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FOOD FOR YOU

Third Edition

MIDDLE SECONDARY

2 BOOK

Sally Lasslett and Chrissy Collins

Consultant: Andrew McVittie

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Please be aware that this publication may contain images of Aboriginal and Torres Strait Islander people now deceased. Several variations of Aboriginal and Torres Strait Islander terms and spellings may also appear; no disrespect is intended. Please note that the terms 'Indigenous Australians' and 'Aboriginal and Torres Strait Islander peoples' may be used interchangeably in this publication.

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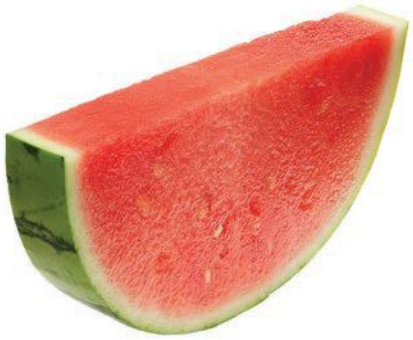

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Foreword

Achieving a healthy lifestyle through a balance of work, exercise and nutritious meals continues to grow as a priority for millions of Australians. Finding that balance can be difficult for home cooks, as they seek to produce healthy, nutritious meals that not only look appetising, but also taste great and meet the specific dietary needs of everyone in the home. There continues to be a need to assist families in making educated choices about food and health, and how to best manage these in our increasingly busy lives.

Australia, as a multi-cultural society, has access to cuisines from all over the world. Being one of the world's most fertile and wide-ranging producers of fresh food products also allows us access to high-quality produce year round – a luxury many other countries do not have. Australian farmers and producers are, out of necessity, becoming innovative in what they grow, as nutrition and diet become increasingly important issues in our lives.

The popularity of reality TV cooking shows, as well as the celebrity status of local and international chefs show us that anyone with the desire and the determination can become more than 'just a home cook' (a role that is still very undervalued). It also provides an opportunity for teachers and students to be better equipped to replicate and/or improve on foods they see in the media.

This highly visual and engaging textbook provides information to help you make informed food choices for improved health and well-being. This is particularly important given the high levels of obesity in young people and the dramatic rise in juvenile diabetes across Australia. As fast food outlets expand their reach it's important to have a broad understanding of nutrition and which foods are more beneficial than others. Many schools are looking to provide the knowledge for families to create their own food-producing gardens and these texts assist students in becoming teachers themselves, to guide their families to better life choices.

The Australian Curriculum, Assessment and Reporting Authority (ACARA) has allocated Food and Nutrition into the Health & Physical Education subject area and Food Design into the Technology area, but both remain vital subjects for Home Economics teaching and learning. Home Economics should have a place in every secondary high school and college as the subject matters covered are fundamental life skills for all students.

The authors of this revised edition of *Food for You* have sought to present a comprehensive range of informative chapters, covering the required areas of the impending new curriculum. As you progress through the textbook, you will learn the basics of all the food groups and interesting activities and research tasks will improve your knowledge and skill. The chapters include references to online resources, fascinating facts and figures, high-quality photos and graphs, a comprehensive glossary, as well as many primary and secondary sources. The included Interactive Textbook includes videos and multimedia resources to enhance learning.

The authors are sure that you will find this textbook not only useful in your studies, but relevant to your own life. Food can be one of life's greatest pleasures, particularly when enhanced by the knowledge that you have made food choices that positively impact you and your family's health.

Andrew McVittie

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About the authors

Sally Lasslett

Sally has been teaching Food and Technology and Health and Human Development for over 20 years. She is currently the Principal at Wallan Secondary College and is an active Home Economics professional with a passion for the VCE and VCAL curriculum. Sally has coordinated a Food and Technology online network, regularly presents professional development, has been an exam marker and SAT reviewer, and has also been on the Selection Panel for Top SATs. Sally continues to co-author a number of Food Technology, Health and VCE Health and Human Development textbooks and revision texts.

Chrissy Collins

Chrissy is a passionate Home Economics and Health teacher. She has written and presented numerous professional development sessions, both locally and internationally, in Home Economics and Health, with a focus on Home Economics education, e-learning, and student motivation and engagement. An experienced exam marker and SAT reviewer, she has also co-authored Food, Health and VCE Health and Human Development textbooks, and had a student in Top Designs. Chrissy enjoys teaching with both junior and senior students, inspiring their love of food, health and wellbeing, ensuring students flourish and thrive.

Consultant: Andrew McVittie

Andrew has been a Home Economics/Hospitality teacher for 13 years at Caloundra Christian College in Queensland, having left a 22-year career in the hospitality industry to pursue a lifelong desire to be a teacher. As well as coordinating a number of subject areas within the college, he has been involved in committee activities interstate through Home Economics Victoria, and currently internationally as an executive member for the Pacific region of the International Federation of Home Economics. Andrew's vision for the future is to encourage more male students into Home Economics, both at secondary and tertiary levels. He hopes that he is able to facilitate this through his own role modelling and mentoring of young up and coming male Home Economics teachers, both in Australia and overseas.

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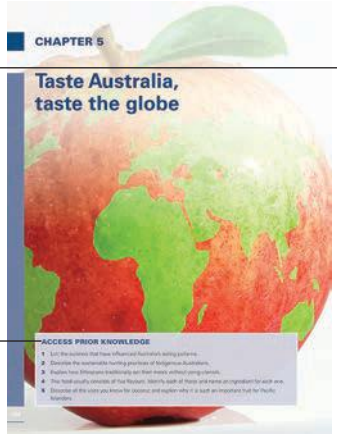
How to use this resource

Let's collaborate tasks encourage collaboration between students, while also deepening knowledge and understanding.



Access prior knowledge at the start of each chapter focuses your attention on the topic being studied.

Glossary terms are bolded in the text, defined in the margins and collated at the end of the textbook for easy reference.

Tasty trivia boxes highlight interesting information to enrich your learning.

A variety of **Activities** and **Investigate IT** tasks explore key concepts, develop skills and link back to the general learning capabilities and cross-curriculum priorities.

Design thinking and **Create a solution** features encourage the use of the design process and allow students to explore ideas and solve problems while producing design solutions.

Information and activities on food production help you make **ethical and sustainable food** choices.

Reflect on learning activities finish each topic to consolidate learning throughout the chapter.

Looking back chapter summaries review the main ideas of the topic to reflect and consolidate on what you have learned.

Test your knowledge questions at the end of the chapter reinforce key concepts and the application of skills.

Flags on recipes show the country of origin (where it can be determined).

Carefully timed **recipes** include step-by-step methods and recognisable ingredient images. Each recipe identifies production skills, cooking processes and the main tools and equipment needed. In most cases, you are also asked to evaluate your understanding and skills.

Also available:

- A downloadable PDF Textbook is available with note-taking and search functions, downloadable worksheets and end-of-chapter content.
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Getting started

The design process

design An activity that translates an idea into something useful, making it better and improving quality of life; it fulfils a need.

design process A process that typically involves investigating, generating, producing, evaluating, planning and managing to create a designed solution that considers social, cultural and environmental factors.

designed solutions The products, services or environments that have been created for a specific purpose or intention as a result of design thinking, design processes and production processes.

Design is a part of everyday life and is primarily about problem solving. Small items, such as the shoes you wear, or much larger items, such as your school building, have all gone through a **design process**. What we grow, eat, make, wear or build, our health and safety, how we travel and how we spend our spare time are all related to design.

What does this have to do with food? Every day, food presents people with the chance to create **designed solutions** through problem solving and decision making.

The process of planning and preparing a meal or snack is no different from the process through which other designers go. The problem of what to eat, the options available and the solution you find are all part of working through the design process in order to find design solutions.

Figure 0.1 This dish is the design solution to a brief that asked for a healthy, tasty, colourful summer dish.

The chapters that follow will build your knowledge to enable you to make decisions about food options. Knowledge of food, equipment and processes is critical in the design process so you can develop a quality final **product** solution.

product One of the outputs of the design and production processes. Products are the tangible end results of natural, human, mechanical, manufacturing, electronic or digital processes to meet a need or want.

0.1 LET'S COLLABORATE

1. As a class, develop a list of food products you have eaten in the last two days. Suggest any problems or challenges you think may have resulted in the development of these products.
2. With the person next to you, explain the problem and the process that you followed when you made your breakfast and lunch today.

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The stages of the design process

In order to ensure a successful design, it is necessary to follow basic steps and adequately complete each stage.

Figure 0.2 Stages of the design process

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Identifying a need or opportunity

The design process starts from a need or opportunity.

In food preparation, new problems or scenarios arise all the time. What will I have for lunch? This fried rice needs to be made for a vegan. I have sport in an hour, but I need to have a quick meal first. This savoury muffin would taste better if it had some fresh herbs in it. In **design thinking**, these problems are written as a **design brief**.

design thinking Use of strategies for understanding design problems and opportunities, visualising and generating creative and innovative ideas, and analysing and evaluating those ideas that best meet the criteria for success and planning.

design brief A concise statement clarifying the project task and defining the need or opportunity to be resolved after some analysis, investigation and research. It usually identifies the users, criteria for success, constraints, available resources and timeframe for the project, and may include possible consequences and impacts.

In responding to each of these problems, you are actively identifying needs, wants, opportunities and areas that can be changed or improved, simultaneously with considering any restrictions or guidelines that may have been provided.

The design brief

The design brief provides the designer with a range of factors that must be considered when thinking of possible solutions to the problem – for example, who is it for (intended audience)? How is it to be used? What food is available? Are there any time or equipment considerations? A design brief never contains the solution to the problem – it simply sets out the problem, need or opportunity waiting to be solved.

'I have a problem. I need to make a quick breakfast to share with friends.'

'**W**hy do you need the meal?'

'**W**ho is it for and how many people will there be?'

'**W**here will the meal occur?'

'**W**hen will the meal occur?'

'**W**hat does it need to include?'

Figure 0.3 Design briefs often include information about the 'five W' questions.

For each problem, barriers will exist that limit possible solutions. For example, 'What will I have for lunch?' may be influenced by how much money you have, whether you have food allergies, or any ethical or cultural considerations. These barriers are referred to as **specifications**.

A design brief is a statement that contains:

- an opportunity, problem or need – this is what has to be solved
- the background to the problem, usually written as a scenario
- all specifications or guidelines that apply to the problem
- the **constraints** – these are the aspects that are 'fixed'
- the **considerations** – the aspects that have some flexibility.

specifications Constraints and considerations or issues that will need to be thought about when you come up with a solution.

constraints The aspects of a design brief that are fixed.

considerations The aspects of a design brief that have some flexibility.

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Developing criteria for success

From the design brief, the designer should be able to identify the most important parts – these will assist in the development of the criteria for a successful solution. During the last stage of the design process, these **criteria for success** will be used to evaluate the product.

criteria for success Questions developed to check whether you have made something to meet the requirements of the design brief. The criteria for success should come out of the design brief.

Investigating

Gathering information and building knowledge about the impact of the specifications, as well as the best way to design possible solutions, make up the **investigating** stage of the design process. In this stage, you will look at possible alternatives that exist or solutions that have been applied to similar problems.

investigating The problem is developed as a result of critiquing needs or investigating opportunities of designed solutions.

It may also be necessary to look at how to improve existing solutions or come up with totally new and innovative ideas. This stage in the design process is an important step in transforming ideas into creative and practical realities by making the most of the different foods and pieces of equipment available.

Sources of information (research) include:

- existing solutions – recipe books
- guiding information available – people, books, magazines, the internet, television, tablet and smartphone apps
- target market for the product – who the product is for, their general likes and dislikes that you know about.

Investigating also involves looking at the resources that currently exist. In food preparation, this includes issues relating to health and safety requirements, nutrition, the availability of resources such as money, time, knowledge, skills and equipment, and the properties of food – physical, sensory, chemical and functional.

Generating

Creating design solutions means **generating** lots of ideas – even ideas that initially may seem to be unrealistic.

generating Developing and creating a number of ideas or solutions.

In food preparation, the problem is often solved by finding a recipe that is suitable or, when you are more experienced, by designing your own recipe. Adapting or making changes is an excellent way to try something new, or improve a product solution. It can also help you to turn what may not meet the design brief into something that does.

Recipe adaptions might include:

- changing from using a dried to a fresh product, such as pasta (or vice versa)
- swapping the protein – for example, chicken to turkey
- changing the cooking method – for instance, roasting to grilling
- altering how the ingredients are prepared – such as crushing to dicing.

Once you are aware of the options that are available, it is time to make the final decision. This decision-making includes being able to justify your final choice, linking it directly back to the design brief. You also need to explore how your final product will look and be presented. This can be done by simply drawing a picture of how you would like your product to look and then labelling it, or perhaps creating a model of your product using Web 2.0 tools.

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Planning and managing

project management The responsibility for planning, organising, controlling resources, monitoring timelines and activities, and completing a project to achieve a goal that meets identified criteria for judging success.

A successful solution is the result of successful **project management**. As you work through the design process, you will be responsible for a number of different tasks using a variety of skills and knowledge – for example, planning solutions during generation; using the plan during production; and reviewing management skills during evaluation. At times, this will be done collaboratively as part of a team; at others, it may be done individually, depending on the requirements of the problem or project.

When you are cooking for yourself or your family, one person can usually easily carry out the tasks required – especially if they have a plan in place. Catering for a large group of people or hosting a function may involve more than one person. There are often many tasks and problems to solve, and these are tackled more effectively if a team of people is involved.

Working collaboratively as a member of a team ensures everything that needs to be completed in time gets done. When working in a team, planning and organisation are essential, as everyone needs to work towards the common goal and ensure that they know what they have to manage and that they are able to fit in with others. The key here is teamwork – good planning and effective communication.

Producing: Making the proposed solution

Once all the design options have been explored and the solution has been reached, it is time to make the food item by logically following the recipe. **Producing** is when you apply the skills and knowledge you have acquired about safety and hygiene, use tools and equipment appropriately and utilise correct techniques. The aim is to make the highest quality product possible while meeting the requirements of the design brief.

producing Actively realising (making) the designed solutions using appropriate resources and means of production.

Developing a work plan or production plan helps you to think through all the steps of the production process, not just the steps in the recipe. It also helps to identify where management of health and safety, and of quality, is necessary. This helps you to project manage your product effectively.

If a trial food item is made, this is referred to as a **prototype**. Prototypes are common in industry as the manufacturer has to be sure that everything will work correctly in all aspects of the design process, otherwise they can waste a lot of money. When a food item is made at home, it is not an official prototype, but you will obviously change any part of the process or final product that does not work before you prepare it again or else not make it again.

prototype A trial item made to test an idea or process in order to inform further design development.

During production, you may make modifications or changes if it is apparent that something will not work as well as expected or a piece of equipment is not available. In the school food-preparation area, modifications are also frequently made – for example, if the microwave is not available to melt some chocolate, it is done in a basin over hot water on the stove. However, to make successful modifications, you need knowledge of equipment and ingredients so that you maintain the quality of a product.

Evaluating: Checking the finished product and processes

The evaluation process gives you the opportunity to ensure that the final product solution actually solves the problem stated in the design brief.

Using criteria for success

In food preparation at home, at the school canteen or in a restaurant, this step in the process may be informal. In a

'This time I grated the cheese; next time I will slice the cheese.'

'My partner did not like the look of my wrap because I folded it in half and it partly opened. I am not sure I completely agree with what she said.'

'This time I used a tomato and it made the filling watery. Next time I will …'

'I was not very efficient when working today. I wasted too much time talking.'

Figure 0.4 Responding to criteria for the design brief

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restaurant, when a new dish is introduced and the plate comes back with a lot of leftovers, the chef needs to question why. Evaluations assess the properties of food, the processes that occurred and whether the finished product meets specific requirements in the brief.

Evaluating properties of food

Satisfying the senses is one of the key objectives of food preparation and processing. A lot of evaluation of food is **subjective** – in other words, it is based on opinions rather than facts. However, opinions are very important when it comes to food: if a dish does not look, smell, taste and feel good, no one will eat it! Often, **descriptive words** are used to give impressions about sensory properties of the food, particularly the taste.

subjective A view about food that is based on opinion rather than facts – for example, based on taste, look, smell and feel.

descriptive words Words used to describe characteristics of food – for example, for appearance: translucent, watery, colourful, bright red; for texture: crunchy, crisp.

The simplest test used for evaluation is a **hedonic scale**. It can be used for an overall opinion about the properties, or a specific property such as taste.

Another test used for evaluating food is **ranking**. This is when you make a decision about which food you prefer when you compare foods.

Analysing the processes and reflecting on your work

As well as responding to the criteria for success, it is also worth analysing the actual processes that have occurred. In analysing the final product solution, you should note the feedback from other students and the teacher as well as do self-assessment.

Your analysis of the process and use of equipment could be presented as a table. Write up what worked, areas for improvement and what you would do next time in a table like the one below.

This worked	Areas for improvement	Next time I could try …

Self-assessment

As well as assessing the food you have produced and the processes you have used, take time to think about how well the product works. Don't be disappointed if your product has not worked to your satisfaction, as long as you can identify what needs improving. There are several questions you can ask yourself to think about your progress – for example:

- Today I learnt …
- My strength today was …
- I supported my friends in class today by …
- One thing I was not sure about today was …
- An area I can improve on was …

Providing feedback and working collaboratively

Often your peers are a useful source of information on how well you worked or how well your product turned out. Remember, though, that evaluating food is subjective. Different people have different opinions, and different likes and dislikes.

When you are evaluating your food, what you think looks good may not be the same for someone else. If you criticise other students' food, you must be able to justify your decisions.

The feedback sandwich can be used to provide feedback on your friends' work. Instead of using 'I' in each statement, change it to 'you'.

Figure 0.5 The feedback sandwich

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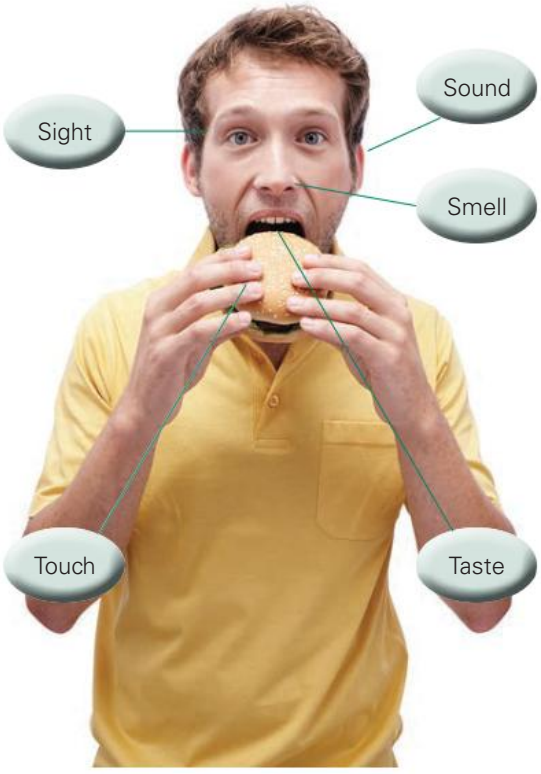

Figure 0.6 Sensory properties of food relate to the human senses.

APPLY DESIGN THINKING

It is 6.00 pm and your parents or guardians are running late – they still have not left work. They have asked you to prepare dinner for the family. In the fridge you find chicken mince, spring onions, bean sprouts and lettuce. There is also some rice as well as a number of sauces and seasonings in the pantry. Decide what you will prepare for dinner.

Sensory analysis

Food should be eaten for enjoyment. Your favourite foods and the meals that you remember are the ones that delight all of your senses!

The sensory properties of food are related to the human senses, as outlined in Figure 0.6.

Appreciating and enjoying food is based on the food's sensory properties. When we evaluate foods, we draw on these sensory properties and use our own senses to make judgements about whether we like or dislike the food item.

0.2 LET'S COLLABORATE

Touch is usually associated with your hands and fingers. Suggest why your tongue is included for touch. Think about the following foods and describe the different **mouthfeel** sensations that they create: apple, handful of nuts, chocolate, piece of toast, jelly and rice pudding.

mouthfeel How food or drink feels in the mouth – the sensory evaluation of impressions on the palate.

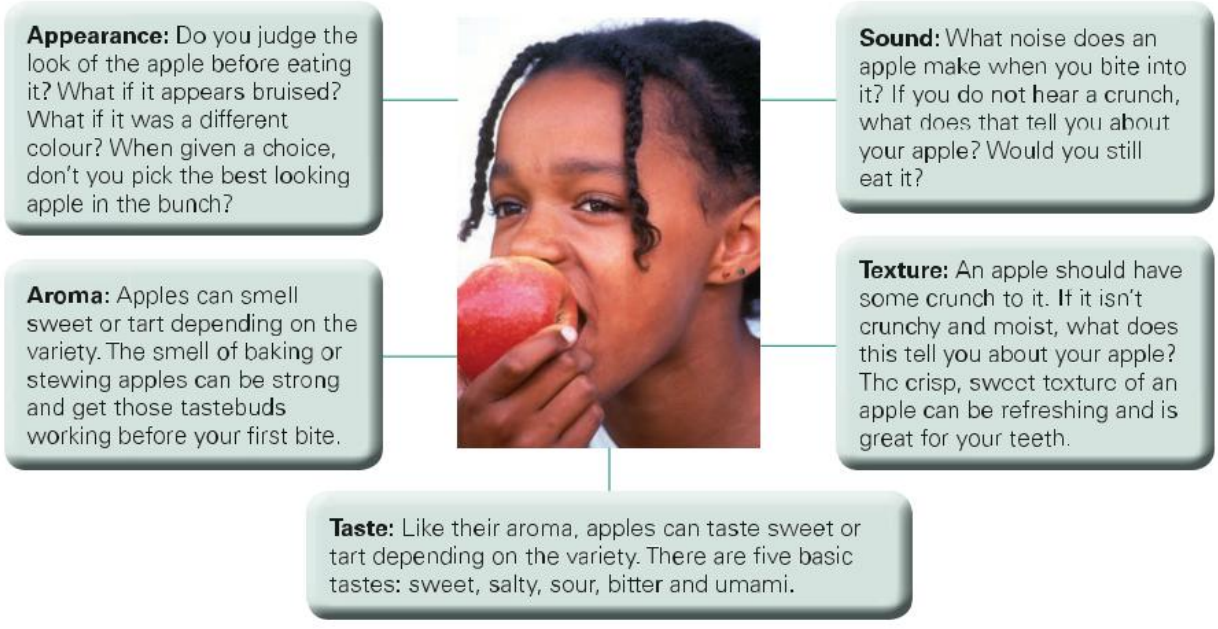

Figure 0.7 Our senses in action.

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Appearance

Consumers are often quick to judge food by its **appearance** or the appearance of the product's packaging. Sight is the dominant sense, and accounts for 80 per cent of our experiences. It is very important that the food appeals to the senses when designing and creating food products. Have you ever seen any foods that didn't look right? Did you eat them?

appearance The 'look' of the product, packaging or food.

Consumers often have an expectation of how food should look, and if it does not meet expectations, it is often not consumed. For example, a high-quality risotto will look creamy and be a white colour. If you were served a grey risotto, would you eat it? The colour of the dish may highlight that it has not been produced correctly.

Figure 0.8 Does the colour of this tomato make it more appetising?

0.3 LET'S COLLABORATE

If pasta were a bright blue or pale pink colour, would you eat it? Explain your answer and compare it with the rest of the class.

Aroma

Have you ever smelled onion or garlic cooking? **Aroma** plays an important role in our experience of food. In fact, many real-estate agents, when selling homes, have muffins or cakes baking in the oven, or use the smell of cooking to make a kitchen feel enticing and comforting. Often the aroma of food can bring back memories of past food experiences. This can sometimes be positive or negative. While aroma is often used to enlighten the senses, it can also be used to make judgements about food and food quality. Have you ever smelled milk to see whether it is spoiled before you used it?

aroma The smell arising from the food.

0.4 LET'S COLLABORATE

Think about the foods that you don't like the smell of – what about blue-vein cheese or over-ripe bananas – do you like their smell? Do you eat these foods? Share with the class a list of foods with a smell that you dislike. Compare the 'smell' dislikes of others in your class. Explain what would happen if everyone had the same sense of smell.

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Taste

taste The sense by which the flavour or savour of things is perceived with your mouth and tongue.

nutrition The science that studies the interaction between our bodies and food.

umami The savoury flavour or taste sensation of food.

We all eat food for the **taste** and pleasure it can give us, as well as for the **nutritional** benefits. There are five basic tastes: sweet, salty, sour, bitter and **umami**. Flavour is a combination of taste and aroma, with the mouth and nose sending signals to the brain.

Texture (mouthfeel)

The texture of food is the feeling created inside your mouth: biting, chewing and swallowing. Think about eating a piece of chocolate. It is smooth and coats the roof of your mouth with a rich texture. Consumers enjoy the different textures that foods provide, and in a well-planned product or meal there will be ingredients that provide different textures from others to make the food interesting to consume – for example, the crunch of lettuce in a salad compared with the moist softness of a ripe tomato.

0.5 ACTIVITY

1. Does aroma really influence taste? Try tasting a piece of food – for example, a strawberry or a piece of cheese. Now taste it again with your nose pinched shut. Record any taste differences you experienced.
2. Discuss how important smell is to taste.
3. Suggest why you think smell affects taste so much.
4. Describe whether tastes change for you when you are experiencing a cold or hay fever.

Appearance	Aroma	Texture	Taste
burnt	acidic	brittle	bitter
clear	aromatic	chewy	bland
cloudy	bland	creamy	burnt
crisp	burnt	crisp	creamy
crumbly	citrus	crumbly	fatty
dark	fishy	crunchy	hot
dull	fragrant	dry	mild
firm	fruity	fatty	rich
flaky	mild	flaky	salty
flat	rotten	hard	sour
glossy	smoky	lumpy	spicy
golden	spicy	moist	strong
hard	strong	runny	sweet
light	sweet	rough	tart
lumpy	tender	smooth	weak
mushy	weak	soft	
pale	yeasty	sticky	
smooth			
sticky			
transparent			
undercooked			
uneven			

Figure 0.9 Sensory term word bank

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0.6 ACTIVITY

Using these pictures of common foods, complete a sensory analysis for each product. You must write a sentence to describe each aspect of the product: appearance, aroma, texture and taste. Remember to use appropriate descriptive words to describe each product, no 'yums' or 'yucks'. You may like to use the words in the sensory term word bank in Figure 0.9 to help you.

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CHAPTER 1

Producing food safely

ACCESS PRIOR KNOWLEDGE

1. Compare and contrast the terms 'food safety' and 'food hygiene'.
2. Explain how you can ensure the safety of yourself and others in the kitchen.
3. List the production skills you require in order to prevent food spoilage and food poisoning.
4. Develop a summary of how the Australian government ensures the food we eat is safe.
5. List the key pieces of information that must be found on a food label.

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1.1 Safety in the kitchen

When working in a kitchen, whether the school kitchen, your kitchen at home or the kitchen at your workplace, it is essential that the food you prepare is safe to eat and that the people preparing the food avoid injury and accidents.

When professionals design kitchens, they must think about many important safety aspects. Your school kitchen is no exception. **Ergonomics** is about ensuring that each individual worker carrying out the production skills is working in a safe, **efficient** and comfortable environment. More accidents happen in the kitchen than in any other room of the home. It is therefore very important that we manage the physical environment so that we are able to prevent burns, scalds, cuts, electric shock and any other accidents from occurring.

ergonomics A science that seeks to adapt work conditions and equipment to suit the worker and limit injuries and accidents.

efficient Performing in an organised manner.

Tasty Trivia

Work Health and Safety (WHS) is concerned with protecting the safety, health and wellbeing of all people engaged in work or employment. Regardless of the nature of their work, workers should be able to carry out their responsibilities in a safe and secure working environment, free from hazards.

Sharp and breakable objects

The kitchen is home to many sharp objects. Knives are of primary concern, and are a common cause of kitchen injury.

1.1 LET'S COLLABORATE

Develop a list of rules or safety practices to follow in order to prevent accidents when using, storing, sharpening and cleaning knives.

1.2 LET'S COLLABORATE

1 Have you ever cut yourself? Discuss with the others around you the times when you have cut yourself. What kind of knife were you using? What food were you cutting? Was the knife sharp? How bad was the cut? Why do you think that this accident occurred?

2 Look at the picture of the person trying to remove the stone from the avocado. Explain what is wrong with this production skill. Discuss the best way to manage the removal of the stone from inside an avocado.

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Heat and fire safety

The stove is the greatest heat and fire safety hazard in the kitchen.

The following safety practices need to be considered:

- Be extra careful when lighting gas stoves.
- Don't allow excessive gas to be released from the stove or oven. Wait for any gas that has leaked from the stove to disappear before carefully relighting with a match or gas lighter.
- Keep all flammable materials like clothing, hair or aprons at a safe distance from open flames.
- Always keep pot handles turned inwards to prevent spillage from knocks or snagging on clothing.
- Use oven mitts when handling hot items.
- Always remove pot lids by allowing steam to escape away from you. Despite being invisible, steam can cause serious burns.
- Be alert at all times when cooking with large quantities of oil. Be aware of spills; never allow water or other liquids near hot oil. If dropped into the oil, they will turn into steam and spray with force.
- In the event of a kitchen fire, it is important to assess the situation and act accordingly. Turn off the heat source if safe to do so. If the fire is confined to a pot or pan, cover it tightly with a lid. Don't attempt to carry the pan away. If the fire is unmanageable, use a fire blanket or fire extinguisher. Never use water or flour, which can cause a grease fire to spread.
- Always keep a fire extinguisher accessible; extinguishers should be tested on a regular basis to ensure that they work properly.

1.3 LET'S COLLABORATE

As a group of two or three, go into the school kitchen. Draw a diagram of the stove top and label each part of the stove. Add four saucepans to your diagram. Annotate these to show how they should be placed on the stove top and the direction of the handles.

Electrical equipment

Electrical fires and **electrocution** can result when equipment is not used properly. Never use electrical appliances near water.

electrocution Death by electric shock. (Non-fatal exposure to electricity is an electric shock.)

1.4 INVESTIGATE IT

Visit the SafeWork SA website and complete the activity in the Virtual Hotel by entering the kitchen. See how good you are in the kitchen. Discuss whether or not you think you are up to scratch when it comes to working in the hospitality industry.

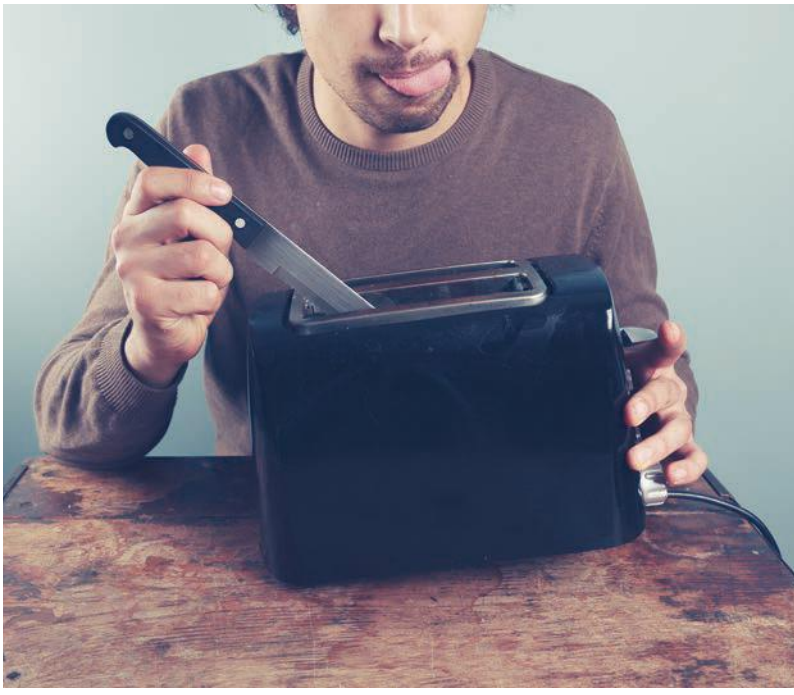

Figure 1.1 Think about how many times you have used a knife to free your toast from the toaster. Always make sure the toaster is unplugged from the wall when you do this, and use a non-metal implement.

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DESIGN BRIEF: SANDWICH CUTTING

You have been asked to prepare gourmet open sandwiches for a lunch for the teachers at your school. You need to create a range of four gourmet open sandwiches using a selection of knife skills to show the attractive fillings.

Investigating

1. Create a mind map using inspiration or an online mapping tool to investigate at least eight different gourmet sandwich fillings and breads.
2. For each option, explain why you think it is an appropriate option to suit the brief.
3. Select your four sandwiches. Explain why you have chosen each option and what knife skills this sandwich will allow you to demonstrate.
4. Develop three criteria for success that can be used to critically evaluate the sandwich selection.
5. Prepare your gourmet sandwiches.

Evaluating

1. Critically evaluate your sandwiches using your previously established criteria for success.
2. Critically evaluate your safety practices by answering these questions:
   - **a** Were the correct safety practices followed? Explain the reasons for your response.
   - **b** Did you use your knives safely? Explain the reasons for your response.
   - **c** How did you manage hygienic work practices throughout the production and clean up?

1.2 Hygiene in the kitchen

kitchen hygiene The prevention of illness and the maintenance of health in the kitchen.

personal hygiene Ensuring good cleaning and washing practices to prevent illness and maintain the health of food and food handlers.

A high standard of **kitchen hygiene** and good **personal hygiene** are important, as they help to control the spread of harmful germs.

There are many surfaces in the kitchen where harmful **bacteria** and **micro-organisms** can live, grow and multiply.

bacteria Single-celled micro-organisms responsible for decay, fermentation and ultimately spoilage of food.

micro-organism A tiny single-celled organism that is only visible through a microscope. Three types connected with food are yeast, moulds and bacteria.

1.5 LET'S COLLABORATE

Develop a list of surfaces where bacteria can grow. Work as a class group to develop a list of at least 50 places where bacteria can grow. Then, for each of these surfaces, suggest a food item that might come into contact with the surface.

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1.6 LET'S COLLABORATE

Figure 1.2 Kitchen surfaces must be cleaned after food has been prepared. It is important to be sure that you 'clean as you go'.

Define the phrase 'clean as you go'. Talk to the person sitting next to you and explain why this is so important, both in the kitchen at school and the kitchen at home. Think about a large kitchen in a hotel and explain why is it so important that each person working in the kitchen cleans as they go.

Utensils, kitchen surfaces and your hands must be washed thoroughly before contact with other foods, especially cooked and ready-to-eat foods.

To ensure kitchen hygiene and prevent food poisoning, it is important to wash and dry all utensils and equipment properly. The water used to wash dishes should be warm/hot, soapy and changed regularly.

Tasty Trivia

Dishcloths and tea-towels contain more bacteria than any other piece of equipment in the kitchen. They can be a source of cross-contamination. Be sure to use them only if they have been cleaned and completely dried.

Figure 1.3 Raw meat, poultry, fish and other raw foods can easily cross-contaminate other foods.

Figure 1.4 The kitchen sink is a breeding ground for germs.

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A person who handles food is responsible for ensuring good personal hygiene. It is important that food and surfaces that come into contact with food are not contaminated by contact with the food handler's body or clothing.

Possible personal contaminants include:

- hair
- saliva
- mucus
- sweat
- blood
- fingernails
- clothes
- jewellery
- Band-Aids or bandages.

1.7 LET'S COLLABORATE

From paddock to plate, there are so many people who handle the food that we eat. Make a list of all the people who could handle your apple in the process of food preparation from 'paddock to plate'.

Tasty Trivia

The number of germs on your fingertips doubles after you use the toilet. Half of all men and a quarter of women fail to wash their hands after they have been to the toilet.

One of the best ways to ensure personal hygiene and prevent the contamination of food is to wash your hands well. Germs can stay alive on our hands for up to three hours. In this time, they can spread to anything and everything that we touch. Regular hand-washing is important when preparing food, between the handling of raw foods, after going to the toilet, after touching rubbish or the rubbish bin and after coughing or sneezing.

1.8 LET'S COLLABORATE

Personal hygiene is vital in food preparation. Develop a list of tips that are important for the kitchen. Be sure to only consider personal hygiene tips this time. When you develop your list, think about ill-health, sores, clothing and fingernails. Share your list with a partner and add any tips that you have missed to each of your lists.

1.9 INVESTIGATE IT

Check out YouTube. Can you find two videos that show someone using poor personal food hygiene and/or safety when preparing food? Share these disasters waiting to happen with the class.

1.10 ACTIVITY

Being clean

Design a video presentation to inform Year 7 students who are new to Food and Technology about the importance of personal and kitchen hygiene. In your video clip, be sure to demonstrate hand-washing and discuss the importance of an apron and other protective clothing. You could use Animoto, Vimeo, Movie Maker or even try Glogster to complete this activity.

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How to wash your hands

We all think we know how to wash our hands, but many of us don't do it properly. Rinsing your fingertips under cold water is not sufficient to prevent food contamination.

When you wash your hands, remember to:

- use warm water
- wet your hands before applying soap – this prevents irritation
- rub your hands vigorously for approximately 15 seconds (sing 'Happy Birthday' twice)
- wash both sides of your hands, down to the wrists, around the thumb, between each finger and around and under the nails
- rinse with clean water
- dry your hands thoroughly – use a clean, dry towel, paper towel or an air dryer if it is available.

Tasty Trivia

Damp hands spread more germs than do dry hands – 1000 times more germs, in fact!

Figure 1.5 Always wash and dry your hands thoroughly before preparing food.

DESIGN BRIEF: DESSERTS

Most of us like a sweet treat now and then. This brief requires you to investigate and generate a variety of after-dinner treats that could be eaten with coffee. Select one and then produce it. The item that you choose should have appealing sensory properties and involve baking in the oven, chilling in the fridge and the use of an electric appliance. It should be completed in the time that you have available for practical classes.

Investigating

1. Create a list of personal hygiene practices that must be followed in the kitchen. From this list, develop a web page that highlights safety issues.
2. Create a list of kitchen hygiene practices that must be followed in the kitchen.
3. Summarise the cleaning/sanitising that needs to occur in the kitchen.
4. Write three criteria for success questions.
5. Develop a list of constraints and considerations that you need to take into account when preparing your chosen dessert.

An example recipe – Caramel Butternut Cheesecake – is provided for you on p. 19. Study this recipe to determine whether it suits the time constraints that you have in class.

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Caramel butternut cheesecake

USA

RECIPE

Main tools and equipment

Wooden spoon, spring-form pan, electric beater, pastry brush

Production skills

Melting, crushing, beating, chilling

Cooking processes

Baking

SERVES 12

Preparation time: 45 minutes

Cooking time: 40 minutes baking, 4 hours chilling

Serving and presentation time: 5 minutes

Total time: 5 hours, 30 minutes

Ingredients

 1 tablespoon butter, melted	 250 g packet Butternut Snap biscuits, crushed	 125 g butter, melted	 2 × 250 g packets cream cheese, at room temperature
 300 ml sour cream	 100 g caster sugar	 3 eggs, lightly beaten	NESTLÉ caramel

Method

1. Preheat oven to 160°C.
2. Brush a 24 cm spring-form pan with the tablespoon of melted butter to grease lightly.
3. Place the crushed biscuits into a bowl, add the 125 g melted butter and stir well until combined.
4. Place the biscuit mixture into the prepared pan. Press firmly over the base and side.
5. Cover with plastic wrap and place in the fridge for 15 minutes to chill.
6. Place the cream cheese, sour cream and sugar in a bowl. Beat with an electric beater until smooth.
7. Add the eggs and beat until well combined.

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Caramel butternut cheesecake – continued

8 Pour half of the cream cheese mixture into the biscuit base.

9 Top with caramel.

10 Pour over remaining cream cheese mixture.

11 Bake for approximately 40 minutes until set.

12 Leave the cheesecake in the tin until cooled.

13 Place in the fridge for 4 hours or overnight to chill.

14 Cut into wedges and serve. Decorate with whipped cream or even caramel sauce. How creative can you be?

Evaluating

1 Copy and complete the table below to assess your safety and hygiene practices. Insert the lists that you prepared previously in the first column.

2 Analyse how you managed your own work practices in the kitchen.

3 Explain three things that worked well.

4 State three improvements that you could make.

5 Complete each of your criteria for success questions.

Safety and hygiene practice	Completed	Not completed (why was this practice not completed?)	Evaluation of the importance of this practice
Personal hygiene			
Safe work practices			
Cleaning/sanitising practices			

REFLECT ON LEARNING

1 Explain how ergonomics ensures that a kitchen is safe. In your explanation, include a definition of ergonomics.

2 List five accidents that could occur in the kitchen at school. How does this list differ from the accidents that could occur in a busy commercial kitchen?

3 'Gas can be deadly in the kitchen'. Discuss this statement.

4 Water and electrical appliances should never mix. Explain why this is the case.

5 Explain the role that a food handler plays in ensuring that food is safe.

6 'Happy Birthday' is not just to celebrate the date of someone's birth. Explain how it can help in preventing food contamination.

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1.3 All about food poisoning

Food poisoning is a serious health problem caused by poor personal hygiene on the part of food handlers, poor storage of food or **cross-contamination**. It is important that a person who is handling and preparing food protects those people who are going to eat the food from getting sick.

Food poisoning causes vomiting, diarrhoea and stomach cramps. It is a very unpleasant illness, but one from which most people recover. However, for some people – especially young children and the elderly – it can be life-threatening or leave sufferers with serious health problems.

food poisoning A common illness, usually mild but sometimes deadly, caused by eating contaminated food or drink. Typical symptoms include nausea, vomiting, abdominal cramping and diarrhoea that occur suddenly (within 48 hours) after contamination.

cross-contamination Indirect contamination of food caused by contact with a raw food or non-food source such as clothes, cutting boards or knives.

Figure 1.6 Food with visible mould, as shown in this picture, should never be consumed.

1.11 ACTIVITY

Preventing food poisoning

1. Develop a list of rules or recommendations that should be followed in the kitchen in order to prevent food poisoning.
2. For each rule, explain why this is an important practice in the kitchen. Share your list with a partner. Add to your own list if there are some suggestions that you have missed.
3. Finish the following sentence, considering your own personal hygiene practices: 'When in the kitchen, I need to improve my personal hygiene practices by …'

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How do bacteria grow?

One cause of food poisoning is bacteria. Food poisoning bacteria can grow and multiply very quickly in the right conditions.

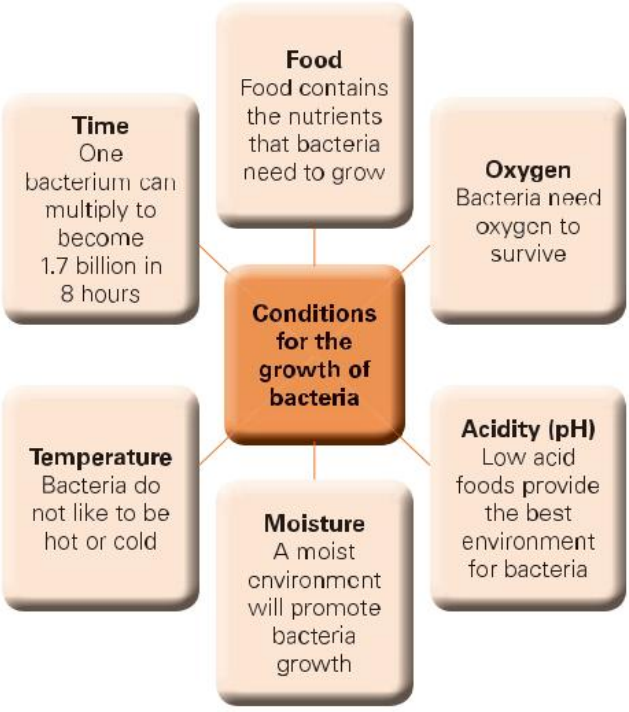

Figure 1.7 Conditions for the growth of bacteria

Figure 1.8 The food poisoning chain

The growth of food poisoning bacteria can be prevented by controlling these four links in the food poisoning chain.

Over five million cases of food poisoning could be avoided in Australia each year if all food handlers followed three simple steps:

1 Control temperature.
2 Kill harmful bacteria.
3 Prevent cross-contamination.

Step 1: Control temperature

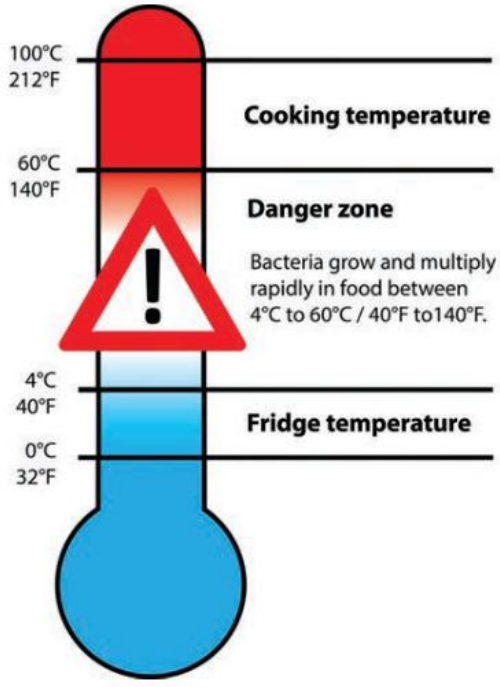

Figure 1.9 The temperature danger zone

Bacteria in food grow to unsafe levels when the food is warmer than 4°C and cooler than 60°C. This is the 'temperature danger zone'. Keeping food at the right temperature will prevent food-poisoning bacteria from multiplying.

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1.12 ACTIVITY

Cool and reheat?

Potentially hazardous foods for bacteria growth are those that have cooled and are then reheated.

1 Look at the three leftover food products in the pictures. Explain why these leftovers are potentially hazardous.



2 Develop a list of leftover foods that are likely to be cooled and then reheated in your house.

3 Look at the list of foods that you have developed. Use your knowledge of the food groups and suggest the types of foods that are potentially hazardous.

Once food has dropped in temperature to 60°C or below, bacteria will multiply rapidly as the food cools to 4°C. The longer the food takes to cool, the greater the number of bacteria.

4 Design a computer-generated flow chart outlining the ways in which you can prevent bacteria from multiplying. Explain why each stage in the flow chart is critical in controlling the multiplication of bacteria.

5 Reheating food increases the risk of bacteria. Food-poisoning bacteria start multiplying when chilled food is reheated above 4°C.

- **a** At what temperature will bacteria stop multiplying?
- **b** If it takes 20 minutes to reheat a food product, describe what will happen to the bacteria present in the food once it is eaten.

6 Design a computer-generated flow chart outlining ways to reheat food. Include critical temperatures and suggest why time is also a critical factor that needs to be considered.

7 Mason has leftover pizza in the fridge and he plans to eat it for lunch. He bought the pizza last night from the local pizza shop. The pizza topping includes extra cheese, bacon, ham, salami and egg. To reheat the pizza, Mason places it in the oven at 55°C. He forgets it while he plays a video game, but after 40 minutes he remembers that his pizza is heating in the oven and eats it. Outline the potential for the development of food-poisoning bacteria on this reheated pizza. In your evaluation, consider:

- **a** food products that are high risk
- **b** temperature
- **c** time
- **d** cooling and reheating.

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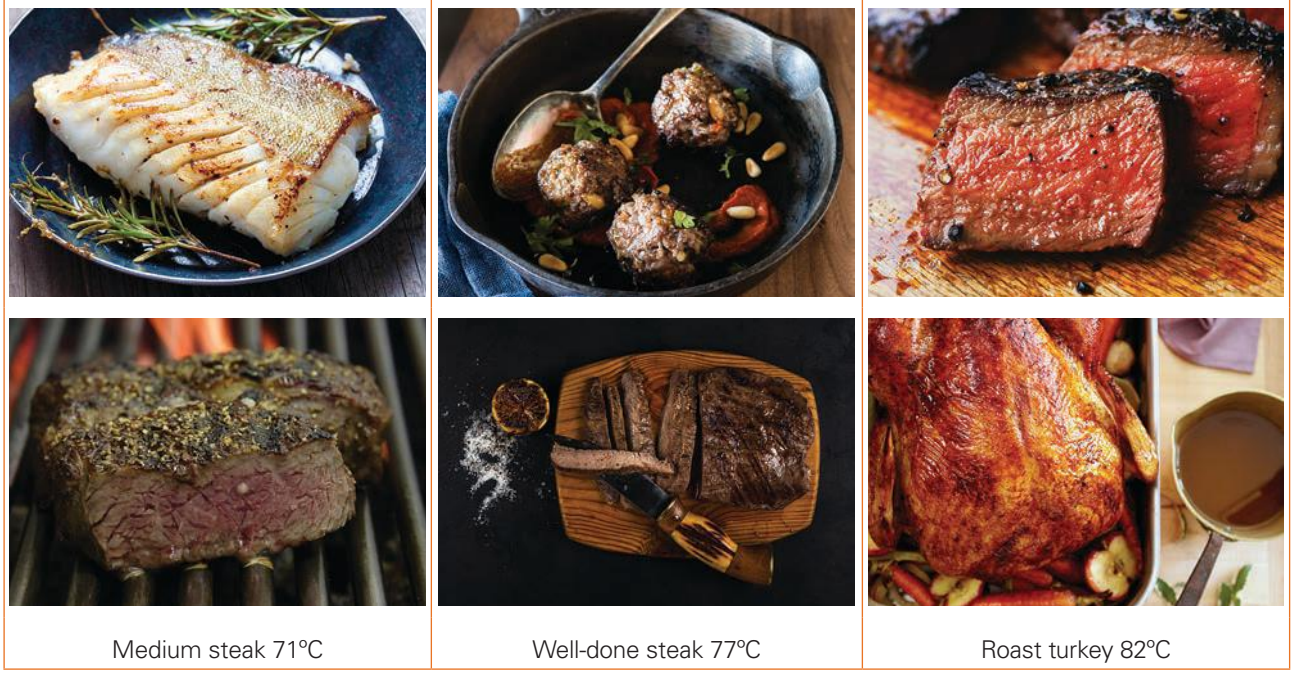

Figure 1.10 Correct temperatures for cooked meats.

Step 2: Kill harmful bacteria

In order to kill harmful bacteria, it is important to cook food properly. When cooking meat products like chicken, mince, meat with bones, hamburgers, stuffed meats and sausages, ensure that they are thoroughly cooked and that the meat juices run clear.

1.13 LET'S COLLABORATE

Explain what you think it means when people say that meat juices should 'run clear'. Discuss with a partner how you can check to see whether the juices are clear.

1.14 LET'S COLLABORATE

Create a list of cuts of meat that contain bones. Suggest the reasons why you think these require longer cooking times.

Step 3: Prevent cross-contamination

Bacteria can spread if raw meat or poultry touches or drips onto **ready-to-eat foods**. This is dangerous because ready-to-eat foods often receive no further cooking, and therefore the bacteria are not killed.

ready-to-eat foods
Foods that have been processed before they reach the home kitchen. They need limited (if any) further preparation.

1.15 LET'S COLLABORATE

Ready-to-eat foods are quick and convenient.

1. What are some ready-to-eat foods? Discuss with your partner why these are so popular.
2. As a class, develop a list of ready-to-eat foods that are available in the supermarket or that you have seen advertised on TV.

To prevent cross-contamination, it is important to:

- separate raw and cooked foods
- store raw foods covered at the bottom of the fridge
- keep the kitchen and utensils clean
- wash hands with soap, rinse and dry thoroughly before and after preparing raw food. (Remember to sing 'Happy Birthday' twice.)

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1.16 ACTIVITY

milk	*roast barbecue chicken*	
6 eggs	*kale*	*bread*
salami	*bananas*	*1 kg mince*
Feta	*burger patties*	*lamb fillet*

Chiara's shopping bag

Chiara has just been shopping. She bought: a carton of milk; one hot roast barbecue chicken; six eggs in an egg carton; a bunch of fresh kale leaves; a fresh loaf of bread; sliced salami; five bananas; 1 kg raw mince in a plastic bag; feta cheese in a plastic bag; six raw chicken burger patties; two pieces of lamb fillet.

Considering her grocery bag, complete the following questions:

1. Make a list of the potentially hazardous foods in Chiara's shopping bag.
2. Help Chiara by highlighting the items that need to be cooled quickly. Explain why this is the case and suggest how she should store and separate the foods.
3. Create a visual display that could be placed in the supermarket or given out as a brochure that shows shoppers how to store their purchases correctly. Use your imagination and design a fridge, then place each item in it – this could be a computer-generated image.
4. Explain why you have placed each item in its position.

DESIGN THINKING

Look at the list of ingredients that Chiara has in her shopping bag. Develop and then produce a design solution or food item that could be eaten as an afternoon snack by students who attend your school's homework club.

Tasty Trivia

Illness from food poisoning is becoming more common as our lifestyles change. The more we eat out and purchase food that requires very little preparation, the higher our incidence of food poisoning becomes.

1.17 LET'S COLLABORATE

1. Summarise how our lifestyle has changed. Consider the changes in our regional and global communities.
2. Discuss what has happened to food preparation and the places where we eat food.
3. Think about and discuss the number of meals that you have had at home in the last week, fortnight and month that were cooked **from scratch**.
4. Think about and discuss the cultural backgrounds of the foods that you have eaten in the last week, fortnight and month. Compare as a class.

from scratch Prepared from fresh ingredients, without the use of anything pre-cooked or packaged.

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Symptoms of food poisoning

The symptoms of food poisoning are many and varied; they depend on the type of bacteria that has caused the illness. Symptoms can include:

- nausea
- stomach cramps
- diarrhoea
- fever
- headaches.

1.18 LET'S COLLABORATE

Develop a list of foods that can cause food poisoning. Have you ever had food poisoning? Discuss your symptoms with a partner. Was their experience similar?

Types of food poisoning

There are two types of food poisoning: toxic and infective.

- **Toxic food poisoning** is caused by the action of a **toxin** released by bacteria found in food prior to it being eaten, or in the body after it is eaten.
- **Infective food poisoning** is caused by living, food-borne pathogens that invade the tissues of the body.

toxin A poisonous substance produced by living cells or organisms that is active at very low concentrations.

1.19 ACTIVITY

Research assignment

Working collaboratively in teams of no more than three, carry out an internet search to investigate the different food-poisoning bacteria. Copy and complete the table to summarise the information that you find. Start with these websites and see what else you can find:

- Food Safety Information Council
- Beef and Lamb (carry out a search on this website by using the key word 'food safety')
- NSW Department of Primary Industries Food Authority.

Food poisoning bacteria	Effect/symptoms evident in humans	Food sources	Best way to prevent the micro-organism from making you sick	Microscopic picture of the bacteria
Salmonella				
Campylobacter				
Listeria monocytogenes				
Escherichia coli (E coli)				
Staphylococcus aureus				
Clostridium botulinum				
Clostridium perfringens				
Bacillus cereus				

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REFLECT ON LEARNING

1. Explain how food poisoning can occur in the home or in the school kitchen.
2. Develop a list of the symptoms of food poisoning. State the individuals who are most at risk of having these symptoms.
3. Describe the conditions required for the growth of bacteria.
4. Suggest and explain three ways by which food poisoning can be prevented.
5. Explain the temperature danger zone. How can this be an issue for a food handler in terms of the growth of bacteria?
6. Name, compare and contrast the different types of food poisoning.

1.4 All about food contamination

Food can easily become **contaminated** by a number of different items. There are three main types of food contamination:

- chemical
- physical
- microbiological.

contaminated Unsafe to eat due to contact with chemicals, foreign objects or bacteria that are harmful for people to eat.

Tasty Trivia

Bottled water may account for 12 per cent of infections by the bacterium *campylobacter jejuni*, the biggest cause of food-borne infection in the Western world.

Type of contamination	Explanation	Examples of contaminants	
Chemical	This occurs when harmful chemicals contaminate food. Incorrect storage and cleaning are often the reasons why chemical contamination occurs.	Dishwashing detergent, disinfectants, pesticides and naturally occurring toxins and poisons.	
Physical	This occurs when foreign objects enter food. Good cleaning practices, personal hygiene and protective clothing can prevent this type of contamination.	Wood, glass, Band-Aids, hair, jewellery, cigarette butts, insects and animal faeces.	
Microbiological	This occurs when micro-organisms get into food and poison or spoil it.	There are five different types of micro-organisms: yeasts, mould, viruses, protozoa and bacteria.	

Figure 1.11 Food contaminants

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1.20 ACTIVITY

Food poisoning

Salmonella linked to NT rockmelon grower

3 August 2016

South Australian health authorities have detected Salmonella on rockmelons supplied by a Northern Territory rockmelon grower.

The link comes after a spike in Salmonella Hvittingfoss cases, a rare strain of Salmonella, across a number of states in the past weeks, with 86 cases reported nationally, 43 of them in NSW.

Following the positive test results, confirmed by SA Health on Tuesday, 2 August, the company, 'Red Dirt', has said it will undertake a trade level recall of its product, which means it will be removed from the supply chain so consumers can be assured rockmelons currently available on shelves are not implicated in this outbreak.

The NSW Food Authority and the local NT health agency are working with the company in resolving the issue.

Further, as a precautionary measure, the NSW Food Authority advises anyone who may have rockmelon in their home and is unsure of its origin not to consume the product.

It is always important to use caution when preparing or consuming the fruit, particularly if it is being prepared for or consumed by the young, the elderly, pregnant women or people with compromised immune systems.

Some simple food safety precautions will help minimise the risk of Salmonella in rockmelons, including:

- always purchase undamaged and unbruised rockmelon and if it is pre-sliced ensure it is refrigerated promptly
- discard sliced or peeled rockmelon that has been left at room temperature for more than two hours
- wash hands thoroughly with warm soapy water before and after handling rockmelon
- use clean chopping boards and utensils when preparing rockmelon and thoroughly wash in hot soapy water after cutting or peeling.

The NSW Food Authority will continue to work with other jurisdictions via the National Food Incident Response Protocol to monitor the situation.

Further food safety advice relating to the safe preparation and storage of rockmelon can be found at the NSW Food Authority website.

1 Explain why the rockmelons from the Northern Territory were recalled.

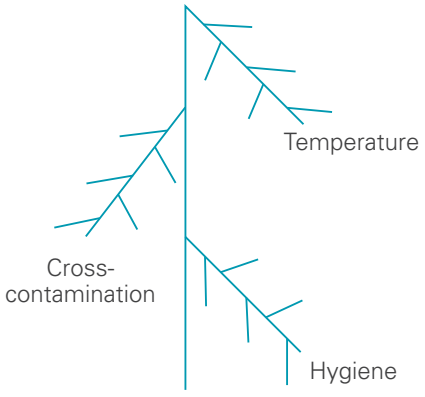
2 Discuss the signs and symptoms that would be evident in someone who has suffered from food poisoning as a result of the rockmelons.

3 Complete a fishbone chart like this one to explain how temperature, hygiene and cross-contamination can result in food poisoning.

4 Develop your own concept map to summarise how food poisoning can be avoided or prevented.

5 Complete a fishbone chart to explain how food contamination can occur.

6 Develop your own concept map to summarise how food contamination can be avoided or prevented.



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1.21 LET'S COLLABORATE

Ask your partner the following questions:

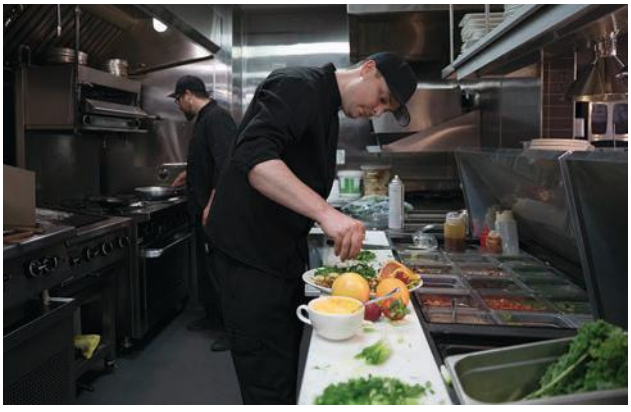
- Have you found a physical contaminant in your food?
- What was it and how do you think it got there?
- What potential harm could it have caused?
- What should you do if you find a physical contaminant in your food?

1.22 ACTIVITY

Develop your own blog or web page

Food handlers can prevent food poisoning by practising good personal hygiene. Develop a web page or blog with links that could be used in the food industry to show food handlers how to practise good personal hygiene. The site Webs will get you started. In your presentation, you should include:

- an explanation of what it means to have good personal hygiene
- a list of rules to ensure that food handlers follow adequate personal hygiene practices
- a description of how food poisoning and food contamination can occur
- a discussion of the critical temperature limits and how food should be stored, cooled, cooked and reheated.



REFLECT ON LEARNING

1. List the different types of food contamination.
2. Complete a comparison alley to show the differences and similarities between these types of food contamination.

Differences:

Similarities:

Differences:

3. Dishwashing detergent is potentially harmful because … (complete sentence).
4. Suggest how foreign objects can enter food. Develop a list of 10 foreign objects that can be found in food.
5. Name and describe the different types of micro-organisms.

1.5 Food safety in Australia

The food supplied to us in Australia is renowned for being extremely safe for consumers. To ensure that we have a safe food supply, a number of very strict regulations and standards exist at all levels of government.

1.23 LET'S COLLABORATE

Explain the reasons why it is so important to ensure that our food supply is safe for consumers.

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1.24 INVESTIGATE IT

Use the internet as a research tool to find out about the ways in which your state and local governments ensure that the food you consume is safe. Copy and complete this flow chart using the information that you have found. Sources you could consult are:

- Food Standards Australia New Zealand (FSANZ)
- Food Standards Code, including food labelling regulations
- Department of Agriculture.

The federal government ensures the food I eat is safe by:	My state government ensures the food I eat is safe by:	My local government ensures the food I eat is safe by
↓	↓	↓
↓	↓	↓
↓	↓	↓

DESIGN BRIEF: EMPLOYED BY LOCAL GOVERNMENT

You have been employed by the Northern Territory rockmelon grower (see the article on p. 28) to prepare a food item and demonstrate the safe preparation of this food item at the regional fruit and vegetable grower farmers' market. The idea of the food item and the demonstration is to show the community that the rockmelons are safe to eat. You are also going to show how to purchase, store and then prepare the rockmelons. You must help the grower to gain back sales lost as a result of the food poisoning scare.

1. Apply the design thinking process to choose a food item that you could prepare.
2. Work independently and use your production skills to prepare and produce the food item.
3. Evaluate how successful you think you would be in terms of your level of skill and knowledge in demonstrating safe food-handling techniques to a large audience.

Tasty Trivia

Use the FSANZ website to find out about the product recalls that have occurred in Australia in the last 30 days.

Food recalls

A food recall occurs when a food that poses a safety hazard to consumers is removed from sale, distribution and consumption. Food can be recalled at any time when it poses a possible public health and safety risk. Food recalls also occur if a food product is incorrectly labelled – for example, an unlabelled food allergy danger. FSANZ coordinates food recalls in Australia and New Zealand to ensure our safety.

Figure 1.12 In 2016, Mars ordered a mass recall of chocolate bars from over 55 countries after a piece of plastic was found in a Snickers bar purchased in Germany.

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1.25 LET'S COLLABORATE

Food recalls assist consumers to return and avoid consuming foods that are not 'perfect' for us to consume. Where have you seen food recalls advertised? What food recalls have you seen advertised? What should you do with foods that have been recalled?

1.6 Food labelling

By law, food that is sold in Australian shops must be of good quality and safe to eat. Foods that are **processed**, and therefore not fresh, must carry a food label. Food packaging helps to prevent food from spoiling and ensures that it is safe to eat, but it is the food label that provides us with information. Labels identify the food contained inside the package and provide us with information that helps us to decide whether we want or are able to eat the food.

processed To change a food product with a series of steps – for example, peeling, cutting, boiling and putting into a can.

allergy An abnormal reaction of the body to an allergen, creating itchy eyes, runny nose, wheezing, skin rash, diarrhoea or other symptoms.

Many people suffer from **allergies**, and these may prevent them from eating certain foods. (See Chapter 3 for more information on food allergies.)

The Standards in the **Australian New Zealand Food Standards Code** govern the information relating to food labels.

Australia New Zealand Food Standards Code Legislative instruments of individual food standards.

1.26 ACTIVITY

Country of origin labelling

Use the FSANZ website to investigate 'country of origin' labelling.

1. Explain what the country of origin label is.
2. Discuss why you believe this type of labelling requirement is important.
3. Find out what the following terms mean:
   - a product of
   - b produce of
   - c produced in
   - d made in
   - e manufactured in.
4. Sometimes the terms are mixed (e.g. 'made in Australia from imported products'). Evaluate the importance of this information.

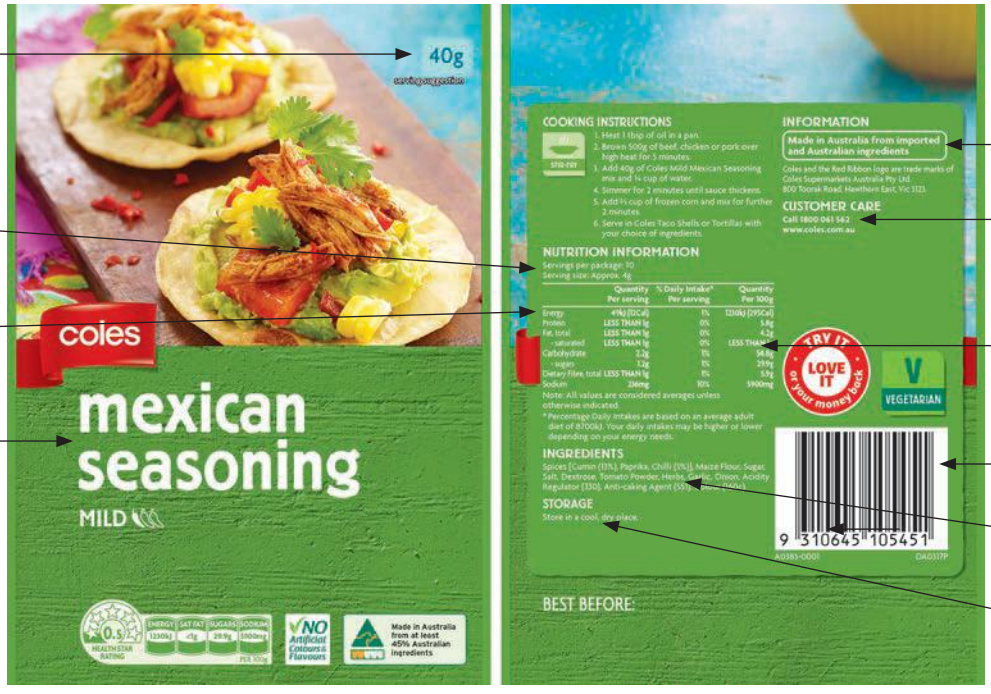

Figure 1.13 Elements of a food label

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Rhubarb and raisin chutney

INDIA

RECIPE

Main tools and equipment

2 heavy-based saucepans, wooden spoons, sterilised jars

Production skills

Stirring, dissolving, thickening, bottling

Cooking processes

Boiling

MAKES APPROXIMATELY 500 G

Preparation time: 20 minutes

Cooking time: 60 minutes

Serving and presentation time: 30 minutes

Total time: 1 hour, 50 minutes

Ingredients

 450 g rhubarb, chopped	 115 g raisins	 210 ml white malt vinegar
 225 g sugar	 1 cm piece ginger, grated	 Juice of ½ orange

Method

1. Place the rhubarb and raisins into a heavy-based saucepan.
2. Add half the vinegar. Bring to the boil, then cover and simmer for 10 minutes until soft and thoroughly cooked.
3. Place the sugar in another heavy-based saucepan and pour over the remaining vinegar. Stir occasionally over gentle heat until the sugar has dissolved.
4. When the fruits are cooked, add the sugar and vinegar solution and ginger. Simmer uncovered for 30–50 minutes, until thickened to the desired consistency.
5. Spoon into clean, warm, sterilised jars. Serve as an accompaniment to cold meat.

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Evaluating

1 Explain why is it important that the jars used to store the chutney are:
   - **a** well cleaned
   - **b** airtight
   - **c** labelled correctly.

2 Indicate the information that should appear on the label of a bottle of chutney.

3 Prepare labels and fix them to your jars of chutney.

REFLECT ON LEARNING

1 Summarise the regulations that exist in Australia to ensure that food is safe to eat.
2 Compare and contrast the roles of the federal, state and local governments in protecting our food supply.
3 Explain the function of a food recall.
4 Discuss the reasons why all processed food products must be labelled.
5 Develop a list of the information that must be on a food label. Suggest reasons why this information is important for us as consumers.

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LOOKING BACK

1 Food safety and hygiene are essential in order to ensure the safety of all kitchens and to make sure that the food we consume is free from contamination.

2 Kitchen hygiene and personal hygiene are ways by which a food handler can help to prevent contamination of food. Washing hands is the first step to maintaining Australia's reputation for having a clean and safe food supply.

3 Poor personal hygiene and incorrect storage of food can result in food poisoning. It is important to remember that bacteria are always present on food, and it is up to the food handler to ensure that bacteria do not have the right conditions to grow and multiply.

4 The two types of food poisoning that cause illness are toxic and infective food poisoning. Food can easily become contaminated by chemical, physical and microbiological contaminants that result in unsafe food and illness.

5 The three levels of government – federal, state and local – work together to ensure that our food is safe and free from harm.

6 A number of measures, such as food labelling and food recalls, are used to assist governments in ensuring this safe food supply.

TEST YOUR KNOWLEDGE

Multiple choice

1 Food safety aims to protect:

- **a** the food handler
- **b** the food handler and the food items being produced
- **c** the animals that enter the kitchen
- **d** the kitchen equipment.

2 Hands must be washed correctly before preparing food. When washing your hands, remember to wash:

- **a** your fingertips
- **b** both sides of your hand and around the thumb
- **c** between each finger and under the nails
- **d** all of the above.

True/false

1 Food poisoning occurs as a result of physical contamination.

2 The federal government alone is responsible for ensuring a safe food supply.

3 Food labelling protects consumers who have food allergies.

Short answer

1 Kitchen safety helps to reduce the number of accidents involving food producers. Look at Figure 1.14 and suggest a reason why injuries to each of the indicated body parts could occur.

Figure 1.14 Injury hotspots

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2 Develop a list of safety procedures to follow to avoid each of these injuries.

3 Explain the different types of food poisoning and food spoilage. Summarise the causes of both food poisoning and food spoilage.

4 Find a food label like the one on the right and annotate the information that must be displayed. Suggest a reason why each piece of information is important.

Extended response

1 Define the term 'food poisoning'.

2 List and explain how two different types of food-poisoning bacteria can cause illness.

3 Read the food recall (right) and discuss why this product is not safe for consumers.

4 Explain how a food recall occurs.

5 Describe how food poisoning can occur via cross-contamination.

6 Define the term 'temperature danger zone'. Suggest what may occur to this food product if it is stored within the danger zone.

7 Develop a list of guidelines to follow to prevent food poisoning and to ensure that food is safe to eat.

Gallo Farms Marinated Fetta	
Gallo Farms Pty Ltd has recalled Gallo Marinated Fetta in Far North Queensland only, due to microbial (E. coli) contamination. Food products contaminated with E. coli may cause illness if consumed. Consumers should not eat this product. Any consumers concerned about their health should seek medical advice. The product can be returned to the place of purchase for a full refund.	
Date notified to FSANZ:	02/11/2016
Food type:	Marinated Fetta in oil with added parsley and pepper
Product name:	Gallo Marinated Fetta
Package description and size:	Plastic tamper-evident tub, 250 g
Date marking:	All best before dates between 06.11.16 and 30.11.16
Country of origin:	Australia
Reason for recall:	Microbial (E. coli) contamination
Distribution:	Selected IGA supermarkets and small grocery stores in Far North Queensland
Consumer advice:	Food products contaminated with E. coli may cause illness if consumed. Consumers should not eat this product. Any consumers concerned about their health should seek medical advice. The product can be returned to the place of purchase for a full refund.
Contact	Gallo Farms Pty Ltd 07 40 952 388 www.gallodairyland.com.au

ISBN 978-1-316-64937-4

Career profile: Robert Ford

Current occupation: Chef, coordinator of Home Economics subjects with the Bachelor of Education (P–12)
Place of employment: Victoria University, Melbourne

Explain your interest in the area of your chosen career path. Discuss the reasons why you have pursued this career.

I was always surrounded by food and its preparation at home. I decided to do the Home Economics classes at school – at that time I was one of only two boys in the class!

And I loved it – it was far more than the ingredients and producing the finished item – understanding the process, learning skills, the science of what was happening, problem solving when things did not work quite right – it was amazing, and still is every time I prepare something.

As I became more confident, I wanted to learn more about what is was to be a cook and a chef, and I was fortunate to have a variety of great work experience chefs. Then to college and the real learning started and has never really stopped – I still love the heat and pace and challenge of a kitchen every time I put on my chef's uniform and walk in to start the mise en place and service.

Who was your role model and how did they influence your decision to work with food?

Initially my mum – an amazing cook, always trying out new things and exposing me to new ingredients.

My first chef who gave me the appreciation of what it is to be a 'chef': an approach to every task you do – no matter how insignificant it may seem and how that all adds up to the final dish experience for the customer.

The various chefs at trade school and in industry who have nurtured and challenged me along the way and given me the opportunities to develop and refine my skills and approach to the food I prepare.

Discuss the most rewarding aspects of your career.

It is an industry of opportunities with the broad sectors you can work across.

Alongside the demands of being a chef, there are the creativity and innovation that it allows and develops through recipe and dish creation and being involved in food competitions.

But above all of this is to always be learning something new about ingredients, techniques, technology, cuisines and cultures, and to challenge yourself to continually improve and be a mentor to others.

Being part of a community of cooks and chefs through the membership of and involvement in the professional associations – the Australian Institute of Technical Chefs and the Australian Culinary Federation.

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Explain the challenges you face in your job.

All of the following we need to be prepared for – long hours on your feet, hot environment, highly stressful during the service period (the adrenalin rush of service), accommodating the various (last-minute) customer requests and keeping up with the ever-changing 'fashions' and fads of food.

Is there such a thing as a 'normal' day in your work? Outline some things that you do in a day.

A 'normal' day – this usually starts with the receiving of fresh produce from a variety of suppliers or even visiting the markets to select items. Then back to the kitchen for preparation or mise en place list in preparation for the next service – chopping, slicing, making, marinating, etc.

Then service itself – one to two hours of full-on highly charged, high-speed work to fill all the customers' orders on time and at top quality. Then clean-up and back to preparation for the next service period.

Alongside this is the menu planning for functions, food orders, meeting with reps from your food suppliers, developing and evaluating new menu ideas, staff recruitment, rostering and mentoring.

These can be broken down into the main areas of:

- staffing – recruitment, training, mentoring
- food preparation and service
- finance – food costing, stock takes, etc.
- marketing and planning – functions, menu items
- kitchen cleaning and maintenance
- networking within the sector and industry and your suppliers
- research – trade shows, industry associations.

Identify the opportunities this career has afforded you.

Wow! I have been fortunate to work across a number of sectors during my career from café, bakery, restaurants through to major hotels and other sectors have included the airlines and health sectors and education. I have been able to travel to work, learn and indulge my passions alongside work. Then to owning my own food business, a restaurant and food manufacturing enterprise.

Some of the opportunities have been to be involved as a team of chefs working in major events such as sporting events and being able to support volunteer organisations such as the SES when needed. Then there are the food competitions – as an individual competitor and as part of a team – and now to be involved in teaching.

What are your career goals for the future (e.g. in five years' time)?

To continue to develop and refine skills, to be challenged and inspired by the new crop of young cooks and chefs, and the technology they are bringing into the kitchen. To be an advocate for cooking and being a chef as a profession to be proud of and to inspire others about food and cooking.

Outline the qualifications needed to complete this type of work.

Initially the completion of VCE, through an apprenticeship or traineeship in commercial cookery.

Then work experience and further study – Certificate, Diploma, Advanced diploma in Hospitality and then to a Masters – mine was in Gastronomy, could also be in business and finally, why not a doctorate?

What role has Home Economics played in your career?

That is where it all started – in a school Home Economics class and being amazed at what putting ingredients together could produce.

That is when my passion for food and learning about the how and why started, and challenging yourself to produce food that others appreciate. It still continues today.

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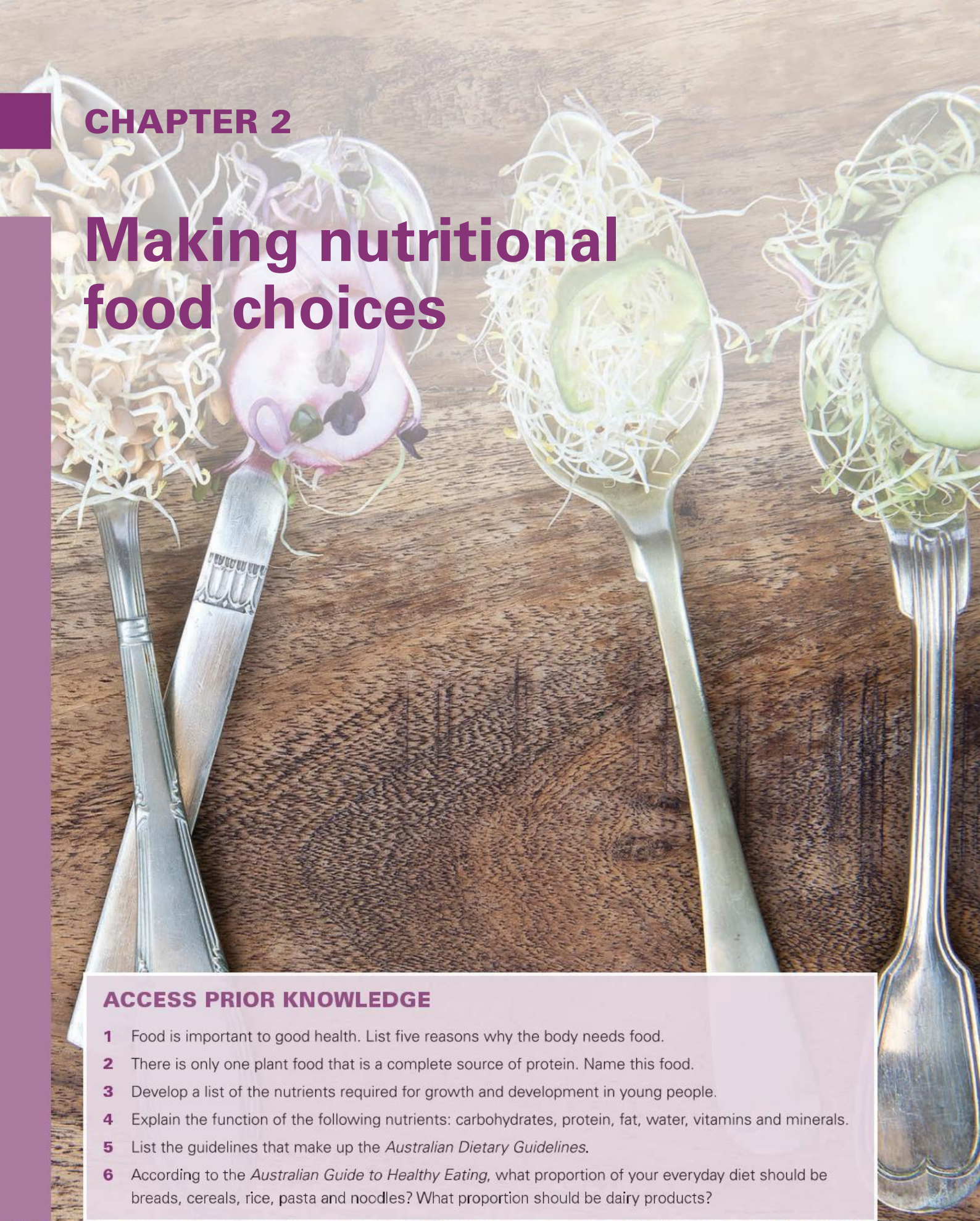
CHAPTER 2

Making nutritional food choices



ACCESS PRIOR KNOWLEDGE

1. Food is important to good health. List five reasons why the body needs food.
2. There is only one plant food that is a complete source of protein. Name this food.
3. Develop a list of the nutrients required for growth and development in young people.
4. Explain the function of the following nutrients: carbohydrates, protein, fat, water, vitamins and minerals.
5. List the guidelines that make up the *Australian Dietary Guidelines*.
6. According to the *Australian Guide to Healthy Eating*, what proportion of your everyday diet should be breads, cereals, rice, pasta and noodles? What proportion should be dairy products?

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2.1 A balanced diet

nutrients The chemical compounds found in food that are used by the body to function and grow.

balanced diet Dietary intake that includes the nutrients needed by the body for good health.

body processes A series of changes that result in growth or development.

It doesn't matter what age you are, it is important to eat well. Food is not only something to enjoy; it also provides the body with **nutrients**, which are needed for your body to function efficiently. Eating a **balanced diet** is the best way to guarantee that you are getting all the essential and non-essential nutrients that your body needs every day. Nutrients are required by our bodies for:

- energy
- growth and repair of body cells and tissues
- regulation of **body processes**
- prevention of disease.

2.1 LET'S COLLABORATE

As a class, list all the nutrient groups and their food sources.

Nutrients

Nutrients are the chemical compounds found in food that are used by the body to function and grow.

macronutrients Vital energy-yielding nutrients that are required in large quantities by the body.

micronutrients Nutrients required in small amounts by the body.

fats Compounds, usually derived from an animal source, that are solid at room temperature and liquid when heated – for example, butter.

Some nutrients are referred to as **macronutrients**, which are large molecules that the body requires in large quantities. **Micronutrients** are small molecules, and the body only needs small quantities of them.

There are six main nutrients essential for the body: protein, carbohydrates (including fibre), **fats**, vitamins, minerals and water.

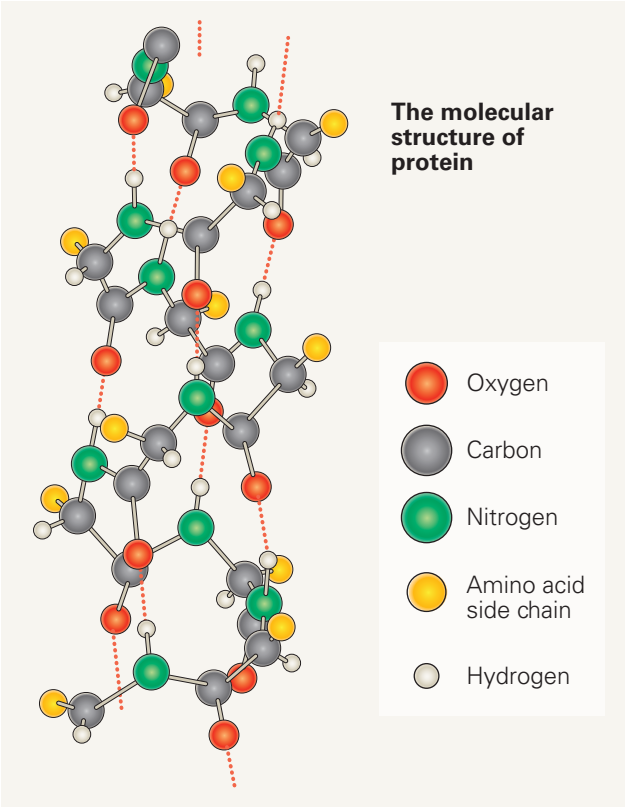

Figure 2.1 Protein is made up of carbon, hydrogen, oxygen and nitrogen which are arranged as strands of amino acids.

2.2 Essential nutrients: Protein

All cells in the body contain proteins, so it is necessary to maintain levels of protein – especially because it is necessary for growth and repair of tissues. Because the body is not able to store amino acids, it is important to consume protein every day. There are eight **essential amino acids**; these are classified as 'essential' because the body is unable to produce them itself, so they must be supplied by food. The foods containing essential amino acids are called **complete proteins** and are found in animal foods such as meat, fish, chicken and eggs, as well as soybeans.

essential amino acids The building blocks of protein needed for growth and function. The body cannot produce these, so they must be supplied through food.

complete proteins Proteins that contain all the essential amino acids for body function.

There is only one substance more plentiful in the body than protein. Can you guess what it is?

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incomplete proteins Proteins, usually from plant sources, that lack one or more essential amino acids.

vegetarian Generally, a person who eats eggs and dairy products, but does not eat any animal flesh. (This type of vegetarian is called lacto-ovo.)

vegan A person who eats only plant foods. They do not eat any animal products.

complementing proteins Proteins that lack one or more of the essential amino acids, but when eaten together can supply a complete protein.

The non-essential amino acids are able to be made by the body, and are called **incomplete proteins**. Because these are found in plant foods, it can be difficult for **vegetarians** and **vegans** to ensure that they get complete proteins. Yet, if you consume particular incomplete proteins together, you can ensure that all the essential amino acids are present. These are called **complementing proteins**.

Cereal + legume = complete protein

Brown rice + nuts = complete protein

Tofu = complete protein

Figure 2.2 Combinations of incomplete proteins can form complete proteins.

Tasty Trivia

The amount of protein you need is based on your age, weight, height and sex.

A rough recommendation for protein is calculated using the following guide:

- 1 gram per kilogram for adolescents
- 0.75 gram per kilogram for adult women
- 0.84 gram per kilogram for adult men
- around 1 gram per kilogram for pregnant or lactating women.

Calculate how much protein you should be eating every day.

Functions in the body

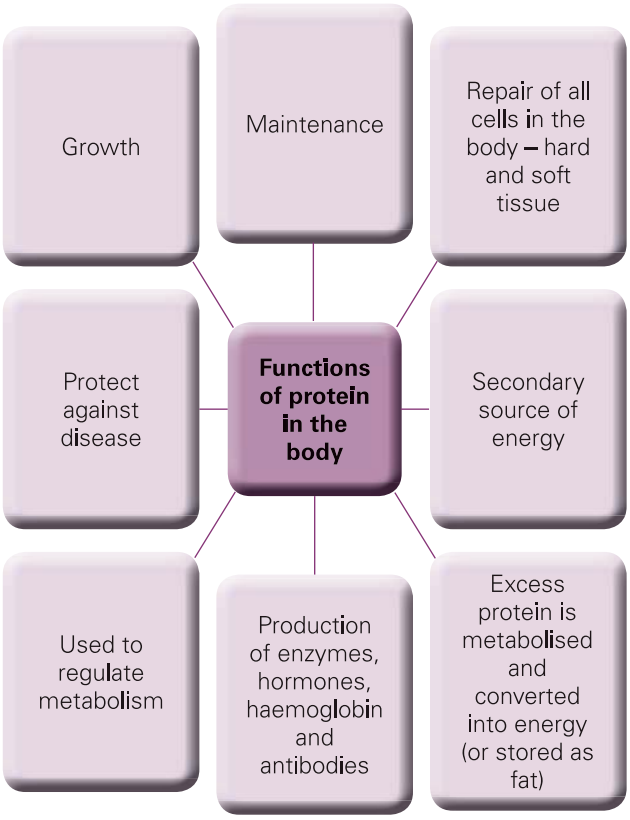

Figure 2.3 Functions of protein

Figure 2.4 Sources of protein

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Complete protein foods	Incomplete protein foods
Meat	Legumes
Poultry	Nuts
Fish	Rice
Eggs	Vegetables
Dairy products (milk, cheese, yoghurt)	Wholegrains
Soybeans	Seeds

Figure 2.5 A selection of complete and incomplete protein foods.

REFLECT ON LEARNING

1. Explain the difference between macronutrients and micronutrients.
2. Making nutritional food choices is important. Explain why nutrients are required by the body.
3. Describe the difference between essential and non-essential amino acids. Include food sources in your response.
4. Explain the function of a complete protein. List four food sources of incomplete proteins.
5. People who consume a vegetarian or vegan diet can struggle to consume the essential amino acids. Explain why this is the case and describe how this can be prevented.

2.3 Essential nutrients: Carbohydrates

Carbohydrates are made up of carbon, hydrogen and oxygen, which is why the word is often abbreviated to CHO. They are produced through the process of **photosynthesis** in plants and are stored as starches or sugars.

photosynthesis The process by which green plants and other organisms turn carbon dioxide and water into carbohydrates.

Carbohydrates are the preferred energy source for the body, and 55 per cent of your daily energy should come from this nutrient. When digested, all carbohydrates – both starch and sugar – are broken down into **glucose**, which is then used as energy during physical activity. If not used, carbohydrate is stored as glycogen in the liver and released as glucose when required.

glucose A sugar energy source produced by plant products.

Carbohydrates are divided into two groups: **complex carbohydrates** and **simple carbohydrates**.

complex carbohydrates Molecules that supply energy, fibre and other nutrients that the body needs.

simple carbohydrates A quick energy source that does not supply any other nutrients.

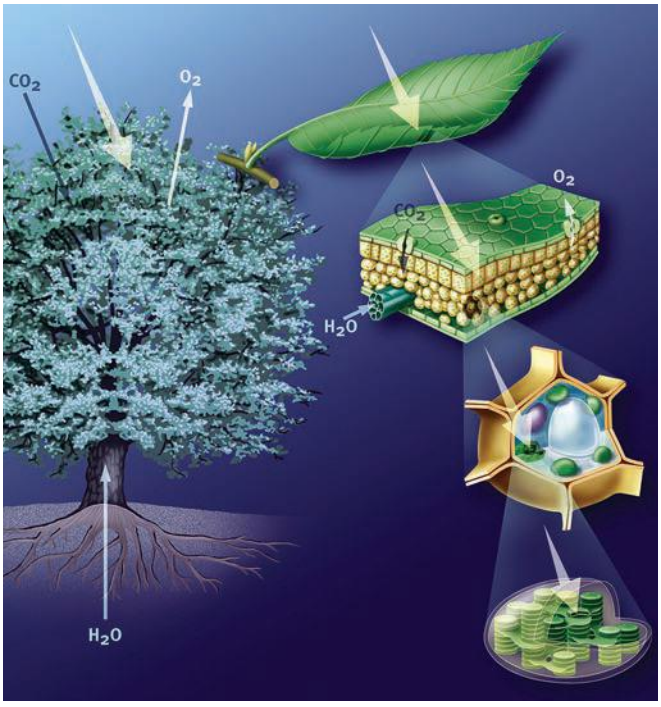

Figure 2.6 The process of photosynthesis.

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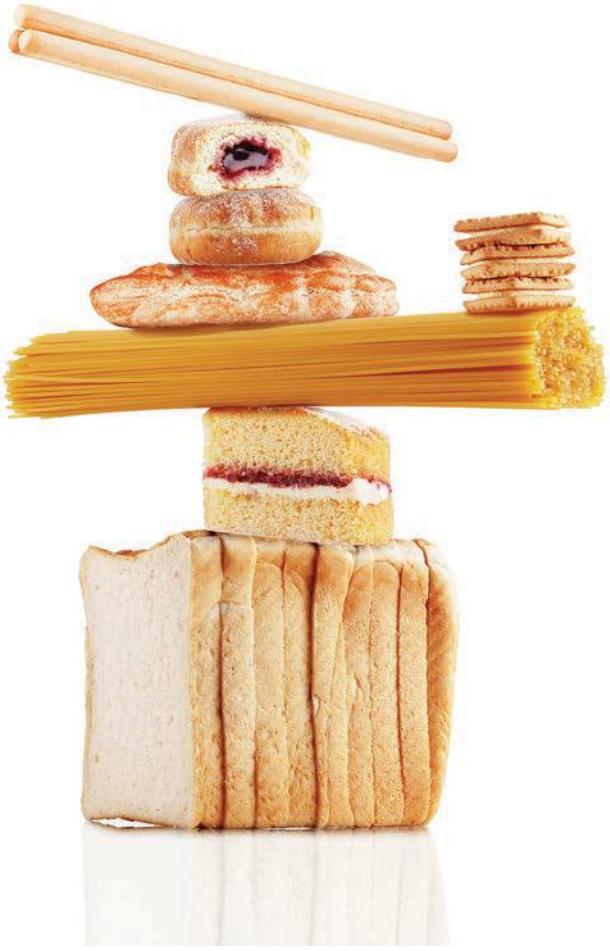
Simple carbohydrates (the sugars)	Complex carbohydrates
Monosaccharides	
There are three forms of monosaccharides: • Glucose 	There are many different types of monosaccharide molecules, including: • Starch • Fibre • Glycogen 
• Fructose 	
• Galactose 	
Disaccharides	
Two monosaccharide molecules form a disaccharide, including:	
• Sucrose (glucose + fructose) 	
• Lactose (glucose + galactose) 	
• Maltose (glucose + glucose) 	

Figure 2.7 Simple and complex carbohydrates.

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Glycaemic index

The **glycaemic index (GI)** rates carbohydrates according to how quickly they are digested, absorbed and metabolised, and raise the glucose level in blood, over a two-hour period. Carbohydrate foods are given a score out of 100; the lower the score, the lower the glycaemic index. The foods you consume should have a low GI for sustained energy release. Carbohydrates that are rapidly digested, absorbed or metabolised, such as white bread, result in a rapid increase in blood glucose levels and have a high glycaemic index of 70 or above.

glycaemic index (GI) The ranking of carbohydrates according to their effect on blood glucose levels.

It is important that people with diabetes try to incorporate at least one low-GI food at every meal to help manage blood glucose levels.

Some low-GI snacks are:

- reduced or low-fat yoghurt
- slice of raisin toast
- small can of baked beans
- corn on the cob
- large pear.

Tasty Trivia

A low GI rating of a food does not mean you can eat a larger serve of that food – the total amount of carbohydrate and kilojoules consumed is still important.

Low-GI foods: Rating of 55 or below	Medium-GI foods: Rating of 56–69	High-GI foods: Rating of 70+
GI 43 	GI 69 	GI 70 
GI 36 	GI 59 	GI 75 
GI 48 	GI 65 	GI 99 

Figure 2.8 Low-, medium- and high-GI foods

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Functions in the body

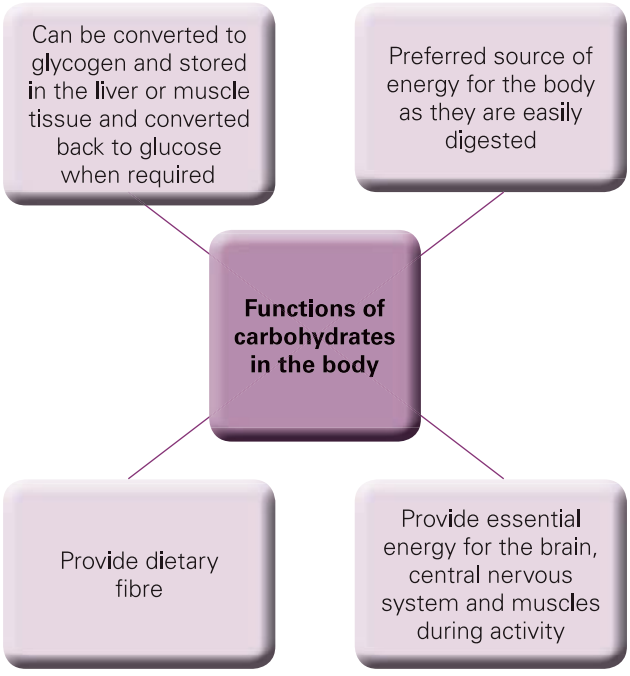

Figure 2.9 Functions of carbohydrates in the body

Good carbohydrate foods

Carbohydrates are found in foods that are starch based as well as sugar based. **Nutrient-dense** carbohydrate foods are the best source of carbohydrates, and the following foods are recommended:

- vegetables
- fruit
- wholemeal pasta
- potatoes
- bread and wholegrain **cereals**.

nutrient-dense Containing a large amount and number of different nutrients.

cereals The grasses of cultivated edible fruits or seeds.

2.2 ACTIVITY

Are you making nutritionally sound food choices?

1. List all the foods you have consumed in the last 24 hours.
2. Research the GI values of the foods on your list to analyse your diet. Use the University of Sydney Glycaemic Index site or the Glycaemic Index Foundation site to help you get started.
3. Place an up arrow next to those foods that are high GI.
4. Place a down arrow next to those foods that are low GI.
5. Develop a new menu plan for the next three days so that you consume a low-GI diet.
6. Explain the reasons for the foods that you have included in your new menu plan.
7. List the new foods you should eat to improve your GI rating. Explain why these foods are important.
8. Try putting your new GI diet into practice.

Figure 2.10 Nutrient-dense carbohydrate foods

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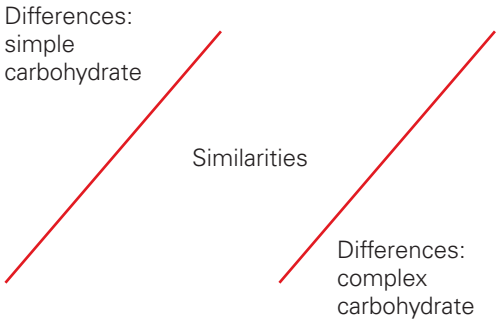
REFLECT ON LEARNING

1. State what CHO stands for and outline the function of CHOs.
2. Develop a flow chart to show how carbohydrates are digested and absorbed. Indicate in your chart where they are stored if they are not used immediately.
3. Copy and complete the following comparison alley to illustrate the similarities and differences between simple and complex carbohydrates. Write the similarities between the carbohydrate types in the centre and the differences on the outside.



4. Develop a list of high- and low-GI foods.
5. Sugary foods provide the body with carbohydrate, but are not considered a good source. Explain why this is so.

Fibre

soluble fibre The digestible fibrous parts of plants.

insoluble fibre The indigestible fibrous parts of plants.

Fibre is mostly carbohydrate and is made up of the indigestible parts of plants. There are two types: **soluble fibre** and **insoluble fibre**. Fibre is essential for a healthy diet and digestive system.

Soluble fibre	Insoluble fibre
Includes pectins, gums and mucilages, mostly found in plant cells.	Includes cellulose, hemicelluloses and lignin, the structural parts of plant walls.
Helps lower blood cholesterol.	Prevents constipation by adding bulk to faeces, ensuring regular, healthy visits to the toilet.
Completely digested by bacteria.	Promotes good digestive health by providing roughage through the intestine.

Figure 2.11 Soluble and insoluble fibres

Figure 2.12 Most plant foods contain both soluble and insoluble fibre, especially if the skin is eaten.

Resistant starch

Resistant starch is not technically 'fibre' but acts in a similar way. It is a starchy component that cannot be digested in the small intestine and is an important nutrient for bowel health. Bacteria in the large intestine break down the resistant starch into short-chain fatty acids. These acids are absorbed into the bloodstream and may help reduce blood cholesterol levels.

resistant starch The starchy component that is unable to be digested in the small intestine.

Figure 2.13 Lentils are a great source of resistant starch.

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Functions in the body

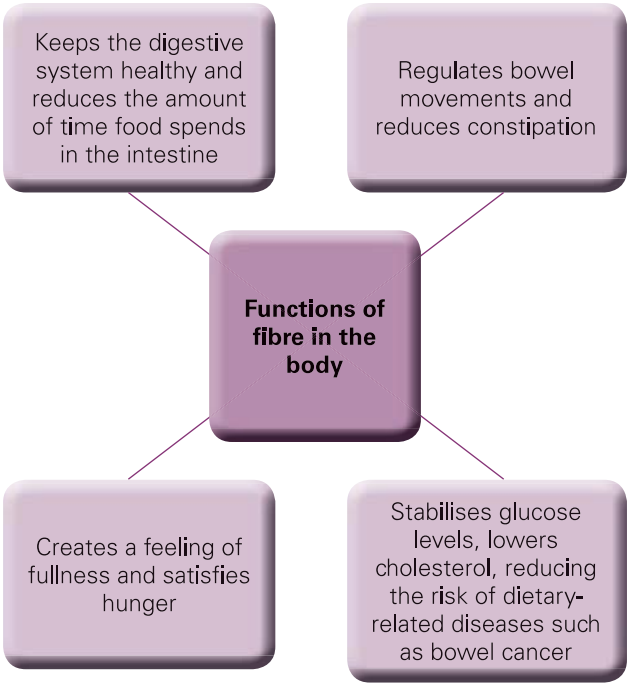

Figure 2.14 Functions of fibre in the body

Foods high in fibre

The following foods are high in fibre:

- wholegrain cereals such as soy and linseed bread
- bran
- wholemeal pasta
- brown rice
- fruit – your fibre intake increases if you eat the skin of the fruit
- vegetables
- legumes such as baked beans
- nuts such as almonds and peanuts.

DESIGN THINKING

Adults should consume 30 g of fibre a day. Most Australians don't get enough fibre. Develop a menu plan for a retirement village that contains foods high in dietary fibre.

2.3 ACTIVITY

Focus on fibre

1. Choose five recipes to create meals that could be eaten throughout one day.
2. Modify each recipe so that they all become recipes that are high in fibre. For example, for fried rice use brown rice and include a wide variety of vegetables with their skin left on.
3. Justify your reasons for each of the changes using your nutritional knowledge.

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Cornish pasties

GREAT BRITAIN

Main tools and equipment

Frying pan, rolling pin, pastry brush, knife

Production skills

Rubbing, mixing, rolling, folding

Cooking processes

Frying, baking

MAKES 4

Complex process: Pastry making

Preparation time: 45 minutes

Cooking time: 50 minutes

Serving and presentation time: 5 minutes

Total time: 1 hour and 40 minutes

Ingredients

Pastry

 150 g plain flour, sifted	 150 g self-raising flour, sifted	 Pinch of salt	 125 g butter, cut into small pieces	 ⅓ to ½ cup water

Filling

 ½ brown onion, peeled and finely diced	 2 tablespoons olive oil	 60 g lean beef mince	 ¼ swede, peeled and finely diced	 60 g pumpkin, peeled and finely diced	 70 g potato, peeled and finely diced
 60 g sweet potato, peeled and finely diced	 ½ carrot, peeled and finely diced	 ¼ turnip, peeled and finely diced	1 tablespoon tomato sauce	1 tablespoon parsley, chopped	2 teaspoons Worcestershire sauce
 ¼ teaspoon salt	 ¼ teaspoon pepper	 1 egg, lightly beaten	1 tablespoon milk		

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Cornish pasties – continued

RECIPE

Method

1. Preheat the oven to 200°C.
2. Mix the plain and self-raising flour with the salt.
3. Rub in the butter until it resembles breadcrumbs.
4. Mix to a pliable consistency with water, leave to rest for ½ an hour.
5. Fry the onion with half of the oil until translucent. Add the mince and cook until brown.
6. Add all other vegetables and stir-fry for 3 minutes. Allow to cool.
7. Mix the vegetables with the tomato sauce, parsley, Worcestershire sauce, salt and pepper.
8. Divide the pastry into 4. Roll out the rounds of the pastry until about 5 mm thick. Lightly flour the rolling surface to stop the pastry sticking (you can use a saucer to make the rounds an even size).
9. Pile mixture onto the pastry. Brush the edge of the pastry with water.
10. Cook for approximately 35 minutes until pastry is golden brown.

2.4 Essential nutrients: Fats

There are three main types of fats:

- **Polyunsaturated fats** and **monounsaturated fats** contribute positively to health, and are often referred to as **good fats** because they help lower cholesterol levels and the risk of heart disease.
- **Saturated fats** are referred to as bad fats because they contain cholesterol and are linked with many health concerns. We should replace saturated fats with monounsaturated and polyunsaturated fats for better health.

polyunsaturated fat Fatty acids that have two or more double bonds in the carbon chain.

monounsaturated fat Fatty acids that contain one double bond in the carbon chain.

good fats Fats that lower cholesterol and the risk of heart disease.

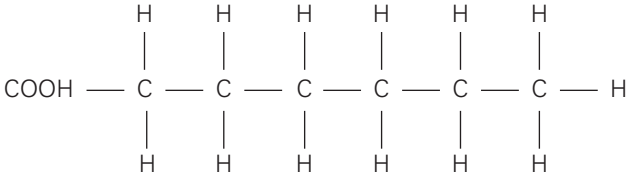
saturated fats Bad fats that clog our arteries, such as those found in animal products like full-fat dairy and fatty meat, as well as some plant-based sources.

Saturated fats

Saturated fats generally are solid at room temperature. They contribute to the risk of heart disease by increasing blood cholesterol levels.

Tasty Trivia

The reduction of saturated fat in the diet has resulted in an increase in the intake of carbohydrate.



Saturated fat

Figure 2.15 The chemical bond of saturated fats

Figure 2.16 Saturated fats are found mainly in animal products such as fatty meat, butter, full cream milk, cheese, cream, pastries, cakes, deep-fried foods, coconut oil and chocolate.

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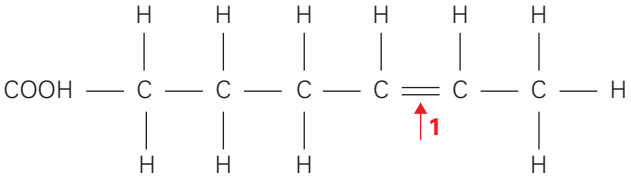
2.4 INVESTIGATE IT

Use the internet to find five diets that have been promoted to reduce saturated fat in the diet. Analyse these diets and decide whether they involve making nutritional food choices.

Monounsaturated fats

Monounsaturated fats should replace saturated fats in your diet.



Monounsaturated fat

Figure 2.17 The chemical bond of monounsaturated fats.

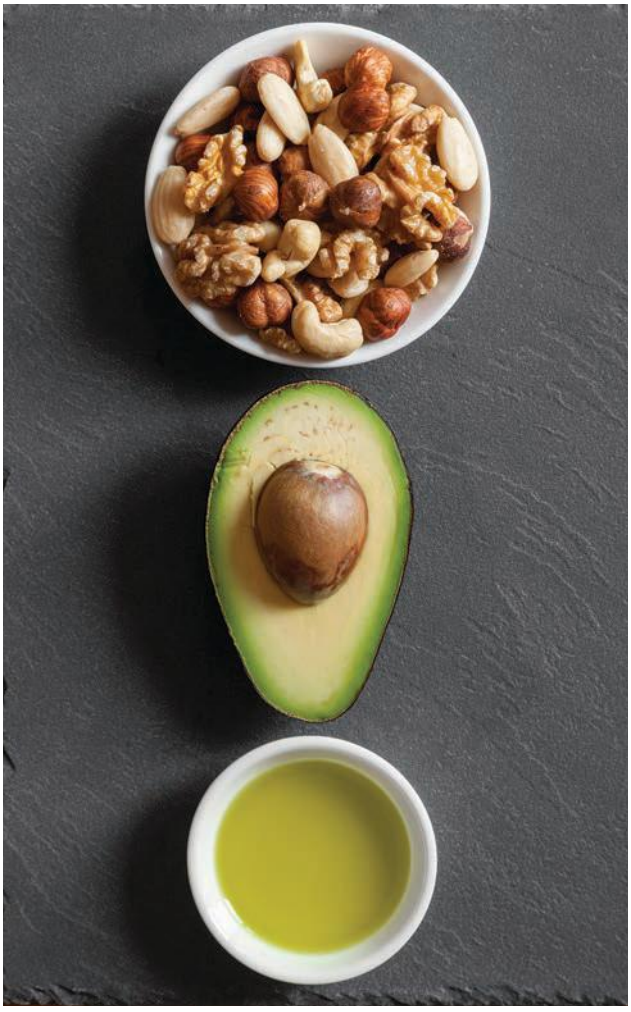


Figure 2.18 Sources of monounsaturated fats include peanuts, avocado, cashews, hazelnuts and olive oil.

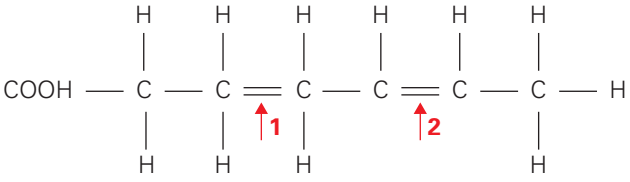
Polyunsaturated fats

These fats contain **omega-3 fatty acids** and omega-6 fatty acids. Health benefits include lowering blood cholesterol, reducing blood pressure and reducing the risk of heart disease and strokes. These nutrients are also important for human development and the immune system.

omega-3 fatty acids Long-chain polyunsaturated fats that have health benefits.

2.5 INVESTIGATE IT

Develop a list of foods that contain omega-3 or omega-6 fatty acids. Discuss how you could include more of these foods in your weekly intake of food.



Polyunsaturated fat

Figure 2.19 The chemical bond of polyunsaturated fats

Figure 2.20 Sources of polyunsaturated fats include tuna, sunflower oil, vegetable oil and nuts such as walnuts and brazil, as well as seeds.

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Functions in the body

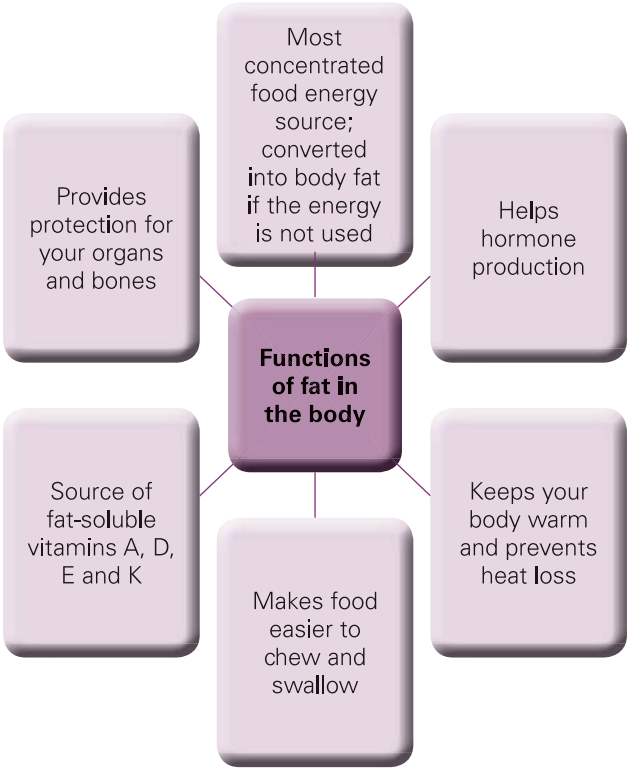

Figure 2.21 Functions of fat in the body

2.6 LET'S COLLABORATE

Work with your partner to develop a detailed description of the functions of the fat-soluble vitamins A, D, E and K. In your description, develop an explanation of the term 'fat-soluble vitamins'.

Sources of good fats

The following foods are sources of good fats:

- olive and vegetable oils
- avocado
- olives
- nuts
- seeds
- fish.

Figure 2.22 Sources of good fats

2.7 INVESTIGATE IT

Kangaroo meat is very low in fat – it usually has less than 2 per cent. This makes kangaroo meat a very healthy red meat alternative.

1. Investigate the use of kangaroo meat in a low-fat diet.
2. Find two recipes that are high in protein and low in saturated fat, and use kangaroo meat. Use the Kangaroo Industry Association of Australia website as your starting point.
3. Kangaroos were and still are eaten as a staple food in some Aboriginal communities. Find out the nutritional content of kangaroo meat and develop a nutritional panel or label that could be used by the Kangaroo Industry Association of Australia.

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Spaghetti with kangaroo meatballs

AUSTRALIA

Main tools and equipment

Knife, oven tray, bowl, frying pan, saucepan

Production skills

Rolling, chopping

Cooking methods

Frying, boiling

SERVES 2

Preparation time: 20 minutes

Cooking time: 45 minutes

Serving and presentation time: 5 minutes

Total time: 70 minutes

Ingredients

 250 g kangaroo meat, minced	 ¼ onion, finely chopped	 ¼ teaspoon lime juice	 ⅛ teaspoon wattle seeds, crushed	 ¼ cup breadcrumbs	 ½ tablespoon olive oil
 ¼ teaspoon crushed garlic	 125 g canned diced tomatoes	 ¼ teaspoon Italian mixed herbs	120 g spaghetti		
 6 basil leaves, finely chopped	 ¼ teaspoon ground black pepper	 25 g Parmesan cheese, shaved			

Method

1. Combine meat, onion, lime juice, wattle seeds and breadcrumbs in a medium bowl. Stir well.
2. Scoop out a tablespoon of mixture and roll it into a ball. Place on a greased oven tray and repeat until all balls are rolled.
3. Place meatballs into the fridge until the Napoli sauce is made.
4. Put olive oil into a large frying pan, heat slightly. Add garlic. Cook until fragrant.

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Spaghetti with kangaroo meatballs – continued

RECIPE

5 Stir in diced tomatoes and mixed herbs. Heat through.
6 Place a large saucepan of water on the stove to boil.
7 Carefully place meatballs into tomato sauce mix. Simmer, turning often to cook through.
8 Put spaghetti into boiling water and cook until al dente.
9 Stir basil leaves and ground black pepper into tomato mix.
10 Serve cooked spaghetti with meatballs and sauce over the top.
11 Sprinkle with Parmesan cheese.

REFLECT ON LEARNING

1 Develop a list of the benefits of a high-fibre diet.
2 List five foods that should be included in a high-fibre diet.
3 Outline the similarities between soluble and insoluble fibre.
4 Explain the difference between saturated and unsaturated fat.
5 List five foods that contain saturated fat and five foods that contain unsaturated fat. Which list of foods represents the most significant health risk. Outline the reasons for your answer.

2.5 Essential nutrients: Vitamins

vitamin An organic substance vital for the body in small quantities.

water-soluble vitamins Vitamins that dissolve in water.

fat-soluble vitamins Vitamins (A, D, E and K) that are not soluble in water and that need to be stored in the body in either the liver or in fatty tissues. They are transported around the body by special proteins.

Vitamins are micronutrients that are vital for the body in small amounts. There is a wide variety of different vitamins and many have differing functions for the body. Some foods contain only one or two vitamins, while others contain many types. The body does not produce most vitamins, so they must be obtained from food. The best way to ensure you are meeting all your vitamin requirements is to consume a wide variety of fresh foods. Freshness is especially important, as vitamins are often lost during the processing of foods. There are two groups of vitamins: **water-soluble** and **fat-soluble**.

Water-soluble vitamins (B group and C)

These vitamins are not stored in the body and they dissolve in water. This allows them to be carried around the body in the blood. These vitamins are easily destroyed if foods are cooked in water.

Fat-soluble vitamins (A, D, E and K)

These vitamins do not dissolve in water and can be stored in the body, either in fat tissue or in the liver. These

Figure 2.23 Fresh produce is packed full of micronutrients.

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Vitamin	Source	Major function in the body
Vitamin A (retinol)	Liver, kidneys, carrot, egg yolk, butter, oily fish, dark green and orange fruits and vegetables such as spinach, mango, pumpkin and rockmelon	• Maintains eyesight • Protection from infection • Growth of soft and hard tissue
Vitamin B_1 (thiamine)	Wholegrain cereal products, legumes, nuts, liver, kidney, lean pork, yeast extracts	• Enables energy to be released from food • Promotes functioning of the nervous system and heart
Vitamin B_2 (riboflavin)	Liver, kidneys, milk, cheese, green vegetables, yeast extracts	• Growth of new tissue, especially skin and eyes • Enables energy to be released from food
Vitamin B_3 (niacin)	Liver, meat, fish, wholegrain breads and cereals, yeast products, legumes	• Enables energy to be released from food • Healthy skin
Vitamin B_6 (pyridoxine)	Meat, legumes, poultry, wholegrain breads and cereals	• Enables energy to be released from food • Formation of red blood cells
Vitamin B_{12} (cyanocobalamin)	Eggs, liver, kidney, meat, milk, fish, seafood	• Formation of red blood cells • Formation of DNA
Vitamin C (ascorbic acid)	Citrus fruit, berries, capsicum, broccoli	• Assists iron absorption • Needed for soft tissue formation and healing
Vitamin D (cholecalciferol)	Fatty fish, eggs, sunlight, dairy products, margarine	• Absorption and metabolism of calcium and phosphorus
Vitamin E (tocopherols)	Nuts, seeds, fish, wholegrain cereals, eggs, vegetable oils	• Maintenance of healthy cell membrane
Vitamin K	Leafy green vegetables, eggs, liver, cheese, made by bacteria in the intestine	• Blood clotting
Folate	Leafy green vegetables, yeast, liver, kidney, lentils, oranges, asparagus	• Cell division and multiplication • Red blood cell formation • Assists in the prevention of neural tube defects such as spina bifida • Assists in the metabolism of protein

Figure 2.24 Major functions of vitamins in the body

vitamins are usually not damaged by cooking. Due to the fact that these vitamins can be stored, excessive amounts can be toxic – although this is rare.

Newborn babies are given a vitamin K injection at birth to prevent severe bleeding, which can sometimes happen in the brain and can cause brain damage. Infants are born with very low levels of vitamin K. Vitamin K is not found in breast milk or milk formula, and is not consumed until infants are eating solid foods at around six months of age.

2.8 ACTIVITY

Read the tasty trivia on this page. If babies do not get vitamin K from breast milk, they must be given a diet high in vitamin K once they start eating solid foods. Investigate the foods that contain Vitamin K and suggest how these could be consumed by a toddler. Be sure to be creative, as toddlers can be very fussy eaters!

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Tasty Trivia

In 1747, James Lind, a British naval surgeon, discovered that eating lemons and limes prevented the deadly disease scurvy, which was common among sailors who lived on biscuits and salted pork.

Figure 2.25 The mouth of a patient affected by scurvy

2.9 ACTIVITY

Vital vitamins

1 Work individually to list the vitamins that each of the following foods contains (remember that they may have more than one):
   - **a** oranges
   - **b** eggs
   - **c** liver
   - **d** milk
   - **e** lentils
   - **f** butter.

2 Working collaboratively, choose one of the vitamins listed in Figure 2.24 on p. 53. Investigate the consequences of being deficient in this vitamin and then produce a computer-generated information poster or oral presentation detailing the information that you have collected. Your poster or presentation must include the following information:
   - **a** the vitamin chosen
   - **b** the condition caused by a deficiency
   - **c** signs and symptoms of a deficiency
   - **d** prevalence of this condition in Australia and around the world, and who generally is affected by this condition
   - **e** food products you should consume to avoid this deficiency
   - **f** a recipe for a food item that could be included in a school lunchbox and that would be a good source of the vitamin.

3 Use a program such as Photoshop or Illustrator to present your information professionally.

4 Each member of the team should take on one of the following roles to equally share the research and presentation work fairly:
   - *time manager* – monitors the team's use of time to ensure everyone stays on task
   - *recorder* – writes down ideas as they are discussed
   - *summariser* – asks questions to clarify the team's thinking and ensures that everyone in the team has the same understanding of what is being discussed.

5 At the conclusion of this task, reflect on your participation in this activity by detailing what you have learnt about the vitamin you studied.

6 Are you at risk of a vitamin deficiency? Explain your answer.

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2.6 Essential nutrients: Minerals

Minerals are chemicals other than carbon, hydrogen, oxygen and nitrogen that are found in the body. Minerals are necessary for good health, and are part of many hormones and enzymes. Minerals are classified as either trace or major; the body requires larger quantities of major minerals, such as calcium and iron, whereas trace minerals such as iodine are only needed in small amounts.

minerals Elements required by the body and found in foods.

DESIGN BRIEF: HIGH-CALCIUM MILK SMOOTHIE

Calcium is one of the most important minerals for adolescents. Design a high-calcium flavoured milk smoothie to encourage young people to increase their calcium intake. You will need to use two other high-calcium ingredients, in addition to milk, to ensure calcium needs are met. Your product needs to serve two people and be presented in a way that would appeal to adolescents.

1. Research foods high in calcium.
2. Create, design and produce your milk drink.
3. Complete the sensory table below to analyse the success of your smoothie.
4. Get your classmates to taste your drink. You all need to try at least two smoothies other than your own.
5. Copy the table to evaluate the flavoured milk drinks. Explain which one was the most popular in the class. Discuss why you think this was the case.

	Appearance	Aroma	Texture	Taste	Rating 1 to 5 (5 = outstanding)
My own smoothie					
Smoothie 1					
Smoothie 2					

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Mineral	Source		Major function in the body
Calcium	Milk, yoghurt, cheese, bones of small fish such as sardines, almonds, dried figs, prawns		• Growth and ossification of bones and teeth
Copper	Shellfish, liver, kidney, legumes, dried fruit, wholegrain bread and cereals		• Formation of red blood cells, functioning of the nervous system
Fluoride	Fluoridated drinking water		• Maintenance of strong bones and teeth
Iron	Meat, eggs, chicken, legumes, dark leafy green vegetables, wholegrain bread and cereals		• Formation of red blood cells • Carries oxygen around the body
Phosphorus	Meat, dairy products, eggs, fish		• Builds strong bones and teeth
Potassium	Meat, milk, raw leafy green vegetables, nuts, dried fruit		• Fluid balance • Metabolism of carbohydrate
Magnesium	Wholegrain bread and cereals, almonds, walnuts, legumes, leafy green vegetables, bananas		• Bone structure • Assists the control of nerve functioning and muscle contraction
Sodium	Salt, added to most foods, especially processed foods		• Fluid balance
Zinc	Seafood, liver, nuts, chicken, milk, wholegrain breads		• Functioning of the immune system and healing of wounds • Maintenance of sex glands, including maturation and reproduction

Figure 2.26 Major functions of minerals in the body

The most common mineral deficiencies are calcium (leading to osteoporosis) and iron (resulting in anaemia). The best way to ensure you are consuming the minerals you need for good health is by eating a balanced diet that includes a wide variety of foods, as food is the best source of minerals.

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REFLECT ON LEARNING

1. Name the two groups of vitamins and list the vitamins in each of the two groups. Match a food to each of the vitamins.
2. List the vitamins found in wholegrain breads and cereals.
3. Evaluate the differences between major and trace minerals and provide two examples from each classification.
4. List the two most common minerals in which people are commonly deficient. Provide two ideas for increasing adolescent intake of these minerals to help decrease the risk of deficiency.
5. Identify the vitamins and minerals that assist in the absorption of calcium.

2.7 Essential nutrients: Water

Water is essential for life and is responsible for many functions in the body. The human body is able to last weeks without food, but only a few days without water. Every cell in the body uses water to maintain cell structure, and water is vital for energy production and growth.

Water loss

A loss of 5–10 per cent of body water results in serious **dehydration**, and can be life-threatening. The best way to tell whether you are getting enough water is to inspect your urine. It should be clear or pale yellow. If not, it is time to drink up! You should drink six to eight glasses daily, more in warmer weather or if you are particularly active.

dehydration A dangerous lack of water in the body.

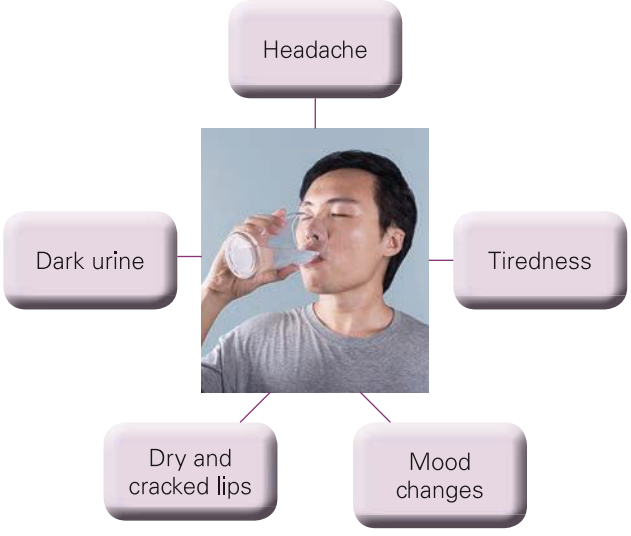

Figure 2.27 Symptoms of dehydration

Functions in the body

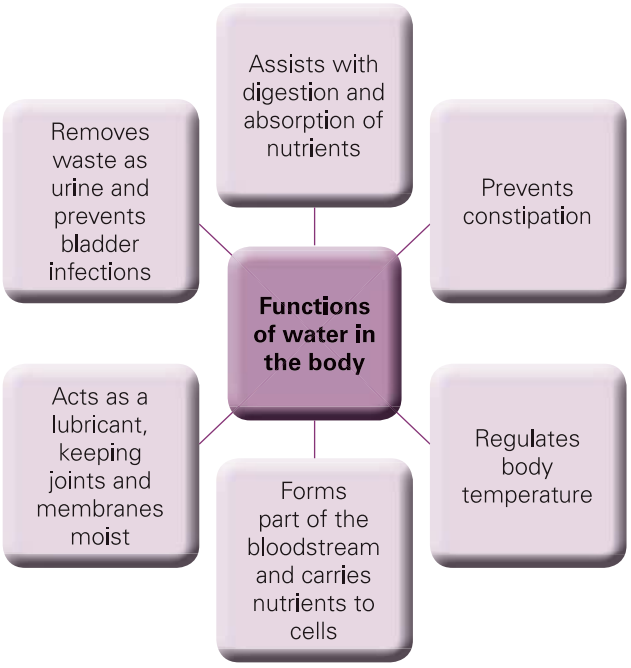

Figure 2.28 Functions of water in the body

Sources of water

Most foods contain water, but vegetables and fruit have more than other foods. At least half of your daily water intake should be consumed as plain tap water.

2.10 INVESTIGATE IT

Bottled water is NOT the best source of water. Discuss why and make a sustainable decision about what type of water you will drink in the future and how you will drink it. Start your investigation at the All About Water website.

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2.11 ACTIVITY

Water in food

1 Can you analyse how much water is in the foods we eat? Investigate by completing the following experiment:
   - **a** Collect half a tomato and a slice of bread.
   - **b** Weigh each item and record the weight.
   - **c** Preheat oven to 160°C.
   - **d** Place food items on an oven tray. Heat for 25 minutes.
   - **e** Weigh each item again and record the weight.
   - **f** Work out the amount of moisture in the bread and tomato.
   - **g** Explain how the water content has changed.

2 Discuss the benefits of dehydrating foods.

3 Identify the foods you eat that contribute water to your diet.

4 If we can consume water through foods, why do you think it is recommended that we drink at least six to eight glasses of water a day?

5 List five foods you believe have a high water content.

6 Design your own 'water in food' experiment by choosing another two items to investigate.

2.8 Refuelling your body

We know that food and water are basic human needs, and we cannot survive for a long period without either. The body is a complex and amazing system. It knows when it needs to be refuelled and this is why we feel hungry at various times throughout the day.

The **hypothalamus** monitors the nutrient levels in our bloodstream and sends out messages that create feelings of **hunger** or thirst when nutrient levels fall below what the body needs to function. However, the body is not able to tell us what it needs or what to eat; this is a decision we make for ourselves based on a number of factors, including our **appetite**.

hypothalamus The central area in the brain that controls involuntary functions.

hunger The feeling of emptiness in the stomach; your body's signal that it needs food.

appetite The desire or need for food.

The digestive tract

When foods are consumed, the body breaks the food down into a form that it can absorb and digest. A number of organs are responsible for digesting, absorbing and metabolising your food to provide the energy and nutrition your body needs. These make up the digestive tract.

Tasty Trivia

The surface area of the small intestine is about 250 m^2, which is around the same size as a tennis court!

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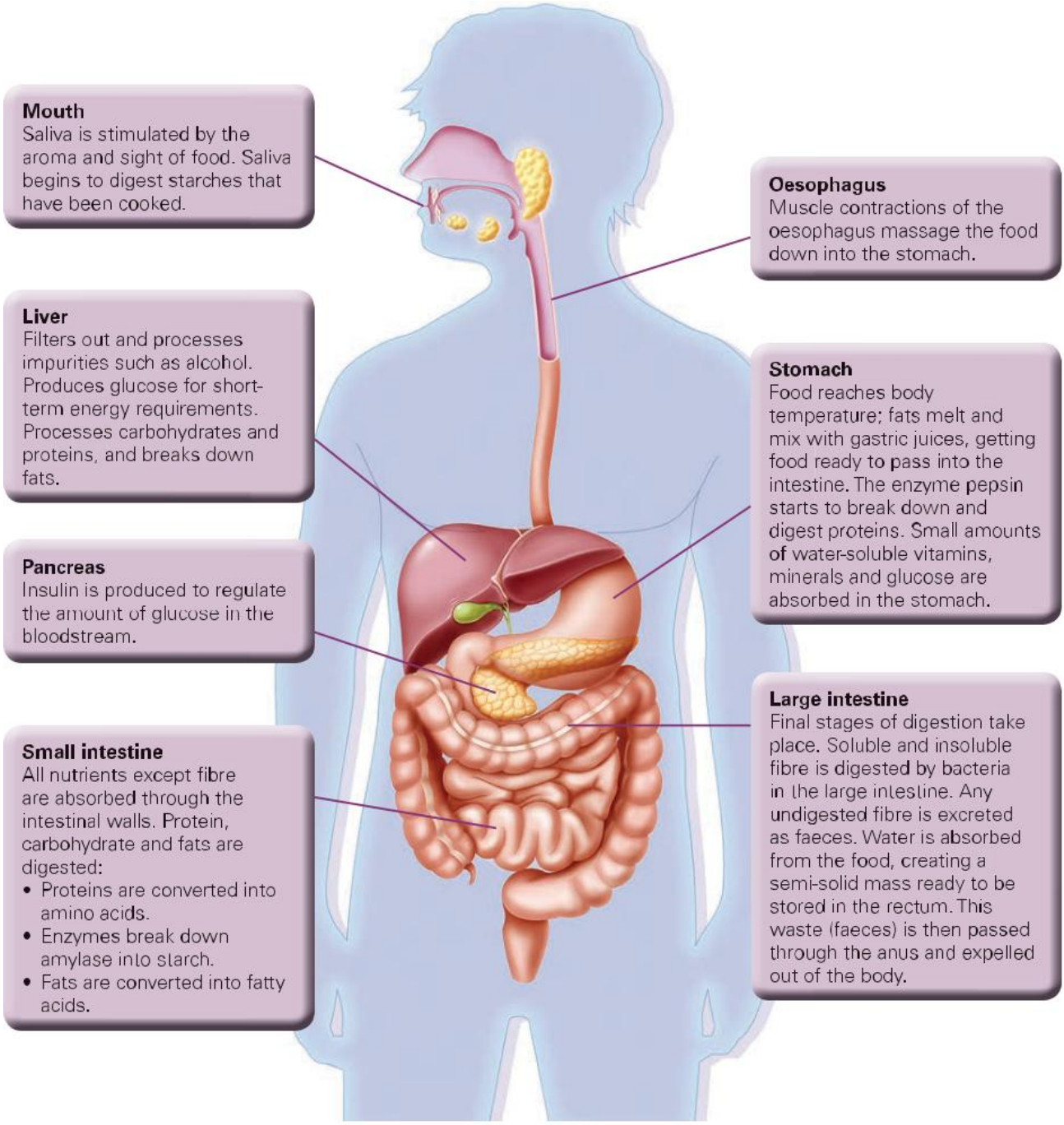

Figure 2.29 The digestive tract

2.12 ACTIVITY

Create your own digestive journey

1 Find a recipe that promotes nutritional food choices. Prepare the recipe and eat the food produced.

2 As you eat the food that you have prepared, develop a graphical representation of the digestive journey of the ingredients and nutrients of this recipe to illustrate how food is digested. You can use Photoshop or similar software to present it.

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REFLECT ON LEARNING

1. Explain how the body is able to let us know we are hungry.
2. List the organs involved in the digestion of food.
3. Name the substance released by the pancreas. Explain the function of this in the body.
4. Describe the role of saliva in the digestion of food.
5. Prepare a summary chart showing where each nutrient is digested and absorbed.

DESIGN BRIEF: DELICIOUS AND NUTRITIOUS!

Poached chicken is an example of a delicious and nutritious meal, incorporating the nutrients discussed earlier in this chapter. Design your own delicious and nutritious meal and give it an appealing recipe name.

1. List the nutrients that you need to include in your meal and possible food sources.
2. Investigate the different flavouring options you could use. You may like to use a marinade like the Poached Chicken recipe on p. 61 or fresh herbs and spices.
3. Generate three different meal solutions.
4. Choose your preferred solution and justify your choice. Make sure you link your choice to the brief.
5. Complete a nutritional analysis of your meal idea. Visit the SELFNutritionData website. Input the information for your recipe and the program will create the nutrition information for you.
6. Produce your meal.

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Poached chicken breast

Main tools and equipment

Saucepan with tight-fitting lid

Production skills

Simmering

Cooking processes

Boiling

Ingredients

 1 chicken stock cube	 ¼ onion	 8 cm stick celery
 1 bay leaf	 ¼ carrot	 2 peppercorns
 Water, enough to cover the chicken	 1 small chicken breast	

Method

1. In a saucepan with a tight-fitting lid, add chicken stock, onion, celery, bay leaf, carrot and peppercorns to the water.
2. Bring to the boil.
3. Add the chicken breast and reduce heat to just below simmering point (87–95°C).
4. Cover with lid and cook for 8 minutes.
5. Turn off heat, allow chicken to cool and remove from liquid.

MAKES 1 SERVE

Preparation time: 15 minutes

Cooking time: 15 minutes

Serving and presentation time: 5 minutes

Total time: 35 minutes

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lifespan The length of time that a person can be expected to live and the stages through which they will progress – for example, infancy and adolescence, adulthood and old age.

development The gradual changes in an individual's physical, social, emotional and intellectual states and abilities.

2.9 Nutrient needs across the lifespan

As we develop, our nutrient needs change. Many specific nutrients are required during each stage of the **lifespan** that are important for health and **development**.

2.13 LET'S COLLABORATE

It is recommended that women of childbearing age consume 400 mg of folate per day for one month prior to and during pregnancy.

1. List the foods rich in folate. How hard or easy do you think it would be to consume 400 mg of folate per day?
2. Can you think of any other ways for women to ensure they are consuming the recommended level?

	Important changes	Important nutrients
	• Rapid growth and development of the foetus, including: – development of red blood cells – new foetal tissues. • Normal mother weight gain is 10–13 kg.	• Iron – increased production of red blood cells • Protein – new foetal tissue and placenta • B group vitamins – energy release • Folate – research shows increased levels of folate can reduce the incidence of neural tube defects in unborn babies • Calcium – foetal skeletal system • Vitamin C – connective tissue and iron absorption • Carbohydrate

Figure 2.30 Nutrient needs in the prenatal stage of development

	Important changes	Important nutrients
Infancy (0–2 years of age) 	• The most rapid growth and development occurs. • Infants usually increase in length by 50 per cent and in weight by 300 per cent from birth until 1 year of age. • Highest level of nutrition required. • Only small amounts of food able to be consumed because of infant body size.	• Fat – energy • Protein – rapid growth • Carbohydrate • Calcium – bone growth • Water – so infants do not become dehydrated
Childhood (2–11 years of age) 	• Continued growth, but not as rapidly as infants. • Should be consuming a nutrient-dense diet. • Dietary requirements dependent on physical activity. • Baby teeth lost and replaced with secondary teeth.	• Carbohydrate • Protein • Calcium • B group vitamins • Iron • Zinc – development of the immune system and assists muscle growth • Water

Figure 2.31 Nutrient needs across the lifespan

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	Important changes	Important nutrients
Adolescence (12–18 years of age) 	• Period of rapid growth. • Hormone production increased. • Puberty commences. • Formation of peak bone mass.	• Carbohydrate • Calcium • Protein • Iron – especially for females to replace blood lost during menstruation • B group vitamins • Vitamin C
Adulthood (19–60 years of age) 	• During this stage, growth has stopped but nutrients are still required for the maintenance and repair of tissues.	• Protein • Calcium – to prevent osteoporosis • Iron
Late adulthood/ elderly (60 years and older) 	• Women experience menopause. • Calcium loss in bones. • Organ function may decline, impacting digestion and metabolism. • Appetite decreases. • Energy needs reduce.	• Calcium – during menopause, calcium loss can increase • Fibre • Protein

Figure 2.31 Nutrient needs across the lifespan – continued

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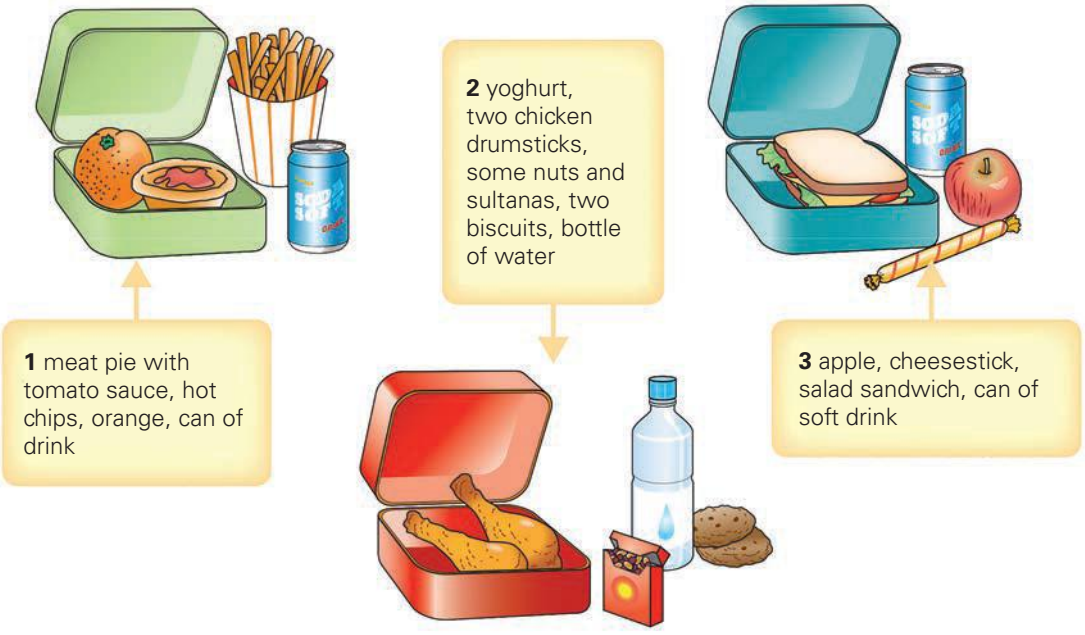
2.14 ACTIVITY

Lunchbox vs lunchbox



Look at the picture of the three lunchboxes and answer the following questions.

1. Which lunchbox do you think best addresses the nutritional needs of children? Explain the reason for this.
2. Each lunchbox contains some everyday foods and good nutritional choices – identify these items for each lunchbox.
3. Combine the food items from the three lunchboxes to create the best lunch for a child.
4. Create a list of alternative foods that would ensure a balanced diet and include the nutrients needed by children.

2.15 ACTIVITY

Scrapbook

1. Create a timeline or scrapbook page highlighting each of the lifespan stages, their growth and development and the important nutrients required at each stage.
2. Include as many visual representations as you can – for example, include a picture to illustrate each lifespan stage.
3. Include an ideal daily menu for each lifespan stage. Remember to incorporate the significant nutrients.

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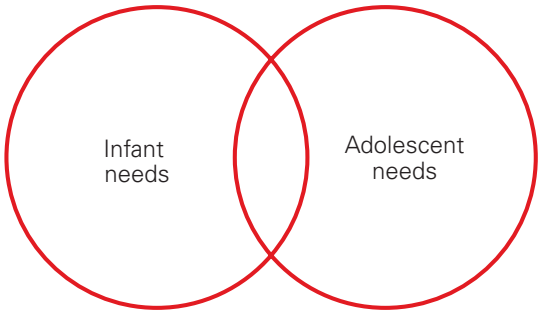
REFLECT ON LEARNING

1 Energy is important for all age groups. Explain the nutrients that provide energy and outline why energy is important for all ages.

2 Copy and complete the following Venn diagram to compare the needs of an infant to an adolescent.



3 Discuss the reasons why food and nutrient needs differ throughout the lifespan.

4 Identify which nutrients are especially important for the growth and development of adolescents and explain why.

5 There has been some discussion that once women are of childbearing age they should be required to increase their consumption of folate. What is the reasoning for this? Do you agree with this? Justify your response.

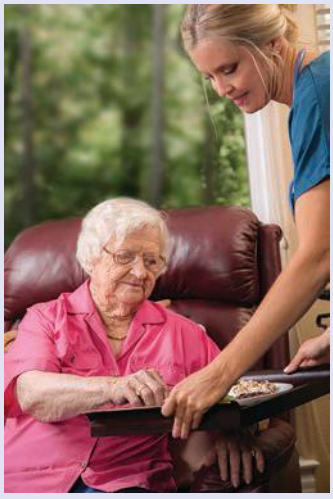
DESIGN BRIEF: MEALS ON WHEELS

The Meals on Wheels program aims to provide a meals service to people at nutritional risk throughout metropolitan and rural Australia. Every year, over 10 million meals are produced and delivered to 10 000 people around Australia.

The Meals on Wheels dietitian is looking for new and exciting recipe ideas that would be suitable for the program's clientele – elderly people and young people with disabilities who want to live independently at home. They want you to design a meal suitable for both age groups that will meet their nutritional needs. It needs to be a hot main meal that could be eaten for either lunch or for dinner. Your meal must be of a high quality and well presented to appeal to the Meals on Wheels clientele.

You are only required to produce a sample recipe at this stage (to serve two).

Hint: for the elderly, you will need to be considerate of the fact that many individuals aged 65 and older experience teeth deterioration and loss. Consider what impact this will have on what you produce and how you present your item.



Investigating

1 List the nutrients your meal is required to contain and suggest good food sources for each of these.

2 Identify the constraints and considerations of the Meals on Wheels design brief.

3 Write three criteria for success questions from the design brief to ensure you have met the constraints and considerations of the brief.

4 Research special requirements for people who have dentures.

5 Design and produce your meal.

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Corn chowder with croutons

USA

RECIPE

Main tools and equipment

Knife, board, saucepan, oven tray

Production skills

Pan frying, blending, stirring, puréeing, cutting – cubes

Cooking methods

Frying – dry method; simmering – wet method; baking

SERVES 2

Preparation time: 15 minutes

Cooking time: 30 minutes

Serving and presentation time: 5 minutes

Total time: 50 minutes

Ingredients

Corn chowder

 1 bacon rasher, chopped	 ¼ onion, chopped	 ½ celery stalk, diced small	½ large potato, diced	1 cup vegetable stock	1 cup milk
 1 tablespoon plain flour	 125 g corn kernels	 ⅓ red capsicum, diced	½ teaspoon thyme		
 1 spring onion, chopped	 Pinch salt	 Pinch cayenne pepper	1 tablespoon cream, garnish		

Croutons

 1 slice bread	 Olive oil spray	 Garlic (optional), 1 clove

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Method

1. Lightly fry the bacon, onion and celery in a saucepan. Do not brown.
2. Add potato and cook for 1 minute.
3. Add the vegetable stock, cover and simmer for 10 minutes (until potato is soft).
4. Add ¾ of the cup of milk to the saucepan, keeping ¼ cup of milk aside.
5. Blend the leftover ¼ cup of milk with the flour.
6. Add the flour and milk mixture to the saucepan. Stir until boiling then cook for 3 minutes.
7. Add corn, capsicum, thyme, spring onion, salt and cayenne pepper to taste.
8. Cook for 5 minutes. (Note: You may like to purée the soup for a smooth consistency and texture.)
9. For the croutons, preheat oven to 180°C.
10. Remove crusts from bread.
11. Cut bread into 1 cm cubes.
12. Place on a baking tray and spray lightly with olive oil. (Option: for extra flavour, rub garlic on the bread before cutting.)
13. Bake in the oven for about 5 minutes or until golden brown.
14. Serve soup and garnish with croutons.

Evaluating

1. Answer the criteria for success questions you set at the beginning of the design brief.
2. Describe your product's appearance, aroma, taste and texture using sensory analysis language.
3. Conduct a PMI (Plus/Minus/Interesting) reflecting on this design brief. Include points on your meal, planning, production skills and any areas that you would like to improve.
4. Discuss how you have addressed the nutritional and physical needs of the Meals on Wheels clients.

2.10 Food-selection models

Food-selection models enable individuals, families and communities to make informed food choices to maintain their health. Over the years, many of these models have been reviewed and updated to reflect developments in nutrition and the links between diet and disease.

A range of Australian food-selection models with a similar message are available, all providing information on how to eat well. Only the presentation of the models and the complexity of the information provided vary.

Australian Guide to Healthy Eating

The *Australian Guide to Healthy Eating* was introduced in 1999 and revised in 2013. It is a practical guide for food selection. It was developed to encourage the consumption of a variety of foods from the five food groups every day; the size of each segment represents the amount that should be consumed. The foods illustrated in the guide are the most commonly eaten foods from each section by Australians.

Foods not in the circle

Some foods do not fit into the five food groups. These foods are not essential to provide the body with the nutrients it needs, but contribute to the enjoyment of eating. These foods typically contribute a large amount of energy. The inclusion of these foods in the guide allows consumers to consider these foods in their selection of a healthy eating pattern, but illustrates that they should not be consumed daily or in large amounts.

2.16 LET'S COLLABORATE

In the *Australian Guide to Healthy Eating*, water has been left out of the circle, but features prominently on the page. Discuss why this might be.

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Figure 2.32 *Australian Guide to Healthy Eating*

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2.17 ACTIVITY

Food groups

1. Identify each of the five food groups in the *Australian Guide to Healthy Eating*.
2. Write down all the foods illustrated for each group. *Hint:* there are over 30!
3. Identify the foods not in the circle and write down the food group to which they belong. Highlight why these foods are not included in the circle.
4. Determine the approximate percentage of each section in the total daily diet. Remember that all your figures should add up to 100 per cent.

Australian Dietary Guidelines

The *Australian Dietary Guidelines* were first produced in 1979 by the Commonwealth Department of Health and have been revised a number of times, responding to changes in nutritional information and the needs of Australians. The most recent guidelines were released in 2013.

Unlike the *Australian Guide to Healthy Eating*, the *Australian Dietary Guidelines* highlight groups of foods and lifestyle patterns that promote good health and nutrition. No guideline is considered more important than another, and together they are the best guide to food, nutrition and health. Because nutrition needs are different during the lifespan stages, this is reflected in the different dietary guidelines available.

There are five principal recommendations featured in the *Australian Dietary Guidelines*. Each guideline is considered to be equally important in terms of public health outcomes.

Guideline 1: To achieve and maintain a healthy weight, be physically active and choose amounts of nutritious food and drinks to meet your energy needs

- Children and adolescents should eat sufficient nutritious foods to grow and develop normally. They should be physically active every day and their growth should be checked regularly.
- Older people should eat nutritious foods and keep physically active to help maintain muscle strength and a healthy weight.

Guideline 2: Enjoy a wide variety of nutritious foods from these five groups every day:

- Plenty of vegetables, including different types and colours, and legumes/beans.
- Fruit.
- Grain (cereal) foods, mostly wholegrain and/or high cereal fibre varieties, such as breads, cereals, rice, pasta, noodles, polenta, couscous, oats, quinoa and barley.
- Lean meats and poultry, fish, eggs, tofu, nuts and seeds, and legumes/beans.
- Milk, yoghurt, cheese and/or their alternatives, mostly reduced fat (reduced fat milks are not suitable for children under the age of two years).
- Drink plenty of water.

Guideline 3: Limit intake of foods containing saturated fat, added salt, added sugars and alcohol

- Limit intake of foods high in saturated fat, such as many biscuits, cakes, pastries, pies, processed meats, commercial burgers, pizza, fried foods, potato chips, crisps and other savoury snacks.
- Replace high-fat foods that contain predominantly saturated fats such as butter, cream, cooking margarine, coconut and palm oil with foods that contain predominantly polyunsaturated and monounsaturated fats such as oils, spreads, nut butters/pastes and avocado.
- Low-fat diets are not suitable for children under the age of two years.
- Limit intake of foods and drinks containing added salt.

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- Read labels to choose lower sodium options among similar foods.
- Do not add salt to foods in cooking or at the table.
- Limit intake of foods and drinks containing added sugars such as confectionery, sugar-sweetened soft drinks and cordials, fruit drinks, vitamin waters, energy and sports drinks.
- If you choose to drink alcohol, limit intake. For women who are pregnant, planning a pregnancy or breastfeeding, not drinking alcohol is the safest option.

Guideline 4: Encourage, support and promote breastfeeding

Guideline 5: Care for your food; prepare and store it safely

2.18 ACTIVITY

Evidence suggests …

The *Australian Dietary Guidelines* provide advice on how many serves of these food groups you need to consume every day, depending upon your age, gender, body size and physical activity levels.

According to the Eat for Health website, evidence suggests that:

- Australians need to eat more:
  - vegetables and legumes/beans
  - fruits
  - wholegrain cereals
  - reduced fat milk, yoghurt, cheese
  - fish, seafood, poultry, eggs, legumes/beans (including soy), and nuts and seeds
  - red meat (young females only).
- Australians need to eat less:
  - starchy vegetables (i.e. there is a need to include a wider variety of different types and colours of vegetables)
  - refined cereals
  - high- and medium-fat dairy foods
  - red meats (adult males only)
  - food and drinks high in saturated fat, added sugar, added salt or alcohol (e.g. fried foods, most take-away foods from quick service restaurants, cakes and biscuits, chocolate and confectionery, sweetened drinks).

1. Consider the list of foods that Australians need to eat more. For each of these foods, name the nutrients that it contains.
2. Find three recipes that could be included in the diet of a young adult to ensure that they eat these foods.
3. Consider the list of foods that Australians need to eat less. Outline the diet-related diseases that are associated with these foods.
4. Prepare a meal plan for an adult for one week that ensures they do not consume these foods.

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REFLECT ON LEARNING

1. Discuss the message of the *Australian Guide to Healthy Eating* and suggest who the target market for this food selection model is.
2. Explain why some foods have not been included in the circle of the *Australian Guide to Healthy Eating* (Figure 2.32 on p. 68).
3. Copy and complete the comparison alley to illustrate the similarities and differences between the two food-selection models discussed in this chapter. List the similarities between the models in the centre and the differences on the outside.

4. Choose one guideline and explain why it is essential to maintaining good health. Develop a list of nutrients that are included as part of this guideline.

DESIGN BRIEF: EAT RIGHT

Develop your own design brief for a meal that is based on eating right and that follows the recommendations of one of the Australian food-selection models. You must include constraints and considerations as well as some context for the brief.

1. Start by working out the following details to help you construct your brief: What? How? Where? When? Why? Who?
2. Research the necessary requirements of your brief, remembering to document as you go. You will need to research the food selection model you have chosen, as well as possible recipes that will meet your brief.
3. Write three criteria for success questions, drawing on the constraints and considerations of your brief.
4. You will need to prepare and submit a food order.
5. Prepare a time plan for the production.
6. During the production, take note of any changes you have made or improvements you wish to make during the evaluation stage.

Evaluating

1. Describe the appearance, aroma, taste and texture of your meal using sensory analysis language.
2. Evaluate your meal using your criteria for success to make sure you have met the brief successfully.
3. Complete a SWOT analysis, including comments on the meal you produced and your performance during the design brief process. You may like to think about how effective your planning was, your performance in the kitchen and anything you would do differently if you were to complete this task again.

Strengths	Weaknesses
Opportunities	Threats

4. Plot the ingredients used in your meal on your food-selection model. Have you successfully produced a meal following the recommendations of your model? Explain your answer with reference to the model.

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LOOKING BACK

1 Food is needed for energy, the growth and maintenance of cells and tissues, and regulating body functions.

2 Nutrients – protein, carbohydrate (and fibre), fat, vitamins, minerals and water – are supplied through food and have specific functions in the body. The best way to ensure you get the nutrients you need is to consume a balanced diet.

3 The digestive tract is responsible for the digestion, absorption and metabolism of food nutrients.

4 Nutrient requirements change throughout the lifespan, reflecting what is needed for health and development at that time.

5 Food-selection models, like the *Australian Dietary Guidelines* and the *Australian Guide to Healthy Eating*, have been developed to highlight the groups of foods and lifestyle patterns that promote good health and nutrition.

TEST YOUR KNOWLEDGE

Multiple choice

1 The most rapid time for growth is infancy. There are a number of important nutrients that are required at this time, including:

- **a** fat and water
- **b** carbohydrates
- **c** calcium and protein
- **d** all of the above.

2 Proteins are absorbed in which organ of the digestive system?

- **a** mouth
- **b** small intestine
- **c** large intestine
- **d** stomach.

3 The *Australian Dietary Guidelines* are an important food-selection tool. Which of the following is not a guideline?

- **a** Drink plenty of water.
- **b** Choose foods low in salt.
- **c** Ensure saturated fat intake and moderate total fat intake.
- **d** A wide variety of nutritious foods should be enjoyed.

True/false

1 We should eat fish three times a week due to its health benefits, especially as its nutrients are not in a variety of foods. These nutrients include omega-3 fatty acids, B group vitamins, complete proteins and magnesium.

2 Carbohydrate foods are given a GI score out of 100 – the higher the score, the lower the glycaemic index. The foods you should be consuming for sustained energy release should be high-GI.

Short answer

1 List the main nutrients. Summarise their functions and food sources.

2 Discuss the way in which the *Australian Guide to Healthy Eating* and the *Australian Dietary Guidelines* encourage healthy eating.

3 Discuss the health effects of poor food choices.

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Extended response

The interrelationship of nutrients in the body enables us to function efficiently. In some cases, there is a strong interrelationship between a group of nutrients, including blood production and energy production.

1 Copy and complete the table below, identifying which nutrients are involved in the interrelationships for each key function.

Nutrients	Blood production	Energy production
CHO		
Protein		
Fat		
Water		

2 Provide a summary for each function, explaining how they work together.

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Career profile: Natalie Stivala

Current occupation: Head chef
Place of employment: Omni restaurant

Explain your interest in the area of your chosen career path. Discuss the reasons why you have pursued this career.

My love and passion for food are the reasons why I chose the hospitality industry. In my 24 years' experience, I've established two restaurants which channelled my creativity and fuelled my love of food, but most of all it has taught me to embrace the moment, people, places, textures, flavours and sensations.

Who was your role model and how did they influence your decision to work with food?

I have two role models: my grandparents. They were Italian immigrants who settled on a farm in Shepparton. I spent endless time on their property when I was a girl. There was nothing better than the smell and taste of my grandmother's freshly baked bread, freshly made fettuccini with homemade sauce and meatballs.

My grandfather's vegetable patch was so enormous and had a variety of delicious veggies; he put so much pride into his work. This is when I knew I wanted to cook and where I learned all the secret recipes I have today.

Discuss the most rewarding aspects of your career.

I lived my dream of owning my own restaurants, so this I would say is the most rewarding aspect of my career. I'm delighted when I see people eating and loving something I created. I love how food and cooking can bring people together. It's definitely hard work but so rewarding.

Explain the challenges you face in your job.

The day-to-day pressure, schedules, constantly coming up with modern food trends, reinventing yourself by creating new dishes. Always striving for excellence and always knowing what your competitors are doing.

Is there such a thing as a 'normal' day in your work? Outline some things that you do in a day.

Every day brings different things. Preparation for the daily bookings and possible walk-ins. Some days there would be a multitude of work – for example, preparing for functions as well as the restaurant menu.

I will never forget my opening night. It was a little chaotic and intense but we pulled together and worked as a team and the night was a success. Every day has new challenges, preparation and deadlines for the day ahead.

Identify the opportunities this career has afforded you.

Being your own boss is the most rewarding opportunity. The ability to express yourself on a plate and the enjoyment you see on people's faces when they come into your venue to eat the food you have created.

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What are your career goals for the future (e.g. in five years' time)?

In five years' time I see myself owning a small eatery where I would seat approximately 26 patrons, serving small tasters paired with fine wine and boutique beers at an affordable set price. Attached to it would be a wood-fired pizzeria catering for families with children.

The Food Truck is also one of my goals for the future. I see myself driving all over Australia, catering at country race meets, festivals and local markets.

Outline the qualifications needed to complete this type of work.

First, explore the industry and what it demands. Work experience gives you an insight into daily operations and so does talking to people in the hospitality industry. An apprenticeship is done over four years and there are employers that take on first-year apprentices with one day at trade school and four days at work. Government agencies offer employers incentives, therefore employment is easily found both in rural and metropolitan areas.

What role has Home Economics played in your career?

It has made me love the art of creating innovative, wholesome and delicious food that brings people together – whether it be a simple dinner at home or a more swish dish in my restaurant. Meeting interesting people from all over the world, eager to tell you about their worldly experiences, has been amazing!

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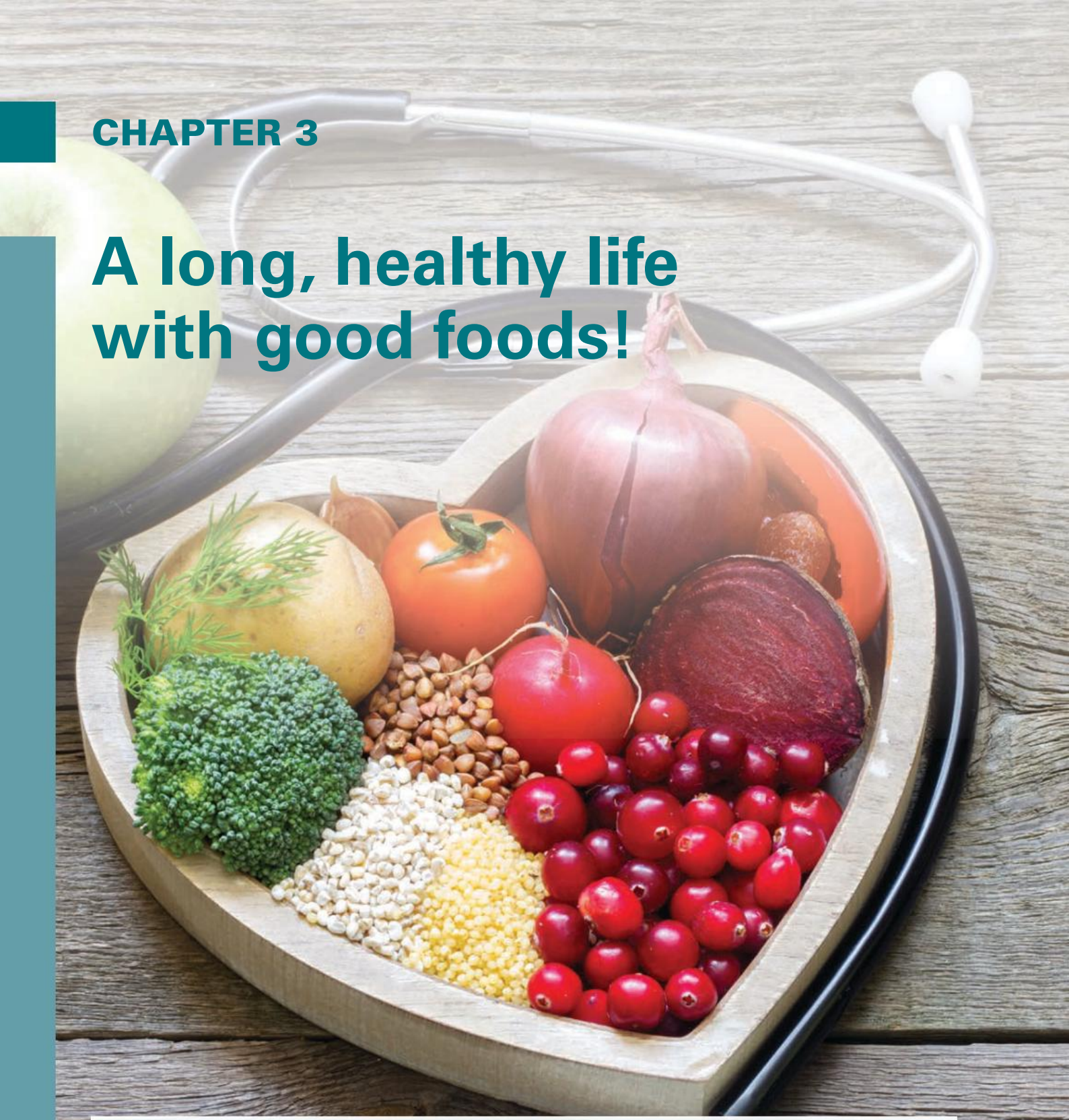
CHAPTER 3

A long, healthy life with good foods!



ACCESS PRIOR KNOWLEDGE

1. Name the diseases directly linked to diet.
2. State the best ways to maximise the nutrient content of food when cooking.
3. Describe the impact on a coeliac of consuming gluten.
4. Name the most common food allergy.
5. Provide five strategies for people to reduce their risk of type 2 diabetes.

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3.1 What are you eating?

Ever heard the saying 'you are what you eat'? Well, there's some truth to it! What you consume can have a significant impact on your **health**. Research suggests that diet plays an integral role in the prevention of disease, and can be a major factor in reducing your chance of experiencing poor health. Overall, Australians are considered to be pretty healthy, with most Australians stating they are experiencing good levels of health and wellbeing.

health 'A state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity' (World Health Organization, 1946).

However, a number of health concerns are becoming significant issues for Australians, with many directly connected to diet. The lifestyle habits, practices and values that you develop today, together with food intake and exercise, can influence your health now and in later years.

Good food choice is important because it can:

- control your weight
- improve your cholesterol levels
- control your blood glucose levels
- reduce your risk of dietary-related diseases such as some cancers, cardiovascular disease and type 2 diabetes
- protect against weak and brittle bones
- improve your general health and wellbeing.

Figure 3.1 Most Australians have very good health and consider themselves to be healthy.

People are aware of the impact of their diet on their health status. A diet high in saturated fat, low in fibre and high in sugar and salt can lead to health issues such as obesity, type 2 diabetes, osteoporosis, cardiovascular disease and stroke. We will investigate these diseases in this chapter.

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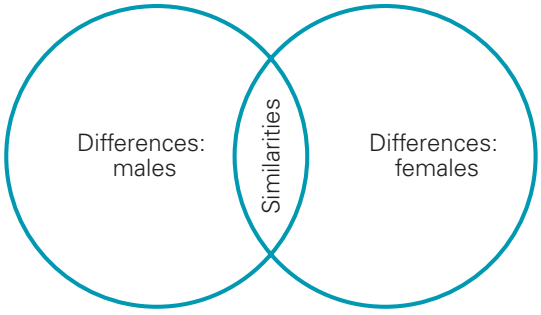
3.1 ACTIVITY

Check out the stats!

	Cause of death	% of all male deaths	% of all female deaths		Cause of death	
1	Coronary heart disease	15.6		1	Coronary heart disease	13.7
2	Lung cancer	6.6		2	Cerebrovascular diseases	9.5
3	Cerebrovascular diseases	5.9		3	Dementia, including Alzheimer's disease	9.2
4	Prostate cancer	4.4		4	Lung cancer	4.4
5	Chronic obstructive pulmonary disease (COPD)	4.4		5	Breast cancer	4.1
6	Dementia, including Alzheimer's disease	4.3		6	Chronic obstructive pulmonary diseases	3.6
7	Colorectal cancer	3.0		7	Diabetes	2.8
8	Diabetes	2.9		8	Heart failure and complications	2.8
9	Cancer, unknown, ill-defined	2.6		9	Colorectal cancer	2.6
10	Suicide	2.3		10	Cancer, unknown, ill-defined	2.5

Figure 3.2 Leading causes of death, by sex, 2011
Source: AIHW, *Australia's Health 2014*.

1. Using the table, identify the leading cause of death for females.
2. Identify the leading cause of death for males.
3. State what you believe are the top five health concerns for Australians.
4. Highlight any causes of death on this list to which you believe diet contributes, or for which diet is a protective factor.
5. List five dietary changes people could make to have a positive impact on these statistics.
6. Copy and complete the following Venn diagram to illustrate the similarities and differences between the data for males and females. In the centre, write the similarities and on the outside list the differences.



7. Discuss the age at which you believe it is important to eat for health and the prevention or reduction of the incidence of diet-related diseases.
8. Describe the difference between **morbidity** and **mortality**.
9. Research the projected causes of death for 2050. Explain the differences between our current causes and the projected causes.

morbidity The prevalence and incidence of disease and illness.

mortality Death caused by a disease, illness or other environmental factors.

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3.2 ACTIVITY

Food solutions for good health

Copy and complete the following table and list the foods available on the market addressing or related to health issues such as obesity, type 2 diabetes, osteoporosis, cardiovascular disease and stroke.

Health concern	Foods available
Obesity	
Type 2 diabetes	
Osteoporosis	
Cardiovascular disease	
Stroke	

3.2 Obesity

overweight Having a BMI over 25.

obesity Having a BMI of 30 or over; being 20 per cent or more above the person's ideal weight according to their height and sex.

hypertension Persistently elevated blood pressure.

Over the last few decades, the prevalence of **overweight** people and **obesity** has increased significantly. Obesity is a major concern because it increases the risk of many chronic diseases such as heart disease, stroke, **hypertension** and diabetes. More concerning is the increasing rate of childhood obesity.

3.3 LET'S COLLABORATE

KFC used to be known as Kentucky Fried Chicken, but changed its name to the commonly used abbreviation KFC, dropping the 'fried' in response to consumers' desire to eat healthier food products. Discuss with your partner any other changes you can think of where companies have changed their menu or new fast food organisations have been developed.

Tasty Trivia

Childhood obesity is associated with a higher chance of premature death and chronic diseases in adulthood, as well as social problems such as bullying and low self-esteem during childhood and adolescence.

Figure 3.3 What you eat and your amount of physical activity can be either a protective or risk factor for obesity.

Tasty Trivia

It has been predicted by the International Obesity Taskforce that one in every three adults globally will be obese by 2025 if current trends continue.

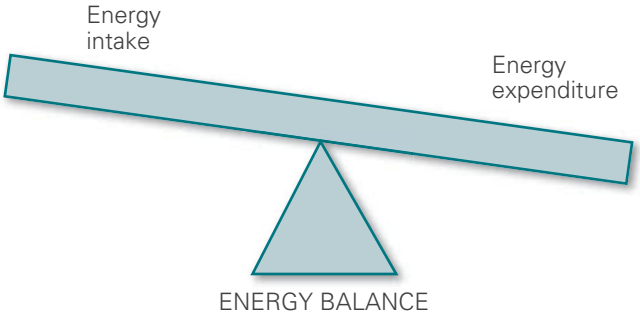

Figure 3.4 Obesity – a long-term imbalance between energy intake (food and drinks) and energy expenditure (through activity and internal bodily functions). If energy intake is greater than energy expenditure, excess food energy is stored in the body as fat and body weight increases.

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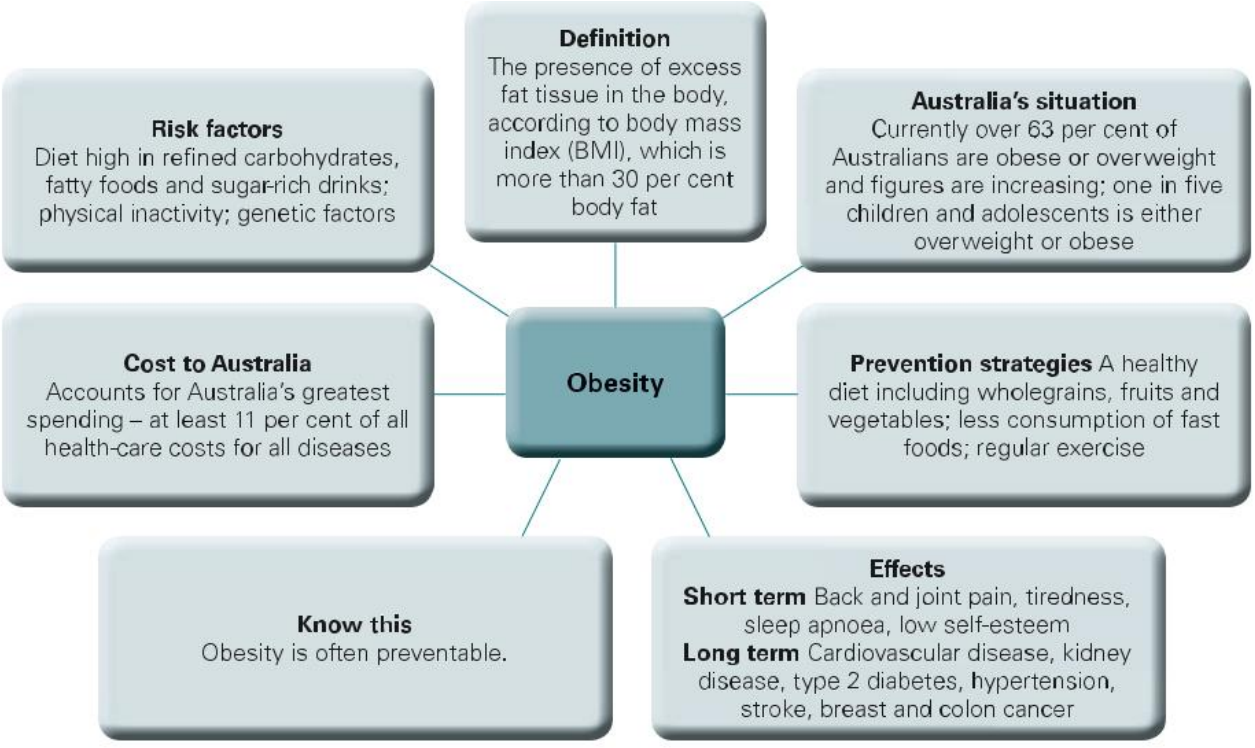

Figure 3.5 Profile of obesity

body mass index (BMI) A measure to determine a person's approximate amount of body fat.

Obesity is defined using the **body mass index (BMI).** BMI is an approximate measurement of total body fat. Adult BMI is calculated using the following equation:

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{height (m)}^2}$$

This calculation is only suitable for adults because their bodies have finished growing.

Figure 3.6 Adult BMI chart

3.4 INVESTIGATE IT

Are you interested in calculating your BMI? Check out the Better Health Channel online and do a search for 'Body mass index (BMI) for children and adolescents'.

Watch what you eat!

Obesity can largely be prevented through lifestyle changes to achieve energy balance. Foods that reduce the risk of obesity include those high in fibre. It is very difficult to gain weight if low energy-dense foods such as fresh vegetables, fruits, cereals and wholegrain breads are being consumed every day.

Tasty Trivia In the 1960s, a typical dinner plate size was 25 centimetres in diameter. Now it is 30 centimetres. Try measuring your plate in the kitchen and compare it with any old-fashioned plates your parents or grandparents might have.

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3.5 ACTIVITY

Portion distortion

1. Review what you learnt about serving sizes or portion sizes from Chapter 2, referring to the food-selection models.
2. Visit the websites of three of your favourite takeaway food outlets.
3. Investigate the nutritional information for your favourite meal and complete an analysis of the serving size of the meal against what is recommended. Now compare with the largest size meal available.
4. Does the portion size of the meal match the recommended serving size? Outline what modifications could occur to do so.
5. Discuss why you believe most fast food outlets have an 'upsize' deal.
6. Explain the potential risks of opting in for the upsize.
7. Portion sizes have increased over the last 20 years. Suggest why this might be the case and describe the implications of this for good health.

3.6 LET'S COLLABORATE

List as many weight-loss programs or organisations as you can think of. Discuss why there are so many of them.

Tasty Trivia

In Medieval times, when many people experienced food shortages and the food supply was unreliable, being overweight or obese was a status symbol. Being fat displayed your wealth by showing you had plenty to eat!

Figure 3.8 Avoid energy-dense foods and foods high in fat and sugar.

Changes you can make for good health and to prevent obesity include the following:

- Increase physical activity and incidental exercise – be active every day.
- Swap soft drinks for water.
- Watch your portion size.
- Limit energy from fats, especially saturated and trans fats.
- Eat fresh fruits and vegetables.
- Choose filling foods with fibre to fill you up for longer.
- Watch your mindless eating – only eat when you are hungry, not when you are bored or feeling emotional.
- Plan your meals and follow the recommendations in the *Australian Dietary Guidelines*.

Figure 3.7 Fruits and vegetables from the 'rainbow' are full of flavour, fibre and minerals – an excellent choice for good health.

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3.7 INVESTIGATE IT

Mindless eating

1. Research mindless eating and provide a definition of this consumption practice.
2. Can you identify a time when you have eaten or tend to eat mindlessly? What are your eating traps?
3. Outline why people turn to food when they are feeling emotional or bored.
4. Explain the impact walking past a sausage sizzle has on your desire for food.
5. Describe a marketing campaign that makes you crave that particular food. Include a list of the strategies the campaign uses to influence you.
6. List five strategies or changes people could make to reduce their mindless eating.

3.8 ACTIVITY

1. Explain how each of the listed factors helps to prevent or reduce obesity.
2. List 10 ways you could increase your incidental exercise every day. Here's one to get you started: get out of the car one block early and walk to school.
3. Add any other change ideas you have to the list to educate people on making good lifestyle choices for health.

DESIGN BRIEF: RESTAURANT QUALITY, BUT WITHOUT THE FAT!

Chicken Parmigiana is a popular restaurant meal, but it isn't considered an everyday choice because the chicken and chips are usually deep fried, making it high in saturated fat and salt. You have been asked by your local Parmigiana-serving restaurant to modify this recipe to create a 'heart-healthy Parma' for its menu. You need to ensure that this is a complete meal, not just the Parmigiana.

Investigating

1. Investigate the ingredients and cooking methods used to produce a Chicken Parmigiana. Analyse the impact of these on the final **chemical properties** of the Parma.
2. Research alternative ingredients that could be used to ensure your Parma is heart healthy.
3. Think about how you will present this meal so that it would be suitable to serve in a restaurant.

chemical properties Includes all natural chemical parts of food, such as nutrients, acids, alkalis and enzymes, and in processed food includes additives.

Planning and managing

1. Prepare your food order for your Parma production.
2. Prepare a work plan to ensure your production lesson runs smoothly and your meal components are all ready to serve at the same time.

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Chicken parmigiana with chips

USA

Main tools and equipment

Meat mallet, crumbing set, grater, frying pan, paper towels, deep fryer, tongs, baking tray

Production skills

Flattening, crumbing, grating, slicing

Cooking processes

Frying, deep-frying, baking

SERVES 1

Preparation time: 10 minutes

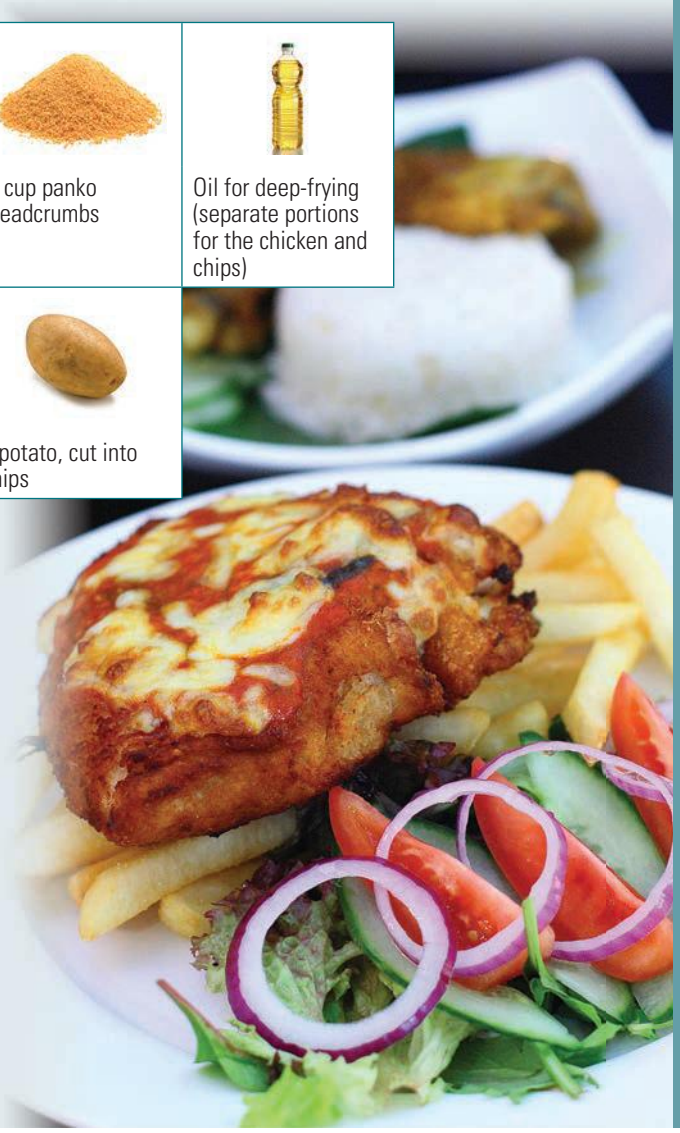
Cooking time: 20 minutes

Serving and presentation time: 5 minutes

Total time: 35 minutes

Ingredients

 1 chicken fillet	 1 teaspoon flour	 1 teaspoon milk	 ¼ cup panko breadcrumbs	Oil for deep-frying (separate portions for the chicken and chips)
 1 tablespoon salsa	 1 slice ham	 1 tablespoon cheese, grated	1 potato, cut into chips	



Method

1. Preheat oven to 180°C.
2. Using a meat mallet, flatten your chicken fillet to make it thinner. Coat the chicken with flour.
3. Dip the chicken in the milk, then the breadcrumbs, pressing the crumbs on firmly.
4. Heat oil in a frying pan (or use a deep fryer) and cook your chicken.
5. When cooked, drain the chicken on absorbent paper and place on a baking tray.
6. Coat with salsa, then layer with the ham and cover with the cheese.

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Chicken parmigiana with chips – continued

7 Place in the oven and cook for about 10 minutes, or until the cheese has melted and browned slightly.

8 Deep-fry the chips in hot oil. Drain when cooked.

9 Serve the Chicken Parmigiana with the chips.

Evaluating

1 Describe the appearance, aroma, taste and texture of your final product using sensory analysis language.

2 List two safety rules you had to consider when producing your Chicken Parmigiana.

3 Summarise the modifications you have made and justify your choices.

4 Take a picture of your Parma and post it on school-approved social media. Get two friends to comment on the presentation of the meal.

5 Reflect on your performance in this task. Would you make any changes if you were to do this activity again?

REFLECT ON LEARNING

1 Define the term 'obesity'.

2 Obesity has been identified as a National Health Priority Area in Australia. Explain why this dietary disease has been identified.

3 List the foods that should be reduced or avoided to prevent obesity. Describe the reasons why this is so for each food.

4 Explain the term 'energy balance'.

5 Provide your top five tips or strategies for helping people to lose weight.

3.3 Cardiovascular disease

Cardiovascular disease (CVD) is the leading cause of death in Australia. The majority of these deaths are largely preventable, and the most important consideration in preventing heart disease is what you eat. People who are obese or overweight, or who are suffering hypertension, are more likely to suffer CVD.

cardiovascular disease (CVD) A class of disease that affects the heart and blood vessels.

atherosclerosis Narrowing of the arteries due to the deposit of fatty plaques.

What is heart disease?

Coronary heart disease is characterised by a narrowing of the arteries caused by a build-up of plaque in your arteries. This is commonly known as **atherosclerosis**.

Plaque is made up of fat, **cholesterol**, calcium and other substances found in your blood. Plaque clings to and clogs artery walls, and blood clots are more likely to form. A blood clot then blocks an artery, causing a heart attack. This prevents blood flow and oxygen supply to the heart, resulting in damage or death to the heart cells.

Angina occurs periodically when the heart has temporary deficiencies in its blood supply. Reducing your saturated fat will reduce your chance of clogged arteries.

Blocked blood supply to the brain causes a **stroke**.

plaque A fatty deposit on the inner wall of an artery.

cholesterol A waxy, fat-like substance used by the body to build cell walls. It is either produced in the liver or absorbed from animal fats eaten. It is necessary for good health; however, excess levels are detrimental.

angina Chest pain caused by insufficient flow of blood and oxygen to the heart.

stroke Damage to the brain caused by interrupted blood flow due to a blood clot blocking or partially blocking an artery.

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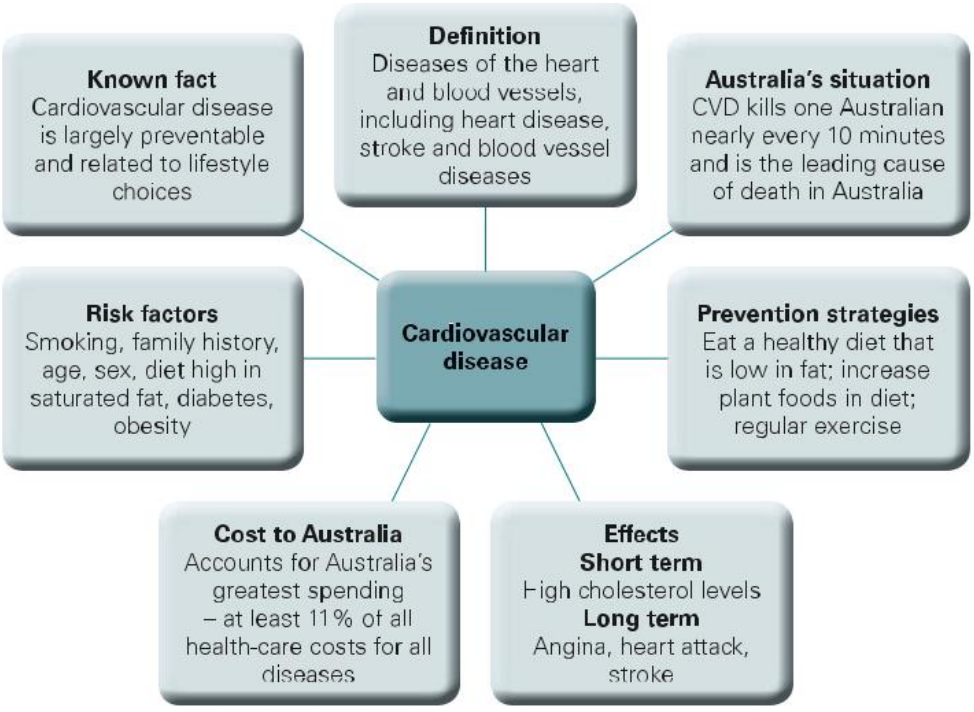

Figure 3.9 Profile of cardiovascular disease

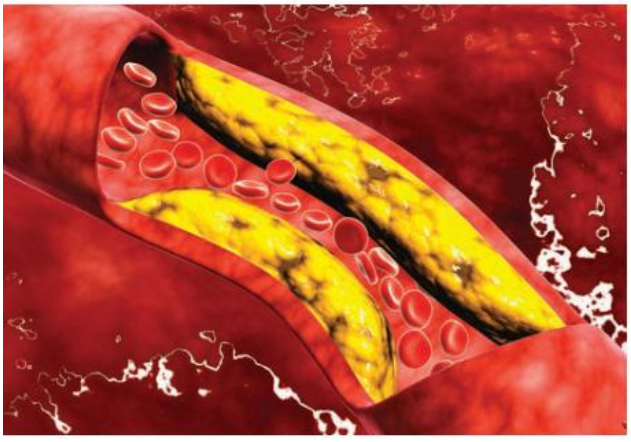

Figure 3.10 Atherosclerosis creates a narrowing of the arteries.

Figure 3.11 Angina can result from insufficient blood flow and oxygen to the heart.

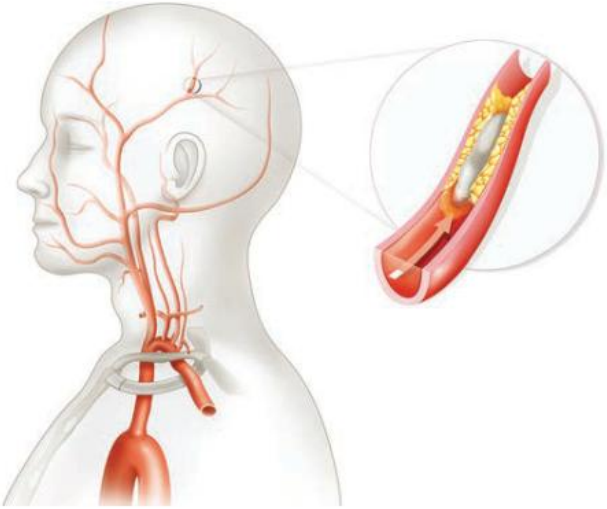

Figure 3.12 An interrupted blood flow can cause damage to the brain and result in a stroke.

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3.9 INVESTIGATE IT

Visit RealTime Health to view animations showing how a stroke occurs in the body. Also watch interviews with people sharing their experiences of diseases, including cardiovascular disease.

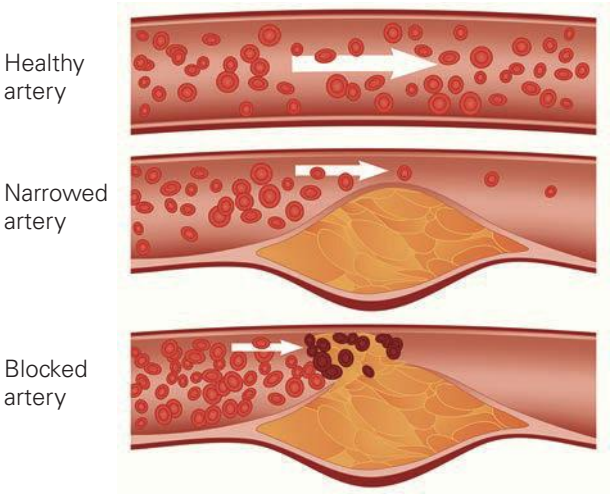

Figure 3.13 Reducing your saturated fat intake will reduce your chances of clogged arteries.

Foods for heart health

One of the most important considerations in preventing or reducing the risk of heart disease is a diet low in saturated fats and trans fats. Not only does a high-fat diet increase your chance of obesity; a diet high in both saturated and trans fats also increases cholesterol, leading to CVD.

There is evidence supporting a link between food products and the decrease of heart disease. Polyunsaturated and monounsaturated fats, as well as wholegrain cereals and plant foods, lower the risk of heart attacks because they help to lower cholesterol levels.

Factors that reduce your risk of heart disease	Factors that increase your risk of heart disease
Maintaining a healthy weight (BMI 18.5–25)	Being obese
Following a reduced-fat diet	Eating food high in saturated and trans fats
Increasing your dietary fibre consumption	Eating foods high in salt
Reducing the amount of salt in your diet	Not getting enough exercise
Exercising regularly	Smoking
Not smoking	Drinking high levels of alcohol

Figure 3.14 Factors that influence your risk of heart disease

Foods to eat	
Oily fish, which contains omega-3 fatty acids and helps to lower cholesterol and thin blood	
Fruits, which contain antioxidants and offer protection against heart disease	
Wholegrain cereals, which are high in fibre, low in fat and have no cholesterol	
Legumes, which are high in fibre, and soy proteins, which have been shown to lower cholesterol	
Antioxidants, which are found in tea, may reduce the build-up of fatty deposits in arteries	

Figure 3.15 Ensure that you increase your intake of these foods to improve your heart health.

antioxidants Substances, such as vitamins C and E, thought to help fight free radicals in the body that can cause disease.

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Saturated and trans fats that increase blood cholesterol and heart attack rates, such as:	
Fatty meats	
Full-cream dairy products	
Butter	
Coconut and palm oils	
Fried takeaway foods	
Trans fats are found in foods such as:	
Commercially prepared cakes and biscuits	
Margarine	
Baked goods such as pies and sausage rolls	
Fried foods	

Figure 3.16 Foods to avoid – reducing saturated and trans fats

3.10 LET'S COLLABORATE

Look at the pictures of the foods containing saturated and trans fats in Figure 3.16 and as a class identify healthier alternatives you could choose for better health.

DESIGN BRIEF: START YOUR DAY IN THE BEST WAY

We all need to make sure that we have a filling and nutritious breakfast to get off to the best start every morning. Too many people skip breakfast, eat sugary cereals or buy convenience breakfast alternatives. Create a breakfast dish that is creative and unusual, encouraging people to eat breakfast. Your breakfast dish must include a cooked component. You also need to include fresh fruit for colour, flavour and nutrition. You are not able to use egg in your product due to allergies. Your final breakfast dish needs to serve one person and be produced in class. It is important that it is presented well and is visually appealing to consumers.

Investigating

1. Prepare a list of possible breakfast ideas.
2. Locate a recipe for your product, which you can then use as the starting point for your design.
3. Write two criteria for success questions, drawing on the constraints and considerations apparent from the brief.

Generating

1. Brainstorm different ideas for your breakfast dish.
2. Finalise your breakfast dish and write your recipe.
3. Using ICT software, plan and model how you will present your final product.

Planning and managing

1. Prepare a food order for your product solution.
2. Prepare a production plan for your product solution.

Producing

1. In your practical class, produce your breakfast dish.
2. During the production, take note of any changes you have made or improvements you wish to make to assist you during the evaluating stage.

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Breakfast tarts

AUSTRALIA

RECIPE

Main tools and equipment

Large bowl, wooden spoon, tart cases, saucepan, chef's knife, chopping board, pastry brush, metal spoon

Production skills

Combining, melting, greasing, garnishing

Cooking processes

Baking

SERVES 2 (4 TARTS)

Preparation time: 10 minutes

Cooking time: 15 minutes

Serving and presentation time: 10 minutes

Total time: 35 minutes

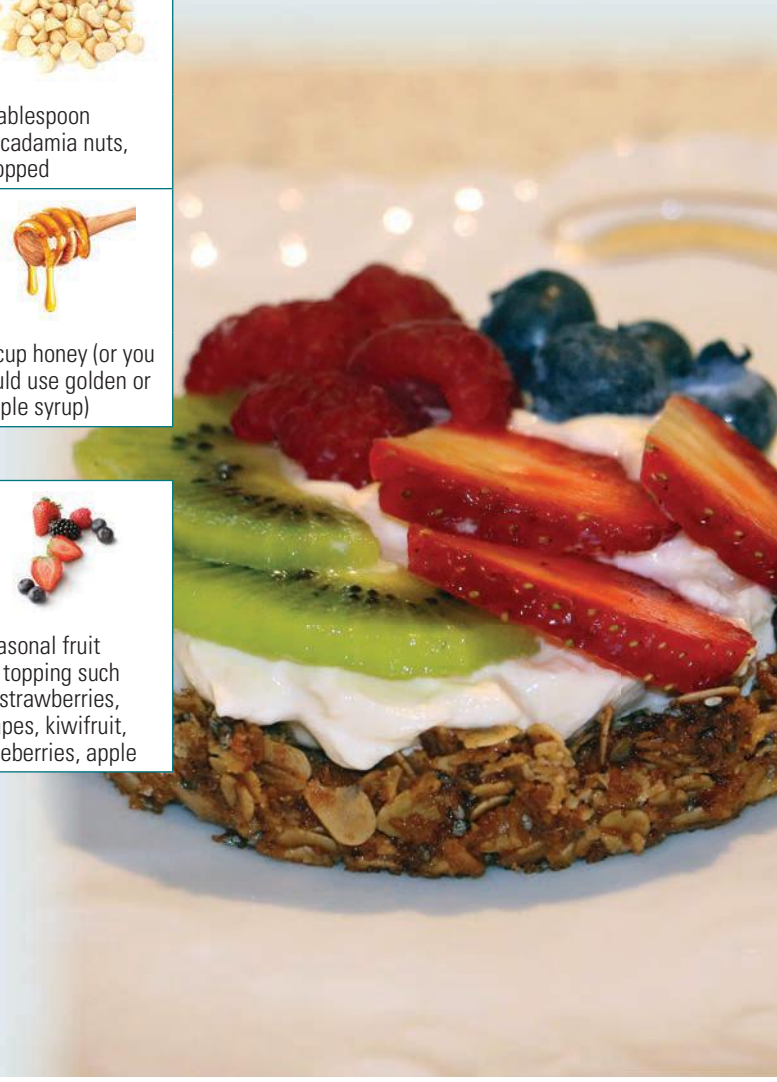
Ingredients

Pastry

 1½ cups rolled oats	 ½ cup shredded coconut	 1 tablespoon chia seeds (or you could use wattle seeds)	 1 tablespoon macadamia nuts, chopped
 ½ teaspoon cinnamon	 ¼ cup coconut oil	 1 tablespoon coconut oil	¼ cup honey (or you could use golden or maple syrup)

Filling

 1 cup plain Greek yoghurt	 1 tablespoon honey	 1 teaspoon vanilla essence	Seasonal fruit for topping such as strawberries, grapes, kiwifruit, blueberries, apple



Method

1. Preheat oven to 180°C.
2. Combine oats, shredded coconut, chia seeds, macadamia nuts and cinnamon in a large bowl. Mix well.
3. Melt coconut oil with honey over a low heat.

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4 Pour melted mixture into your dry mixture and mix well.
5 Lightly grease your tart cases.
6 Divide your mixture into four portions and place into your tart cases. Using a spoon, gently press the mixture into the case as this will form the tart shell.
7 Bake for 12–15 minutes or until a light brown. Watch carefully to ensure they don't get too dark or burn.
8 Allow cases to cool on a cooling rack. They must be completely cool before filling.
9 Combine yoghurt, honey and vanilla essence.
10 Place spoonfuls of the yoghurt into each tart case.
11 Cut your fruits and arrange creatively on top of your yoghurt.
12 Serve.

Evaluating

1 Describe the appearance, aroma, flavour and mouthfeel of your final product.
2 Describe how your product has met the requirements of the brief.
3 Answer the criteria for success questions you set at the beginning of this design process.
4 Discuss any modifications or improvements you would make to your final product and how you performed during the planning and production of your product.
5 Rate your product solution out of 10. Write a paragraph reflecting on whether you believe your product will in fact encourage people to stop and make time for breakfast.

3.11 INVESTIGATE IT

The benefits of lowering cholesterol in your diet for improved health are firmly established. As a result, food manufacturers are creating more heart healthy foods or new functional foods. Flora's proactive range is an example of a food product that has been developed to improve health. Visit the Flora website to learn more about this product and answer the following questions:

1 Explain what cholesterol is.
2 Describe what plant sterols are.
3 Outline the health benefits of Flora Proactive.
4 Name the target market for which this product has been developed.
5 Identify the active ingredient in Flora Proactive that is proven to lower cholesterol and state where it comes from.
6 Explain how the plant sterols in Flora Proactive work.

7 List the other products available in the Proactive range.
8 Do you want to make the switch to Proactive? Explain your response.

REFLECT ON LEARNING

1 Explain what cholesterol is.
2 Describe the benefits of eating oily fish.
3 List some of the food products that have been developed to lower cholesterol and improve health.
4 Outline three risk factors for CVD and explain how they can be prevented.
5 Discuss the reasons why CVD is the leading cause of death in Australia.

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3.4 Diabetes mellitus

Diabetes is the fastest growing chronic disease in the world, with two people being diagnosed and one person dying from diabetes-related causes every 10 seconds. Diabetes is also Australia's fastest growing chronic disease with approximately 280 Australians developing diabetes every day.

diabetes A group of different conditions in which there is too much glucose in the blood.

What is diabetes?

Diabetes mellitus is a condition in which the body is unable to maintain normal blood glucose levels. For our bodies to function properly we need **insulin**, produced by the pancreas, to convert sugar (glucose) into energy. Insulin transports glucose from the blood to the body's cells. People with diabetes don't produce sufficient amounts of insulin, so when they consume products containing glucose, such as breads, fruits, dairy products and sugary foods, the body is unable to convert the glucose to energy. If untreated, high blood glucose levels can cause kidney damage, eye damage, nerve damage to the feet and other body parts (sometimes resulting in the need for amputation), and heart disease.

insulin A hormone produced in the pancreas to help the body convert glucose to energy.

There are two main types of diabetes: type 1 and type 2.

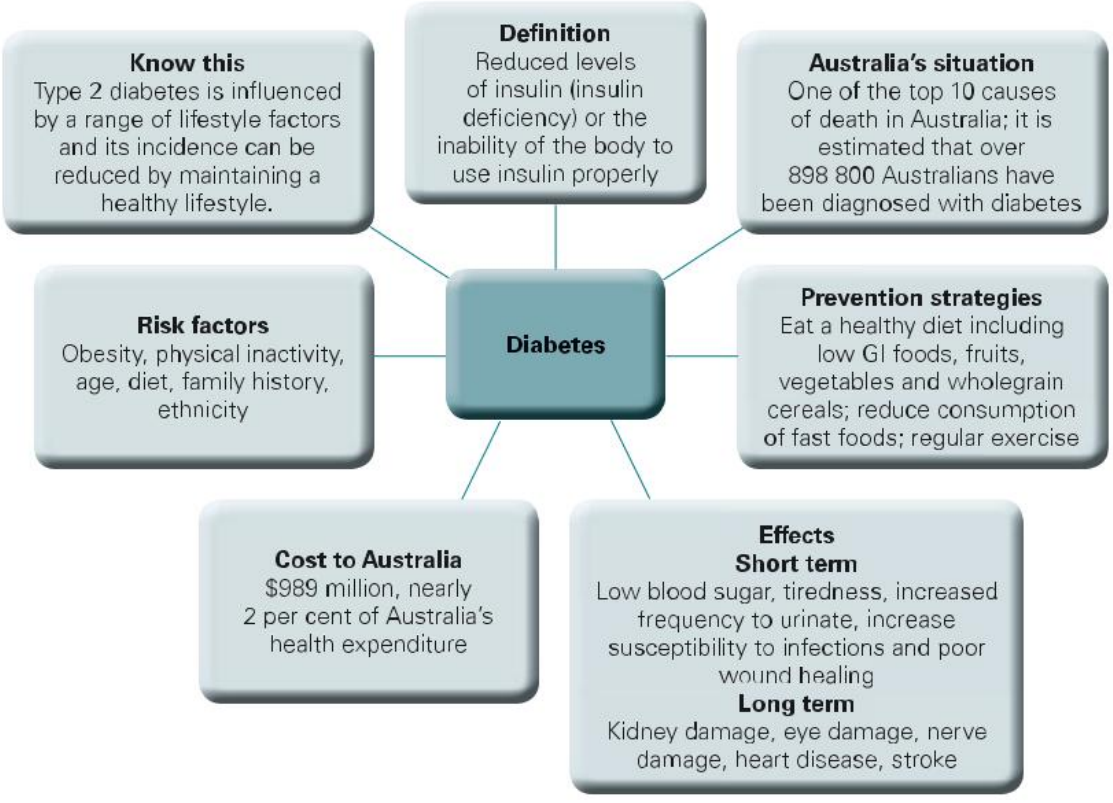

Figure 3.17 Profile of diabetes

Tasty Trivia

Looking for sugar in food products? Look for words ending in 'ose' to find them – **sucrose**, **glucose**, **lactose** and **fructose**. These are all types of sugars.

sucrose A complex carbohydrate found in many plants and used as a sweetening agent.

glucose A sugar energy source produced by plant products.

lactose Sugar found in milk and milk products.

fructose The sugar found in fruit.

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Type 1 diabetes (insulin dependent)	Type 2 diabetes (non-insulin dependent)
• Comprises 10–15 per cent of all diabetes cases. • Due to inability of the pancreas to produce insulin. • The body is unable to convert glucose into energy. • Insulin replacement is needed for survival (up to four injections a day). • Blood glucose levels must be tested several times per day. • This condition is not preventable or curable.	• Comprises 85–90 per cent of all diabetes cases. • Not enough insulin is produced or used effectively by the body to regulate blood sugar. • Can be managed with changes to diet, exercise, drugs or insulin injections. • Many cases of type 2 diabetes can be prevented through changes to diet and physical activity.

Figure 3.18 How to distinguish between the two main types of diabetes

Figure 3.19 Symptoms of type 2 diabetes

What should I eat? Foods to help you avoid diabetes

Type 2 diabetes is related directly to diet, and up to 60 per cent of type 2 diabetes cases can be prevented. It is recommended that people with type 2 diabetes eat:

- regular meals evenly spread throughout the day
- fruits, vegetables, wholegrain cereals and **legumes**
- foods low in saturated fat
- foods with only a small amount of added sugar
- foods with a low glycaemic index
- artificial sweeteners (or stevia) instead of refined sugars.

legumes The seeds from some pod-bearing plants.

DESIGN THINKING

Stevia is a natural sweetener and alternative to sugar. Native to South and Central America, stevia is now grown all over the world and is becoming a more commonly used ingredient in both commercial and home food production. Stevia is 200 to 300 times sweeter than sugar and, as it is not sugar, it is a suitable sweetener for diabetics.

Develop a recipe that could be included in a new recipe book being developed as a giveaway for consumers who purchase stevia. Think carefully about the amount of stevia you need to use in your product solution. Given that stevia is considered an alternative to sugar, the emphasis of the book is to provide healthy and tasty recipes for people to explore working with it.

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3.12 ACTIVITY

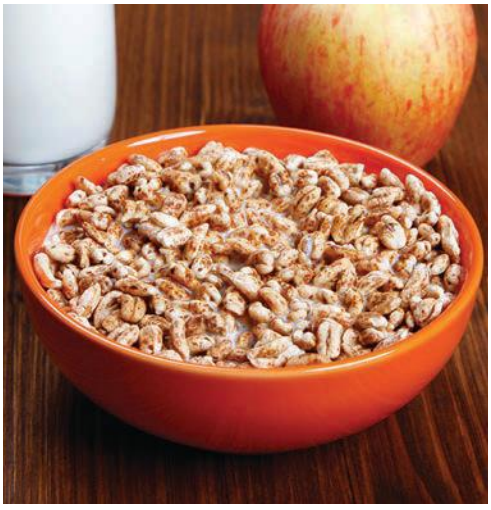
Spot the hidden sugar

Ingredients: Yoghurt

Compound [sugar, vegetable fat, skim yoghurt powder (4%), whey powder, emulsifiers (soy lecithin 492), food acid (citric)], Uncle Toby's rolled oats (24%), glucose (wheat), whole wheat (9%), sugar, raspberry fruit pieces [raspberry purée (1%), apple paste, pear paste, plum paste, invert sugar, sucrose, humectants (glycerol), wheat fibre, vegetable fat, vegetable gum (pectin), natural colour (elderberry juice concentrate), food acid (lactic), natural flavour], maize starch, vegetable oil [emulsifier (soy lecithin), antioxidants (304, 306)], coconut, dried apple, humectants (sorbitol), almonds, honey, oat flour, rice flour, strawberry juice concentrate, elderberry juice concentrate, skim milk powder, emulsifier (soy lecithin), raspberry juice concentrate (0.2%), natural flavour, food acid (malic), preservative (220)

Ingredients: Rice Bubbles

Sugar, salt, barley, malt extract, vitamins (vitamin C, niacin, riboflavin, thiamine, folate), minerals (iron, zinc oxide), glucose syrup, fructose, hydrogenated soybean oil (antioxidants [320, 306, 034]), sugar, glucose solids, invert sugar, humectants (glycerol), flavours (marshmallow, butter), gelatin, salt, emulsifiers (472e, 471)



1. Using the information above, how many times do you think sugar is used to make each of the products shown?
2. Under the name of each product, list each ingredient that includes sugar.
3. Was there more sugar in either product than you thought? Explain your answer.
4. Summarise why dietitians are concerned about the sugar content in these products.
5. Describe the consequences of consuming large amounts of sugar.
6. List a healthier substitute snack food for each of those shown above and justify each of your choices.
7. Now compare the sugar content of fruit drink to fruit juice. Outline why the best type of juice to drink is freshly squeezed rather than commercially purchased.
8. Head into your pantry, either at school or at home, to have a look for more hidden sugars. Pick five savoury products and read their ingredient lists to see whether there is any sugar – for example, tomato sauce contains 30 per cent sugar! Write down what you have discovered.

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3.13 ACTIVITY

Suitable foods checklist

1 Copy and complete this table to highlight which foods are suitable for everyday eating and which foods should be avoided by people with diabetes.

Food	Suitable	Best to avoid
Nutella		
Wholemeal bread roll		
Donuts		
Coco Pops		
Corn		
Apples		
Reduced-fat cheese		
Coke Zero		
Hot chips		
Jelly beans		
Porridge		
Brown rice		
Stevia		
Sugar-free raspberry jam		

2 Now add another 10 foods that are recommended for healthy eating for people with diabetes.

REFLECT ON LEARNING

1 Define type 2 diabetes.
2 Explain why just avoiding sugar is not enough in the management of diabetes.
3 Describe the role of insulin in the body.
4 Suggest why diabetes is the world's fastest growing chronic disease.
5 Design a day's menu for a diabetic and explain each of your food choices.

3.5 Cancer

cancer A group of diseases in which the body's cells grow in an uncontrolled (malignant) or abnormal way.

Cancer is a major cause of death in Australia. Current research suggests that there is a link between the foods we consume and preventing or reducing susceptibility to certain cancers.

What is cancer?

Cancer is a disease of the body's cells. It develops when normal body tissue grows in an uncontrolled (malignant) way. This abnormal cell growth may turn into cancer and can occur anywhere in the body. If the cancer cells replace too many healthy cells, the affected organ can no longer function properly.

Figure 3.20 Some people wear a coloured ribbon to show that they, or someone they love, has been affected by cancer.

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Bowel cancer

Bowel cancer, also known as colorectal cancer, is the fourth most common cancer in the world, and the second most common in Australia. To reduce the risk of developing bowel cancer, it is recommended that we should aim for a healthy weight; be physically active; increase our consumption of dietary fibre, especially resistant starch; eat wholegrain cereals and vegetables; and reduce consumption of red meats, especially processed meats.

Figure 3.21 Bowel cancer is also known as colorectal cancer.

Figure 3.23 Saturated fat increases the risk of bowel cancer.

Figure 3.24 Foods high in fibre are protective nutrients, reducing the risk of bowel cancer.

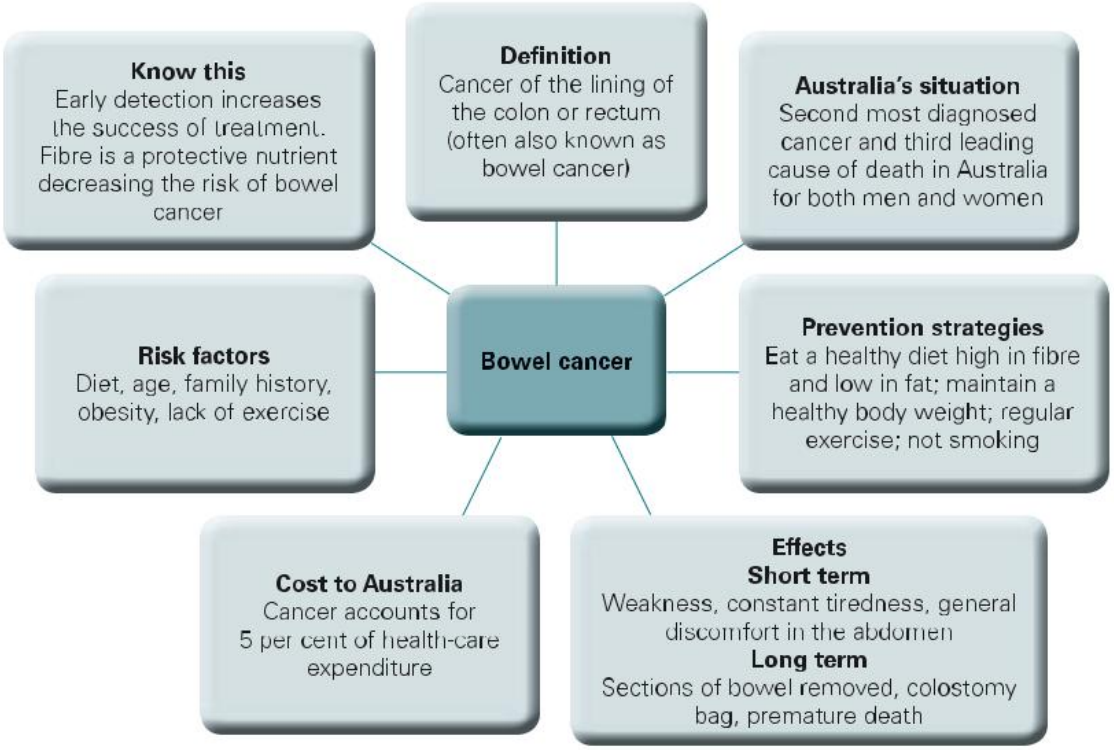

Figure 3.22 Profile of bowel cancer

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3.14 ACTIVITY

'You Need to Know This' campaign

Discussing your bowel and bowel movements generally isn't really done. In fact, it's pretty personal. When was the last time you discussed your bowel movements? However, if we are going to have a positive impact on the incidence of bowel cancer, we need to educate people about the disease.

Create a 'You Need to Know This' campaign, providing information about the risks of bowel cancer and ways to reduce your risk. Include five recipe ideas to include in your everyday meal planning that incorporate healthy eating as a protective factor for bowel cancer.

Figure 3.25 Let's beat bowel cancer awareness campaign 'Don't Wait Until it's Too Late', aimed at raising public awareness of bowel cancer and the importance of screening

Foods for fibre

Bowel cancer is one of the most curable cancers if it is found early. You can lower your risk with a healthy diet and regular physical exercise. One key recommendation to reduce risk is to consume a high-fibre diet.

Choose multigrain or wholemeal breads, pastas and cereal products. Start your day with a high-fibre breakfast cereal (check the nutritional panel). Eat fresh fruits and vegetables, rather than drink juices, and eat the skin. Include legumes in salads, soups and pasta dishes. Read product labels and look for fibre.

3.15 ACTIVITY

Fibre – make the switch

1 There are many benefits to be gained from increasing the fibre in your diet. Copy and complete the following table, providing a higher-fibre alternative to those listed.

Food	High-fibre switch
Orange juice	Orange
White bread	
Hot chips	
Jasmine rice	
Lasagne	
Chocolate	
Cornflakes	
Mashed potato	
Biscuit	
Peeled apple	

2 Now come up with 10 more food examples to increase the fibre in your diet.

Figure 3.26 A healthy, balanced diet promotes good health.

REFLECT ON LEARNING

1 Explain why it is important to reduce the amount of saturated fats in your diet.
2 List five foods that are high in saturated fat.
3 Outline the nutritional recommendations addressing bowel cancer.
4 Bowel cancer is a leading cause of death in Australia. Discuss why this might be the case.
5 Describe one disadvantage of a high-fibre diet.

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3.6 Osteoporosis

osteoporosis A condition where bone deteriorates, becoming fragile and brittle, leading to a high risk of fracture and breakages.

peak bone mass When the body contains the greatest amount of bone.

Osteoporosis is considered to be a disease of old age, but since **peak bone mass** is achieved by the age of 30, this attitude needs to change. The symptoms of osteoporosis may occur later in life, but it is what you do now that makes the difference. Are you getting enough calcium?

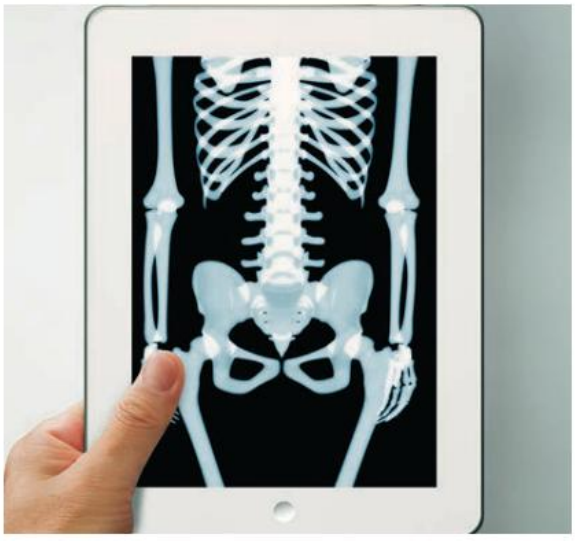

Figure 3.27 It is important to consume enough calcium throughout life for bone health.

Calcium needs

	Age (years)	Amount (mg per day)
Children	1–3	500
Children	4–8	700
Adolescents	9–11	1000
Young adults	12–18	1300
Adults	19–50	1000

Figure 3.29 Calcium needs across the lifespan

Figure 3.30 Milk products containing calcium

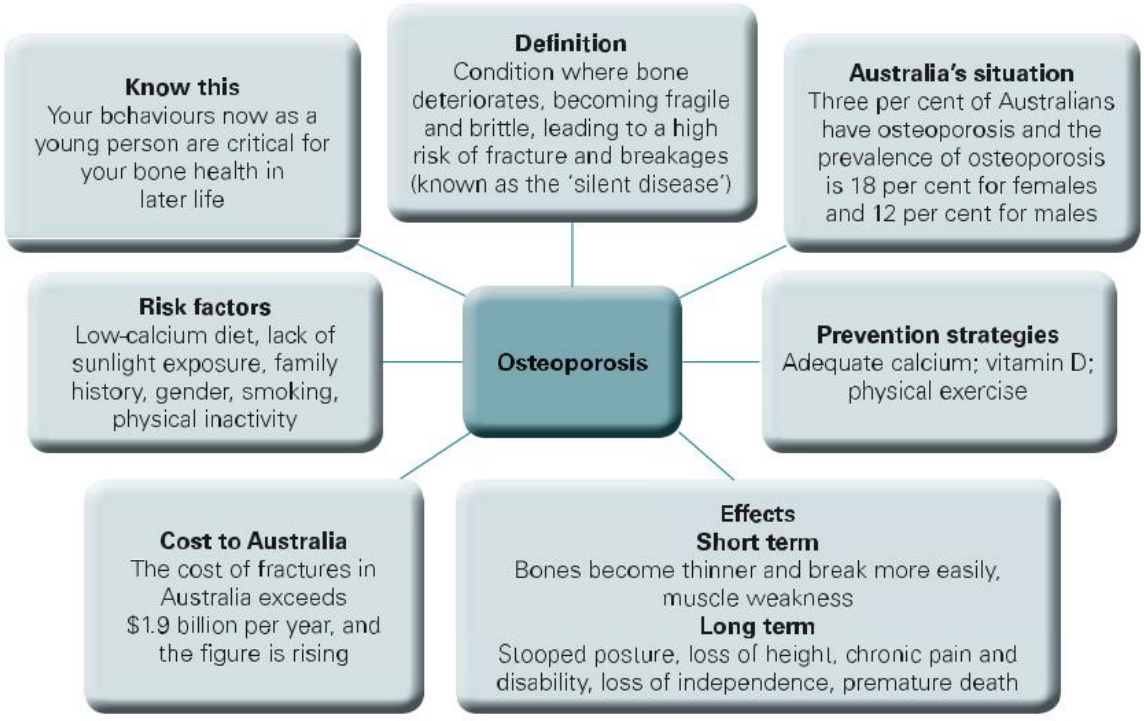

Figure 3.28 Profile of osteoporosis

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Foods for strong bones

Our bodies cannot make calcium, so it needs to be supplied through food. The following foods supply the body with calcium:

The body also requires an adequate intake of vitamin D, which is supplied by sunlight, to assist the absorption of calcium.

- cheese
- sardines
- spinach
- almonds

Figure 3.31 Foods that contain calcium

DESIGN THINKING

Go back to Chapter 2 and review the nutrients needed for bone growth. For each nutrient, identify two good food sources. Design a snack food that is high in calcium and would be appealing to children and adolescents that could be included in their lunchbox. It needs to be high in calcium but also fun and appealing to your target market.

Factors affecting the absorption of calcium

The following factors can hinder the absorption of calcium by the body:

- caffeine
- smoking
- salt
- alcohol.

Figure 3.32 Foods that hinder the absorption of calcium

3.16 INVESTIGATE IT

Assess your bones online. Visit the Healthy Bones Australia website and take the online test you will find there.

REFLECT ON LEARNING

1. Outline the important factors in calcium absorption.
2. Describe what causes osteoporosis.
3. Explain what people can do to reduce their risk of osteoporosis.
4. List five good food sources of calcium.
5. Discuss why osteoporosis is considered an old person's disease, when really it should not be.

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DESIGN BRIEF: DISEASE AWARENESS DINNER PARTY

Working in a team, develop your own design brief based on an educational two-course dinner party for people who have just been diagnosed with one of the dietary-related diseases you have studied in this chapter. You must include constraints and considerations in your brief that will need to be solved. You may like to start by working out the following details to help you construct your brief: What? Where? When? Why? Who? How much?

Investigating

1. Research the necessary requirements for your brief, including foods suitable and unsuitable for your chosen disease.
2. Write three criteria for success questions, drawing on the constraints and considerations from your brief.

Generating

1. Generate different meal options you could make that would be a suitable solution to the brief.
2. Choose your final option and justify why this is the best choice.
3. Using 3D modelling software, model and annotate your intended meal presentation.

Planning and managing

1. Determine the role of each member of your group.
2. Prepare a food order for your products.
3. Prepare a production plan for the production of your products.

Producing

1. In your practical class, produce your two-course meal.
2. During the production, take note of any changes you have made or improvements you wish to make to assist you during the evaluation stage.

Evaluating

1. Describe the appearance, aroma, flavour and mouthfeel of both your courses.
2. Explain how your meal options have met the requirements of the brief.
3. Answer the criteria for success questions you set at the beginning of this process.
4. Discuss any modifications or improvements you would make to your final product and how you performed during the planning and production of your product.
5. Outline how effectively you collaborated with your team members. Include how you worked well as a team member and set a goal to achieve next time you are working in a group situation.

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3.7 Food allergies and intolerances

A **food allergy** is an abnormal immune response to a specific part of a food, usually a protein. Food allergies can be fatal and are a serious issue for many Australians. The **allergen** causes the immune system to produce antibodies to fight against this substance. Symptoms are generally severe and appear very quickly after consumption. A sudden or severe reaction is known as **anaphylaxis** and requires urgent medical attention.

food allergy An abnormal immune response to a specific part of a food, usually a protein.

allergen A substance that triggers an allergic reaction.

anaphylaxis An extreme allergic reaction to a food product.

Tasty Trivia

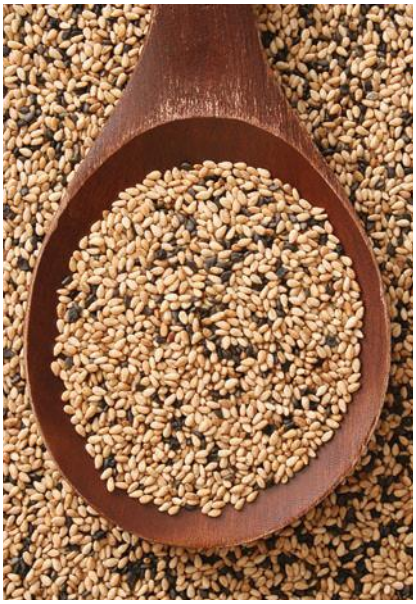
'Food sensitivity' is an umbrella term used to cover food allergies and food intolerances.

There are many foods that can cause a food allergy. The most common are:

- peanuts and other nuts – the most common allergen for children and adolescents
- eggs
- shellfish
- sesame
- soy.

The high incidence of allergies has resulted in very strict labelling laws. All food products must declare allergens clearly on food labels if they are contained in the product. These include gluten, nuts, fish and crustacea, eggs, milk, soybeans, sesame seeds, sulphides, royal jelly and any products made from these known allergen ingredients.


Peanuts


Sesame


Shellfish


Eggs

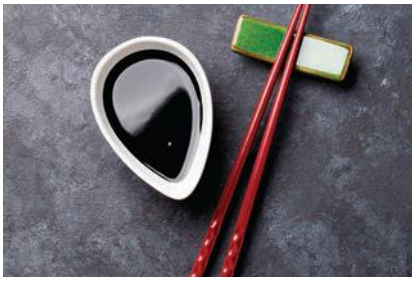

Soy

Figure 3.33 Common food allergens

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3.17 ACTIVITY

Understanding allergies

Working collaboratively in teams of three, investigate one of the following food allergens: peanut, shellfish, fish, egg, soy, sesame, nut or another that you have negotiated with your teacher.

Your team is to produce an interactive presentation that includes information about:

- the allergen chosen
- signs and symptoms of an allergic response
- food products to avoid
- support groups and websites available for people with this particular condition
- a suitable meal that could be served for dinner.

Each member of the team is to take on one of the following roles to equally share the research and presentation of the work fairly:

- time manager – monitors the team's use of time to ensure everyone stays on task
- recorder – writes down ideas as they are discussed
- summariser – asks questions to clarify the team's thinking and ensures that everyone in the team has the same understanding of what is being discussed.

At the conclusion of this task, complete the following tasks to reflect on your participation in this activity:

1. Summarise what you learnt about the food allergen you studied.
2. Discuss how effectively you communicated with your team members. Reflect on how well you listened as well as talked.
3. Describe the strengths of your contribution to the group.
4. Explain the areas you need to focus on improving for next time you work collaboratively.
5. State what you found hardest about working collaboratively and explain your response.

Food intolerances are more common than food allergies; they occur when the body has a chemical reaction to eating a particular food or drink, but not an immune response as with food allergies. Food intolerances happen when food is not able to be digested properly and the accumulation of food causes a reaction. These reactions are not usually life-threatening, and symptoms can occur straight after eating or as much as 24–48 hours later. This often makes it difficult for people to determine what they are intolerant to. The easiest way to treat food intolerance is to eliminate the particular food from your diet. The most common foods that cause sensitivities are gluten and lactose.

food intolerance A chemical reaction to eating a specific food or drink. Food cannot be digested properly and this accumulation causes a reaction.

3.8 Coeliac disease

Coeliac disease is a disease of the small intestine that results in permanent intolerance to **gluten**. Gluten is the protein found in many cereal products, including wheat, rye, barley and oats, and any products that include these ingredients. Coeliac disease affects approximately one in 100 people, but surprisingly four out of five people with this condition either do not realise and simply put up with the symptoms, rather than seeking medical attention and getting a formal diagnosis to explain their problems, or are asymptomatic – which means they do not have any digestive symptoms, even though the disease is affecting their bodies in other ways.

coeliac disease A disease of the small intestine that results in permanent intolerance to gluten.

gluten A mixture of two different types of protein found in cereal grains.

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Symptoms of coeliac disease

Figure 3.34 Those suffering from coeliac disease may experience one or more of the digestive symptoms, or none.

Today there are lots of gluten-free products available to consumers. The supermarkets now stock a wide range of products, including gluten-free pies, cereal, pastry and flour, and there are also specialty gluten-free food shops.

The only treatment for coeliac disease is a gluten-free diet, and even the smallest amount of gluten can be enough for people to suffer the symptoms of the disease. The long-term effects of going undiagnosed, or not ensuring a gluten-free diet, include bowel damage, anaemia and osteoporosis – this is because the gluten protein causes damage to the lining of the intestine (the villi), which prevents the absorption of nutrients.

3.18 LET'S COLLABORATE

Describe why gluten-free cooking can be a challenge, especially for restaurants and food producers. List other food sensitivities that chefs will need to understand to ensure they meet the needs of their potential customers.

Figure 3.35 Villi are damaged by gluten, becoming inflamed and flattened. Removing gluten from the diet allows the lining of the intestine to return to normal, and this diet must be maintained for life.

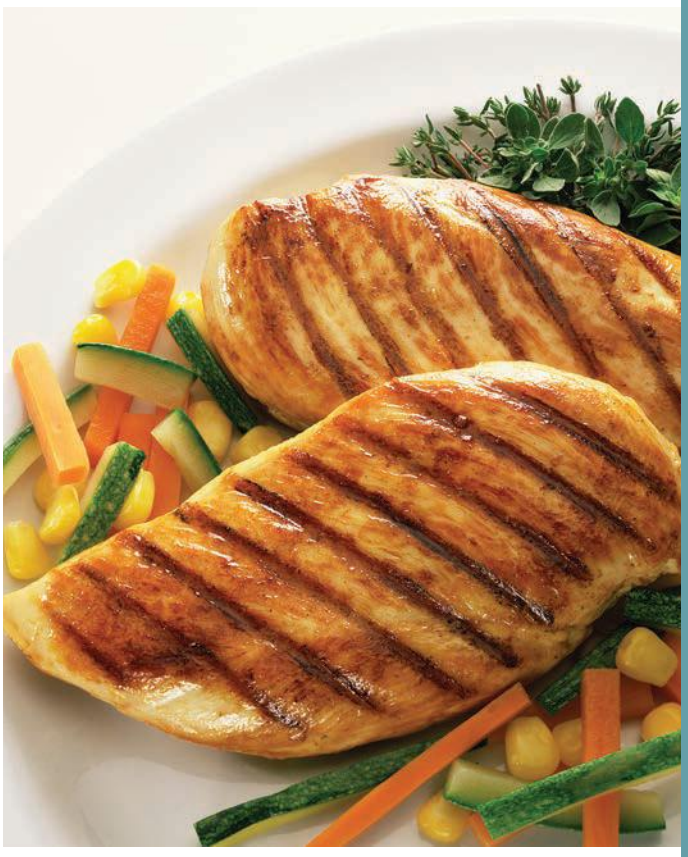

Figure 3.36 Chicken and vegetables are healthy, gluten-free options.

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Tasty Trivia

Gluten-free cooking is not always as simple as changing ingredients with gluten to ingredients without, as many gluten-free flours behave differently in baking from flours containing gluten (such as wheat flour). This is because of the **functional properties** of gluten in food products. Gluten is also used as a bulking agent in meat products such as salami and sausages, and as a thickener in many food products.

functional properties What an ingredient of a food actually does when it is prepared and/or cooked – for example, an egg will set when it is heated, so this makes it useful to thicken sauces.

3.19 INVESTIGATE IT

Gluten-free shopping

1. Visit your local supermarket or go online.
2. List all the gluten-free food products available.
3. Outline the reasons why these products are now readily available to consumers.

DESIGN BRIEF: COELIAC LUNCH PARTY

Coeliacs are typically unable to consume many traditional lunch and party foods. Pastries, sandwiches, quiche, cakes and biscuits usually contain flour, so unless this flour is substituted with another ingredient or flour type that is gluten free, these products are off the menu.

Your best friend is coming over for lunch this weekend and you know she is a coeliac. You need to design a lunch or party item, sweet or savoury, suitable for your friend that you can serve at your lunch party.

Investigating

1. Investigate gluten-free food or food ingredient substitutes.
2. Investigate food suitable to be served at your lunch party.

Generating

1. Generate a list of possible food solutions.
2. Justify your final choice and explain why it is a suitable choice.

Planning and managing

1. Complete a food order for your production.
2. Prepare a production plan and include safety and hygiene considerations.

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Gluten-free and lactose-free mini frittatas

ITALY

RECIPE

Main tools and equipment

Muffin tin, grater, fork, large mixing bowl, baking paper

Production skills

Grating, greasing, mixing

Cooking processes

Baking

MAKES 6 MINI FRITTATAS

Preparation time: 15 minutes

Cooking time: 20–25 minutes

Serving and presentation time: 5–10 minutes

Total time: 40–50 minutes

Ingredients

 Cooking spray	 4 eggs, beaten	 ½ cup lactose-free milk	 ½ cup lactose-free cheese, grated	 ¼ red onion, finely diced
 8 black olives, chopped	 8 semi-dried tomatoes, chopped	 50 g frozen spinach, defrosted	¼ teaspoon salt	¼ teaspoon pepper

Method

1. Preheat oven to 180°C.
2. Grease a large muffin tin with cooking spray and line with baking paper.
3. Combine beaten eggs and milk.
4. Add all other ingredients and mix well.
5. Spoon mixture evenly into 6 muffin tins.
6. Bake in the oven for 20–25 minutes or until set.
7. Allow to cool in muffin tin before removing.
8. Alternatively, you could use mini-muffin tins to make bite-size frittatas.

Evaluating

1. Describe your product's appearance, aroma, taste and mouthfeel using sensory analysis language.
2. Explain how you have met the requirements of the brief.

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Gluten-free and lactose-free mini frittatas – continued

RECIPE

3 Identify which ingredients you substituted in your recipe to make it suitable for coeliacs.

4 Describe how not having gluten may have affected this product.

5 If you were to make this product again, what improvements would you make or what would you do differently?

3.9 Lactose intolerance

Lactose intolerance occurs because the body lacks sufficient amounts of the enzyme lactase to digest lactose, the sugar found in milk and milk products. Normally the body breaks down lactose into simpler components (glucose and galactose) with the help of this enzyme.

lactose intolerant Unable to digest lactose (milk sugar), such as is found in milk and cheese.

Tasty Trivia

The majority of people who are lactose intolerant are of Asian, Middle Eastern, Indigenous Australian or Mediterranean backgrounds.

Symptoms of lactose intolerance

People can have varying degrees of lactose intolerance. Many people who are lactose intolerant have a level of lactose that they can consume with minimal symptoms, but most should avoid drinking milk. Cheese contains virtually no lactose, so it can be well tolerated and yoghurt is generally well digested due to the natural level of bacteria cultures. Available now are many dairy and milk substitutes that do not contain lactose, which are suitable for people suffering from lactose intolerance.

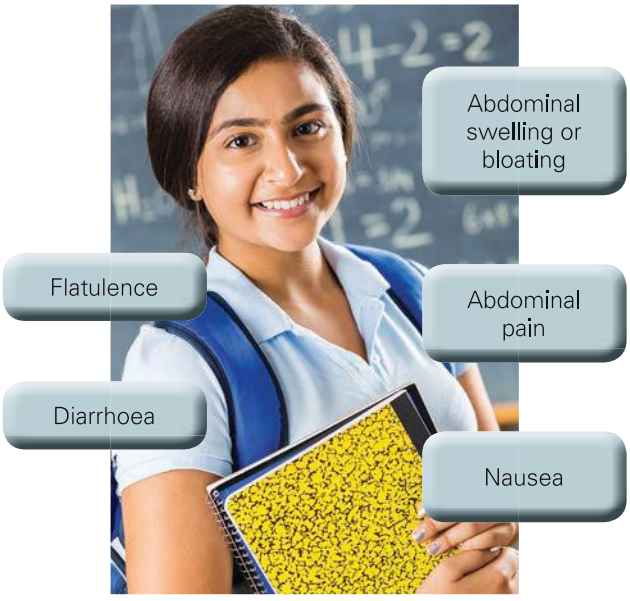

Figure 3.37 People who are lactose intolerant can experience one or more of these symptoms:

Figure 3.38 There are many types of milk available for lactose-intolerant people.

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3.20 ACTIVITY

Lactose free – is there a difference?

For this activity, you need soy milk, lactose-free milk, rice milk and cow's milk. Copy and complete the table below and fill it in as you taste each milk. You will also need to read the labels to collect all the information required. Then answer the questions that follow.

Type of milk	Appearance	Aroma	Texture	Taste	Ingredients	Cost	Rating out of 5
Soy milk							
Lactose-free milk							
Rice milk							
Cow's milk							

1. Name the milk you drink at home.
2. Identify which of these milks you have tasted before today.
3. State which milk sample you liked the most. Explain your choice.
4. State which milk sample you liked the least. Explain your choice.
5. Was there a difference between the tastes of the milks? Explain your answer.
6. Was there a texture/mouthfeel difference between the milks? Explain your answer.
7. List the ingredients that were common to all the milks.
8. Identify which ingredient/s in the cow's milk are not in the other milk samples.
9. Describe who the target markets are for each of the different milks.

Hidden lactose: Foods to avoid if you are lactose intolerant

Lactose can be hidden in foods, and people with lactose intolerance should read the food labels – looking for milk solids, whey, milk sugar and non-fat milk solids listed as ingredients – before eating any of the following foods:

- some breakfast cereals
- creamy soups
- custard
- scrambled eggs
- pancakes
- muesli bars
- chocolate.

Figure 3.39 Cakes containing milk

Figure 3.40 Cheese and white sauces

Figure 3.41 Quiche

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3.21 LET'S COLLABORATE

Suggest what might be a nutritional consideration for people who are not consuming milk or many dairy products. Discuss other products that should be included in their diet to ensure they consume all the important nutrients.

3.10 Get the most out of what you eat

When preparing and producing food products, maintaining and maximising the nutrient level should be an important consideration, and this can impact the way foods are prepared and cooked in order to maximise their content. The way food is prepared can have a significant impact on nutritional value.

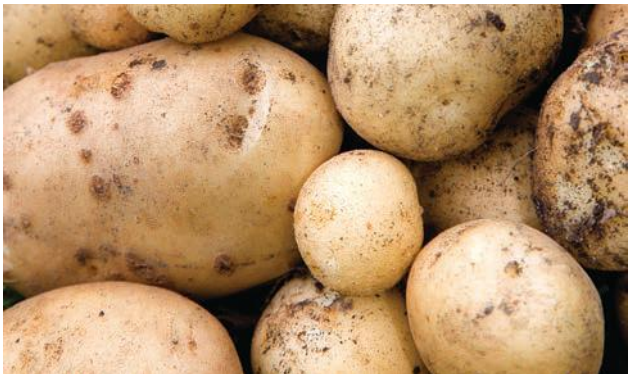

Figure 3.42 If a potato is peeled before cooking, the fibre content of the potato is reduced. If the potato is coated or sprayed with oil before roasting, its fat content is increased. If it is boiled, water-soluble vitamins can be lost into the cooking liquid, but if it is stewed, the liquid is part of the meal so the water-soluble vitamins can be maximised.

Figure 3.43 Maximise the nutrient value of meat by removing some or all of the fat to reduce fat content.

REFLECT ON LEARNING

1. Define the terms 'food allergy' and 'food intolerance'.
2. List the ingredients that need to be avoided by coeliacs and provide three alternatives.
3. Describe the nutritional considerations for coeliacs if they do continue to consume gluten.
4. Lactose-free milks are becoming popular food products. Suggest why people other than those who are lactose intolerant might be purchasing these.
5. Discuss how Australian food law has responded to the high incidence of food allergies to ensure a safe food supply for consumers.

Figure 3.44 The nutrients in vegetables are very sensitive to cooking and are easily destroyed by heat.

Figure 3.45 Traditionally, vegetables were boiled, but soluble vitamins in vegetables cooked using this method can be lost in the cooking liquid and the heat-sensitive nutrients can also be destroyed if cooked for a long time or by extreme heat.

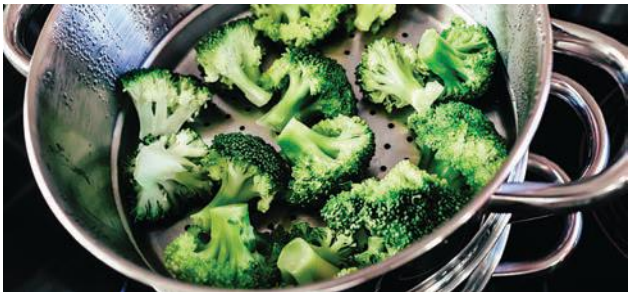

Figure 3.46 Cooking methods such as steaming maximise the retention of nutrients, as soluble vitamins are not lost in the steam.

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3.22 ACTIVITY

Preparing broccoli

Broccoli is a nutritious and delicious vegetable when cooked the right way. Complete the following experiment to determine the best way to prepare broccoli in order to maximise the nutrient content and physical properties.

1 Cut a head of broccoli into florets. Divide evenly into six groups:

- **a** Place one broccoli portion into cold water. Bring to the boil and cook for 10 minutes. Drain and serve on a plate for analysis.
- **b** Place one broccoli portion into a steamer and cook for 10 minutes. Serve on a plate for analysis.
- **c** Place one broccoli portion onto a microwave plate and cook on high for four minutes. Serve on a plate for analysis.
- **d** Stir-fry one portion of broccoli with a teaspoon of water in a wok for six minutes. Serve on a plate for analysis
- **e** Place one broccoli portion into cold water. Boil rapidly for two to three minutes. Quickly drain and immerse in ice-cold water (known as refreshing). Leave for one to two minutes, then serve on a plate for analysis.
- **f** Place one broccoli portion into boiling water. Add a pinch of salt and a pinch of bicarbonate of soda. Cook for 10 minutes. Serve on a plate for analysis.

2 Copy and complete the table below.

Cooking method	Appearance	Aroma	Taste	Texture
Boiling				
Steaming				
Microwaving				
Stir-frying				
Blanching				
With salt and bicarbonate of soda				

- **a** Which method retained the best colour?
- **b** Which method produced the broccoli with the best texture?
- **c** Which method produced the strongest aroma?
- **d** Which method would have maximised the nutrient content of the broccoli?
- **e** Which is your preferred method for the cooking of broccoli? Explain why.

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LOOKING BACK

1 Dietary-related diseases contribute significantly to Australia's burden of disease.

2 Food is a protective factor, reducing the risk of dietary-related diseases such as obesity, cardiovascular disease, type 2 diabetes, bowel cancer and osteoporosis.

3 A food allergy is an abnormal response to a specific part of a food, such as peanuts, eggs and soy.

4 A food intolerance occurs when the body has a chemical reaction to eating a particular substance, such as gluten or lactose.

5 The way food is prepared can have a significant impact on nutritional value.

TEST YOUR KNOWLEDGE

Multiple choice

1 Diet and disease are interrelated. Good lifestyle choices to reduce your risk of dietary related diseases include:

- **a** eating fresh fruit and vegetables, wholegrain cereals and fatty meats
- **b** eating lean meats, fruit juices and commercially prepared products including takeaway
- **c** eating salmon, nuts and pies
- **d** eating a balanced diet including lean meats, fresh fruit and wholegrain cereals.

2 Consumption of which of the following nutrients has been linked to lowering cholesterol and reducing the risk of cardiovascular disease?

- **a** omega-3
- **b** water
- **c** calcium
- **d** iron

True/false

1 Obesity is a risk factor for all diet-related diseases.

2 Boiling your vegetables is the best cooking method to maintain their nutritional value.

3 People who are lactose intolerant can drink fat-free milk.

Short answer

1 Explain the impact that diet is having on the health status of Australians.

2 Describe the difference between a food allergy and a food insensitivity. Include two examples for each.

3 Copy and complete the following summary chart. Use the example to help you.

Disease	Foods that act as protective factors	Foods that act as risk factors
Obesity	High-fibre foods such as wholegrain cereals, fruits and vegetables	Foods high in saturated and trans fats, such as fried foods, fatty meats, cakes and biscuits
Cardiovascular disease		
Bowel cancer		
Diabetes		
Osteoporosis		

4 Now state what else is missing from this picture, but is also very important for good health.

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Extended response

1 Choose one of the dietary-related diseases discussed in this chapter.

2 Copy and complete the table below and modify the menu plan below to meet the needs of the condition you have chosen. Justify the changes that you have made, explaining why you have made these choices.

	Menu item	Modification
Breakfast	1 glass orange juice 1 bowl Fruit Loops with milk 1 piece white toast with butter and peanut butter	
Lunch	1 sandwich of white bread with butter, mayonnaise, salami, lettuce and tomato 1 apple 1 tuna sushi roll 1 juice box	
Dinner	1 piece battered fish hot chips 1 glass cordial	
Snacks	1 cup-cake 1 can Coca-Cola 1 muesli bar 1 glass water	

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Career profile: Melanie Lionello

Current occupation: Nutritionist and Director of Naturally Nutritious
Place of employment: Naturally Nutritious

Explain your interest in the area of your chosen career path. Discuss the reasons why you have pursued this career.

I have always loved cooking, and as I neared the end of high school I became more aware of what I was eating and what I was cooking. The area of nutrition took my interest because I found there were so many conflicting views and opinions and I've always had a little part of me that wants to know the truth! So after taking three years off from study after school, I finally enrolled in and completed a Bachelor of Human Nutrition with Honours.

Who was your role model and how did they influence your decision to work with food?

I don't think I really had a role model as such, but I was heavily influenced by my Italian family and their love of cooking, growing and eating food. I wanted to be able to feed myself properly and teach others that they could too – good, wholesome food didn't need to be as hard as it was made out to be.

Discuss the most rewarding aspects of your career.

I have had a lot of highlights and I have to pinch myself to believe them all! My most rewarding one would have to be launching my very own long-life packaged soup into Woolworths and independent grocers nationwide. It was a dream come true to see so many people enjoying my product, into which I had poured my heart and soul, and loving a product that was great for their tastebuds as well as their health.

Explain the challenges you face in your job.

One of the biggest challenges is needing to be continuously creative and inventive. It's challenging in the way writer's block would be for an author: you have a deadline, but you feel as though you're out of ideas! It's also really isolating working for yourself, and that's not something that is really spoken about. I try to break up my day with reading or watching a cooking show on TV, walking to the shops for the day's groceries and spending some time offline in the evening.

Is there such a thing as a 'normal' day in your work? Outline some things that you do in a day.

It's different every day, but in a nutshell, I wake up early and have a coffee (I couldn't function without it!). I get my plan for the day sorted with work I need to complete for clients, shop for ingredients, come home and test the recipes a few times, do lots of dishes and dishwashing loads, make the recipes one last time, style the scene, photograph it all, edit the images, write up the recipes, analyse them with software for nutrient information and then forward it all on to my client. Sometimes I might be making videos instead or having to be on location for a client so it's always busy and I work quite long hours but it's always fun!

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Identify the opportunities this career has afforded you.

I've had the opportunity to work with some of the biggest companies in Australia and internationally, such as Nespresso, David Jones, Coles Supermarkets, Dairy Australia and Vitamix. It's such a privilege to create recipes for these companies and have them shared with such a broad audience. It's really exciting for me to think that I could inspire someone to try something new in the kitchen, or make a healthier choice every now and again.

What are your career goals for the future (e.g. in five years' time)?

I would love to continue creating recipes and products for companies as well as possibly having the opportunity to one day publish a cookbook full of healthy, affordable, delicious and simple recipes, so that people can see that cooking is fun and easy and even better when the food is shared at the end of it all!

Outline the qualifications needed to complete this type of work.

Just get cooking! Get creative, try new things, eat different cuisines. Learn what you love to eat, what feeds your soul and what satisfies your tastebuds. It's okay if some of your creations and recipes don't work or taste terrible – it's all part of it! I'd try to see if you can volunteer at community gardens or schools to see what people are interested in eating and growing, and what's manageable for them, so you can create targeted recipes – recipes that people actually want and need! Start a blog, post your recipes and make connections with other food bloggers – it's a big world out in cyberspace! If you want to become a nutritionist while doing all of this, you can do so at university by undertaking a Bachelor of Human Nutrition or similar. Of course, it isn't necessary if your focus is more on cooking amazing food rather than amazing healthy food.

What role has Home Economics played in your career?

It taught me some of the most basic skills I still use today. It taught me a lot of things to do with recipe structure and recipe writing, and it involved the beginnings of food science – for example, I learnt in Home Economics that you can't make shortbread with oil instead of butter because different types of fat will behave differently with flour. It was critical for my career to develop from my love of food and cooking.

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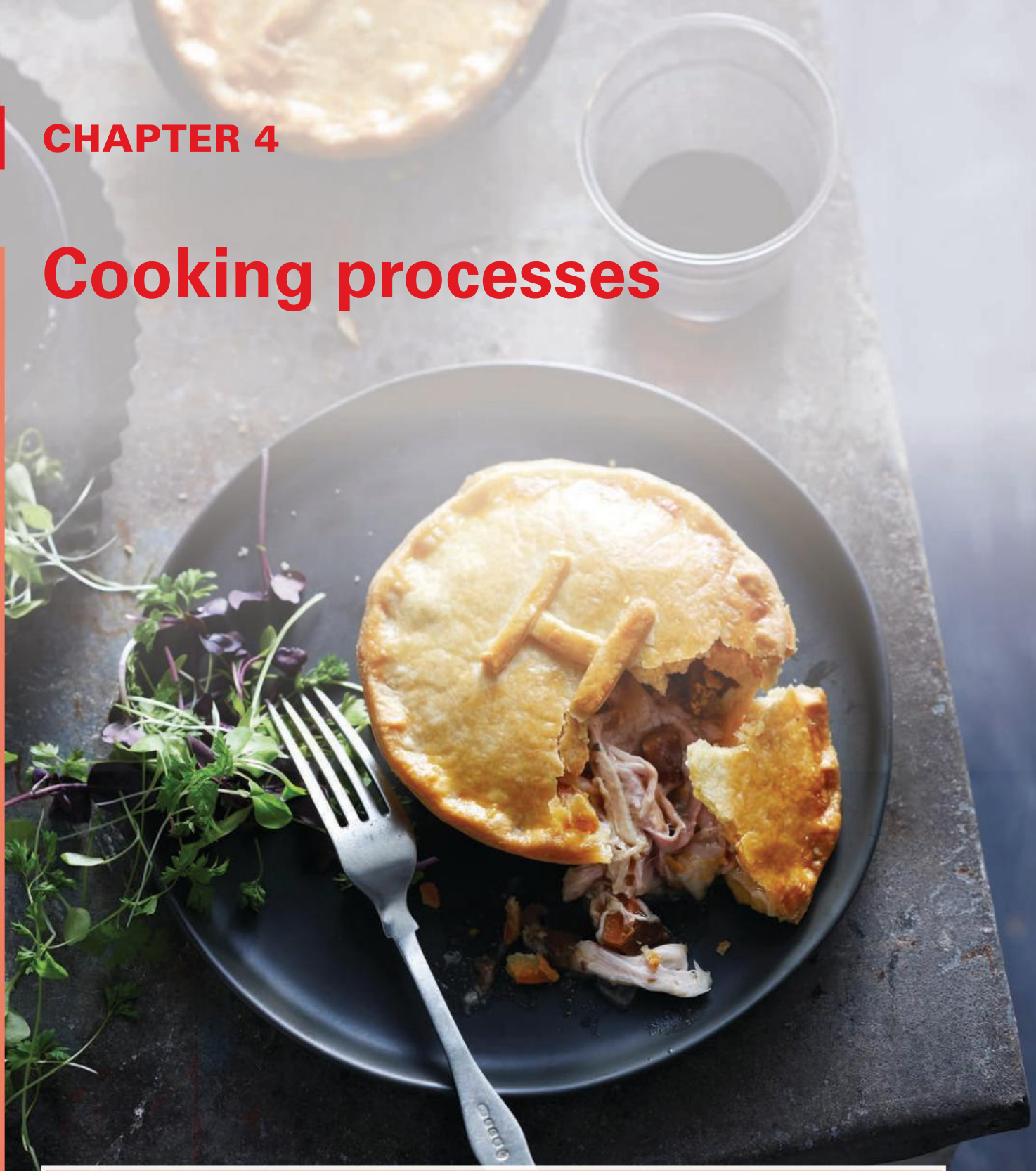
CHAPTER 4

Cooking processes



ACCESS PRIOR KNOWLEDGE

1. Outline why we need to cook some foods before eating but not all.
2. List the methods of cooking and provide an example of a recipe for each one.
3. Describe the process of food preservation.
4. Define the terms 'conduction', 'convection' and 'radiation'.
5. Explain why cooking in the microwave is so fast.

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4.1 The purpose of cooking

Food is cooked for a number of reasons. Cooking improves its **digestibility**, taste and appearance; it kills micro-organisms; it delays **spoilage**; and it creates new food items or new combinations of foods.

digestibility The ability to swallow and process the food that is being eaten.

spoilage Microbiological damage that occurs to the original nutritional value, texture and flavour of food. The food then becomes harmful to people and unsuitable to eat.

Preparing and cooking food results in a variety of changes to the food. When we cook food, we are also changing its sensory properties, such as colour, aroma, texture and flavour.

Figure 4.1 Cooking can create new food items, changing flavours and textures.

Figure 4.2 Micro-organisms present on many raw foods are destroyed during cooking.

The cooking process involves the following elements:

- application of heat
- destroying harmful micro-organisms
- changing the physical, sensory and chemical properties of food
- combining or developing new ingredients, flavours and textures
- accurate measurements
- understanding cooking processes.

Figure 4.3 The cooking process.

Some foods, like apples and carrots, can be eaten without cooking, but other foods, like chicken, need to be cooked before eating. This is partly because some raw foods are difficult to chew, or taste awful, but it is also due to the fact that they contain bacteria and micro-organisms that are harmful if we consume them. These bacteria and micro-organisms are destroyed by the heat used in the cooking process.

4.1 LET'S COLLABORATE

List five foods that must be cooked before being eaten. Try to think of an example from each food group.

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4.2 Cooking changes the sensory properties of food

Colour

blanching The process whereby a food substance is plunged into boiling water, removed after a short period of time, then finally plunged into ice-cold water to stop the cooking process.

When food is cooked, it looks completely different. In some foods the colour becomes more intense – for example, when beans are **blanched**. Some foods, like meat, undergo a total colour change. A piece of raw meat is bright red; add heat, and the colour becomes brown.

Figure 4.4 The sensory properties of food change when cooking, but the change will depend on the cooking method used.

4.2 LET'S COLLABORATE

Can you think of any examples when the cooking of food may have resulted in a change to the colour, making the food unappealing? Think about what happens when you over-cook food. How many examples can you think of?

Aroma

The chemicals found in food create their aroma. When food is cooked, the aroma becomes more intense as the chemicals change.

Flavour

The flavours or taste sensations of food are sweet, sour, salty, bitter and **umami**. The flavour change that occurs when food is cooked is the result of chemical changes that occur and the mixing of combinations of foods. Consider the taste of raw minced meat – not very nice. Add the ingredients to make a Bolognese sauce and the flavour is totally different and very pleasing to the senses.

umami The savoury flavour or taste sensation of food.

Figure 4.5 The aroma of food intensifies when it is cooked. How good does a sausage smell from a distance?

Figure 4.6 The flavour of food changes when it is cooked, often improving.

Tasty Trivia

Your tongue does a better job of tasting food when it is warm. Compare a scoop of vanilla ice cream from the freezer, then taste a scoop that has been melted in the microwave. The warm one will taste much sweeter.

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Texture

The texture of food relates to how the food feels in your mouth and when you chew it. When food is cooked, chemical and physical changes take place and alter its texture. A piece of raw butternut squash is very chewy but when cooked it becomes soft and smooth.

Figure 4.7 The texture of food changes when it is cooked, but will depend on the cooking method used.

Tasty Trivia

Think about what you have noticed when you eat food and have a cold. Have you ever noticed that food tastes different? This is because your nose is blocked and your sense of smell is affected. Taste is a combination of your tastebuds and the aroma created by food.

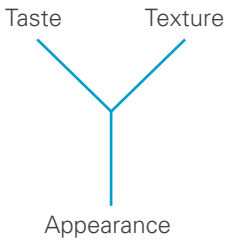
4.3 INVESTIGATE IT

Cooking can be a long or a short process, depending on what you are cooking and the cooking method used. One challenge for many families is what to cook for dinner once they get home. Life can be very busy, with different activities, work and school. The New South Wales government's HealthyKids website provides inspiration for meal solutions that are quick and easy to cook at home with a focus on young people. Review its recipe offering online. Highlight three recipes you could cook at home to include in your family meal planning. Suggest three recipes that you could include in your own *Busy Family Cookbook*.

4.4 ACTIVITY

Sensory changes after cooking

1. For this activity you will need to cook the following foods according to the instructions given:
   - **a** ¼ carrot, sliced and then steamed
   - **b** 1 slice white bread, toasted
   - **c** ¼ cup milk, heated in the microwave for 20 seconds
   - **d** 1 apple, peeled, diced and simmered.
2. Compare these cooked foods with the raw food product. Draw up in your workbook four separate Y charts, like the one below:



3. Compare the taste, texture and appearance of each of the four cooked food items.
4. Explain how the cooking of food changes the sensory properties of foods.
5. Explain why some foods can't be eaten raw.
6. Which of the senses is most important for you when eating a food? Explain your reason for this.

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REFLECT ON LEARNING

1 Name and describe each of the sensory properties of food.
2 Discuss the reasons why we cook food.
3 Choose a vegetable that you like to eat – for example, a potato. Compare the changes to the physical properties of your vegetable when cooked from its raw state.
4 Define the term 'digestibility' and list two foods that need to be cooked for this reason.
5 List three foods that change colour when cooked, making them more appealing to eat.

4.3 The three methods of heat transfer

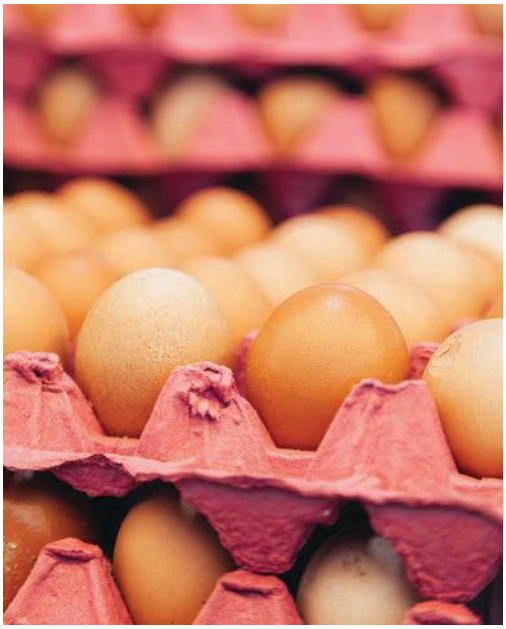
moist heat Any cooking technique that involves cooking with moisture: steam, water, stock, wine or some other liquid. Low temperatures generally are used.

dry heat Any cooking technique in which the heat is transferred to the food without moisture. Dry-heat cooking involves high temperatures.

Food is cooked through the application of heat. This can be wet or **moist heat**, **dry heat** or microwaving. The heat that is used to cook the food involves one of three principles of heat transfer: conduction, convection or radiation. Food can also be cooked through the action of microwaves.

4.5 LET'S COLLABORATE

List all the different cooking methods that could be used to cook an egg.



Conduction

Conduction is the transfer of heat from one molecule to the next by contact with a hot material (e.g. a frying pan). Conduction involves the transfer and distribution of heat energy from atom to atom within a substance. For example, a spoon in a cup of hot soup becomes warm because the heat from the soup is conducted along the spoon. Conduction occurs best in solid foods like a leg of lamb, but it can happen in fluids.

conduction Cooking food by heat transferring through a flat metal surface onto the food or liquid – for example, frying, poaching and grilling.

Tasty Trivia Have you ever burned yourself on a hot pan? This is conduction! Heat has been transferred through matter – your skin!

Figure 4.8 Heat transfer through conduction

Tasty Trivia Have you ever noticed that metals tend to feel cold? Believe it or not, they are not cold. They only feel cold because they conduct heat away from your hand. You perceive the heat that is leaving your hand as being cold.

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Figure 4.9 These materials are all good conductors of heat.

Figure 4.10 Plastics and wood are poor conductors of heat.

4.6 ACTIVITY

Don't use a metal spoon!

Re-read the information about conduction on p. 116 and then answer the following questions:

1. Explain why you should not use a metal spoon when stirring food that is cooking in a metal saucepan.
2. Look at Figure 4.9, showing the good **conductors** of heat. Explain why these materials are used as the container for the cooking of food.
3. Look at Figure 4.10, showing the poor conductors of heat. State a use for each of these and explain why they are suitable for this use.
4. Suggest why it is appropriate to use a wooden spoon when cooking using a stainless steel saucepan.
5. Describe why a frying pan is made out of a metal material.
6. Outline the reasons why we do not use wood as a frying pan or saucepan handle.

conductor A good conductor of heat allows the heat to travel through it quickly – for example, copper, stainless steel and enamel. Wood and glass are poor conductors of heat. This is why wooden spoons are best for stirring hot food.

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Tasty Trivia

Water, air, steam and fat (or combinations of these) are cooking mediums through which heat is transferred.

Convection

Convection is the transfer of heat by the actual movement of the warmed foods. The heat is created via the movement of hot particles from one particle to the other, so the heat moves with the liquid that surrounds the food. As liquids or gases are warmed, they become less dense and rise; cooler, denser liquid or gas then sinks down towards the heat and creates convection currents.

convection Cooking food by the circulation of hot air or steam, such as in an oven or a steamer.

Tasty Trivia

Convection and the hot temperatures of the oven are responsible for the chemical reactions that occur when cooking, such as the browning of a cake or the crisp texture of pork crackling.

Radiation

Radiation is the transfer of heat directly from a heat source to the food. An example of cooking using radiation is grilling. When using radiant energy, heat is transferred by waves of energy that vibrate at a high frequency and travel rapidly through space. When these heat and light waves are absorbed by food, only the surface of the food is heated, as the waves cannot penetrate the food. The rest of the food is heated via conduction. In order for food to be heated, a combination of radiation and conduction is necessary.

radiation Cooking food by direct heat from a flame or element, such as in a griller, or when electromagnetic waves pass through food, such as in a microwave.

Radiant energy is rapid because it moves at the speed of light.

Tasty Trivia

The faster the convection current, the quicker the heat transfer – our food will cook. Or, in the case of a blast chiller, the quicker the food will cool.

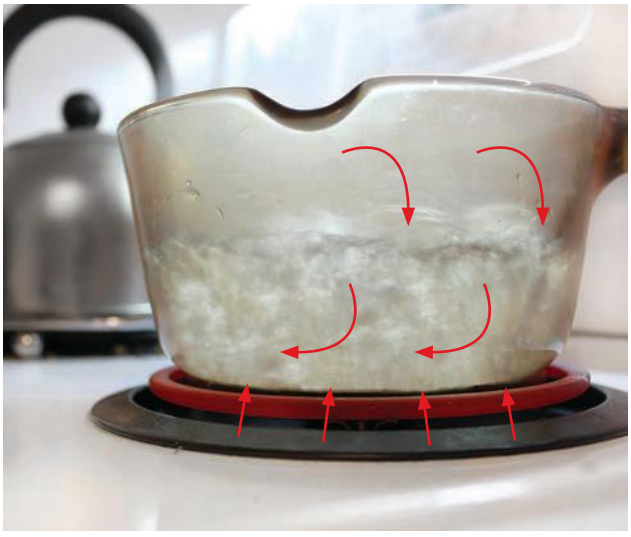

Figure 4.11 Heat transfer through convection. As the water in the pot boils, heat leaves the pot as the currents of steam and air rise.

Tasty Trivia

Convection is responsible for making pasta spirals rise and fall in a saucepan of heated water. Heat always moves towards areas of lesser heat. The warmer portions of the water are less dense, and therefore they rise. Meanwhile, the cooler portions of the water fall because they are denser.

Figure 4.12 Heat transfer through radiation

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Figure 4.13 Next time when you toast marshmallows over an open fire or use the toaster in your kitchen, you will know that you are using radiant energy (the glowing coals of a fire and the glowing coils of the toaster) to cook the food.

Tasty Trivia

Temperature and heat are technically not the same thing. Temperature is the average motion of atoms and molecules. Heat is the energy that flows due to temperature differences. Heat is always transferred from warmer to cooler substances.

4.7 ACTIVITY

Understanding methods of heat transfer

Copy and complete the following table summarising the different methods of heat transfer.

Method of heat transfer	Diagram of the cooking method	Explanation of how the heat is created	Explanation of how the heat is transferred	Example of foods cooked this way
Convection				
Conduction				
Radiation				

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4.8 ACTIVITY

Popping corn

There are three ways to cook popcorn:

- Place popcorn kernels in a popcorn popper. Plug it in and turn on the popper. Hot air will transfer heat to the kernels, making them expand and pop.
- Cook a bag of microwave popcorn in the microwave.
- Put oil in the bottom of a pan, then pour in the popcorn kernels. Place the pan on the stove and turn on the burner to a medium heat. Cover the pan with a lid. Periodically shake the pan so the kernels move around in the oil.

These methods of cooking popcorn are examples of the three ways by which heat can be transferred.

1 State which method you believe is:
   - **a** conduction
   - **b** convection
   - **c** radiation.

   Explain your reasoning.
2 Describe how heat is transferred to the popcorn in the pan.
3 Explain how hot air can cook popcorn.
4 Think about the explanation of radiation. How do you think that popcorn can create its own heat when cooked in the microwave?
5 State the method of cooking popcorn that you think is the healthiest. Explain why you think this is the case.
6 Prepare the popcorn using each of the methods outlined above and complete a sensory analysis.
7 Identify the popcorn that is more appealing in terms of its appearance.
8 Discuss the reason for the better-tasting popcorn. Explain your response.
9 Which popcorn had an aroma that was most pleasing to your sense of smell?
10 Which popcorn did you like the best and which did you like the least? Provide a reason and an explanation for your decision.

REFLECT ON LEARNING

1 Define the three ways by which heat is transferred.
2 Describe the reason why we use a wooden spoon when cooking on the stove top.
3 Outline how an egg is cooked when it is poached.
4 Outline how an egg is cooked when it is fried.
5 Explain why rice and pasta rise and fall in the saucepan when they are being cooked.

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DESIGN THINKING

Eggs are a versatile ingredient that can be cooked in many different ways.

Design a healthy meal solution (it can be for breakfast, lunch or dinner) that incorporates eggs but also uses the three methods of heat transfer when being produced. You must also include at least two vegetables in your final product. Eggs Florentine (on p. 122–3) is an example of a recipe that would meet this design brief.

Investigating

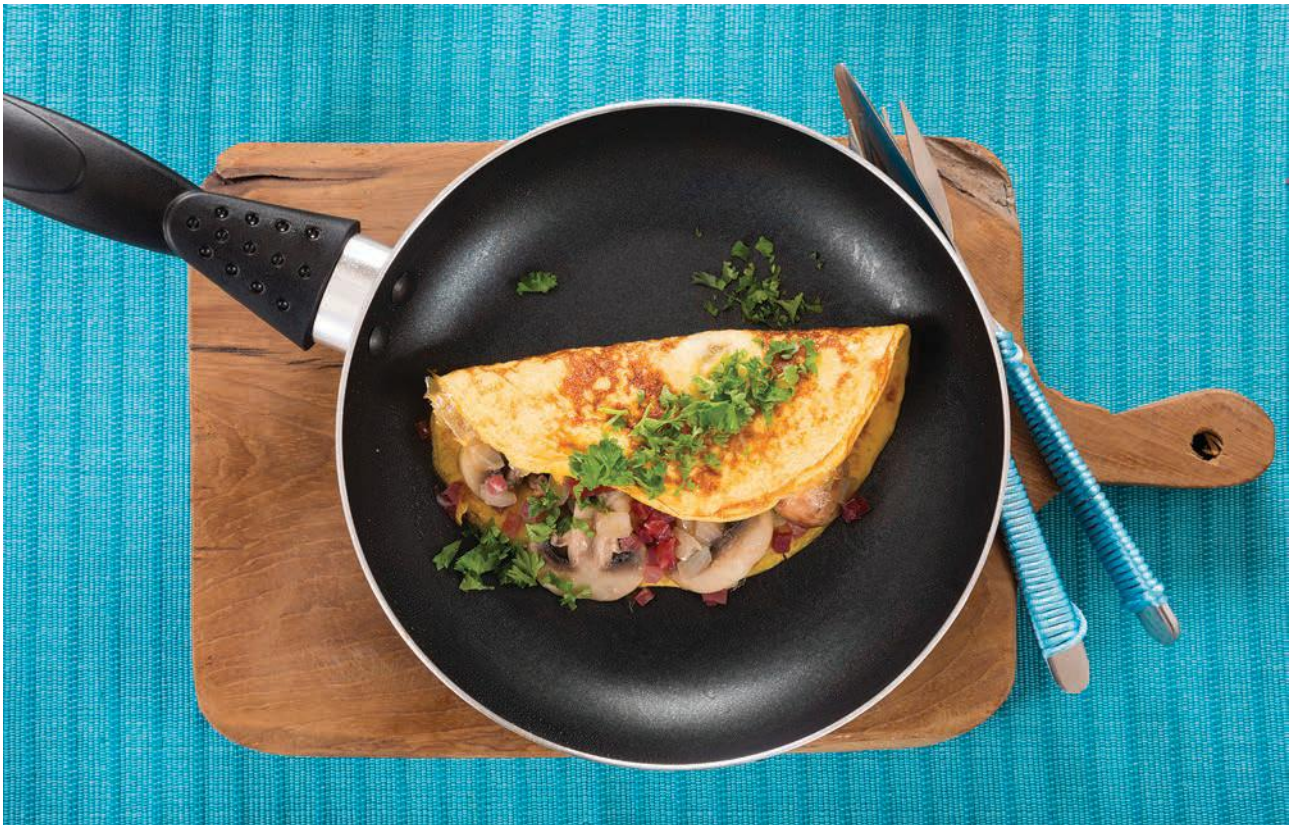
1. Investigate the different methods of heat transfer.
2. Suggest different ways of cooking eggs.
3. Prepare a list of ingredients for each method.
4. List the aspects that need to be considered when making a decision about the meal solution featuring eggs that you will produce.

Generating

1. Generate a list of possible meal solutions that will meet the specifications of the brief.
2. Determine which option you will produce.

Planning and managing

1. Design how you will present your final meal solution, including any garnish.
2. Prepare a food order to submit to your teacher.
3. Develop a work plan for your production.



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Eggs Florentine

FRANCE

RECIPE

Main tools and equipment

Double boiler, whisk, grill, saucepan, slotted spoon, frying pan, cling wrap

Production skills

Whisking, separating

Cooking processes

Poaching, frying, toasting

SERVES 2

Preparation time: 20 minutes

Cooking time: 15 minutes

Serving and presentation time: 5 minutes

Total time: 40 minutes

Ingredients

 1 egg yolk	 ½ teaspoon lemon juice	 ¼ cup butter	 Pinch salt	 2 eggs
 2 English muffins, split, toasted and buttered	 1 bunch spinach	 10 g butter		

Method

1. Using a double boiler, whisk the egg yolk and lemon juice together over simmering water.
2. Add half the butter and whisk vigorously until the butter melts and the sauce begins to thicken.
3. Add the remaining butter. Continue to whisk until the butter melts and the Hollandaise sauce thickens (2–3 minutes).
4. Remove from heat and stir in salt. Place cling wrap over the entire surface of the sauce to stop a film from forming while you prepare the rest of your ingredients.
5. Half-fill a saucepan with water and bring to just simmering.

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6 Heat butter in a large frying pan.

7 Add the spinach and cook until spinach wilts.

8 Using your slotted spoon, stir the water in the saucepan to make a whirlpool. When formed, gently drop your egg into your whirlpool.

9 When your egg white is set, remove your egg from the saucepan gently with your slotted spoon and drain. Cook the second egg.

10 Place the toasted and buttered English muffins on your serving plates. Spoon the spinach over your muffin halves. Gently place your poached egg on top, then drizzle with Hollandaise sauce. Serve immediately.

Evaluating

1 Explain why it is so important to serve your Eggs Florentine immediately.

2 Identify and define the method/s of heat transfer involved in the recipe that you produced.

3 Analyse the sensory properties of your final egg meal solution. Include a discussion of appearance, aroma, taste and texture.

4 Outline the importance of your work plan in producing your product. Refer to how you managed to coordinate all of your different cooking methods and ensure that your final product was well presented and of optimal quality.

4.4 Methods of cooking

Food is cooked by the application of heat, which may be either wet (moist) or dry. Cooking itself is impossible without heat; in many cases, the area of cooking that requires the most skill and experience is when heat is involved, as many decisions need to be made.

intensity The strength or level of flavour created by the cooking of a food.

Figure 4.14 Many problems can occur if the correct decisions are not made when cooking. A dish can be spoiled if it is subject to heat that is too **intense**, or if it is cooked for too long or not cooked quickly enough.

Dry heat	Wet (moist) heat
Roasting	Boiling
Baking	Poaching
Grilling	Steaming
Frying	Stewing

Figure 4.15 Methods of cooking

4.9 ACTIVITY

Chicken fillets can be cooked in many different ways, including wet methods, dry methods and using the microwave.

1 List all the ways a chicken fillet can be cooked.

2 Choose a cookery method that best cooks a chicken fillet to enhance its sensory properties.

3 Find two recipes that cook chicken in this way.

4 Select one recipe.

5 Produce a food order for your teacher and then prepare and cook the chicken fillet.

6 Develop a list of decisions that need to be made when heat is applied to this chicken fillet.

7 Describe the sensory properties of the chicken fillet once cooked compared with its raw state.

8 Justify your choice and recipe given the final sensory properties of the chicken fillet.

9 Critically evaluate your level of skill in using the method of cooking involved.

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4.10 LET'S COLLABORATE

Have you ever been served food that has not been cooked well? Perhaps under-cooked chicken or over-cooked and rubbery calamari?

4.5 Cooking with dry heat

There are many ways in which dry heat is used to cook food, such as roasting, baking, grilling, frying and sautéing. These methods involve the food being exposed to a source of heat, or placed in a closed oven and subjected to heated air.

Foods cooked with dry heat are cooked to add crispness, colour and flavour. Dry heat does not **tenderise** foods, so it is very important to choose the correct foods to cook with dry heat. Thin, tender and small food items should be fried and grilled. Larger, denser food items should be baked and roasted.

tenderising The process of breaking down collagen in food to make it more palatable for consumption.

4.11 ACTIVITY

Dry and hot

1. List 10 food products that can be cooked by dry heat.
2. Make a list of thin meat cuts that could be cooked using dry heat.
3. Name five other tender cuts of meat that can be cooked by dry heat.
4. Explain why it is best to cook with tender cuts of meat when using dry cooking methods.
5. Prepare a list of vegetables that can be cooked using dry heat. Explain how each should be cut or prepared.

Figure 4.16 Roasting is a dry-heat cooking method.

Roasting

Roasting is a cooking method that utilises dry heat from an open fire, oven or other heat source. Roasting generally is carried out in an oven where the food is surrounded by heat. This method of cooking causes the **caramelisation** of the food's surface; this enhances the appearance and flavour of the food.

caramelisation The heating of sugar or foods containing sugar until a brown colour and characteristic flavour develops.

When meat is roasted in the oven, it generally is cooked by convection and radiation, because only a small proportion of the meat comes into direct contact with the heated roasting pan.

Large, thick and compact cuts of meat usually are selected for roasting, as are potatoes and other larger pieces of vegetables. The food needs to be coated in fat – either the fat naturally found on the meat, or fat or oil added to the food and pan before cooking.

Tasty Trivia

Originally, the term 'roast' meant 'to cook before an open fire'. Food to be roasted was placed before a fire in a device that reflected heat, open on the side towards the fire and closed on the side towards the room. The meat to be roasted was suspended in this device, slowly turned and cooked. Have you ever seen modern food being prepared like this?

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Baking

Baked food is cooked by the process of convection, whereby hot air is created and circulated in an oven. High temperatures generally are created by an oven, but hot ash or hot stones can also be used to bake foods.

The dry heat of baking changes the structure of the starch granules found in food. This causes the surface of the food to brown, a process called **dextrinisation**.

Figure 4.17 Baking is used to prepare bread, muffins, cakes, pastries, pies and biscuits.

Figure 4.18 Consider the distance that heat travels to reach the centre of these food items.

Caramelisation and dextrinisation give food an attractive appearance and taste, and partially seal in the food's moisture. An example of caramelisation is a sugar-topped crème caramel that is grilled until it is brown. This also occurs when meat juices are cooked to a dark glaze.

dextrinisation The process whereby starch is broken down to develop a characteristic appearance and flavour.

Tasty Trivia

It is important to ensure that baked or roasted foods are cooked thoroughly. Large food items, such as meat, heat very slowly on the inside, as the heat has further to travel to reach the centre of the food.

DESIGN BRIEF: BAKED FILO

Filo pastry is a fantastic pastry with which to work. The word 'filo' comes from the Greek word meaning 'leaf'. Lighter than most pastries, it is a healthier alternative to use in baked products. But working with filo can be tricky, due to its delicate nature. Your task is to design a baked product that uses filo pastry. Your product needs to be healthy, tasty and easy to eat. You need to prepare either a sweet dish that incorporates fruit or a savoury dish that incorporates vegetables. An example of a recipe that would meet this brief is Cheese and Spinach Triangles (p. 126).

Investigating

1. Investigate the ingredients used to make filo pastry.
2. Compare these ingredients with those used to make puff pastry and make a nutritional analysis.
3. Research tips and techniques for working with filo pastry, including how to avoid it drying out or tearing.

Generating

1. Generate a list of recipe ideas – either sweet or savoury – as your inspiration for your final product.
2. Design your recipe and justify your choice of either a sweet or savoury item.

Planning and managing

1. Prepare a food order for your product.
2. Prepare a work plan for the production of your final product.

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Cheese and spinach triangles

GREECE

RECIPE

Main tools and equipment

Chopping board, chef's knife, pastry brush, baking tray, tablespoon

Production skills

Combining, slicing, brushing, folding

Cooking processes

Baking

MAKES 16 TRIANGLES

Preparation time: 15 minutes

Cooking time: 25–30 minutes

Serving and presentation time: 5 minutes

Total time: 45 minutes

Ingredients

					
250 g feta cheese, crumbled	250 g spinach, cooked	Spring onion	2 eggs, beaten	20 g butter melted	16 filo pastry sheets

Method

1. Preheat oven to 180°C.
2. Line a baking tray with baking paper or spray with oil so your triangles don't stick.
3. Ensure your spinach has been drained, removing the moisture.
4. Combine the spinach, cheese, spring onion and eggs.
5. Brush your filo pastry sheet with butter and then fold into thirds.
6. Place one tablespoon of mixture into the corner of your filo pastry.
7. Fold over, forming a triangle, and continue to fold until you have formed your finished triangle.
8. Brush the top of the triangle with melted butter.
9. Repeat the process with your other sheets of filo pastry.
10. Bake for 25–30 minutes until your triangles are puffed and golden.

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Evaluating

1 List two safety rules you had to consider when producing this recipe.

2 Describe the appearance, aroma, taste and texture of your filo product using sensory analysis language. Write a complete sentence for each point.

3 Summarise what you learnt about working with filo pastry.

4 Critically evaluate what you have learnt from making this recipe. If you made this recipe again, what modifications or changes would you make? Explain why.

Grilling

Grilling is a very quick method of cooking by radiant heat. The food usually has to be turned once while it is cooking. This method of cooking generally is carried out underneath an electric or gas griller. Food can also be cooked over glowing charcoals or an open fire, which is referred to as barbecuing. Foods suitable for grilling are those that are tender and require quick cooking. Items such as steak, fish and some vegetables can be grilled. High temperatures are used to cook foods, and the food is positioned close to the heat source. Food is cooked on a barbecue by the heat radiating from the hot coals or the gas flame, and through the process of conduction.

The barbecue has its origin in prehistoric times, when hunters and gatherers used open fires and hot coals to cook the foods that they killed and collected.

4.12 LET'S COLLABORATE

Australians are famous for their barbecues. How often do you use a barbecue in your household? List the foods you typically barbecue at home.

Figure 4.19 Gas barbecues are easy to operate and are commonplace at many Australian campsites and beaches.

Tasty Trivia

There are generally three types of barbecues available for purchase in Australia: charcoal-powered, gas-powered and electric.

4.13 LET'S COLLABORATE

As a class, develop a list of other food items that can be cooked under the griller.

Tasty Trivia

A grill or salamander can be used to brown the top of some dishes. The sugar on the top of a crème brûlée becomes brown and toffee-like with the use of a griller. Alternatively, you can use a flambé torch.

DESIGN THINKING

Crème Brûlée is a delicious rich, thick dessert with a crisp top crust. Develop a Berry Brûlée recipe that could be used to highlight this seasonal dessert. Ensure that you use the grill safely and efficiently to obtain the crisp top crust.

ISBN 978-1-316-64937-4

DESIGN BRIEF: AN AUSSIE SNAG

You are going on a camping holiday with your family at Christmas. You have all been assigned a meal to prepare. You have decided to prepare sausages for dinner on the third night of the holiday, which you will bring frozen to increase their shelf life. In order to ensure that the food is prepared and stored safely, you need to investigate the safety guidelines for storing the meat. You should also research three different meat options and develop a list of 10 different options for fillings or flavours.

Figure 4.20 The sausage, a great Aussie barbecue favourite

Investigating

1. Develop a list of criteria for success questions that could be used to evaluate the sensory properties of the sausage that you design.
2. Prepare a list of considerations and constraints associated with the development of this sausage.
3. Research the sausage-making process so you are an informed food product designer. Make sure you investigate the ratio of fat to meat.
4. Investigate the different sausage casings available and decide which one is best for your product.
5. Construct a concept map using Inspiration, or a similar program, that details your sausage flavouring options.

Generating

1. Make a decision about the sausage you will produce and the fillings you will include.
2. Prepare your recipe, making sure you have the right fat-to-meat ratio for the right sausage texture.

Planning and managing

1. Prepare a list of safety requirements for the storage of the ingredients that need to be taken on your camping holiday.
2. Prepare your food order form. Remember to order the skins to hold your sausages together (unless you have planned a skinless one!).
3. Prepare your work plan to ensure success during your production time.

Producing

Produce your sausage for your camping trip.

Evaluating

1. Write a response to each of the established criteria for success.
2. Evaluate your effectiveness in managing each of the tasks required for this design brief. In your evaluation, include a comment that discusses:
   - **a** your choice of meat to make the sausage
   - **b** your choice of flavourings
   - **c** your work and skills during the preparation of the sausage.
3. Detail the changes that occurred to the food as a result of the method of cooking used. Outline how this changes the sensory properties of the food.
4. List any modification or changes that you would make to your sausage if you were to complete this task again.

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Figure 4.21 Charcoal barbecues take approximately 25–30 minutes to heat up from the time you light the coals.

Frying

Frying food entails cooking the food in fat, oil, butter or **lard**. Food is totally or partially immersed in hot fat, and cooks rapidly as heat is conducted from the fat into the food by convection currents. There are three main types of frying: deep-frying; shallow- or pan-frying; and stir-frying.

lard Pig fat that is used to tenderise meat or other food items.

Tasty Trivia

The temperature of fat is considerably greater than that of boiling water. The fat or oil is heated to temperatures between 150°C and 220°C.

Tender pieces of meat, poultry, seafood and vegetables can be fried. The temperature of the fat or oil is extremely important; high temperatures seal the outside of the food, which prevents it from soaking up the heated oil like a sponge.

4.14 LET'S COLLABORATE

Can you think of any unusual fried food products? A corndog is a popular American fried food; this is simply a frankfurt deep fried in a corn batter – you may have tried one at an agricultural show or carnival. List other examples that you can think of and that you may have tried.

Deep-frying

Deep-frying involves totally immersing food in hot oil. Deep-fried foods often have an outer layer of crumbs or batter; this protects the food from the high temperature of the fat.

To check that the oil is hot enough before beginning to cook, place a small portion of food into the pan. If the oil is hot enough, it will bubble as soon as the food is added. Alternatively, you can place the handle end of your wooden spoon in the oil and look for bubbles.

Figure 4.22 Foods are fully submerged in hot oil for deep-frying.

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Watch out! Make sure you have removed the moisture from foods before deep frying, otherwise 'spitting' will occur during the cooking – which is an Occupational Health and Safety (OH&S) hazard.

4.15 INVESTIGATE IT

In deep

1. Complete a KWL to outline what you know, what you want to know and what you have learned about the deep-frying cooking method.
2. Research the health issues associated with consuming foods that have been deep-fried.
3. Develop a list of safety rules that should be followed when deep-frying.
4. Find out the special OH&S requirements that need to be followed in a restaurant or fast-food outlet where deep-frying occurs.
5. Deep-frying is considered a difficult skill, and often is not taught in school kitchens until the senior years, if at all. Explain why deep-frying is considered a high production skill and why some schools choose not to have deep-fryers in their Home Economics/Food Technology rooms.
6. Prepare a computer-generated visual display using a program like Infographic or Comic Life to hang in your school Home Economics room, outlining the practices to follow when deep-frying food.

4.16 ACTIVITY

Oven fries

This activity requires you to compare deep-fried homemade fries and commercially available oven fries.

- For the oven fries, heat the oven and place a handful of frozen oven fries onto a tray. Follow the cooking instructions as found on the package.
- For the deep-fried fries, prepare two potatoes for shallow frying. Peel and cut the two potatoes into chunky-cut fries. Pat the fries down with a paper towel to reduce moisture. Shallow fry these potatoes until crispy.

Compare the two types of fries and complete the following questions:

1. Discuss the sensory properties of each of the fries. Summarise the appearance, aroma, taste and texture of the two different types of fries.
2. Using sensory terminology, explain which of the two types of fries you liked the best. Justify the reason for your answer.
3. Describe the method of cooking that is the healthiest option. Discuss the reason for your answer.
4. Explain why you think deep-frying potatoes to make chips has decreased in popularity.
5. Develop a list of safety recommendations that need to be followed when cooking with hot oil/fat.

Shallow-frying or pan-frying

This method of frying involves cooking food in a shallow pan. A small quantity of pre-heated fat or oil is used. Shallow-frying is a quick method of cooking that is only suitable for tender cuts of meat. This method of frying results in a final cooked product that has a good colour and has lost minimal amounts of nutrients.

DESIGN THINKING

Fries or chips are typically made of potato, but other vegetables or even fruit can make a great chip as well. Design your own alternative to the potato chip that can either be fried or baked. Think about whether you will add any flavouring or coating to your chip.

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Stir-frying

Stir-frying is an Asian technique for cooking meat and vegetables quickly, so that the food retains its texture and flavour. Stir-frying typically involves a quick **sauté** over high heat, occasionally followed by a brief steam in a flavoured sauce.

sauté To fry gently for a short time in a minimal amount of oil.

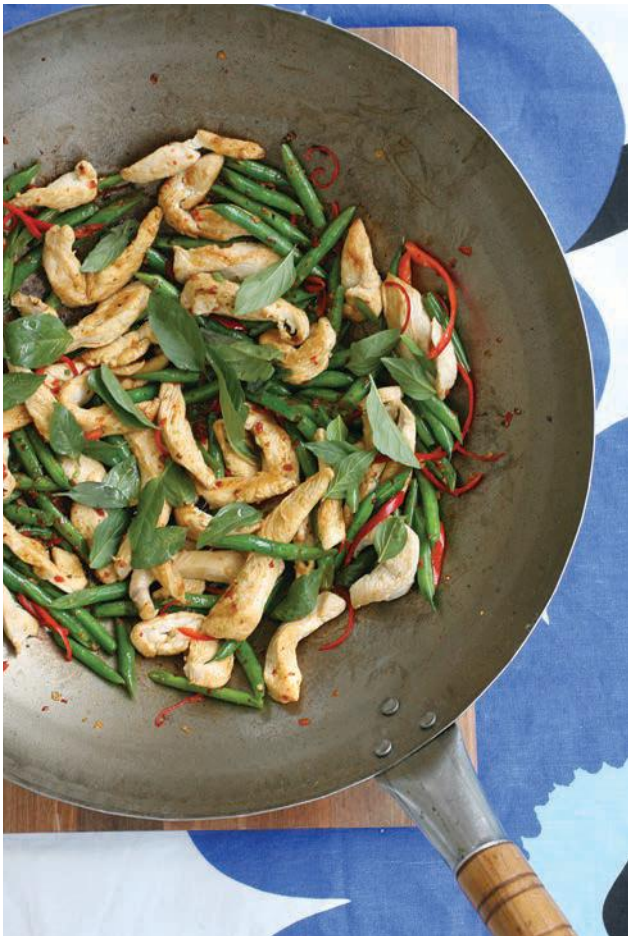


Figure 4.23 Small pieces of food such as vegetables, meat, poultry and seafood can be stir-fried.

4.17 LET'S COLLABORATE

Generate a list of the tools and equipment that are needed to stir-fry foods. Generate a list of the food ingredients that work well in a stir-fry.

Tasty Trivia Due to health concerns over the use of saturated fats, dry-frying has become one of the more popular methods used to fry foods. This dry method of frying uses a heated frying pan that is seasoned or lightly coated with oil to cook the food.

Tasty Trivia Palm oil is the most widely consumed vegetable oil in the world, and global demand for palm oil is increasing.

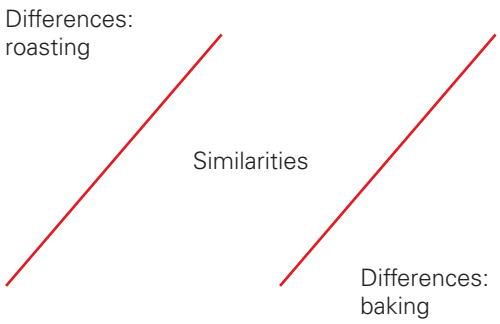
4.18 INVESTIGATE IT

Oils ain't oils

Do you consume palm oil? Palm oil is an edible plant oil, high in saturated fats, that is derived from the fruit of the oil palm tree. What is the connection between palm oil and rainforests? Use the internet to find out about the connection between palm oil and rainforests. Use the World Wildlife Federation website as your starting point. Perhaps you could write a letter to the editor of a newspaper and discuss your viewpoint on this issue. Critically investigate the foods in your pantry to discover how much palm oil you consume.

REFLECT ON LEARNING

1. Define each of the dry cooking methods. Provide an example for each method.
2. Explain why tender cuts of meat are used for dry cooking methods.
3. Many people confuse deep-frying as a moist cooking method. Outline why it is actually a dry cooking method.
4. Copy and complete the comparison alley to show the similarities and differences between roasting and baking.



5. Describe the changes that occur to foods when cooked using dry cooking methods.

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4.6 Cooking with moist heat (liquids)

This method of cooking uses liquid (water or stock) as the medium of heat transfer, and includes boiling, poaching, steaming and stewing. Some foods cooked using this method require large quantities of liquid to be added, while for others small amounts of liquid, or even the steam created by the liquid, are enough to cook the food.

Boiling

Boiling involves cooking food in boiling liquid, usually water. The liquid boils when its temperature is raised to its **boiling point**. As the liquid heats, tiny bubbles appear on the bottom of the saucepan, then rise to the surface. Gradually the bubbles increase in size until large bubbles form, which rise rapidly to the surface and break. This causes the constant agitation of the liquid.

boiling point The temperature at which water changes from a liquid to a vapour or gas.

Figure 4.24 The different stages of boiling

Boiling has the following effects on foods:

- It toughens the **albumin** in eggs.
- It toughens the fibres and dissolves the connective tissues found in meat.
- It softens the **cellulose** in cereals, vegetables and fruits.

albumin A water-soluble protein found in egg whites and blood.

cellulose One of the main components of plant cell walls. An indigestible carbohydrate and an important source of insoluble fibre.

4.19 ACTIVITY

Let's boil

What is the optimal boiling time for some foods?

1. For this experiment you will need four saucepans, all containing boiling water.
2. Divide a carrot into four pieces of equal size.
3. Place each carrot into a saucepan of boiling water and set a timer.
4. Drain one piece of carrot from the saucepan at each of the time intervals listed in the table below. Complete the sensory analysis straight after each piece of carrot has been removed for accurate data collection. Make sure you are descriptive in your responses.

Time interval	Appearance, including colour	Aroma	Taste	Mouthfeel
3 minutes				
8 minutes				
15 minutes				
20 minutes				

5. Determine which cooking time produced the best carrot.
6. Describe the physical impact on the carrot of boiling for a prolonged period of time.
7. Outline the impact on the chemical properties when vegetables are over-boiled.
8. Some foods are better when boiled (or sometimes simmered) for longer. Explain why this is the case and provide an example.

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Tasty Trivia

At extremely high altitudes, the boiling point of water is lower than usual, so boiling food can be very difficult at a high altitude and can take much longer.

4.20 LET'S COLLABORATE

Water is critical for life and something that we take for granted – turn on the tap and it is there for cooking, doing the dishes, washing our bodies and drinking. Generate a list of all the ways you use water at home. Globally, many people do not have access to safe, healthy water. Discuss the impact of not having readily available water on their lives compared with your own.

Tasty Trivia

Permanent water restrictions were put in place in Victoria on 1 December 2012. Target 155 was also introduced, encouraging people to limit their water use to 155 litres per person per day. Visit the Melbourne Water website to find out more.

DESIGN THINKING

It's boiling!

Soup is a food that usually incorporates the process of boiling. Design a tasty soup that can be served during winter.

Poaching

This is the process of gently simmering food in liquid – usually water, stock or wine. Poaching is particularly suitable for fragile foods like eggs, poultry, fish and fruit, which can easily dry out and fall apart.

When poaching food, it is important to keep the heat low and the cooking time to a minimum. This prevents the food from drying out or falling apart, and also preserves the flavour of the food.

Figure 4.25 Poaching is often used to cook eggs and fruit.

4.21 ACTIVITY

My best poached egg

1. Review the Eggs Florentine recipe on pp. 122–3. This recipe does not use vinegar when poaching, but some recipes and chefs do.
2. Following the poaching instructions in the recipe, poach one egg without vinegar and another egg with the addition of 2 teaspoons of white vinegar in the water.
3. Explain the role that vinegar plays when poaching an egg.
4. Analyse the appearance, aroma, taste and texture of the eggs poached using the two different methods.
5. Describe, using sensory language, which egg you preferred. Explain the reason for this.

4.22 INVESTIGATE IT

Get poaching

1. Develop a list of foods that can be poached.
2. Write down five pieces of equipment used to poach foods. Explain the method of heat transfer involved in the poaching of these food items.
3. Research how to poach pears.
4. Design your poaching liquid. Consider the impact your liquid will have on the sensory properties of your poached pear.
5. Prepare and poach your pear.
6. List other fruits that can be poached.

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Tasty Trivia

A **court-bouillon** is a poaching liquid. This consists of an acid (wine or lemon juice), an aromatic (**bouquet garni**), poaching liquid and a **mirepoix**.

court-bouillon A poaching liquid consisting of an acid, an aromatic, poaching liquid and a mirepoix.

bouquet garni A bundle of herbs tied with string, used to flavour soups and stocks.

mirepoix A combination of diced onion, carrots and celery.

steamer A piece of cooking equipment used to steam foods.

palatable Having a good taste or mouthfeel when eaten.

Steaming

Steaming involves cooking food through the application of steam. The food is put into a **steamer**. The water underneath the steamer boils and evaporates into steam, which rises up to heat and cook the food. Steaming is a good alternative to other cooking methods such as boiling, as no oil is needed and there is no loss of nutrients or flavour from the food. Vegetables cooked using this method are very **palatable** in terms of texture, flavour and aroma.

Figure 4.26 Steaming food is a healthy way to cook, as no oil is required.

4.23 LET'S COLLABORATE

Develop a list of foods that can be steamed. Write down five pieces of equipment used to steam foods. Explain the method of heat transfer that is involved in steaming these food items.

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DESIGN BRIEF: YUM CHA

You are to prepare an Asian dish for a class yum cha meal. This design brief requires you to investigate the different food offerings available at a yum cha and prepare a small tasting dish to be served to your peers. You must use the cooking method steaming and your flavours should be authentic to Asian cuisine.

Investigating

1. Explain how steaming is used to cook foods.
2. Investigate the types of food available at a yum cha.
3. Develop a set of six criteria for success questions that can be used to evaluate your dish.

Generating

1. Develop a list of possible yum cha food items. Prepare an annotated concept map that details the options and the dishes you could prepare.
2. Choose an option and justify your choice.
3. Prepare your final recipe.
4. Design how your final product will be presented at the class yum cha. Consider whether your final product will need to be served with a condiment.

Planning and managing

1. Write and submit your food order to your teacher.
2. Plan your production by preparing a work plan using 10-minute intervals showing the sequence of operations you need to follow when preparing your Asian dish.

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Steamed pork and vegetable buns

CHINA

RECIPE

Main tools and equipment

Mixing bowls, wok or frying pan, jug, whisk, steamer and basket

Production skills

Mixing, kneading, proving, whisking

Cooking processes

Frying, steaming

Ingredients

Dough

 1½ tablespoons caster sugar	 2 teaspoons yeast	 ¼ teaspoon salt	
 1¼ cups plain flour	 ¼ cup milk	 ¼ cup warm water	 2 tablespoons vegetable oil

Filling

 1 tablespoon soy sauce	 1 tablespoon oyster sauce	 1 tablespoon rice wine	1 tablespoon caster sugar	1 teaspoon cornflour
 1 teaspoon sesame oil	 200 g pork shoulder or Chinese Char-siu pork, finely chopped	 2 tablespoons cabbage, shredded	1 shiitake mushroom, finely chopped	

SERVES 2

Complex process: Yeast baking (Pork Buns have been responsible for food poisoning incidents.)

Preparation time: 45 minutes

Cooking time: 10 minutes filling and 15 minutes steaming

Serving and presentation time: 15 minutes

Total time: 70 minutes

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Method

1. Mix the sugar, yeast, salt and flour in a large bowl. Make a well in the centre.
2. Add the liquid ingredients and mix until well combined, forming a dough.
3. Turn the dough onto a lightly floured bench and knead until smooth and elastic – about 5 minutes.
4. Place the dough into a bowl, cover and leave to **prove** in a warm place until it doubles in size (about 25 minutes).
5. Prepare filling: mix soy sauce, oyster sauce, rice wine, sugar and cornflour in a jug. Whisk to combine.
6. Heat sesame oil in a wok or frying pan. Add pork, cabbage, mushroom and mixed sauces.
7. Cook until the mixture comes to the boil, about 2–3 minutes, stirring constantly. Leave to cool.
8. Place filling into pastry and pinch at top.
9. Boil water in a large steamer saucepan with basket, and steam for 15 minutes.
10. Serve while hot.

Prove To double in size.

Evaluating

1. Develop a written paragraph in response to each of the criteria for success that you have written.
2. Evaluate your product according to appearance, aroma, taste and texture. Use sensory terminology in your response.
3. Explain the process by which steam cooks food. Explain how this alters the texture of the food you produced.
4. Copy and complete the table below to explain what worked, what areas of improvement were required and how you would complete this task differently next time.

This worked	Area/s for improvement	Next time I could try …

stewing Slow, moist method of cooking less tender cuts of meat.

simmering A cooking technique by which foods are cooked in a hot liquid kept just below boiling point.

reduction A process of decreasing the amount of liquid. This process occurs in a stew in order to make the sauce thicker.

searing Browning the surface of meat with the use of a quick application of heat.

roux A mixture of equal proportions of butter and flour, used as a base for thickening sauces or to make gravy.

Stewing

Stewing involves cooking food in water, or another form of liquid, at a temperature below boiling point. The liquid used to cook the food is generally **simmering** in a pot on the stove top, or cooked in a covered casserole dish in the oven.

Tough cuts of meat can be made tender and tasty by long, slow stewing. This softens the fibres and helps to develop flavour in foods. The liquid used for stewing often needs to be thickened before eating. Stews can be thickened by **reduction**, but are most often thickened with flour, either by coating pieces of meat with flour before **searing**, or by using a **roux**. This process can be carried out in the oven, on the stove top or using a slow cooker.

Figure 4.27 A slow cooker features in many Australian kitchens, helping to prepare nutritious meals, particularly for people who are time poor.

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4.24 LET'S COLLABORATE

Brainstorm a list of foods that can be stewed. Write down five pieces of equipment used to stew foods. Explain the method of heat transfer that is involved in stewing these food items. Name your favourite stewed food item.

A popular slow-cooking method involves raw food and a cooking liquid – usually water, wine or stock. The food is cooked over a very long time period – up to eight hours. The long, moist nature of this cooking gives good results using cheap, tough cuts of meat. Often, the cheaper the cut of meat, the more flavour develops.

Figure 4.28 Casseroling is a way of stewing food in the oven.

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DESIGN BRIEF: THE BEST FOR LESS

Your parents or guardians are away this week and your food budget has become a bit tight towards the end of the week. While shopping, you have realised that you can only afford one of the cheaper cuts of meat, often referred to as a 'tough cut'. You know that these cuts of meat are best stewed. Design a recipe that uses a cheaper cut of meat, but will result in a delicious dinner for you and a friend at the weekend. Your stew should also be served with one accompaniment to ensure it is not only a tasty meal, but also nutritious and filling. Consider the length of time that you will have available when designing your final product.

Investigating

1. Investigate and then list a range of economical cuts of meat from a variety of sources.
2. Prepare a list of other suggested ingredients and flavouring that could be included.
3. Develop a list of criteria for success questions that can be used to assess the suitability of your recipe.
4. Copy and complete the table below to list the considerations and constraints that are associated with this brief.

Considerations	Constraints

Generating

1. Create a recipe map list of all the cuts of meats you could use and possible flavourings or recipe ideas you have.
2. Decide which meat you will be using.
3. Consider any modifications or ways you can try to reduce the time needed to cook your stew, given that you only have your class time. (*Hint:* think about the size of your ingredients, etc.)
4. Determine your recipe. Explain your final choice.
5. Design your final stew meal presentation.

Planning and managing

1. Prepare your food order.
2. Plan your production by preparing a work plan. Make sure you can cook your stew in the time you have allocated.

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Gumbo

USA

RECIPE

Main tools and equipment

Chef's knife, chopping board, frying pan, saucepan, wooden spoon

Production skills

Dicing, chopping, roux making

Cooking processes

Sautéing, boiling, simmering

SERVES 2

Preparation time: 10 minutes

Cooking time: 50 minutes

Serving and presentation time: 5 minutes

Total time: 65 minutes

Ingredients

 1 tablespoon butter	 1 tablespoon plain flour	 110 g canned, crushed tomatoes	 1 bacon rasher, chopped	 ¼ teaspoon fresh basil, finely chopped	 ¼ teaspoon thyme
 1 bay leaf	 1 teaspoon curry powder	 ½ teaspoon peanut oil	 3 okra, cut into slices	 ½ onion, chopped	 1 stick celery, chopped
 ¼ green capsicum, chopped	 1 clove garlic, crushed	 250 ml chicken stock	250 ml beef stock		
 1 chicken thigh, sliced thinly	 ¼ teaspoon Tabasco sauce	 1 cup cooked rice for serving			

ISBN 978-1-316-64937-4

Method

1. Melt butter in a small saucepan. Add the flour and make a **dark roux**. Be very careful not to burn it.

dark roux A darkened mixture of equal proportions of butter and flour, used as a base for thickening sauces for making gravy.

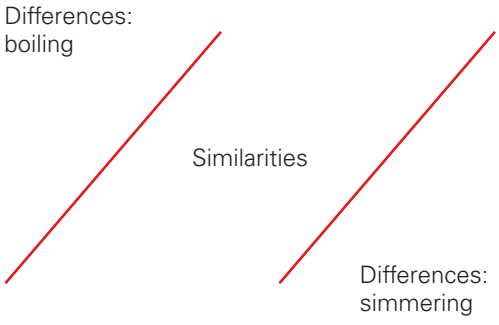
2. Add tomatoes slowly so that the roux does not become lumpy. Stir continuously.
3. Add bacon, thyme, basil, bay leaf and curry powder. Simmer over a low heat.
4. Using a frying pan, heat half the peanut oil. Add the okra and sauté for approximately 10 minutes.
5. In a large saucepan, heat remaining ¼ teaspoon peanut oil. Sauté onion, celery, green capsicum and garlic. Add chicken and beef stock and bring to the boil.
6. Add chicken thigh and tomato roux mixture. Simmer for 30 minutes.
7. Stir in Tabasco sauce (if you like it hot!).
8. Serve over cooked rice in a large bowl.

Evaluating

1. Prepare a short response to each of the criteria for success questions that you developed.
2. List the processes involved in the production of your slow-cooked food product. Evaluate your efficiency in carrying out the processes.
3. Summarise how slowly cooking economical cuts of meat alters the sensory properties of the meat.
4. Evaluate the sensory properties of the meat as a result of this slow cooking.
5. Explain the reason why time needs to be considered when cooking food from scratch.
6. State why you think the slow cooker appliances available on the market have become so popular.

REFLECT ON LEARNING

1. Define each of the moist cooking methods. Provide an example of each method.
2. Outline the types of food ingredients that are best cooked using moist cooking methods. Explain why this is the case.
3. State the methods of moist cooking that are the most nutritious. Justify your response.
4. Copy and complete the comparison alley below to show the similarities and differences between boiling and simmering.



5. Describe the changes that occur to foods when cooked using moist cooking methods.

4.7 Microwave cooking

Microwave cooking should be treated as a separate cooking method as no heat is transferred. Microwave ovens provide a convenient way of cooking and reheating food. The popularity of these ovens is largely due to their ease of operation and their time-saving properties.

Most foods are suitable for cooking in the microwave, with the exception of foods that require a different consistency inside and out. Consider a meringue, for example – imagine if this were cooked in the microwave! Foods you can cook in a microwave include rice, pasta, meats, fish, poultry, vegetables, potatoes and any pre-cooked microwave meals.

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Tasty Trivia

In 1946, Dr Percy Spencer was testing a vacuum tube called a magnetron when a candy bar melted in his pocket. He tried other experiments with food and then created a metal box to channel and contain microwaves. Engineers developed and refined the idea, and the first commercial microwave oven hit the market in 1947.

4.25 LET'S COLLABORATE

List the foods that you most often put into the microwave. Are you reheating or cooking this food from scratch? Name the foods you would never put in the microwave.

The microwave is most often used to provide quick and easy heating of food, since it cooks food more quickly than an ordinary oven. It also allows for a greater variety of cooking tasks. For example, a microwave can heat water, cook a casserole and thaw frozen foods. The microwave is also very good at reheating foods, can heat food quickly and decreases the risk of burning foods. Plastic containers can be placed in the oven, which is more convenient when cooking.

4.26 LET'S COLLABORATE

Metal and the microwave don't mix! Explain why you are not able to use metal equipment when using the microwave.

Tasty Trivia

Cold spots can occur in food cooked in a microwave, as the food does not heat uniformly. Unwanted micro-organisms can survive in portions of poorly heated foods. In order to eliminate these cold spots, it is important to stir or rotate the food midway through cooking.

How does the microwave oven work?

Microwave ovens produce microwave **energy** or radio waves, which heat and cook food. The high-frequency electromagnetic waves go straight through food, causing its molecules to become agitated. These electromagnetic waves are created by a magnetron in the oven and directed into the oven by a device called a waveguide. When the waves hit the reflective walls of the cooker, they bounce off them and into the food.

energy Wave of currents that cook food.

As the food absorbs the microwaves, the agitated molecules vibrate against each other. This friction causes heat, which then cooks the food.

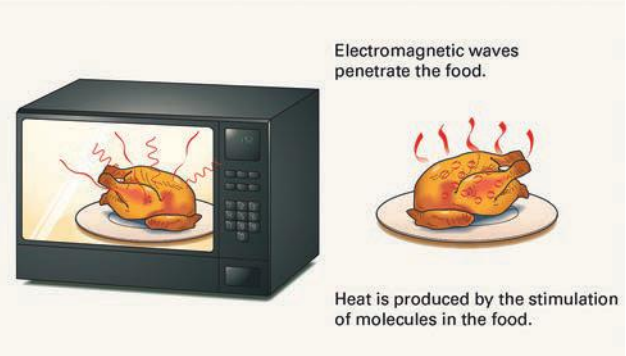

Figure 4.29 The heat production of a microwave

For the best results when using a microwave

- Undercook foods rather than overcook them
- Alter cooking time to suit the amount of water in the food
- Allow food to rest after cooking
- Stir foods during cooking
- Pierce the skin of unpeeled vegetables, plastic packets and egg yolks to let steam escape and prevent them from bursting

Figure 4.30 Microwave cooking tips

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Standing time

The turntable found in a microwave serves a purpose – by turning the food, it helps to alleviate the problem of uneven heating. Standing time is also important in preventing uneven heating. Before eating food that has been cooked in the microwave, check that it has been cooked thoroughly. Foods continue cooking after the microwave is turned off, so allowing it to stand in the microwave after the cooking time has been completed allows the whole product to reach a uniform temperature.

Getting the equipment right

It is best to choose a container in which food may be spread evenly for consistent exposure to the action of the microwaves. Round dishes are better than square ones, and shallow dishes are better than deep dishes. Think about the shape of the turntable – nearly all are round, so try to use a round container.

Use	Don't use
• Glass • Plain paper plates can be used to reheat food, but waxed-coated plates shouldn't be used as the wax can melt. • China dishes and plates • Most plastic is heat resistant and can be used for reheating food.	• Metal or foil containers, or any dish with a metal trim. Metal reflects microwaves and could damage the oven. • Melamine. Some plastic-looking plates are made from a material called melamine resin. This material can't be used in a microwave, as toxic compounds can leak into food when the resin molecules are agitated.

Figure 4.31 These are all good containers for use in a microwave oven.

4.27 ACTIVITY

Cheese melting

For this experiment you will need two slices of bread and two slices of cheese.

1. Place each slice of cheese on a piece of bread.
2. Melt one slice of cheese using the microwave.
3. Melt the other slice using the griller.
4. Describe the differences between the appearances of both cheeses.
5. Describe the differences between the aroma of both cheeses.
6. Describe the differences between the taste of both cheeses.
7. Describe the differences between the mouthfeel of both cheeses.
8. Determine which is the best piece of equipment for melting cheese. Outline the reasoning for your final conclusion.
9. List some foods that are best cooked in the microwave.
10. List some food items that are best not cooked in the microwave.

Tasty Trivia

Unlike conventional ovens, microwave ovens don't get hot when they cook food. This is a problem if you require the food inside the microwave to brown and crisp.

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4.28 ACTIVITY

Oven vs oven

Carry out an investigation to compare a normal conventional oven with a microwave. Complete a comparison table like the one below to answer the questions in the table.

	Conventional oven	Microwave oven
Is preheating required?		
Identify the method of heat transfer.		
Is an oven mitt required? Explain your response.		
How easy is it to clean? Provide a comment.		
What is the cost to purchase?		
List the utensils required.		
Comment on the time required.		
Explain how food should be placed for cooking.		
Comment on the amount of space required in the kitchen.		

DESIGN THINKING

Microwave cooking is fast and convenient. Cake in a cup is a new food trend that uses the microwave. Design a recipe for a sweet slice or cake that contains chocolate or fresh fruit in season and can be cooked quickly in the microwave for afternoon tea when unexpected visitors arrive. When investigating and creating your recipe, find out how to melt chocolate in the microwave and consider the use of fresh seasonal fruit.

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4.29 ACTIVITY

Practice makes perfect

Practise using the microwave oven. Check out the best settings and times for the following:

- softening butter
- thawing mince
- cooking a rissole made from the mince
- cooking a cup of peas
- cooking a potato in its jacket
- reheating a bowl of soup.

Complete the following questions:

1. Explain why settings and times change for different foods.
2. Discuss why you need to consider standing time when reheating foods.
3. Name the food item that was the easiest to cook in the microwave. Explain the reason for your answer.
4. Which food item was the hardest to cook in the microwave? Explain the reason for your answer.
5. Did you pierce the skin of your potato? Discuss why it is important to do this.
6. Suggest why the water content of food alters cooking times.
7. State the advantages of using the microwave to defrost foods.

Tasty Trivia

Microwavable meal packaging has been designed specially for the high temperatures of a microwave. This innovative style of packaging incorporates susceptors (surface layers) to compensate for some of the limitations of microwave cooking. Susceptors consist of a plastic film metallised with aluminium and laminated paper or paperboard to hold the required shape. These packages are designed to enhance the browning and crisping of a product and to improve its texture.

DESIGN THINKING

You are preparing a special two-course dinner for friends. Due to the fact that you are very busy, this dinner will be cooked entirely in the microwave. It is important to organise the dinner appropriately, and you will need to take cooking times and standing times into consideration. The Butter Chicken recipe on p. 146 is an example of a meal that could be included in a two-course dinner.

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Butter chicken

INDIA

RECIPE

Main tools and equipment

Knife, chopping board, grater

Production skills

Grating, crushing, dicing

Cooking processes

Microwaving

SERVES 2

Preparation time: 5 minutes

Cooking time: 37 minutes

Serving and presentation time: 5 minutes

Total time: 47 minutes

Ingredients

 1½ tablespoons butter	 ½ onion, finely chopped	 1 small piece ginger, grated	 1 clove garlic, crushed	 ¼ teaspoon chilli powder	 ¼ teaspoon ground cumin
 ¼ teaspoon ground coriander	 ¼ teaspoon ground cinnamon	 ½ teaspoon flour	 2 chicken thighs, skinned and diced	¼ cup chicken stock	200 g crushed tomatoes
 Pinch salt	 ¼ cup natural yogurt	 ½ cup rice			

Method

1. Melt butter for 1 minute on high.
2. Add the onion, ginger, garlic and all the spices.
3. Cook on high for 2 minutes and stir in the flour.
4. Add the chicken.
5. Gradually stir in the chicken stock and tomatoes.
6. Cover and cook on high for 20 minutes or until the chicken is tender.
7. Stir twice while cooking.
8. Add the yogurt and leave to stand 3–5 minutes.
9. Place rice in a microwave-proof bowl and add 1 cup of water. Microwave for 12 minutes on high.
10. Serve the chicken on the cooked rice.

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REFLECT ON LEARNING

1. Explain how a microwave oven works.
2. Suggest two reasons why microwave ovens are so popular.
3. Explain the reason why the 'hot spot' needs to be considered when using the microwave oven.
4. State two types of cooking container that can be used in the microwave.
5. Discuss the reasons why you believe food companies develop meals specifically for microwave ovens.

4.8 Preservation

The process of food preservation is important because it allows us to use fresh produce and increase its shelf life by inhibiting the conditions for food spoilage and contamination.

But food preservation is not only used to increase the shelf life of a food.

Figure 4.32 Reasons for food preservation

There are a number of different food preservation techniques used to prevent the spoilage of food.

Preservation technique	How food is preserved and spoilage inhibited	Food examples
Freezing 	Freezing foods below -18°C inactivates micro-organism growth.	Meat Vegetables
Dehydration 	The removal of moisture from food to between 5 and 25 per cent. Bacteria cannot survive in these conditions.	Fruit Meat
Addition of sugar 	Strong concentrations of sugar inhibit the growth of micro-organisms.	Jam Glacé fruit
Addition of salt 	Strong concentrations of salt remove the moisture from food, inhibiting the growth of micro-organisms.	Preserved lemon Olives
Canning/bottling 	Heating food in cans or bottles to high temperatures kills micro-organisms and creates a vacuum, sealing the bottle or can and protecting the food.	Tomato sauce Stone fruits
Use of acids 	A high acidic environment creates an environment where micro-organisms are unable to grow.	Relishes Pickled onions

Figure 4.33 A variety of food-preservation methods

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4.30 LET'S COLLABORATE

Work with a partner to add five more food examples to Figure 4.33 on p. 147.

4.31 ACTIVITY

Fresh vs preserved

1. Find a food item (such as apricot or tomato) that uses dehydration as a preservation technique.
2. Compare and contrast the properties of the fresh and dried product. Provide a detailed analysis. Provide an explanation for the differences in taste and texture.
3. Determine when fresh is best versus when dried might be the best option.
4. Investigate ways to use your dried ingredient in cooking.
5. State which product you preferred and why.

DESIGN THINKING

You have an excess amount of tomatoes – what can you do to ensure they don't get wasted?

Investigate different ways and recipes to preserve tomatoes. Think about what the traditions are in different cultures around the world, preserving foods when they are in season to have products available all year round.

A focus on fermentation

Fermentation is a slow method of pickling vegetables. Preservation occurs through the acid that is produced by the microbes that grow in the salt brine over a number of weeks. You have to be careful when fermenting, as the wrong microbes will produce bad flavours and the vegetables will turn soft and slimy.

4.32 LET'S COLLABORATE

Have you ever eaten any fermented foods – for example, sauerkraut (fermented cabbage)?

Kimchi is one example of a fermented food product and is a national staple in Korea. It is usually spicy, sweet, salty and strong. Many different varieties of Kimchi are found (and much loved by locals) throughout Korea.

4.33 INVESTIGATE IT

1. Research other fermented food products.
2. List five different fermented foods and their country of origin.
3. Conduct a taste test and determine which products you enjoy.
4. Describe any common sensory attributes between the products.
5. Explain why fermentation is a popular preservation technique.

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Kimchi

SOUTH KOREA

RECIPE

Main tools and equipment

Sterilised jar, chef's knife, chopping board, colander, large bowl

Production skills

Chopping

Preservation processes

Fermentation

SERVES 3

Preparation time: 4 hours

Fermentation time: 2–3 days

Serving and presentation time: 5 minutes

Total time (apart from fermentation): 4 hours, 5 minutes

Ingredients

 400 g wombok, roughly cut	 ½ cup water	 30 g rock salt	 1 garlic clove, minced
 Ginger, I large slice	 ¼ teaspoon chilli flakes (or less if you don't like it hot!)	 ½ teaspoon rice wine vinegar	

Method

1. Rinse and prepare wombok.
2. Combine the salt and water in a large bowl.
3. Stir in the wombok, cover and leave to sit for four hours.
4. Drain the wombok, keeping the liquid from the bowl.
5. Place wombok back into a bowl and add garlic, ginger, chill and rice wine vinegar. Stir to combine.
6. Place mixture into a sterilised jar, covering with the reserved liquid. Make sure the wombok is completely covered by the liquid. Keep at room temperature.
7. Put aside for 2–3 days to develop the flavours of the kimchi.
8. Drain liquid before using.

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LOOKING BACK

1. Food is cooked in order to increase its palatability. Cooking also changes the sensory properties of a food, helping to enhance its aroma, colour, flavour and texture.
2. Food is cooked through the application of heat. There are three methods of heat transfer for cooking: conduction, convection and radiation.
3. Wet heat (the use of a liquid) and dry heat are the methods by which most food is heated and cooked.
4. Dry heat exposes the food to a source of heat. This method of cooking includes roasting, baking, grilling, frying and sautéing.
5. Liquid such as water, stock or wine can also be used to cook foods. Heat is transferred via the liquid and can be completed by boiling, poaching, steaming and stewing foods.
6. Microwave cooking is a method of cooking food that is quick, convenient and relatively safe. It uses radio waves to agitate molecules within the food, which generate heat.
7. Food preservation refers to a number of techniques that are used to prevent food from spoiling. This allows foods to have an increased shelf life and can enhance the flavours and textures of foods.

TEST YOUR KNOWLEDGE

Multiple choice

1. Convection is:
   - **a** heat transferred by the circulation of hot air or steam
   - **b** the use of microwaves to cook food
   - **c** heat transferred from atom to atom, with heat passing through a flat metal surface onto the food or liquid
   - **d** cooking through a direct heat from a flame or element or when an electromagnetic wave passes through a food.
2. Dry cooking methods:
   - **a** include baking, frying and roasting
   - **b** are the best methods to use for tender cuts of meat
   - **c** produce a browning reaction such as dextrinisation or caramelisation
   - **d** all of the above.

True/false

1. We cook food to improve digestibility.
2. Steaming, stewing and sautéing are all moist methods of cooking.
3. Food preservation is simply about increasing the shelf life of ingredients.

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Short answer

1 Copy and complete the following table.

Cooking method	Dry or moist?	Description of method	Food example using this method
Roasting			
Baking			
Boiling			
Simmering			
Frying			
Stewing			
Grilling			
Sautéing			
Steaming			
Poaching			

2 Outline the physical, sensory and chemical changes to a potato when:

a it has been boiled

b it has been baked.

3 Copy and complete a T chart to develop a list of the advantages and disadvantages of using the microwave oven.

Advantages	Disadvantages

Extended response

You have been asked to design your own food science experiment that compares wet and dry cooking methods.

1 Include all the instructions and develop questions related to the physical, sensory and chemical changes of the cooking process. Make sure you are explicit about what you are asking to be done, including the specific food or food items being used.

2 Swap experiments with your partner.

3 Record your learning.

4 Share your experiences, what you learnt, how successful the experiment was and any critical friend feedback to improve the experiment for next time.

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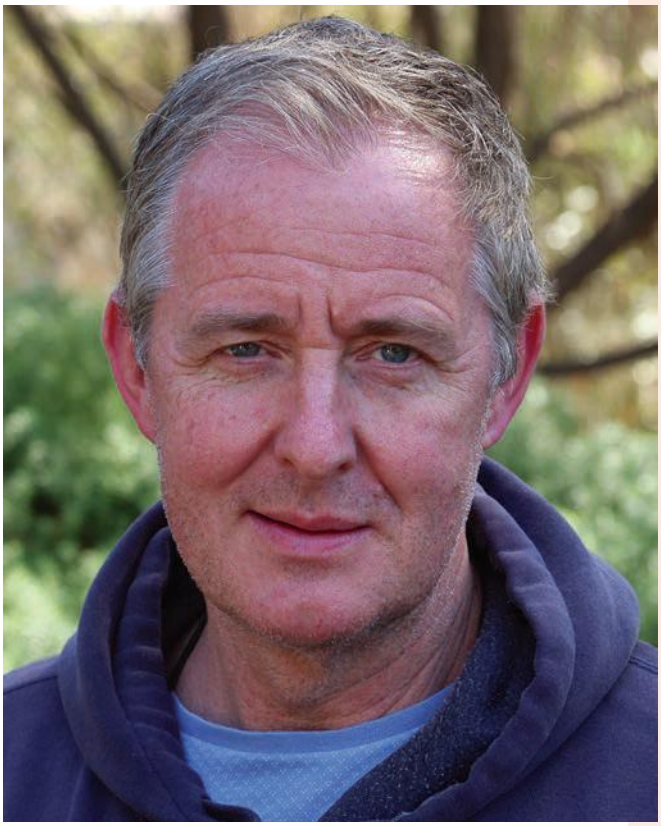
Career profile: Bruno Malzacher

Current occupation: Managing director/business owner
Place of employment: Movo Kitchen



Explain your interest in the area of your chosen career path. Discuss the reasons why you have pursued this career.

At school I was really unsure of what I wanted to do. It was as a 15-year-old that I joined the Home Economics class and my career started from there. At 16, I left school and started my formal chef training. Then, as the years progressed, I enhanced my skills with formal learning and additional studies in culinary studies, business management and restaurant management.

Who was your role model and how did they influence your decision to work with food?

In my career, I have been lucky enough to work with many extremely talented individuals, but the two role models that stand out to me are my Home Economics teacher who put me on the path to being a chef and my Executive Chef at the Dolder Grand Hotel, a five-star establishment in Zurich, Switzerland. My Executive Chef was a very humble individual who demanded the best but was equally brilliant in his ability to mentor and develop young chefs. Today he has left hospitality and works in drug rehab programs with youths.

Discuss the most rewarding aspects of your career.

The most rewarding aspects of my career have been the opportunity to travel the world and learn from some of the best chefs and now own a business and work for myself.

Explain the challenges you face in your job.

Hospitality can be challenging. Some of the harder aspects are the long and often anti-social hours. You are often working when others are off.

Is there such a thing as a 'normal' day in your work? Outline some things that you do in a day.

No two days are the same! My days now start early with trips to the market to choose the freshest produce. All our items are cooked fresh and onsite. During the day I am now front of house, rather than always in the kitchen. As the business owner, I need to be in touch with the guests, understanding their requirements and ensuring that we change to meet demands. The cafe business is competitive and you need to ensure a continual change in menus to satisfy regular guests.

Identify the opportunities this career has afforded you.

My career has led me from Switzerland to Australia with many exciting adventures along the way. I have been an Executive Chef and Culinary

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Director in some of the leading hotels throughout Asia and the Middle East. My career also afforded me the opportunity to travel for work with my family before recently settling in Australia as the Culinary Director at Crown Melbourne, where I oversaw 27 food outlets. Today I am living my dream of being a business owner and branching into cafés. This gives me balance and time off in the evenings and at weekends for the first time in my hospitality career, but allows me to continue doing what I love.

What are your career goals for the future (e.g. in five years' time)?

In five years' time, I hope to have expanded my cafe and catering operations.

Outline the qualifications needed to complete this type of work.

To pursue a career in hospitality, it is important to learn the fundamentals. I see a lot of cooks with a limited knowledge of the basics. With a good grounding or robust apprenticeship, people can be creative and take their knowledge to develop their own dishes. It is important to also move around during your apprenticeship, learning new skills of the trade as well as creating a network of culinary professionals. I am a firm believer in overseas experience and find that in many cases European experience enhances knowledge and opens further pathways for young chefs.

I completed a Masters Degree in Culinary in Switzerland. At that time, there were only 50 of us in the world. I also completed a Diploma in Restaurant Management. Today I would also suggest that chefs complete course units in business management or undertake degrees. To operate and run your own business or to take the step into an Executive Chef or Director of Food and Beverage position, these further business studies are invaluable and really can accelerate a chef's career into management.

What role has Home Economics played in your career?

Home Economics played an important role in my choice to take on my apprenticeship. My teacher was very passionate about cooking and it rubbed off on us all – me in particular, helping me to transition from high school to an apprenticeship.

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CHAPTER 5

Taste Australia, taste the globe

ACCESS PRIOR KNOWLEDGE

1. List the cuisines that have influenced Australia's eating patterns.
2. Describe the sustainable hunting practices of Indigenous Australians.
3. Explain how Ethiopians traditionally eat their meals without using utensils.
4. Thai food usually consists of five flavours. Identify each of these and name an ingredient for each one.
5. Describe all the uses you know for coconut and explain why it is such an important fruit for Pacific Islanders.

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5.1 Australian food, past and present

What do you feel like eating today? Korean, Nepalese, Moroccan, Italian, Vietnamese or maybe Sri Lankan? Australia is truly a **multicultural** society, and we are extremely fortunate to be able to taste the globe right here on our own doorstep. The variety of different foods and the demand for traditional ingredients come from the wide variety of ethnic groups living here. We take foods like sushi, pho and drinks such as chai for granted, but many of the foods we consume today were unavailable even a decade ago. In fact, some of our everyday meals, such as pasta and rice dishes, were less common 20 or 30 years ago. These products have slowly made their way into our everyday diet and have become popular, readily available and accepted foods. Consuming multicultural food is now part of our Australian **culture**, and something we celebrate proudly as a nation.

multicultural From different cultures and countries.

culture Beliefs, customs, traditions and social practices of a group of people.

5.1 LET'S COLLABORATE

List your top 10 favourite meals. Name the cultures that have influenced these food products. Compare with your partner.

Tasty Trivia

Food Safari on SBS discovers different cuisines from around the world. Visit the *Food Safari* website to view episodes, watch cooking demonstrations and learn more about different ingredients and cultures from around the world.

Figure 5.1 How many of these do you recognise? Many multicultural foods have now become mainstream in Australia.

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5.2 ACTIVITY

Where do I come from?

1 How familiar are you with foods from around the world? Complete the table to discover some international foods.

Product	Description of product including main ingredients	Country of origin	Have you ever tried this before?
Baba ghanoush			
Borscht			
Burrito			
Chicken feet			
Colcannon			
Dolmades			
Escargot			
Falafel			
Finger limes			
Fufu			
Haggis			
Jambalaya			
Kimchi			
Maple syrup			
Pad Thai			
Paella			
Panettone			
Pho			
Rosella			
Sacher torte			
Samosa			
Sauerkraut			
Scone			
Shakshuka			
Taro			
Yakitori			
Yorkshire pudding			

2 Now add to the table another five international food examples that you know and have tasted.

Tasty Trivia

There is still debate about whether the pavlova originated in Australia or New Zealand.

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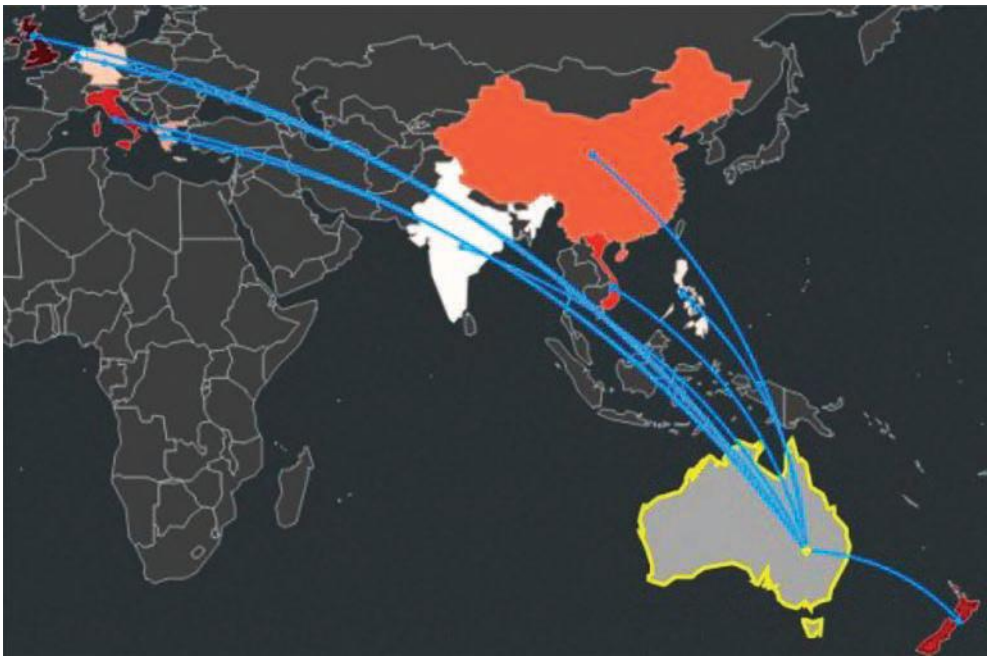

Figure 5.2 The foods that we eat in Australia have been influenced by immigrants who have moved here from many different parts of the world.

Figure 5.3 These foods are all part of Australia's British heritage, but they did not all arrive at the same time – they are an example of how food changes through the centuries.

Before World War II, Australian food typically was influenced by our British traditions. The majority of **immigrants** were from the United Kingdom, bringing with them their Northern Hemisphere foods, ingredients and cultural food traditions.

immigrant A person from overseas who has come to settle in a new country.

5.3 LET'S COLLABORATE

As a class, name as many British traditions as you can think of that have influenced Australian eating habits. For example, think about the traditional Christmas dinner: a roast turkey dinner with all the trimmings – maybe not so great for our Australian summer climate!

Discuss your family's food traditions around an important religious festival.

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Figure 5.4 In Australia, we are lucky to have a wide variety of foods from different cultures.

After the war, Australia's migrant makeup changed, with people immigrating mainly from Europe and Asia, bringing with them many interesting new dishes, techniques, and tools – for example, pasta, pastries, stir-frying and steamer baskets.

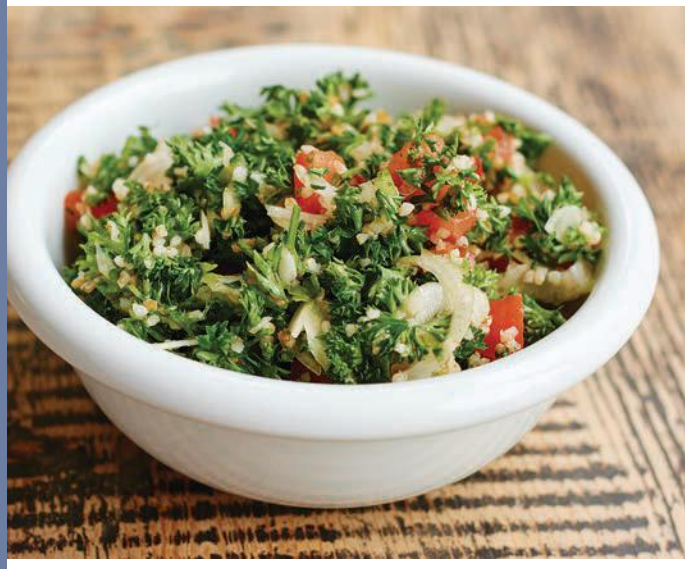

Figure 5.5 Tabouli, a Middle Eastern vegetable dish

Today we are seeing many immigrants from African countries as well. The food products now available in our supermarkets reflect our immigration patterns. New ingredients and new food products, as well as new cooking techniques, have been brought to Australia and consumers have demanded that products with which they cooked at home be available to use here. This is why we are seeing more international products in our supermarkets, special sections reflecting different countries and cultures, and the increased availability of a wider range of products.

5.4 LET'S COLLABORATE

Identify the different cultures in your class. Speak with your classmates and identify a traditional celebration food from each culture. Name any of these foods that you have not tasted before.

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5.5 INVESTIGATE IT

Australia's food past to present

Research the history of Australia's food.

1. Use Timetoast or another interactive tool to produce a timeline of Australia's food history. You will need to make references to both our Indigenous cultural foods and international influences. Include specific foods and culture references as well as dates and relevant significant events, both here and abroad. Use pictures to help you summarise and present the information in a visual format.
2. Predict the future. Write a paragraph about what you think Australia's food and drink will look like over the rest of this century.

DESIGN THINKING

An Aussie favourite with a twist

The lamington is a much-loved Australian classic. You have been asked to design and produce a lamington with a twist and reinvent this classic. Your lamington needs to include a jam filling (which you could make yourself) and a coating. Your teacher will share a recipe for lamingtons with you.

5.6 LET'S COLLABORATE

The increased availability of different ingredients and foods from many different countries has had a big impact on the culture of food in Australia. Many ingredients are imported from around the world. Discuss the social, economic and environmental impacts of this.

5.2 Homegrown: Aboriginal and Torres Strait Islander ingredients

Have you ever tried bush tucker? You might surprise yourself and realise you have eaten Indigenous Australian ingredients without even knowing it.

Aboriginal and Torres Strait Islander peoples have been eating native ingredients and hunting in sustainable ways for thousands of years. During the last 10 to 15 years, native ingredients have started to be produced for commercial use, and we are seeing the inclusion of Indigenous ingredients in restaurants, farmers' markets, commercial products and on the dinner table.

The traditional Aboriginal and Torres Strait Islander diet consisted of products that could be hunted or gathered.

5.7 INVESTIGATE IT

Research the Aboriginal people from the area in which you live. Find out about their cultural practice and any particular foods they ate that were available locally.

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Protein sources

Traditionally in Aboriginal culture, males would head out hunting in the bush and most meats would be cooked over an open fire. Foods were sometimes wrapped in paperbark for protection, smoking and flavour, and food was cooked in the coals. Bark was also used to make vessels for holding liquids and boiling produce. The animals caught and eaten would depend on where in Australia the group was. Southern Australians caught koalas, whereas Aboriginal and Torres Strait Islander people in northern parts of Australia hunted crocodiles.

5.8 LET'S COLLABORATE

Have you ever eaten any native Indigenous ingredients? Discuss foods you have tried and foods you would be interested in trying with your partner.

Tasty Trivia

Chef Leonie Clayton has put possum on the menu in her restaurant in Stawell, Victoria. Dishes such as Possum Pie and Possum Cassoulet have been very popular, with the meat being described as sweet and surprisingly tender. Given that possum is a protected marsupial, Leonie sources her possums from a farmer in Tasmania who has a commercial harvesting management plan.

5.9 LET'S COLLABORATE

Check out this sustainable practice – Aboriginal hunters didn't kill emus during breeding season. Explain how the hunting of emus by Aboriginal people is a sustainable practice. As a class, discuss why people have hunted some animals to extinction.


Crocodile


Eel


Emu


Fish


Goanna


Kangaroo


Snake


Witchetty grub


Yabby

Figure 5.6 Protein sources traditionally hunted by Aboriginal and Torres Strait Islander people

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Gathered ingredients


Bush tomato


Honey ants


Lilly pilly


Macadamia nuts


Quandong


Wild rosella

Figure 5.7 Gathered food sources traditionally consumed by Aboriginal and Torres Strait Islander people

Flavours

Product	Description	Uses
Bush tomato 	Small in size, the bush tomato has a strong sun-dried tomato flavour.	Makes good chutney and bush tomato sauce. Can be used in any recipe as a tomato substitute.
Davidson plums 	Has a strong, sharp sour plum flavour. The plum has a thin leathery skin and dark red flesh surrounding a flat stone. These are sometimes known as 'sour plums'.	Used in sauces, marinades, desserts and jams.
Finger lime 	Called finger lime because it is long and thin like a finger. Inside are caviar-like balls. The strong lime flavour bursts in your mouth when each ball is broken. The colour can vary from lime green to scarlet red.	Often used with seafood, particularly oysters. Finger limes are also used in dressings, drinks and sometimes desserts.
Lemon myrtle 	Lemon–lime citrus-flavoured leaves. It can be used fresh or dried and ground into a powder.	One of Australia's most popular Indigenous herbs, used in both savoury and sweet dishes such as marinades, sauces and baked goods, including biscuits and breads.
Wattle seed 	A nutty, coffee taste, especially when seeds have been dark roasted. Seeds can be crushed to make flour.	Wattle seed can be used in many ways, including flavouring ice-cream, thickening sauces, added to breads and damper and in casseroles.

Figure 5.8 Different Indigenous flavours found in the Australian bush

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5.10 INVESTIGATE IT

Outback Spirit has a large range of Indigenous products available at the supermarket. Visit your local supermarket to see what's in stock or view the products on the Outback Spirit website. Give the products a try and discover your favourite Indigenous product.

5.11 INVESTIGATE IT

How readily available are our Indigenous ingredients and flavours?

1. Research the three different ingredients with which you would be interested in working and that you would like to incorporate into a food product.
2. Determine the availability and the cost of each ingredient.
3. Choose one ingredient. Investigate the different ways in which it can be used in food products.
4. Design a food product that uses this ingredient as a hero in the dish.
5. Produce your food product.
6. Develop a podcast promoting your chosen ingredient. Include where it is produced and where you can purchase it, and a description of the ingredient. Showcase the product you made using your ingredient.

DESIGN BRIEF: BURGER CONDIMENTS

There has been much discussion about whether kangaroo should become a national dish or whether it is wrong to eat part of our coat of arms. Kangaroo is a lean meat that is native to Australia and can easily be produced sustainably. The recipe for a Roo Burger is on pp. 163–4. It is hoped that this will become the new burger meat 'hero', as a leaner alternative to beef mince – our new Aussie favourite. Consumer panels have suggested that the burger is missing something, though. You need to design a condiment to complement this Roo Burger, to be included when served.

Investigating

1. Investigate the different key ingredients used in condiments.
2. Investigate different condiment recipes as inspiration for your condiment.

Generating

1. Generate a list of possible condiment ideas to compliment the Roo Burger.
2. Decide on your final option and justify your choice.

Planning and managing

1. Design your condiment recipe.
2. Prepare your food order.
3. Prepare your work plan to ensure you are able to produce your condiment and Roo Burger in your practical class time.

Producing

Prepare your condiment and the Roo Burger on p. 163–4.

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Roo burger

AUSTRALIA

RECIPE

Main tools and equipment

Chef's knife, chopping board, bowl, fork, egg lift

Production skills

Dicing, beating, combining, shaping, frying, grilling

MAKES 2

Preparation time: 15 minutes plus 20 minutes resting time if available

Cooking time: 15 minutes

Serving and presentation time: 10 minutes

Total time: 40–60 minutes

Ingredients

 200 g kangaroo mince	 1 small egg, lightly beaten	 ⅓ cup breadcrumbs	
 ½ onion, finely diced	 ½ garlic clove, crushed	 ¼ tomato, finely diced	 ½ teaspoon continental parsley, chopped
 Pinch black pepper	 2 hamburger buns	 Gourmet lettuce leaves	 4 slices tomato

Method

1. Place the mince, egg, breadcrumbs, onion, garlic, diced tomato, parsley and pepper in a bowl. Mix until well combined.
2. Shape your meat into two burger patties.
3. Allow to rest for 20 minutes in the fridge if you have time.
4. Heat oil in a pan and cook burgers on a medium heat for about 5 minutes on each side or until the juice runs clear.
5. Alternatively cook your burger on a barbecue or under a preheated griller.
6. Cut your hamburger buns in half and lightly toast them under the griller.
7. Build your burger, top with tomato slices, lettuce and your homemade condiment.

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Roo burger – continued

Evaluating

1 Describe the appearance, aroma, flavour and mouthfeel of your condiment.

2 Describe the appearance, aroma, flavour and mouthfeel of your hamburger.

3 Explain how you could improve the presentation of your final Roo Burger product.

4 Discuss the reasons for using kangaroo meat instead of beef mince for the burger patty.

5 Review your work practices against your work plan. Outline any areas where you had difficulty meeting the plan. Outline areas where your plan worked well.

6 Reflect on your final condiment. Outline what you are happy with and any areas you might modify or do differently if you were to produce this burger again.

5.12 INVESTIGATE IT

Visit the Pimp my Plants website. Costa from the ABC TV show *Gardening Australia* has built a native garden featuring indigenous species. Check out the fact sheet for more information and gardening inspiration. List plants that you could grow at your school to create a native garden. Use the internet to research the best plants for your climate.

REFLECT ON LEARNING

1 Name an Indigenous ingredient and describe one way it can be used in cooking.

2 Define the terms 'hunter' and 'gatherer'. Describe both of these roles in Indigenous communities and include the importance of each role in food security.

3 Should we be eating more kangaroo meat? Why, or why not?

4 Explain the importance of sustainable Indigenous hunting practices and why this is an important consideration in food consumption.

5 Discuss the influence of native ingredients and Aboriginal and Torres Strait Islander cultures on Australia's eating habits.

5.3 Our Pacific Island neighbours

Throughout the Pacific Ocean lie a number of islands, including New Zealand, Fiji, Samoa, Papua New Guinea and Vanuatu. Some of these islands are our nearest neighbours, and the Australian Government works closely with these countries. Many Australians also visit them as tourists, enjoying their culture, climate and food.

The Pacific Islands constitute a diverse group of countries, but they all have a wonderful palette of fresh local flavours that have been influenced by the people who live there, the environment and other cultural influences from colonisation.

5.13 LET'S COLLABORATE

Have you ever travelled to any of the Pacific Islands? Can you identify the cultural influences that have influenced the foods of any of the islands?

The traditional Pacific Islands' diet is based on:

- tropical starches
- seafood
- fruits and vegetables
- flavourings.

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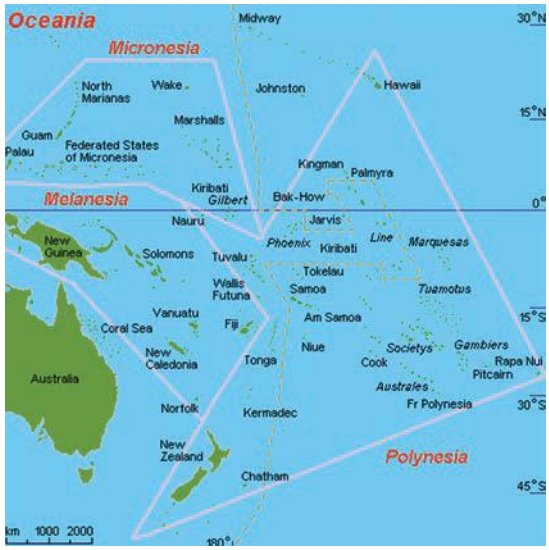
Tasty Trivia

There are three areas within the Pacific Islands:

- Micronesia, the area to the north-west, has predominantly Asian influences.
- The band in the west, from Papua New Guinea across to the Solomons and through to Fiji, is Melanesia; its peoples have hunter-gatherer roots.
- The triangle between New Zealand, Easter Island and Hawaii is known as Polynesia. Polynesian means 'people of many islands'.



Taro is eaten as an everyday food, but also features in ceremonial meals.

Bananas

Breadfruit

Papaya

Sweet potato

Snake beans

Coconut

Mango

Pineapple

Chilli

Ginger

Figure 5.9 Some of the traditional foods and ingredients used in Pacific Island cooking

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Mahi mahi


Tuna


Marlin


Kingfish


Trevally


Parrot fish


Shellfish


Octopus

Figure 5.10 Seafood plays an important part in the Pacific Islands diet

There is a strong culture of food in the Pacific Islands. No matter what the occasion is, there is always food to share. Traditionally, the family gathers together to share lunch during the heat of the day. Elders and children eat first and the women eat last.

Tasty Trivia

The coconut is not only a life staple, providing liquid to drink and flesh to eat; it also provides fuel, and fibre for products such as cooking utensils, matting, tools and housing materials.

5.14 INVESTIGATE IT

The Pacific Islanders have a particular method for cooking food that is used when they are preparing a celebration feast.

Research the commonly used underground hole or pit that is used as an oven to cook the food.

Answer the following questions:

1. Name and define the underground oven used to cook food in the Pacific Islands.
2. State the types of foods that typically are cooked.
3. Describe the cooking method used to cook the food.
4. Explain how the food is prepared prior to cooking.
5. Outline the impact this cooking method has on the physical and sensory properties of the foods being cooked.

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5.15 ACTIVITY

Make your own coconut milk

The liquid inside the coconut is fresh coconut water. This has become a popular drink in Australia. The juice from the pressed flesh of the coconut is the milk.

Fresh coconut milk

1. Puree the grated flesh of a mature coconut.
2. Strain, squeezing all of the liquid from the flesh.

Dried coconut milk

1. Add two cups of desiccated coconut with one cup of hot water.
2. Strain, squeezing all of the liquid from the coconut.
3. Chill and use within two days or freeze.

You may like to compare your homemade coconut milk with commercial coconut milk.

DESIGN BRIEF: PACIFIC BANQUET

A Pacific banquet is planned to celebrate the friendship of our regional neighbours, their culture, foods and festivities.

Working collaboratively in pairs, each group needs to prepare and present a Pacific dish for inclusion in the banquet. The combined effort of all groups should be a truly representative sample of food from our neighbours in the Pacific.

The feast is to include a range of dishes from across the Pacific; therefore, you will need to negotiate which country's cuisine you want to produce. The feast will take place in class and all food items must be ready for presentation at the designated time of the banquet.

So everyone knows what the different dishes are at the banquet, you need to design and produce a place card for your dish that includes the name of the dish, its country of origin and the main ingredients or flavours.

The dish you bring to the banquet needs to be suitable to feed two people.

Investigating

1. Investigate possible countries you could represent.
2. Select a Pacific country.
3. Complete the investigation based on the cuisine of your chosen country.

Generating

1. Compile a recipe bank of three different recipes from your chosen country that will meet the demands of the design brief.
2. Determine which recipe you will produce for the banquet.
3. Identify the ingredients that are unique and authentic to your chosen dish.

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DESIGN BRIEF: PACIFIC BANQUET – CONTINUED

Planning and managing

1 Consider how you will present your dish for the banquet and prepare an annotated diagram or model of your final presentation, including garnish.

2 Submit an appropriate food order.

3 Develop a work plan.

4 Design a creative place card for your dish that will entice other diners.

Evaluating

1 Explain how the dish met the specifications of the design brief.

2 Suggest modifications to the dish that would make it more suited to the design brief or improve its quality if you were to make it again.

3 Describe the appearance, aroma, taste and texture of your product using sensory analysis language. Write a complete sentence for each of these.

4 Reflect on your performance and the performance of your team by answering the following questions:

- **a** I contributed to my group by …
- **b** My strength in this task was …
- **c** I believe our group performance could have been improved by …
- **d** If I was to make this again I would do ... differently because …
- **e** I believe our group strength was …
- **f** I would give our meal … out of 10 because …
- **g** The product that I enjoyed the most at the banquet was … because …

5.16 INVESTIGATE IT

Rotten delicacies

Partially rotted raw sea slugs are considered a delicacy by Rarotongans.

Research other delicacies of the Pacific Islands that we might consider to be rotten foods. You could start with investigating *kaanga wai*. Also see what you can find out about Māori delicacies.

REFLECT ON LEARNING

1 Discuss the importance of coconut for the people living in the Pacific Islands.

2 Explain why fish is the staple protein in the Pacific Islands.

3 Identify the different regions within the Pacific Islands.

4 Suggest the reasons why tropical fruit are commonly consumed in the Pacific Islands.

5 Describe the cooking method used to cook foods for a feast.

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5.4 French fare

Europe is an exciting continent because it has such a diverse variety of countries and cultures to explore, each with its own traditions, ingredients and cooking equipment.

The French have had a very strong influence in the world of cookery. Many of the foods you enjoy today, or the terms you read and follow in a recipe, are of French origin. The French are known for their fine cuisine, and many foodies visit France to experience the pleasures of French food – their rich sauces, **pâtés** and **terrines**, soft cheeses and the pâtisseries selling beautiful cakes and pastries. Each region has its own food specialties, based on the ingredients produced there. Quiche Lorraine, for instance, is named after the Lorraine region in eastern France. Northern France is the main apple-growing area and is also famous for its dairy products, such as butter, cream and Camembert cheese.

pâté A paste made from meat, vegetables or fish.

terrine A mixture of either meat, fish or poultry and other ingredients, which is cooked and served cold.

Figure 5.11 Duck cassoulet

Figure 5.12 Croissants

Figure 5.13 Macaroons

Figure 5.14 Lemon soufflé

Figure 5.15 Escargot (snails)

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Common foods

Common French foods include the following:

baguette A long, narrow loaf of bread with a crusty outside and soft, fluffy white inside. Often known as a French stick or loaf.

- **Breads:** **baguette**. Bread is baked and purchased three times a day.
- **Dairy:** cheese (such as Roquefort), butter, cream.
- **Meat:** poultry, beef, pork, lamb and game.
- **Seafood:** fish and shellfish.
- **Common fruits and vegetables:** apples, pears, cherries, potatoes, green beans, eggplant, zucchini.
- **Flavourings:** tarragon, sage, rosemary, marjoram, fennel, thyme, garlic.
- **Other:** Escargot (snails) are a French delicacy but not commonly eaten, and mushrooms.

5.17 ACTIVITY

Parlez-vous Français?

1 Many cookery terms originate from France and are French foods. Match up the following terms with their definitions in the table below.

Term	Meaning
Bouquet garni	To flame, usually done using alcohol
Julienne	Everything in its place, preparation before cooking
Flambé	Equal quantities of flour and butter to make a paste used to thicken sauces
Mise en place	Blending food until smooth, usually done using a food processor
Roux	A bundle of aromatic herbs and spices used to flavour stocks and casseroles
Sauté	Cut food into thin strips the size of a matchstick
Purée	To cook foods in a frying pan with a small amount of fat or oil

2 Investigate another 10 French food terms and their definitions to add to this list.

Breads

Fruit and vegetables

Roquefort cheese

Flavourings (herbs)

Figure 5.16 These are all commonly consumed as part of the French diet.

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Tasty Trivia

Foie gras is one of the most popular delicacies in French cuisine. It is made from the liver of a goose or duck, which was produced by fattening up the bird through force-feeding it. This production method of force feeding is quite controversial, and many people choose not to eat foie gras for this reason. The ducks are fed two to three times a day using a feeding tube placed down their throats. This results in the livers swelling up to 10 times their normal size. The process is known as *gavage*. *Gavage*-produced foie gras is an ethical issue due to the force-feeding of the birds, intensive farming and the living conditions and welfare of the birds. Because the animal is force-fed, it can suffer health complications from having an enlarged liver.

foie gras A food made from the liver of a goose that has been fattened as a result of force-feeding. In French this means 'fatty liver'.

5.18 LET'S COLLABORATE

Describe how you are feeling now about the production and consumption of foie gras.

5.19 INVESTIGATE IT

Investigate and discuss the ethical issues around foie gras. You may like to start by visiting the RSPCA or the People for the Ethical Treatment of Animals (PETA) website to investigate foie gras production further. While researching, complete the issues map, recording in each box the arguments for and against the production and consumption of foie gras. Remember to research all stakeholders in this issue, not just those against the production of foie gras.

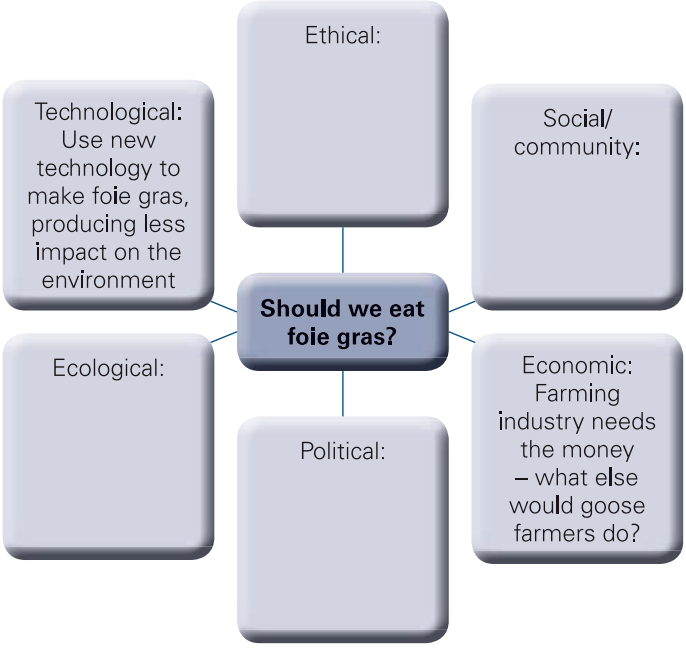

Figure 5.17 Should we allow the production of foie gras?

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DESIGN THINKING

Design your own terrine. Terrines are a popular traditional French food product. You must include at least four different ingredients, including a protein source. Make sure you consider how the inside will present when sliced, as this is an important part of a terrine.

5.20 ACTIVITY

France produces more than 365 cheeses – the largest number produced by any country – and cheese is often enjoyed at the end of a meal. In fact, the French eat more cheese than anyone else in the world!

1. Visit your local supermarket – or you can use an online supermarket or app – and identify all the imported French cheeses available.
2. Investigate any Australian-produced equivalents and note these down as well.
3. Back at school or at home, research some of the 365 different varieties of French cheese. You need to find at least 15. Start with the ones you found at the supermarket.
4. Write down a description of each cheese and the region in which it is produced.
5. Find a recipe for each cheese chosen.
6. Taste some of the cheeses if possible to determine which is your favourite.

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Quiche Lorraine

FRANCE

Main tools and equipment

Large bowl, chef's knife, chopping board, quiche tin, measuring jug, fork, oven tray, frying pan, whisk

Production skills

Rubbing in, beating, dicing, kneading, blind baking

Cooking processes

Baking

MAKES 1 QUICHE, SERVES 4

Preparation time: 60 minutes

Cooking time: 40 minutes

Serving and presentation time: 5–10 minutes

Total time: 105–110 minutes

Ingredients

Shortcrust pastry

 1 cup plain flour, sifted	 90 g butter, cut into small cubes	 1 egg yolk, lightly beaten	 3 teaspoons lemon juice

Filling

 3 bacon rashers, rind removed, diced	 3 eggs	 125 ml milk	250 ml (1 cup) crème fraiche

Method

1. Preheat oven to 200°C.
2. To make the rich shortcrust pastry, place flour in a medium bowl. Rub in butter with fingertips until just combined.
3. Add egg yolk and enough lemon juice to make ingredients cling together.
4. Turn pastry dough onto a lightly floured surface and knead gently until smooth. Wrap in plastic wrap and refrigerate for 30 minutes.
5. On a lightly floured surface, roll out pastry until it is large enough to cover a round quiche tin.

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Quiche Lorraine – continued

6 Place pastry in quiche tin, press it into the sides. Cut off pastry that hangs over the side of the tin.

7 Cover pastry with baking paper and place loading (blind baking mix) inside on top of paper.

8 Place tin on an oven tray. Bake for 10–12 minutes.

9 Remove paper and loading. Continue to bake pastry for a further 10–15 minutes or until lightly browned. Remove from oven and allow to cool.

10 Cook the bacon in a frying pan over a medium heat. Allow to drain on paper towel.

11 Sprinkle the cooked pastry case with the cooked bacon.

12 Whisk the eggs, milk and crème fraiche. Season with a pinch of salt and pepper, then pour over the bacon.

13 Reduce oven to 180°C. Bake for 40 minutes or until set in the centre.

14 Stand the quiche in the tin for 5 minutes before removing and serving.

Evaluating

1 Describe the appearance, aroma, taste and mouthfeel of your quiche using sensory analysis language.

2 Outline what makes this quiche a traditional Quiche Lorraine. Suggest other ingredients that could be used in a quiche filling.

3 Explain three health and safety rules you had to consider during this production.

4 Discuss the importance of blind baking on the final texture of this product.

5 Describe the modifications you could make if you needed to cook your quiche in a shorter timeframe.

Tasty Trivia

Le petit déjeuner (breakfast) is usually a quick meal of baguette slices or croissants with jam, served with coffee or hot chocolate. The hot chocolate is often drunk out of a bowl and can be used for dunking your bread.

REFLECT ON LEARNING

1 Outline the flavours used in French cookery.

2 Define the following terms commonly used in food production: 'sauté', 'julienne' and 'puree'.

3 Explain why each region in France has its own food specialties.

4 Discuss the controversy around the French product foie gras.

5 Describe how French cuisine has influenced food around the world.

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DESIGN BRIEF: FRENCH PÂTISSERIE

One of the highlights of a trip to France is spending some time at the local pâtisserie and being tempted by the gateaux, truffles, petits fours, macaroons, éclairs and other sweet treats on display. Investigate and produce a *petit* (small) food item that could be sold in a French pâtisserie. You need to be able to produce this item in your food production class time.

Investigating

1. Visit or virtually visit a French pâtisserie. You could try the Laurent website for inspiration on what you could produce.
2. Write three criteria for success questions using the information provided in the brief.

Generating

1. Generate a list of at least six solutions for ideas you might like to make.
2. Choose which item you are going to make and justify your choice.

Planning and managing

1. Prepare a food order for your product and submit it to your teacher.
2. Write a time plan for your production lesson, including health and safety information.
3. Using an ICT program, produce a design of your final French pâtisserie product presentation, including any garnishes.
4. Give your product a French name.

Producing

Prepare your pâtisserie product.

Evaluating

1. Answer the criteria for success questions you set at the beginning of the design process.
2. Describe the appearance, aroma, taste and mouthfeel of your final product solution.
3. Did you have to learn any new cooking techniques or work with a piece of equipment or an ingredient that was new to you? Explain your answer.
4. Complete a PMI table reflecting on this design brief. Include points on your pâtisserie item, planning, management, collaborating and producing skills.

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5.5 Gourmet Greek

Food is extremely important in Greek culture. Many people in Greece eat a simple diet that has stayed more or less the same since 4000 BCE, based on fresh seasonal produce such as bread, olive oil, vegetables, figs and dairy products. Seafood is an important ingredient on the Greek menu, especially as Greece and the Greek Islands are surrounded by the Mediterranean, Aegean and Ionian Seas.

A very popular 'fast food' meal in Greece is the gyro – finely chopped meat (usually beef or lamb) pressed together and cooked slowly on a spit. This cooked meat is thinly sliced and placed in pita bread with tzatziki (a sauce of yoghurt, cucumber and herbs).

In Australia, we typically refer to gyros as souvlaki. But gyros meat is used in the filling.

Figure 5.18 Feta is a key ingredient in a Greek salad. A traditional Greek salad contains cucumber, olives, tomato, red onion, capsicum, feta, oregano and an olive oil dressing.

Figure 5.19 Dolmades

Figure 5.20 Gyro wraps are a popular fast food in Greek cuisine.

Tasty Trivia

The world's first cookbook was written in Greece by Archestratos in 330 BCE.

Figure 5.21 Calamari

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5.21 ACTIVITY

A closer look at (and taste of!) feta cheese

Feta is a soft, white cheese traditionally made from goat's milk and then stored in brine, and it is an important protein source. Feta is the most popular and most ancient of the Greek cheeses. In 2005, Europe introduced feta cheese regulations. Only feta made in Greece is allowed to be called 'feta', and is made from sheep's milk or a mixture of sheep's milk and up to 30 per cent of goat's milk from the same area. Can you taste the difference?

Copy and complete the table to compare an authentic Greek feta with Australian-style feta cheeses. You will need to read the label to collect all information required. You could also compare an organic variety or a Bulgarian-style feta as well.

	Appearance	Aroma	Mouthfeel	Taste
Greek feta				
Australian goat feta				
Australian sheep feta				
	Fat content	**Ingredients**	**Cost per 100 g**	**Ranking (individual preference)**
Greek feta				
Australian goat feta				
Australian sheep feta				

1. Name which cheese you enjoyed the most. Give an explanation of why you have chosen that particular cheese. Use your descriptive words from the tasting in your response.
2. Compare your choice with those of the rest of the class. Determine which was the most popular cheese.
3. Could you taste a difference between the two Australian feta cheeses (goat and sheep)? Explain your answer.
4. Discuss the difference in the taste between the Australian and the Greek feta cheeses? Explain your answer.
5. Identify which feta cost the most. Outline why this might be the case.
6. Should Australian feta be allowed to be called 'feta'? Justify your opinion.
7. Complete a KWLH for the cheese tasting: K – what do you know about feta cheese? W – what do you want to find out about feta cheese? L – what have you learnt from this cheese tasting? H – how did you learn during the tasting?

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Common foods

The following are some common Greek foods:

- **Breads:** pita breads and crusty bread.
- **Olive oil:** there aren't many Greek dishes that don't include olive oil, and fresh olives are also very popular. Olive oil is even used in cakes and biscuits.
- **Legumes:** lentils and chickpeas.
- **Dairy:** yoghurt, feta and haloumi.
- **Meat:** large amounts of seafood, poultry and lamb. Lamb is the most popular meat in Greece.
- **Common fruits and vegetables:** vine leaves, eggplant, olives, potatoes, spinach, zucchini, lemons and figs.
- **Flavourings:** oregano, mint, parsley, bay leaves and honey.

5.22 INVESTIGATE IT

Delicious dips

Dips are popular in Greece. Investigate some examples of Greek dips that are served as part of a Greek meal.

Choose one of the dips and produce it. Serve it with homemade pita bread.

A typical Greek day

The day usually starts with a cup of strong coffee, bread and a small pastry or biscuit. Lunch is usually a bigger meal and is eaten around 1.00 pm. It is common to eat three to four entree dishes, such as Greek salad, dips, calamari or meatballs. Then it's time for a siesta as everything closes between 3.00 and 5.00 pm, the hottest part of the day. Dinner is eaten later in the evening, usually around 9.00 pm. Again, the meal starts with entree dishes and is followed by a main meal, often a grilled meat or seafood dish, and then fresh fruit or a sweet dessert such as baklava.

Tasty Trivia

Although Spain is by far the world's largest producer of olive oil, Greece has the highest per capita consumption.

Figure 5.22 Pita bread

Figure 5.23 Olives and olive oil

Figure 5.24 Figs

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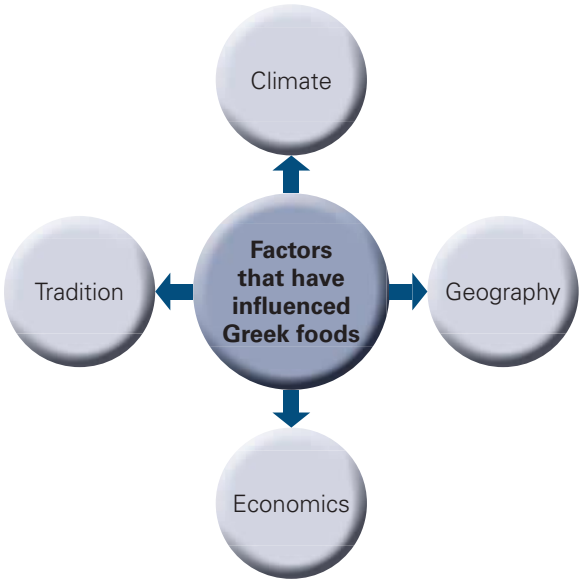
5.23 ACTIVITY

Using the headings in the graphic, explain how each of these factors has influenced Greek foods and flavours.



5.6 Inviting Italian

Italian foods are popular dishes with most Australians, with many of us often consuming pasta and pizza dishes. Like France, each region in Italy has its own specialties, from the rich and creamy dishes of the north to the hot and spicy foods of the south. Northern Emilia-Romagna has produced the best-known dishes – spaghetti Bolognese, lasagne, tortellini – and is also the home of parmesan cheese.

Pasta

In Italian pasta means 'paste', and is a dough made of durum wheat combined with a liquid – usually egg or water. There are lots of varieties of pasta available, with many different shapes and different sauces to serve with them. Pasta is very easy to make at home using a pasta machine.

5.24 LET'S COLLABORATE

Write down all the different types of pasta you know. State how many you came up with. Now compare your results with your classmates. Add any more pasta shapes or varieties to your list.

5.25 INVESTIGATE IT

Go to the Scientific Psychic Pasta Quiz website and test your knowledge.

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5.26 ACTIVITY

Practising perfect pasta

Work in pairs to prepare your own fresh pasta (there is a recipe in the Teacher Resource) and compare your fresh pasta to a commercial pasta to determine which is best. Investigate five tips for cooking pasta so it is **al dente**. Produce your own homemade pasta. Time how long it takes you to prepare and produce it.

al dente Cooked 'to the tooth' – not too soft, but chewy with some bite or texture to it.

Purchase a commercial packet of pasta and prepare it according to the instructions provided.

Serve both pastas with a plain tomato or Napoli sauce so that you can compare the two fairly. Answer the following questions to help you compare the two pastas and decide which is best.

	Homemade pasta	Commercial pasta
Time taken to prepare		
Appearance		
Aroma		
Flavour		
Mouthfeel		
Give each pasta a rating out of 5		
Cost of product		

1. Name which pasta's presentation you preferred. Explain why.
2. Name which pasta, in your opinion, had the best flavour.
3. List the ingredients you used to make your homemade pasta.
4. State the ingredients used to make the pasta as written on the packet.
5. Discuss which pasta is the healthier option. Justify your response.
6. Compare the time taken to prepare both pastas. State which was the most time efficient.
7. Explain which pasta was the cheapest.
8. Identify your overall favourite and explain why.

DESIGN THINKING

Design a pasta sauce you could serve next time you prepare pasta.

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Italian meals

An Italian meal consists of many courses. **Antipasti** may include meats such as prosciutto and salami, cheeses such as mozzarella, and vegetables such as olives and artichokes.

antipasti The food served at the beginning of an Italian meal.

The second course, *primi*, is a pasta or rice dish. The *secondi* is the third dish and is the protein for the meal – usually chicken, fish, meat or eggs. The secondi is served with a side dish of vegetables or a salad dressed with olive oil and balsamic vinegar. This side dish is called *contorni*. Another important part of the Italian meal is *formaggi* – cheese. A variety of cheeses is often served before dessert. The last course is *dolce*, dessert, which might be tiramisu, cakes, gelati or fresh seasonal fruit. *Molto buono* (very good)!

Figure 5.25 Antipasti

Figure 5.26 Gelati

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Tiramisu

ITALY

RECIPE

Main tools and equipment

Electric beater, large bowl, spatula, serving dish, whisk

Production skills

Beating, folding, layering

Cooking processes

Chilling

SERVES 2

Preparation time: 40 minutes

Refrigeration time: 4–5 hours

Serving and presentation time: 10 minutes

Total time (excluding refrigeration time): 50 minutes

Ingredients

 2 eggs, separated	 2 tablespoons caster sugar	 125 g mascarpone cheese	Salt, pinch
 250 ml strong coffee	 100 g sponge finger biscuits (recipe in Teacher Resource)	 Cocoa powder or chocolate for grating	

Method

1. Beat egg yolks and sugar with an electric beater until the mixture is thick and pale.
2. Add the mascarpone cheese and continue beating until well combined.
3. Mix the coffee liqueur (if using) and set aside.
4. Using a large bowl, beat the egg whites with salt until stiff peaks form.
5. Gently fold the beaten egg whites into the mascarpone mixture.
6. Pour the coffee into a shallow bowl. Dip the biscuits into the coffee for 2–3 seconds or until soaked in the coffee. Place one layer of soaked biscuits on the bottom of your serving dish.

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7 Pour a layer of your cheese mixture to cover the surface of the biscuits.

8 Repeat the process of layering soaked biscuits then cheese mixture until all your biscuits have been used. Your last layer needs to be the cheese mixture.

9 Cover your tiramisu and refrigerate for a few hours until set.

10 Before serving, sprinkle with cocoa powder or freshly grated chocolate.

Evaluating

1 Outline three considerations when preparing to beat your egg whites.

2 Describe the process of folding.

3 Explain why a plastic spatula or metal spoon, rather than a wooden spoon, is used to fold.

4 Suggest three other ways to garnish and present your tiramisu.

5 Describe the appearance, aroma, taste and mouthfeel of your tiramisu.

DESIGN BRIEF: AN ITALIAN DINNER PARTY

1 Using the information just described about Italian courses, design an Italian dinner party for two people. Use the menu map below to help you get started.

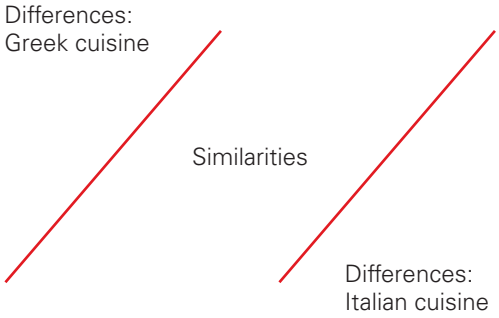
2 Design a copy of the menu for your dinner party.

3 Choose one of your courses to make in your next food production class.

Course	Ideas	Final choice	Reason for final choice
Antipasti			
Primi			
Secondi			
Contorni			
Formaggi			
Dolce			

REFLECT ON LEARNING

1 Copy and complete the comparison alley to illustrate the similarities and differences between Greek cuisine and Italian cuisine. Write the similarities in the centre and the differences on the outside.



2 Explain why there are similarities between these two cuisines.

3 Define the term 'al dente'. Outline why this is important when cooking pasta.

4 Discuss why seafood is an important protein in the Greek diet.

5 Describe the influence Greek and Italian cultures have had on the Australian diet. Account for why this is the case.

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5.7 Amazing Africa

Africa's cuisine is extremely diverse due to the 54 different countries and more than 1500 language groups spread across the continent. While African cuisine is becoming more readily available and popular in Australia, you may encounter the food from only one region. Like every other cuisine in the world, African cuisine has a variety of interesting ingredients, cooking equipment and traditional foods. A lot of African cooking is done using one saucepan or piece of equipment, such as a tagine. This then creates wonderfully vibrant dishes with all of the different ingredients mixed into the one main meal.

It doesn't matter which part of Africa you are in, meals are served with a starchy porridge, known as *fufu*, mealie pap, *ugali* or *sadza*, depending on where you are.

Biltong is a popular spiced dried meat product in southern Africa, developed from a need to preserve meat. While biltong is occasionally used in dishes, it is most commonly eaten as a snack.

Made from steamed and dried durum wheat, couscous is popular in North Africa. Couscous is served with a stew spooned on top, or mixed with raw tomato, onion and cucumber.

Figure 5.28 Bilton

The tagine is an earthenware pot traditionally used for slow cooking meat, chicken or fish and vegetable dishes, which are also named tagine after the dish in which they were cooked.

Tasty Trivia

Many of the dishes prepared and consumed in Africa have developed from subsistence living. What can be farmed, hunted, fished or gathered comprise the key ingredients in the traditional foods of the area.

Figure 5.27 Jollof Rice (or *ceebu jen*) is an example of a West African dish where all the ingredients are mixed together in one pot.

Tasty Trivia

It is common in Ethiopia for people to eat without utensils. Food is served on top of *injera*, which is a spongy fermented bread made from teff flour. The bread collects the juices and is used to scoop the food up for eating.

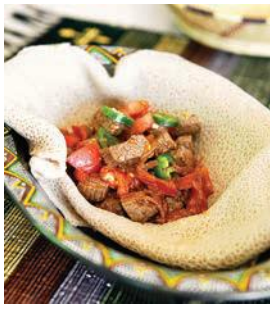

Figure 5.29 Tagines

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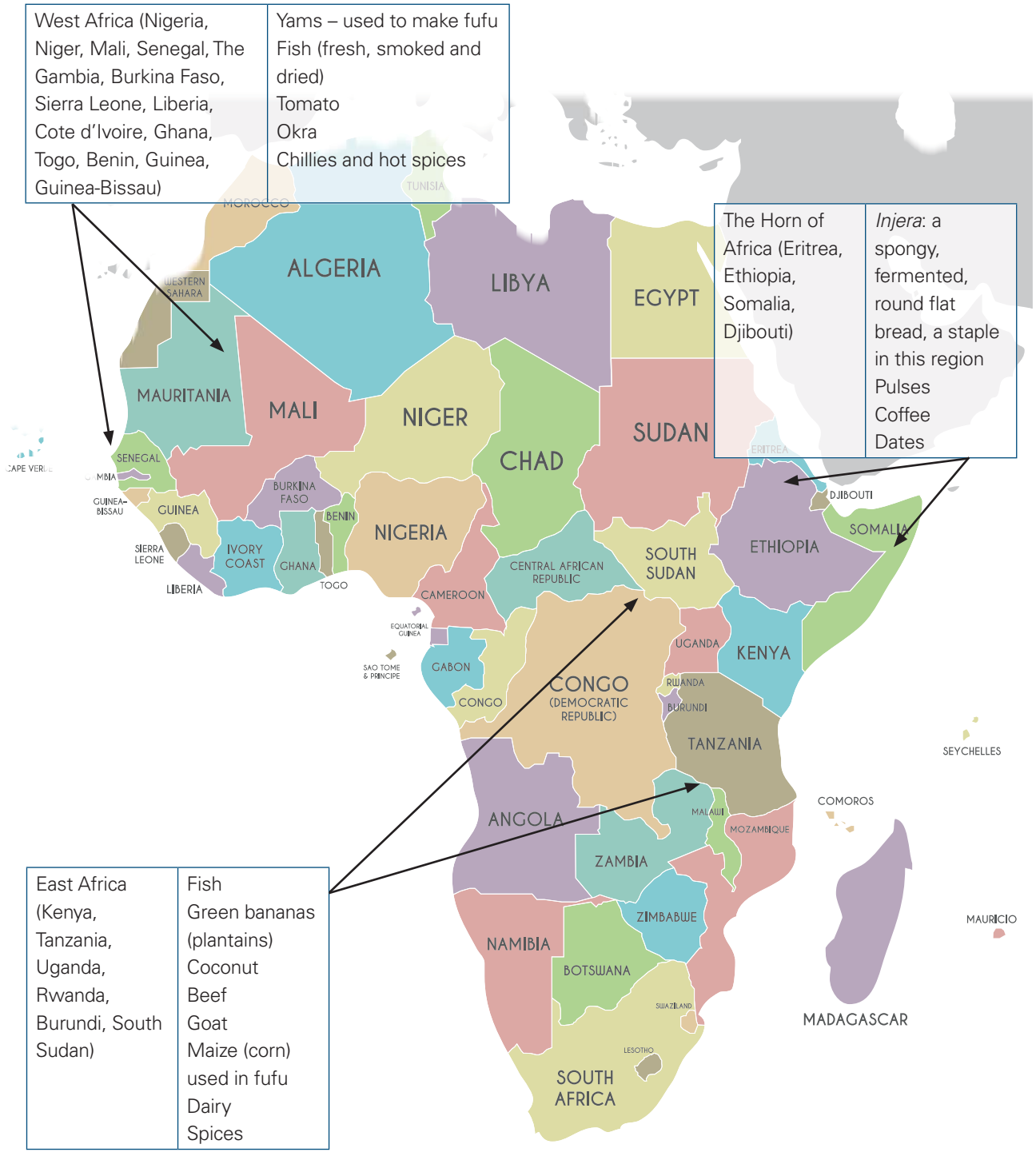

Figure 5.30 Selected foods of Africa. As Africa comprises so many different food cultures, it is impossible to show much.

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Lentil and chickpea dish

ETHIOPIA

RECIPE

Main tools and equipment

Large bowls, saucepan, chef's knife, chopping board, non-slip mat, wooden spoon

Production skills

Soaking, slicing, chopping, dicing

Cooking processes

Boiling, simmering, sautéing

SERVES 2

Preparation time: 30 minutes

Cooking time: 20 minutes

Serving and presentation time: 5 minutes

Total time: 55 minutes

Ingredients

 1 cup dried lentils	 ½ cup dried chickpeas, soaked overnight	 1 tablespoon vegetable oil	 ½ teaspoon salt	 2 teaspoons ground black pepper	 ½ chilli, finely sliced	 1 tablespoon vegetable stock
 ½ teaspoon curry powder	 ½ cup fresh parsley, chopped	 1 fresh tomato, diced	 1 tablespoon tomato paste	 ½ large onion, diced	 1 small garlic clove, crushed	

Method

1. Wash lentils in cold water. Place lentils in a large saucepan with enough water to cover them.
2. Bring to the boil, then simmer until the lentils are tender. Drain and set aside.
3. Drain soaking chickpeas. Place in a large saucepan with enough water to cover them.
4. Bring to the boil, then simmer until chickpeas are tender. Drain and set aside.
5. Heat oil in saucepan. Sauté onions and garlic.
6. Add the curry power, chilli, black pepper, tomato paste and fresh tomato. Simmer for 10 minutes.

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7 Add chickpeas, lentils, vegetable stock, parsley and salt. Simmer for 20 minutes. Serve.

Evaluating

1 Explain how this dish would typically be eaten.
2 Outline the nutritional benefits of this product.
3 Suggest modifications that could be made to change this from a vegetarian meal to one containing meat.
4 Describe the appearance, aroma, taste and texture of your lentils and chickpeas.
5 This recipe uses dried pulses, which need to be soaked overnight. What ingredient could make this meal in a shorter timeframe?
6 Outline the flavours in this dish that represent African cuisine.

5.27 INVESTIGATE IT

Injera is a traditional Ethiopian fermented bread that traditionally is served on a plate with meat and vegetable stew on top.

1 Research the recipe for *injera*. Produce this to serve with your Lentil and Chickpea Dish.
2 Prepare your food order and work plan to ensure you are able to prepare and produce your *injera* in your class time.

REFLECT ON LEARNING

1 Discuss why, traditionally, most African countries have a version of *fufu*.
2 Explain the importance of *injera* bread in Ethiopia.
3 Africa is a diverse continent. Outline some of the similarities in ingredients throughout the region.
4 The tagine is a popular piece of cooking equipment in Northern Africa, especially Morocco. Explain what a tagine is and outline the food ingredients commonly used.

5.8 Invigorating Indian

Asian counties are our close neighbours and have introduced fresh and flavoursome foods into our daily culinary life. Australians have learned about new and exciting ingredients like rice noodles, soy sauce, lemongrass and kaffir lime leaves, all of which can now be found in a large number of local supermarkets.

India has been called the 'spice bowl of the world', and the key to Indian food is the aromatic spices that create wonderful flavours and aromas. Each region in India has its own style of flavours and cooking. The north is known for cooking using a clay oven called a **tandoor**, creating foods such as tandoori, korma and meat-based dishes, while the south is known for its spicy vegetarian dishes.

tandoor An Indian clay oven that is able to cook food at high temperatures.

staple food source A food that is eaten regularly and in large quantities. It is the most eaten product in the diet.

India has the world's second largest population after China, and more than half the people of India are vegetarian. Many do not eat meat due to their religious beliefs, while others cannot afford to buy meat or fish. The cow is considered sacred by Hindus, so eating beef is forbidden. Lentils, legumes and rice are **staple food sources** for Indians, and many Indian curries are vegetarian.

Figure 5.31 A traditional clay oven from Northern India known as a tandoor, with naan bread cooking within.

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Figure 5.32 Australia has benefited from being geographically close to the rich food cultures of Asia.

5.28 LET'S COLLABORATE

India is one of the few countries in the world to grow vanilla beans. The world's largest producers are Madagascar, Indonesia, Papua New Guinea and Mexico. Have you ever used one? Can you place all of these countries on the world map? Name Australia's closest vanilla producer.

A typical meal

A typical Indian meal is made up of several dishes with contrasting savoury, sweet and spicy flavours, with different colours and textures. There is often a meat dish (especially in northern India), **dhal**, a vegetable dish, rice, **raita** and maybe a fresh mango or lime chutney and a bread such as chapatti or naan. The food is served in small metal bowls on a tray called a **thali**. All parts of the meal, including the accompaniments, are served together. Food traditionally is eaten with the right hand from the thali.

dhal A thick stew made from lentils, onions and spices.

raita A yoghurt dish usually mixed with finely chopped cucumber, mint and garlic.

thali A large metal plate and metal bowls used for Indian meals.

Common foods

Common Indian foods include the following:

- **Breads:** chapattis, naan, parathas, roti.
- **Legumes:** lentils and beans.
- **Dairy:** yoghurt.
- **Meat:** some lamb, chicken, goat and fish.
- **Common fruits and vegetables:** onion, okra, eggplant, tomatoes, mango, bananas, papayas.
- **Rice:** basmati rice is the staple grain in India.
- **Flavourings:** curry blends.

Tasty Trivia

India is the world's biggest producer and consumer of mangoes. The mango is officially India's national fruit.

Creating curry

The term 'curry' is not a word used by Indians. The term probably came from the Indian word for 'sauce', *kari*. Each dish has a name according to the ingredients used in it, which is why there is such a wide variety of Indian curries. The key to successful Indian cooking is in the **blending** of the herbs and spices used for cooking.

blend To mix or combine ingredients thoroughly.

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Indian curries are based around a number of different herbs and spices, with different combinations creating different flavours and dishes. Most contain a number of spices, including turmeric, coriander, cumin, cardamom, cinnamon, garam masala, cloves, curry leaves, mustard seeds, black pepper, fenugreek and chilli.

5.29 LET'S COLLABORATE

How many Indian curry dishes can you name? Here's one to get you started: Tikka Masala. Compile a list as a class. Now check off any you have eaten before.

Figure 5.33 Lamb Rogan Josh curry

Figure 5.34 Mushroom, spinach and turmeric curry

5.30 LET'S COLLABORATE

Do you recognise any of the spices in the picture below? As a class, name as many as you can.

5.31 ACTIVITY

1. Take a trip to the supermarket or visit the Coles Online website and check out all the different Indian curry blends available.
2. Write a list of the different blends and their ingredients.
3. Divide your class into groups and prepare one dish of each variety. You will need to decide the protein on which your dish will be based. Serve with rice.
4. Compare each dish to discover the tastes of India and which curry you like best.
5. Different areas in India have different traditional curries. Research your curry to work out its origins.

DESIGN THINKING

India has the world's largest film industry, including Bollywood. You have been asked to prepare a small product that could be served during a Bollywood movie premiere being held at the local Gold Class Cinema. The dish can either be vegetarian or contain meat. It must have at least five ingredients in it and reflect Indian culture.

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5.9 Tasty Thai

Thai food is a gastronomic delight for the senses. The vibrant and distinctive colours and flavours of Thai food have made this cuisine incredibly popular in Australian culture. Authentic Thai cuisine is based around five flavours: bitter, salty, sour, spicy and sweet. These flavours are blended and balanced in each meal. Plenty of fresh vegetables and salads are featured in this cuisine, with small amounts of fish, meat or poultry.

5.32 LET'S COLLABORATE

Have a look at the recipe for Thai Green Chicken Curry on p. 193. Identify which of the five Thai flavours each ingredient contributes.

Tasty Trivia

The word 'Thai' means 'free'. Thailand is the only South-East Asian country that has never been colonised by European powers.

Important ingredients

Important ingredients in Thai cooking include the following:

- **Rice** is the staple food item in Thai cooking. Rice or rice noodles are a component of every meal, including breakfast, usually boiled or steamed.
- **Coconut milk** is a very important ingredient in Thai cooking. It is the liquid component of most curries, and is also used in many desserts, such as coconut jelly.
- **Lemongrass** is used in many soups, curries, stir-fries, salads and marinades. It has an intense lemon flavour with a hint of ginger, but without the acidity of lemons. Lemongrass needs to be bruised before use to release its flavour.
- **Kaffir limes** look like regular limes, only with an extremely bumpy surface. Yet, unlike everyday limes, the fruit and juice are not eaten; only the rind and leaves are used for their flavour. A strong lemon flavour is released when the leaves are torn and used in soups or curries.
- **Chillies** not only provide the spicy flavour of Thai foods, but also add colour and are often used to garnish a meal.

Figure 5.35 How many of the ingredients listed below can you identify in this photo?

- **Tropical fruits** are commonly used. The warmer temperatures of Thailand give it the perfect climate for growing fruits such as coconuts, pineapples, bananas, watermelon, guava, custard apples and lychees.

The heart of all Thai curries is the curry paste, which is made from fresh herbs and spices. This paste is then cooked in coconut milk to release the flavours before the meat or vegetables are added. Because they are based on fresh ingredients, Thai curries are light and refreshing, with a distinctive colour – quite different from Indian curries.

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Street vendors

There are many street food vendors in Thailand, selling all types of foods, including noodles, satays and fruit. Stallholders start work around 4.00 am, preparing breakfast items: soup, fresh fruit, coffee and curry with steamed rice. At lunchtime there's a selection of about 10 different curries to choose from, served with rice.

The food is bought and eaten in the street, similar to Western takeaway-style eating, or taken home or to work for consumption later in the day. The lunch rush is usually over by 2.00 pm and the stalls are cleaned up and packed away so the vendors can go to the markets and purchase the ingredients needed for tomorrow's meals. In tourist areas, stalls stay open much later, providing snack and dinner items for hungry tourists.

Figure 5.36 Street vendors selling food are common in Thailand.

Figure 5.37 Thailand is also famous for its floating markets, where vendors operate stalls in small boats floating in canals selling fresh fruits, vegetables, fish, chillies and other ingredients.

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DESIGN BRIEF: DESIGN YOUR OWN CURRY

Curry is a popular style of meal throughout Asia, and many Asian countries have their own style of curry using local, fresh ingredients, like the Thai Green Chicken Curry on p. 193.

Investigating

1. Develop your own design brief based around designing your own curry theme, and include the constraints and considerations listed:
   - **a** It has to be prepared from scratch using at least four fresh ingredients (no prepared commercial pastes allowed).
   - **b** It should try to include the use of a mortar and pestle.
   - **c** It should have one source of protein and at least three vegetables.
   - **d** It must include an accompaniment.
   - **e** It needs to be made within your normal production class.
   - **f** It must include a garnish.
   - **g** It needs to serve one to two people.
2. Write four criteria for success questions based on the brief you have written.
3. Investigate the different types of curries available. List possible flavour combinations you could use in your curry.

Generating

1. Design and develop your own curry paste.
2. Generate different ideas for the final presentation of your curry and what accompaniments, if any, you will serve.

Planning and managing

1. Prepare a food order for you curry.
2. Prepare a work plan for your curry.

Producing

Prepare and produce your curry in class.

Evaluating

1. Thai foods are based around five flavours. If you made a Thai-style curry, list these flavours and then link each element with the appropriate ingredient in this recipe.
2. Indian curries are based around spice blends. If you made an Indian-style curry, list the herbs you used and describe how you created your spice blend.
3. Describe the appearance, aroma, taste and texture of your curry.
4. Answer the criteria for success questions you set at the beginning of this design process.
5. Explain why you need to fry your curry paste or blend before adding your other ingredients.
6. Rate your curry paste out of 5, with a score of 5 being outstanding.
7. Were the flavours balanced – that is, were any of the flavours too strong? Explain your answer.
8. Suggest any improvements you would make to your curry if you were to make this again. Comment on your planning, production and final product solution.
9. Explain what you found most difficult when completing this task.

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Thai green chicken curry

Main tools and equipment

Chef's knife, chopping board, non-slip mat, steamer, frying pan, wooden spoon, measuring cup, peeler, measuring spoon, microwave

Production skills

Dicing, slicing

Cooking processes

Steaming, sautéing, simmering

SERVES 2

Preparation time: 10 minutes

Cooking time: 25 minutes

Serving and presentation time: 5 minutes

Total time: 40 minutes

Ingredients

 ½ cup jasmine rice	 2 teaspoons oil	 2 cloves garlic, finely diced	 4 cm lemongrass, finely sliced	 1 small piece of ginger, peeled and finely sliced	 1 chilli, finely chopped (remove the seeds if you don't like it hot)
 1 chicken breast, diced	 1 onion, roughly diced	 1 kaffir lime leaf, finely sliced	 ½ red capsicum, roughly diced	 10 green beans, roughly chopped	 2 teaspoons soy sauce
 200 ml coconut cream	 ½ cup chicken stock	 2 teaspoons green curry paste	1 teaspoon coriander, chopped		

Method

1. Start steaming the rice in a microwave or steamer while you prepare the curry.
2. Heat oil in a frying pan over a medium flame and sauté garlic, lemongrass, ginger and chilli for 1–2 minutes to release the flavours and aromas of the spices.

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Thai green chicken curry – continued

RECIPE

3 Add the chicken and cook for 5 minutes until brown all over.

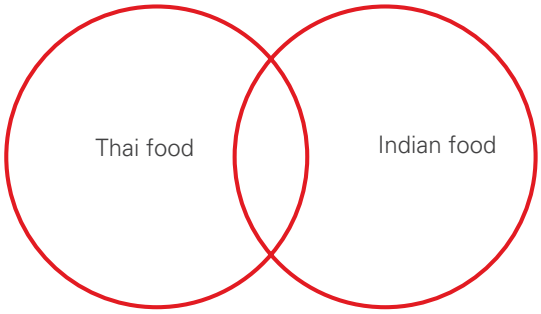
4 Add the onion and sauté until transparent. Do not brown, as this will discolour your sauce.

5 Stir in the remaining ingredients (but only half the kaffir lime leaves) and simmer for about 15 minutes until the chicken is tender.

6 Serve with the rice and garnish with the remaining kaffir lime leaves and some fresh coriander.

REFLECT ON LEARNING

1 Copy and complete the Venn diagram below, comparing Indian curries with Thai curries.



2 Identify the staple ingredients in Thai cuisine and explain why these are used in Thai foods.

3 More than half of India's population is vegetarian. Discuss why this is so.

4 Explain the reason why there are so many street vendors in Thailand.

5 Outline why India is often referred to as the 'Spice Bowl of the World'.

5.10 Vibrant Vietnamese

Vietnam is part of the Asia-Pacific region and a popular travel destination for Australians. Many Vietnamese people also immigrated to Australia after the Vietnam War, and brought with them their traditional ingredients, recipes and cultural practices, contributing to our multicultural melting pot.

Figure 5.38 One of the influences on Vietnamese cuisine has been the French, who colonised Vietnam in 1859.

5.33 ACTIVITY

Visiting Vietnam

On p. 195 is a typical Vietnamese recipe. Complete an extended investigation researching Vietnam. Include the following information – similar to what you have learnt about the other countries studied in this chapter:

- common ingredients – including pictures, descriptions and uses
- cooking methods used
- cultural influences
- five interesting facts
- one traditional recipe.

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Vietnamese spring rolls

VIETNAM

Main tools and equipment

Chef's knife, chopping board, non-slip mat, grater, frying pan, wooden spoon, deep fryer, pastry brush, measuring spoon, bowls, strainer, garlic press

Production processes

Dicing, rolling, grating, mixing, draining

Cooking processes

Frying, deep-frying

SERVES 2

Preparation time: 15 minutes

Cooking time: 10–15 minutes

Serving and presentation time: 5 minutes

Total time: 30–35 minutes

Ingredients

 50 g rice vermicelli noodles	 1 teaspoon sesame oil	 1 red shallot, finely diced	 1 garlic clove, minced	 200 g pork mince (or chicken mince)	 ½ carrot, grated
 1 teaspoon coriander, chopped	 1 teaspoon Vietnamese mint, chopped	 ½ teaspoon fish sauce	½ teaspoon sugar	12 rice paper wrappers	
 1 egg white, beaten	 Oil for deep frying	 12 iceberg lettuce leaves			

Method

1. Place rice vermicelli in bowl and cover with boiling water. Allow to soften for a few minutes and then drain.
2. Heat oil and sauté shallot and garlic in a frying pan. Add pork mince and stir until cooked.
3. Remove from frying pan and allow mixture to cool.

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Vietnamese spring rolls – continued

4 Combine meat mixture, carrot, coriander, Vietnamese mint, rice noodles, fish sauce and sugar in a bowl. Mix well.

5 Divide mixture into 12 equal portions on a tray.

6 Place hot water into a large bowl and soften one rice paper wrapper, then place it on a plate.

7 Place one portion onto the end of a rice paper sheet.

8 Fold over the end and tuck ingredients in. Fold in both sides and roll tightly. Seal edge with egg white.

9 Repeat the process until you have finished.

10 Heat the oil in the deep fryer and fry your rolls, a couple at a time, until they are golden and crisp.

11 Drain on a paper towel.

12 Serve with fresh iceberg lettuce leaves.

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LOOKING BACK

1 The enormous variety of foods available in Australia today is due largely to the country's multicultural nature and the demand for traditional ingredients and foods from the wide variety of ethnic groups living here.

2 Up until World War II, Australia's food selection was typically influenced by British eating traditions and habits.

3 After the war, there was an influx of migrants from different parts of the world, rather than just the United Kingdom, and this is reflected in our immigration patterns today.

4 Australian cuisine has been influenced by many cultures, including Indigenous, European, Asian and African cultures.

TEST YOUR KNOWLEDGE

Multiple choice

1 Foods hunted by Aboriginal and Torres Strait Islander peoples as a protein source include:
   - **a** kangaroo, crocodile, sheep and possum
   - **b** emu, eels, goanna and yabbies
   - **c** fish, crocodile, snake and honey ants
   - **d** goanna, finger limes, fish and witchetty grubs.

2 Authentic Thai cuisine is blended and balanced for each meal around how many flavours?
   - **a** six – bitter, sour, sweet, umami, salty and spicy
   - **b** two – sweet and sour
   - **c** five – bitter, salty, sour, spicy and sweet
   - **d** four – sour, sweet, spicy and salty

True/false

1 Foie gras is a staple French food product.

2 All countries in Africa have a carbohydrate food item typically served with each meal.

3 Traditionally, the main protein eaten in India is goat.

Short answer

1 List all the different cuisines available in your local area. Describe the positive effects that multiculturalism and immigration have had on Australia's food.

2 Reflecting on the common Greek foods, complete the following table, highlighting main nutrient sources. An example is provided for you.

Carbohydrate	Protein	Fat
Pita bread	Feta	Olive oil

3 Now complete another nutrient table for a country of your choice.

Extended response

Prepared and published meal plans have become very popular for busy working households. You have been asked to design a 'Taste of the World' meal plan guide that could be published and made available through social media. The meal plan guide is for healthy, quick and easy evening meals to serve two people. You must include one meat-free meal in your weekly plan. It is important that you reflect different cultures from around the world as it is intended that this be used during Multicultural Week. The ingredients need to be easily accessible for people to use in their kitchen. All meals must include a short recipe card with the following information:

Name of meal:

Country of origin:

Ingredients:

Cooking time:

Nutrition information panel:

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Career profile: Stephanie McCrabb

Current occupation: Food scientist and account manager
Place of employment: CHR Hansen and Ingredion

Explain your interest in the area of your chosen career path. Discuss the reasons why you have pursued this career.

I had always been intrigued by how the human body functions so perfectly and how it interacts in this fascinating world. Not really having a career plan while in school, I enrolled in a science degree, simply choosing the subjects I enjoyed. Soon after I graduated from university, I fell into the food industry and was intrigued by the scope of opportunities on offer. As a result, I never felt a need to look into alternate fields.

Who was your role model and how did they influence your decision to work with food?

I grew up watching my parents grow and prepare their own food. After school I watered the vegetable patch, harvesting what was ready before taking a basket of the freshest veggies into the kitchen. I watched Mum cook as I podded the peas and broad beans. I've seen my father prepare a whole sheep carcass and milk his own cows. We caught yabbies by hand, cooking and peeling them painstakingly, one by one. As kids we clearly understood the value of food and where it came from. The commercial world is a far cry from those experiences, but I like to remind myself that real food is never fast.

Discuss the most rewarding aspects of your career.

I feel a great level of satisfaction when working in partnership with large food manufacturers where the projects are complex and unexpected hurdles often arise. Having the opportunity to visit many different factories and be involved in trials that many people don't get to experience has been amazing. It's very rewarding to see the end product on the supermarket shelves and know your contribution helped to make it happen.

Explain the challenges you face in your job.

Large projects take a team of people from many different places. As a project manager, part of my role is to pull all these resources together at the right time. Projects rarely stay true to the initial plan, which can be challenging. You must be creative and adaptable.

Is there such a thing as a 'normal' day in your work? Outline some things that you do in a day.

I'm called into a lot of meetings and we often use the opportunity when everyone is together to taste food products and samples. Taste is something that can never be emailed. Then we put the project plan together, gathering what we need. Sometimes I am in the lab working with food technologists. At other times I can be looking at costs and shipping containers. I've always enjoyed the lab work, as it remains at the core of the job. You need to be

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involved in every facet and can't be afraid to jump in, volunteer, get your hands dirty and try everything.

Identify the opportunities this career has afforded you.

The food industry is a global industry. We are all connected by food and each world region influences others. I have been fortunate to travel to Asia and Europe, seeing food factories, trying different foods and meeting colleagues. While I love travelling to a new country, there is also something very special about visiting the same places again. I have made good friends and feel those special places will always welcome me back.

Outline the qualifications needed to complete this type of work.

A Food Technology qualification will definitely get you an excellent start but the industry needs a variety of backgrounds. I recommend that students pursue what they enjoy. Your best resource will be the friends you make in the industry. Seventy per cent of food industry jobs are not publicly advertised, but filled through a network of contacts, so get out there and try things. Join the Food Industry Association, get a holiday job, try work experience or volunteering. The people you meet are your future mentors, coaches and employers.

What role has Home Economics played in your career?

Home Economics taught me to understand that when you prepare food, things don't happen randomly, but for a reason. I also learnt what happens to that food once you swallow it and what that means for our health. Our body's fuel is so important to our lives. You definitely are what you eat. I like to make it count and make it fun.

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CHAPTER 6

Working wonders in the kitchen

ACCESS PRIOR KNOWLEDGE

1. Explain how flour thickens a liquid.
2. List the functions or roles that sugar plays in food preparation.
3. Summarise the function of fats and oils when preparing cakes and pastries.
4. State five functions of eggs in food preparation.
5. List three natural raising agents.
6. Discuss how chemical raising agents work in food preparation.

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6.1 Transforming food

Do you understand the way food behaves when you mix, heat, cook, freeze or process it in other ways? Knowing these things will help you choose your ingredients and make the best use of them. It also enables you to change ingredients in a recipe and still have success.

The exciting aspect of food preparation is the variety of changes that occur to food when it is prepared and cooked. Cooking hardens some foods, softens some foods, melts some foods and sets other foods.

functional properties What an ingredient of a food actually does when it is prepared and/or cooked – for example, an egg will set when it is heated, so this makes it useful to thicken sauces.

Food is made of many different ingredients or components, including different nutrients. Knowing what food is made of gives you some understanding of the secrets related to these changes. These secrets are the **functional properties** of food – the way in which food impacts on a recipe when it is prepared and cooked.

6.1 LET'S COLLABORATE

Foods sometimes change colour when they are cooked, cooled, frozen or even placed in sunlight. Name two foods that change colour significantly when cooked. Compare your answer with those of others in the class. Figures 6.1 and 6.2 will help you to develop your list.

Figure 6.1 Raw prawns

6.2 ACTIVITY

Changing foods

1 For each of the food changes that are listed below, match three foods that can be involved in the change. The first one is completed for you.

- **a** Melt: butter, chocolate, ice-cream
- **b** Freeze:
- **c** Beat:
- **d** Soften:
- **e** Go brown:
- **f** Go white:
- **g** Shrink:
- **h** Harden:
- **i** Set:
- **j** Dehydrate:
- **k** Lose flavour:
- **l** Gain flavour:
- **m** Absorb water:

2 Share your responses with a partner. See whether you can increase your list of foods to five.

Figure 6.2 Cooked prawns

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6.3 LET'S COLLABORATE

For the meal described below, suggest changes that occur to each ingredient during the preparation and cooking process.

Chicken curry served with a sauce made with diced chicken, tomatoes, coconut cream, chilli, bay leaves, garlic, onion, black peppercorns, served on a bed of jasmine rice. (Note that cooking may also alter the nutrient content.)

a jasmine rice:

b diced chicken:

c tomatoes:

d onion:

e garlic:

f red chillies:

g black peppercorns:

h coconut cream:

6.4 INVESTIGATE IT

Use the internet or a nutrient table to analyse the changes in nutritional content of each of the ingredients in the chicken curry and rice meal above.

How and why do preparation and cooking change food?

Any one food item is a complicated mixture of chemicals. These may or may not change during cooking, and they react differently from each other.

With any food you prepare, ingredients contribute properties that become an important part of the final product; these are referred to as functional properties. The function or role of each ingredient determines the end result of all cooking. Some ingredients, such as cornflour in a stir-fry sauce, have a specific functional property and are important for the best final result. The cornflour produces a thick, clear sauce, and can only be changed for an ingredient that gives the same result. But others, such as capsicum, do not have a specific function in the cooking process; instead, they add colour and nutritional value, and can be replaced with a similar food item, which provides a different colour or even a different shape.

Figure 6.3 A tomato has 500 chemicals related to flavour.

While the ingredients have clear functions in cakes and pastries, their function may be less clear in a complete meal. Knowing and understanding these functions makes it easier to successfully change ingredients or create recipes.

Foods have a particular role to play in every recipe. Changing an ingredient can sometimes drastically alter the outcome of a food item because of the function of particular ingredients in food preparation.

Nutrients are not only important when considering the health of foods. Nutrients are chemicals that have a key role in food preparation, and like all chemicals they react in different ways to different situations. This therefore influences the outcomes in food preparation.

The chemicals with significant functional properties in more complex food preparation are:

- carbohydrates, in particular sugars and starch from flour
- proteins, in particular eggs
- **lipids**, in particular **butter** and oils.

lipids Substances that are insoluble in water, such as fat and oil.

butter A dairy product that is produced from churning milk or cream until the fat solidifies and forms a spread.

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6.2 Starch

In Chapter 4, you tested the best equipment for popcorn making. The change in one corn kernel is an extreme example of what happens when heat is applied to any starch grain. The starch in the grain swells when heated – and, in the case of popcorn, the grain bursts. This reaction enables starches to be used as a thickening ingredient and as the structure in cakes and biscuits. Starches used in food preparation are any flour from grains, such as wheat, rice and corn, along with potato flour and arrowroot (made from a tropical root). The changes in starch vary with dry heat or moist heat.

Figure 6.4 Each of these ingredients has a function. Do you know what it is?

Figure 6.5 The ingredients in Figure 6.4 could be used to make orange shortbread.

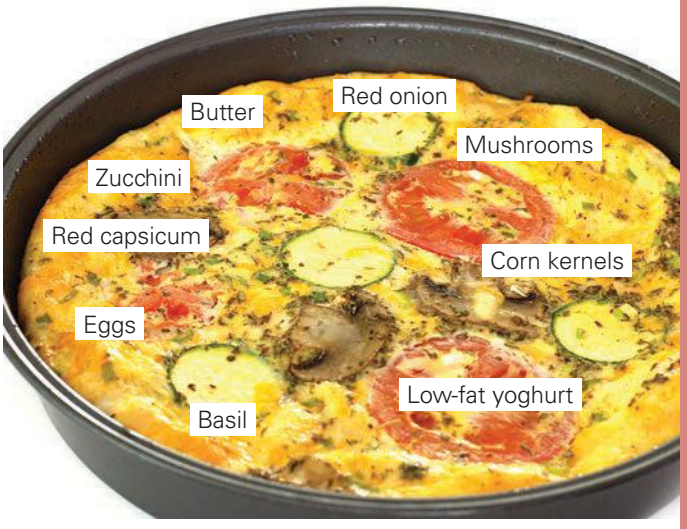

Figure 6.6 These are the ingredients in a vegetable frittata. Each of these ingredients has a function. Do you know what it is?

6.5 INVESTIGATE IT

Use the internet to find the method for making shortbread. Use the ingredients list in Figure 6.4 to create your own Orange Shortbread Biscuits.

6.6 INVESTIGATE IT

Use your creative food talent. Develop the recipe for Vegetable Frittata from the ingredients in Figure 6.6, prepare a food order and develop a method so that you can prepare a Vegetable Frittata.

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Functional properties of starch

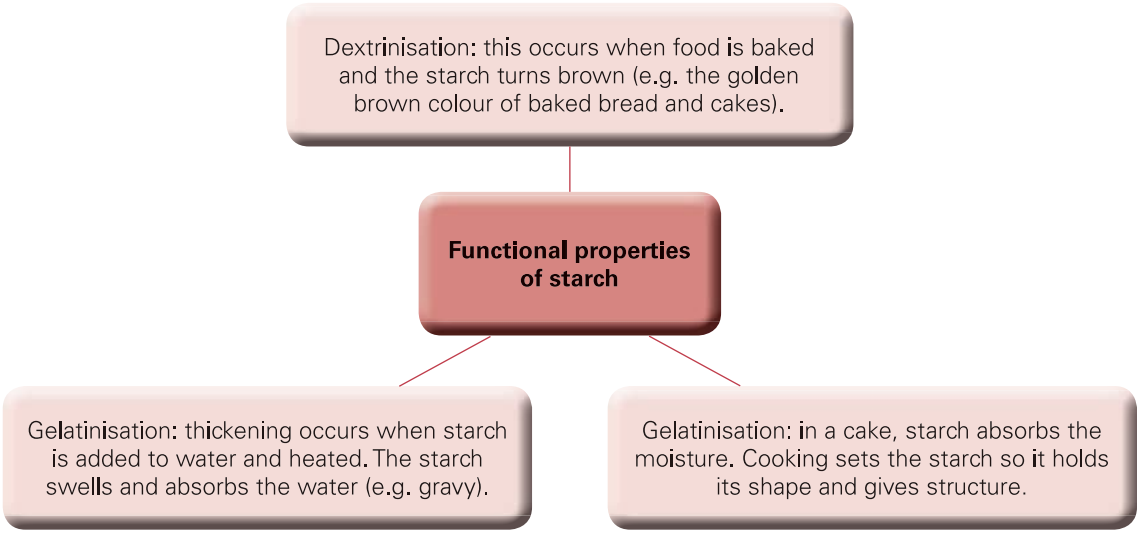

Figure 6.7 Functional properties of starch

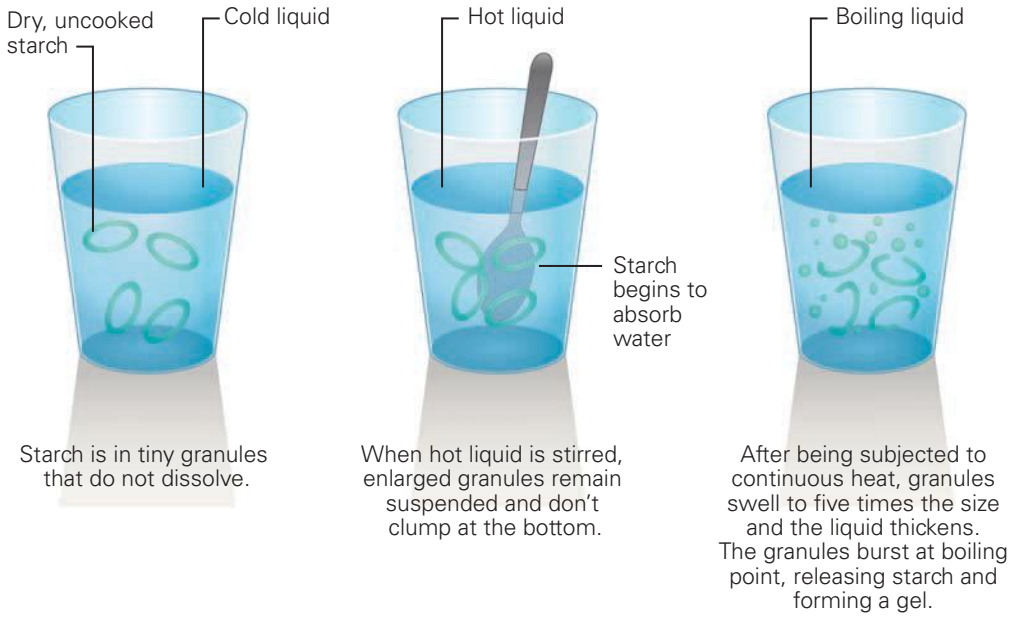

Figure 6.8 How does gelatinisation or thickening occur?

6.7 ACTIVITY

Food science

Collect five clear glasses or bowls, five small saucepans, two teaspoons each of cornflour, plain wheat flour and arrowroot, and one teaspoon of lemon juice, and complete the following instructions:

1. Label each glass from 1–5.
2. In glass 1, blend 2 teaspoons of cornflour with 4 tablespoons of water.
3. In glass 2, blend 2 teaspoons of wheat flour with 4 tablespoons of water.
4. In glass 3, blend 2 teaspoons of arrowroot with 4 tablespoons of water.
5. In glass 4, add 1 teaspoon of lemon juice and 3 tablespoons of water.
6. In glass 5, repeat the instructions for glass 1.

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6.7 ACTIVITY – continued

7 Observe the results of the three different flours. Which dissolves more easily? How clear is the liquid?

8 **Test 1:** Cook the contents of glasses 1–3. Pour the liquid mixture in each glass into a small saucepan or microwave dish and heat gently, stirring occasionally. This can be done one glass at a time. Try to use the same heat for each and observe the time when changes start to occur. Observe the result, including colour and transparency. Keep the contents from glass 1 for further observations.

9 **Test 2:** Heat the content of glass 4 using the same method and for the same time as glass 1. Compare the results. Has the addition of the lemon juice made any difference to the outcome?

10 **Test 3:** Heat the contents of glass 5, but do not stir the mixture until it has thickened, then stir.

11 Record all your results in a table.

DESIGN BRIEF: DIFFERENT FLOURS FOR DIFFERENT SAUCES

You have been asked to test a starch for thickening an Asian-inspired beef stir-fry with oyster sauce. The sauce should be clear and shiny, not cloudy. The starch used should dissolve easily and leave no distinct starchy flavour.

What is the best flour to thicken a sauce for a beef stir-fry? Even though all flours are made up of starch, different starches react differently and other ingredients will impact on the results. Different proportions of water to starch will also impact on the properties of a sauce.

Work as a group to develop the method and preparation/cooking/presentation times for this recipe, creating your own steps in the 'Method' section, and then test the suitability of different flours to thicken a sauce. Write four criteria for success that you will use to assess the effectiveness of the group.

Write four criteria for success that will be used to evaluate the sauce for the Beef Stir-Fry with Oyster Sauce recipe on p. 206.

Investigating

1 From the test that you conducted in Activity 6.7, what will be the best starch to use to thicken the sauce? Justify your response by using your observations from Activity 6.7.

2 Explain why it is necessary to blend the starch with water before you start.

3 Explain the impact of adding an acid, such as tomatoes or lemon juice, to a starch before gelatinisation has occurred.

4 Discuss when and how an acid should be added to a starch-thickened sauce.

5 Copy and complete the information at the beginning of the recipe to list the main tools and equipment required, and the production skills and cooking processes that will be used when producing this recipe.

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Beef stir-fry with oyster sauce

THAILAND

RECIPE

Main tools and equipment

Knife, chopping board _____

Production skills

_____

Cooking processes

_____

SERVES 2

Preparation time: _____

Cooking time: _____

Serving and presentation time: _____

Total time: _____

Ingredients

 1 teaspoon vegetable oil	 150 g beef strips	 ½ small brown onion, thinly sliced	 1 clove garlic, crushed	 1 teaspoon grated fresh ginger	 ¼ teaspoon dried red chilli
 ¼ carrot, cut into julienne	 6 snow peas	 100 g bamboo shoots, drained	½ teaspoon curry powder		
 1 teaspoon cornflour	 ¼ cup chicken stock	 1 tablespoon oyster sauce			

Method

1 _____

_____

2 _____

_____

3 _____

_____

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4 _____

_____

5 _____

_____

6 _____

_____

7 _____

_____

8 _____

_____

Evaluating

1 Use the criteria for success that you developed in your brief to assess the outcome of the end product.

2 Assess the effectiveness of your group in working collaboratively. Prepare a 250-word evaluation report that critically analyses how you all worked together as a team. In your report, discuss any areas where improvement could be made and explain why this would make a difference to the final outcome.

3 In your investigation, you discovered that wheat flour did not dissolve very well in water. However, equal proportions of wheat flour and butter can be combined to make a roux. This is the basis for a famous French white sauce called béchamel sauce – a brown version of this is gravy.

Tasty Trivia

Remember making papier-mâché masks in primary school? Flour and water, cooked to a thick creamy consistency, are used as glue. Piñatas and faces made from balloons are covered in layers of newspaper, attached by a cooked flour-and-water glue mixture. Salt is added to prevent the glue from going mouldy.

6.3 Sugar

From birth, sugar is part of your diet in the form of lactose in the milk you drink. Perhaps this is why most of us have a liking for sweet foods. As you get older, you're introduced to many other naturally occurring sugars, such as maltose in grain foods and fructose in fruit. The sugar used in food preparation is most often sugar from cane, or sucrose. Sucrose is available in different forms that increase its functionality in food preparation.

Cane sugar or sucrose, in forms such as caster sugar, brown sugar or A1 sugar, easily dissolves in liquid and melts when heated, so it can add a sweet taste without being visible. These two characteristics, along with its availability and other properties, have made it an essential ingredient in food preparation.

Figure 6.9 Different sugars have different uses. How many of these sugars do you recognise?

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Impact of heat on sugar

caramelisation The heating of sugar or foods containing sugar until a brown colour and characteristic flavour develop.

If sugar is present in food, it adds colour to the food when cooked because it melts and goes brown when heated. This is called **caramelisation**. The process also enhances the aroma of food.

Tasty Trivia

Sugar is found in unlikely places, such as tonic water, marinades, crackers, bread, fat-free dressing and tomato sauce. One tablespoon of tomato sauce contains one teaspoon of sugar. Just one can of soft drink contains 65 g of sugar.

Functional properties of sugar

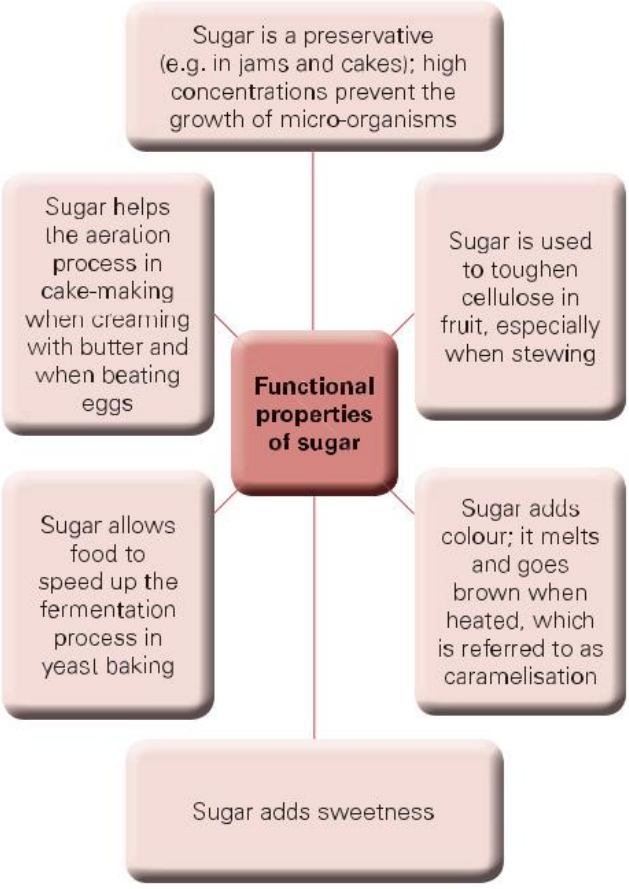

Figure 6.10 Functional properties of sugar

Caramelisation also occurs when dry heat is applied to fruit and vegetables that have a high sugar content. This browning process is evident with baked potatoes, sliced apples gently **sautéed** in butter and fried onions.

sauté To fry gently for a short time in a minimal amount of oil.

Onions are one of the vegetables with a very high natural sugar content. Slowly cooked onions are very sweet compared with raw onions. The sensory properties of the aroma of an onion are also significantly changed with caramelisation. The aroma of onions on a barbecue can be detected from some distance. Try a pizza with caramelised onions.

Figure 6.11 A tarte tatin is a classic French dessert that relies on caramelised apples for flavour and colour.

Figure 6.12 Does the smell of fried onion get your tastebuds working?

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6.8 ACTIVITY

Caramelise some sugar

Warning: When sugar is heated and caramelises, it becomes extremely hot and potentially dangerous. Be very careful when you carry out this activity!

1. In the food-preparation area, select four different sugars, like those shown in Figure 6.9.
2. Compare the textures and colours of the sugars.
3. Discuss possible uses for the sugars and possible tasks for which each one would best be suited.
4. Bake some of each of the sugars by following this method and record the changes:
   - Place a teaspoon of each of the sugars onto non-stick baking paper.
   - Spread the sugar a millimetre thick and place the tray in an oven that has been preheated to 200°C for 5 minutes. Check and record the changes that have occurred in 5 minutes.
   - Return to the oven for another 5 minutes. Check and record the changes. Describe the impact of heat on the sugars.
   - Allow to cool. Do not touch while it is hot, as it can cause a serious burn. The end product is like hard toffee.
   - Crushed nuts can be mixed with the sugar; when it has cooked, it can be crushed and sprinkled over ice-cream or a custard-based dessert. This toffee and nut mixture is known as praline.

6.9 INVESTIGATE IT

Onions have one of the highest sugar contents of all vegetables, although they are nowhere near as sweet as fruit. Use the internet to help you find three other vegetables of relatively high sugar content and compare them with fruit.

6.10 INVESTIGATE IT

Check out the website for *That Sugar Film*. What other tasty trivia can you find out about sugar.

Tasty Trivia

Some Aboriginal and Torres Strait Islander peoples prize honey ants as a natural sweetener. The ants live in underground nests under mulga trees and have huge abdomens full of honey. To eat a honey ant, you pick it up by the head, put the abdomen in your mouth and bite it off.

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6.11 INVESTIGATE IT

Using the internet, research the Australian honey ant (also known as the honeypot ant) and complete the tasks below.

1. Identify where Aboriginal and Torres Strait Islander communities can gather them today.
2. Explain how the hunting and gathering of such bush foods has changed over time.
3. Describe how the impact of changing environmental conditions has altered the availability of bush tucker.

6.12 ACTIVITY

Investigate

In Activity 6.8, which sugar melted the fastest? Discuss possible reasons why the Sticky Date Pudding recipe on p. 211 uses brown sugar and not white sugar. Some people think brown sugar is better for them because it has not been purified. What's your opinion? Try to find some nutrient data to support your point of view.

DESIGN THINKING

Different sugars have different consistencies and even vary in taste. Select one type of sugar and design a recipe that specifically requires your chosen sugar. When investigating and creating your recipe, explain exactly why this sugar must be used.

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Sticky date pudding with caramel sauce

UNITED KINGDOM

Main tools and equipment

Knife, whisk, bowl, wooden spoon, muffin tins, saucepan

Production skills

Whisking, melting, stirring

Cooking processes

Dry method of cooking – baking, simmering

SERVES 2

Preparation time: 7 minutes

Cooking time: 37 minutes

Serving and presentation time: 17 minutes

Total time: 61 minutes

Ingredients

Sticky date pudding

 1 teaspoon melted butter, to grease muffin pans	 ⅓ cup pitted dates, chopped	 2 teaspoons finely grated fresh ginger	 2 tablespoons water	 ¼ teaspoon bicarbonate of soda	 ⅔ cup self-raising flour
 ¼ teaspoon mixed spice	 ¼ cup lightly packed brown sugar	 1 egg, lightly whisked	 1 tablespoon milk	 30 g butter, melted	 ½ teaspoon vanilla essence

Caramel sauce

 ⅓ cup, firmly packed brown sugar	 ⅓ cup thickened cream
 25 g butter	 2 teaspoons golden syrup

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Sticky date pudding with caramel sauce – continued

RECIPE

Method

1. Preheat oven to 180°C. Brush two 185 ml (¾ cup) capacity muffin pans with melted butter to grease lightly.
2. Combine dates, ginger and water in a small saucepan over a high heat. Bring to the boil. Cook for 1 minute or until dates soften slightly. Remove from heat.
3. Stir in the bicarbonate of soda and set aside for 5 minutes to soak.
4. Sift the flour and mixed spice into a large bowl. Add the sugar and stir to combine.
5. Make a well in the centre of the flour mixture. Add the date mixture, egg, butter, milk and vanilla essence and stir well until combined.
6. Spoon mixture into the prepared pans. Bake in preheated oven for 20–25 minutes or until a skewer inserted into the centre comes out clean. Remove from oven. Set aside for 5 minutes to cool slightly.
7. For the caramel sauce, combine all ingredients in a medium saucepan over low heat. Cook, stirring, for 2 minutes or until sugar dissolves.
8. Increase heat to medium and simmer for 2–3 minutes or until sauce thickens slightly.
9. To serve, divide the puddings among serving plates. Drizzle with caramel sauce and serve immediately.

Sugar's role in aeration

When making a cake using the **creaming** or **beating** methods, sugar combines with other ingredients to aid aeration. In the creaming method, sugar and butter or margarine are beaten together and air is trapped. In the beating method, eggs and sugar are beaten together. The sugar helps to stabilise the beaten egg and trap the air.

creaming The process of preparing the butter and sugar to create a soft and creamy texture; this ensures even distribution of the butter through the cake mixture.

beating The process of combining ingredients to trap air and create lightness.

The great Australian pavlova is one example of a food in which sugar is beaten with egg white. In fact, the dessert consists mainly of sugar and egg white.

6.13 ACTIVITY

YouTube recipes: Check them out – do they work?

Search the internet to see whether you can find an internet chef who has a video of how to make a Pavlova Roll.

1. Watch the video chef.
2. Find a Pavlova Roll recipe in a recipe book. Make sure it includes a picture of the final product.
3. Compare the YouTube recipe and print recipe. How are they different? How are they the same?
4. Decide which is the better recipe and prepare a food order.
5. Prepare the Pavlova Roll and complete a sensory analysis.
6. Make a valid judgement about whether your final pavlova roll is better than the YouTube or print version.

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Impact of sugar on cellulose when cooking

Other than adding a sweet flavour to food, sugar has other qualities that make it a useful ingredient in food preparation.

When fruit is boiled or stewed without sugar, the fruit will break down and become a **purée**. But if sugar is added at the beginning of the cooking process, the fruit will hold its shape. This is called a **compote**.

purée To blend, process, sieve, mash and/or strain cooked food to the consistency of a soft paste or thick liquid.

compote Fruit stewed or cooked in a syrup, usually served as a dessert.

Figure 6.13 When sugar is added at the end of the cooking process, fruit collapses.

Figure 6.14 A French-style macaroon relies on the functional properties of sugar and egg white for its shape, colour and taste.

Figure 6.15 When sugar is added at the beginning of the cooking process, fruit holds its shape.

Figure 6.16 Ingredients for a fruit cake. Can you find all the sources of sugar in a fruit cake?

6.14 ACTIVITY

Secret sugar

1. Have you ever studied the labels of processed foods? How much hidden sugar do you consume in processed food? What other names are used for sugar?
2. Study the ingredients for a fruit cake. Write down all the ingredients that add sugar to this cake.
3. State the other names suggesting sugar as an ingredient.
4. Describe three functional properties of sugar in this cake.
5. The nutrition information section for this product lists 24.2 g of sugar for a 50 g serve of cake. Calculate how many teaspoons of sugar this is.

REFLECT ON LEARNING

1. Explain how starch in flour thickens a liquid.
2. Name the thickening process.
3. Describe another function of starch in food preparation.
4. Explain what happens when sugar is heated.
5. Discuss the way in which sugar helps in the preservation of food such as jams.

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6.4 Lipids: Fats and oils

Compare eating a slice of toast with butter to eating a slice of toast without butter. The presence of butter completely changes the taste and flavour of the toast and its textures in the mouth. Fat in butter improves the mouthfeel.

Fats and oils have the same basic chemical structure: a mixture of fatty acids and glycerol. The different properties of the various fats and oils – for example, whether they are liquid or solid, their flavour, their smoking point – will depend on the types of fatty acids they contain.

Solid fats, such as butter, are referred to as saturated fatty acids, as they cannot take any more hydrogen atoms. Oils are either polyunsaturated or monounsaturated, and remain liquid. As a group, they are referred to as lipids.

Figure 6.18 Solid fats are usually animal products, except for margarine, which is hydrogenated. Liquid oils are usually plant products.

Functional properties of lipids

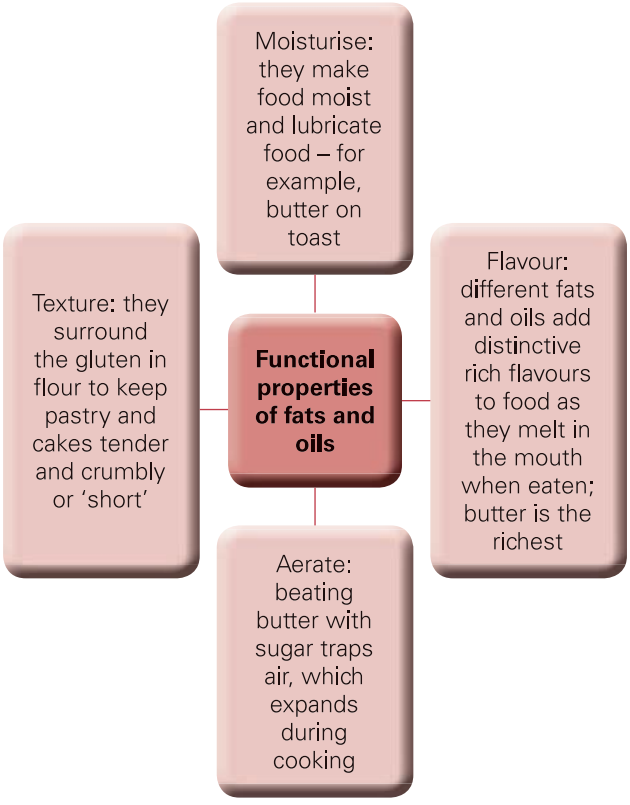

Figure 6.17 Functional properties of fats and oils

The flavours of fats and oils vary significantly, but butter and olive oil are considered to be two of the tastier lipids. There are still considerable flavour variations in these lipids, depending on the source of the original main ingredients (milk or olives). The sources of animal fats used in food preparation are:

- butter, which is most likely made from cow's milk
- lard, which is pig's fat
- suet, which is the fat around animal kidneys
- dripping, which is the fat left in the pan after roasting.

The most frequently used oils are olive, sunflower, canola and vegetable oil. Common Asian cooking oils include sesame, rice bran and peanut oils.

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6.15 ACTIVITY

Margarine vs butter: which is better for you?

Margarine was invented in 1869 by a French chemist as a cheap substitute for butter, at a time where there was a butter shortage in Europe. It is naturally white in colour, and some countries passed laws that it had to stay white, or be dyed bright pink, to make sure it was not illegally substituted for butter.

Eventually these laws were withdrawn (margarine the colour of butter was illegal in Australia until the 1960s), and manufacturers have worked hard to imitate the taste, texture and colour of butter. Worries about cholesterol spread in the late 1950s, and margarine gained a reputation as a superior spread to butter.

However, more recent discoveries in nutrition have questioned the health qualities of margarine as an alternative to butter. Margarine is made from **hydrogenated oils**. The hydrogenation process changes liquid oils into solid fats, which produces **trans-fatty acids**. Recent research has shown that trans-fatty acids may raise a person's level of bad cholesterol and lower their level of good cholesterol.

1. The overall consumption of fats has decreased considerably since 1979. Explain why this trend has occurred.
2. Butter consumption dropped rapidly in the 1960s. Account for this change in consumption.
3. The consumption of butter is overtaking that of margarine. Suggest the reasons why you think this may be the case.
4. Investigate salt-reduced spreads. Explain how these are used to produce pastries and desserts.

hydrogenated oils
Oils hardened by the addition of hydrogen gas, which makes the fats more saturated.

trans-fatty acids
Unsaturated fatty acids that can impact on health by adversely affecting cholesterol levels. They are formed during processing of vegetable oils when making semi-solid fats such as margarine. They can also occur at low levels naturally in the fats of dairy products and meat.

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Tasty Trivia

Lipids were key ingredients in an early Australian folklore remedy for preserving the soles of boots. This used equal parts of beeswax, olive oil and mutton suet melted together. People rubbed it onto the soles of their boots, believing the sole would last well beyond the upper part of the shoe.

6.16 ACTIVITY

The impact of fat content on the flavour and texture of cheese

Conduct a **blind tasting** of cheese with full-fat, medium or 50 per cent fat, and low or 25 per cent fat tasty cheese. The cheese should be the same brand. Select a cheese that has a distinctly different fat content.

When undertaking the tasting, remember that cheese leaves a fatty coating on the tongue that prevents the taste buds from picking up new flavours. Between each tasting, rinse your mouth with water and eat celery or apple to cleanse the palate. Select the same food to eat between tastings. The tasting involves the following tasks:

1. Discuss words that could be used to describe cheese flavours and textures.
2. Identify the different fat content of the cheeses.
3. Complete a **preference** ranking of the cheeses.
4. Complete a descriptive analysis of the three cheeses.
5. Undertake a **profile** ranking of four different attributes of the cheeses.
6. Draw a table as shown in Figure 6.19. Record your personal responses. Try to think creatively when selecting words to describe the flavour or experience.
7. Create a key for each cheese:
   - Sample A
   - Sample B
   - Sample C.
8. When using a star profile, place a key symbol for each cheese at the point that you believe matches each attribute. For example, if you think sample A is very salty, place the symbol for sample A on the last mark on the 'salty' line. Closest to the centre indicates the least of each attribute. If you think sample A is not very salty, place the symbol closer to the centre.
9. Compare your results.

blind tasting Tasting a food that is unlabelled or unmarked. The taster is not blindfolded; rather, the food is not identifiable by a label.

preference Comparing food items by placing or ranking them in order from the best or most preferred to worst or least preferred.

profile Comparing two food items by ranking several features of a food item on a scale, such as saltiness, oiliness, sweet flavour or creaminess.

Code (try to identify each cheese)	Ranking+	Descriptive analysis++ of the dominant flavour notes or experiences
A		
B		
C		

+ Ranking of personal preference – 1 for first preference (most liked), 2 for second and 3 for third.
++Use words to describe each cheese.

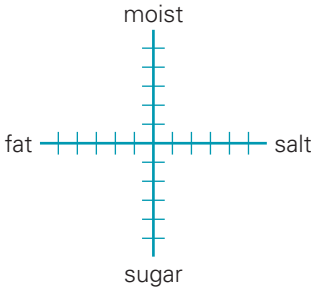

Figure 6.19 Sensory evaluation of cheese: Ranking and descriptive analysis

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6.17 ACTIVITY

Test it

1 Compare and contrast the making of pastry using:
   - **a** high-fat and low-fat spreads
   - **b** salt-reduced spreads and spreads containing salt.

2 Compare the different outcomes and use the information you have gained about the nutrient content to explain the differences.

REFLECT ON LEARNING

1 Compare and contrast the function of fats and oils, and give an example of each.
2 Summarise the three functional properties of fats and oils. Give an example where each is used.
3 Explain what 'short' means in pastry-making. Suggest how butter helps to make pastry short.
4 Discuss the reasons why margarine is now questioned as a suitable substitute for butter.
5 Suggest an ingredient that replaces fat in a low-fat spread.

6.5 Eggs

Sponge cakes and soufflés are said to be the test of true cooks. There aren't that many ingredients, but many things can go wrong. It is not only the ingredients that are important, but also the processes and the equipment used – this is referred to as a **complex process**. A plain sponge cake, like a soufflé, has only about six ingredients and no added butter or oil. There is very little flour, yet with it you can make a very light cake that rises quite high. The functional properties of eggs play a significant role in these two products.

complex process A term used in Food and Technology to describe a process that requires decision-making in the choice of processes and equipment to achieve a good outcome.

Function of eggs

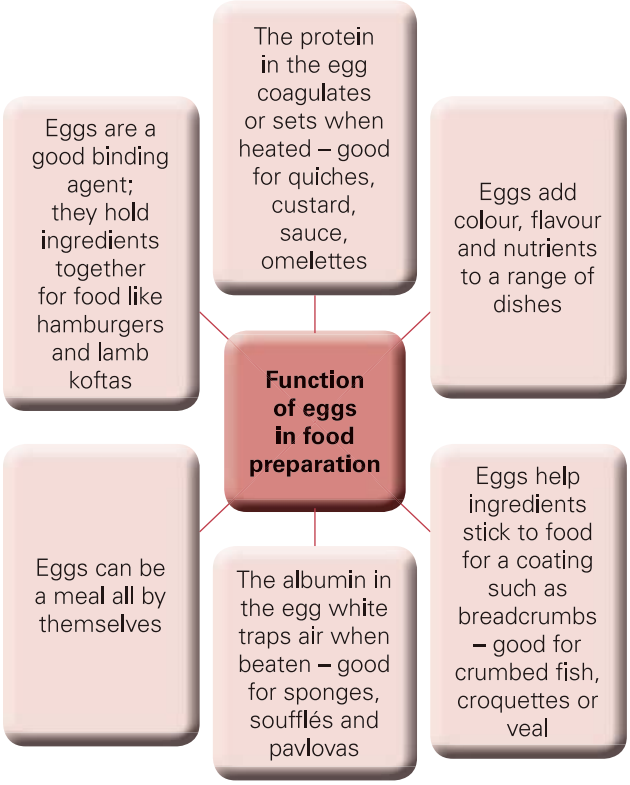

Figure 6.20 Function of eggs in food preparation

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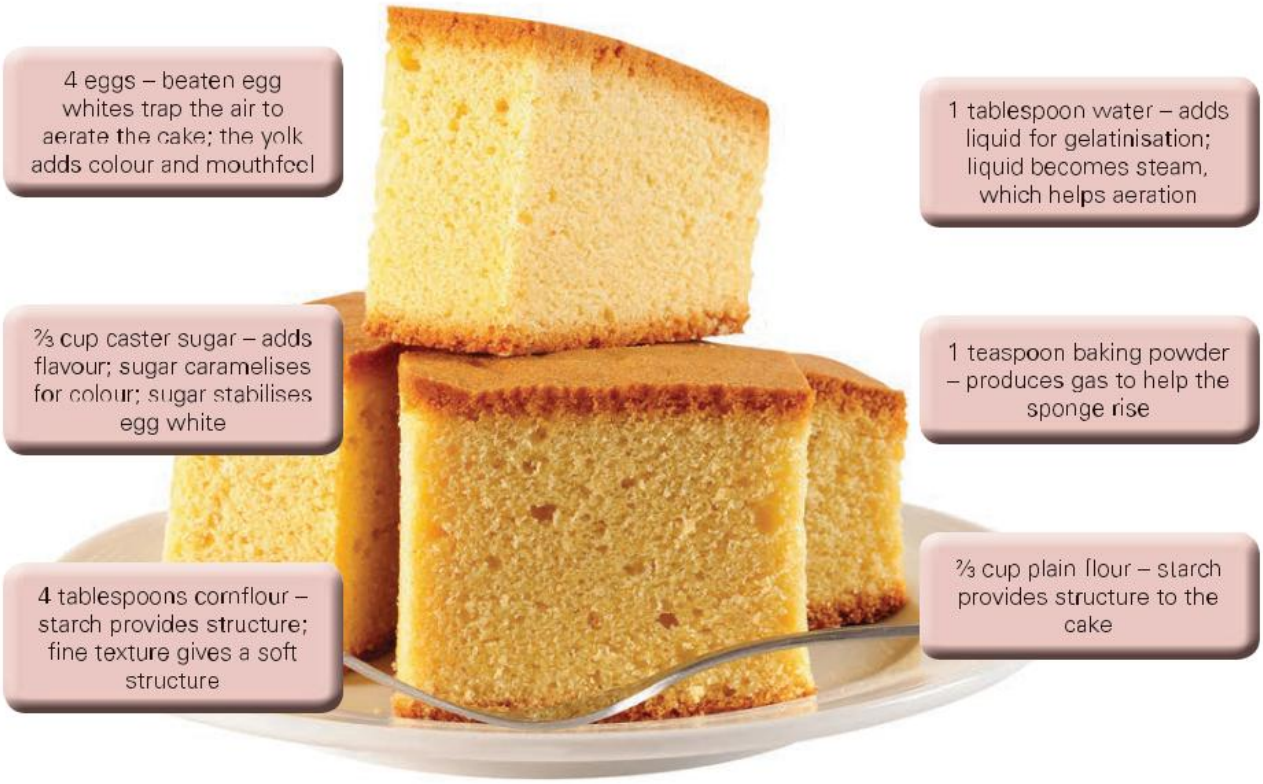

Figure 6.21 The six ingredients of the sponge cake: each plays a vital role.

DESIGN BRIEF: SOUFFLÉ

You have been asked to demonstrate your skills in following a complex process and using equipment correctly by making a soufflé. The product should also demonstrate the functional properties of a range of ingredients. You are required to reflect upon your processes at the end of the task when the outcome is evident.

At the completion of the process, evaluate your results. Select three criteria for success.

A good soufflé is dependent on air being trapped and held at all stages of the process. Study the recipe for a soufflé and note all of the steps where air can be gained and/or lost. Include the process and use of equipment. Try to get at least six points.

A Passionfruit Soufflé combines the functional properties of flour and butter in a roux and uses egg white for aeration. You need to manage equipment and processes to produce a quality product.

Figure 6.22 The height of this flourless chocolate cake relies solely on the air incorporated from about 12 egg whites.

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Passionfruit soufflé

FRANCE

Main tools and equipment

Ramekins, peeler, baking tray, whisk, spatula

Production skills

Melting, adding, pouring, whisking, folding

Cooking processes

Dry method – baking; wet method – boiling

SERVES 2

Preparation time: 20 minutes

Cooking time: 30 minutes

Serving and presentation time: 5 minutes

Total time: 55 minutes

Ingredients

 Butter for greasing the ramekins	 1 tablespoon caster sugar for the ramekins	 2 tablespoons passionfruit pulp	 165 ml milk	 1 piece of lemon rind, removed with a peeler	 30 g caster sugar
 25 g soft butter	 25 g plain flour	 10 g caster sugar extra	 1 egg, separated	 Pinch salt	 Pure icing sugar for dusting

Method

1. Rub the edges of two 1-cup ramekin dishes with butter and sprinkle with caster sugar.
2. Preheat oven to 180°C. Place a baking tray in the oven to heat up.
3. Heat the milk, lemon rind and sugar in a small saucepan and bring to the boil over a medium heat.
4. Gently melt the butter in another small saucepan over a medium heat. Add the flour and stir until a roux forms. (It should be white and bubbling.) Remove the saucepan from the heat.
5. Pour the hot milk mixture into the roux and whisk to combine.

ISBN 978-1-316-64937-4

Passionfruit soufflé – continued

RECIPE

6 Return the saucepan to the heat and stir the mixture over a medium heat until it is thick and just bubbling. Remove from heat and stand for 5 minutes. Add the passionfruit pulp and egg yolk, and whisk to combine. Leave to cool.

7 Whisk the egg whites and a pinch of salt until soft peaks form. Sprinkle the extra caster sugar over and continue whisking until firm peaks hold.

8 Fold the egg whites into the mixture until just combined. This must be done as lightly and efficiently as possible.

9 Divide the mixture equally into the ramekin dishes. Place the ramekins onto the hot oven trays. Bake for 15–20 minutes or until risen and golden. A good soufflé should retain a slightly creamy liquidity at the centre.

10 Dust with icing sugar. Serve immediately.

Evaluating

1 Explain why you think the oven tray is heated before the soufflés go into the oven.

2 Identify three processes that are important in creating and retaining the air in the mixture.

3 Discuss the advantages and disadvantages of three alternatives for beating the egg whites.

4 Explain what will happen if the mixture is not stirred at step 5.

DESIGN BRIEF: PRODUCT DEVELOPMENT

Creating a new food product requires an understanding of ingredients and the properties of different ingredients. You are at a holiday house and would like to make Chocolate Soufflé, but you have only the Passionfruit Soufflé recipe with you. How can you change the Passionfruit Soufflé recipe to make a chocolate variation?

1 List the ingredients that you would leave out. Justify your decision.

2 List the ingredients you would add and when you would add them. Explain the reason for your choice and decision-making process.

3 Describe the qualities that chocolate will add to the recipe.

4 Discuss whether there are any other changes you may need to make to the process.

5 Suggest how you could make a cheese variation and a berry variation. Discuss the ingredients you would leave out and identify and explain the reasons for the ingredients you may need to add.

Figure 6.23 The perfect soufflé has height and is very light.

REFLECT ON LEARNING

1 Explain why eggs are good for thickening.

2 Describe the role of egg whites in sponges and soufflés.

3 When you are using egg white to aerate, describe three steps that are important to keep the air in the beaten egg white.

4 Explain why you add egg when you make hamburgers.

5 Describe the function of an egg in a small cake.

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6.6 Raising agents

raising agent A substance that makes a food item such as cake or bread rise. The raising agent may be chemical or natural. The air may be trapped before baking, such as in a sponge cake or steam, or air is produced during baking. Also known as a leavening agent.

When you bake a cake, muffin, bread or soufflé, notice how the mixture goes into the oven as a small quantity but is about double in size when it comes out. In all of these food items, a **raising agent** has been used.

Functions of raising agents

Raising agents have the following functions:

- They make food lighter and easier to digest – for example, a soufflé.
- They make dough and cake mixtures rise – for example, cakes and muffins.
- Raising agents such as eggs and yeast also increase food value – for example, bread and sponge cake.

Types of raising agents

Raising agents work by producing and trapping air, steam and/or carbon dioxide. In a hot oven, the air, steam or carbon dioxide expands, pushing up the surrounding mixture. The gas or air is trapped as the surrounding mixture cooks and sets, and the cake or bread holds its shape.

Natural raising agents

Natural raising agents are:

- **Biological:** Yeast is a single-celled plant that gives off carbon dioxide during growth; it needs food (sugar), moisture and warmth to grow (e.g. bread).
- **Steam:** Liquid converts to steam during cooking (e.g. choux pastry and batters).
- **Air:** This is incorporated by beating egg whites and processes such as sieving, beating, whisking, rubbing in and creaming.

Figure 6.24 The lightness of puff pastry is achieved by rolling and folding the pastry repetitively and trapping the air between the layers of pastry.

Chemical raising agents

Chemical raising agents are a mixture of acids and alkalis in a ratio of two parts alkali to one part acid. The acids and alkalis react in the presence of moisture to give off CO_2 gas. The CO_2 can be produced in a number of ways:

- **Self-raising flour:** Contains baking powder.
- **Bicarbonate of soda plus an ingredient with acid:** Some acid options are cream of tartar, sour cream or milk, golden syrup, citrus or fruit juice.
- **Baking powder:** A mixture of an acid and an alkali with rice flour to prevent the chemical from reacting.

6.18 LET'S COLLABORATE

When you are working with flour mixtures in production classes, air is introduced by a range of processes without the addition of a raising agent. For each of the following processes, write down an example of a food item that you've made by:

- sieving
- rubbing in
- whisking
- beating
- creaming.

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6.19 ACTIVITY

Investigating yeast

Like all chemical reactions, sometimes raising agents work and sometimes they don't. For all the chemical and natural raising agents, there are conditions that will give an optimal result. As yeast is a living organism, it needs food, moisture and warmth to grow and produce CO_2 gas. When these conditions are not present, the yeast is inactive.

For this investigation, you will need five test tubes, five beakers, five soft balloons, dried yeast and caster sugar.

Write up your conclusion about the best conditions for good yeast growth, and therefore the maximum production of CO_2 for a yeast product.

Test tube number	Testing conditions	Observations
1 ½ teaspoon dried yeast 1 tablespoon warm water ½ teaspoon sugar Shake to combine Put a balloon onto the tube	Place the test tube in a beaker half-full of warm water (body temperature)	Leave for 15 minutes, but check every 5 minutes
2 ½ teaspoon dried yeast 1 tablespoon warm water Shake to combine Put a balloon onto the tube	Place the test tube in a beaker half full of warm water (body temperature)	Leave for 15 minutes, but check every 5 minutes
3 ½ teaspoon dried yeast ½ teaspoon sugar Shake to combine Put a balloon onto the tube	Place the test tube in a beaker half-full of warm water (body temperature)	Leave for 15 minutes, but check every 5 minutes
4 ½ teaspoon dried yeast 1 tablespoon warm water ½ teaspoon sugar Shake to combine Put a balloon onto the tube	Place the test tube in a beaker half-full of iced water	After 15 minutes, place in a beaker half-full of warm water (body temperature)
5 ½ teaspoon dried yeast 1 tablespoon warm water ½ teaspoon sugar Shake to combine Put a balloon onto the tube	Place the test tube in a beaker half-full of very hot or boiling water	After 15 minutes, place in a beaker half-full of warm water (body temperature)

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DESIGN BRIEF: COMPARING PASTRY AND YEAST DOUGH

With the increasing concern about saturated fat intake, traditional pastry has become less popular as a casing for pies and tarts. A company that traditionally produced only pastry wants to expand its market into a yeast-based product.

One key ingredient in pastry is butter. The company wants to avoid using butter or margarine, but still maintain a satisfying product that can be used in place of pastry. The company accepts that fat (butter, oil or margarine) has a number of functions in pastry:

- It contributes to keeping qualities.
- It adds moisture and helps prevent drying out.
- It improves mouthfeel.
- It adds flavour.

1 Compare shortcrust pastry and a yeast dough for a calzone-type product. Work as a team to make each one and compare the outcome. A yeast dough and shortcrust pastry have very similar ingredients, and both products will have the same filling. The dough will have some olive oil added, although it will not have the same qualities as a pastry such as shortcrust or puff pastry.

2 Develop six criteria for success that will be necessary for the company to be able to make a good comparison between the pastry and a yeast-based dough.

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Basic dough

RECIPE

Main tools and equipment

Bowl, wooden spoon, heels of the hands (kneading), clean bench top

Production skills

Combining, kneading

Cooking methods

Dry method – baking

MAKES 2 CALZONE

Preparation time: 10 minutes

Cooking time: 30 minutes

Serving and presentation time: 2 minutes

Total time: Total time: 42 minutes

Ingredients

 100 ml warm water	 ½ teaspoon sugar	 1 teaspoon dried yeast (½ sachet)	 1 cup plain flour
 ½ teaspoon salt	 1 teaspoon olive oil	 1 teaspoon olive oil extra	

Method

1. Combine warm water, sugar and dried yeast. Stir and stand in a warm place until the mixture is frothy.
2. Combine dry ingredients (flour and salt) in a warm bowl.
3. Add the oil to the dry ingredients.
4. Combine the yeast mixture and the flour mixture using a wooden spoon until dough forms a ball.
5. Transfer dough to a lightly floured surface and knead for five minutes until smooth.
6. Place in a well-oiled bowl, turn to coat with oil, cover and stand in a warm place for about 30 minutes.
7. Prepare the filling.

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Shortcrust pastry

Main tools and equipment

Sifter, fingertips (rub in), heels of hands (knead)

Production skills

Sifting, kneading, rolling

Cooking processes

Dry method – baking

MAKES 2 CALZONE

Preparation time: 15 minutes

Total time: 15 minutes

Ingredients

 ⅔ cup plain flour	 ⅔ cup self-raising flour	 ½ teaspoon salt	 85 g butter margarine or dairy blend	 ¼ cup water	 ¼ teaspoon lemon juice

Method

1. Sift flours and salt together.
2. Add butter and rub into flour using the fingertips until the mixture looks like breadcrumbs.
3. Combine the water and lemon juice.
4. Gradually add the water to the flour mixture to create a soft dough, leaving the bowl clean.
5. Knead dough lightly on a lightly floured work surface. Do not over-knead.
6. Rest pastry. Roll pastry to size and shape required with a floured rolling pin.

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Meatlovers' calzone

ITALY

RECIPE

Main tools and equipment

Knife, board, whisk, frying pan, bowl, rolling pin

Production skills

Dicing, whisking, kneading

Cooking processes

Moist method – sautéing; dry method – baking

MAKES 2 CALZONE

Preparation time: 20 minutes

Cooking time: 25 minutes

Serving and presentation time: 5 minutes

Total time: 50 minutes

Ingredients

 1 tablespoon olive oil	 ½ red onion, diced	 3 slices salami	 ½ rasher bacon
 1 slice ham	 120g mozzarella cheese	 ¼ teaspoon dried mint	

Method

1. Preheat an oven to 200°C.
2. In a frying pan, heat the oil and gently cook the onion until soft.
3. To assemble the calzones, knead the dough and divide it into 2 portions.
4. Form into a circle and roll out with a rolling pin.
5. Place the meat lovers filling onto one half of each circle. Brush the edges of the circle with water. Fold over the dough and press the edges together firmly to seal. Make two small cuts in the top of the pie to let steam escape.
6. Place the calzone onto a lightly oiled oven tray. Glaze with water or milk.
7. Bake at 180°C to 200°C for 20–25 minutes or until crisp and golden brown.

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Evaluating

1 Make a detailed comparison between the dough and the pastry for the company, including the properties that were identified as important.

2 A company wishes to promote the yeast dough as an alternative to pastry. Complete the brief and include some considerations and constraints that may be necessary for the company to include in the brief.

3 Make suggestions for an alternative for each product.

4 Investigate various fillings that will work in these products. What restrictions would there be?

REFLECT ON LEARNING

1 Describe three processes that can incorporate air as a natural raising agent, and give an example of a food for which each process is used.

2 Explain how yeast works as a raising agent.

3 Describe three processes that will prevent yeast from working.

4 List and summarise the chemicals in a chemical raising agent and explain how they work.

5 State the four types of foods with naturally occurring acid.

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LOOKING BACK

1 Food is a complicated chemical mix, and these mixtures react in different ways to preparation, heat and moisture.

2 With any food you prepare, ingredients contribute functional properties that become an important part of the final product.

3 The chemicals with significant functional properties are carbohydrates (sugar and starch), proteins and lipids.

4 Starch is useful for thickening, setting and browning food.

5 Sugar has many functions in food preparation, such as adding sweetness, preserving food, toughening cellulose, adding colour, speeding up fermentation of yeast and aerating in cake-making.

6 Lipids add texture, flavour and moisture, and help to aerate food.

7 Protein, in particular in eggs, also has many functions. Eggs help food to set, aerate food as binding agents, add flavour and colour, and can be a meal in themselves.

8 Raising agents can be chemical, such as a combination of acids and alkalis, or natural, such as yeast and eggs, and can be incorporated by processes such as beating and creaming.

TEST YOUR KNOWLEDGE

Multiple choice

1 Caramelisation occurs when:
- **a** protein sets when it is heated
- **b** starch thickens when it is heated
- **c** sugar melts and goes brown
- **d** bread goes brown when dry heat is applied.

2 Aeration using egg white occurs best when:
- **a** there is a little bit of yolk mixed into the white
- **b** the egg white and equipment are clean before you start
- **c** the sugar is added before you start beating
- **d** you use a fork to beat the white.

True/false

1 When making a cake, you can easily change ingredients as it will not affect the outcome.

2 Gelatinisation occurs when sugar is melted and it goes brown.

3 Chemical raising agents are a mixture of acids and alkalis.

Short answer

1 Explain the changes that occur to sugar in the manufacture of toffee.

2 Describe the impact on flavour and colour of over-heating sugar.

3 Explain why over-cooked rice or pasta becomes sticky.

Extended response

1 In Figures 6.4 and 6.6, several food items were listed and questions were posed about the function of their ingredients. With the knowledge gained in this chapter, fill in the gaps and explain what you think are the functions of each ingredient in these foods.

2 From what you know about ingredients, write down where you think it is possible to include a variation and still achieve a successful outcome. Suggest variations.

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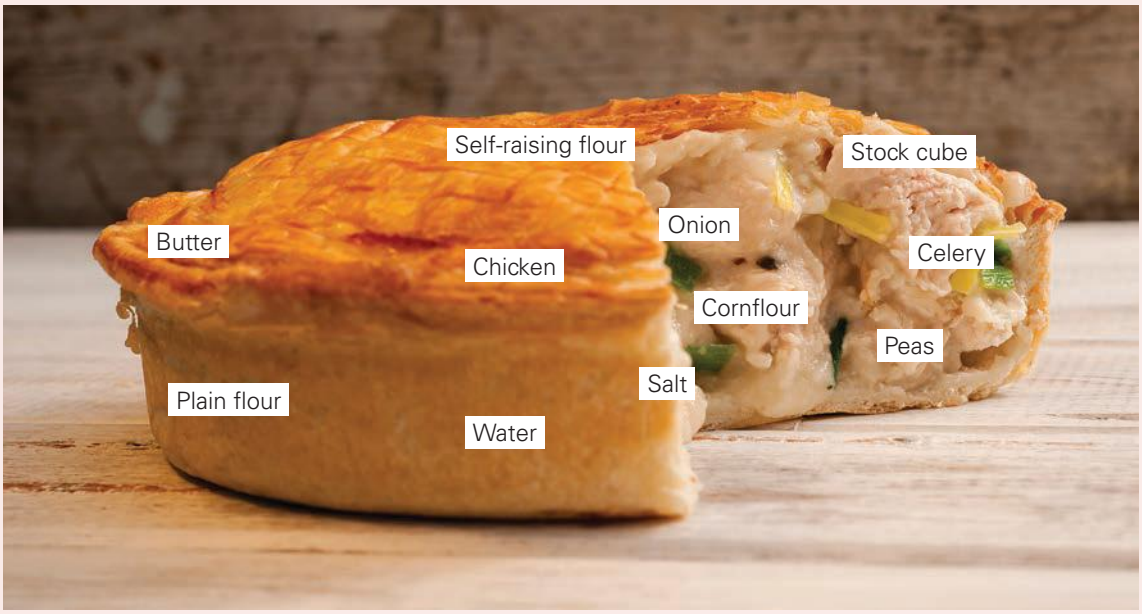
3 These are the four ingredients in a muffin: self-raising flour, butter, milk and egg. What is the function of each one and can it be changed?

4 Below are the ingredients in a chicken pie. What is the function of each one and can it be changed?



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Career profile: Rachel De Prinse

Current occupation: Food Technology/Food Studies teacher
Place of employment: Wallan Secondary College

Explain your interest in the area of your chosen career path. Discuss the reasons why you have pursued this career.

I loved Food Technology and cooking when I was in high school and originally thought about being a chef when I finished. When I reached VCE, however, I started to become more interested in the theory behind food and started to wonder whether being a chef was what I really wanted to do. My friends always told me that I was pretty good at helping them to understand the work and that I should be a teacher. It became pretty clear that I should combine these two things and become a Food Technology teacher.

Who was your role model and how did they influence your decision to work with food?

My Food Technology teacher in high school was one of the main reasons why I chose to become a teacher. Her enthusiasm and drive to teach students were inspiring, and made me want to have the same effect on students in my line of work.

Discuss the most rewarding aspects of your career.

The best part of my job is watching students achieve something they didn't realise they could. The look on their face after they've completed a challenging recipe, or passed a unit of work they thought they would fail, makes the hard work worth it.

Explain the challenges you face in your job.

Trying to explain the importance of vegetables to students who only want to make cakes all day! But seriously, the behind the scenes of being a teacher is a lot more work than most people realise. The marking, the course planning, the meetings, the photocopying, the preparation and the clean-up mean that time-management skills are a must for a teacher. As a fairly new teacher, this has been one of the most important things to learn and sometimes it feels like I still have a long way to go!

Is there such a thing as a 'normal' day in your work? Outline some things that you do in a day.

I like to arrive at school around 8.30 am. Depending on the day, I'd start with a morning briefing where all the staff members go through important announcements for the week. After this, it's generally a practical class where the students get a demonstration of how to cook the recipe for that day. Armed with this, they go off and attempt it themselves before the mad scramble to get the kitchen cleaned in time for recess. After recess there will usually be a theory class (lucky classes may even get a sensory evaluation lesson!), followed by a spare session. I'll generally use these to mark student work or prepare for my next class.

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The final two sessions could either be theory or practical classes. But school doesn't end for teachers when the bell goes! Meetings after school or more marking will come after this. I typically go home around 5.00 pm only to do it all again the next day.

Identify the opportunities this career has afforded you.

Teaching has allowed me to meet a range of people from a variety of learning areas, meaning that there is always something new to learn. Food Technology teaching in particular has allowed me to see just how important food and nutrition education is to young students, and I love that I am able to teach these valuable skills to new learners.

What are your career goals for the future (e.g. in five years' time)?

In five years' time, I plan on still teaching as much Food Technology as I can. Developing my skills as a teacher is an ongoing goal for me, and I hope that eventually I can be someone who inspires students in the same way that my teachers inspired me.

Outline the qualifications needed to complete this type of work.

Most people will become a Food Technology teacher through undertaking some sort of food-related Bachelor degree (I studied Food Science and Nutrition at RMIT University) and doing further study to get a teaching qualification. Alternatively, some universities will offer a Bachelor with a Diploma of Teaching with Food Technology as a method of teaching.

If you are interested in becoming a Food Technology teacher, my advice would be to volunteer at a school to see first hand what teaching is like before you jump in. As well as this, a part-time job in some sort of food-related industry or even at a supermarket will give you good background knowledge.

What role has Home Economics played in your career?

My job is all about Home Economics! To me, preparing and cooking food is the most important part of Home Economics and to be able to teach people about that every day is one of the best parts of my job.

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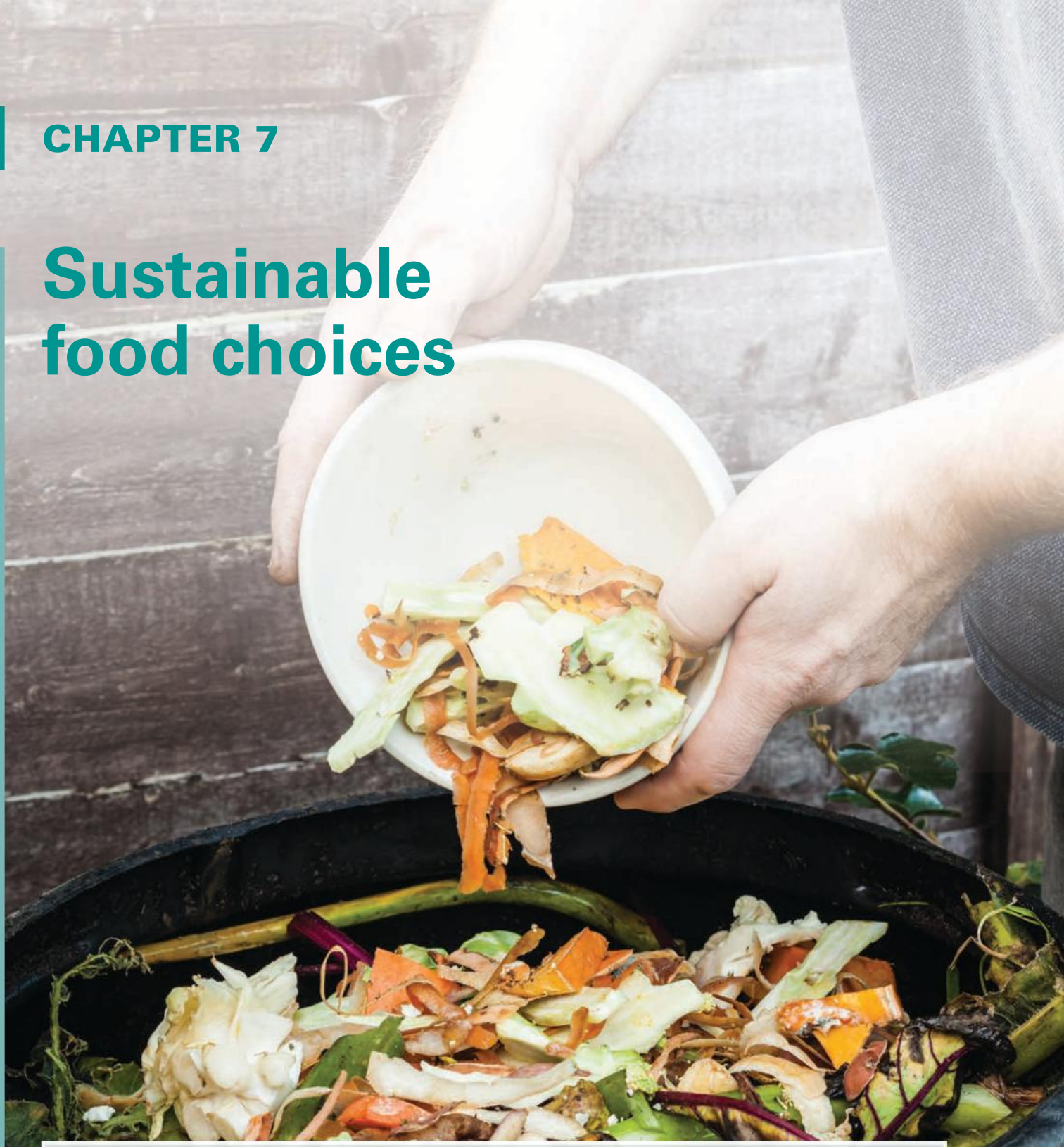
CHAPTER 7

Sustainable food choices



ACCESS PRIOR KNOWLEDGE

1. Define the term 'sustainability'.
2. Eating local is important. Discuss why we should eat local, seasonal produce.
3. Bottled water is everywhere and it is so expensive. Explain why, for a sustainable world, we should not drink bottled water when we have access to fresh tap water.
4. Explain why you should reduce the amount of animal products you eat.
5. Describe the type of farming that best supports farms, farmers, animals and plants.

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7.1 How our food choices impact the environment

More and more these days, we have to think about the food we eat. Your food choices have an impact not only on your personal health, but also on the health of the environment. Land use for food products now competes with land use for car fuel, cattle feed, textiles for clothing and, of course, the environment in which animals and people live. It is estimated that between one-third and one-fifth of the greenhouse gases causing climate change are from agriculture systems producing the food that we eat. Unlike making a decision to stop driving a big car, you cannot stop eating – but you can make ethical and sustainable choices that will support the environment. It is time we started considering the benefits of **green food** – and that doesn't mean a diet of lettuce and broccoli!

green food Earth-friendly food that supports the sustainability of the environment – local, fresh, grown with minimal or no herbicides or pesticides, and grown in areas that are environmentally suitable and do not cause destruction to animal habitats.

What is sustainable food?

We have just referred to Earth-friendly food as 'green' food, but it is also often called sustainable food. What 'sustainable' means is much debated; in fact, there are about 1500 recorded definitions of **sustainability**. At the moment, there is no legal definition of 'sustainable food'. A number of things contribute to a food being sustainable – not just one factor. While concepts such as **organic** or **Fairtrade** are more clearly defined, 'sustainable' brings all of these terms together. The purpose of promoting sustainable food is to simultaneously enhance the environment, society and the wider economy.

sustainability The idea that goods and services should be produced in ways that do not use resources that cannot be replaced and that do not damage the environment (*Cambridge Dictionary*); 'meeting the needs of the present without compromising the ability of future generations to meet their own needs' (UN, 1987).

organic Grown and/or produced without synthetic chemicals – for example, not using weed killers or sprays to kill insects, moulds or fungus.

Fairtrade A labelling system specifying that fair trading standards are met at every stage of production, and that a certain portion of profits return to the farmers and communities.

Figure 7.1 Reducing food waste is a good way to eat more sustainably.

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Tasty Trivia

The establishment of Kentucky Fried Chicken (KFC) in Australia, with its first store opening in 1968, had a major impact on the consumption of chicken. In the 12 months from 1970 to 1971, a total of 75 KFC stores opened and during the same period Australian chicken production increased by 38 per cent.

7.1 INVESTIGATE IT

Use the internet to find five other definitions of sustainability. How do these compare with the *Cambridge Dictionary*'s definition and the United Nations definition? Is it correct that all definitions or concepts are related to the environment, society and the wider economy?

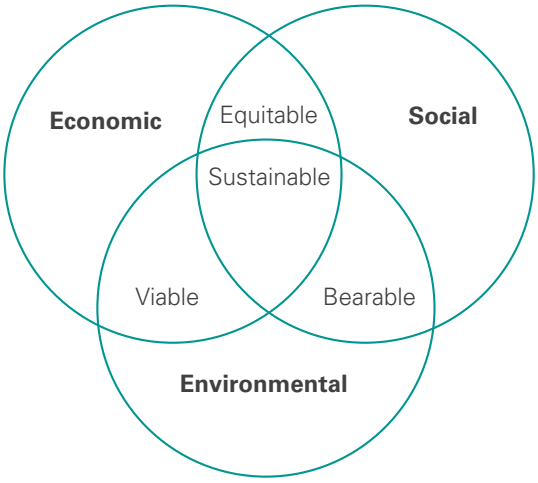

Figure 7.2 Social, environmental and economic factors are the three pillars of sustainability.

This means that food should be produced, processed, traded and distributed in ways that support economics, the environment and society:

- **Economics:** Contributing to thriving local economies and sustainable livelihoods, both in Australia and overseas.

- **Environment:** Promoting responsible use of resources such as water, energy and land, protecting the diversity of plants and animals (and the welfare of farmed and wild species), and avoiding damaging natural resources.
- **Society:** Providing social benefits such as good quality food and safe and healthy products, and recognising the possible personal and environmental effects of farming and production practices.

An Earth-friendly diet includes many steps in the total food chain from paddock to plate. Sustainable food encourages a lifestyle that is healthier for both people and the planet. Your food shopping behaviour is also important for supporting the environment. You could minimise car use or leave the car and walk, cycle or use public transport to do your food shopping. If you travel by car, buy the week's food, not just one item. Don't use plastic bags.

7.2 INVESTIGATE IT

Watch the Green Grok's DIY Sustainable Food Shopping Tour online. The Green Grok gives an explanation of shopping and eating green and about sustainable shopping for food and other items. The information is more relevant for people living in the city. Discuss the options for people living in the country to be green shoppers.

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Figure 7.3 A sustainable world …

Figure 7.4 Consumers wishing to support a sustainable food system should …

7.2 Choose ethically sound foods

When choosing **ethically** sound foods, you need to consider the principles of wellbeing, choice and **fairness** for those who support and protect farmers, consumers, animals and the environment. Ethical decisions should be based on reasoned arguments, not just gut reactions.

ethics The science of how we should live or attempt to live; behaviours and decisions that reflect right or wrong.

fairness Actions that will result in a satisfactory outcome for all involved.

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7.3 ACTIVITY

Animal ethics

For each of the following animal or poultry production techniques, write a list of advantages and disadvantages that looks at:

- animals/hens
- farmers
- consumers
- the environment.

Your arguments should include aspects of wellbeing, choice and fairness. Wellbeing is the state of being healthy, happy and comfortable – this includes people, the environment and animals. Choice is to freely act to the reasonable preferences of the farmer, animal, consumer or environment – for example, whether farm animals prefer to roam free or be locked up. Fairness is about actions that are considered right or wrong.

Check out the PBS video *The Lexicon of Sustainability: The Story of an Egg* online to get you started.

Figure 7.5 The wellbeing of livestock is an important part of the industry.

7.4 INVESTIGATE IT

Food, Inc. is a documentary looking inside the world of the food industry. Search for the documentary online and watch it. Write a movie review discussing the message behind the documentary.

7.5 INVESTIGATE IT

Use the internet to come up with more reasons why you should not use plastic bags and why it is so important to reuse, recycle and reduce the amount of packaging waste used in the food industry. Go to the Planet Ark website. Click on the the National Recycling Week tab. List as many reasons as you can find.

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7.6 LET'S COLLABORATE

The plastic bags used to carry groceries and the packaging waste from the food products we purchase are some of the world's biggest waste problems. In many council areas, plastic bags are the single main contaminant of kerbside recycling. They should never be put in the recycle bin, either loose or wrapped around items such as jars. Discuss with a partner why you think plastic bags are a recycling problem. Explain the reasons why these are often not recycled. Identify the opportunities available for plastic bags and other packaging waste, and discuss why it is so important that these items are recycled or reused.

There are many decisions that determine whether your food choices are sustainable or not sustainable. Some of them include:

- food miles versus locally grown food
- organic versus non-organic food
- genetically modified versus unmodified food
- world trade profits versus Fairtrade decisions
- biodiversity versus monoculture
- vegetables versus animal products
- safe food versus multiple packaging
- tap water versus bottled water
- land for feed, fuel, fodder or fibre.

7.7 LET'S COLLABORATE

1. Write down your understanding of the terms used in the bullet points on food choices on a blog, wiki or using Padlet.
2. Discuss your response with a partner.
3. Form a group and discuss your responses.
4. Compare responses within the class.
5. Check your responses again when you have completed the chapter to see whether you have changed your view.

7.8 INVESTIGATE IT

Thankyou is a social enterprise that aims at changing the world! Its products are actually making a difference. Learn more about this company's sustainable global solution by visiting the Thankyou website.

1. Discuss how Thankyou is different from other food and beverage companies
2. Outline the concept behind Thankyou's 'Little Champions' products.
3. Explain how this company is being socially responsible and ensuring that we make ethically sound choices.
4. Read the information about co-founder of Thankyou, Daniel Flynn, on p. 238. Discuss your thoughts on his contribution to society, locally, nationally and globally.

Figure 7.6 A build-up of plastic waste at a public dump.

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Daniel Flynn

– Managing Director, Thankyou

When was your interest in your area of expertise first nurtured? Explain why you pursued this career.

At the age of 19, I was studying for a degree in project management and I had what I thought was a pretty good five-year plan mapped out. That all changed when I stumbled across alarming facts about the World Water Crisis, and realised that 900 million people in our world (at that time) did not have access to safe water. At that point, something switched inside of me, and I decided I wanted to do something about this huge global issue.

From there, I pulled together a group of friends and we came up with the idea to launch a social enterprise called Thankyou Water that would provide consumers with the opportunity to change the world through a simple purchase in their everyday lives. In 2013, we rebranded our company to Thankyou and launched two new ranges – Thankyou Food and Thankyou Body Care – in order to fund food and hygiene projects, as well as water solutions.

Describe your role model in the industry.

We have had some amazing personal mentors – not big names necessarily – over the years. These have included CEOs around the country and other experts in business who have been instrumental in their advice about what we could and should do. I think some of our biggest helpers have also been our critics, those who've said, 'You can't do that!' It might sound crazy but that one little line has actually kept us going over the years. Certain people saying that we're not going to be able to do this or that has fuelled us to a degree. It's funny to think that people who probably don't think they have helped us actually really have.

To me, a role model and a hero is someone who has a dream and then has the guts to go and make it happen. People who are willing to do the hard yards. I know some people who have built great organisations from a dream, and they just kept going until it happened. I look up to people like that. These are the people who inspire me most.

Discuss the most rewarding aspects of your career.

The most amazing thing about my job is that we get to see lives changed on a daily basis. Waking up every morning knowing that Thankyou exists solely to fund projects in the developing world and that I get to play a part in improving the quality of life for many is mind-blowing. It is also rewarding to see products, which the team have spent so much time on, appearing on shelves in all of the major retailers around Australia.

Is there such a thing as a 'normal' day in your work? Outline some things that you do in a day.

I would say that each and every day is different. I get to meet so many unique and incredible people in my work. As the Managing Director of Thankyou, the nature of the role is that you work across a whole lot of different aspects of the business. Every day is different but the common parts of my day would include meeting with members of my team, speaking to a variety of audiences about the Thankyou story, attending sales pitch meetings to grow the Thankyou brand as well as working with the marketing team on the development of new products.

Identify the opportunities this career has afforded you.

Each day is an opportunity at Thankyou: an opportunity to improve the quality of life for someone in dire need, the opportunity to educate people that, with their daily shop, they too can change the world. I've been able to meet some amazing people and have had the opportunity to travel to some incredible places to share the Thankyou story.

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7.9 INVESTIGATE IT

Are you a Thankyou school? Check out the Thankyou website and find out how you can be a Thankyou school.

7.10 ACTIVITY

Sustainability explained!

1. View the Sustainability explained (by explainity®) YouTube clip to consolidate your introductory knowledge of sustainability.
2. Create a Wordle representing all the words you associate with sustainability.
3. Using Inspiration, or a similar program, develop a mind map based around the topic of sustainability. Include on your map each of the pillars of sustainability as well as other considerations that you believe are relevant and relate to sustainability.

REFLECT ON LEARNING

1. State the three features of a sustainable Earth.
2. Describe two important shopping behaviours that are Earth friendly.
3. Explain why there are problems recycling plastic bags.
4. Summarise the three ways to support a sustainable food system.
5. Draw up a table to compare the negatives and positives for sustainable food choices.

7.3 Choose local, fresh and seasonal

Eating green can start by buying local, fresh food in season. You may assume that this is what you already do most of the time. But how much of the fresh fruit and vegetables you consume are actually grown locally? The tomatoes in the supermarket in summer probably travel only from local areas within your state, but in winter they may have been transported from different areas with the right climate for growing, such as Queensland or Western Australia. Everybody becomes used to having a wide choice of fruit and vegetables because transport systems have made it possible for oranges from California to be in your supermarket when there are no fresh oranges available locally.

If you eat locally grown fruit and vegetables in season, and don't buy the same things all year round, this significantly reduces energy used in food production, transport and storage.

Figure 7.7 At farmers' markets, only fresh, locally grown food is sold, and you will never find food out of season – why is that?

7.11 INVESTIGATE IT

To see which foods are in season, visit the Market Fresh website:

1. Name the current season.
2. Develop a list of the seasonal produce currently available.
3. State one item that you should not purchase as it is not in season. Discuss how this item can still be available in some supermarkets. Is it really fresh?
4. Choose one ingredient that is currently in season. Suggest a recipe you could make with this ingredient.

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DESIGN BRIEF: WINTER SALAD

Salads are popular in winter as well as in summer, but a salad does not have to be made with just iceberg lettuce and cherry tomatoes.

1. Write a design brief for a salad to be eaten at a lunch in June, using three winter vegetables. Use a market website to find out what is in season. If you can't find a winter salad that inspires you in a recipe book, there are many websites with a huge selection of recipes, such as Taste.
2. Plan the lunch.
3. Develop criteria for success questions.
4. Prepare and produce the lunch.

Investigating

The Moroccan Lettuce Cups recipe on p. 241 almost fulfils the requirements of a winter lunch salad. The recipe has some ingredients that are suitable for a winter lunch, but other ingredients are not suitable.

1. Identify the ingredients that are not suitable.
2. Explain what modifications need to be made to make this suitable to fulfil the design brief.

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Moroccan lettuce cups

MOROCCO

RECIPE

Main tools and equipment

Grater, chopping board, chef's knife, saucepan, frying pan, wooden spoon

Production skills

Grating, slicing

Cooking processes

Boiling, frying, sautéing

SERVES 1

Preparation time: 15 minutes

Cooking time: 15 minutes

Serving and presentation time: 5–10 minutes

Total time: 35–40 minutes

Ingredients

 95 ml water	 5 ml soy sauce	 ¼ cup red lentils	 5 ml sesame oil	 1 small clove garlic, crushed	 ¼ teaspoon ginger, finely grated
 ¼ teaspoon ground cumin	 1 spring onion, sliced	 ¼ red capsicum, sliced	 ¼ carrot, grated	 ½ stick celery, sliced	 25 g mushrooms, finely diced
 1 teaspoon fresh mint, finely chopped	 3 small lettuce leaves				

Method

1. Place water, soy sauce and lentils in a saucepan. Bring to the boil, then simmer uncovered for 5 minutes. Remove from the heat and leave to sit for a further 5 minutes, covered.
2. Heat the oil gently in a non-stick frying pan. Add the garlic, ginger, cumin, spring onion and capsicum, and sauté gently for 1 minute.
3. Add the carrot, celery and mushrooms, and sauté over medium-high heat for 3–5 minutes.

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Moroccan lettuce cups – continued

4 Add the vegetable mixture to the lentils and mix well. Cool the mixture slightly.

5 Stir through the mint. Serve as a snack in the lettuce cups.

Evaluating

1 Use the criteria for success you developed from the brief to evaluate the Moroccan Lettuce Cups.

2 Explain your suggested modifications.

Many discussions of sustainable food refer to **food miles**. This refers to the distance food travels from production to point of purchase and consumption. Food miles are becoming more and more of an issue, as there is increased consumption of foods that burn more **fossil fuels** in production and transportation.

food miles The distance food travels from production to point of purchase and consumption.

fossil fuels Non-renewable sources of power that contain carbon, such as petrol, oil and coal.

The burning of fossil fuels for transportation increases the levels of carbon dioxide and other greenhouse gas emissions. If food can be grown in the area or state where you live, then buy it, but there is a lot of food that isn't grown locally, such as coffee and tea. If you cannot buy local, choose Fairtrade items, but don't buy food brought to this country by air. Air travel uses considerable amounts of fossil fuel. (Fairtrade is discussed in Section 7.6: Choose to support sustainable farmers.)

A product's life cycle should also be considered, as well as its food miles. The product life cycle includes growing, manufacture of packaging, transporting, consumer preparation, waste management of packaging or leftovers, and waste management throughout the whole process.

Sometimes food miles are unavoidable. For a Victorian or Tasmanian to eat a mango, it must travel from tropical North Queensland, contributing approximately 12 black balloons in emissions to the environment. Growing mangoes in southern Australia is not sustainable, as the temperature is not warm enough; growing them in hothouses requires considerable amounts of energy and would be less efficient. If the fresh mango is processed and tinned, this increases the amount of energy used, and the tin becomes waste that must be recycled.

7.12 INVESTIGATE IT

See the Sustainability Victoria website for more information. Investigate other sustainability websites and organisations.

Tasty Trivia

Did you know that the average trolley of groceries has travelled the equivalent of twice around the world before it gets to you?

7.13 INVESTIGATE IT

Energy use can be measured using the concept of black balloons. Watch the *Black Balloons Energy Saving Campaign* video on YouTube for more information.

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7.14 ACTIVITY

Travel miles with an orange

1. An orange from Mildura travels about 400 kilometres to get to Adelaide. An orange from California travels about 12 860 kilometres.
2. If an orange from Mildura to Adelaide is 2.5 black balloons, how many black balloons would an orange from California cost? *Note*: this calculation does not include energy to store the orange on its travels!
3. What steps for transporting an orange from California would not occur for an orange bought at a local farmers' market?
4. Investigate where the oranges sold in your supermarket come from and calculate the environmental cost.

What gives food a high carbon footprint?

- **Animal products.** Approximately 60 per cent of greenhouse gases produced from food are generated from animal products.
- **Travel.** Many foods these days are very well travelled. Often foods that can be sourced locally have come from overseas. Foods that are out of season locally have to be transported from another climate, which usually involves many food miles.
- **Processing.** Food processing consumes energy, water and valuable resources while producing a product that needs to be packaged, transported and stored. Refrigeration and freezing consume energy and processing plants generate waste, which then requires further processing.
- **Farming practices.** Artificial pesticides and fertilisers emit greenhouse gases through their production, packaging and transport. These chemicals contaminate water supplies and soil.
- **Harvesting practices.** Harvesting without concern for ongoing survival of plant and animal species leads to endangerment of species.
- **Business practices.** Ethical farming and fair terms of trade support sustainable businesses, particularly in low-income countries.

Figure 7.8 The Californian orange has contributed a lot of gas emissions into the environment before it gets to Australia.

7.15 LET'S COLLABORATE

Fruits and vegetables travel all over Australia and even the world. Find out about the following:

1. List the fruits or vegetables grown in Tasmania or Victoria that are then transported to Queensland or Perth.
2. List the fruits or vegetables that are grown in a different country and are then imported to Australia.
3. As a class, discuss the impacts of this on the three pillars of sustainability (economics, environment and society).

REFLECT ON LEARNING

1. State the environmental problems associated with buying vegetables such as tomatoes all year round.
2. Define the term 'food miles'.
3. Discuss the best options for buying fruit and vegetables in terms of reducing food miles.
4. Explain what 'black balloons' measure.
5. Explain the difference between the 'life cycle' of a product and its 'food miles'.

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7.4 Choose to waste less

If you were making a poster to promote this section, it might say:

- Don't waste food.
- Only buy and cook the food you need.
- Don't throw food away.
- Think preservation.
- Buy food with minimal packaging.
- Compost or recycle any unavoidable waste.

Food consumption and waste

Household food waste includes packaging – leftover food and food waste removed to make food palatable (e.g. corn husks).

Food is packaged for many reasons, and protection of the food is one of the really important reasons. But packaging is a major waste issue as well.

7.16 LET'S COLLABORATE

Food items are often over-packaged and the waste created is enormous. Think of 10 food items that are over-packaged. Discuss with your partner the packaging on these products. Is it really necessary? Compare your answers with others in the class.

Tasty Trivia

The average Australian household throws out roughly one-third of the food purchased in a week. This can be food scraps, leftovers or food that has gone bad. It is about 250 kg of uneaten fresh fruit, vegetables and meat over the year. What are the statistics where you live?

Figure 7.9 Really? How much packaging is too much?

7.17 ACTIVITY

How much waste?

1. Calculate the different amounts of waste from a meal prepared from scratch and a meal prepared from processed food.
2. Select a recipe such as tortilla and corn salsa. For one recipe, try to have every ingredient as fresh as possible. Make another version using processed or partly processed food items – for example, commercially made tortillas versus homemade tortillas, and for the salsa, fresh corn versus canned or frozen corn.
3. After the meal has been prepared, weigh all the food scraps and any packets used.
4. Discuss the recycling and disposal process of all food or packaging remains. Which meal produced the most waste and would be most costly, economically and environmentally, to dispose of?
5. Weigh the leftovers for both meals and explain why there may have been leftovers.
6. Analyse how the meal could be redesigned to avoid preparation waste and leftovers. This may mean changing ingredients to make them appeal to the taste of the consumers.

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Households are not the only places that have leftover food; restaurants and food shops generate a great deal of leftover food as well. SecondBite exists to provide access to fresh, nutritious food for people in need across Australia. SecondBite does this by rescuing and redistributing surplus fresh food, building community capacity in food skills and nutrition, and advocating for an end to food insecurity.

FareShare is another organisation that rescues leftover food heading to landfill, and turns it into healthy and nutritious meals that are donated to people who are struggling financially. FareShare uses donated leftover food, such as pastry from a pie shop, and makes it into other food items, such as sausage rolls and quiches. The FareShare kitchen boasts that it produces 25 000 free, nutritious meals per week. Every $100 FareShare receives from fundraising allows it to cook and distribute 150 meals. What an awesome effort to reduce food waste and assist those in need!

7.18 ACTIVITY

FareShare at work

Watch the video on volunteering at FareShare on the Fareshare website and look at the FareShare Feed Melbourne campaign, then answer the following questions:

1. Summarise where FareShare gets its ingredients.
2. Explain where these ingredients used to end up before FareShare.
3. State the estimated tonnes of food waste ending up in landfill and the costs involved.
4. Identify how many people are going hungry in Melbourne each day.
5. Suggest reasons for food insecurity in Australia.
6. Discuss how long FareShare has been operating in Australia and reasons for its establishment.
7. Define the term 'surplus'.
8. Develop a flow chart to demonstrate what happens once the food has been given to FareShare, where it goes and who is involved at each step.
9. Identify the key people who are benefiting from the FareShare program.
10. State how many meals FareShare is hoping to cook a year.
11. Discuss how FareShare offers a sustainable approach to our food waste problem in Australia.
12. FareShare has been described as an excellent solution to the problem. State the problem.
13. Look at the SecondBite website and compare these two organisations, considering their ability to reduce food waste and help those in our community who are less fortunate.

7.19 LET'S COLLABORATE

Discuss how the information about FareShare makes you feel. Determine how much food you waste in your own household. Describe what you could do differently to prevent food waste. Compare ideas as a class.

Figure 7.10 FareShare uses donated leftover ingredients to make fresh food to donate to people who are struggling.

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DESIGN THINKING

FareShare has just received a large donation of apples. You have been asked to design a preserved food product that will enable it to use the donated apples. You will need to follow all the steps in the design process and carefully manage this project to ensure a successful solution. Before you start, prepare this brief further to include any constraints and considerations you might also need to include.

Tasty Trivia

To help reduce all waste from picnics, not just food scraps, several companies now produce plates made from palm leaves and cutlery from corn starch. At the end of the picnic, the plates and cutlery can go into the compost bin and decompose.

It's a waste! Avoid bottled water

After heavy rain, check your local creeks, rivers or stormwater drains. What's the source of the most noticeable waste? It's usually plastic soft drink or water bottles.

Our bodies are mostly water, and water is more essential for life than food. We should all be drinking more water – it is good for hydration, digestion and all-round wellbeing.

The trend towards consumers drinking water instead of high-calorie, sugary drinks certainly promises health benefits. However, we don't need to drink water from plastic bottles. There are no known health benefits from drinking bottled water instead of tap water. If you are going to be away from a tap, a reusable aluminium water bottle filled with tap water is ideal.

Why do you drink bottled water?

Australians drink an estimated 150 million litres of purchased bottled water a year. Yet in most parts of Australia, virtually free quality drinking water is available on tap.

Figure 7.11 Think before you drink!

7.20 LET'S COLLABORATE

Not only does bottled water have a detrimental effect on the environment, but it also has a detrimental effect on your wallet. You can get 50 glasses of water for 1 cent, calculated on a glass being about 250 ml.

If the average water bottle is about 500 ml, given the cost of bottled water, calculate (with a partner) how much 50 glasses of bottled water would cost you.

7.21 ACTIVITY

Water vs water

Taste test cold tap water and at least two different brands of plain bottled water. Also try the test with room temperature tap and bottled water. Use a graphic organiser to compare the differences.

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Tasty Trivia

Did you know that the ingredients used to produce bubbles in sparkling water can reduce your calcium absorption and thus impact bone health?

Making bottled water uses dwindling energy supplies in bottle production, sourcing water, transport and refrigeration, all of which contribute to greenhouse gas emissions. Petroleum is also needed to make the plastic. Additionally, these environmental costs include significant waste disposal of a **non-biodegradable** material. It is estimated that it takes 2–3 litres of water to produce every litre of purified water to put into bottles.

non-biodegradable
Unable to break down or decompose in the soil or ocean.

Tasty Trivia

Did you know that the amount of recycled plastic in Australia would fill the Melbourne Cricket Ground five times, and that is only 30 per cent of plastic packaging? Where is the other 70 per cent going? Remember, plastic will not break down in the soil or in the ocean.

7.22 LET'S COLLABORATE

Discuss why sales of bottled water have exploded when the manufacturing and distribution of bottled water create a huge **carbon footprint**. In a world of limited resources, it takes more energy to bottle water and deal with the waste than to drink it from a tap. Are there ever times when perhaps you do need to use purchased bottled water? Justify your answer with the reasons why.

carbon footprint
A measure of the impact that human activities have on the environment in terms of the amount of greenhouse gases produced.

7.23 ACTIVITY

Free water

1. Investigate the range of bottled water on sale in a supermarket, or on a supermarket website such as Coles Online.
2. Create an advantages and disadvantages table for buying bottled water.
3. Explain why bottled water sales have increased so rapidly.
4. If you buy bottled water, compare your reasons for this choice.
5. Calculate the cost of the water you buy per litre per week.

Figure 7.12 Do you buy bottled water?

Tasty Trivia

In cities such as Paris, London, San Francisco and New York, local government offices are turning onto tap water and banning bottled water. Paris ran a successful campaign to have tap water on every restaurant and café table, and London is hoping to copy this.

REFLECT ON LEARNING

1. Suggest three good food-consumption practices that could help limit waste from food.
2. Explain what creates the largest proportion of municipal waste.
3. State what proportion of food is thrown out each week.
4. Discuss three reasons why drinking purchased water from a plastic bottle is an environmental concern.
5. Only one-third of plastic is recycled. Explain why this is an environmental concern.

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7.5 Choose to eat less food of animal origin

The Healthy Eating Pyramid for our eating patterns is a bit like the Healthy Eating Pyramid for the environment. The food that is best for us also happens to be best for the environment.

The trend towards grain-fed beef is reducing the amount of grain available for human consumption. Increased demand on grain reduces supplies and pushes prices up, and people from low-income countries who are reliant on cheap sources of grain miss out on their main source of food. Grass-fed beef is better for grain supplies.

Tasty Trivia

About 25–35 kg of cereal is needed to produce 1 kg of meat.

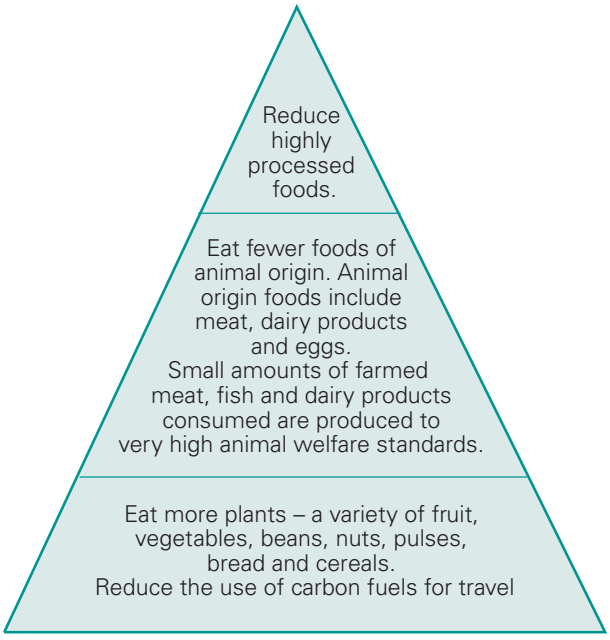


Figure 7.13 The healthy pyramid for the environment, which shows how food choices can be environmentally friendly.

7.25 LET'S COLLABORATE

Do you think more energy is required to produce 1 kg of meat compared with 1 kg of cereals? Produce a flow chart for wheat and another for meat, both locally grown.

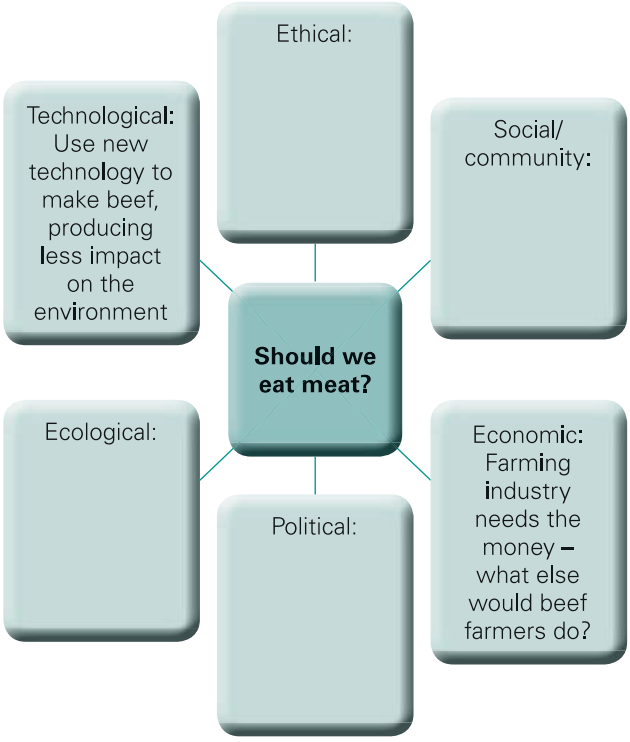
7.24 ACTIVITY

To eat meat, or not to eat meat?

There are many sides to the argument about whether you should eat meat. Most people are committed **omnivores**, and eat a variety of food, both plant and animal. There are, however, many people who have a vested interest in eating or not eating meat.

omnivore An 'all-eater': a person (or animal) who eats a diet consisting of a variety of food sources, including both plants and animals.

Copy and complete the issues map on whether we should eat meat. In each box, write arguments for and against the eating of meat. 'Technological' and 'economic' have been started.



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DESIGN BRIEF: HAVING YOUR PROTEIN AND NOT EATING MEAT

Meat is an excellent source of protein, particularly for growing children and adolescents. It is important to eat less meat, but not to eat less protein. Plant protein also has the advantage of being an excellent source of dietary fibre and other vitamins and minerals.

For people who really like meat, there are ways of modifying well-known dishes that make it seem as if you're still eating meat. This means making the dish tasty and interesting. Crunchy Vegetarian Rolls (p. 250), for instance, are an alternative to sausage rolls.

Meat Free Monday (see the campaign's website) is a popular campaign focusing on changing the eating patterns of Australia. Design a recipe that can be included as a meal idea for this campaign.

Investigating

1. Develop four criteria for success of a meat-free dish.
2. Investigate four plant foods (from Chapter 2) that are good sources of protein.
3. Compare the cost difference between 1 kg of meat and 1 kg of an alternative plant protein source.
4. Critique the Crunchy Vegetarian Rolls recipe on p. 250 and identify the foods that contain protein. Compare the protein content with that of meat.

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Crunchy vegetarian rolls

AUSTRALIA

RECIPE

Main tools and equipment

Food processor, sifter, rolling pin, pastry brush

Production skills

Sifting, rubbing in, resting, rolling, glazing

Cooking processes

Baking

MAKES 18 SMALL ROLLS

Preparation time: 45 minutes

Cooking time: 15–20 minutes

Serving and presentation time: 5 minutes

Total time: 65–70 minutes

Ingredients

Pastry

 150 g plain flour	 150 g self-raising flour	 Pinch of salt	 125 g butter	 ⅓ to ½ cup water

Filling

 2 eggs	 ¼ cup pecans	 ½ large onion, chopped	2 teaspoons soy sauce	½ cup low-fat cottage cheese	⅓ cup finely grated carrot
 ⅓ cup finely diced zucchini	 ¼ diced red capsicum	 ⅓ cup dry breadcrumbs	½ cup rolled oats		
 1 egg for glazing	 1 tablespoon milk for glazing	 1 tablespoon sesame seeds	Tomato sauce or salsa to serve		

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Method

1. Preheat oven to 200°C.
2. To make the pastry, sift the flours with the salt, then rub in the butter until the mixture resembles breadcrumbs.
3. Mix to a pliable consistency with the water and leave to rest for half an hour.
4. Divide the pastry into two. Roll out into a long rectangle until it is about 5 mm thick. Lightly flour the rolling surface to stop the pastry sticking.
5. To make the filling, process the eggs, pecans, onion, soy sauce and cottage cheese until fine.
6. Transfer to a bowl and mix in the carrot, zucchini, capsicum, breadcrumbs and oats.
7. To assemble the rolls, cut the pastry sheet in half lengthwise.
8. Pile the mixture along the length of the pastry. Brush the edge of the pastry with water.
9. Fold the pastry over the mixture and crimp the pastry edges together to form neat rolls.
10. Roll to enclose the filling with pastry and repeat with the remaining pastry sheet.
11. Cut each log into 6 even lengths. Make 4–5 cuts in the top of the pastry.
12. Transfer the rolls onto a lightly greased baking tray and brush the parcels with a glaze (by combining egg and milk or just plain milk). Sprinkle with sesame seeds or fresh herbs.
13. Bake in the oven for 15–20 minutes, until golden brown.
14. Serve with tomato sauce or salsa.

Evaluating

1. Evaluate the rolls according to the established criteria for success you set at the beginning of this design brief.
2. Compare the taste and nutrient content with commercially made sausage rolls.
3. Determine which rolls you prefer and justify your response using sensory analysis language.
4. Explain which sausage rolls would be considered more sustainable and explain your reasons.
5. Analyse the ingredients used, discuss changes that you would make and justify your decisions.
6. Reflect on your project management processes throughout the completion of this brief. Discuss two areas that you did well in and two areas you would do differently in if you were to solve this brief again.

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Sustainable fish farming

In addition to our other resources, we should also make sure that any wild fish we eat is from sustainable stocks, and that damage to other fish or marine animals does not occur in the netting process.

Everyone assumes the ocean is such a big place that it couldn't possibly be fished out or that fish varieties could be threatened. Whales, sharks and fish varieties (such as orange roughy) are all on the endangered list. Fishing techniques such as trawling collect not only the targeted fish but also many other varieties that exist in the same area. The trawling process drags up everything within the area in reach of the net, from the bottom of the seabed through to the surface of the water.

Figure 7.14 Sharks are an endangered species that are unnecessarily caught in the process of fishing for other types of fish, such as mackerel.

Figure 7.15 Some canned fish companies promote processes that support the environment – for example, line and pole fishing, which catches fish one at a time using a rod, resulting in little or no by-catch.

7.26 INVESTIGATE IT

The Australian Marine Conservation Society website has information on over-fishing and threatened species. Threatened species include orange roughy and sharks. Up to 73 million sharks are killed every year, mostly for their fins, which are used for a delicacy enjoyed by few people. Use this website to locate the sustainable seafood guide.

1. Explain what is meant by sustainable seafood.
2. Develop a list of seafood that you would choose to cook and then eat if you were being sustainable.
3. Outline the concept behind The Good Fish Project.
4. Discuss the FISH concept. Explain what each of the 'fillets' means.

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Polynesian fish in banana leaves with coconut rice

FRENCH POLYNESIA

Tools and equipment

Baking dish, medium saucepan, grater, wooden spoon, chopping board, chef's knife, non-slip mat, small bowl

Production skills

Mincing, grating, mixing, folding

Cooking processes

Boiling, simmering, steaming

SERVES 2

Preparation time: 15 minutes

Cooking time: 20 minutes

Serving and presentation time: 5 minutes

Total time: 40 minutes

Ingredients

Fish in banana leaves

 2 kaffir lime leaves, finely chopped	 2 teaspoons oil	 1 teaspoon fish sauce	 ½ teaspoon turmeric	 1 teaspoon fresh coriander, chopped	 2 cloves garlic, minced
 2 teaspoons palm sugar, grated	 1 teaspoon ginger, minced	 Salt and pepper	 1–2 banana leaves	 300 g white fish fillets (no skin)	

Coconut rice

 ½ cup water	 ½ cup coconut milk	 ½ cup jasmine rice

Method

1. Preheat oven to 180°C.
2. In a small bowl, mix all ingredients except the fish and banana leaves.
3. Lay the banana leaf shiny side down on the bench.
4. Spread half of the flavouring mixture onto the banana leaf where you will place the fish.

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Polynesian fish in banana leaves with coconut rice – continued

RECIPE

5 Place the fish on the banana leaf and spread the rest of the flavouring mix over the top of the fish.

6 Fold in the banana leaf to make into a sealed parcel.

7 Place in a baking dish and steam in the oven for 15–20 minutes, until the fish is cooked.

8 To make the coconut rice, place water, coconut cream and rice into a medium saucepan and give it a quick stir.

9 Bring to the boil.

10 When just starting to boil, reduce to a simmer and cover with lid. Simmer for 10 minutes.

11 Remove from the heat and allow to stand covered for 10 minutes.

12 Serve with the cooked fish.

DESIGN THINKING

The Polynesian fish recipe is missing something! Design an appropriate vegetable accompaniment to complement your Polynesian Fish. Remember to use Polynesian flavours. Also think about the cooking methods and equipment that you might use. Produce a production plan to ensure your fish, rice and designed vegetable solution are all ready to be served up at the same time.

REFLECT ON LEARNING

1 Explain why the Healthy Eating Pyramid for eating is like a healthy pyramid for the environment.

2 Discuss the concerns about the increased trends for consuming grain-fed beef.

3 State one argument for and one argument against eating meat.

4 Identify which marine animals can be affected by fishing techniques and in what ways.

5 Describe the problem with the trawler style of fishing.

7.6 Choose to support ethical farming

Earlier in the chapter, the section on sustainable food encouraged you to buy local, but if the item is not grown locally or even in Australia, such as chocolate or coffee, select food that has been traded in a way that supports farmers.

Sustainable food is not only about the food we eat but also about the people who produce the food. An organisation called Fairtrade International aims to support small producers in developing nations by connecting disadvantaged producers and consumers, promoting fairer trading conditions and empowering producers to combat poverty, strengthen their position and take more control over their lives. Small farmers can't compete with large multinational companies that own several steps in the supply chain, or that can buy food such as tea or coffee when it is cheap and store it until the price rises to make large profits. When you buy fairly traded tea or coffee, the small producer gets paid a fair price.

The Fairtrade Mark is your guarantee that products have been independently checked against international standards all the way from the field to the product in your hand, so you can trust that your purchase really makes a difference. According to Fairtrade, more than six million people – farmers, producers, workers and their families – in 70 countries benefit from the unique, independent Fairtrade system. Coffee, tea and chocolate from Africa, Latin America and Asia are the most popular Fairtrade items.

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Figure 7.16 Many supermarkets now have Fairtrade products; look for this symbol and choose Fairtrade.

7.27 LET'S COLLABORATE

'Fairtrade' is often confused with 'organic'. Explore this concept further on the Fairtrade website.

Discuss the differences and explain why you think they may be confused. Identify the possible similarities.

Explain why the Fairtrade symbol is an excellent marketing tool.

7.28 ACTIVITY

Cadbury and Fairtrade Marketing

In 2010, Cadbury committed to Fairtrade and has since become the world's largest buyer of Fairtrade certified cocoa. Visit the Cadbury website to learn more about the company's commitment to Fairtrade.

1. List the Cadbury products that are now Fairtrade Certified.
2. Discuss the reasons why Cadbury has changed many of its products to Fairtrade.
3. Describe how Cadbury has helped communities through its purchase of Fairtrade ingredients.
4. Suggest whether you believe Cadbury should change all of its products over to Fairtrade cocoa. Explain your response.
5. Suggest reasons why Cadbury has not ensured that all of its products are made using Fairtrade cocoa.
6. Summarise the benefits of the Fairtrade system.
7. Reflect on all that you know about Fairtrade and the benefits of this system for farmers, producers and economies. Does this make you think twice about the chocolate that you will eat in the future?

Buy food from farming systems that minimise harm to the environment

How do you recognise possible farming and production practices that may produce personal and environmental ill-health? When you buy food at the supermarket, it can be difficult to know whether the farming system has harmed the environment, but some practices make it less likely.

Organic food vs the use of chemicals

The use of chemicals is one such practice. Chemicals are used to control insects, moulds, fungi and weeds. They are used to maximise production, increase profits and maintain a food supply. Yet organic foods are the most significant growth area in food production. In Australia, there is a 25 per cent increase per year. Organic farming is not new, as 80 per cent of farms in low-income countries are organic.

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7.29 LET'S COLLABORATE

Study this photograph. Explain why farmers use pesticides and herbicides on their crops. List two advantages and two disadvantages of spraying this crop.

Tasty Trivia

The worst food crop failure from a disease resulted in the Irish Potato Famine. Potatoes were the main food source for the Irish, and 1.5 million deaths occurred directly and indirectly as a result of potato crop failures. The first significant crop failures were noticed in about 1845, and in some places continued for nearly 10 years. It was the cause of major social and political upheaval in Ireland.

Figure 7.17 A coffin ship memorial to the Irish Potato Famine.

Organic farming and more traditional methods of farming use environmentally friendly practices: natural composts and manures to fertilise soil; or rotating with plant crops such as beans, which leave nutrients in the soil and allow recovery time for the nutrients, and also keep soil pest free and encourage natural pest control from other insects and birds.

World's biggest chocolate companies melt under consumer pressure

Campaigning for change article written on 24 April 2013

More sweet news today for chocolate lovers: the biggest chocolate maker in the world, Mondelez International who owns brands like Cadbury, Toblerone and Oreo, has agreed to take steps to address inequality facing women in their cocoa supply chains—thanks to pressure from customers like you.

More than 100,000 people around the world joined Oxfam's campaign, signing petitions and taking action to urge Mondelez and its competitors to tackle the hunger, poverty, and unequal pay facing many women cocoa farmers and workers. You also made your voices heard by sending messages to the companies on Facebook and Twitter.

Today's announcement by Mondelez follows commitments last month by Mars and Nestlé to address these issues. Together, Mars, Mondelez, and Nestlé buy more than 30 percent of the world's cocoa—so changes in their policies could have huge effects for cocoa farmers and their families.

"Empowering women cocoa farmers has the potential to improve the lives of millions of people, some of whom are earning less than $2 a day," said Dr Helen Szoke Chief Executive of Oxfam Australia. We hope that the steps taken by Mars, Mondelez, and Nestle offer an example to the rest of the food and beverage industry that consumers are paying attention to how companies impact the communities they work in."

Mars, Mondelez, and Nestlé are now taking the first steps to commit to the empowerment of women and to find out how women are being treated in their supply chains. All have agreed to publish the data from first stage impact assessments in one year's time and to publish concrete action plans to address the issues. Mondelez will also sign on to the UN Women's Empowerment Principles later this month, becoming the first of the three major chocolate companies to do so.

We're looking forward to working with Mondelez, Mars and Nestle to ensure they stick to their promises to women. So we can all watch and make sure they stay on track, we have produced a Road Map to highlight all the promises they have made and the dates they have committed to.

You can also stay informed and take further actions through Oxfam's Behind the Brands scorecard; we'll be updating this online tool in real time so you can see how the giant companies that make your favourite brands (chocolate and otherwise) measure up.

by Clancy Moore
GROW Campaign Lead

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7.30 ACTIVITY

Organic vs non-organic fruit and vegetables

1 Taste test organic versus non-organic fruit and vegetables and compare the appearance, taste and cost.
2 Write up a conclusion after the taste test of your preferred fruit and vegetables. Justify your response using evidence from the taste test.
3 Complete a PMI on buying organic foods.
4 Prepare a list of all of the food items that can be purchased organically.

7.31 LET'S COLLABORATE

Land use and production are not always fair. Large multinational companies use large quantities of land space to maximise production. Compare the use of multinational companies with that of small farmers who produce a range of crops.

Monoculture and biodiversity

You might expect that all farmers would intend to protect the environment – after all, it's their future and possibly the future of their children. But the continuing pressure to maximise profits, or just to make enough money to survive, can override sound agricultural and primary production practices. Farmers try to make farming practices easier, maximise crops by using a range of chemicals and attempt to survive on soils and land that are often not suitable for some types of farms. This may add up to unsustainable practices in an attempt to survive and compete against imported foods.

monoculture The planting of a single crop on a very large scale on the same land year after year.

land exhaustion Exhaustion, fatigue or wearing out of land from over-use, with no time in between crops for the soil to recover.

soil erosion The blowing away or washing away of soil, usually as a result of trees and vegetation being removed, leaving nothing to hold the soil in place.

salinity Salt levels in soil. These can rise due to poor irrigation practices.

biodiversity The number and variety of living organisms found in all ecosystems, such as marine and land, which includes diversity within species, between species and of ecosystems.

Chemical and herbicide usage is often associated with huge **monoculture** farms, run by big companies wanting to maximise profits. Large multinationals can contribute to **land exhaustion** through the use of monoculture. Removal of trees can lead to considerable land degradation of the soil, dust storms, **soil erosion** and high levels of **salinity** in the soil.

It is important to look for variety in fruit and vegetables. It helps to shop at places that offer diversity and include 'heritage' varieties. This supports the **biodiversity** of fruit and vegetables. There are about 5000 types of potatoes, yet commercial growers only plant two or three varieties. It is important for growers to save less commercially used varieties. Different plants have different levels of resistance to insects, drought and disease, and these plants should remain a part of the plant gene pool.

Figure 7.18 In monoculture, the land is totally cleared of trees, and the same plant is grown as far as the eye can see.

Figure 7.19 Consider the difference between large-scale monoculture farming and small farms that plant a variety of crops, thus promoting biodiversity.

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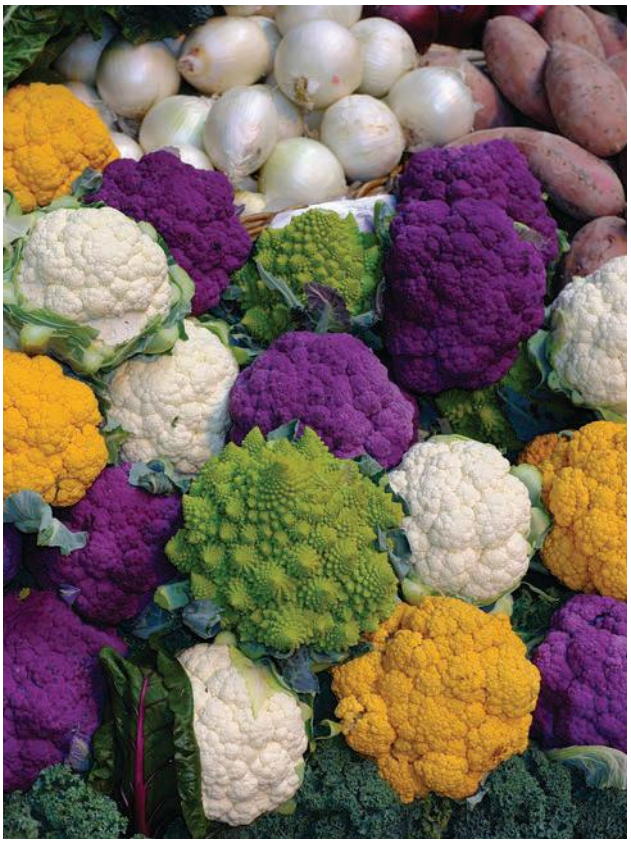


Figure 7.20 Variety supports continuing the gene pool of plants.

7.33 INVESTIGATE IT

There are strict labelling requirements for any GM product in Australia. Visit the Food Standards Australia New Zealand (FSANZ) website to learn more about GM labelling laws. While there, investigate the information provided on genetic modification.

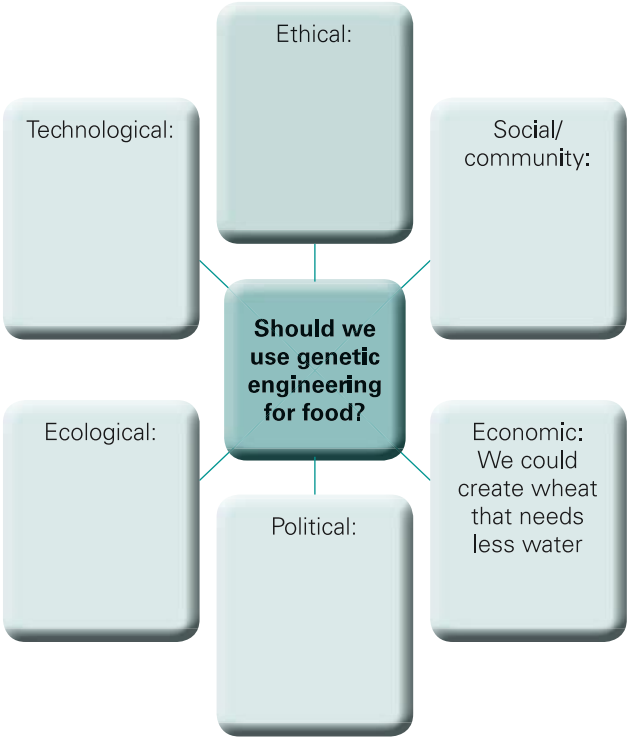
REFLECT ON LEARNING

1. State the three principles for ethically sound food.
2. Select one of the principles and explain what it means.
3. Describe what it means when food has been 'traded fairly'.
4. Explain a farming system that possibly harms the environment.
5. Discuss why it is important to shop at places that offer a variety of fruit and vegetables.

7.32 ACTIVITY

Genetic engineering or real food

Think about the issues. Use the issue map below to explain whether we should use **genetic engineering** for food. In each box, write arguments for and against the use of genetic engineering for food.



genetic engineering Altering the genetic makeup of plants and animals by taking genes from one organism and inserting them into a different organism to create something with a new genetic mix.

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7.7 Making difficult choices

Deciding which food is more Earth-friendly is not always easy. If you are choosing between two organic products, one made overseas and one in Australia, the choice is clear from a food miles perspective. Deciding to eat locally grown rice rather than imported rice is less easy. Rice needs a lot of water to be grown in Australia, and water is a scarce resource here but not in countries like Thailand. Therefore, rice imported from a wetter Asian country may be a better choice.

7.34 LET'S COLLABORATE

We are all passionate about something. Given the information that you have read so far, which ethical issue is most important to you: the environmental implications of the food miles or the environmental benefits of the organic product? Discuss your response with a partner.

Land for fuel, animal food or human food

biofuels Fuels produced from plants such as canola, palm oils, sugar, corn and wheat, often referred to as renewable sources.

ethanol An alternative fuel produced by fermenting and distilling grains such as corn, barley and wheat. It is blended with petrol to produce a fuel with a higher octane rating and fewer harmful emissions than unblended petrol.

renewable Able to be remade, as there can be a constant source of material to make it. For example, solar energy is renewable as there is always sunshine.

One of the biggest threats to sustainable food supply worldwide is the shortage of fuel. Sugar, corn, beans, palm oil, rapeseed oil, wheat, sugar beet, sugar cane and algae are all traditionally food sources. Now they are all also sources of **biofuels** such as **ethanol**. They compete for land to grow food, pushing food prices higher. Nowadays many crops, including palm oils, rape oils and grain, can be grown and then held back at harvest to see which commands the higher prices – food or fuel. Fuel is winning. Ethanol is a sustainable and **renewable** product that has several positives as an alternative fuel additive. In particular, using ethanol as a fuel additive has many advantages for the environment as it reduces greenhouse emissions, improves engine performance and may be better for the farming economy.

Tasty Trivia

In Malaysia, tropical forests are being cleared to grow palm oil. Over 90 per cent of orang-utan habitat has been destroyed over the last 20 years, and the United Nations considers this to be a conservation emergency. An estimated 1000–5000 orang-utans are killed each year for the development of palm oil farms.

Figure 7.21 Deforestation has many implications for the environment globally.

Tasty Trivia

A four-wheel drive with one tank of ethanol uses the same amount of corn it takes to feed a child for one year.

In Australia, sugar cane is used to produce ethanol. While oil prices increase and instability exists in countries that produce oil, less land is being devoted to food production every day, and more is being used for ethanol production. The need to find healthier fuel alternatives and fuel sources to fulfil the increasing shortages is applying extreme pressure on food production for humans and animals. For example, a flow-on effect of using food such as corn for ethanol is that it reduces corn as a food source and reduces the supply of corn as feed for livestock and chickens.

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DESIGN BRIEF: WHAT'S IN SEASON?

Working collaboratively in a group of four, you have been asked to produce a healthy two-course meal. The meal must be produced using locally grown ingredients that are currently in season. Your meal needs to feed two people and include at least eight different food ingredients. Your meal options can be either hot or cold items – it is your choice. Your meal must be quick to make, present well and taste delicious!

Investigating

1. List all the specifications that you need to meet in the design brief.
2. Decide as a group which meal of the day you will be cooking for.
3. Develop four success criteria from the design brief.
4. Investigate the different products that are currently in season and would be suitable for inclusion in your meal.

Generating

1. Design your two-course meal. Make sure you meet all the requirements of the brief.
2. Draw a 3D diagram using modelling software to plan how you will present your meal to ensure it is presented well.
3. Prepare your food order.
4. As a group, develop your production plan to ensure that your solution to the brief is able to be produced in the timeframe you have available and that all elements will be served together.

Collaborating and managing

Be your own project manager. Ensure that you manage your time effectively and seek assistance if you need it.

Producing

In your Home Economics/Food Technology class, serve your seasonal meal for two.

Evaluating

1. Identify the season for each of the ingredients you have used in your meal.
2. Justify the choices you have made for what you have included in your meal.
3. Conduct a sensory analysis to describe the appearance, aroma, flavour and mouthfeel of both dishes.
4. Explain two health and safety rules you had to follow when managing this design process to produce your meal.
5. Discuss what improvements you would make to your product if you were to produce it again.
6. Describe how your final design solution has met all the requirements of the brief.
7. Reflect on the difficulty of this task. Were there any products that you wanted to use but couldn't?
8. Explain how you could improve the presentation of your product.
9. Explain how important seasonal foods should be when consumers are considering their meal options.
10. Discuss the impact that buying produce out of season has on our environment and sustainability.

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7.35 ACTIVITY

Corn debate

Debate the use of corn in Australia. Get into teams of four, with each member of the team taking on one of the following roles:

- a producer of biofuels
- a producer of cage-free chickens that use corn
- a worker for a non-government organisation supporting people in low-income countries
- a large manufacturer of processed corn food products.

REFLECT ON LEARNING

1. Explain why it is possibly better to buy rice grown in Thailand than rice grown in Australia.
2. Name four food plants that can be used to produce ethanol.
3. Identify a food that is being converted to ethanol in Australia.
4. Describe why ethanol is considered a good fuel additive.
5. Discuss two impacts of using corn to produce ethanol.

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LOOKING BACK

1 The food choices you make can have an impact on the environment.

2 Food should be produced, processed, distributed and traded in ways that are socially, economically and environmentally sound.

3 Eating green involves eating food that is locally grown, fresh and in season.

4 Buy, prepare and dispose of food and packaging in ways that create minimal waste.

5 Avoid drinking bottled water. Tap water is cheaper and in Australia is an excellent alternative.

6 Reduce the amount of foods of animal origin that you eat, such as meat, dairy products and eggs.

7 Choose ethically sound foods, ones that ensure wellbeing, choice and fairness for farmers, consumers, animals and the environment.

8 Try to buy food from farming systems that minimise harm to the environment.

9 Land for food is now in competition with land for fuel and animal food.

TEST YOUR KNOWLEDGE

Multiple choice

1 Monocultural farming practices are:

- **a** farming with minimal use of water
- **b** farming with no use of chemicals to control weeds and insects
- **c** farming of a single crop on a very large scale on the same land year after year
- **d** farming that plants as many varieties of the one crop as possible.

2 The largest amount of household waste in a municipal rubbish collection is:

- **a** plastics
- **b** food and garden waste
- **c** glass
- **d** paper.

True/false

1 The focus of Fairtrade is to ensure all consumers pay a fair price for what they are purchasing.

2 There is a legal definition of sustainable food.

3 Grain-fed beef is a better choice for the environment than grass-fed beef.

Short answer

1 Define the term 'sustainability'. Discuss why sustainability is a critical consideration and include reference to the three pillars of sustainability in your answer.

2 Select three of the choices involved in making sustainable food decisions listed below. Write three positives and three negatives for each side of the argument:

- food miles versus locally grown food
- organic versus non-organic
- genetically modified versus real food
- world trade profits versus Fairtrade decisions
- biodiversity versus monoculture
- vegetables versus animal products
- safe food versus multiple packaging
- tap water versus bottled water.

3 Write a catchy saying or slogan to encourage people to drink tap water. It should be no more than 10 words. As a class, select the preferred five slogans and design an infographic poster to promote the use of tap water around the school.

Extended response

Read the recipe on the next page and then complete the questions that follow.

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Marinated chicken sticks with mango salsa

Main tools and equipment

Glass bowl, skewers, chopping board, chef's knife, small bowl

Production skills

Slicing, marinating, dicing

Cooking processes

Grilling

SERVES 2

Preparation time: 30 minutes

Cooking time: 10–15 minutes

Serving and presentation time: 5 minutes

Total time: 45–50 minutes

Ingredients

Marinated chicken

 1 chicken breast fillet, thickly sliced	 2 tablespoons lemon juice	 2 tablespoons olive oil	 2 teaspoons Dijon mustard
 1 teaspoon balsamic vinegar	 1 clove garlic, finely diced	 ½ teaspoon fresh thyme leaves	 Pinch black pepper

Mango salsa

 ½ small mango, diced	 ¼ red chilli, seeded and finely diced	 ⅛ red onion, finely diced	Couple of drops of sesame oil
 ½ tablespoon lime juice	 Pinch black pepper	 2 mint leaves, finely sliced	
 2 basil leaves, finely chopped	 2 coriander leaves, finely chopped	 1 cos lettuce leaf	

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Marinated chicken sticks with mango salsa – continued

Method

1. Thread equal amounts of chicken onto each of 6 skewers. Keep the meat flat; don't pack it on.
2. Combine all the remaining ingredients that form the marinade.
3. Place the skewers in the marinade for at least 20 minutes, longer if possible.
4. Remove the chicken sticks from the marinade and grill or barbecue until cooked through – about 10 minutes.
5. For the mango salsa, peel the mango and dice the flesh.
6. Place the mango flesh in a bowl with the red chilli, red onion, sesame oil, lime juice, black pepper, mint, coriander and basil leaves. Toss gently to combine.
7. Spoon the salsa into the ramekin (or alternatively, a lettuce leaf).
8. Serve the chicken sticks beside the salsa cups.

Evaluating and analysing

1. For each ingredient, decide what would be needed to make the ingredient sustainable. For example, the olive oil should be Australian.
2. Identify what time of the year is more suitable for this recipe if you were to use all fresh ingredients.
3. Decide what ingredients should be replaced to make the recipe more sustainable.
4. Suggest suitable changes that could be made to the recipe to make it more sustainable, but not necessarily economically viable.
5. Discuss alternatives that are both economically viable and sustainable.
6. Prepare your alternative recipe with the most sustainable but economical options.
7. Evaluate your final outcome and summarise the issues with eating in an Earth-friendly way.

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Career profile: Curtis Stone

Current occupation: Celebrity chef
Place of employment: Celebrity chef for Coles Supermarkets, cookbook author, restaurant owner and more!

Explain your interest in the area of your chosen career path. Discuss the reasons why you have pursued this career.

Ever since I was young, I've always been fascinated with food – whether it was making marmalade with my nan and grandad or fudge with my granny. It wasn't until I was 18 years old that I decided to embark on a career in the kitchen, and started out at the Savoy Hotel, in my hometown of Melbourne. During my time there, I worked with many European and British chefs, who inspired me to broaden my experience and skills by working abroad.

Upon completion of my qualifications as a chef, I decided to set off to Europe to see what Italy, France and Spain had to offer before finally arriving in London. I found myself knocking on the door of the legendary Marco Pierre White, the youngest man in the world to be awarded three Michelin stars, and whose book *White Heat* was the first cookbook I'd ever been given. I started that same afternoon at Marco's famed restaurant, The Grill Room, which was to be the start of my future career as a celebrity chef.

Discuss the most rewarding aspects of your career.

A career as a chef is constantly rewarding, as you are bringing people together over good food and drinks! Spending a little time in the kitchen to prepare a homemade meal and sitting down to share it with family and friends is one of the best treats. The ability of food to bring so much pleasure can't be under-estimated. Weddings, engagements, birthdays and business deals – food is always involved. I just love how food and cooking can bring people together.

Is there such a thing as a 'normal' day in your work? Outline some things that you do in a day.

These days my 'normal' work day is fairly varied, and it really depends on what I am working on at the time. When filming episodes of *Take Home Chef*, my day goes from dawn to dusk making the show. This starts with sifting through the hundreds of requests we receive from people wanting to cook for someone special, selecting the person and then working out the 'ambush' strategy for surprising them. It's then into filming an episode that starts at about 10.00 am and finishes with me serving the meal at about 8 or 9 at night.

What are the challenges in your career?

The long hours and intensity of working in a professional kitchen are not for the faint-hearted!

Identify the opportunities this career has afforded you.

Definitely the places I've travelled to and the people I've met. Also, just being able to help people become better cooks and enjoy more time with their families is great.

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What are your career goals for the future (e.g. in five years' time)?

Hopefully I can continue to use my media platform to influence more people, whether it be about cooking, enjoying a great meal with family and friends, or encouraging people to enjoy natural and wholesome ingredients.

Explain how you suggest students pursue a career in the type of work you are doing.

Work experience is a great way to check out most kinds of working environments. Sometimes the only way to get an authentic feel for a place is to launch into a day's work and get your hands dirty. There are so many great ways to experience the food industry first hand as a chef, and it's a great help to understand all aspects of the food chain. For example, if you want to work in a seafood restaurant one day, why not get some hands-on experience at your local fishmonger, which could be a real asset to a restaurant kitchen.

I think it's important to learn as much as you can about the seasons, and try to get close to your food as much as possible, learning the history of a certain dish, technique or type of cuisine. It's also really important to keep an open mind and to absorb as much as you can, even if it's in the most unexpected place! Remember, patience is a virtue.

Outline the qualifications needed to complete this type of work.

Experience and training coupled with a real passion for food! I also encourage people to travel – the life experience, knowledge and opportunities from exploring the world are priceless.

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Glossary

al dente Cooked 'to the tooth' – not too soft, but chewy with some bite or texture to it.

albumin A water-soluble protein found in egg whites and blood.

allergen A substance that triggers an allergic reaction.

allergy An abnormal reaction of the body to an allergen, creating itchy eyes, runny nose, wheezing, skin rash, diarrhoea or other symptoms.

anaphylaxis An extreme allergic reaction to a food product.

angina Chest pain caused by insufficient flow of blood and oxygen to the heart.

antioxidants Substances, such as vitamins C and E, thought to help fight free radicals in the body that can cause disease.

antipasti The food served at the beginning of an Italian meal.

appearance The 'look' of the product, packaging or food.

appetite The desire or need for food.

aroma The smell arising from the food.

atherosclerosis Narrowing of the arteries due to the deposit of fatty plaques.

Australia New Zealand Food Standards Code Legislative instruments of individual food standards.

bacteria Single-celled micro-organisms responsible for decay, fermentation and ultimately spoilage of food.

baguette A long, narrow loaf of bread with a crusty outside and soft, fluffy white inside. Often known as a French stick or loaf.

balanced diet Dietary intake that includes the nutrients needed by the body for good health.

beating The process of combining ingredients to trap air and create lightness.

biodiversity The number and variety of living organisms found in all ecosystems, such as marine and land, which includes diversity within species, between species and of ecosystems.

biofuels Fuels produced from plants such as canola, palm oils, sugar, corn and wheat, often referred to as renewable sources.

blanching The process whereby a food substance is plunged into boiling water, removed after a short period of time, then finally plunged into ice-cold water to stop the cooking process.

blend To mix or combine ingredients thoroughly.

blind tasting Tasting a food that is unlabelled or unmarked. The taster is not blindfolded; rather, the food is not identifiable by a label.

body mass index (BMI) A measure to determine a person's approximate amount of body fat.

body processes A series of changes that result in growth or development.

boiling point The temperature at which water changes from a liquid to a vapour or gas.

bouquet garni A bundle of herbs tied with string, used to flavour soups and stocks.

butter A dairy product that is produced from churning milk or cream until the fat solidifies and forms a spread.

cancer A group of diseases in which the body's cells grow in an uncontrolled (malignant) or abnormal way.

caramelisation The heating of sugar or foods containing sugar until a brown colour and characteristic flavour develop.

carbon footprint A measure of the impact that human activities have on the environment in terms of the amount of greenhouse gases produced.

cardiovascular disease (CVD) A class of disease that affects the heart and blood vessels.

cellulose One of the main components of plant cell walls. An indigestible carbohydrate and an important source of insoluble fibre.

cereals The grasses of cultivated edible fruits or seeds.

chemical properties Includes all natural chemical parts of food, such as nutrients, acids, alkalis and enzymes, and in processed food includes additives.

cholesterol A waxy, fat-like substance used by the body to build cell walls. It is either produced in the liver or absorbed from animal fats eaten. It is necessary for good health; however, excess levels are detrimental.

coeliac disease A disease of the small intestine that results in permanent intolerance to gluten.

complementing proteins Proteins that lack one or more of the essential amino acids, but when eaten together can supply a complete protein.

complete proteins Proteins that contain all the essential amino acids for body function.

complex carbohydrates Molecules that supply energy, fibre and other nutrients that the body needs.

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complex process A term used in Food and Technology to describe a process that requires decision-making in the choice of processes and equipment to achieve a good outcome.

compote Fruit stewed or cooked in a syrup, usually served as a dessert.

conduction Cooking food by heat transferring through a flat metal surface onto the food or liquid – for example, frying, poaching and grilling.

conductor A good conductor of heat allows the heat to travel through it quickly – for example, copper, stainless steel and enamel. Wood and glass are poor conductors of heat. This is why wooden spoons are best for stirring hot food.

considerations The aspects of a design brief that have some flexibility.

constraints The aspects of a design brief that are fixed.

contaminated Unsafe to eat due to contact with chemicals, foreign objects or bacteria that are harmful for people to eat.

convection Cooking food by the circulation of hot air or steam, such as in an oven or a steamer.

court-bouillon A poaching liquid consisting of an acid, an aromatic, poaching liquid and a mirepoix.

creaming The process of preparing the butter and sugar to create a soft and creamy texture; this ensures even distribution of the butter through the cake mixture.

criteria for success Questions developed to check whether you have made something to meet the requirements of the design brief. The criteria for success should come out of the design brief.

cross-contamination Indirect contamination of food caused by contact with a raw food or non-food source such as clothes, cutting boards or knives.

culture Beliefs, customs, traditions and social practices of a group of people.

dark roux A darkened mixture of equal proportions of butter and flour, used as a base for thickening sauces for making gravy.

dehydration A dangerous lack of water in the body.

descriptive words Words used to describe characteristics of food – for example, for appearance: translucent, watery, colourful, bright red; for texture: crunchy, crisp.

design An activity that translates an idea into something useful, making it better and improving quality of life; it fulfils a need.

design brief A concise statement clarifying the project task and defining the need or opportunity to be resolved after some analysis, investigation and research. It usually identifies the users, criteria for success, constraints, available resources and timeframe for the project, and may include possible consequences and impacts.

design process A process that typically involves investigating, generating, producing, evaluating, planning and managing to create a designed solution that considers social, cultural and environmental factors.

design thinking Use of strategies for understanding design problems and opportunities, visualising and generating creative and innovative ideas, and analysing and evaluating those ideas that best meet the criteria for success and planning.

designed solutions The products, services or environments that have been created for a specific purpose or intention as a result of design thinking, design processes and production processes.

development The gradual changes in an individual's physical, social, emotional and intellectual states and abilities.

dextrinisation The process whereby starch is broken down to develop a characteristic appearance and flavour.

dhal A thick stew made from lentils, onions and spices.

diabetes A group of different conditions in which there is too much glucose in the blood.

digestibility The ability to swallow and process the food that is being eaten.

dry heat Any cooking technique in which the heat is transferred to the food without moisture. Dry-heat cooking involves high temperatures.

efficient Performing in an organised manner.

electrocution Death by electric shock. (Non-fatal exposure to electricity is an electric shock.)

energy Wave of currents that cook food.

ergonomics A science that seeks to adapt work conditions and equipment to suit the worker and limit injuries and accidents.

essential amino acids The building blocks of protein needed for growth and function. The body cannot produce these, so they must be supplied through food.

ethanol An alternative fuel produced by fermenting and distilling grains such as corn, barley and wheat. It is blended with petrol to produce a fuel with a higher octane rating and fewer harmful emissions than unblended petrol.

ethics The science of how we should live or attempt to live; behaviours and decisions that reflect right or wrong.

fairness Actions that will result in a satisfactory outcome for all involved.

Fairtrade A labelling system specifying that fair trading standards are met at every stage of production, and that a certain portion of profits return to the farmers and communities.

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fats Compounds, usually derived from an animal source, that are solid at room temperature and liquid when heated – for example, butter.

fat-soluble vitamins Vitamins (A, D, E and K) that are not soluble in water and that need to be stored in the body in either the liver or in fatty tissues. They are transported around the body by special proteins.

foie gras A food made from the liver of a goose that has been fattened as a result of force-feeding. In French this means 'fatty liver'.

food allergy An abnormal immune response to a specific part of a food, usually a protein.

food intolerance A chemical reaction to eating a specific food or drink. Food cannot be digested properly and this accumulation causes a reaction.

food miles The distance food travels from production to point of purchase and consumption.

food poisoning A common illness, usually mild but sometimes deadly, caused by eating contaminated food or drink. Typical symptoms include nausea, vomiting, abdominal cramping and diarrhoea that occur suddenly (within 48 hours) after contamination.

fossil fuels Non-renewable sources of power that contain carbon, such as petrol, oil and coal.

from scratch Prepared from fresh ingredients, without the use of anything pre-cooked or packaged.

fructose The sugar found in fruit.

functional properties What an ingredient of a food actually does when it is prepared and/or cooked – for example, an egg will set when it is heated, so this makes it useful to thicken sauces.

generating Developing and creating a number of ideas or solutions.

genetic engineering Altering the genetic makeup of plants and animals by taking genes from one organism and inserting them into a different organism to create something with a new genetic mix.

glucose A sugar energy source produced by plant products.

gluten A mixture of two different types of protein found in cereal grains.

glycaemic index (GI) The ranking of carbohydrates according to their effect on blood glucose levels.

good fats Fats that lower cholesterol and the risk of heart disease.

green food Earth-friendly food that supports the sustainability of the environment – local, fresh, grown with minimal or no herbicides or pesticides, and grown in areas that are environmentally suitable and do not cause destruction to animal habitats.

health 'A state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity' (World Health Organization, 1946).

hunger The feeling of emptiness in the stomach; your body's signal that it needs food.

hydrogenated oils Oils hardened by the addition of hydrogen gas, which makes the fats more saturated.

hypertension Persistently elevated blood pressure.

hypothalamus The central area in the brain that controls involuntary functions.

immigrant A person from overseas who has come to settle in a new country.

incomplete proteins Proteins, usually from plant sources, that lack one or more essential amino acids.

insoluble fibre The indigestible fibrous parts of plants.

insulin A hormone produced in the pancreas to help the body convert glucose to energy.

intensity The strength or level of flavour created by the cooking of a food.

investigating The problem is developed as a result of critiquing needs or investigating opportunities of designed solutions.

kitchen hygiene The prevention of illness and the maintenance of health in the kitchen.

lactose Sugar found in milk and milk products.

lactose intolerant Unable to digest lactose (milk sugar), such as is found in milk and cheese.

land exhaustion Exhaustion, fatigue or wearing out of land from over-use, with no time in between crops for the soil to recover.

lard Pig fat that is used to tenderise meat or other food items.

legumes The seeds from some pod-bearing plants.

lifespan The length of time that a person can be expected to live and the stages through which they will progress – for example, infancy and adolescence, adulthood and old age.

lipids Substances that are insoluble in water, such as fat and oil.

macronutrients Vital energy-yielding nutrients that are required in large quantities by the body.

micronutrients Nutrients required in small amounts by the body.

micro-organism A tiny single-celled organism that is only visible through a microscope. Three types connected with food are yeast, moulds and bacteria.

minerals Elements required by the body and found in foods.

mirepoix A combination of diced onion, carrots and celery.

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moist heat Any cooking technique that involves cooking with moisture: steam, water, stock, wine or some other liquid. Low temperatures generally are used.

monoculture The planting of a single crop on a very large scale on the same land year after year.

monounsaturated fat Fatty acids that contain one double bond in the carbon chain.

morbidity The prevalence and incidence of disease and illness.

mortality Death caused by a disease, illness or other environmental factors.

mouthfeel How food or drink feels in the mouth – the sensory evaluation of impressions on the palate.

multicultural From different cultures and countries.

non-biodegradable Unable to break down or decompose in the soil or ocean.

nutrient-dense Containing a large amount and number of different nutrients.

nutrients The chemical compounds found in food that are used by the body to function and grow.

nutrition The science that studies the interaction between our bodies and food.

obesity Having a BMI of 30 or over; being 20 per cent or more above the person's ideal weight according to their height and sex.

omega-3 fatty acids Long-chain polyunsaturated fats that have health benefits.

omnivore An 'all-eater': a person (or animal) who eats a diet consisting of a variety of food sources, including both plants and animals.

organic Grown and/or produced without synthetic chemicals – for example, not using weed killers or sprays to kill insects, moulds or fungus.

osteoporosis A condition where bone deteriorates, becoming fragile and brittle, leading to a high risk of fracture and breakages.

overweight Having a BMI over 25.

palatable Having a good taste or mouthfeel when eaten.

pâté A paste made from meat, vegetables or fish.

peak bone mass When the body contains the greatest amount of bone.

personal hygiene Ensuring good cleaning and washing practices to prevent illness and maintain the health of food and food handlers.

photosynthesis The process by which green plants and other organisms turn carbon dioxide and water into carbohydrates.

plaque A fatty deposit on the inner wall of an artery.

polyunsaturated fat Fatty acids that have two or more double bonds in the carbon chain.

preference Comparing food items by placing or ranking them in order from the best or most preferred to worst or least preferred.

processed To change a food product with a series of steps – for example, peeling, cutting, boiling and putting into a can.

producing Actively realising (making) the designed solutions using appropriate resources and means of production.

product One of the outputs of the design and production processes. Products are the tangible end results of natural, human, mechanical, manufacturing, electronic or digital processes to meet a need or want.

profile Comparing two food items by ranking several features of a food item on a scale, such as saltiness, oiliness, sweet flavour or creaminess.

project management The responsibility for planning, organising, controlling resources, monitoring timelines and activities, and completing a project to achieve a goal that meets identified criteria for judging success.

prototype A trial item made to test an idea or process in order to inform further design development.

prove To double in size.

purée To blend, process, sieve, mash and/or strain cooked food to the consistency of a soft paste or thick liquid.

radiation Cooking food by direct heat from a flame or element, such as in a griller, or when electromagnetic waves pass through food, such as in a microwave.

raising agent A substance that makes a food item such as cake or bread rise. The raising agent may be chemical or natural. The air may be trapped before baking, such as in a sponge cake or steam, or air is produced during baking. Also known as a leavening agent.

raita A yoghurt dish usually mixed with finely chopped cucumber, mint and garlic.

ready-to-eat foods Foods that have been processed before they reach the home kitchen. They need limited (if any) further preparation.

reduction A process of decreasing the amount of liquid. This process occurs in a stew in order to make the sauce thicker.

renewable Able to be remade, as there can be a constant source of material to make it. For example, solar energy is renewable as there is always sunshine.

resistant starch The starchy component that is unable to be digested in the small intestine.

roux A mixture of equal proportions of butter and flour, used as a base for thickening sauces or to make gravy.

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salinity Salt levels in soil. These can rise due to poor irrigation practices.

saturated fats Bad fats that clog our arteries, such as those found in animal products like full-fat dairy and fatty meat, as well as some plant-based sources.

sauté To fry gently for a short time in a minimal amount of oil.

searing Browning the surface of meat with the use of a quick application of heat.

simmering A cooking technique by which foods are cooked in a hot liquid kept just below boiling point.

simple carbohydrates A quick energy source that does not supply any other nutrients.

soil erosion The blowing away or washing away of soil, usually as a result of trees and vegetation being removed, leaving nothing to hold the soil in place.

soluble fibre The digestible fibrous parts of plants.

specifications Constraints and considerations or issues that will need to be thought about when you come up with a solution.

spoilage Microbiological damage that occurs to the original nutritional value, texture and flavour of food. The food then becomes harmful to people and unsuitable to eat.

staple food source A food that is eaten regularly and in large quantities. It is the most eaten product in the diet.

steamer A piece of cooking equipment used to steam foods.

stewing Slow, moist method of cooking less tender cuts of meat.

stroke Damage to the brain caused by interrupted blood flow due to a blood clot blocking or partially blocking an artery.

subjective A view about food that is based on opinion rather than facts – for example, based on taste, look, smell and feel.

sucrose A complex carbohydrate found in many plants and used as a sweetening agent.

sustainability The idea that goods and services should be produced in ways that do not use resources that cannot be replaced and that do not damage the environment (*Cambridge Dictionary*); 'meeting the needs of the present without compromising the ability of future generations to meet their own needs' (UN, 1987).

tandoor An Indian clay oven that is able to cook food at high temperatures.

taste The sense by which the flavour or savour of things is perceived with your mouth and tongue.

tenderising The process of breaking down collagen in food to make it more palatable for consumption.

terrine A mixture of meat, fish or poultry and other ingredients, which is cooked and served cold.

thali A large metal plate and metal bowls used for Indian meals.

toxin A poisonous substance produced by living cells or organisms that is active at very low concentrations.

trans-fatty acids Unsaturated fatty acids that can impact on health by adversely affecting cholesterol levels. They are formed during processing of vegetable oils when making semi-solid fats such as margarine. They can also occur at low levels naturally in the fats of dairy products and meat.

umami The savoury flavour or taste sensation of food.

vegan A person who eats only plant foods. They do not eat any animal products.

vegetarian Generally, a person who eats eggs and dairy products, but does not eat any animal flesh. (This type of vegetarian is called lacto-ovo.)

vitamin An organic substance vital for the body in small quantities.

water-soluble vitamins Vitamins that dissolve in water.

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