequently provides information on new and emerging foods including functional foods. An emerging technology associated with food product development is high pressure processing, a new method of cold-pasteurising food. In Australia it is used to produce mainly fruit juices and fruit purees.

A visit to a small or large-scale food production site would be a useful experience for students, but is not essential. There are many food production DVDs available to give students an understanding of processes, hygiene and safety issues associated with food production. The DVDs may be used as a substitute for plant visits.

As Unit 4 Outcome 2 covers a broad range of key knowledge and skills, teachers may wish to assess this outcome using two separate assessment task types.

GLOSSARY

For the purposes of this study design the following definitions will apply.

Term	Definition
Aseptic packaging	A process whereby the food product and the package are sterilised separately and brought together in a sterile environment.[1]
Coagulation	Permanent change in protein from a liquid into a thick mass as the result of heat or the addition of acids.
Complex processes	Refers to 'hands-on processes' that typically involve (a series of) decision-making that directly affects an outcome involving the selection of correct processes and their correct application.
Denaturation	Permanent structural change of the protein molecules in food. This can occur by application of heat, mechanical action or the addition of acids.
Dextrinisation	The process that occurs when starch is exposed to dry heat; the starch is broken down to dextrin resulting in a change in colour to golden brown.
Enzymes	Chemical substances that act as biological catalysts in plants, animals and microorganisms. They bring about and speed up chemical reactions in foods without becoming involved in the reaction.
Functional foods	Foods that provide health benefits beyond basic nutrition.[2] For example, by adding Omega-3 to a food that does not normally contain this nutrient or by decreasing the fat content of a traditional food, such as milk.
Functional properties	The physical and chemical properties of ingredients that impact on food preparation and processing. For example, a physical property of sugar is that it acts as a tenderising agent in cakes and muffins. An important physical property of starch is that it enables gelatinisation or thickening to occur when making a cheese sauce.

[1] Packaging Council of Australia.

[2] Adapted from University of Wollongong – School of Health Sciences.

Term	Definition
Gelatinisation	The process that occurs where starch granules absorb liquid in the presence of heat and thicken the liquid, forming a gel.
Genetic modification (GM)	A process that alters the genetic material of plants or animals by duplicating, removing or inserting one or more new genes to improve its characteristics. Genetic modification can take place within the same species or it can be transgenic.
Hazard Analysis and Critical Control Points (HACCP)	HACCP is a food safety system that identifies potential food hazards and their control points at all stages in the production of the food.
High pressure processing	A method of preserving food that involves subjecting food to intense pressures to kill microbes such as yeasts, moulds and bacteria while maintaining the fresh qualities of the food.
Line-extension	Variations on existing commercially available food products; a variation or an improvement, for example a new flavour.
Maillard reaction	The reaction that occurs when sugar or starch and a protein are present in a food and dry heat is applied, producing a golden brown colour.
Membrane technology	Involves using a porous membrane or filter to separate the particles in a fluid. Two of the most commonly used forms of membrane technology in food production are ultrafiltration and reverse osmosis.
Me-toos	A copy of an existing commercial food product created by a competing manufacturer.
Microencapsulation	The packaging of small particles of an active or a functional ingredient in a minute capsule. This process is used to mask the flavour of ingredients or to extend their shelf life within a food product. For example, the addition of Omega-3 to bread.
Modified Atmosphere Packaging (MAP)	A system of packaging that changes or modifies the atmosphere of gas inside a package (from air) in order to extend the shelf life of food.
Primary processing	Involves a range of processes to make food safe to eat so that it can be consumed individually or used in the manufacture of other food products. The physical form of the food changes very little.

Term	Definition
Qualitative testing of food	Sensory tests that are used to rate and/or rank the organoleptic or sensory properties of food; for example, flavour, texture, aroma and appearance.
Quantitative testing of food	Scientific techniques used to measure features such as size or height, weight, volume, texture, colour, viscosity, shelf life and nutrient content.
Secondary processing	Methods of turning primary processed food into other food products either on their own or mixed with other ingredients. The physical form of the original food can change quite significantly as a result of secondary processing.

SUITABLE RESOURCES

Courses must be developed within the framework of the study design: the areas of study, outcome statements, and key knowledge and key skills.

A list of suitable resources for this study has been compiled and is available via the Food and Technology study page on the Victorian Curriculum and Assessment Authority website: www.vcaa.vic.edu.au/vce/studies/index.html

VICTORIAN ESSENTIAL LEARNING STANDARDS (VELS)

The study of VCE Food and Technology builds on knowledge and skills developed in the domains of Design, Creativity and Technology, Health and Physical Education, Interpersonal Development, Communication, Thinking Processes and Personal Learning.

The key knowledge in VCE Food and Technology builds on the concepts in the Design, Creativity and Technology dimensions of Investigating and designing, Producing and Analysing and evaluating. Throughout all units of this study, students extend their knowledge and skills in using the design process to design, produce and evaluate food products. They undertake research to develop innovative and creative solutions to the problem, need or want outlined in a design brief. Production work involves students in using complex tools and equipment to safely and hygienically prepare and process quality food products. Students develop appropriate evaluation criteria and use them to assess all aspects of their work, including the success of the product to meet the specifications in the design brief.

Students further develop their understanding of the Health knowledge and promotion dimension of the Health and Physical Education domain through the investigation of the major nutrients present in key foods in Units 1 and 2 of Food and Technology. They also examine nutritional considerations important in planning meals and special nutritional requirements for those who have a food intolerance or food allergy in Unit 2. Students explore social and cultural factors that can influence the food Australians eat, and develop skills in improving the nutritional quality of meals by adjusting recipes to, for example, make them higher in fibre or lower in fat.

Students build on the skills and knowledge gained in the Working in teams dimension of Interpersonal Development through many of the learning activities they undertake in this study. In Unit 2 Outcome 2 of Food and Technology, students collaborate with other team members to research, plan, prepare and evaluate meals for specific design briefs. Through participation in a range of other production and learning activities, for example, the completion of practical tests, students are able to further develop their ability to contribute to team goals and work co-operatively by supporting each other.

The skills underpinning the Presenting dimension of the Communication domain enable students to develop their ability to present information clearly and confidently. Further development of these skills occurs throughout this study as students read and interpret information, including the ability to read instructions in a recipe or production plan. They also create documents using a range of presentation techniques such as annotated visual displays, multimedia presentations or online communication products. The ability to present ideas and arguments clearly and concisely is also enhanced when students undertake a media analysis, for example, of food safety issues in Unit 1 or 3.

The domain of Thinking Processes encourages students to reason, process information, develop their creativity and to reflect on and evaluate their ideas. When working through the design process in all units of Food and Technology students build on the thinking skills gained in earlier years. When developing solutions to complex design briefs, students use their problem-solving skills, analyse complex information, generate creative solutions to problems, and reflect on and refine their ideas.

Through the domain of Personal Learning, students work towards becoming positive, confident and successful learners. Throughout all units of Food and Technology, students build on these skills, particularly when they are engaged in designing and developing a solution in response to a design brief. As they complete design activities, students set goals and plan the use of resources including time management. Students also undertake multiple tasks within the one activity and evaluate and monitor their own performance, seeking feedback from others.

EMPLOYABILITY SKILLS

Units 1 to 4 of the VCE Food and Technology study provide students with the opportunity to engage in a range of learning activities. In addition to demonstrating their understanding and mastery of the content and skills specific to the study, students may also develop employability skills through their learning activities.

The nationally agreed employability skills* are: Communication; Planning and organising; Teamwork; Problem solving; Self-management; Initiative and enterprise; Technology; and Learning.

Each employability skill contains a number of facets that have a broad coverage of all employment contexts and are designed to describe all employees. The table below links those facets that may be understood and applied in a school or non-employment related setting, to the types of assessment commonly undertaken within the VCE study.

*The employability skills are derived from the Employability Skills Framework (*Employability Skills for the Future*, 2002), developed by the Australian Chamber of Commerce and Industry and the Business Council of Australia, and published by the (former) Commonwealth Department of Education, Science and Training.

Assessment task	Employability skills: selected facets
Annotated visual display	**Communication** (sharing information)
Case study	**Communication** (sharing information) **Planning and organising** (planning the use of resources including time management, collecting, analysing and organising information) **Technology** (using IT to organise data)
Designing and developing a solution in response to a design brief	**Team work** (working as an individual and as a member of a team; knowing how to define a role as part of the team) **Problem solving** (developing practical solutions) **Initiative and enterprise** (generating a range of options; initiating innovative solutions; being creative) **Planning and organising** (planning the use of resources including time management; collecting, analysing and organising information) **Self management** (evaluating and monitoring own performance) **Learning** (managing own learning) **Technology** (using IT to organise data)
Essay	**Communication** (writing to the needs of the audience) **Planning and organising** (collecting, analysing and organising information)
Media analysis	**Communication** (reading independently) **Problem solving** (testing assumptions taking the context of data and circumstances into account) **Planning and organising** (planning the use of resources including time management) **Technology** (using IT to present data)
Multimedia presentation	**Communication** (speaking clearly and directly; writing to the needs of the audience) **Planning and organising** (collecting, analysing and organising information) **Self management** (evaluating and monitoring own performance) **Technology** (having a range of basic IT skills; using IT to organise data; being willing to learn new IT skills)
Practical tests	**Team work** (working as an individual and as a member of a team; knowing how to define a role as part of the team) **Problem solving** (applying a range of strategies to solve problems) **Planning and organising** (planning the use of resources including time management)
Production activities	**Communication** (listening and understanding) **Team work** (working as an individual and as a member of a team) **Problem solving** (developing practical solutions) **Initiative and enterprise** (generating a range of options; initiating innovative solutions; being creative) **Planning and organising** (planning the use of resources including time management; managing time and priorities – setting timelines, coordinating tasks for self and with others) **Self management** (evaluating and monitoring own performance; seeking feedback) **Learning** (managing own learning)

Assessment task	Employability skills: selected facets
Report (oral/written/visual)	**Communication** (speaking clearly and directly; writing to the needs of the audience) **Planning and organising** (collecting, analysing and organising information) **Self management** (evaluating and monitoring own performance) **Technology** (using IT to organise data)
Structured questions	**Communication** (writing to the needs of the audience) **Problem solving** (applying a range of strategies to problem solving) **Planning and organising** (planning the use of resources including time management) **Self management** (evaluating and monitoring own performance)
Tests (short and/or extended answer)	**Problem solving** (developing practical solutions) **Planning and organising** (planning the use of resources including time management)

LEARNING ACTIVITIES

Examples of learning activities for each unit are provided in the following sections. Shaded examples are explained in detail in accompanying shaded boxes.

Unit 1: Food safety and properties of food

AREA OF STUDY 1: Keeping food safe

Outcome 1

Explain and apply safe and hygienic work practices when storing, preparing and processing food.

Examples of learning activities

analyse hygienic and safe work practices demonstrated in food programs on television

work in teams, using the Internet to research a recent newspaper article that highlights an incident of food poisoning in Australia and present the key findings to the class

produce a series of annotated photos or a video showing safe and unsafe work practices; annotate on an electronic interactive whiteboard

work in teams, using appropriate software to develop a series of posters or small instructional leaflets that identify potential hazards; include recommendations for safety procedures and hygienic practices for junior students using the kitchen in the Food and Technology centre

identify and explain the hygiene and safety risk points for food spoilage when transporting, storing, preparing and serving a key food; for example, meat/poultry or eggs; discuss strategies that will eliminate risks

store a selection of fresh foods in a range of ways for a period of time and observe the results; identify causes of food spoilage for each food; record optimal methods of storage

identify storage techniques that enhance the ripening process and improve the quality and sensory properties of foods such as unripe bananas, green mangoes, green tomatoes

access the food industry websites for one of the key foods, for example meat, eggs or fruit and vegetables such as Meat and Livestock Australia www.mla.com.au, the Australian Egg Industry www.eggs.org.au or Melbourne Markets www.marketfresh.com.au; identify recommendations for preparing and storing this food safely; assess the usefulness of this information for consumers and make recommendations for any improvements to the information provided

identify and discuss the advantages/disadvantages of different chopping surfaces in providing hygienic food preparation; develop recommendations for the most hygienic surface type for food preparation

complete a range of food preparation activities that incorporate the safe, hygienic and appropriate use of a variety of equipment

complete a practical activity such as the preparation of a coleslaw salad to evaluate the safety, effectiveness and efficiency of various cutting tools (vegetable knife, cook's knife, grater) and small electric appliances (food processor)

design a checklist for the production of a selected food product using key foods; the checklist must include the selection and safe use of appropriate tools and equipment, safe food storage and appropriate standards for cleaning; use a strategy or thinking skill such as 'Habits of Minds', www.habits-of-minds.net, to complete the task and analyse the practices; appropriate 'Habits of Mind' include persisting; applying past knowledge to new situations; thinking flexibly; striving for accuracy; creating, imagining, innovating; taking responsible risks

Detailed example

ANALYSE HYGIENE AND SAFETY RISK POINTS

Students are instructed to:

1. Undertake a web search for information on food hygiene and safe food handling of a key food; for example, meat/poultry, eggs or milk. A good starting point for research is the website of Food Safety Victoria at www.health.vic.gov.au/foodsafety. Use Australian websites to obtain data relevant to Australian conditions.
2. Prepare an oral report and an accompanying multimedia presentation using PowerPoint or an interactive whiteboard based on the following:
   - the causes of food spoilage in the key food identified
   - hygiene and safety risk points when transporting and storing the key food
   - safe food handling when preparing and serving the food
   - storage practices to maximise the quality of the food in its raw and cooked form.
3. Discuss strategies that will overcome the hygiene and safety risks identified.

AREA OF STUDY 2: Food properties and preparation

Outcome 2

Analyse the physical, sensory, chemical and functional properties of key foods, and select, prepare and process foods safely and hygienically to optimise these properties using the design process.

Examples of learning activities

use a teacher-initiated design brief that focuses on the use of a key food in the preparation of a main course dish; prepare a simple recipe that uses a key food as the main ingredient; complete the following components of the design process – development of criteria for evaluation, research, and evaluation; set up a tasting table to complete a sensory analysis of all the products produced by the class, encouraging use of appropriate terminology to describe the sensory properties

classify a range of food into different groups on the basis of their physical, sensory, chemical and functional properties; justify the decisions made about the groupings

select a key food and list the groups into which food is classified within this key food group; identify two examples of foods that fit into each classification; for each food identified, describe its structure and nutrient composition

use the Internet to research the origin, structure and nutrient composition of one key food

visit a local food produce market and examine and compare the quality considerations when selecting key foods

prepare a list of recommendations of quality considerations for key foods suitable for use by young adults living independently

use a nutrition panel calculator (see the FSANZ website) and work in small teams to identify the main nutrients present in one key food group and identify the importance of these nutrients for good health; present the information using presentation software

use a dietary analysis software program to compare the nutrient content of selected key foods

research websites of major breakfast cereal manufacturers or *Choice* to investigate the nutrient composition of packaged breakfast cereals

work in small teams to research information about fair trade; use a computer-based visualisation program to prepare a concept map of the main issues related to fair trade, both in developing countries and within the Australian farming and horticultural communities

use the Internet to research information about intensive farming practices used in the production of eggs, lamb or pork; prepare a PMI (positives, negatives, interesting) chart to present the information researched

work in small teams to prepare a recipe that highlights a functional property of a key food; present a short oral report, video or practical demonstration of the functional property to the class

research websites (such as the site of a major supermarket chain) to develop ideas about the range of products that can be made from one key food; prepare a set of recipe cards that include photos of the products

use the Internet to research recipes that include dairy foods, eggs or cereals as a significant ingredient and discuss their functional role in the recipe

use a teacher-initiated design brief that focuses on the use of the key foods – cereals and dairy foods – in the preparation of a biscuit recipe for a special occasion

complete a production activity involving aeration; complete an evaluation for the production, identifying a particular piece of equipment used and advantages/disadvantages of the equipment for completing the task; discuss possible alternatives

prepare a range of recipes over several practical sessions that demonstrate the functional properties of key foods such as denaturation and/or coagulation, aeration, Maillard reaction, dextrinisation and gelatinisation; photograph each product and annotate the photos to highlight the impact of these properties

prepare a product such as a lemon tart; analyse the effect of heat and moisture on the functional properties of starches and proteins, and their impact on the physical, sensory, chemical properties of the product; the analysis may be presented as an evaluative table

prepare a range of products that demonstrate the functional property of particular foods to aerate mixtures, for example egg white foam, creamed butter and sugar, yeast, use of chemical raising agents

use a MasterChef taste test to identify ingredients in a food item, for example a curry; describe the function of each ingredient

compare the physical, chemical and sensory properties of a range of vegetables before and after preparation and cooking

prepare one type of key food (for example, potatoes) using different food preparation methods for example, steaming, roasting, baking, frying and boiling to optimise the sensory properties

Detailed example 1

USING THE DESIGN PROCESS IN THE PREPARATION OF THE KEY FOODS – CEREALS AND DAIRY PRODUCTS

1. Provide students with a design brief that focuses on the use of the key foods – cereals and dairy foods – to prepare a biscuit recipe for a special occasion.

   Specifications in the design brief could include:
   - scenario, for example biscuits for a fund raising event such as the Cancer Council's Biggest Morning Tea
   - biscuits which include a filling or icing
   - importance of producing a high-quality product with an appealing aroma, appearance, colour, flavour and texture that consumers will want to buy.
2. Students should complete the following components of the design process:
   - development of criteria for evaluation based on the specifications in the design brief
   - research into the functional properties of each of the key ingredients used to prepare the biscuits
   - identification of how the functional properties of the key foods can optimise the finished biscuits, for example proportion of butter to enhance the eating and keeping qualities of the biscuits
   - production of the biscuits
   - sensory evaluation of the biscuits
   - evaluation of the biscuits according to the previously established criteria.

Detailed example 2

FUNCTIONAL PROPERTIES OF KEY FOODS – AERATION

Students work in small teams to complete the following task:

1. Brainstorm the physical and chemical properties of ingredients that are used to produce aeration, for example eggs, yeast, baking powder, creamed butter and sugar.
2. Investigate the range of equipment that could achieve a successful outcome in making a product that requires aeration.
3. Prepare a range of food products, for example meringues, Italian olive bread, Anzac biscuits and/or creamed patty cakes that use different ingredients and processes to produce aeration.
4. Describe the way in which the ingredient and process produce aeration in each product.
5. Describe the impact of aeration on the sensory properties of the finished product.
6. Present the results in a table format, including ingredients, process, environment necessary to achieve aeration using this technique, tools, impact on sensory properties.

Unit 2: Planning and preparation of food

AREA OF STUDY 1: Tools, equipment, preparation and processing

Outcome 1	***Examples of learning activities***
Use a range of tools and equipment to demonstrate skills and implement processes in the preparation, processing, cooking and presentation of key foods to maximise their properties.	develop an information table that identifies the most appropriate tools and equipment suitable for cutting and chopping, weighing and measuring, mixing and processing, and aerating
	annotate a recipe to highlight the major pieces of equipment used; explain why the equipment selected would be the most appropriate to use
	prepare a recipe such as French crepes using different types of equipment; for example, making a batter with an electric beater, a wooden spoon and a blender; prepare a brief report on the advantages and disadvantages of each type of equipment and analyse their impact on the outcome of the final product
	select a tool or piece of equipment that features a recent technological development; for example, the silicon glove, micro-plane grater, flexible silicon-based bakeware, magic-eye cookware, steamer oven, or induction cooktop; use information brochures or the manufacturer's website to identify the materials used and/or manufacturing processes and the advantage of this equipment in food preparation
	work in small teams to prepare a food item, for example cup cakes; bake half of the mixture in traditional cup cake tins and half in silicon bakeware; analyse the outcome of the production noting ease of use and impact on the final product of each type of bakeware
	select two appealing photographs and accompanying recipes from a food magazine; identify and discuss the sensory properties of colour, texture, shape and arrangement on the plate that optimise the presentation of the dish and encourage consumers to cook these recipes
	use computer-based visualisation software such as Inspiration or MindManager to prepare a knowledge map or mind map to provide a visual summary of methods of food preparation suitable for one type of each key food, for example vegetables – carrots: steamed, boiled, blanched, baked, microwaved, in combination with other ingredients
	work in small teams to research and prepare a key food using a variety of wet and dry techniques of cooking, for example poultry: grilled kebabs, baked drumsticks, stir-fried fillets, chicken curry
	prepare a meal that includes five different techniques of cooking, including two dry and two moist techniques and microwaving

Detailed example

RESEARCH AND PREPARE A KEY FOOD (MEAT – POULTRY) USING A VARIETY OF WET AND DRY TECHNIQUES OF COOKING

Students work in small teams to complete the following task:

1. Prepare a knowledge map or mind map using computer-based visualisation software such as Inspiration or MindManager, of wet and dry techniques of cooking suitable for one key food, for example poultry.
2. Access the website of a major poultry manufacturer and identify and list the variety of cuts of poultry available to consumers and any special tips for cooking each type of cut.
3. Refer to the mind map and the web research, and identify the most appropriate technique of cooking each of the poultry cuts listed.
4. Use current food magazines to research recipes which use the poultry cuts and techniques of cooking identified.
5. Select four of the recipes that use different preparation and cooking techniques for poultry and prepare the recipes; for example, grilled chicken kebabs using chicken fillets or thigh fillets, baked drumsticks, Asian stir-fried chicken fillets, chicken curry using thigh fillets.
6. Prepare an evaluation of each of the recipes produced, noting the appropriateness of the cooking technique for the selected poultry cut and its impact on the nutrient content, appearance, aroma, flavour.

AREA OF STUDY 2: Planning and preparing meals

Outcome 2

Individually and as a member of a team, use the design process to plan, safely and hygienically prepare and evaluate meals for a range of contexts.

Examples of learning activities

use a design brief that focuses on a main meal; work in small teams to develop criteria suitable to evaluate the meal

use computer-based visualisation software to prepare a flow chart of the design process; annotate each stage of the design process to note the key activities and resources needed for each stage

use a design brief that focuses on the production of reduced fat or high fibre snack foods; highlight and annotate the brief to identify the considerations and constraints for planning

select a nutritional requirement such as reduced fat or high fibre and visit a supermarket to compile a list of foods that meet this nutritional concern; focus on a range of products in this category, the price of products compared with traditional products and the claimed health benefits to consumers

select and annotate a recipe to modify the ingredients and food preparation techniques to enhance the nutrient value of the meal; prepare the new recipe and evaluate the nutritional and sensory properties of the finished product

in small teams, use computer-based visualisation software such as Inspiration or MindManager to brainstorm planning considerations that a selected fast food outlet would consider when planning their menu for children and/or adolescents

use the Internet to research associations established to assist people living with food intolerances such as coeliac disease or lactose intolerance; investigate the food requirements for people living with these conditions

work in small teams to research food allergies; focus on defining the term 'food allergy', list foods that are likely to cause an allergy and recipes for a meal suitable for someone with a food allergy; present the information as a podcast or visual summary

prepare a Venn diagram to demonstrate the similarities and differences between food intolerances and food allergies

examine the website of a major fast food chain and assess the nutrition information provided to consumers and its suitability for children and/or adolescents; prepare a summary of your findings to contribute to a nutrition blog

use the design process to design, prepare and evaluate a meal that incorporates a particular cultural food style; for example, a meal to celebrate Chinese New Year or a Greek Easter lunch

work as a member of a team to design and prepare a range of drinks suitable to serve as part of a healthy breakfast or brunch for children and/or adolescents

work with a local primary school to prepare a recipe book suitable for primary-aged students; demonstrate some of the recipes for the students

use the design process to plan, prepare and evaluate a food item for a specific purpose; for example, a school fund-raising event for a local charity

develop and implement the specifications of a design brief based on producing a healthy lunch for children or adolescents to be included in an online publication

use the Internet to investigate the food requirements for people who choose a vegetarian diet; identify the foods necessary to provide a balanced diet for vegetarians

use current food magazines to research and select a recipe for a main course dish suitable for vegetarians; prepare the recipe; evaluate the physical, sensory and nutritional properties of the recipe and its suitability for someone choosing a vegetarian diet

use the Internet to research indigenous ingredients suitable for flavouring a simple recipe such as a pizza, oven-baked potato wedges or biscuits; prepare the recipe using the selected indigenous ingredients; complete a sensory evaluation of the product

work in small teams to prepare a quick and easy meal using five major ingredients and limited equipment and time

set up a class blog to develop and share strategies for minimising food waste at school

use visualisation software and work in small teams to prepare a SWOT analysis (strengths, weaknesses, opportunities, threats) of the concept of 'food miles'

write a short article to post on a blog for one of the local fresh food farmers' markets, highlighting the advantages to consumers of using seasonally available ingredients

Detailed example 1

ENHANCING THE NUTRIENT VALUE OF A HOME-PREPARED MEAL

Students work in small teams to complete the following task:

1. Use a variety of current food magazines to research a main course dish suitable for a home-prepared meal. Appropriate current food magazines are listed in the Resources section on the VCAA website.
2. Select a suitable recipe for a main course dish and annotate the recipe identifying ingredients that could be substituted; for example, to make the meal suitable for a family member wishing to reduce the consumption of fat in their diet OR someone wishing to increase their consumption of dietary fibre.
3. Research ingredients that could be substituted for ingredients identified in the recipe to reduce the level of fat or increase the fibre content.
4. Establish a set of criteria to be used as the basis for evaluating the new recipe, for example flavour, texture, aroma, visual appeal, nutrient content of the meal, efficiency of food preparation and processing techniques, and suitability for the consumer.
5. Prepare a production plan for the main course dish, identifying how food preparation techniques could be altered to improve the nutrient content of the meal.
6. Prepare the main course dish using the alternative ingredients, food preparation and processing techniques.
7. Evaluate the meal using the previously established criteria.

Detailed example 2

DESIGNING, PRODUCING AND EVALUATING A LUNCH DISH FOR ADOLESCENTS

1. As a class, students are instructed to develop a design brief that focuses on designing and producing a noodle or pasta dish suitable for lunch.

   Specifications in the design brief could include:

   - consumers, for example adolescents
   - importance of including a range of fresh vegetables and a source of protein in the lunch dish
   - suitability of the dish to reheat in a microwave oven in the school cafeteria or the Food and Technology centre
   - preparation of the recipe for the noodle or pasta dish so that it can be included as part of an online publication for a new healthy eating program at the school.
2. Students should complete the following components of the design process:
   - develop criteria for evaluation based on the specifications in the design brief
   - research recipes in current food magazines
   - research a variety of seasonal vegetables and sources of protein
   - prepare a production plan including safety and hygiene practices to be followed
   - produce the noodle or pasta dish
   - conduct a sensory evaluation of the noodle or pasta dish
   - evaluate the dish using the previously established criteria
   - evaluate the production processes.

Unit 3: Food preparation, processing and food controls

AREA OF STUDY 1: Maintaining food safety in Australia

Outcome 1	***Examples of learning activities***
Explain the roles and responsibilities of and the relationship between national, state and local authorities in ensuring and maintaining food safety within Australia.	research the likely causes of food spoilage and food poisoning and summarise the information in a chart use a visualisation software program to prepare a Venn diagram of the similarities and differences between food spoilage and food poisoning view a DVD or vodcast on food processing and identify areas where hygienic and safe food practices are critical in the production of a particular food; prepare a mind map or knowledge map of the key information prepare a recipe and identify the safety and hygiene practices necessary to prevent food spoilage and food poisoning invite a member of the class who is employed in the food service industry to outline the safety and hygiene procedures they follow in their workplace; as a group, brainstorm the reasons for these procedures access the website of the national food authority and identify the roles and responsibilities of FSANZ and AQIS; use a visualisation software program to prepare a flow chart summarising the roles and responsibilities of both authorities using presentation software, prepare a presentation for a small business seminar that outlines the requirements for developing and implementing a food safety plan when establishing a small catering business invite a guest speaker such as the environmental health officer of the local government authority to explain the role of local authorities in monitoring a safe food supply analyse a recent newspaper article about a food poisoning incident related to unhygienic food practices at a particular premises; identify the causes of the food poisoning incident; outline the roles and responsibilities of the federal, state and local authorities and their response to unsafe and/or unhygienic food production premises prepare an organisational chart to demonstrate the roles and responsibilities of and the relationship between the federal, state and local authorities if action is taken to recall a food product access the FSANZ website and research the information manufacturers are required to include in a food recall notice; download a recent food recall notice; use text boxes to annotate the notice to identify each of the FSANZ requirements access the website of the national food authority and research the purpose of the Food Standards Code and its role in ensuring a safe food supply; prepare a mind map to summarise the findings of the research access the website of FSANZ; research information about nutrition content claims and health claims; prepare a Venn diagram to identify the similarities and differences between nutrition content claims and health claims

visit the FSANZ website and research the definition of 'health claims'; in small teams, brainstorm why nutrition content claims are allowed on a food label, but there are restrictions on high level health claims

scan a variety of food product labels; using text boxes, annotate the labels to identify and justify the information required on the food labels under the Food Standards Code

view an audio visual program on the role of HACCP in the food industry; prepare a list of key points to post on a food safety blog

work in small teams to prepare a flow chart of the HACCP system that a restaurant would require to prepare a recipe such as fried rice; annotate the flow chart to identify the critical control points and possible corrective actions

Detailed example

FOOD SAFETY IN A SMALL CATERING BUSINESS

Students work in teams to prepare a data presentation for a small business seminar that outlines the food safety requirements for establishing a small catering company.

The websites for Food Safety Victoria or Food Smart may be good starting points for research:
www.health.vic.gov.au/foodsafety/
www.foodsmart.vic.gov.au

The data presentation should summarise the following information:

1. The role of the state authorities in the establishment of a food business.
2. The key responsibilities of local authorities in establishing a new food business.
3. The requirements for running a food business safely, for example:
   - preparing a food safety program
   - staff training
   - personal hygiene for food handlers
   - high-risk foods and how to store and prepare them safely
   - how to check for quality when selecting food
   - labelling of food products for sale
   - recall of food products.

   Each group prepares an oral report supporting the data presentation, to be shared with the class.

AREA OF STUDY 2: Food preparation and processing

Outcome 2	***Examples of learning activities***
Analyse preparation, processing and preservation techniques for key foods, and prepare foods safely and hygienically using these techniques.	view an audio visual program on the primary and secondary processing of one of the key foods such as vegetables or dairy foods; develop a flow chart of the major stages in primary and secondary processing of the key food; identify the preservation techniques used in the secondary processing of the food
	work in small teams to research and prepare a summary table of the natural components present in key foods and their function in recipes, for example cereals – starch, fibre, gluten
	select a key food, for example vegetables (potatoes), and analyse the physical, chemical and sensory properties of the key food
	use computer-based visualisation software such as Inspiration or MindManager to prepare a knowledge map or mind map to provide a visual summary of the functions of natural food components, for example protein – coagulation, denaturation, aeration, emulsification
	prepare a cereal-based product, for example focaccia bread, and analyse the function of the natural components of the key foods used in the recipe; describe the food processing and preparation techniques undertaken; justify the cooking technique used
	use current food magazines to identify cooking techniques used to prepare each of the key foods
	work in small teams to prepare a key food using a variety of cooking techniques, for example meat (minced beef) – baked meat balls, grilled koftas, fried mini hamburgers, dumpling soup; evaluate the impact of the cooking technique on the physical, chemical and sensory properties of the minced beef
	in small groups, brainstorm popular processed foods and the methods used to preserve them to prevent deterioration
	select a fruit, for example apples or strawberries, and preserve it using a variety of food preservation techniques; make observations and record the results of each preservation technique on the physical and sensory properties of the fruit

Detailed example 1

THE FUNCTIONS OF NATURAL FOOD COMPONENTS IN A CEREAL-BASED PRODUCT

Students are instructed to do the following:

1. Select a recipe for a cereal-based product, for example focaccia bread.
2. Use current texts or complete a web-based search to identify the natural components of cereals.
3. Analyse the function of the natural components of flour (starch and gluten), yeast, sugar, salt, oil and water in the recipe.
4. Describe and explain the main processing techniques used to prepare the focaccia, for example activating the yeast, kneading and proving of the dough, baking the bread.
5. Prepare an individual production plan for the recipe, and identify the main hygiene and safety issues involved in using the ingredients and equipment required to produce the recipe.
6. Prepare the selected recipe, noting the changes to the properties of the dough during the production process.
7. Bake the focaccia bread according to the production plan. Discuss the changes that occur to the dough during baking, for example dextrinisation, Maillard reactions, oven spring, and structure formation.

Detailed example 2

PRESERVING FRUIT USING A VARIETY OF FOOD PRESERVATION TECHNIQUES

Students are instructed to do the following:

1. Select a fruit such as apples or strawberries and preserve the fruit using a variety of techniques, for example:
   - apples – use of sugars (apple and mint jelly), use of acids (apple chutney), dehydration (apple rings), heat processing (bottling apple sauce using a home-preserving unit or microwave oven)
   - strawberries – freezing (strawberry sorbet), dehydration (strawberry roll-up), use of sugars (strawberry jam).
2. Use current textbooks, recipe books, food magazines or complete a web-based search to identify:
   - three appropriate techniques for preserving the selected fruit and how each technique will preserve the fruit and prevent deterioration
   - a recipe suitable for preserving the fruit using each of the identified preservation techniques
   - the functional properties of the main ingredients in the selected recipes
   - the key steps in the complex process/es in each recipe
   - specialist tools and equipment required to prepare each of the selected recipes
   - food safety and hygiene requirements necessary to produce each recipe.
3. Prepare a summary table of the main findings of the research.
4. Prepare the selected recipes.
5. Undertake an analysis of the sensory properties of each of the preserved food items using qualitative methods.

AREA OF STUDY 3: Developing a design plan

Outcome 3	***Examples of learning activities***
Develop a design brief, evaluation criteria and a design plan for the development of a food product.	brainstorm scenarios on which a design brief could be based for a set of food items
	use a teacher-developed or an existing design brief to identify considerations and constraints in the brief; annotate the brief to identify the specifications and develop appropriate criteria to evaluate the final product; brainstorm a set of food items that would meet the requirements of the brief
	review approaches to developing a design plan using the work of previous students, including those represented in the Top Designs exhibition
	use a teacher-developed design brief to work in small teams to brainstorm ideas for a set of food items (the product) that would satisfy the specifications in the brief; research information about the properties of the main ingredients and processes
	select a recipe and develop relevant notes on preparing the food item, including a discussion of the functional properties of the key ingredients, complex processes used in the production of the food item, and the tools and equipment used in its production
	in small teams, select a range of recipes from current magazines; use computer-based visualisation software such as Inspiration or MindManager to brainstorm the functional ingredients, major processes and appropriate equipment used in the production of the recipe
	develop a design brief to develop food to meet the specific needs of consumers; use a range of current magazines or recipe books to prepare a menu appropriate to the brief
	research a recipe for four different sweet or savoury preserves; use computer-based visualisation software such as Inspiration or MindManager or prepare a podcast to present a visual summary of the advantages and disadvantages of each of the preserves; select the preserve you prefer and justify your decision based on the summary information you have prepared
	prepare a Gantt chart to show the activities, their order and time allocations required to produce the set of food items (the product)

Detailed example

FOOD TO MEET NEEDS OF SPECIFIC CONSUMERS

Students are instructed to develop a design brief that focuses on meeting the needs of specific consumers such as party food for pre-school children using only fresh ingredients.

Students will:

- Develop a range of criteria for evaluation based on the specifications in the design brief.
- Use a range of current magazines or recipe books to prepare a menu appropriate to the brief.

In addition, students will:

- Justify the choices made.
- Select one of the recipes for the menu and identify the functional properties of the main ingredients, complex processes and major equipment required to produce the recipe.
- Prepare the selected recipe and evaluate the food item using the previously established criteria.

Unit 4: Food product development and emerging trends

AREA OF STUDY 1: Implementing a design plan

Outcome 1	***Examples of learning activities***
Safely and hygienically implement the production plans for a set of four to six food items that comprise the product, evaluate the sensory properties of the food items, evaluate the product using the evaluation criteria, and evaluate the efficiency and effectiveness of production activities.	select a recipe that incorporates a complex process, for example, a savoury preserve; prepare a production plan for the recipe including an explanation of the stages in the complex process, decisions required, equipment required and safety and hygiene practices to be followed use a variety of food production activities including a range of preservation techniques such as jam-making, dehydration or freezing brainstorm examples of ongoing evaluation and decision-making that takes place as students undertake production activities, for example judging when the custard base for ice-cream has reached the optimum consistency review approaches to recording information about decisions and modifications made during production activities, for example as annotations on individual production plans or a photostory to document processes completed and features of food items produced analyse the risks associated with storage of foods for the set of four to six food items prior to and after applying food preparation, processing and/or preservation techniques contribute to a class blog on tips for taking food photographs select and prepare an Asian stir-fry and undertake a sensory analysis of the finished product using qualitative analysis use complex processes to prepare a recipe such as a chocolate cake; undertake a sensory evaluation of the outcome of the production using qualitative methods students plan for the preparation of a food item using complex processes such as making pastry for a tart or quiche; prepare a production plan for the food item; prepare the food and evaluate its sensory properties; evaluate the effectiveness of the planning, safety and hygiene practices, and the efficiency of the production activities

Detailed example

PREPARING A PRODUCTION PLAN AND EVALUATING AN INDIVIDUAL FOOD ITEM

Students are instructed to plan for the preparation of a food item using complex processes such as making pastry to be used as the base for a savoury quiche or sweet tart.

They are given the following directions:

1. Prepare a production plan for the food item which identifies and explains the ingredients required; the sequence of steps and food preparation techniques used in the production of the food item; for example, rubbing-in, kneading, rolling, lining of the flan tin, blind baking, filling and baking of quiche or tart; important safety and hygiene requirements.
2. Outline the way the food item will be presented to maximise its qualities.
3. Prepare the food item using the previously developed production plan.
4. Analyse the sensory properties of the completed food item using qualitative methods and tabulate the results.
5. Evaluate the effectiveness of the planning, safety and hygiene practices and the efficiency of the production activities.

AREA OF STUDY 2: Food product development

Outcome 2	***Examples of learning activities***
Analyse driving forces related to food product development, analyse new and emerging food products, and explain processes involved in the development and marketing of food products.	view a current television program that focuses on an environmental issue in food production; discuss the key factors in food production that have led to the environmental concern highlighted in the program; identify sustainable farming practices that could help to address the issues of concern visit the website of the Australian Conservation Foundation, Greenpeace or CSIRO and select an example of an environmental issue related to primary food production and evaluate its impact access the website of Biological Farmers of Australia or TMOrganics; draw up a PMI (positives, negatives, interesting) chart of information on the value of adopting organic farming methods to the environment, to the farmer and/or to consumers work in small teams and select a new food product; brainstorm the reasons for the development of the product selected, including any social or consumer demand; prepare a summary and present the findings to the class as an oral report or a visual display work in small teams to prepare an electronic flow chart of the key stages in the process of product development of a breakfast bar view a video or vodcast on the development of a food product, for example high fibre bread or margarine; use a software program such as Inspiration to develop a flow chart of the key stages in product development use a range of quantitative and qualitative measures to evaluate the physical and sensory properties of two brands of similar products such as two types of bread, one traditional bread and one with added Omega-3

access the website of a major food retailer, review a series of television advertisements or research using current food magazines to identify the different types of food product development

visit a local supermarket and identify new products which have emerged in the market place in the previous year; develop a summary chart including the name of the new food product, the functional ingredient used in its production or the development in technology that has led to its development and the claimed nutritional or health benefit of the product

undertake a sensory analysis of examples of functional foods, for example margarine that may assist in reducing cholesterol absorption or bread enhanced with Omega-3 fatty acids, and compare with the traditional product

view a video or vodcast on foods suitable for people with a food sensitivity; identify the reasons for the development of the product and the process of product development

visit the website of a food manufacturer of gluten-free or lactose-free food; identify the range of new and emerging products available to meet the dietary needs of people living with a food intolerance

use Internet research and prepare a short tutorial for other class members on the features of a new technological development in food manufacturing, for example high pressure processing

select an example of a new and emerging technology such as microencapsulation or membrane technology; search the Internet for information on the selected technology; prepare a mind map or knowledge map of the results of the research including an explanation of the technology, types of products produced using the technology, any advantages or disadvantages in the use of the technology

visit the website of FSANZ or the Better Health Channel to research information about genetically modified foods; work in small teams to prepare a concept map or mind map of the main issues linked to genetic modification of food including: examples of crops that have been genetically modified, perceived benefits and risks of genetic modification, food labelling requirements for GM foods

work in small teams to investigate food products available as a result of genetic modification; prepare a summary table of the findings

prepare a 'showcase' of various types of food packaging; identify the purpose of each packaging type, for example safety, preservation, containment, transportation

research Aseptic packaging and Modified Atmosphere Packaging (MAP) systems; identify the key features used in the production of each type of system that enables them to protect and preserve food

assess the packaging systems used to package a particular food, for example fresh pasta; identify the type of packaging system used, the advantages and disadvantages of the packaging system, and identify the technique used to detect evidence of tampering

visit a supermarket and identify a range of foods packaged using aseptic and MAP packaging; select two examples of each type of packaging system and list the benefits to consumers

work in small teams to research strategies Australian food manufacturing companies are using to address environmental issues in food manufacture such as reducing water consumption, energy use and minimising waste sent to landfill; use visualisation software to prepare a short summary of the findings

view an audio visual program that focuses on environmental issues associated with food packaging; prepare a concept map or visual summary of the concerns and how they can be addressed

obtain a copy of the local government information booklet on waste disposal or undertake an excursion to a local council recycling depot; identify the food packaging materials suitable for recycling and assess whether recycling programs are effective in reducing landfill

visit the website of an Australian food manufacturer or research the 'What's new' section of current food magazines and select one of the latest food products available to consumers; develop a list of the key features of the product which could be used as a part of the marketing campaign

develop a concept map using visualisation software such as Inspiration to identify factors used by a food manufacturer in designing and marketing one of their food products

review a range of television and print commercials; identify the target market for each food product and evaluate the strategies used to promote the product

work in small teams to select a new food product; identify the target market and suggest appropriate marketing strategies for the product; provide reasons for the strategies suggested

work in small teams to develop a promotional strategy for a primary producer to promote a key food, for example a fruit or vegetable

access the website of *Choice* or *Parents Jury* and *Australian Food and Grocery Council* (AFGC); research the concerns consumer groups and parents have about food marketing to children and the response from the AFGC; use research to prepare a short article for a blog on the ethical marketing of food products to children

Detailed example

INVESTIGATING GENETIC MODIFICATION

Students are instructed to work in small teams to investigate food products available to consumers as a result of genetic modification.

They are given the following directions:

1. Complete a web search to identify relevant sites for the collection of information. A starting point for this research is the CSIRO website www.csiro.au that includes information on genetic modification.
2. Review the selected sites for validity: the source of the information, author of the article, date of publication, relevant links from the article, for example, to government departments.
3. Briefly explain the major steps involved in producing food products using genetic modification.
4. Prepare a summary table of the main findings of the research, including:
   - a list of food products available as a result of genetic modification
   - the main features of the food products developed using genetic modification
   - the main advantages to consumers and producers of each food product
   - the main disadvantages to consumers and producers of each food product.
5. Draw a conclusion based on the key findings of the research and respond to the following questions: Will products available to consumers as a result of genetic modification provide significant benefits or create major concerns? What are the long-term benefits to food producers? What, if any, are the main disadvantages of genetic modification to food producers?

SCHOOL-ASSESSED COURSEWORK

In Units 3 and 4 teachers must select appropriate tasks from the assessment table provided for each unit. Advice on the assessment tasks and performance descriptors to assist teachers in designing and marking assessment tasks will be published online by the Victorian Curriculum and Assessment Authority in an assessment handbook. The following is an example of a teacher's assessment program using a selection of the tasks from the Units 3 and 4 assessment tables.

Outcomes	Marks allocated	Assessment tasks
Unit 3 **Outcome 1** Explain the roles and responsibilities of and the relationship between national, state and local authorities in ensuring and maintaining food safety within Australia.	20	A multimedia presentation on the food safety requirements for establishing a small food company, including the roles and responsibilities of and the relationship between national, state and local authorities in Australia. The presentation will cover safety and hygiene practices in food preparation to prevent food spoilage and food poisoning; and the HACCP system and food labelling requirements of which the small food company will need to be aware.
Outcome 2 Analyse preparation, processing and preservation techniques for key foods, and prepare foods safely and hygienically using these techniques.	40	Two production activities which require the preparation of recipes that incorporate the use of complex processes and at least three key foods. One of the food items will be a preserve. A written report that analyses the function of the ingredients in the recipes selected and the effect of processing and preparation techniques on the properties of these foods.
Total marks for Unit 3	**60**	
Unit 4 **Outcome 2** Analyse driving forces related to food product development, analyse new and emerging food products, and explain processes involved in the development and marketing of food products.	40	**Task 1:** A short-answer test comprising a set of questions on sustainability in primary food production, driving forces related to food product development, the processes involved in the development of food products, associated environmental issues, purposes of packaging and description of packaging systems. **Task 2:** A report on a new and emerging food including an explanation of the technological developments that have led to its production. It will include images and text to describe the products available to consumers as a result of one of the innovations/emerging technologies, and evaluate strategies used to market these products.
Total marks for Unit 4	**40**	