



# FOOD TECHNOLOGY

Year 12



GOVERNMENT OF SĀMOA  
MINISTRY OF EDUCATION, SPORTS AND CULTURE

## Acknowledgements

The Ministry of Education, Sports and Culture would like to thank the following people for their vision, patience and hard work in putting together this valuable book:

Linda Moses	Author
Fa'amoemoe Soti	CMAD
Brenda Sio	Local research
Anna Egan-Reid	Illustrator
Ann Dunphy	Editing

Some of the material in this book is taken from the following text and is used with the permission of New House Publishers Ltd, Auckland, New Zealand and the listed author:

<b><i>Food Health and Well-being For New Zealanders</i></b>	Author: Patricia Bawden Acknowledgements: page 41 <i>National Heart Foundation of New Zealand</i>
---	---

© Ministry of Education, Sports and Culture, Sāmoa, 2004

Designed, edited and typeset by Egan-Reid Ltd, Auckland, as part of the Sāmoa Secondary Education Curriculum and Resources Project for:

Government of Sāmoa Ministry of Education, Sports and Culture, 2004.

Funded by the New Zealand Agency for International Development, Nga Hoe Tuputupu-mai-tawhiti.

Printed through Egan-Reid Ltd.

Managing Contractor: Auckland UniServices Limited.

ISBN 982-517-068-9

## Table Of Contents

Introduction	5
<b>Part I Food And Nutrition</b>	7
<b>Unit 1</b> Checking Up On Food Safety	7
<b>Unit 2</b> Keeping Food Safe From Micro-Organisms	9
<b>Unit 3</b> Close Up On Bacteria	12
<b>Unit 4</b> Keeping Food Safe	19
<b>Unit 5</b> Development Of Commercial Preservation Methods	21
<b>Unit 6</b> Nutrients In Our Food	27
<b>Unit 7</b> Carbohydrates	32
<b>Unit 8</b> Protein	41
<b>Unit 9</b> Lipids: Fats And Oils	47
<b>Unit 10</b> Energy	56
<b>Unit 11</b> Digestion	60
<b>Unit 12</b> What Is Available To Eat?	65
<b>Unit 13</b> Making Sense Of The Food Label	68
<b>Unit 14</b> Packaging Food	73
<b>Unit 15</b> Decoding Food Labels	75
<b>Unit 16</b> Becoming Familiar With Food Prices	80
<b>Unit 17</b> Budgeting For Food	82
<b>Unit 18</b> Why Is Sound Nutrition So Important?	85
<b>Unit 19</b> Support For The Sāmoa National Plan Of Action For Nutrition	86
<b>Unit 20</b> Meeting Soifua Mālōlōina Problems With Different Family Members	95
<b>Unit 21</b> Food For Infants And Toddlers	101
<b>Unit 22</b> Vegetarian Eating	113

**Part 2 Work Related Skills**

**Unit 23** Career Opportunities . . . . .

**Unit 24** Responsibilities When Working In The Customer Service Industry .

Food Composition Tables . . . . .

Glossary . . . . .

Key Vocabulary . . . . .

118
118
121
125
146
148

# Introduction

Talofa,

If you are a secondary school student studying Food and Textiles Technology at Year 12, this book has been written for you.

It has been designed to give you information and an understanding of different topics that relate to 'Food and Nutrition', 'Caring for the Family' and 'Customer Service.'

In this book we continue to build on the knowledge and skills gained in Year 11. By now you will be working more independently and there will be an expectation that you will research further than the information contained in this book. At this level of study you become investigators, researchers, evaluators and analysers. The information set out is a starting point for your knowledge in Year 12 and 13 as you set out to work towards the PSSC Prescription in Design Technology 1 and 2.

Whichever context you have worked in during years 9–11, whether it has been 'Food' or 'Textiles' or both, in Year 13 the assessment will expect you to be able to do more than just work through a given design brief. There is an expectation at this senior level that you will create your own brief for a perceived need or situation which has been identified as an issue. This book will show you how to carry out this process.

There is not a separate section in this book on Textiles but the information on the design process for Food is equally appropriate for work with Textiles. The information written in Year 11, Book 2, *Food and Textiles Technology* has information on siapo which can be extended and developed in a practical context at Year 12. In Year 12 you should be able to create siapo yourself with the assistance of a tutor who has specialist skills in this art form. The focus of the work in Textiles will not just be on creating individual items. The scope at Year 12 extends to researching mass production techniques in the clothing industry. At present this is not developed to any great extent in Sāmoa, so it will be necessary for you to look for examples from overseas countries.

There is a section in this book on 'Career Opportunities' and 'Customer Service.' This is of particular importance as students focus in Year 12 on the 'World of Work'. The knowledge gained by being involved in learning throughout the school in the areas of 'Food, Textiles and the Family' will have heightened your awareness of a range of career opportunities to follow when you leave school.

Each section in this book has a list of key words at the top. The meanings of these words are given to you in the glossary at the back of the book. There are activities throughout the book that you can complete individually or in groups.

We hope you will experience new and exciting things as you journey through this book exploring more information about food and its effects on the family. By extending your knowledge of the design process, you can relate it to any work you have the opportunity to do in textiles technology.



## Checking Up On Food Safety

In Years 9 and 10 we identified the traditional methods of preservation used by our ancestors in Sāmoa and explored ways of preserving seasonal fruit and vegetables. The causes of food contamination were investigated in Year 11 and the role of additives in commercially produced food was studied. In this book we will investigate the different types of bacteria that cause deterioration in our food and the commercial methods used to preserve food so it is safe to eat. So we can be sure that the food we prepare is safe to eat we will look at how we can put 'The Food and Drug Act 1967', which regulated the provision of safe food to the consumer, into practice every time we prepare food.

Each year many of us will suffer from food poisoning. Food poisoning is defined as an illness characterised by stomach pains, diarrhoea and sometimes vomiting, developed within 36 hours of eating affected food. When we look at what causes food poisoning we will see how it could easily be prevented. Often the cause is poor standards of equipment or lack of facilities to maintain hygienic standards, but it can also be the result of:

- having little knowledge of hygiene rules related to safe food handling
- having little knowledge of the importance of personal hygiene and its relationship to safe food preparation
- being careless when preparing food.

We start this section by reviewing the work covered in Year 11.

This first activity over the page will go over what you next need to know and understand about food safety.

### Key Words

Contamination  
Deterioration  
Bacteria  
Regulated  
Enzyme  
Radioactivity  
Parasites  
Diarrhoea



## Activity 1

- 1 Read through the chapter on page 13–16 in Year 11, Book 1, *Food & Textiles Technology* on the ‘Cause of Food-borne Illnesses and Disease-Causing Agents’ and answer the following questions in your book:
  - a Explain the term ‘Food-borne illness’.
  - b Name the symptoms that can occur in our body if we develop a food-borne illness.
- 2 Compare and contrast enzymes and bacteria by taking into consideration the following points:
  - a how they get into food
  - b how we would know they are present in the food we are eating
  - c how they develop or grow in food.
- 3 Explain how chemicals, metals, radioactivity and parasites can get into our food.
- 4 Give an example of two foods which can be toxic to some people and explain what we mean by the term ‘toxic food’.



# Keeping Food Safe From Micro-organisms

To make sure that food is safe to eat, it is necessary to know what causes food spoilage. In the air there are certain micro-organisms called moulds, yeasts and bacteria which cause food to decompose, putrefy and go sour. When this happens any of the following effects can be seen in the food. It can:

- become discoloured
- smell unpleasant
- become sticky
- turn slimy.

### Key Words

Micro-organisms  
Decompose  
Putrefy

**Did you know** that anyone who has food poisoning should immediately stop preparing food for others? The infection can easily be transferred to food by infected food handlers.

## Moulds

These are simple plants which gradually grow on food. Moulds look like tiny whiskers and grow into a furry film over time. Moulds grow particularly well on sweet foods like cake, and meats and cheeses. They also thrive on jams and pickles. Moulds are frequently found on bread which has not been kept refrigerated.

Apart from food, moulds need warmth, moisture, air and darkness to grow. They are killed by heat and sunlight. Unlike other micro-organisms moulds are not harmful but they can make food taste musty. Some moulds are used to give flavour to cheese, e.g. blue cheese like Stilton, and mould is used to produce antibiotics like penicillin. Storage in a cold dry environment is the best way of preventing moulds from forming.

## Yeasts

These single-cell plants or organisms grow on foods containing moisture and sugar. This process is called fermentation. Foods containing a small percentage of sugar and a large percentage of liquid such as fruit juices are the ones that ferment easily. When yeast feeds on sugar, it produces an alcohol. This is how yeast is used in the beer and wine-making industry. Refrigerating food is the best way of preventing yeasts from causing food spoilage. Keeping fruit and vegetables in the chiller means they stay fresher longer. Yeasts are destroyed by heat, so cooking food destroys their action.

## Bacteria

*Bacteria* are smaller than yeast cells and there are many different types which can cause food to deteriorate. They spoil food by attacking it, leaving waste products, or by producing poisons in the food. The consequences of bacteria entering our body can vary from mild physical discomfort to severe pain, vomiting, diarrhoea and even death. Whenever a person develops food poisoning the doctor will try and track down the cause of the food poisoning. Sometimes the symptoms the patient describes and the foods eaten in the last 24 hours will provide a guide to the cause of their problem. A sample of the bacteria viewed under the microscope can also help identify its type.

## Enzymes

Food spoilage can also be a result of chemical substances called enzymes which are produced by living cells. The over-ripening and aging of fruit and vegetables is caused by enzymes. Enzyme activity is used to soften meat. When we kill an animal, the carcass is hung and the enzyme activity in the meat softens the muscle structure. However, at a certain point the enzyme activity in the food must be stopped, by either refrigerating it or heating to a high enough temperature and for sufficient time to destroy the enzymes.

## The Acidity And Alkalinity Of Foods

The acidity and alkalinity of food determines how well it will keep. Bacteria, particularly the harmful ones, are not very tolerant of acid conditions. Meat and fish, which are not very acidic, are very susceptible to bacterial spoilage.

The level of acidity, or alkalinity, is measured by its pH value. The pH value can range from 1 to 14 with pH7 indicating the food is neither acid nor alkaline. This is shown in Figure 2.1 on page 11.



Acid					Alkaline									
1	2	3	4	5	6	7	8	9	10	11	12	13	14	
strong acid		medium acid			weak acid			weak alkaline		medium alkaline			strong alkaline	
lemons vinegar		bananas carrots tomatoes						minerals waters		egg white baking soda				

Figure 2.1 Acidity and alkalinity of foods

By lowering the pH value of food, we increase its acidity. This reduces the opportunity for micro-organisms to grow.

**Did you know** that you can find out which foods are likely to be particularly susceptible to micro-organism growth by testing their pH value?

## Activity 2

In this activity we will use litmus paper to test the acidity and alkalinity of food. It turns red if put on to an acid base food, and blue if placed on an alkaline based food. It stays the same if placed on a neutral based food.

With the help of your teacher, work in small groups to test different foods to compare their pH value.

Some foods you might like to try are banana, coconut milk, cows' milk, bread, meat, cola flavoured drinks, yoghurt, ice-cream. With some of the foods you test you will need to add some liquid to the food to make it moist enough to work on the litmus paper.

Having carried out the experiment, write up your findings and explain the different results, e.g. Which foods are susceptible to micro-organism growth? Why do yoghurt and ice cream (which are both made from milk) produce different results?



# Unit

# 3

## Close Up On Bacteria

### Key Words

Symptoms  
Abdominal  
Dehydration  
Sanitize  
Toxin  
Collapse  
Incubation  
Vacuum packed  
Antitoxin  
Paralysis  
Germinate  
Environment

### Salmonella

*Salmonella* is a bacteria that many people have heard of and experienced! Salmonella poisoning is one of the most common forms of food poisoning. Salmonella is present in the intestines of animals such as chickens, cats, dogs, rats, mice, shellfish and human beings. Under the microscope salmonella bacteria look like long bodied spiders.

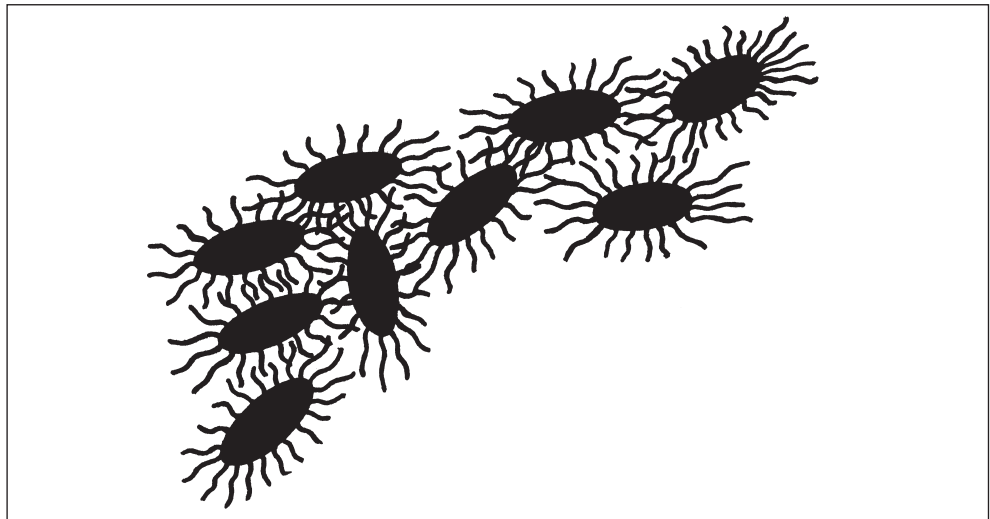


Figure 3.1 *Salmonella*

### Salmonella can infect food being prepared if:

- the food handlers do not take care with their personal hygiene
- chicken, meat, eggs, raw food and shellfish are contaminated with the bacteria and not cooked thoroughly
- shellfish is taken from contaminated waters
- safe food handling practices are not used in food preparation, e.g. washing hands and equipment and surfaces after handling raw poultry to stop cross-contamination.

The illness caused by salmonella food poisoning can last 1 to 8 days. It usually takes 12 to 36 hours to develop after infected food has been eaten. Symptoms include a high temperature, vomiting, diarrhoea, headache and abdominal pain. These symptoms can be so severe that death can occur, usually due to dehydration.

**The following steps can reduce risks:**

- ❑ cooking food thoroughly to a temperature of 75°C to 80°C on the inside to destroy bacteria
- ❑ thawing food completely before cooking
- ❑ separating raw and cooked food
- ❑ washing hands after going to the toilet or handling raw meat
- ❑ washing and sanitizing all equipment after it has come into contact with raw meat.

**These three points all help to prevent cross contamination between fresh and raw food:**

- ❑ If food is to be eaten cold, cook quickly and place in the refrigerator at 4°C or less.
- ❑ Never leave high-risk food between 4°C and 63°C for more than two hours.
- ❑ Keep all animals and pests out of the kitchen and away from food preparation areas.

## Staphylococcus Aureus

*Staphylococcus aureus* bacteria releases toxins into the food as it grows. Under the microscope this bacteria looks like clusters of small dots.

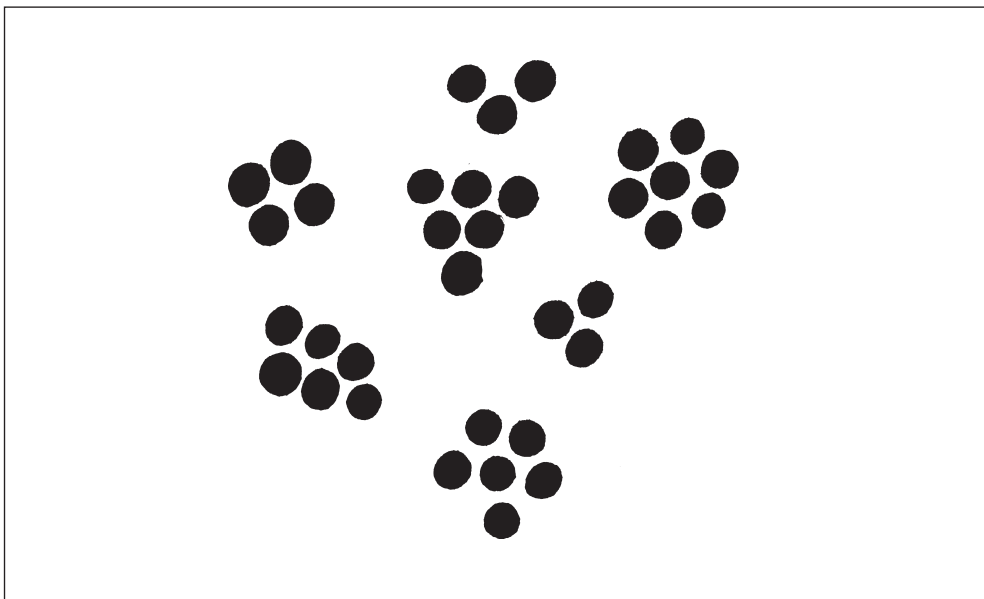


Figure 3.2 *Staphylococcus Aureus*

It is found in scratches, pimples, infected burns or unhealed cuts, on the hands and in the nose, throat and ears. At least 50 per cent of humans can be carriers of this bacteria. Foods affected include those which are handled a lot and are eaten cold such as chicken, brawn, corned beef, and ham. Meat pies are also at high risk from *Staphylococcus aureus*. Foods like cream cakes and custards also provide good breeding grounds for this bacteria.

The incubation period is very quick, just 2 to 6 hours and the illness usually lasts a maximum of 24 hours. The usual symptoms of food poisoning occur: severe vomiting, abdominal pain and diarrhoea. People can collapse as a result of getting dehydrated from vomiting.

### The following steps can reduce risks:

- 1 Wash hands carefully:
  - ☐ before starting work
  - ☐ after blowing the nose, or touching your face after using the toilet.
- 2 Remove jewellery, cover any pimples, scratches and burns on the hands with disposable plastic gloves.
- 3 Touch food as little as possible with your hands, e.g. use tongs, spoons, etc.
- 4 Rapidly cool any 'at risk' foods to temperatures below 4°C and never have danger food between 4°C and 63°C for more than two hours.
- 5 Keep the kitchen and equipment clean.

## Clostridium Perfringens

*Clostridium perfringens* lives in the intestines of humans and animals and in the soil. Flies pick these bacteria up from dust and dirt and transport it to food. The bacteria produces toxins by growing on the food being digested in the intestine. The bacteria will only grow if there is no air, so the intestine is a perfect breeding ground. *Clostridium perfringens* produces spores which are sausage shaped. These bacteria are liable to survive light cooking, therefore foods need to be cooked thoroughly.

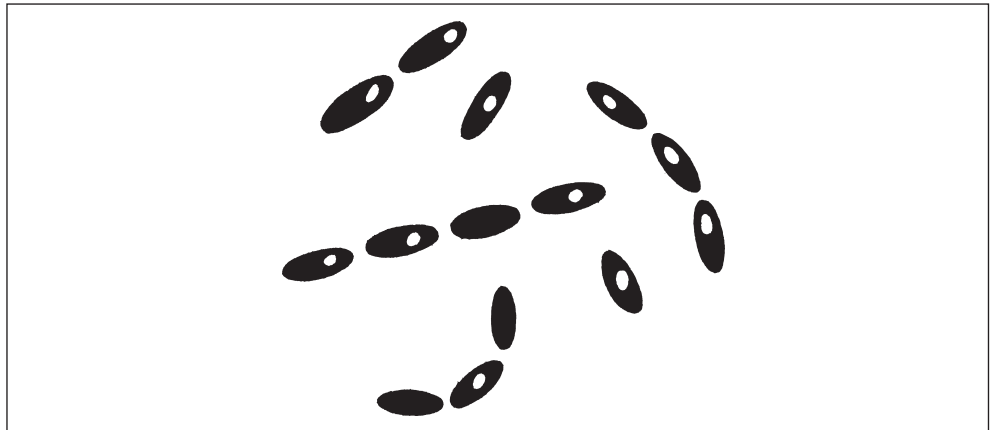


Figure 3.3 *Clostridium Perfringens*

Foods affected include raw meats, chicken and reheated meats which are cooled slowly and inadequately reheated.

Again the incubation period is only 6 to 24 hours and the illness normally only lasts 12 to 24 hours. Abdominal pain and diarrhoea are the main symptoms.

### The following steps can reduce risks:

- 1 Food handlers must always wash their hands after going to the toilet to avoid contaminating the food.
- 2 Use separate preparation and storage areas for raw food and cooked food to avoid cross-contamination.
- 3 Cool cooked food quickly and then refrigerate at 4°C.
- 4 Avoid cooking food such as stews and casseroles in advance.
- 5 If reheating food do it as rapidly as possible, to 83°C in the centre.
- 6 Never reheat food more than once, as the risk of food poisoning is very high.

## Clostridium Botulinum

*Clostridium botulinum* is found in meat and fish and in the soil. This bacteria produces spores and toxins by growing in food, but only if there is no air present. Vegetables that have come into contact with the soil are often affected by this bacteria. Foods that are bottled or vacuum packed, for example meat, fish and vegetables, are the ones most easily affected.

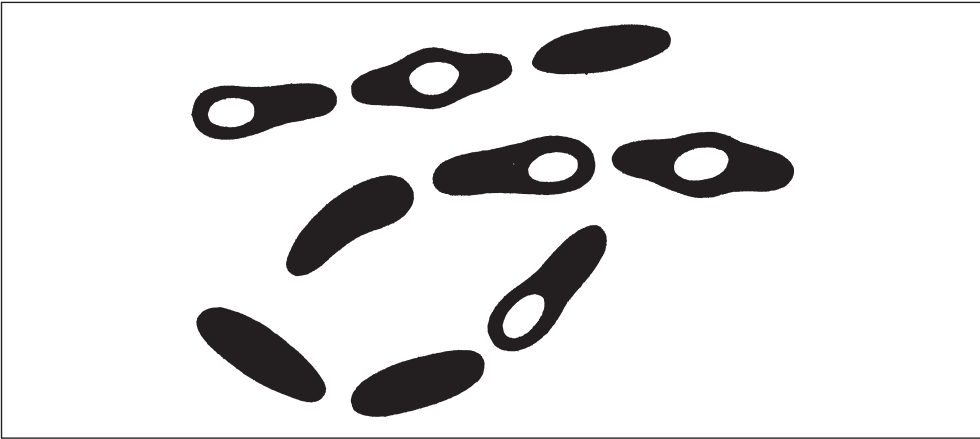


Figure 3.4 *Clostridium Botulinum*

It can take 24 to 72 hours for a person to become sick after being exposed to this bacteria. Diarrhoea is usually the first symptom and then the nervous system is attacked with fatigue, dizziness, loss of vision, inability to breathe and speak, normally resulting in paralysis and even death unless an anti-toxin is given.

### The following steps can reduce risks:

- Avoid home-preserved vegetables, fish and meat because of the high temperature required to kill this bacteria. Freezing is a better option or place in a pressure cooker at 116°C for 20 minutes.
- Avoid eating raw fermented fish.
- Clean hands before and after handling raw foods and after handling vegetables or any food which may come into contact with the soil.
- Refrigerate food below 4°C.

**Did you know** Botulinum spores do not germinate and produce toxins in strong solutions of sugar, salt and vinegar? However these solutions have no effect if the toxin has already been produced.



## Bacillus Cereus

*Bacillus cereus* causes toxins that are released into the food when bacteria grows in the food. This bacteria will only grow if air is available.

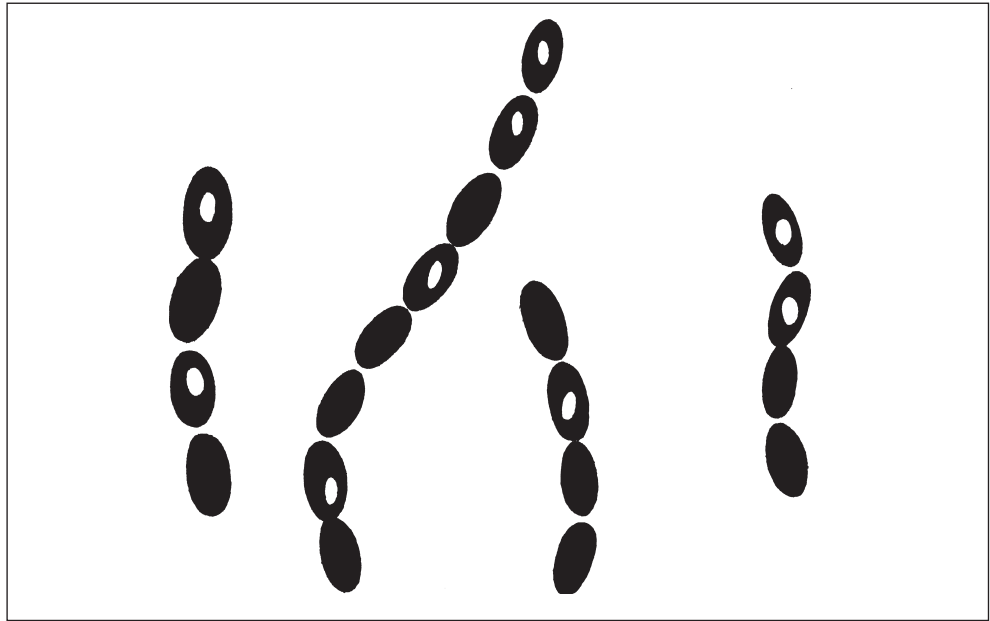


Figure 3.5 *Bacillus Cereus*

It gets into the food through soil and dust. Foods which have been cooked are the ones most commonly affected by this bacteria, e.g. pre-cooked rice and cereals, cooked vegetables and cooked and reheated meat dishes. Illness can be caused by the bacteria in as little as 1 to 15 hours and last for 1 to 2 days. Symptoms include vomiting and diarrhoea.

### The following steps can reduce risks:

- Wash hands before handling any raw food and before handling cooked food.
- Cool cooked foods rapidly and refrigerate at 4°C.
- If reheating cereals, etc, reheat rapidly and thoroughly and serve quickly.  
Never reheat rice products or meat more than once.

## Listeriosis

*Listeriosis* is caused by infection and is found everywhere in the environment.

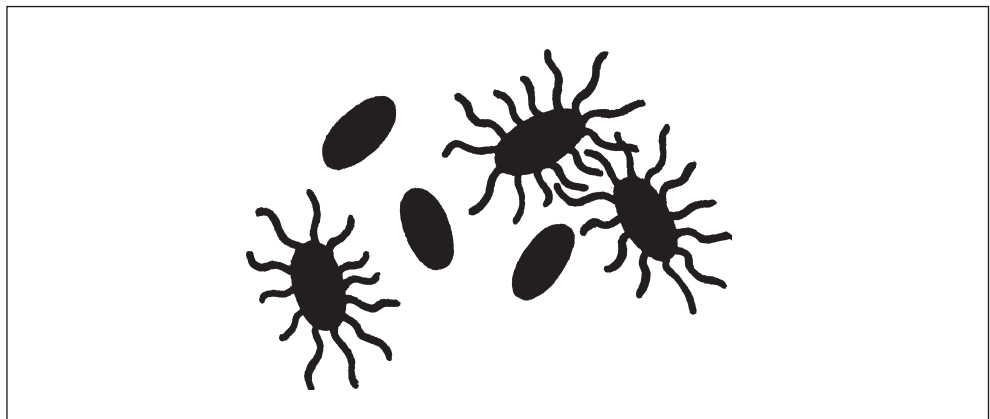


Figure 3.6 *Listeriosis*

Storing food for too long in the refrigerator could result in listeriosis infection. A person being infected with this bacteria whose immune system is not as good as it should be could develop septicaemia and meningitis. It can also affect an unborn child if a mother is exposed to the bacteria. This bacteria can cause an abortion in pregnant women. Coleslaws and other similar mayonnaise-coated cold salads, cold chicken and shellfish are all easily infected as a result of incorrect storage.

### The following steps can reduce risks:

- ❑ People at risk should avoid chilled food. Food prepared for more than 12 hours may not be safe.
- ❑ Cooking food to 75°C will destroy Listeria so canned foods, dry goods and freshly cooked foods are safe.
- ❑ If food is to be heated in a microwave it must be heated right through and left to stand for the required time.
- ❑ Reheat food until it is piping hot, preferably until it reaches 83°C in the centre.

## Activity 3

**Did you know** that one of the ways we remember facts is by making connections in our brain? If we can develop a pattern we are more likely to make links between different aspects of our knowledge.

- 1 Create a mind map that builds on the similarities and differences that occur between the different types of bacteria described above.

This will help you to make links in your learning. Here are some examples to get you going. You can decide the headings you would like to use to group your boxes of key learning. For example, on the following page are examples of facts that could be grouped under a subtitle, e.g. Where is the bacteria found?



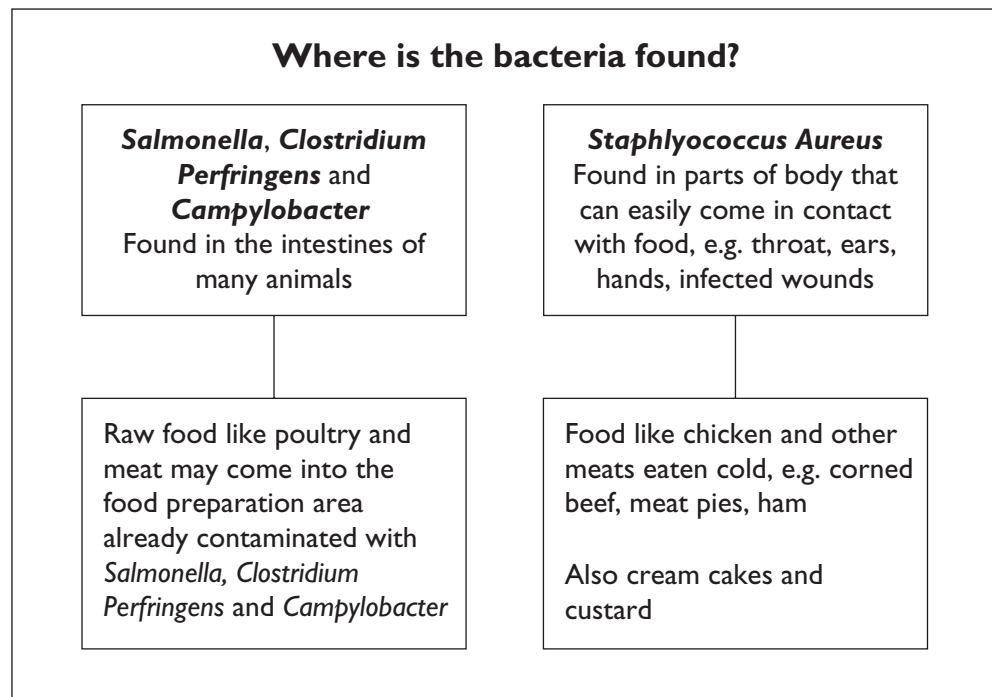


Figure 3.7 Where is the bacteria found

Some other possible titles could be:

- 'How the bacteria gets into our food'
- 'The symptoms of food poisoning caused by different type of bacteria'
- 'How to keep food safe from different types of bacteria'.

- 2 Identify the bacteria which is the most unique (has fewer things in common with the majority of other bacteria). *Give your reason for coming to this decision.*

## Keeping Food Safe

The common theme that goes across all the work we have done on preservation is that raw food will provide a breeding ground for bacteria. Some very perishable raw foods like freshly caught fish will deteriorate within hours if not kept cold.

To preserve food for any length of time the growth of bacteria has to be destroyed or slowed down by:

- freezing
- heating and bottling or canning
- pickling in vinegar
- preserving with salt or sugar
- smoking or drying the food.

Regardless of how you preserve fruit and vegetables (e.g. freezing, bottling, etc), it is necessary to 'blanch' these foods first. Blanching involves exposing the food to temperatures of 95–100°C in steam or boiling water before preserving. By holding the food at this temperature for a short time, any enzymes present in the food are inactivated. Once the enzymes are inactive they cannot cause discolouring, bad flavours or odours in the food.

### Activity 4

- 1 Name the preserving methods mentioned above that would not be suitable to stop deterioration in fish.
- 2 Give an example of one fish product preserved using each of the preservation methods mentioned above. Below is an example for you.  
Freezing – Fish Fingers or Fish Cakes
- 3 What is the purpose of 'blanching' fruit and vegetables before preservation?

#### Key Words

Breeding  
Pickling  
Perishable

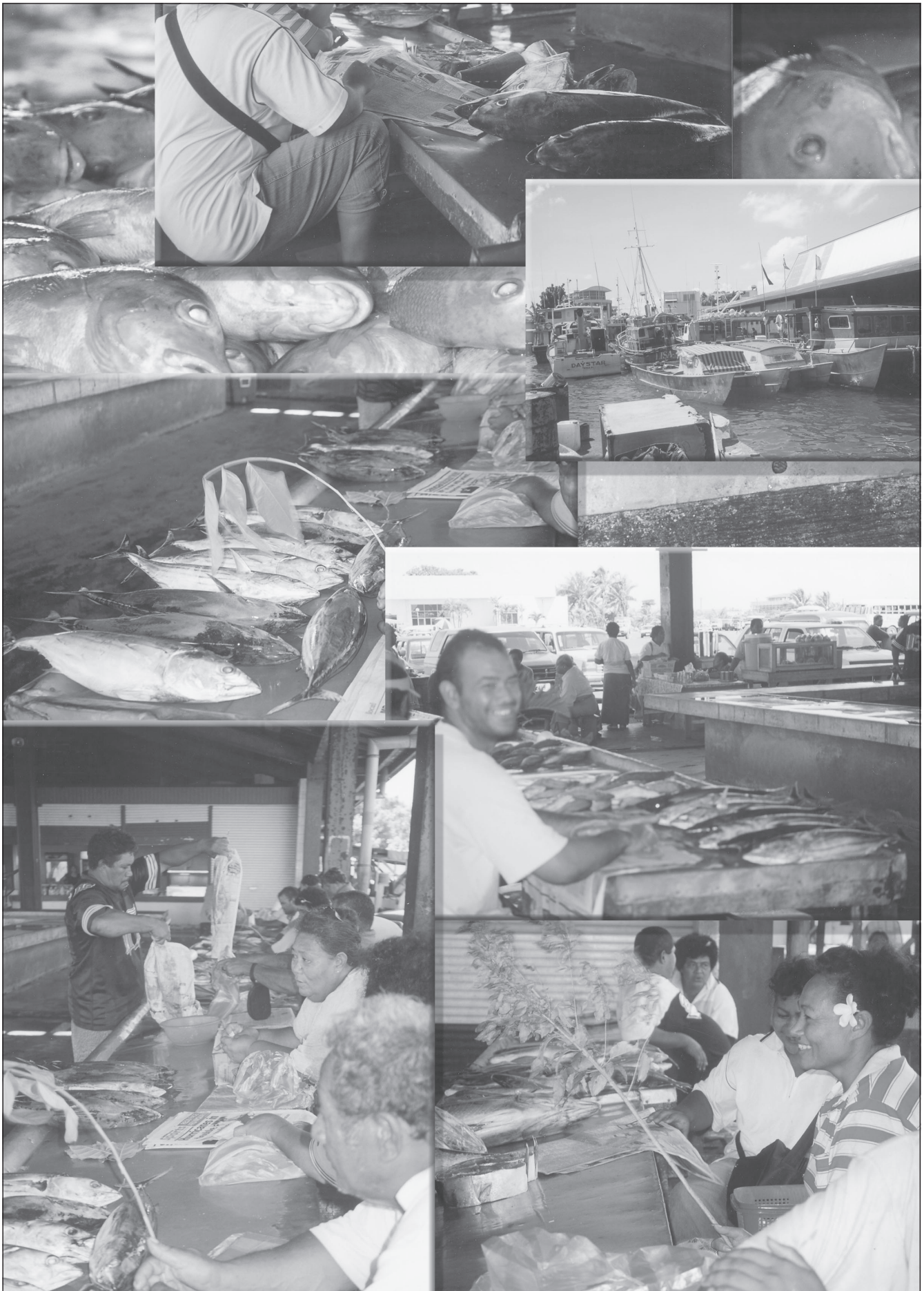


Figure 4.1 Keeping the fish fresh at the Apia fish market



## Development Of Commercial Preservation Methods

Having investigated in previous years how our ancestors used technology to solve problems with food supply for the family, it is now appropriate to investigate how methods of food preservation used commercially today were discovered and developed.

### Canning Or Bottling Food

This commercial process of food preservation goes back to 1795 when the French Emperor Napoleon was marching across Europe with his army and food supply became a major problem. The French Government of the time decided to offer a prize for the invention of a method of food preservation that could be used to keep food safe and in plentiful supply to the soldiers. Nicholas Appert, a chef of the time, used technological practice to experiment with putting food into glass containers and then standing the jars in a bath of boiling water. Technology was starting to solve the problem. The food stayed edible for a considerable length of time. However, it was not the complete solution because glass does not travel well! The solution to the problem of safe food in a container that would not break came in 1809 when Appert developed a process of preserving food in sealed metal containers. This was the beginning of the canning process.

#### Today food is commercially canned using:

The **conventional** method places the food in a container, seals it and heats it to temperatures that range from 105°C to 140°C. Some foods need to be heated to very high temperatures to kill the micro-organisms they may contain. To achieve the high temperature, the cans have to be placed in closed vessels called retorts and heated under pressure using steam. Other foods can just be heated in hot water or steam at atmospheric pressure.

The **aseptic** method involves heating the food to achieve commercial sterility and then placing it in a sterile container and sealing it. This method is used for foods which are liquid in consistency, e.g. fruit juices, purees and milk products.

#### Key Words

Sterile  
Acidic  
Alkaline  
Neutral  
Consistency  
Blanch  
Dense  
Composition  
Sublimation  
Reconstitute

### The length of time for heat treating foods depends on three important factors:

- ❑ **The pH of the food.** A food which measures 0 is acidic and 14 is alkaline while a food which measures 7 is neutral. A food with a pH above 4.5, e.g. tomato, is classified as a low acid food and requires less severe heat treatment to kill bacteria than food with a lower level of acidity.
- ❑ **The consistency of the food.** A dense food or solid food requires much longer to heat through completely than a liquid food.
- ❑ **The size of the container.** The bigger the container the longer it takes to heat the contents to the temperature which will destroy bacteria.

## Freezing

The principle of canning and bottling food is based on destroying bacteria by treating food for a sufficient length of time at a high temperature.

The opposite condition of low temperature can also stop or retard their growth. Freezing is the most satisfactory method currently available for long-term preservation of food. This method of preservation ensures the food keeps its colour, flavour and nutritive value. Food which is frozen retains its Vitamin C better than food which is canned or dried, because it is not exposed to heat. The only heat the food is exposed to is during the brief time taken to blanch fruit and vegetables.

**Did you know** that the birth of commercial freezing began when Clarence Birdseye experimented with freezing rabbit meat between two cold metal plates.

He got the idea of freezing food when visiting the cold climate of Labrador in Canada. He discovered that the secret of freezing food successfully is speed.

**Contact freezing** was the name given to the method Clarence Birdseye discovered for placing food to be frozen between two refrigerator plates. It is an ideal method for freezing food like fish.

Water on its own freezes at 0°C but the water in food does not freeze until a temperature of below -15°C is reached. The point at which all the water in a food is frozen depends on the size and composition of the food. A large piece of food which is dense in its composition (is more solid than liquid in its normal state) will take much longer to freeze. In a large piece of food the ice crystals that form inside the food will also be large and can rupture the cell walls of the food. This causes food to lose its shape when thawed.

The first method used to freeze vegetables was based on the contact method. Birdseye's frozen peas were considered a luxury food item in the Western world in the 1960s because they looked and tasted so much better than tinned peas. But the whole pack of peas had to be eaten at the same time because they came frozen in a solid block of ice. Today we take it for granted that we can use just the amount of peas we want from the bag. This is because they have gone through a freezing process called **snap freezing**. The pieces of food don't stick together because the food is blown down a cold tunnel of air which freezes each piece of food individually.



**Blast-freezing** is similar to snap freezing. It is used to freeze foods like pre-cooked meals and is carried out by sending the packaged food through a tunnel which is blasted by a current of freezing air.

**Immersion freezing** was developed to freeze large pieces of food, e.g. chicken. The food is packaged and then placed in a refrigerant (such as liquid nitrogen which has a temperature of  $-196^{\circ}\text{C}$ ) that quickly reduces the temperature of the food so it freezes.

The method used for freezing depends on the type of food to be frozen. For food to be successfully frozen without losing colour, nutrients or shape, the freezing process must be carried out as rapidly as possible.

Foods that contain a high percentage of water are unsuitable for freezing because of the large number of ice crystals created when frozen. Lettuce is a good example of a food that does not respond well to freezing. Once thawed, green leafy vegetables will become limp and soggy.

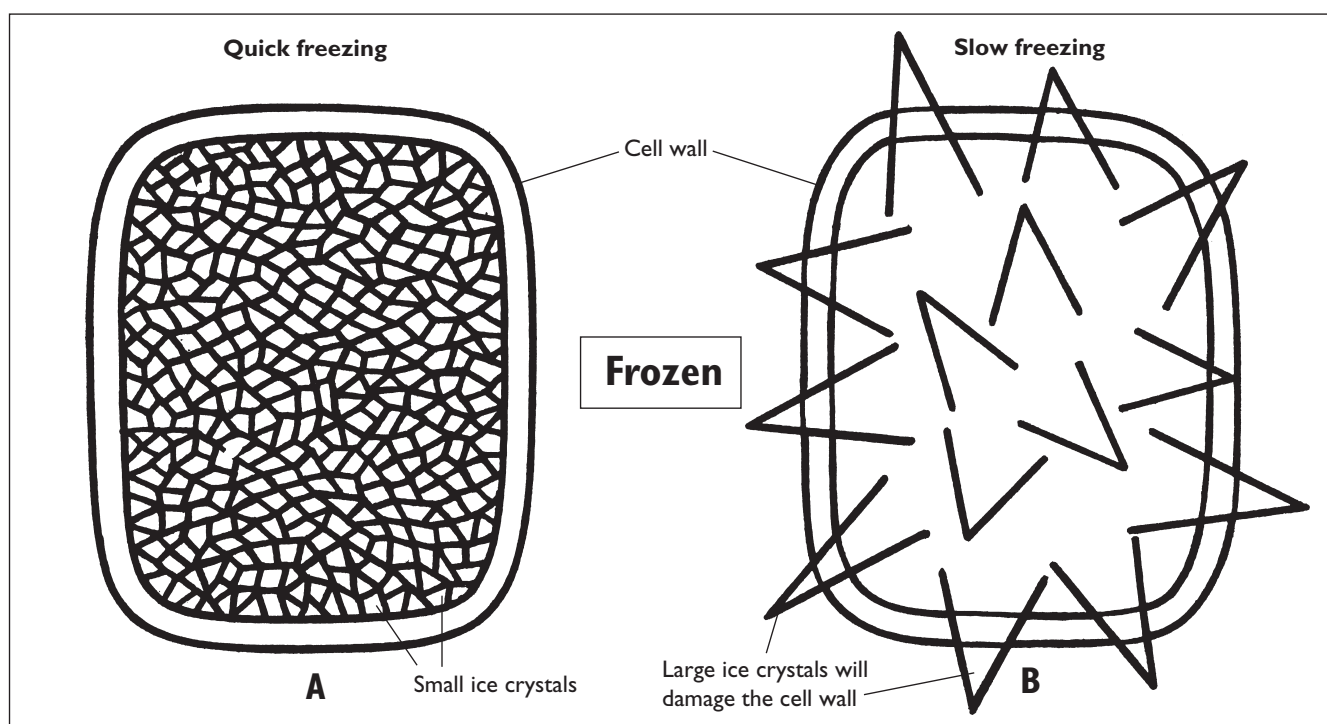


Figure 5.1 Cell wall of a food that is quick frozen **A** versus a food that is slow frozen **B**

Whatever food preservation technique is used commercially, it must be economically and efficiently carried out. The cost of preserving a food can make the food too expensive to buy.

## Drying Food

Micro-organisms and enzymes require water to survive, so removing moisture from food helps to prolong its life. This is one of the oldest methods used to preserve food. The traditional methods of drying food in Sāmoa were explored in Year 9. Drying food in the sun or air drying it in a warm oven requires the food to be subjected to high temperatures for a considerable length of time. This means Vitamin B and C are destroyed during this method of preservation. This method of drying works well for certain types of fruit and vegetables, fish, meat and cereal grains.





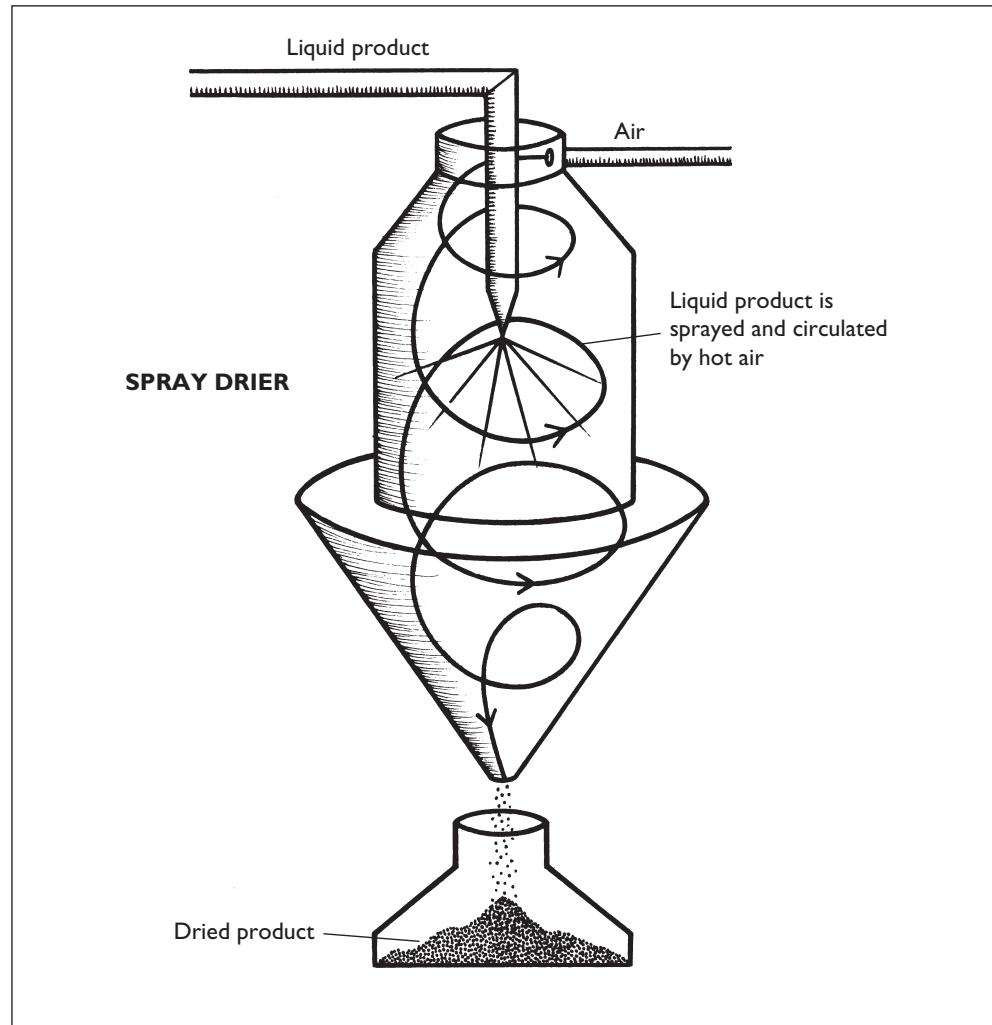


Figure 5.2 Spray drying

To dry liquid foods, it is necessary to ‘spray dry’ them. This method is used to create products like milk powder. The liquid food is circulated in a hot spray-drying chamber to remove as much of the liquid as possible. The technologists who developed this method of preservation were applying the principle observed from watching clothes dry. The windier the day, the faster the clothes dry.

With the drying of food, technologists were still trying to prevent the loss of water-soluble nutrients during the preservation process. They eventually came up with the solution of freeze-drying where the food is first frozen and then dried under pressure. The process of turning a solid (ice) into water vapour (gas) without going through a liquid phase is called **sublimation**.

**Did you know** that just as canning was invented to help solve the food needs of Napoleon’s army, freeze-drying was developed because astronauts needed to have food that was lightweight and suitable for space travel?

It is interesting to see how meeting the needs of one particular group in society can benefit other people too.

Freeze drying produces food with low levels of moisture and minimal change to nutrients, structure, colour and flavour. The food is lightweight which increases the volume of food that can be transported and storage costs do not apply because the food does not require cold storage. Food which has been freeze dried is easy to reconstitute and looks and tastes like fresh food.



## Activity 5

- 1 Carry out the following experiment to test the suitability of foods for freezing.
  - a Collect food samples to test, e.g. sugar, flour, carrots, banana, lettuce, cucumber, taro, tomato, beef mince. Use the foods that are available to you.
  - b Divide the food samples to be tested in half. Wrap one half of each food sample in cling wrap and place in the freezer. Store the other half of each food sample by using the most appropriate method, e.g. beef mince in refrigerator, flour in airtight container.
  - c After 1–2 days remove the samples from the freezer and thaw.
  - d Compare the appearance and texture of the ‘control food samples’ with their equivalent thawed food sample. Record your results in your book, using the chart below as a guide for recording results.

*Table 5.1*

Food	Control Results		Frozen Results	
	Colour/Appearance	Texture	Colour/Appearance	Texture
Taro				
Flour				
Sugar				
Banana				
Minced beef, etc				
Lettuce				

- e Explain the changes in the colour/appearance and texture of the food samples after freezing and thawing.
  - f List the foods tested that proved to be unsuitable for freezing. Explain why this group of foods is unsuitable for freezing.
  - g Describe the type of foods that freeze most successfully.
- 2 What is the reason for freezing being the most satisfactory method of preserving food?
- 3 Frozen vegetables cost considerably more than fresh vegetables.
  - a Discuss the reasons for this with a partner.
  - b Justify when the extra cost involved in buying frozen vegetables might be considered a better option.

**4** Debate the nutritional content of commercially produced foods with fresh foods. Your teacher will put you into four groups and give you one of the following types of food to investigate:

- fresh
- frozen
- canned
- dried.

Using information from this chapter and the food tables you have available, prepare a debate to support the argument that your type of food provides the best nutritional value.

In order to support your argument, your team will need to:

- a** Investigate the nutritional advantages and disadvantages of each food type.
- b** Take into consideration the factors in Sāmoan society that determine food choice.



## Nutrients In Our Food

Food is any substance, solid or liquid, which after digestion and absorption is used to build and maintain body tissues, regulate body processes, give protection from disease and supply energy.

Food comes from a variety of sources:

- animals, e.g. milk, cheese, eggs, fish, meat, chicken
- plants, e.g. fruit, vegetables, grains
- manufactured foods: often a combination of ingredients from different sources, e.g. cakes, biscuits, ice-cream, sauces.

### Nutrients

Good nutrition is essential for total health and well-being. What we eat affects the way we feel, our looks, our resistance to disease, and our sports performance.

All foods are made up of a mixture of chemical substances called nutrients. Nutrition is the study of the various nutrients found in foods, their sources and how they are used in the body. Food can be broken down into over fifty different kinds of nutrients. Essential nutrients are the nutrients needed for the body to survive – for growth, maintenance and repair of the body. The amounts of various nutrients that people require is different at different stages in their lives; for example, during adolescence, pregnancy or old age. A balanced supply of the essential nutrients for each stage will ensure good health and well-being. The six types of essential nutrients present in our foods are carbohydrates, proteins, lipids, minerals, vitamins and water.

#### *Nutrients may be divided into two subgroups – Macronutrients and Micronutrients*

**Macronutrients** (Nutrients required in substantial amounts each day):

- carbohydrates
  - protein
  - lipids: fats and oils.
- } supply energy

**Micronutrients** (Nutrients required in very small amounts each day):

- vitamins
- minerals.

Any single food may contain just one nutrient, such as sugar which contains only carbohydrate; or several nutrients, such as milk which contains protein, calcium, fat and vitamin A. Breast-milk contains all the nutrients needed for the health and growth of a baby. The emphasis now is on the eating of a diversity of foods to provide the body with a wide range of nutrients.

We are constantly learning more about nutrition, especially the role of the micronutrients in the body. For example, we now know much more about the role of antioxidants (vitamin A, C and E) in the possible prevention of heart disease and cancer.

## Nutrient Additions To Diet And Foods

### Supplements

Due to advertising some people have started to take vitamin and mineral tablets. The companies manufacturing these tablets want us to believe that we cannot obtain all our nutritional requirements from a well-balanced diet. Using supplement tablets is very expensive and there is the chance of harmful side effects if people take more than they need.

### Fortification and restoration

Some of the countries that Sāmoa imports food from, e.g. New Zealand, have food regulations that allow for food to be fortified with vitamins and minerals to improve their nutritional quality. This enables food manufacturers to add nutrients that have been lost in processing or to help balance nutritional deficiencies in people's diets, e.g. calcium-enriched orange juice.

The following list outlines the types of food most frequently fortified with added nutrients.

- savoury biscuits
- dried milk/milk power
- bread
- skim milk, non-fat milk, reduced fat milk
- flour
- cheese and cheese products
- pasta
- beverages derived from legumes
- fruit, tomato and vegetable juice
- textured vegetable protein
- fruit drinks and cordials with at least 25% juice
- extracts of meat, yeast and vegetables
- supplementary drink bases.



## Nutrition Information on the label of a breakfast cereal

Servings per package – 18 Serving size – 30 g (1 metric cup)†

	per 30 g serve	per 30 g with 1/2 cup skim milk	per 100 g
<b>Energy</b>	478 kJ (114 Cal)	665 kJ (159 Cal)	1593 kJ (381 Cal)
<b>Protein</b>	2.3 g	6.9 g	7.8 g
<b>Fat</b>	0.1 g	0.2 g	0.2 g
<b>Carbohydrate</b>			
– Total	25.6 g	32.1 g	85.5 g
– Sugars	2.6 g	9.1 g	8.7 g
<b>Dietary fibre</b>	1.0 g	1.0 g	3.2 g
<b>Cholesterol</b>	0 mg	5 mg	0 mg
<b>Sodium</b>	306 mg	376 mg	1020 mg
<b>Potassium</b>	25 mg	242 mg	84 mg
<b>Thiamin (Vit B1)</b> (% Aust. R.D.I*)	0.28 mg (25%)	0.33 mg (30%)	0.92 mg (83%)
<b>Riboflavin (Vit B2)</b> (% Aust. R.D.I*)	0.4 mg (25%)	0.6 mg (37%)	1.4 mg (83%)
<b>Niacin</b> (% Aust. R.D.I*)	2.5 mg (25%)	3.3 mg (33%)	8.3 mg (83%)
<b>Folate</b> (% Aust. R.D.I*)	100.0 µ (50%)	107.5 µ (54%)	333.3 µ (167%)
<b>Iron</b> (% Aust R.D.I*)	3.0 mg (25%)	3.0 mg (25%)	10.0 mg (83%)

(\*Recommended Dietary Intake)

† Cup measurement is approximate and is only to be used as a guide. If you have any specific dietary requirements please weigh your serving.

**Ingredients:** Corn, sugar, malt extract, salt, mineral (iron), vitamins (niacin, riboflavin, thiamin, folate).

Some health professionals are opposed to fortified foods. They argue that if people had healthy diets they wouldn't need extra vitamins and minerals. They also point out that there could be long-term health problems from food fortification, e.g. iron overload. Others argue that there are positive health benefits as it will promote a wider awareness of the importance of minerals and vitamins in foods. Up to 12 vitamins and minerals may be added to cereal products, while riboflavin, vitamins A and D, calcium and phosphorus may be added to selected dairy products.



## Function of nutrients in the body

Nutrients do not work in isolation, but as a team within the body.

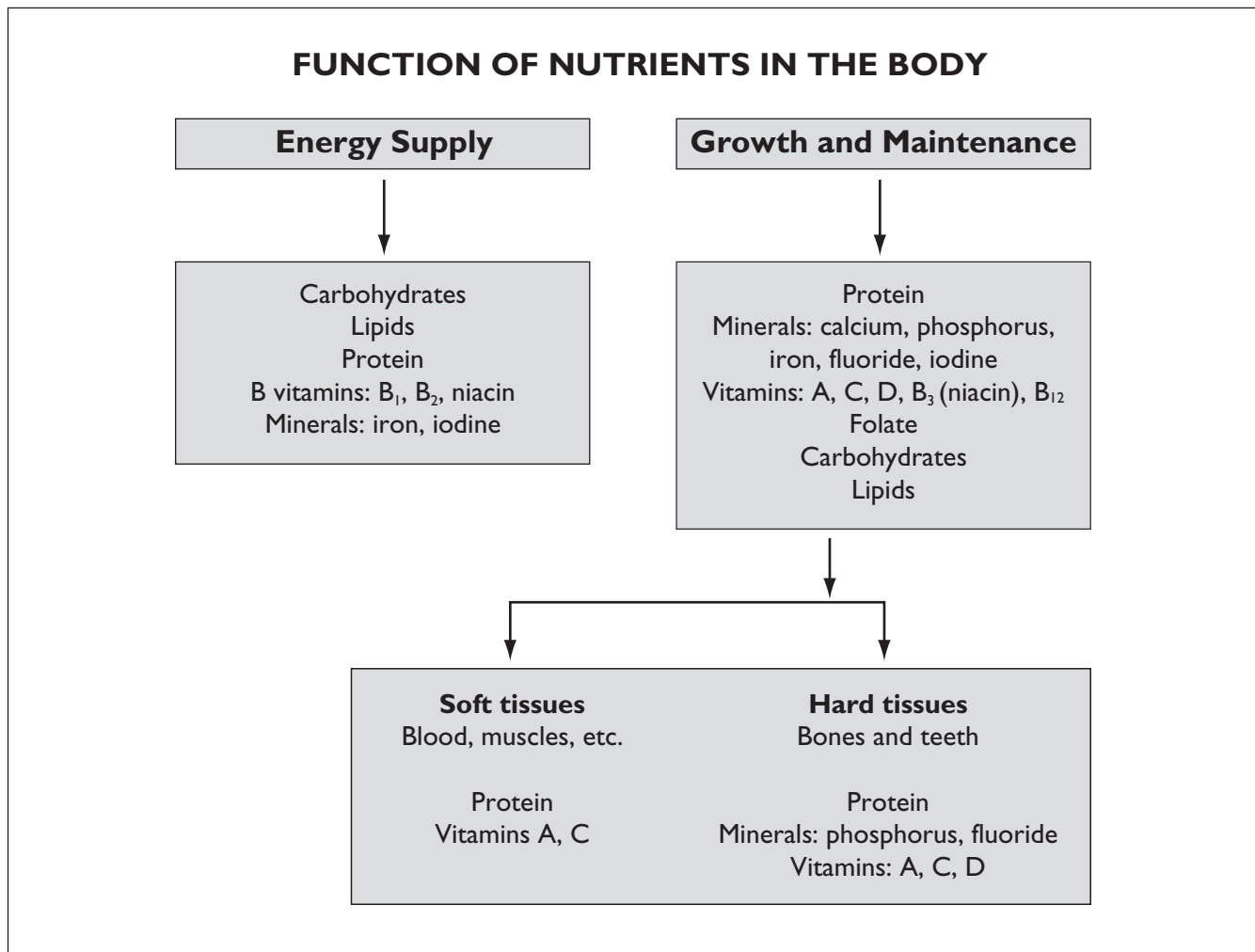


Figure 6.1 Function of Nutrients in the Body

### Activity 6

- 1 Write a definition of food.
- 2 What is a nutrient?
  - List the names of the main nutrients.
  - Name one food that has only one nutrient.
  - Name one food that contains the nutrients needed for the health and growth of a baby.
- 3 Name and list the two subgroups of nutrients.
- 4 What are the major functions of nutrients in the body?
  - a List the nutrients in groups or teams to show they do not work in isolation.
  - b From the chart, list the functions in the body of each nutrient.



- 5 a Visit your local shop to see if you can find four foods that are fortified with vitamins or minerals, or both.
- b Say why you think each has been added. Make a table like the one below.

<i>Food</i>	<i>Nutrient added</i>	<i>Reason</i>
<i>Milk</i>	<i>Calcium</i>	<i>To increase the amount of this mineral which is already in milk. It will make the milk an excellent source of calcium</i>
<i>Breakfast cereal</i>		



## Carbohydrates: Manufacture And Function

### Manufacture of carbohydrates

Carbohydrates are a major source of energy for human beings. They are manufactured in the green substance of plants called chlorophyll, in a process called photosynthesis. As the name suggests, carbohydrates are made up of carbon, hydrogen and oxygen in the ratio of 1:2:1.

The energy in the sunlight is captured by chlorophyll and joins carbon dioxide and water to form simple sugars (in fruit), or complex carbohydrates (as starch and fibre). Animals and humans eat these sugars and starches and break them down again into carbon dioxide and water. In this process they extract the sun's energy in the foods. This cycle is basic to all life.

### Carbohydrates and the energy cycle

The food cycle is part of a natural cycle that is kept going by the absorption of solar energy.

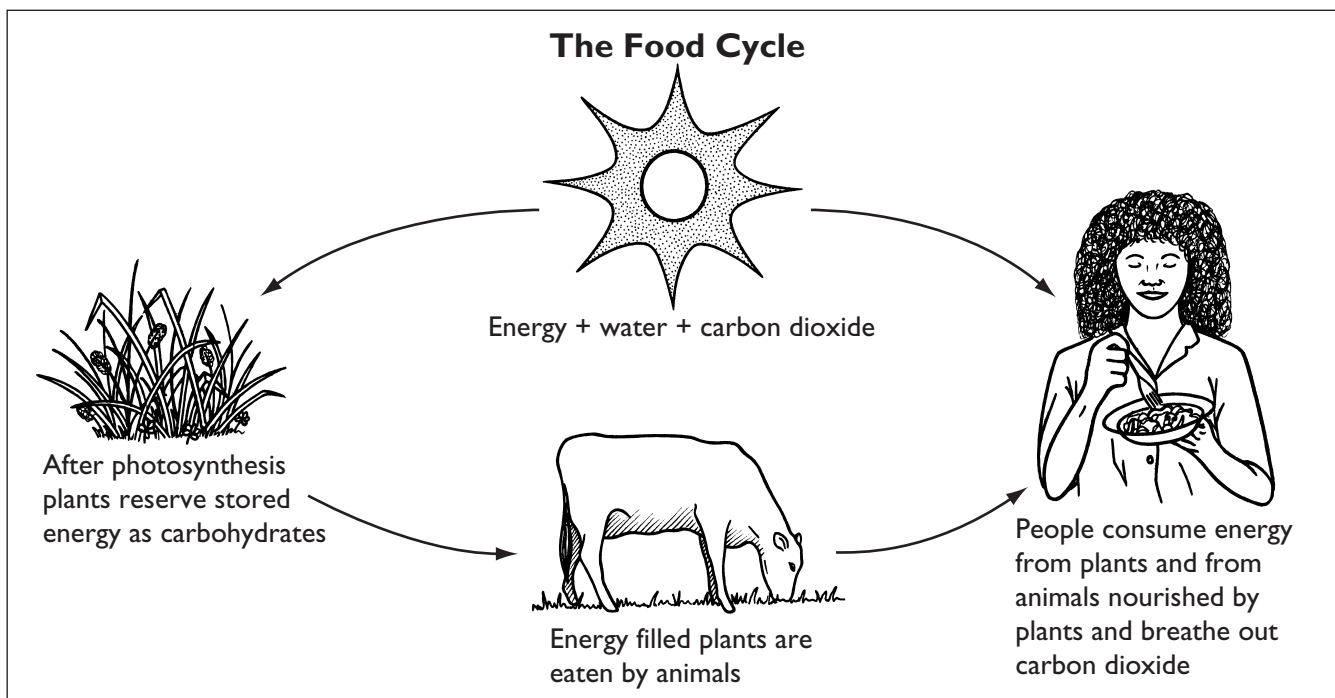


Figure 7.1 The Food Cycle

## Function of carbohydrate in the body

- ❑ Supply energy – 17 kJ per gram (4 calories).
- ❑ If there is sufficient carbohydrate in the diet the body will draw fat or protein to supply energy.
- ❑ During digestion starch is broken down to the simple sugar glucose – the energy source for all cells in the body. It is the main fuel for our muscles.
- ❑ Fibre is important for proper bowel function and in the prevention of some bowel diseases.

## Simple food chains

All that we eat can be traced back to plants.

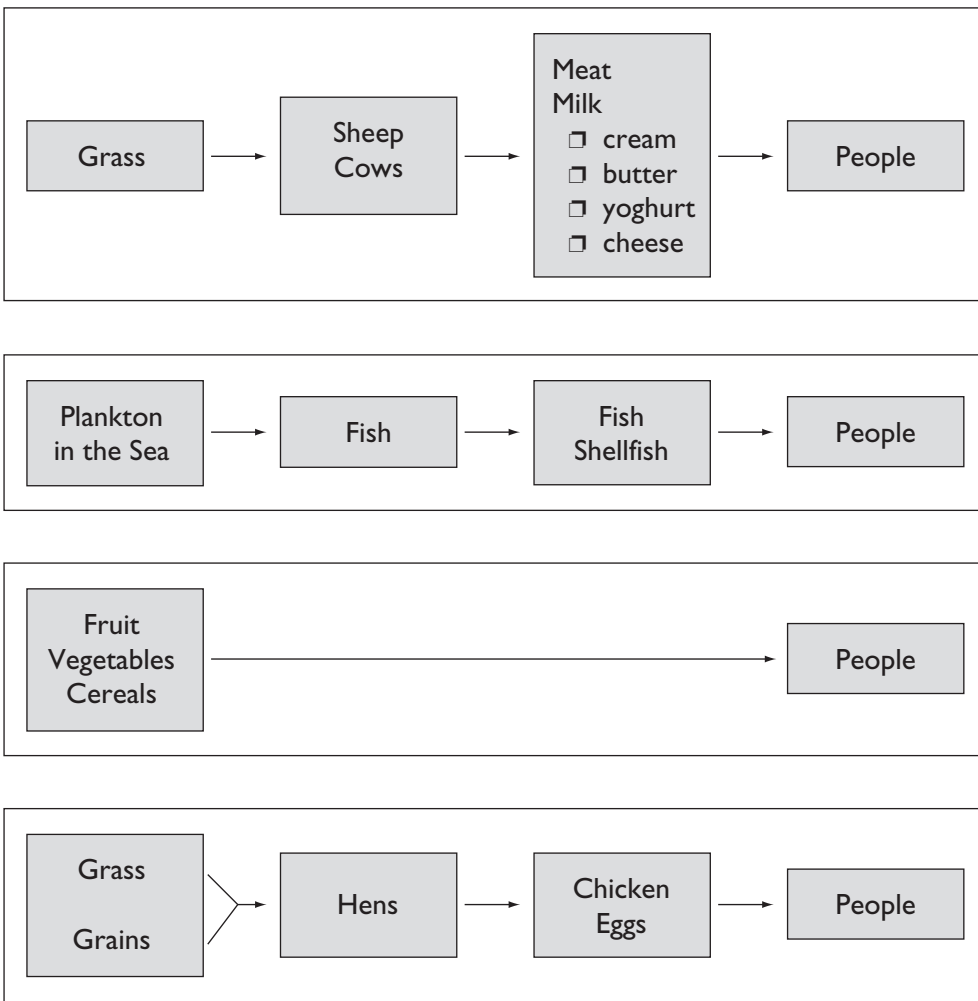


Figure 7.2 Simple food chains

## Three Main Groups Of Carbohydrates

Carbohydrates vary from simple molecules (monosaccharides and disaccharides) to large complex molecules (polysaccharides and fibre). They are all found naturally in fruits, vegetables, cereals and in some dairy products.



Table 7.1 Source of the three main groups of carbohydrate

Simple (sugars)	Complex (starches)	Dietary fibre (Complex)
<p><b>Simple sugars</b> (monosaccharides)</p> <ul style="list-style-type: none"> <li>❑ Glucose – fruits, honey</li> <li>❑ Fructose – fruits, honey</li> <li>❑ Galactose – Milk</li> </ul> <p><b>Double sugars</b> (disaccharides)</p> <ul style="list-style-type: none"> <li>❑ Sucrose – cane sugar</li> <li>❑ Lactose – milk</li> <li>❑ Maltose – barley</li> <li>❑ All sugars are broken down during digestion into glucose or fructose and used for energy</li> <li>❑ Quickly absorbed</li> <li>❑ Low in fibre</li> <li>❑ 'Empty' energy – contain no other nutrients, e.g. sucrose (white sugar).</li> </ul>	<p><b>Starches</b> (polysaccharides)</p> <ul style="list-style-type: none"> <li>❑ Found in plant cells</li> <li>Vegetables, e.g. potatoes, kumara, taro</li> <li>Whole-grains – wheat, rice, barley</li> <li>Processed cereals – bread, wholemeal, cornflakes</li> <li>Pasta – macaroni, spaghetti, etc.</li> <li>❑ Most starches break down to glucose during digestion</li> <li>❑ Lower in calories per gram</li> <li>❑ Higher in fibre</li> <li>❑ Contain other nutrients.</li> </ul>	<p>Can be soluble, but generally insoluble and not digested</p> <p><b>Soluble:</b> Some pectins, gums</p> <ul style="list-style-type: none"> <li>❑ Fruits and vegetables</li> <li>❑ Oats, barley, legumes</li> </ul> <p><b>Insoluble:</b> Cellulose</p> <ul style="list-style-type: none"> <li>❑ Fruit (especially raw), e.g. apples, pears, pawpaw</li> <li>❑ Vegetables (especially raw), legumes</li> <li>❑ Whole-grains, e.g. wheat, oats, breakfast cereals</li> </ul> <p>Although insoluble (not digested), they are partly fermented in bowel by bacteria, resulting in gases, and short-chain fatty acids which provide energy</p> <ul style="list-style-type: none"> <li>❑ soluble fibre helps reduce blood cholesterol</li> <li>❑ soluble fibre helps control nutrient absorption</li> <li>❑ insoluble fibre regulates the bowel; increases bulk and prevents constipation</li> <li>❑ insoluble fibre helps prevent bowel cancer; binds waste products.</li> </ul>
<b><i>In the diet</i></b>		
<ul style="list-style-type: none"> <li>❑ We need to reduce our sugar intake: <ul style="list-style-type: none"> <li>– avoid adding sugar to food</li> <li>– cut down on cakes, biscuits</li> <li>– check labels for sugar content, e.g. in fruit juice, yoghurt, etc.</li> </ul> </li> <li>❑ Watch for 'hidden' sugar – in ice-cream, canned fruit, sauces and soups. Drink plain water, not commercial juices</li> <li>❑ Sugar can cause dental decay</li> <li>❑ Choose natural sugars in raw fruits.</li> </ul>	<ul style="list-style-type: none"> <li>❑ These foods are important in the diet: <ul style="list-style-type: none"> <li>– they provide energy for physical activity and for body functions</li> <li>– they assist in cell formation</li> <li>– they help in the formation of DNA.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>❑ To provide fibre include plenty of fresh fruits and vegetables, whole-grain cereals and breads in the diet.</li> </ul>



*Table 7.2 Carbohydrates in food*

Simple – sugars (% of food)		Complex – starches (% of food)		Dietary fibre (% of food)	
White sugar	99	White flour	73	Wheat bran	44
Honey	75	Wholemeal flour	63	All-bran	26
Jam	69	Bread	48	Oat bran	17
Raisins	64	Bran breakfast cereal	27	Muesli	8
Chocolate	56	Baked beans	24	Peas	8
Chocolate biscuits	43	Potatoes	19	Baked beans	7
Muesli	26	Rolled oats, cooked	10	Cornflakes	6
Ice-cream	22	Carrots, cooked	7	Apple	1
Bananas	16	Bananas	3		
Apples	11				

The Healthy Food Pyramid recommends an increase in complex carbohydrates (fruit, vegetables, cereals, breads) and a decrease in simple carbohydrates (sugars).

Carbohydrates should be the major source of dietary energy, providing some 55–60 per cent of total requirements. As recommended, this energy should be obtained mainly from the polysaccharides, including fibre.

Simple sugars can cause dental decay; as they are often found in foods high in energy and in fat, the use of these foods should be limited. Beware of hidden sugar in manufactured foods such as fruit juices, ice-cream, yoghurt, health bars, cakes and biscuits.

### Carbohydrate and energy

Carbohydrates are broken down into glucose and stored as glycogen in the liver and muscles. High carbohydrate foods keep energy high. When the body's store of glycogen drops, fatigue quickly sets in. These high carbohydrate foods also supply fibre, vitamins and minerals.



Figure 7.3 Carbohydrates

## Activity 7

- 1
  - a Name the three classes of carbohydrates and give two examples of each class.
  - b What happens when a person eats too much of the simple carbohydrates, and not enough of the complex ones?
  - c What is meant by 'empty energy'? Name one carbohydrate that is an example of empty energy.
  - d Why is it important to reduce sugar intake in the diet? List ways that this can be achieved.
- 2
  - a What is 'hidden sugar'?
  - b List the sugar content from the package labels of six different food products containing 'hidden' sugar.

## Dietary Fibre: A Complex Carbohydrate

Dietary fibre has had increasing publicity in recent years as an important nutrient. Advertisements for breakfast cereals emphasise 'added fibre'. We should aim to eat 30 g of fibre a day. Fibre forms the cell walls in plant foods such as grains, cereals, vegetables and fruits. It adds bulk to meals and gives a feeling of fullness which can reduce overeating.

### Types of fibre

Dietary fibre is classed as soluble or insoluble depending on whether the cell wall material in the fibre is soluble or insoluble in water. Fibre is not one single substance – wheat bran provides cellulose which aids digestion and prevents constipation; fruit provides pectin, which may assist in lowering blood cholesterol levels. Types of fibre include:

## Insoluble fibre

Insoluble in water (roughage) – includes cellulose, lignin.

- ❑ *Found in:* Wheat bran, wheat-based cereals and pasta, bread and wheat germ; vegetables, especially legumes; seeds.
- ❑ *Function:* Increases bulk and softens faeces by absorbing water. This quickens the movement of faeces through the bowel. This means less constipation. It also means bowel diseases may be prevented.

## Soluble fibre

Absorbs water to form a gel – includes vegetable gums and pectin. These can be digested.

- ❑ *Found in:* Oat bran, barley, vegetables (beans and peas, dried beans), lentils, nuts, sunflower seeds. Fruits contain pectin (e.g. apples).
- ❑ *Function:* Soluble fibre may assist the absorption of nutrients because it slows down the process of gastric emptying; it binds bile acids and reduces blood cholesterol levels. Soluble fibre also slows down the absorption of sugar into the blood helping to prevent diabetes. It may also help prevent gallstones.

A low intake of dietary fibre may lead to an increased risk of bowel cancer and coronary heart disease. (This is much higher among Europeans than Maori and Pacific Islanders). Vegetables, especially green and yellow varieties; and raw fruits should be eaten daily. Not only are they high in fibre, but they also provide enzymes. No single type of fibre gives you the variety you need. The Healthy Food Pyramid on page 39 recommends you include a wide variety of fruits, vegetables, whole-grain cereals and breads as sources of fibre.

### Caution

Fibre can be good news for slimmers and is an essential part of a balanced diet. However for an active growing child, or an athlete, meals with a high fibre content can be a disadvantage. Too much fibre can slow growth in children as they may not get a range of nutrients. The athlete also needs a balance of body-building nutrients. For the elderly, too much fibre can lead to irritable bowel problems. Provide a selection of fibre foods within a balanced diet.

## Fibre-rich foods

The following are fibre-rich foods from the 'eat most' section of the Healthy Food Pyramid (see Figure 7.4 on page 39):

- ❑ Fruits and vegetables – especially when raw. Fibre softens on cooking.
- ❑ Whole-grain cereals – whole-grain breads, oats, brown rice.
- ❑ Legumes – dried beans, peas and lentils.
- ❑ Nuts and seeds.
- ❑ Use extra bran and wheat germ on breakfast cereals, fruit, desserts, etc.



**Note:**

- ❑ There is no dietary fibre in animal foods.
- ❑ Most vegetarian diets supply ample complex carbohydrate and thus fibre.
- ❑ No dietary fibre should be consumed in excess. Care should be taken not to include too much fibre in the diet of small children.
- ❑ Remember, nuts have a high fat content – avoid eating to excess.

## Summary of the function of fibre

- ❑ Insoluble dietary fibre can help prevent constipation – the insoluble fibre found in vegetables, cereals and wheat bran increases the bulk in the intestine and assists bowel action. It appears that a high-fibre, low-fat diet may reduce the risk of bowel cancer.
- ❑ Insoluble fibre ferments in the bowel to increase bulk and softening of faeces.
- ❑ Soluble fibre, found in legumes (dried peas, beans and lentils), in fruits, vegetables and oats (for example oatmeal) produce short-chain fatty acids during fermentation in the bowel. When absorbed into the liver, soluble fibre forms into high-density lipoprotein cholesterol which can lower blood cholesterol levels. Fibre therefore may play a part in preventing heart disease.
- ❑ It is possible that fibre absorbs poisonous substances from the bowel. This may prevent cancer in the colon. The poisons are eliminated in waste from the body.
- ❑ It is possible that fibre binds some fats preventing their absorption into the bloodstream, lessening the risk of heart disease.
- ❑ A high-fibre diet can slow the rate of carbohydrate digestion, thus helping to prevent diabetes.
- ❑ Fibre-rich foods take longer to chew and are more filling – they can thus assist in weight control, but a nutrient balance needs to be maintained.
- ❑ Fibre-rich foods can help prevent obesity when used in conjunction with regular physical activity.
- ❑ It has been found that people with higher fibre intakes (more than 16 g a day), regardless of the mix of soluble to insoluble forms, are less likely to suffer bowel cancer and heart disease. Even 6 g more fibre a day is beneficial.



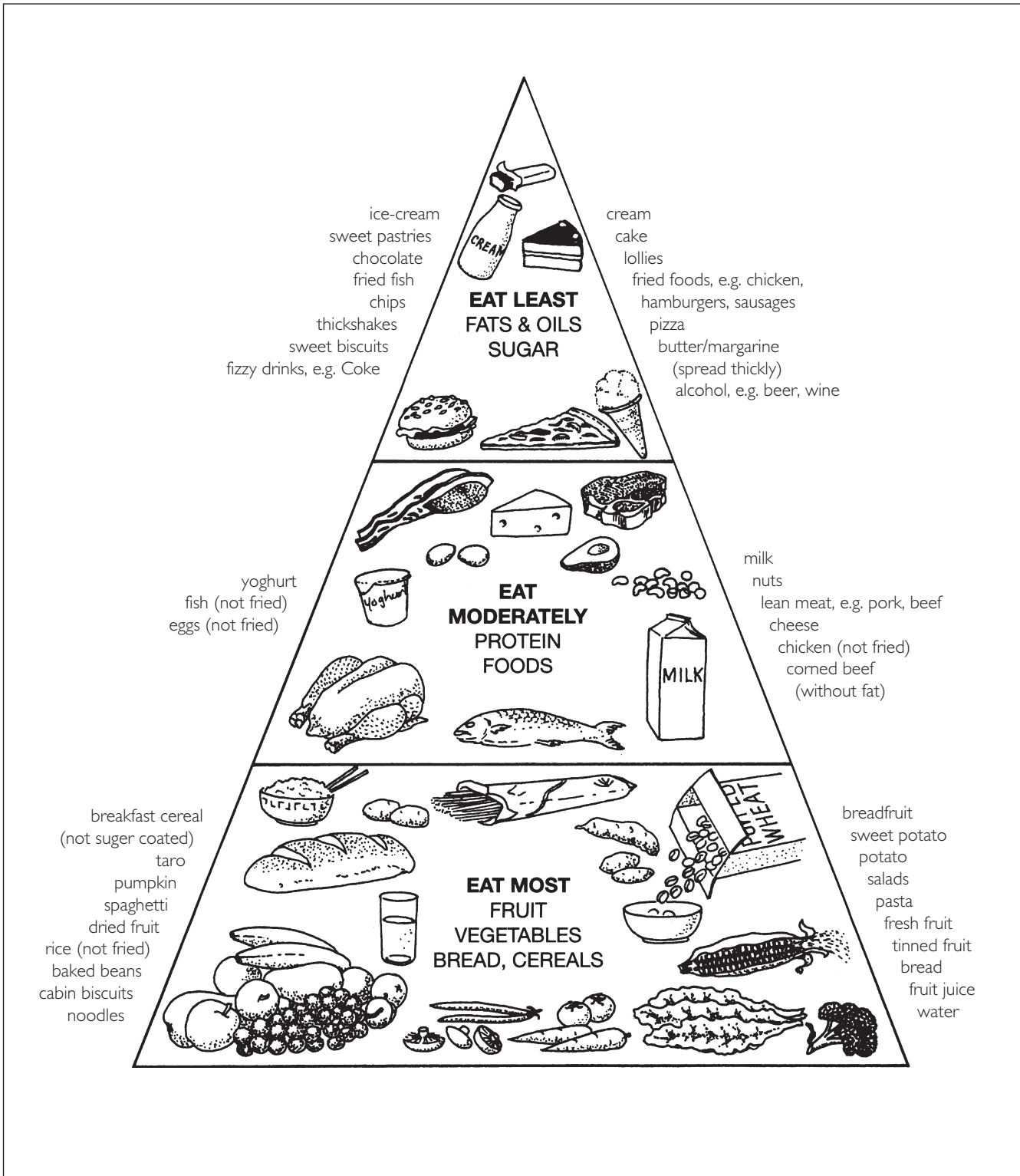


Figure 7.4 Healthy Food Pyramid



## Activity 8

- 1 a** What is meant by dietary fibre?  
**b** What is its function?  
**c** What is the suggested daily requirement of fibre?  
**d** Name any dangers from eating excess amounts of fibre.
- 2 a** Name the two types of fibre.  
**b** Give four sources of each type.  
**c** Give the function of each type in the body.
- 3 a** Explain the connection between non-soluble fibre and the prevention of heart disease.  
**b** Give sources of non-soluble fibre.



# Protein

Proteins are found in all living cells. Children, adolescents, pregnant and breast-feeding women especially need a diet high in protein foods as new cells are being produced. Athletes need high-protein foods to repair and renew body cells, and the elderly to repair and renew worn cells. Protein in the diet is essential but too much can lead to being overweight, as excess is converted and stored in the body as fat.

## Protein: Sources And Function

### Sources of protein

**Animal protein:** Meat, fish, eggs, milk and milk products  
**HBV (high biological value)** – these contain the nine ‘essential’ amino acids

**Vegetable protein:** Vegetables, especially legumes  
**LBV (low biological value)** (peas, beans, lentils); also whole-grain cereals, wheat germ, bran, maize, peanuts – these lack the ‘essential’ amino acids

The soya bean is an exception – although from a plant source, it supplies the essential amino acids.

### Functions of protein in the body

- Growth of new tissues – skin, blood, muscles, teeth, nerves, hair
- Maintenance of tissues – repair from general wear and tear
- Repair of wounds – from accidents or surgery
- As an energy source – 17 kJ (4 calories) per gram
- Manufacture of enzymes required for body functions, antibodies for the immune system, and hormones which control growth and metabolism
- Helps to store oxygen in the muscles for use in exercise.

### Amino acids

Protein is composed of amino acids. There are at least 22 different amino acids found in our food in different combinations and with different functions in the body. Nine of these are called ‘essential’ amino acids, as they cannot be manufactured by the body and must therefore be supplied by the diet. The non-essential amino acids can be made by the body from other food eaten.

Amino acids not present in one food may be supplied by another. A combination of animal and vegetable foods or different vegetable foods can be eaten together to supply a balance of nutrients, for example meat or fish with vegetables; cheese with bread; milk with cereals; peanuts with rice.

Vegetarians need to be aware of the need for protein in the diet and make sure that supplements for animal protein foods, or combinations of different plant proteins, are provided to ensure an adequate supply of the essential amino acids.

### The Essential Amino Acids

\*Arginine  
\*Histidine  
Isoleucine  
Leucine  
Lysine  
Methionine  
Phenylalanine  
Threonine  
Tryptophan  
Valine  
\* essential amino acids for children

## The essential amino acids

The following table gives figures for the essential amino acids in four common protein foods.

*Table 8.1 Essential amino acids in four common foods/mg amino acid/g protein)*

Amino acid	Hen's egg	Cow's milk	Beef muscle	Wheat flour
Isoleucine	54	47	53	42
Leucine	86	95	82	71
Lysine	70	78	87	20
Methionine	57	33	38	31
Phenylalanine	93	102	75	79
Threonine	47	44	43	28
Tryptophan	17	14	12	11
Valine	66	64	55	42

*Table 8.2 Recommended dietary intake (RDI) for protein*

Nutrient	Infants 7–12 months	Children 1–3 years	Boys 12–15 years	Girls 12–15 years	Boys 16–18 years	Girls 16–18 years	Men 19–64 years	Women 19–64 years	Pregnancy 2nd, 3rd trimester	Lactating breast- feeding
Protein g	1.6/kg	14–18	42–60	44–55	64–70	57	55	45	+6	+16

Source: Nutrition Education Service, Sanitarium Health Food Company



Figure 8.1 Some vegetable sources of protein are taro, coconut and breadfruit

Table 8.3 Protein content of some common foods (approximate)

Animal protein (HBV)	g per 100 g	Vegetable protein (LBV)	g per 100 g
Skimmed milk powder (low fat)	38	Peanuts/nuts <sup>3</sup>	26
Milk powder (full cream)	26	Wheat germ	26
Cheese	26	Wheat bran	14
Chicken	25	Soya beans <sup>3</sup>	12
White fish	25	Bread	9
Lean beef and pork	20	Lentils	8
Liver	16	Rice	6
Eggs	12	Peas	5
Yoghurt	5	Cauliflower	3
Milk <sup>1</sup>	3	Potato	2
Gelatine <sup>2</sup>	0	Breadfruit	1.3

**1** Liquid milk has a low protein content due to 87% water content. Milk powder has a higher level.  
**2** Gelatine, although of animal origin, does not contain the essential amino acids (HBV).  
**3** Soya beans and nuts do contain essential amino acids (HBV) although of vegetable origin.

The above table shows that the nutritional value of vegetable proteins can appear to be as high as for animal foods. However, plant proteins have been called ‘incomplete’ proteins or LBV, as they have a lower content of essential amino acids, apart from soya beans and nuts.

### Protein complements

It has been found that different plant proteins contain different essential amino acids. Thus a mixture of plant foods can be used to complement each other to help make up for any deficiencies. As mentioned before, this shows that there is a need for a wide variety of foods in the diet. A food low in one amino acid may be eaten with another food which supplies the missing amino acid.

Cereal grains are low in the essential amino acid lysine, while beans are low in methionine, yet high in lysine. By combining rice or noodles with beans in a recipe, a balance of the essential amino acids can be made. Another example would be baked beans on toast. While wheat bread is low in the essential amino acid lysine, the beans are high in lysine. Maize with beans is often a combination in Mexican recipes. Peanut butter sandwiches can be a protein-rich snack. Asian cooking combines rice and noodles with fish or meat. Total vegetarians or vegans who include no animal protein in the diet need to allow for protein complements to ensure provision of the essential amino acids. If vegetarians include dairy products or eggs in the diet, deficiencies should not occur.

If vegetarians choose a wide variety of foods they will get all the quality protein they need. The chart below illustrates quality protein combinations. The thicker arrows indicate better-quality protein combinations than the thinner arrows.

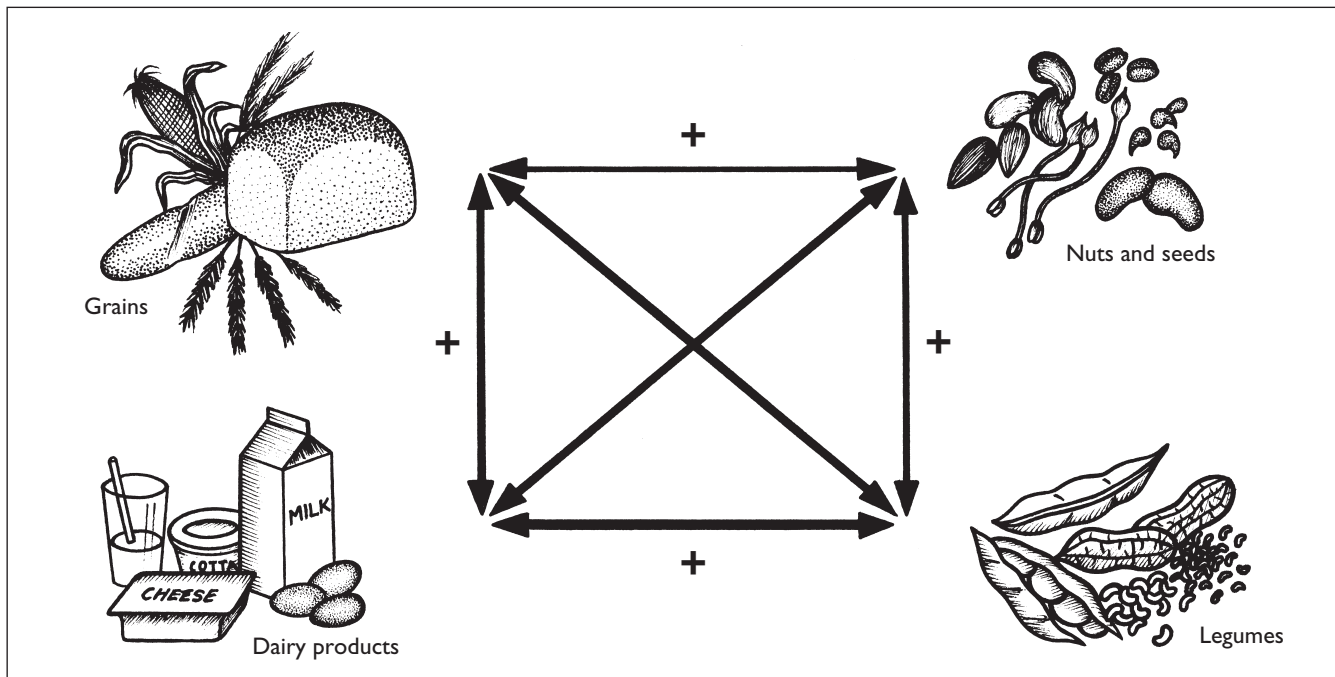


Figure 8.2 Protein complement chart

## Daily Requirement Of Protein

The recommended intake of protein is 1 gram per kilogram of body weight for adults. Children and adolescents require more for a period of rapid growth, while pregnant and nursing mothers have increased requirements for a time.

<i>Table 8.4 Daily protein requirements</i>	
	Daily requirements (g)
Babies and growing children	30–50
Adolescents – growing and active	60–70
Adults (for maintenance of cells)	
sedentary occupations	55–65
very active	65–70
elderly	45–55
Pregnant women and nursing mothers	60–90
Food	Protein supplied (g)
2 eggs	12
2 bread slices	4
600 ml milk	18
25 g cheese	7
1 potato	3
1/2 can of baked beans	7
<b>Total</b>	<b>51</b>



The following recommendations about protein were made for New Zealand in the *Food for Health* publication. They provide a guideline for us as well with fish being easier to access than lean meat as a good source of protein. Likewise, including a variety of vegetables in the diet will help address the lack of protein from expensive sources like cheese.

- ❑ Select protein from a wide range of protein foods, including lean meat, fish, eggs, low-fat milk, cheese, cereals and legumes.
- ❑ Choose **lean** meat and consume it in smaller portions.
- ❑ Skimmed and semi-skimmed milk, and reduced-fat cheeses, are good sources of protein.
- ❑ There are no known benefits from a diet high in animal protein. A plant-based diet can provide adequate supplies of the essential amino acids. The combination of different plant foods ensures the protein quality of vegetarian diets. Choose from grains, legumes, seeds, nuts and vegetables. A range of health benefits has been associated with vegetarian diets, possibly due to low fat intake and enzymes present in raw foods.

In affluent countries, people tend to consume more protein than is necessary. There is some evidence that high protein may increase a loss of calcium from the body. When there is a reduction of energy from fat in the diet, there should not necessarily be an increase in protein intake. It's better to increase energy intake from complex carbohydrates instead.

## Protein deficiency

A deficiency of protein in the diet results in:

- ❑ retarded growth in children
- ❑ slow healing of wounds and illness
- ❑ greater susceptibility to disease
- ❑ protein-deficient diseases such as kwashiorkor and marasmus where deficiency is severe.

## Activity 9

- 1 Make a list of foods that you eat each day that supply protein.
- 2
  - a List the functions of protein in the body.
  - b Name groups of people for whom a high-protein diet may be valuable.
  - c Why is protein important for each of these groups?
- 3 Explain what is meant by HBV and LBV protein. Give examples of each.
- 4 Protein is made up of some 22 different amino acids. Of these some are said to be 'essential' amino acids.
  - a Why are they called 'essential'?
  - b List the essential amino acids. Give one good source of each.
- 5
  - a Choose and write out two recipes for main dishes that use animal foods as a good source of protein.
  - b Choose and write out two recipes for main dishes that use plant foods as their source of protein.
  - c Explain your choice of foods and point out which foods supply the protein.



- 6 Refer to the Healthy Food Pyramid on page 39.
- To which section do protein foods belong?
  - List the main groups of protein foods.
  - If protein foods are so important, why are they placed in the 'eat moderately' section of the Healthy Food Pyramid?
- 7 Refer to the 'Protein Content of Some Common Foods' chart (Table 8.3, page 43). Asians use soya bean products such as tofu. List foods from other cultures that could be included in the given foods.
- 8 Discuss how a vegetarian can ensure adequate protein supplies. Refer to the Food Composition Tables at the back of this book.
- 9 Survey 5 males or 5 females of the same age group. Identify differences between their intake of:
- fruit
  - vegetables
  - pasta
  - meat (or alternatives)
  - whole-grain cereals (breads, etc).
- 10 Refer to the Recommended Daily Intake table to find out recommended dietary allowances for protein for the following people:
- Sene (3 years old)
  - Samuel (7 years old)
  - Tui (16 years old)
  - Michael (16 years old)
  - Aleni (an adult man)
  - Fa'amoemoe (an adult woman)
  - Kisa (a pregnant woman).
- 11 Make a chart like the one below to show the different protein requirements of these people – try to explain the reasons for the differences.

<i>Person</i>	<i>Amount of protein</i>	<i>Reasons</i>



## Lipids: Fats And Oils

Our nutritional goals should be to reduce the overall intake of fat in the diet of Sāmoans. The total fat intake should be reduced to 30–33 per cent of the body's energy needs to help prevent diet-related ill health.

### Sources Of Lipids

Fats and oils together are known as 'lipids'. They may be of **animal** or **vegetable** origin. The different sources are made up of different fatty acids. Common sources include:

#### **Fats (usually set at room temperature)**

Animal sources: butter, cream, meat fat, bacon, cheese, egg yolk, lard.

Plant sources: some nuts, coconut cream.

#### **Oils (usually liquid at room temperature)**

Animal sources: fish liver oils, such as cod.

Plant sources: olive, peanut, soya bean, sunflower, corn.

Fat can be either **visible** or **invisible**. Sometimes we are not aware of the fat content of foods.

- ❑ Visible fats include: butter, cream, fat on meat, chicken and bacon.
- ❑ Invisible or hidden fats are present in: meat, poultry, whole milk, ice-cream, chocolate, eggs, cheese, nuts, baked goods, fried goods, processed foods such as potato chips, mayonnaise, pastry, coconut cream.

It is important to be aware of the presence of hidden fat in order to guard against obesity, some heart conditions and possible bowel problems.

### Fats In The Diet

Recent research has looked at the presence of **trans-fatty** acids in foods. Trans-fatty acids are present in beef and sheep fats, dairy fats (butter, milk, cheese) and in margarine. Trans-fatty acids are similar to **saturated fatty acids** and it is difficult to separate them. There is a need to limit foods in the diet that contain trans-fatty acids and saturated fatty acids as both tend to raise cholesterol levels. Butter is still the food highest in saturated fats. Unfortunately butter is cheaper to buy than special margarines made from unsaturated fats.



## Butter or Margarine – which is better for me?

This is a question frequently asked by people who want to make the healthy choice but are confused by conflicting information.

There are two main health issues to be considered:

- ❑ the amount of fat
- ❑ where the fat comes from i.e. animal-based (butter) or vegetable-based (margarine).

### Amount of fat

The amount of fat in the diet is important because a high-fat diet is a major cause of obesity and probably contributes to some cancers. Both butter and margarine are about 80 per cent fat (some margarines have less fat).

Despite their equal fat content, margarine is easier to spread thinly on bread and toast and it is therefore easier to use less.

### Types of fat

While all fats contribute to obesity, only some fats raise blood-cholesterol levels. Saturated fats (animal-based) in particular raise blood-cholesterol levels. Animal fats, such as those found in butter, dairy fat and meat fat, are mainly saturated. Monounsaturated or polyunsaturated fats do not raise blood-cholesterol levels. Plant oils such as peanut, soyabean and olive oils are high in unsaturated fats.

Trans-fatty acids, found in margarine are the new 'bad guy' in the cholesterol story because they tend to raise blood-cholesterol levels like saturated fats do.

Recent studies in America have shown higher rates of heart disease in people who ate more margarine. The trans-fatty acid content of the margarines in the study were very high but more research is needed to provide a definite answer.

Source: The National Heart Foundation of New Zealand

## Functions Of Fat In The Body

- ❑ Supplies large amounts of heat and energy. Fat is a concentrated energy source of 37 kJ/g (9 calories). Fat supplies twice as much energy as carbohydrate or protein.
- ❑ Excess fat is stored in a layer under the skin and helps to keep the body warm. Too much excess fat, however, leads to obesity.
- ❑ Fat acts as a carrier for the fat-soluble vitamins A, D, E and K.
- ❑ Fat forms a protective layer around the body's vital organs – the heart, kidneys and liver.
- ❑ Some fats provide essential polyunsaturated fatty acids which everyone needs in small amounts, for example, the Omega-6 and Omega-3 series found in fish such as salmon and sardines.



- ❑ When fat is used for energy in the body it saves protein for its main role of building and maintenance of cells. For most adults no more than 30–35 per cent of energy needs should come from fats.
- ❑ Fats decrease hunger and slow digestion, which means you stay feeling satisfied longer.
- ❑ Fats add flavour and make food more appetising. However, choose lean cuts of meat. Avoid or remove excess fat.

When choosing foods it is important to know the type of fat we are eating. Saturated fats are more likely to cause a buildup of cholesterol in the blood vessels which can cause heart disease. The following classification can be a guide to the type of fat:

*Table 9.1 Types of lipids in foods*

Saturated	Monounsaturated	Polyunsaturated
Butter	Canola oil	Fish
Chocolate	Eggs	Polyunsaturated margarines and mayonnaises
Coconut oil	Fish, e.g. tuna, sardines	
Cream	Olive oil	
Milk	Peanut oil	Vegetable oils, e.g. sunflower, safflower, soya bean, corn
Palm oil	Peanuts	
Red meats		

As a guide we should consume 50–55% carbohydrate, 30–33% fat and the remainder protein.

Approximately what percentage of the diet should come from protein?

## Classification Of Lipids

Lipids come from both animal and vegetable sources. They are made up of different types of fatty acids. There are three types of fatty acids:

**Saturated fatty acids:** Mainly animal sources –

- ❑ *Found in:* meat, butter, cream, cheese, lard, egg yolk, some margarines.
- ❑ Two vegetable oils are high in saturated fat: coconut and palm oil.
- ❑ Saturated fats are usually hard at room temperature.
- ❑ Can increase cholesterol level in the blood – therefore reduce intake.

**Polyunsaturated fatty acids:** Vegetable source – sometimes referred to as ‘essential fatty acids’. They decrease cholesterol levels.

- ❑ *Found in:* the oils of seeds and grains, for example, sunflower, safflower, corn, soya beans and nuts; margarine.
- ❑ May decrease cholesterol level in the blood, and so reduce heart disease.
- ❑ Polyunsaturates of both Omega-6 and Omega-3 have beneficial effects. Omega-6 is found in vegetable oils and margarine; Omega-3 is found in fish oils and fatty fish (e.g. sardines and salmon).

**Monounsaturated fatty acids:** Widely found in animals and plants.

- ❑ *Found in:* olive oil, canola oil, peanut oil, avocados.
- ❑ Decrease cholesterol buildup. Tend to reduce the risk of coronary heart disease.

## Cholesterol – What Is It?

Cholesterol is a type of fat found in food, but it is also made in the body. A certain amount of cholesterol circulating in the blood is important for life and good health. Having high levels, however, can increase the risk of heart disease.

Most of the cholesterol in our body is produced by liver and other tissues. Only a small amount comes from the food we eat. Foods high in cholesterol include offal meat (liver, kidney, brains), egg yolks, shrimps and prawns. Moderate amounts are found in meat, chicken, fish, whole milk and cheese. Cholesterol is produced only in animal tissues. There is none in plants. Far too many people have blood cholesterol above the recommended level. The doctor can measure a person’s cholesterol level and make recommendations to help lower the amount. A high level of cholesterol in the blood can be due to:

- ❑ a diet too high in fat, especially saturated fat
- ❑ being overweight
- ❑ a genetic (inherited) condition. This can lead to an inability in the body to cope with increased cholesterol intake.

When the cholesterol level in the blood is too high it is deposited on the artery walls causing narrowing and hardening of the arteries (called arteriosclerosis). This increases the risk of heart disease, stroke and high blood pressure especially for people over 40 years old.

## ‘Good’ and ‘Bad’ cholesterol

Cholesterol is carried in the blood by proteins. The blood fat and protein together are called **lipoproteins**.

- ❑ **High-density lipoprotein** (HDL) cholesterol is often called ‘good’ because it removes cholesterol from the artery walls. HDL can protect against heart disease.
- ❑ **Low-density lipoprotein** (LDL) cholesterol is often called ‘bad’ since it deposits cholesterol, causing a buildup in the artery walls. LDL can be a factor causing heart disease.



## To lower the blood cholesterol level

- ❑ Reduce the total amount of fat in the diet, especially saturated fat.
- ❑ Trim fat from meat, chicken, etc.
- ❑ Use five to six eggs a week – but at-risk groups, such as those with coronary heart disease should use no more than two per week.
- ❑ Use low fat dairy foods. Use butter and margarine sparingly.
- ❑ Eat generous amounts of fruit, vegetables, whole-grain breads, cereals and legumes (dried beans, peas and lentils). Certain types of fibre, such as legumes, oats, fruits and vegetables, help lower blood cholesterol levels.
- ❑ Limit intake of fast foods and takeaways.
- ❑ Limit salt, sugar and alcohol. Do not smoke.
- ❑ Aim for a healthy body weight. Exercise regularly.

*Table 9.2 Cholesterol and fat content of food*

	<b>Cholesterol (mg)</b>	<b>Fat (g)</b>
1 egg	250	5
1 Big Mac hamburger	47	21
1 cup ice-cream	85	30
1 tbsp whipped cream	20	6
1 serving beef	70	15
1 banana	nil	nil
Avocado	nil	25%
Coconut	nil	33%
1 cheese sandwich	40	12
1 sausage (barbecued)	30	30
Chips (1 rounded saucer)	15	15
Fish fillet (fried)	45	20
Fish and chips	60	35
1 KFC chicken piece	100	25
Bacon and 1 egg	270	25
1 tbsp butter	35	15
1 tbsp margarine	nil	15

Suggested daily intake limit for cholesterol is 250 mg and for fat is 50 g.



## Activity 10

- 1 What are lipids?
- 2 What are fatty acids? Name THREE types of fatty acids, with examples.
- 3 List THREE functions of fat in the body.
- 4 What is the difference between fats and oils: Name TWO sources of each.
- 5
  - a Explain what is meant by visible and invisible fats. Give TWO examples of each.
  - b Why is it important to be aware of invisible or hidden fat in the foods we eat?
  - c What type of foods may contain hidden fat? List FIVE examples.
- 6 Make a study of butter and margarine available in Sāmoa. Note down:
  - brand names
  - cost
  - contents (check label).

<i>Butter</i>	<input type="checkbox"/> brand <input type="checkbox"/> cost <input type="checkbox"/> content	<i>Margarine</i>	<input type="checkbox"/> brand <input type="checkbox"/> cost <input type="checkbox"/> content

## Activity 11

- 1
  - a Write out the foods you have eaten over the past 3 days. Underline any foods that contained fat.
  - b Make TWO lists of these foods – visible and invisible fat.
  - c Did your diet contain too much fat? Explain.
- 2
  - a Plan a 3 day menu for a low-fat diet. Refer to the Healthy Food Pyramid on page 39. Try to limit animal fats which contain saturated fatty acids.
  - b Explain reasons for your choice.
- 3 Fats have some positive functions in the body. Name these.
- 4
  - a List the THREE classes of fatty acids with examples of each. What is the difference between them?
  - b In what way do saturated fatty acids differ from the other two? What are the dangers linked to saturated fatty acids?
- 5
  - a What is cholesterol?
  - b What happens when the cholesterol level in the blood is too high?
  - c List FOUR ways to reduce blood cholesterol level in the body.



## Ways To Reduce Fat Intake

- ❑ Eat lean meat and poultry without skin. Buy smaller portions of meat.
- ❑ Increase the number of meatless days and substitute fish, pasta and vegetable dishes.
- ❑ Avoid sausages, bacon and processed meats, such as salami, luncheon sausage.
- ❑ Select fat-reduced milk, use trim or non-fat milk, and other fat-reduced dairy products, rather than whole-milk varieties.

**This recommendation is not for children under 5 years.** Younger children need a higher percentage of energy. After 2 years the proportion of fat may be reduced a little.

- ❑ Avoid block, processed and cream cheeses.
- ❑ Fish is a good source of many nutrients and eating it can reduce the amount of saturated fats in the diet. Avoid frying it in butter, as this increases the saturated fat content.
- ❑ Restrict the use of prepared foods which are high in saturated fats, such as snack foods, biscuits, cakes, ice-cream and chocolates.
- ❑ Use cooking methods which require little or no fat, for example, grilling, baking, steaming, boiling, microwaving. If frying use a non-stick pan.
- ❑ Use oils, margarines and table spreads that contain monounsaturated and polyunsaturated fats. Check labels. Use small amounts, spread thinly, do not add to vegetables.
- ❑ Increase the intake of vegetables, fruits, cereals and legumes to make up for the loss of energy when the amount of fat is decreased. Use whole-grain bread and cereals.
- ❑ Snack on raw vegetables, fruit and dried fruit in place of chips and crisps that contain fat.
- ❑ Eat takeaways as an occasional treat, not as an everyday item.
- ❑ Check labels for low-fat products.

## Trans-Fatty Acids

There has been a growing awareness of the presence of trans-fatty acids in processed foods and their possible bad effects on health, e.g. in causing cancer. They may also reduce the absorption of nutrients. Trans-fatty acids do occur naturally in animal fats but increasingly in chemically hydrogenated (treated with hydrogen) vegetable oils and fats. Trans-fatty acids are found especially in processed foods that contain hidden fat, e.g. margarines, spreads, pies, pastries and biscuits.



It has been difficult to estimate the trans-fatty acid content of New Zealand food due to a lack of research data. In 1993 one study found that margarine blends contained 12 per cent. This was lower than most blends from other countries. Australian blends contain 16 per cent trans-fatty acids, while Europe and USA are up to 40 to 50 per cent possibly due to different oils used in the manufacture of their margarines.

The New Zealand Dairy Research Institute (NZDRI) found that foods containing a large proportion of hydrogenated vegetable oil (e.g. margarines and pastry) had the greatest level of trans-fatty acids. Animal products such as dairy products and beef had fatty acids in the middle range of the foods tested. Foods made from dairy fats or non-hydrogenated vegetable oils such as bread and muesli bars had the lowest trans-fatty acid content.

In the NZDRI survey the trans-fatty acid content per *serving* of each food was calculated. Margarine comes near the top of the list for trans-fatty acid content. Pastry, the meat pie and meat patty had high per serving content. Butter and milk were about the middle range. Bread and biscuits had only small trans-fatty acid content.

## Activity 12

- 1 Investigate recent research on the presence of trans-fatty acids in foods. Why do they have a similar effect to saturated fats?
- 2 List four ways to reduce fat intake in the diet.
- 3 What is meant by:  
'It is not how much fat we eat, but the type of fat we eat that is important.'
- 4 From the Food Composition Tables (page 127) find out how much fat there is in the following foods:

Food percentage
Bread (1 roll/white)
Eggs (1 poached)
Milk (1 cup, whole)
Fish (100 g snapper)
Meat (100 g roast beef)
Cheese (100 g cheddar)

- 5 Sene likes fast foods. Three of her favourite foods are high in saturated fat and low in fibre. The table on the opposite page shows the fat and fibre content of these foods.



Sene wants to make one of these foods herself.

- Choose a food from the table above that Sene could make at home.
- Suggest two ways she could increase the amount of fibre in the food she makes.
- Suggest two ways she could reduce the amount of saturated fat in the food she makes.

<b>Food</b>	<b>Weight (g)</b>	<b>Saturated Fat (g)</b>	<b>Fibre (mg)</b>
Hawaiian pizza	205	20	1.0
Cheese burger	185	25	1.75
Meat pie	175	25	1.0





## The Macronutrients And Energy Intake

Daily energy requirements depend on age and the type of work you do. Macronutrients supply the body with **energy**. Carbohydrates, proteins, and fats are the body's only source of energy. They are called 'macro'-nutrients as the body needs them in large amounts.

We need energy for two main functions:

- 1 To keep our body functioning. Body processes such as breathing, digestion of food, circulation of the blood and elimination of waste require what is referred to as 'resting' energy.
- 2 For activity – working, studying, walking, playing sport, etc.

When we eat food it is broken down through digestion. The energy we require and that we obtain from our food is measured in kilojoules (kJ) or calories. A calorie is defined as the amount of energy needed to raise the temperature of 1 kilogram of pure water by 1°C. 1 calorie = 4.2 kilojoules. A joule is the metric unit of measurement for heat and energy.

*Table 10.1 Carbohydrates, proteins and fats supply different levels of energy*

Nutrient	kJ per g energy	Calories
Carbohydrates	16	3.75
Protein	17	4
Fat	38	9

Fat supplies twice as much energy as the same weight of carbohydrate and protein. The National Heart Foundation in Australia and New Zealand recommends the consumption of foods high in complex carbohydrate and low in fat to supply the body's energy needs. Complex carbohydrates, found in whole-grain breads and cereals, are the preferred source of energy. They release energy at a slower rate than the simple carbohydrates such as sugar.

The World Health Organization (WHO) has studied the dietary recommendations of seventeen industrial and developing nations. They found that most national guidelines recommend:

- decreased fat intake, to less than 30 per cent of energy intake
- decreased saturated fat intake
- decreased sugar intake
- increased complex carbohydrates intake
- decreased sodium (salt) intake
- low alcohol intake.

<i>Table 10.2 Energy value of some foods: Based on kJ per 25 g (approx)</i>	
Butter	950
Margarine	950
Peanuts	720
Potato crisps	670
Chocolate	650
Cream	550
Cheddar Cheese	505
White sugar	470
Roast beef	460
Roast lamb	350
Honey	335
Wholemeal bread	275
Potatoes (boiled)	95
Potatoes (fried)*	285
Fish (steamed)	95
Fish (fried)*	165
Apples	55
Cabbage	20
* (Note increase of fat = energy when fried)	
See also <b>Food Composition Tables</b> at the back of this book.	

The following points need to be considered when trying to maintain an appropriate body weight.

- Reduce energy-dense foods for those with abdominal obesity ('pot-belly' fatness).
- Maintain regular physical activity throughout life to ensure energy balance. For weight reduction increase physical activity.
- If losing weight, try to keep to a weight loss of between 0.5 and 1 kg per week.



- ❑ Children over 5 years with an obesity problem should reduce energy-dense foods and increase physical activity. Parents should seek advice from health professionals – doctors, dietitians, public health nurses.
- ❑ Strict weight-reducing diets are not recommended during the growth period.
- ❑ Some people have a natural tendency to be lean.
- ❑ Those in sports which may encourage low body weight may need professional advice to avoid too much loss of weight which can lead to osteoporosis and other conditions.

## Basal Metabolic Rate

Metabolic rate is the speed at which a body uses up energy. This rises and falls according to activity. Energy is required for body processes such as respiration, growth, digestion, excretion.

The basal metabolic rate is the lowest level of energy required in order to keep the body warm and the internal organs functioning. The basal metabolic rate is the rate of energy expenditure of a person who has not had food for 15 hours, lying at complete rest in a warm environment.

Basal metabolism accounts for about two-thirds of a person's energy output. It varies greatly between people. Growing children and pregnant women have a higher rate. In the elderly the rate decreases. The basal metabolic rate (BMR) is controlled by the thyroid gland.

### Note

A higher BMR may affect the absorption of minerals by the body, for example, the rate of calcium use or loss appears to be related to the BMR.

## Energy Balance

When more kilojoules are consumed in the foods we eat than are needed for the body processes and the physical needs of the individual, excess kilojoules are converted into fat which is stored under the skin as adipose tissue. When this builds up to an excessive amount it results in obesity. To maintain a constant bodyweight, energy intake should equal energy output.

All foods contain energy. The body needs energy to make it work. When doing extra physical activity the body needs more energy (food intake) to maintain its present weight.

### Energy in = Energy out

(food and drink)      (basic needs and physical activity)

- ❑ If you want to lose or gain weight you need to change the balance.
- ❑ The best way to lose weight is to increase your physical activity *and* decrease your energy kilojoule (calorie) intake.



<i>Table 10.3 Average BMR levels</i>	
<b>kJ per hour</b>	
Teenager	250–300
Woman	250
Man	300
Child (1 year)	85
<b>Energy required for different activities</b>	
Lying down, resting	340 approx
Sitting, sewing	420
Housework	752
Gardening	920
Walking at 5 km per hour	960
Swimming, riding	1260
Basketball, squash	1255
Cycling fast	2760
Jogging	3260

## Activity 13

- 1
  - a Why are some nutrients called ‘macro’-nutrients?
  - b Name the macronutrients.
  - c What is their main function in the body?
  - d How is energy measured in the body?
  - e List the amount of energy supplied by carbohydrate, protein and fat.
  - f What is the recommendation of the National Heart Foundation for the body’s energy needs?
- 2 The World Health Organization (WHO) has found that overall the food and nutrition guidelines of different nations make five recommendations about foods for energy. List these, with examples.
- 3
  - a What is meant by basic metabolic rate (BMR)?
  - b List six activities and the amount of energy required for each.
  - c Research the amount of energy required by different age groups.



# Unit

# 11

## Digestion

As we have seen, the main nutrients in our food are carbohydrates, proteins, lipids, vitamins, minerals and water. Large food molecules cannot be absorbed into the bloodstream. They must be broken down into microscopic particles small enough to pass through living membranes. This is called digestion. The body relies on chemical substances called **enzymes** to assist these changes to take place. During digestion the enzymes split carbohydrates (starches and sugars), proteins, and lipids (fats and oils) into smaller units.

Thorough chewing of food, or mastication, is also very important. Lack of teeth or poorly fitting dentures can be a problem to the elderly and can be one factor causing poor nutrition for them.

During digestion carbohydrates are broken down into the simple sugar glucose by the action of enzymes; proteins are broken down into amino acids for absorption into the bloodstream; while lipids are broken down into fatty acids and glycerol. The time taken for food to pass from the mouth to the anus varies from 12 to 48 hours, depending on the type of food eaten. A high-fibre diet including whole-grain cereals, fruits and vegetables is desirable as this forms bulk and slows the movement, enabling digestion and absorption.

# The Digestive System

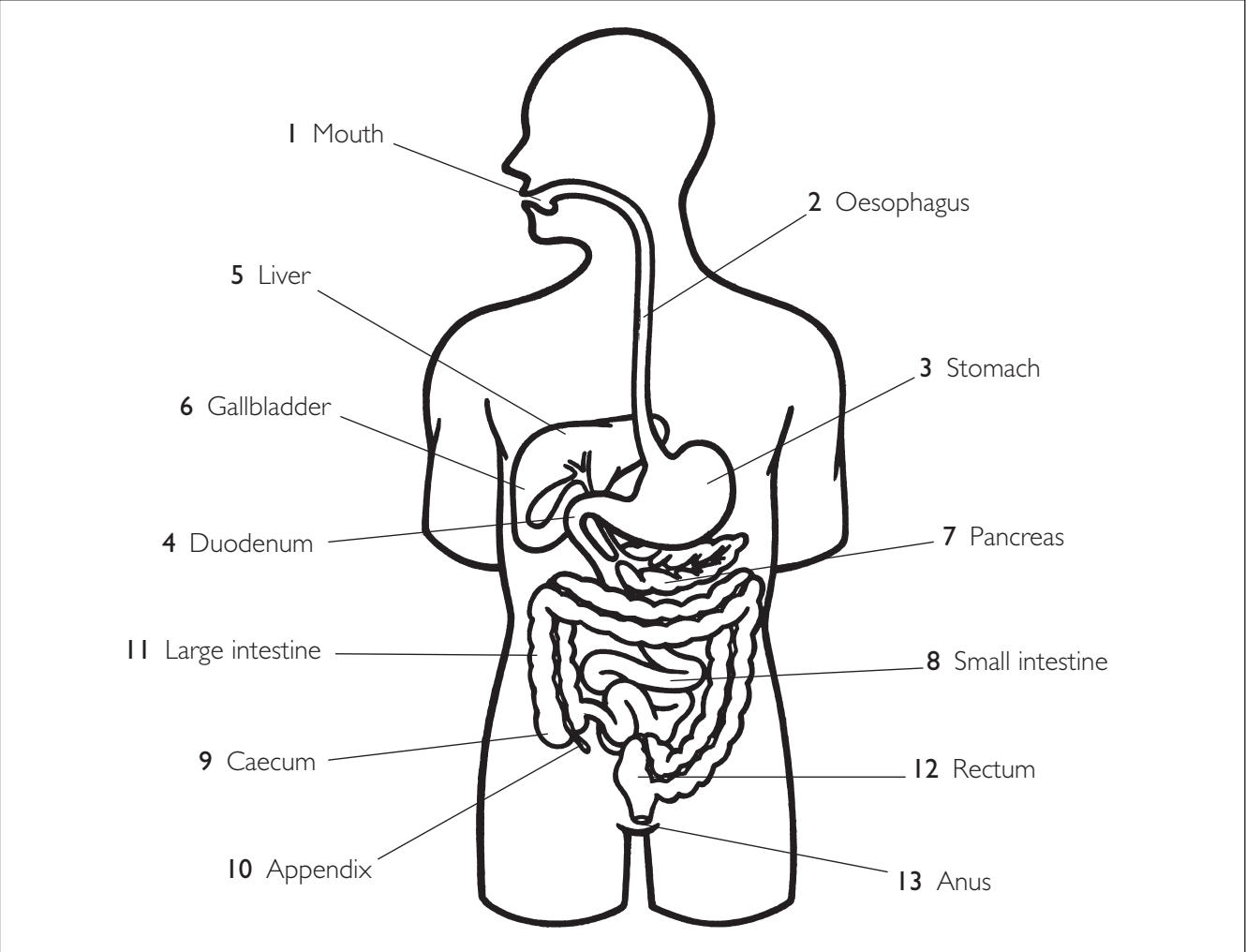
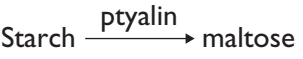


Figure 11.1 The digestive system

## The mouth

Food taken into the body is chewed to produce a soft mass which may be conveniently swallowed, and is mixed with saliva which contains the enzyme ptyalin (which begins the breakdown of starch).

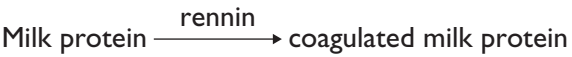


The food passes from the mouth down the oesophagus into the stomach, aided by the wave-like action or peristalsis of the muscles.

## The stomach

Food is mixed with digestive juices and water as the thick muscular walls contract and relax. The digestive juices contain two enzymes, pepsin and rennin. These function in an acidic medium provided by hydrochloric acid.

Protein is broken down by the action of these enzymes.



The semi-liquid food (chyme) is gradually released into the duodenum, a small amount at a time.

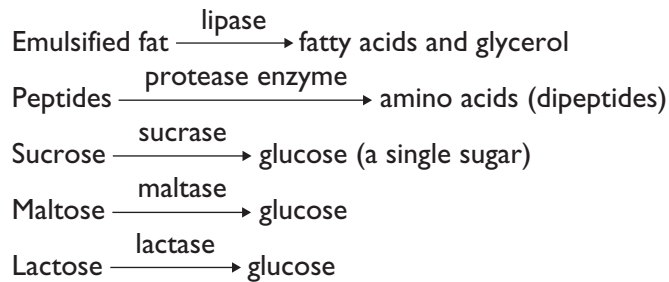
## The duodenum

This is the first part of the small intestine. Here, insulin from the pancreas is secreted into the bloodstream for the control of blood sugar. The duodenum receives bile from the liver to break down fats. The pancreatic juice, containing the enzyme amylase, is secreted by the pancreas. Amylase continues the breakdown of starches into simpler sugars.



## The small intestine (ileum)

The now soft, partially digested food is passed into the small intestine, which is about 7 metres long. Most of the digestion and absorption of food takes place here. Enzymes complete the work of digestion as fats, proteins and sugars are further broken down.



### Tips For A Healthy Gut

(or digestive system)

- Eat plenty of fibre-rich foods:
  - a whole-grain breads and high-fibre breakfast cereals
  - b brown rice and other grains
  - c pasta
  - d multigrain muffins
  - e fresh fruits and vegetables (raw or lightly cooked)
  - f legumes (baked beans, lentils, etc)
  - g nuts and seeds
- Drink at least 6–8 glasses of fluid a day
- Keep fat content of your food low:
  - a avoid excess butter, margarine, or oils
  - b limit your intake of deep-fried takeaways, fatty meats, chocolates and pastries.
- Limit sugar intake. Cut down on sugar added to drinks, and sweet foods such as cakes, biscuits.
- Exercise daily.
- Obey the call of nature (go to the toilet when you need to).

Source: Australian Gastroenterology Institute/Kelloggs, 'The Healthy Gut'



The small intestine has a large surface area, increased by millions of microscopic fingers called 'villi'. As the digested food passes through the small intestine, the products of digestion along with vitamins and minerals are absorbed through the walls into the bloodstream. When the amount of fuel absorbed exceeds the energy needs of the body, it is either converted into fat and stored as body tissue, or into glycogen to be stored in the liver until it is needed. Eventually, the bloodstream will carry it to the cells where it will be used as energy.

### The large intestine (colon)

After most of the nutrients have been absorbed, the liquid residue is passed into the colon, which is about 1.5 metres long. The major function of the colon is to absorb water and some minerals remaining in the waste. The fermentation by bacteria of insoluble fibre may have anti-cancer effects. Solid waste is passed on for excretion as faeces.

### The rectum

The rectum temporarily stores faeces before excretion from the body through the anus.

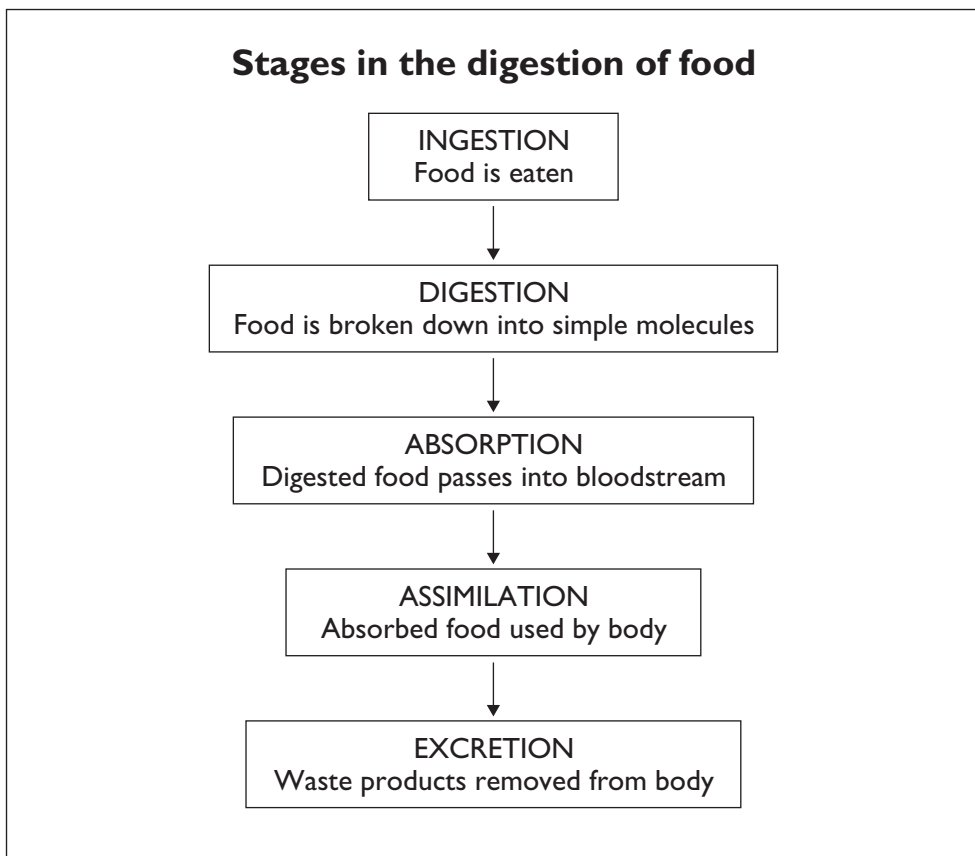


Figure 11.2 Stages in the digestion of food





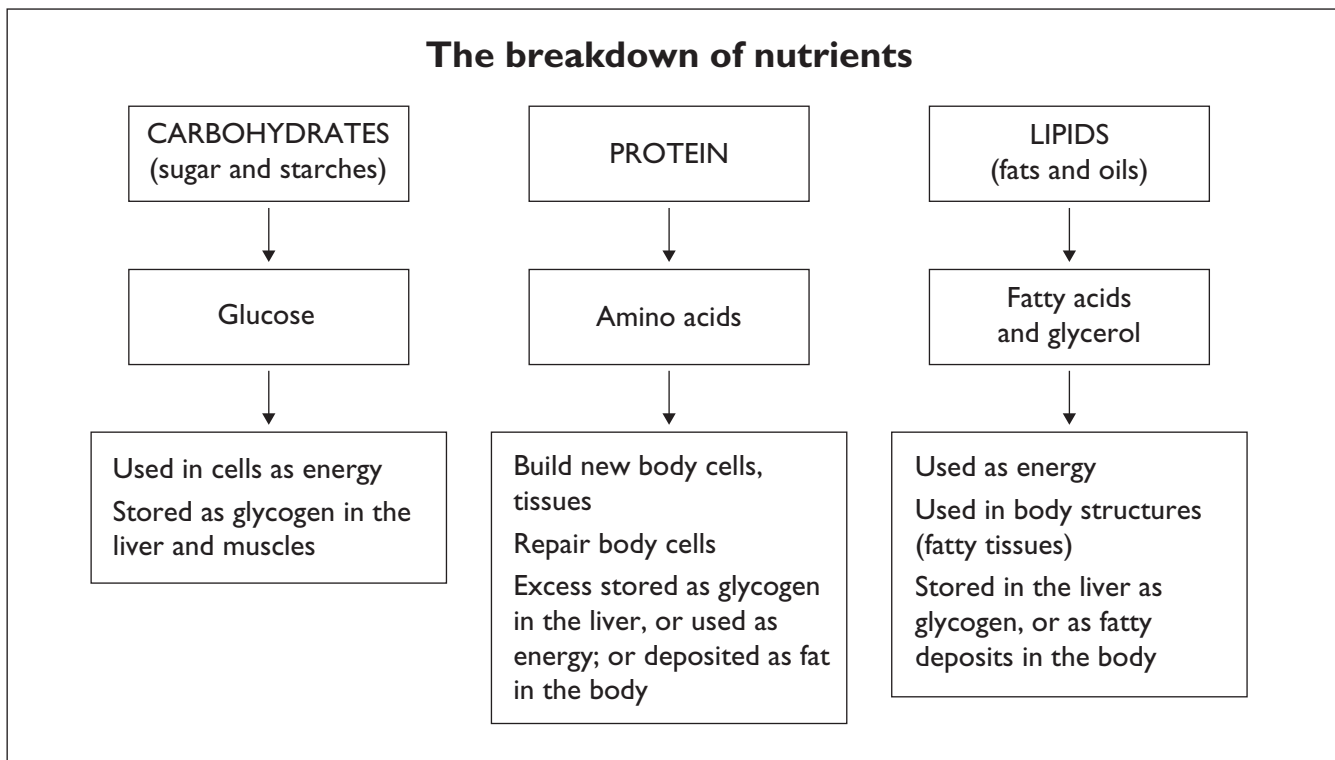


Figure 11.3 The breakdown of nutrients

## Activity 14

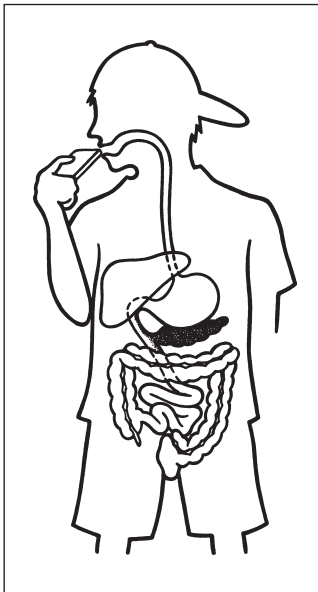


Figure 11.4 Diagram of the digestive system

- 1 Draw a diagram of the digestive system. Name the parts.
- 2 Make a chart to show what happens during the process of digestion in the
  - mouth
  - large intestine
  - small intestine
  - duodenum
  - stomach.
- 3
  - a Make a sandwich with wholemeal bread, butter, cheese and lettuce.
  - b Describe how the sandwich would be digested and absorbed into your body.
  - c Copy the diagram of the digestive system opposite in your book and illustrate the digestion of the sandwich in your diagram.

## What Is Available To Eat?

In Year 11, Book 1, *Food and Textiles Technology*, page 41, we explored the difference between raw and processed foods. We discovered that there is now a number of foods being processed locally in Sāmoa, for example corned beef, vegetable and fruit snack foods, fruit juices and coffee. Many Sāmoans enjoy the produce of their country, as well as the tourists who will often take our coffee back home! There is still much potential for increasing the range of traditional processed foods.

The range of food products available to us in Sāmoa, particularly in and around Apia, has increased considerably over recent years due to technological developments in food production and our awareness through the media and travel of the wider range of foods available to people overseas.

The growth in our tourist industry has also meant that we have more visitors wanting to sample our food, but at the same time many also seek out food from their homeland. Imported food is very expensive for a family living on a low income.

Even buying our own locally produced food like corned beef will be expensive compared with eating fresh protein food available from the sea!

For food to be processed and kept for any length of time, it is necessary with many foods to put in additives. We looked at the role of additives in our food in Year 11. We will revise our knowledge of additives next in Activity 15 and then explore this topic further.

### Key words

Media

Extravagance

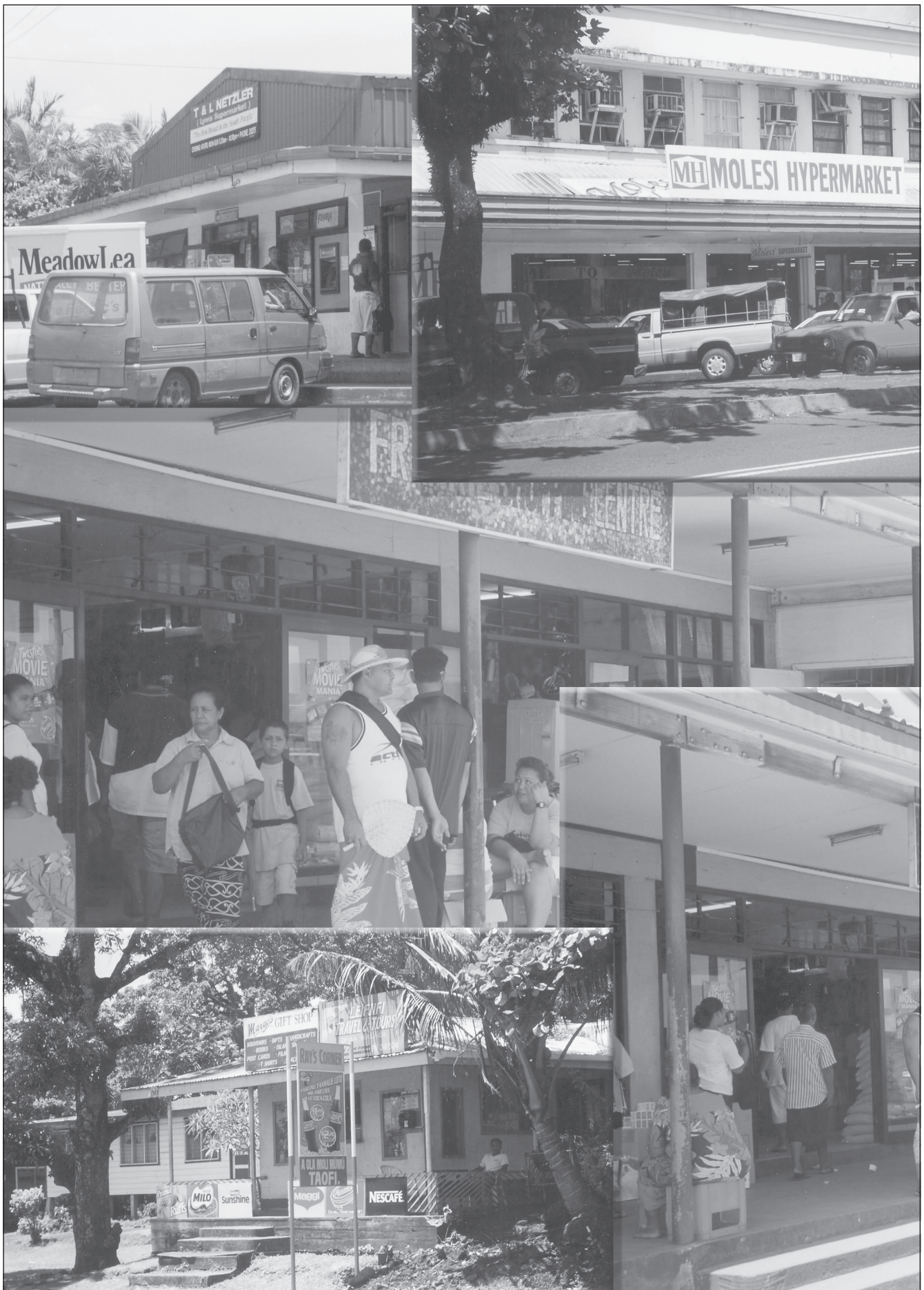


Figure 12.1 A wide range of retail food outlets available in Sāmoa



## Activity 15

- 1 Using pages 18–21 of the Year 11, Book 1, *Food and Textiles Technology* revise:
  - ❑ the purpose of using food additives
  - ❑ the main type of food additives and their function when added to food to be preserved.

To help you do this, you or your teacher may like to make up a mix and match activity by photocopying the information on the charts in the *Food and Textiles Technology* book and cutting up the information (leaving out the information in the third column which relates to 'Examples of additives used'). Then working in pairs, check your success at matching up the additives with their function and with examples of foods that have the additive in them.



# Unit

# 13

## Making Sense Of The Food Label

### Key Words

Legislation  
Negatively  
Immune  
Allergy  
Profile

In Sāmoa we do not have the same food legislation regarding food additives and labelling that exists in countries like America, New Zealand and Australia, where many of our foods are imported from. In these countries a food additive can only be used when there is a need for its use.

**Did you know** that, internationally, approved food additives have been given a number? When consumers see a number amongst the list of ingredients, they know there is a food additive in the product they are buying.

An informed consumer will get to know the code groupings:

- 100s are colourings
- 200s are preservatives
- 300–321 are antioxidants
- 322–400 are emulsifiers and thickeners.

Therefore, consumers will understand the purpose of the additive in the food they are eating.

If an additive is shown on a food package as a number and the consumer wants to know exactly what the substance in the food additive is called, then they would refer to a Code Book on Additives which gives the full name of all the additives. Some people have an allergic reaction to certain food additives. For these people it is important to know what additives are in the food they eat.

An allergy to anything triggers a reaction from the body's immune system. Symptoms of a food allergy can be quite mild, with a slight skin rash, to as serious as the heart racing, swelling of the mouth and throat and eventually an inability to breathe.

**Did you know** that peanuts, cow's milk and eggs are the foods most frequently responsible for an allergic reaction?



Children can develop an allergy to certain foods and then find later in childhood they have grown out of the problem. However an allergy to peanuts can be very serious and is less likely to disappear. The gluten found in wheat is another food that many people are allergic to. In some people it causes the bowel to be over-sensitive and the person can experience stomach pains and diarrhoea and sometimes headaches when they eat wheat products. This condition is known as coeliac disease.

Allergies to fish, soya bean products, pork and beef are also fairly common, usually in that order.

It is not always easy to recognise reactions to food or additives because they:

- do not always occur immediately after eating a particular food
- may be triggered by a number of different compounds.

**The most common adverse reactions are:**

- hives (large lumps that appear on the skin)
- eczema (skin rash)
- asthma
- headaches/migraines
- ADHD (hyperactivity)
- Rhinitis (constant runny nose)
- digestive upsets (abdominal pain, sickness, diarrhoea).

A food additive that is often found to be responsible for a range of physical conditions in people, for example hives, asthma and hyperactivity, is the food additive Code No 102 Tartrazine. This additive is an 'artificial colouring' sometimes added to soft drinks, chocolate, cakes, biscuits, processed cheese, sauces, sweets and jelly.

A tin of corned beef produced in Sāmoa will probably just tell us the weight, where the food was produced and what the main ingredients are. For example: cooked beef, salt, water and sodium nitrate.

If the corned beef had been produced in New Zealand or Australia, the sodium nitrate would have been represented as a preservative with the number 251 after it. If the food had been produced overseas the label would read 'cooked beef, salt, water and preservative 251'.





Figure 13.1 Breadfruit chips

The information you might expect to find on a packet of breadfruit chips produced in Sāmoa could simply be 'ulu, vegetable oil and salt'. From this information the consumer is likely to assume that this food does not have any additives. They are also likely to think that 'vegetable oil' means the chips have been fried in unsaturated oil. Check this out by turning to page 75 and reading the section on 'Cooked in vegetable oil'.

**Did you know** that the type of fat used to cook food can be classed as a 'good' or 'bad' fat depending on whether it causes a build up of cholesterol in the body?

If we look at the picture below of the Lite Mayonnaise manufactured in New Zealand we will see that there is far more information offered to the consumer.

Refrigerate after opening  
 Manufactured by:  
 United Foods Ltd  
 Appleyard Road  
 Auckland 7  
 New Zealand

**NUTRITION INFORMATION**  
 Serves per package: 25.3  
 Serving size: 15 ml (1 Tbsp)

Nutrient	Quantity	Quantity
	per serving	per 100 ml
Energy	60 kJ (15 Cal)	400 kJ (95 Cal)
Protein	0.1 g	0.3 g
Fat, total	0.3 g	2.0 g
-saturated	0.1 g	1.0 g
Carbohydrate, total	3.0 g	20.0 g
-sugar	2.0 g	13.5 g
Sodium	110 mg	730 mg
Potassium	2 mg	14 mg

Ingredients: Water, Sugar, Vinegar, Modified Corn Starch (1442), Egg White, Canola Oil (2%), Salt, Food Acid (330), Garlic, Emulsifier (435) Natural Flavouring, Colour (102), Anti-oxidant (320).  
 Contains traces of Gluten.

Figure 13.2 Label information from a jar of Lite Mayonnaise



Comparing the label on the foods on the previous page with our locally produced food, you could feel that this is information overload!

Most of the food products produced in Sāmoa do not yet give us this level of information. Dietitians and people interested in improving the health of our people are advocating for improved labelling.

## Activity 16

- Below is a sample of the type of information that we might find on a 200 g packet of banana chips that have been locally produced.

<i>Table 13.1 Nutrition per 100 g of Banana Chips</i>	
<b>Nutritional Content</b>	<b>Amount</b>
Energy	2390 kJ
Fat	29.1 g
Moisture	3.5 g
Protein	1.9 g
Total Carbohydrate	69 g
Saturated Fat Total	1.312 g
Sodium	370 mg
Total Sugars	4.3 g

Read the information carefully and make a list of how some of the information shown could be misleading. Analyse the information on your own and then your teacher will ask you as a class to pool your comments.

Record them in your book.

- Now compare the ingredient information from a carton of locally produced orange juice with an imported product. Note the differences in your book.

<i>Table 13.2 Local and imported orange juice</i>	
<b>Sāmoan Orange Juice</b>	<b>Imported Orange Juice</b>
Reconstituted Orange Juice	Has no added colours, preservatives or artificial sweeteners
Sugar	Orange Juice from Concentrates (100%)
Food Acids	Flavour
Vitamin C	Vitamin C (300)
Preservative	
Water Added	





- 3 Research the meaning of the 'Pick the Tick' food symbol found on the Lite Salad Mayonnaise in the picture on page 70.
- 4 In your practical session make a food product that could be given to a child to take to school for lunch that would be suitable to carry a 'Pick the Tick' award if it was commercially produced.

Evaluate the food product you make against any similar food products that already exist and justify why your version is better. If possible ask children of school age to sample and comment on the suitability of the food. Remember a food technologist has to design food to meet a specific customer profile.



# Packaging Food

## Active Packaging

Traditionally, packaging of food was just about a container being suitable to protect the type of food. It was also a space on which to write information to the consumer (e.g. ingredients, weight). The package was also seen as an advertisement for the food product it contained. The major concern has been that the packaging material should not contaminate the food in any way.

With technological improvements in polymers and an in-depth knowledge of how food spoils, it is now possible not only to protect the food in a package but to extend its shelf life. 'Active packaging' makes use of materials and processes that enable the package to do more than prevent possible contamination.

Active packaging uses a technique which involves a reaction between the packaging material and the gas life. The package has an active role in modifying the conditions within the package. The initial conditions of the food can be changed by adding a gas such as nitrogen, which will flush out oxygen. The permeability of the polymer film used in this type of packaging will control the concentration of these gases during storage. Active packaging specifically designed for use in the microwave oven also exists.

### Key Words

Polymers  
Modifying  
Permeability  
Pollution

## Environmentally Friendly Packaging

There has been a significant increase in the amount of recyclable packaging in recent years. This includes materials such as glass, aluminium, some plastics, paper and board containers. Recycling means being able to re-use materials. By reducing the material used in packaging we are also able to conserve our resources. This has come about largely because of consumer concerns for the environment. The manufacturer of the packaging, however, has to decide whether recycling is worthwhile in terms of the profits and technology available. Manufacturers need to consider questions such as: Can the plastic be separated from other plastics easily? Can it be re-used successfully? Is it going to be as cheap or cheaper than the product presently available?

To determine whether the process of recycling is worthwhile, the following points must be considered at each stage of the manufacturing process:

- energy use
- water use
- transport
- availability of materials
- waste and pollution caused by the recycling process.

## Activity 17

- 1 What is the aim of packaging foods?
- 2 **a** Make a list of all the packaging used on foods in Sāmoa.  
**b** What evidence is there of recycling in Sāmoa?
- 3 What is active packaging and how does it work?
- 4 What is environmentally friendly packaging?
- 5 Why has there been a significant increase in this type of packaging?
- 6 Visit a food outlet and make a list of commercially produced foods that could be useful when making a quick meal for the family, for example, tinned tomatoes, frozen vegetables, corn beef.

### Write down:

- the country the food was produced in
- the type of information that appears on the label, for example: serving size, nutritional content of 100 g of the food.

**Remember to include foods produced in Sāmoa.**

- 7 Write a report on your findings having compared the information available on food products that have been commercially prepared both in Sāmoa and overseas.



## Decoding Food Labels

In the last section, reference was made to how a food package or container provides a space on which to write information to the consumer. The information is aimed at attracting people to buy the product.

We see on foods from overseas endless nutritional claims like

- high in fibre
- 98% fat free
- lite
- no cholesterol
- reduced salt.

These are all claims to tempt the consumer to purchase.

Manufacturers should abide by the voluntary Code of Practice related to food labels. Basically, the code expects that a nutrition information panel on the pack will provide evidence of what is being claimed.

### Key Words

Blander  
Impressive  
Counterpart  
Glutamates  
Pasteurization

### Did you know?

**Lite or Light** can mean a number of things, not necessarily low in kilojoules or fat. Lite potato chips are thinly sliced and lightly salted (but may still have the same amount of fat). Light beer is low in alcohol; Light olive oil is blander in flavour; light cheese has less fat and salt; light margarine has less fat.

**Cooked in vegetable oil** might give the idea that the food has been cooked in unsaturated vegetable oils like sunflower, canola or soya bean but it has most likely been cooked in palm oil which is 50% saturated fat. This is the oil commonly used to fry snacks and fast foods, because it is cheaper and keeps the food manufacturers' costs down. If an unsaturated fat is used in the food, it will often tell you on the pack. If not, you can assume it is palm oil or a hydrogenated (hardened and therefore saturated) vegetable oil.

**Cholesterol free or No Cholesterol** is another confusing term for consumers. It does not mean no fat. Many foods can be free of cholesterol but remain high in fat, like oils, margarine, nuts, avocado and snack foods. All plant-derived products are free of it anyway. It is the amount of fat in the food that is just as important as the presence of dietary cholesterol.

(cont.)

**97% fat free** really means that the food contains 3 per cent fat but it sounds better for the consumer. 'Only 3% fat' does not sound as impressive.

**Reduced fat** foods contain less fat than regular products, but may not necessarily be low in fat. Usually there is at least 25 per cent less fat than in the normal counterpart. The most common examples are reduced-fat milks, cheese, ice creams and mayonnaise. On overseas products, the package must carry a nutrition information panel and must show a comparison with the normal counterpart food.

**Reduced salt** foods contain 25 per cent less salt than their regular counterpart. Again the product is expected to carry a nutrition information panel and must show a comparison with the reference food.

**No added sugar** applies to foods which do not contain added cane sugar or other types of sugar in the form of honey, glucose, fructose, malt, malt extract or maltose. However, the food being advertised can be just as high in natural sugars and provide a similar number of kilojoules. Overseas regulations require the label to tell the consumer how many kilojoules are in 100 grams or 100 millilitres of the products.

**Natural** appears everywhere on food labels today. It makes the food seem better for us than other similar products. It should only appear on the food label of products that are as close as possible to the state they exist in nature, with no additives.

**Fresh** is a term that should only be applied to foods which have not been preserved in any way, such as freezing, canning or chemical processing.

**High in complex carbohydrate** is often used to sell breakfast cereals and wholegrain products like pasta, rice and bread. The informed consumer will realise that these products are a better alternative to simple carbohydrate.

**No MSG** is misleading as there are many sources of natural glutamates which may be present in many foods, especially protein foods. Mushrooms, cheese, tomatoes and meat are all rich in natural glutamates, which contribute to flavour. No added MSG would be a more realistic claim.

**No artificial colours or flavours** is a key selling point with consumers but, like other advertising, it is sometimes misused on foods. The food can contain natural colours, e.g. beta-carotene and flavours, but these should be stated on the ingredient list. An example of this can be seen in the information taken from the imported orange juice label in Table 7.2 on page 71.

**No preservatives** is seen by many consumers as an added advantage. For this reason it is seen as a selling point. What it is telling the consumer is that no chemical preservatives have been added although methods of preservation like pasteurization or vacuum sealing may have been used.

**No added chemicals** is a meaningless term, as all food is composed of chemicals. What it is really saying is 'no artificial colours, flavours or preservatives' have been used.

(cont.)



**Baked not fried** is a new phrase to appear on snack foods. It implies that the food is low in fat. For some snacks like pretzels this is true (i.e. they have less than 3% fat) but for others like biscuit snacks, it means they are lower in fat (around 25%) but not necessarily low in fat.

**High in fibre** means that the food must contain at least 3 grams of fibre per serve to qualify for this claim and this can be verified by the nutrition information panel. Wholegrain breakfast cereals and mixed-grain breads would meet this claim.

**High in protein** means the food must contain at least 5 grams of protein or 12 per cent of its kilojoules derived from protein. Most lean cuts of meat, chicken, eggs, milk and cheese would meet this claim.

**Gluten-free** means no wheat, rye, barley, oats or malt are present in foods made from cereals or starch, and they must have no detectable gluten.

**100 per cent juice and no added water** means the fruit juice may contain up to 4 per cent added sugar depending on the sweetness of the fruit, but the added sugar would appear on the ingredient list.

### Activity 18

- 1 Design a label for the food product that you made in Activity 16.4, bearing in mind that it is for a child. Apply the principles of labelling that you have learned in this section.
- 2 Having revised food labelling, organise a debate in your class with the topic: 'Labelling food is a waste of time, no one reads the label'

### What Do We Mean By 'A Serving'

When we look at a food package from overseas we will see a serving size quoted on the label. To see an example of this refer to the label on the Salad Dressing on page 70. In this section we look at some commonly eaten foods to become familiar with some serving sizes. This section will provide guidance when completing the food plan sheets in Unit 21.

<i>Table 15.1 Serving Size Examples (each item represents one serving)</i>	
<b>HEALTH AND PROTECTIVE GROUP</b>	
<b>Vegetables:</b>	
1 medium taro, potato or similar root vegetable	135 g
Half a cup cooked vegetables	50–80 g
Half a cup salad	60 g
1 tomato	80 g

(cont.)

<b>HEALTH AND PROTECTIVE GROUP</b>	
<b>Fruits:</b>	
1 mango, banana, apple, pear, or orange	130 g
1 slice of pawpaw	100 g
$\frac{1}{2}$ cup fresh fruit salad	120 g
$\frac{1}{2}$ cup stewed fruit	135 g
1 cup fruit juice	250 ml
<b>ENERGY GROUP</b>	
<b>Breads and Cereals:</b>	
1 medium slice of bread	26 g
1 roll	50 g
1 muffin	80 g
1 cup cornflakes	30 g
$\frac{1}{2}$ cup cooked cereal	130 g
1 cup cooked pasta	150 g
1 cup cooked rice	150 g
2 cabin biscuits	30 g
2 plain sweet biscuits	14 g
<b>BODY BUILDING GROUP</b>	
<b>Milk Products:</b>	
1 glass milk	250 ml
1 pottle yoghurt	150 g
2 slices of cheese	40 g
2 scoops ice cream	140 g
<b>Meat, poultry, seafood, eggs, dried peas, beans and lentils:</b>	
2 slices cooked meat	100 g
$\frac{1}{2}$ cup mince or casserole	195 g
1 egg	50 g
1 medium fillet of fish – cooked	100 g
$\frac{1}{2}$ cup dried cooked beans	135 g
2 drumsticks or 1 chicken leg	110 g
$\frac{1}{2}$ cup beef and sweet potato stew	195 g
$\frac{1}{2}$ cup palusami, taro leaf, coconut and beef	195 g



## Activity 19

- 1 Keep a food diary for today recording what you eat throughout the day. Record your food in serving sizes and work out a total at the end of the day for the number of servings of each food group.

Evaluate your eating pattern for the day against the food related guidelines 'The Path To a Healthier Sāmoa' currently under development.

**1**

Choose a variety of foods from the three food groups. Local are best.

**2**

Eat plenty of fruit – it is great as a snack.

**3**

Include a generous serving of vegetables in two meals a day.

**4**

Eat less foods which are high in fat, sugar or salt.

**5**

Drink plenty of clean water.

**6**

Be active every day. Walk more.

**7**

Wash hands thoroughly and keep food safe.

**8**

Avoid smoking, tobacco, drugs and betel nut.

**9**

Avoid heavy drinking.

**10**

Exclusively breast-feed babies for about the first six months. Continue some breast-feeding for at least two years.

**11**

Take time to relax – enjoy time with family and friends.





# Unit

# 16

## Becoming Familiar With Food Prices

### Key Words

Interrelationships  
Productivity  
Pertaining  
Acquisition  
Physiological

To understand how much it costs to feed a family it is important to gain knowledge of everyday food prices. If consumers become familiar with the cost of main food items, including commonly used convenience foods, they will be able to make informed decisions when shopping for food.

For you to become familiar with the cost of food your teacher will try to organise a trip to a food outlet near your school. This will enable you to price food and become familiar with the labelling on food products. The greater the number of food prices you become familiar with, the easier you will find the tasks later in this book where you have to cost meals and work out a food budget.

### Activity 20

- 1 Investigate the foods available in your local food outlet. Find out the cost of the product and the weight or number of individual servings available in the container. This may not be stated on the packaging so it may be a case of estimating. As a rough guideline, a serving is the amount of food that could be put into an average sized 'cupped' hand.

Foods which are not packaged, for example bread and carrots, should be priced and then the serving size worked out and costed. For example, a large loaf of bread provides 20 slices and one carrot would be equal to a serving of vegetables. To find out how much the carrot would cost you would need to weigh one and then divide the weight into the cost of one pound of the vegetables.

To make this task simpler, your teacher may decide to use it as group activity with everyone having responsibility for finding out information about certain foods commonly used for meals. Everyone would then share their findings, and a master list of food prices per serving would be available for everyone to use when costing their food plans in later activities in this book.



Figure 16.1 Exploring the food options at Lucky Food Town in Apia

# Unit

# 17

## Budgeting For Food

In an earlier section of this book we looked at why there are now more processed foods in Sāmoa. It was pointed out that the reason for many of the products being on the supermarket shelves in Apia was due to many Sāmoans being exposed to a wider range of food when they travelled overseas.

Eating patterns have changed a lot over the last 20 years. More people now eat imported and processed foods. To maintain a healthy diet, it is important that we read the labels carefully and evaluate the nutrients they contain. Our diet can easily become dominated by foods that are too high in fat, salt and sugar which leads to obesity and all the associated health problems like Type 2 diabetes, heart diseases and possible links to certain types of cancer for example, breast and bowel.

The other issue to be taken into consideration is the cost. Imported and processed foods are often much more expensive. One example is the kind of food you can buy when you eat out.

It is possible to buy, in a cheap restaurant with a basic menu, a good sized serving of mutton, curry and rice/mutton stir fry and rice/bananas or Sāmoan chop suey and rice for \$3.00 tala.

While in a more expensive restaurant a fish burger with salad and fries can cost around \$7.00 tala.

This is considerably cheaper than a Big Mac combo meal at \$13.90 tala from McDonald's but this meal does come with a soft drink.

At the top end of the market you could pay around \$27.00 tala for a fish fillet meal with salad and fries or vegetables and baked potato, while you would expect to pay around \$38.00–\$50.00 tala for a steak meal with vegetables depending on cut and size of the steak. This would be more money than what many people have to live on for food for a week.

So why has eating out become popular if it costs so much? It is because we are becoming caught up in the global trend to eat away from the home. More women work and have less time to spend preparing family meals. Increased income and less time for preparing meals makes buying takeaways or eating out sometimes seem like a well earned treat.





Figure 17.1 Cafés, restaurants and takeaway bars offering food choices to Sāmoans and tourists



**Did you know** that takeaway sales in the USA hit an estimated \$6.3 billion in 1995 and in the same year in Australia it was estimated each individual purchased 65 meals from fast food outlets?

Eating out has become far more popular with a good choice of food outlets, especially in Apia. Meeting up with friends and family over a meal which no one has had to prepare is certainly a treat. If the meal is value for money and the company good, the occasion will enhance all aspects of soifua mālōlōina. However, it is always important to weigh up the costs.

## Activity 21

- 1 Your ability to carry out this activity will depend on the accessibility of a restaurant, café or takeaway bar to your school or home. The task is to compare the cost of eating out with preparing similar food in the home. Having priced the food that is ready-made, your task is to make a similar meal and cost the ingredients.
  - Demonstrate making economical meals for family occasions which meet the needs of individual family members.
  - They have some knowledge about the nutrient content of unprocessed food so they can make comparisons between food options, e.g. fresh tuna compared with tinned tuna.
- 2 Using food tables (in the back of this book) compare the quality and nutritive value of processed food with the equivalent fresh food. Below is a list of foods that could be compared. You and your classmates will be able to think of other foods you could explore this way.
  - baked breadfruit compared with snack breadfruit or ulu chips
  - fresh orange juice with processed orange juice
  - silverside with tinned corned beef
  - white fish steamed (or cooked in umu) with frozen fish fillets or fish fingers.

Having carried out this investigation, write a report on the nutritional content of commercially produced foods and the equivalent fresh food.

- 3 In your practical sessions, your teacher will provide you with the opportunity to make food products from fresh ingredients and compare the results of making the same food, substituting some of the ingredients with ones that have been commercially preserved. The aim of this practical investigation is to evaluate the cost benefit of using convenience foods to save time in the preparation of family meals. This activity could be organised with half the class making the recipe from fresh ingredients and the other half of the class using at least one commercially preserved item.

### Some ideas for food products that could be explored:

- Fish cakes made with tinned fish rather than fresh fish that need pre-cooking.
- Meat and vegetable stir fry using tinned corned beef instead of fresh meat.
- Home made pizza from scone base substituted for a ready made base; or
- A topping of tinned tomatoes or spaghetti, tinned pineapple, chopped onion and cheese instead of fresh vegetables and cheese.



## Why Is Sound Nutrition So Important?

Good nutrition is an essential component of the soifua mālolōina of a country. The food we eat plays an important part in the interrelationship of the physical, emotional, spiritual and social aspects of people's lives. When there is poor health among people, there is pressure on the economy, productivity and development of the country they live in. It is therefore essential that everyone has some understanding of how food is produced, processed and distributed. Having an understanding of food consumption patterns, i.e. what we eat, why we eat it and when we eat it, can help us to bring about improvements to eating patterns.

The first step is people having knowledge about the food that is available so they can make informed choices about nutritious eating. *The Sāmoa National Plan of Action for Nutrition*, (NPAN) that began in 2002 and is due to run until 2007, seeks to do this. It aims to raise awareness about food and nutrition in Sāmoa.

The economic and social systems that exist in the community should make sure that nutritious food options are available to everyone regardless of their place in society and their financial position. For people to be able to enjoy soifua mālolōina they need to have food which meets both their particular nutritional and physiological requirements. By physiological we are meaning the mental, emotional and spiritual needs that we all have. When we think about how our 'aiga' gatherings centre around the provision and sharing of food we see clearly the huge part that food plays in our soifua mālolōina. To have sufficient food to enjoy and share with others is in many ways more important to our mental, emotional and spiritual needs than our physical needs.

### Activity 22

#### Prepare either

- ☐ a short 2–3 minute speech to present to the class or
- ☐ a poster to display on World Consumer Day on the important role food plays in the soifua mālolōina of a nation.

#### Key Words

Documented  
Hypertension  
Intertwined  
Surveillance  
Micronutrient  
Prevalence

## Support For The Sāmoa National Plan Of Action For Nutrition

For the Sāmoan National Plan of Action for Nutrition 2002–2007 to be implemented it had to win support from the following agencies:

- ❑ World Health Organization (WHO)
- ❑ Food and Agriculture Organization (FAO)
- ❑ United Nations Children Fund (UNICEF)
- ❑ University of Otago (NZ).

Once the commitment from these agencies was gained, it was possible to draw together input from all sectors within the Sāmoan community, that are involved in any way in the supply of food to our people.

### A Design Brief Or An Action Plan?

The success of any project like the National Plan of Action for Nutrition depends on people coming together to take joint action. In the health arena we call this an action plan and it has the same features as the technology design brief. The **first step** in a design brief and an action plan is to **'identify a need, issue or problem'** that needs to be solved.

In the case of the National Plan of Action for Nutrition, the issue or problem was the need to improve the nutrition of the Sāmoan people. This need became apparent when there was such a noticeable increase in nutrition related non-communicable diseases. A 1991 study showed that there were high levels of diabetes and hypertension among Sāmoan adults and showed that between 1978 and 1991 the level of diabetes had risen sharply in both sexes, in rural and urban areas. Obesity, also an important risk factor for NCD's, had also shown a marked increase between 1978 and 1991.



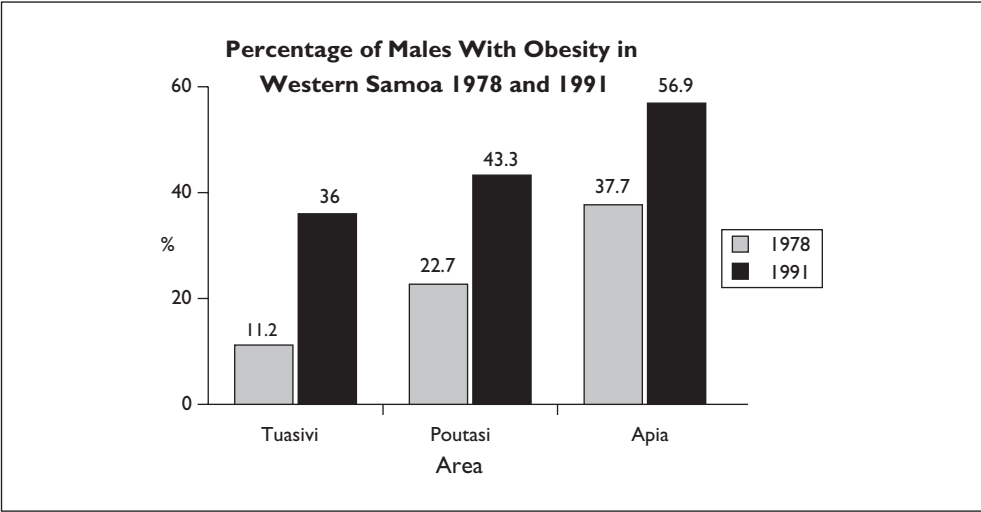


Figure 19.1 Male obesity in Western Sāmoa, 1978 and 1991

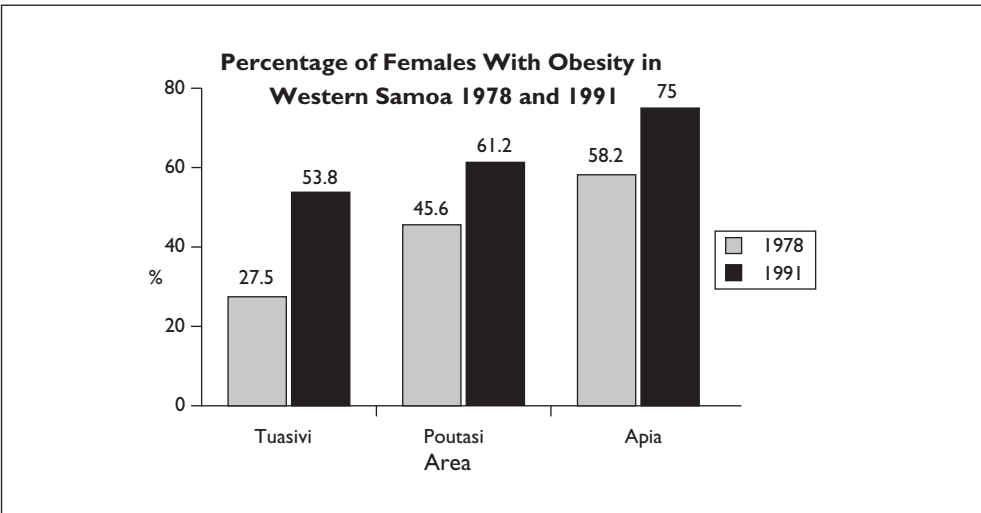


Figure 19.2 Female obesity in Western Sāmoa, 1978 and 1991

Previously, infectious diseases had been the main health problem for Sāmoans. Now it was diabetes, hypertension and cancer that were the major concern.

To revise the causes and symptoms of non-communicable diseases (NCD's) refer to the Year 11, Book 1, *Food and Textiles Technology* 'Food and Nutrition', pages 61–62. The graphs on those pages also show the increase in the NCD diabetes which is now being termed a 'lifestyle' disease.

The **second step** in a design brief is to **'carry out an investigation'** about the problem that needs to be solved. This is the same with an action plan.

As part of the investigation with an action plan it is important to identify what the 'barriers' are that are causing the concern. An example of a barrier in the case of NCD's would be not all people in our country knowing how to prepare local produce into well balanced meals without adding extra salt, fat or sugar to the diet.

In technology the **third step** is **'recording ideas'**. This is the same with a health action plan. This step consists of **identifying what the 'enablers' might be to overcome the 'barriers'**. An 'enabler' is a helpful and positive factor. For example, for an 'enabler' to overcome the 'barrier' (negative factor) of lack of knowledge on how to use local produce in meals might be to have a series of quick, nutritious recipes, using local produce, printed in the local newspaper.



The **fourth step** is ‘**planning the strategy to make use of the enablers**’. In technology we call this the ‘**development**’ stage.

The term ‘development’ stage also describes most appropriately what happens with a health action model. If you look at the development stage of the design brief on page 66 of Year 11, Book 1, *Food and Textiles Technology*, you will see that when students were trying to help a woman with diabetes change her eating and exercise patterns, having investigated the problem, they developed a plan to make improvements.

This is exactly what we see happening with the *Sāmoa National Plan of Action for Nutrition* (NPAN) except that it is being implemented at a societal level, not just a personal level. For example, a person who is suffering from malnutrition is barely going to have the strength to survive. Help is needed from others. Often the type of help given to a hungry family is a quick ‘fix it’ solution like a food parcel. This type of help is essential at the time but in the long term the cause of the problem must be addressed. Often part of the solution to a problem like malnutrition is educating others about the cause of the problem and getting them to change their attitudes and values towards those who are less well off than themselves. Making critical judgements on others is a ‘barrier’ to bringing about positive change.

As with a design brief it is important for ‘**evaluation**’ to be ongoing. If a strategy or step in the action plan is not effective, it is important to make changes.

## A Close-Up On The Strategies Of The Sāmoa National Plan Of Action For Nutrition

The NPAN is made up of nine strategies or steps.

### Strategy one:

#### **Incorporate food and nutrition objectives into development programmes and policies (for Sāmoa)**

This strategy plans to raise awareness about food and nutrition in Sāmoa by producing educational material to inform politicians and policy makers and provide educational talks on radio, TV and in newspapers that educate all sections of the community. Ensuring that food, agriculture and nutrition issues (including food safety, home gardening etc) are in the curricula of preschool, school and tertiary institutes underpins the importance of food and nutrition education.

The NPAN is aiming to train more nutrition professionals, environmental health officers, agriculture professionals and food and textiles teachers. The strategy also wants to keep our trained professionals updated by recommending 40 hours’ professional training each year. This strategy opens up employment opportunities for students in school who achieve well in subjects like Food Technology and Health Education.





Figure 19.3 Students at Malifa school learn how to grow taro in their Food And Textiles Technology class

## Strategy two:

### Improving household food security

The term food security comes from the World Health Organisation and it means everyone having access to sufficient affordable, safe and hygienic nutritious food. To do this the action plan has included ways to increase local production of

- ❑ fruit, vegetables and root crops
- ❑ meat, milk and eggs
- ❑ fish and seafoods.

As well as seeking ways to increase availability of these foods for people to buy, there is also an intention to teach budgeting skills. They also plan to promote correct food handling, preparation, cooking, storage, home processing and preserving.

We may wonder why our people need to be educated about skills that would have been traditionally learned in the family, e.g. correct food handling and preservation and how to keep a vegetable garden. Some of the traditional skills that our grandparents had, have in some instances been lost as we have moved away from the village for paid employment. Paid employment means you sell your skills, knowledge, time and labour for money. With the money earned it may then be possible to buy food prepared and ready to heat and eat instead of growing produce and fishing and preparing meals from fresh foods.

For people working in a main centre like Apia or Salelologa it is possible to visit the market and buy in larger food outlets. The supermarkets offer some foods on 'special' and a wise shopper with some spare money can buy food they would normally use when it is marked-down in price. However, sometimes this can be **false economy** because the food is still expensive.





*Figure 19.4 The fruit and vegetable market in Apia*

Many people will find that it is worth working long hours if we can go to the supermarket or sometimes pick up takeaways for dinner.

Once inside the supermarket doors there are many more food choices to tempt us. We won't always read the labels to check for any nutritional information. The information that we are the most likely to seek is the price and how long it takes to cook or heat. If the shopper is on the way home from work and knows that the family will be waiting for a meal when they arrive, they want to know the food they are buying is going to be quick to prepare. But they have to weigh up the time saved in preparation with the extra cost for saving us that time!

These are some of the issues that need to be taken into consideration when we talk about food security.

Another very important issue related to food security is the reality of the climatic conditions that can exist in Sāmoa. Cyclones can cause havoc to our nation's economy by reducing our food supply. For this reason the NPAN contains a provision for the implementation, review and update of a national emergency and disaster plan that incorporates food guidelines.







Figure 19.5 Replanting after a cyclone

## Strategy three:

### Preventing micronutrient deficiencies

By using a range of media to report on data from National Nutritional Surveys the aim will be to raise the community's awareness about issues of possible deficiency in:

- iron
- iodine
- vitamin A.

The second part to this strategy is to do research on the cause of micronutrient deficiencies. There also needs to be programmes to overcome them. One way is to encourage home gardening programmes, and another is to implement programmes to increase livestock and fish production.

## Strategy four:

### Protecting the consumer through improved food quality and safety

By creating awareness in the community of factors that cause food contamination, people become far more aware of unsafe practices in shops and food outlets. This can be done by producing and distributing written promotion and education materials about food safety and food quality and presenting talks and seminars, locally and through the media. It is also very important to make sure that customers can complain if there is a problem and that the shops and food outlets respond to complaints.

As with all the other strategies in the NPAN, the ways of overcoming the problem of food safety need to be carefully considered. Developing regulations for labelling and regulating incorrect and unethical food advertising are all ways of improving food quality and safety.



## Strategy five:

### Promoting healthy lifestyles and diet

Developing and implementing programmes to promote healthy diets, and increasing awareness about nutritious eating patterns through the media and education, are all ways to improve the health of Sāmoans. Part of the plan is to encourage researchers to investigate beliefs, attitudes and practices about healthy diets. There is also a plan to develop and promote dietary guidelines and these appear in their draft format on page 79.

There is a plan to develop programmes to improve nutrition in canteens. The changes to be made to canteens in the workplace will bring them into line with the dietary guidelines. The practical work in this book is based on the latest version of food based dietary guidelines.

The work being done to promote a healthy diet is being sponsored by the Bahai Charitable Trust and focuses on children and their families. The ideas they have come up with are an excellent example of how change can be brought about by targeting a specific group in society. Developing and screening a television cooking show 'O le Kuka Sāmoa' is one of the ideas being developed. To make sure that the programme reaches everyone in Sāmoa there is a plan to conduct live O le Kuka Sāmoa cooking shows in the rural villages. They also aim to produce and distribute five hundred cookbooks to support the television series. This is a good example of a strategy designed to bring about improvement by making the community aware of the issues and giving people the knowledge and skills to bring about positive change.

One of the most creative activities planned in the NPAN is to develop life-size fruit and vegetable characters and use these for promotion activities and to develop and perform a play about healthy nutrition called 'The Hungry Giant'.

At the other end of the continuum, there is a plan to encourage appropriate Government Agencies to:

- ❑ review and adjust import duties and price controls, to increase consumption of fruit and vegetables and low fat foods and discourage consumption of foods high in fat, sugar or salt and low in fibre.
- ❑ introduce excise tax on food items high in fat, salt, sugar and/or low in fibre.

As well as promoting healthy eating, there is also the need to promote awareness of the importance of physical activity. Seminars, talks, TV and radio spots plus newspaper articles will all be used in this process.

Including physical activity and exercise in pre-schools, schools and tertiary training institutions is also seen as essential for making us see the importance of including exercise in our day.

In the workplace, physical activities can be offered to employees.

At the same time as making people aware of the need to plan their diet and exercise, there is also a need to carry on educating the community about how to

- ❑ lower obesity and
- ❑ reduce dental disease.

Once again as with all health issues, the following methods will be involved, e.g. seminars, talks, TV and radio spots, newspaper articles.



Encouraging research on prevention, developing and implementing a control programme are all part of the plan to help stabilise obesity rates. Similar ideas are suggested to reduce dental disease in our country. Making the community aware of health issues, and the part it can play in overcoming the problem, is always the key to bringing about change. There is an idea of running a mobile dental clinic and ensuring more dental therapists and dentists are trained. With support from the government in terms of policy and funding, individuals are more likely to be empowered to play their part.

## Strategy six:

### **Promote breast feeding and infant feeding**

Producing healthy dietary guidelines for infants and young children and encouraging research about breast feeding and complementary feeding are all part of this strategy. Another part involves legislation for marketing breast milk substitutes based on the World Health Organisation code and another considers maternity leave legislation based on International Labour Organisation recommendations.

## Strategy seven:

### **Preventing and managing infectious diseases**

This strategy also requires that people in preschool, school and tertiary institutes teach about infectious diseases. Other vital parts of this strategy include tracing people who have had contact with infectious disease patients, and conducting village inspections. People who live in watershed areas need to be trained to maintain the area appropriately and the water legislation needs to be reviewed and updated regularly.

## Strategy eight:

### **Caring for the socio-economically disadvantaged and nutritionally vulnerable**

Our country's policy makers need to be kept aware of the problem of malnutrition in Sāmoa. The first step is to have nutritionally at-risk groups in the community identified.

The best way of doing this is to monitor children at regular intervals, implement guidelines and apply treatment that can prevent the problem. Following up malnourished children after they have undergone a programme to improve their state of health is also seen as vital. Providing childcare and gardening education is seen as important. Families of malnourished children should also receive dietary counselling. Men are to be targeted as well as women in this strategy. Family planning is also seen as a way of helping parents to have some control over the size of their families.

There is acknowledgement in the NPAN that at times there may need to be supplementary feeding provided for groups at risk, e.g. malnourished children, or people in a disaster.

Providing pensions for people over 65 years of age, and providing care for the elderly and disabled, are also important ways of giving nutritional help.



## Strategy nine:

### Assessing, analysing and monitoring situations

This strategy is the 'evaluation stage' where all the work that has been done under the NPAN is recorded and analysed. The material is given to policy makers in Government. This means that positive changes keep happening and programmes are put in place where needed to support the work that has been done between 2002 and 2007. At the completion of the NPAN, surveys will be carried out on the status of nutritional needs for:

- women
- youth
- people living in the traditional village environment.

There is also to be a survey carried out to update data on NCD risk factors and agricultural developments.

Once all the evaluation has been done, a food and nutrition surveillance system is to be developed which will co-ordinate all information related to food insecurity.

### Activity 23

- 1 **a** What do we mean by the term socio-economically disadvantaged?  
**b** Explain why people who live in watershed areas need to be trained to maintain the area appropriately?
- 2 How can our country's policy makers be updated on the problem of malnutrition in Sāmoa?
- 3 At times there will be a need to provide a quick 'fix it' programme like offering supplementary feeding for malnourished children. Explain why quick 'fix it' programmes are sometimes necessary but why they should not be used solely?
- 4 Explain why the protocol followed to identify nutritionally at-risk groups in the community must be carefully thought out and followed with consideration?
- 5 Explain the term nutritionally vulnerable and give examples of the groups of people most likely to fall into this category.
- 6 The nutrition policy is about ensuring 'Food Security' in our country. Explain what is meant by this term.



## Meeting Soifua Mālōlōina Problems With Different Family Members

In Year 11, Book 1, *Food and Textiles Technology*, page 38, aspects of pregnancy were covered. Read through the section on the pregnant woman and discuss with a partner the aspects of soifua mālōlōina that were covered.

Whatever stage of life we are at, we will have specific soifua mālōlōina needs. In the next sections we will look specifically at the needs of pregnant women, babies, children and vegetarians.

The needs of the soifua mālōlōina of a woman are probably at their greatest when she is pregnant. Everything that happens to her and everything she does during pregnancy will have an effect on the child she is carrying to a greater or lesser extent. In Year 10, Book 2, *Food and Textiles Technology*, page 30, we looked at the needs of a pregnant woman. It is important to remember that pregnancy can be a very emotional and spiritual time for a woman. There will be feelings of excitement and worry about bringing a new person into the world. The first child can often be the most demanding because a mother and father do not know exactly what to expect, but with other births a mother may ask how will she cope with a new baby if she already has another toddler to care for? The amount of support from the family is critical to the mother's sense of well-being.

The hormone balance in a pregnant woman can become upset from time to time and this can make the mother have mood changes.

It is so important that the people in her family understand this and are there for her. A woman who has been working away from the village and socialising in the wider community may also feel suddenly socially cut off from her friends and colleagues. Finding herself back in a domestic role may feel very limiting. There is a lot to come to terms with during pregnancy and motherhood, and no one should enter into parenthood lightly. This is exactly the same for the father of a child. The role of the partner is to watch over, care for and have an understanding of the woman, and what she has to go through to bring a child safely into the world.

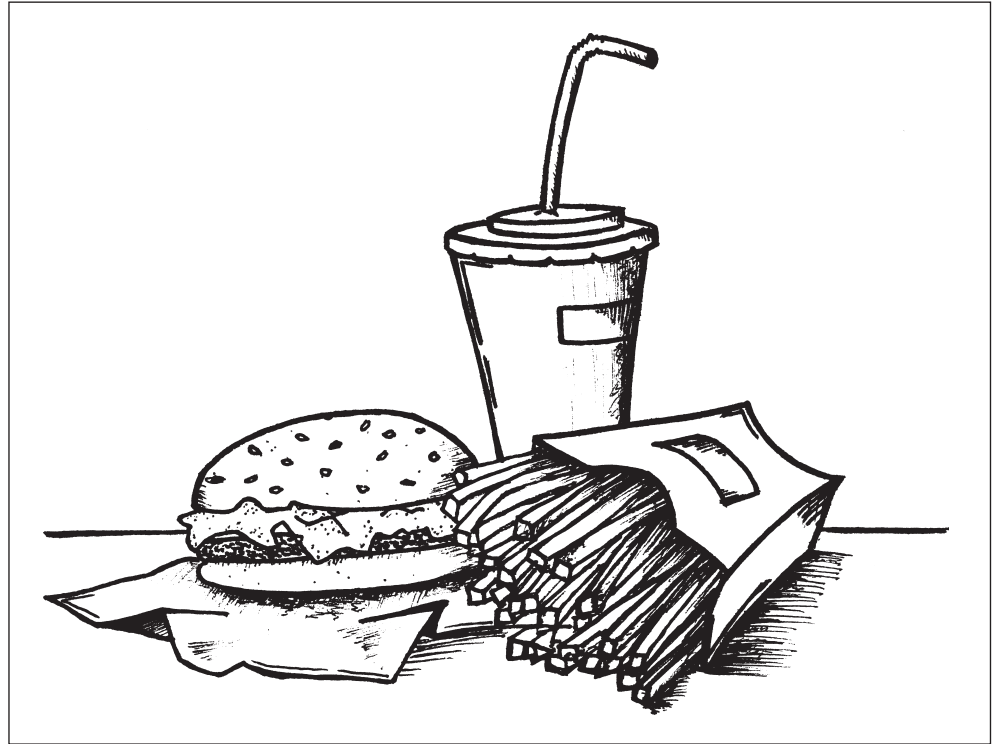
### Key Words

Foetus  
Placenta  
Uterus  
Immunity



The first idea that people have is that they need to eat for two. This will only lead to an unnecessary increase in weight which can be harmful in the long term for the mother. Weight gained during pregnancy needs to be lost afterwards.

However, it is essential that the food eaten does supply the extra nutrients that a mother-to-be and baby will need. In the last 6 months there will be a need to increase particular nutrients to allow for proper growth and development of the foetus. This energy should come largely from the increased amounts of complex carbohydrates and not from high fat and sugar foods.



*Figure 20.1 Pregnant women should avoid fatty and sugary food*

Since **protein** is the basic component of all body tissue and it is new tissue that is being formed as the foetus develops into a baby during pregnancy, most women who follow a diet with animal and vegetable protein sources will have sufficient protein in their diet. However, vegetarians must be careful to have an adequate protein intake.

**Vitamin C** is important in the formation of bones, teeth and connective tissue. It is also needed to help with the absorption of iron – a mineral that pregnant women often need. The amount of iron needed by a pregnant woman is almost doubled during pregnancy. It is used for the foetus, placenta and uterus. Extra iron is also stored by the foetus for the first few months of life. **Folic acid** is also a very important vitamin for the formation of blood cells and new tissues. During pregnancy, the need for folic acid is higher than usual. Lack of this vitamin has been linked with birth defects such as spina bifida. The risk can be reduced by taking folic acid supplements (0.8 mg) daily for four weeks before you might become pregnant, through to 12 weeks after actually becoming pregnant.

The **Vitamin B** group is essential in the release of energy from food. During pregnancy the increase in red blood cell formation makes the mother's body require more vitamin B.

**Vitamin D** and the minerals calcium and phosphorus work together in the formation of bones and teeth. The foetus draws approximately 300 milligrams of calcium each day from the mother's blood. If this calcium is not replaced the woman's bones will be weakened.

Apart from all the nutrients that are needed by a pregnant woman's body, there are other substances that should be avoided. Nicotine and carbon monoxide, are particularly harmful when they are allowed to enter the bloodstream during pregnancy.

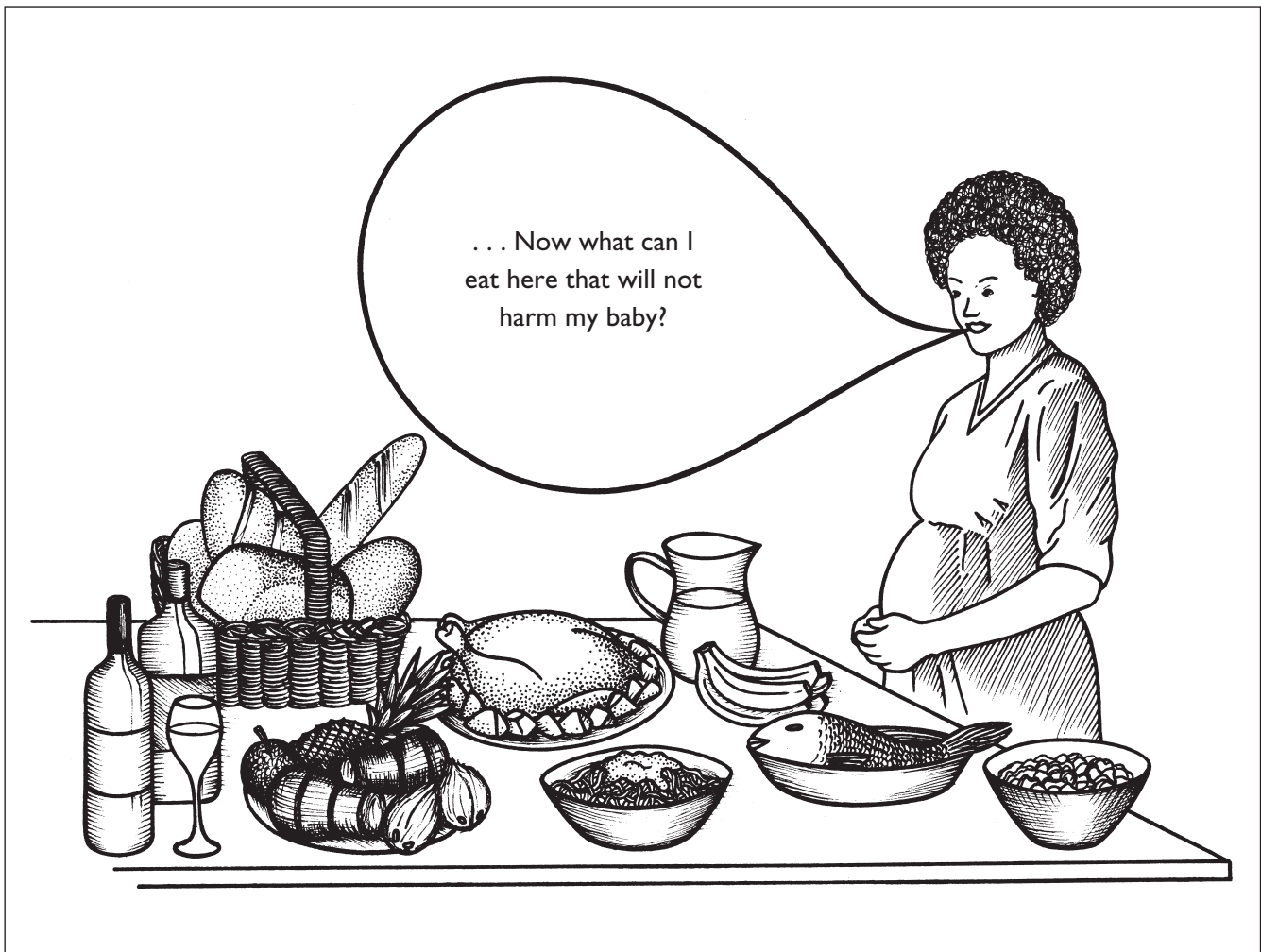
The more cigarettes a pregnant woman smokes, the smaller the baby is likely to be. A baby that is small because it has been exposed to harmful substances is more likely to have had less brain growth. A smoking expectant mother increases the risk of miscarriage, prematurity and early infant death.

Drinking alcohol during pregnancy can have an even more drastic effect than smoking on the unborn child. Even drinking just one or two alcoholic drinks a week can cause the condition known as Foetal Alcohol Syndrome. As with smoking, the baby is usually born smaller, with the brain not fully developed and sometimes they have noticeable facial features, e.g. long forehead and almond shaped eyes. The extent of this condition does not really become acute until childhood. Children with FTA have behavioural problems.

The use of illegal drugs like marijuana, cocaine and heroin causes the same birth defects as smoking and alcohol, except that children are born with an addiction to the drug the mother has been using. The baby therefore goes through a traumatic and unsettled stage until all the drug the mother was taking has worked its way through the baby's system.

Toxoplasmosis is a disease which can badly affect the unborn child, but rarely has any effect on adults. Humans can develop the disease by handling cats and then failing to wash their hands, or eating vegetables grown in soil that contains cat droppings. This disease is not common because most women who have been exposed to cats build up an immunity to toxoplasmosis. However, taking precautions is always a sensible option.





*Figure 20.2 Pregnant woman making nutritional food choices*

There is a higher risk to the pregnant woman and her unborn child from eating food which has been infected with the bacteria *Listeriosis*. Refer back to page 16 to revise your knowledge of this bacteria which can cause miscarriage and stillbirth.

To avoid exposure, pregnant women should avoid eating chilled foods, pre-cooked seafood and chicken products, uncooked seafood and salads that have mayonnaise coating, like coleslaw.

## Activity 24

- 1 The nutrition policy for Sāmoa, which we explored earlier in this book referred to many issues of particular importance to pregnant women. Review the work covered in that section and make a list of all the proposals which would have a positive impact on the care of the pregnant woman and unborn child.
- 2 The chart below shows the daily nutrients that a pregnant woman needs normally and the amount she needs during pregnancy. Copy the chart into your book and work out the amount each nutrient needs to be increased by, and write it in the third column.

Nutrient	Normal	During Pregnancy	Increased amount
Protein	58 mg	66 mg	
Energy (kilojoules)	8400 kj	9000 kj	
Iron	12 mg	22 mg	
Calcium	80 mg	100 mg	
Vitamin C	30 mg	60 mg	
Folic acid	200 ug	400 ug	
Thiamin	0.8 mg	1.0 mg	
Riboflavin	1.2 mg	1.7 mg	
Niacin	12–14 mg	14–16 mg	
Vitamin B12	2.0 ug	3.0 ug	

- 3 If you were able to write another strategy to add to the Sāmoan National Plan that could improve the health and well-being of pregnant women, what would it be? List the objectives that would underlie your strategy and the type of activities that could be put in place to make the strategy work. Set the information in your book using the model on the following page. To get you started, here is an example of three strategies from the Sāmoan National Plan of Action for Nutrition relating to improving household food security.



## Example

### **Strategy – To improve household food security**

#### **Objective**

Raise awareness about food security.

#### **Activities**

- Promote food security awareness through education/awareness sessions – talks, advocacy, seminars, mass media activities. (TV and radio spots and programmes, newspaper columns, newsletters, articles, etc).
- Produce and distribute written promotion and education materials about food security (posters, pamphlets, newsletters etc).
- Conduct an agriculture show.
- Celebrate World Food Day (WFD).

#### **Objective**

Increase local food production – fruit, vegetables and root crops.

#### **Activities**

- Assist with the development of home food gardens.
- Build access roads to plantations.
- Advise farmers on safe and effective control methods for crop pests and diseases.

#### **Objective**

Increase local food production – meat, milk and eggs.

#### **Activities**

- Conduct research on livestock production.
- Encourage increased family production of chickens and eggs.



## Food For Infants And Toddlers

A baby depends on its mother for a healthy start in life. Breast milk is best as it

- ❑ is the intended food for the baby
- ❑ helps protect baby against infection
- ❑ lowers the risk of allergies in the baby
- ❑ costs nothing and is ready to use
- ❑ is safe and environmentally friendly.

A young baby needs to be fed often and on demand. A baby's appetite, weight gain and happiness all help to indicate that the baby's food needs are being met. Being safe and secure at the mother's breast ensures that the baby's emotional needs are also being met. Breast fed babies do not usually get constipated even though some babies only have a bowel motion every few days.

If a mother is finding breast feeding difficult it is important that she gets help and support. Should she have to give up breast feeding she should not feel guilty. Formula milk can be used in place of breast milk. A variety of products are available but under no circumstances should the baby be given cow's milk. Babies who are breast fed do not normally require extra water to drink but this may be needed when the weather is particularly hot or if the baby becomes feverish or has suffered from vomiting or diarrhoea. The water should be boiled and cooled on the day it is used. Tea, coffee or alcohol should never be given to babies or toddlers. They are stimulants that can make them very restless.

### Key Words

Intellectual  
Impairment  
Stimulants



Figure 21.1 Mother and baby

## Introduction Of Solids

It takes time for a baby's digestive system to develop fully. At first, solids should be introduced after the usual feed with breast milk or formula. Once given solids, the baby will take less milk, although breast milk or alternatives should continue to be the main food. Discuss when to start first foods with your baby's health nurse, doctor, or people in your family with expertise.

Introduce a new food when baby is relaxed and happy. First foods need to be plain. Do not add extra salt, sugar or honey to food. Give the milk feed first, then offer solids as a top-up. Try one teaspoon of the new food first and gradually increase until baby is having about three to four teaspoonfuls at a meal. First foods need to be soft and smooth. Use a blender or push foods through a fine sieve with a wooden spoon. Add milk, formula or water to make the food liquid enough for baby to swallow. Cows' milk can be mixed with foods after the baby is eight months old.

Canned or bottled foods made specially for babies are nutritious for a quick, convenient change. But they are expensive and would be seen by many as a waste of financial resources.

First try plain, soft foods:

- baby rice or infant cereal
- ripe mashed banana or other pureed fruit that is easy for a baby to digest
- pureed vegetables such as kumara, taro, pumpkin.

Try one new food every 4 to 5 days. If the baby does not like a food, leave it for a few days and try again.

Babies and children have very efficient digestive systems and do not need as much fibre as adults do. They will get all they need from fruits and vegetables. Avoid too much high-fibre food like certain breads and some breakfast cereals. High-fibre foods may cause diarrhoea.

Iron is an essential nutrient for a baby. Up to 6 months old the baby draws iron from the mother. After that it must be supplied in the diet. Haem iron is found in meat, chicken and fish. It is easily absorbed in the body. Non-haem iron found in vegetables is not so easily absorbed. Absorption of non-haem iron is helped by Vitamin C found in fruits and vegetables. There is now concern that iron deficiency can affect intellectual and physical development in a young child.

It is important to be aware that a small number of children will have allergies and intolerance to some foods. If the child appears to be sensitive to a particular food or group of foods it is important to talk to the doctor. If there is a strong family history of allergy, some foods should be avoided until the baby is 12 months old.

Change the type of food offered and the quantity and thickness of the mixture gradually. At about seven months babies should be introduced to foods containing iron, finely minced lean meat, chicken and green vegetables being the best sources.

At eight to nine months the baby can start to be offered solids before the milk feed. Gradually as the baby is weaned from its milk diet it will start to eat small portions of what other family members are eating, mashed and cut up finely. It is always important to make sure that the child is getting sufficient protein and iron. Avoid feeding the baby simple sugar snack foods like sweets and sugar-filled soft drinks that will take its appetite away. Once weaned, it is vital that the toddler gets a dietary source of calcium each day. While the child is being breast or formula fed, this mineral will be present in the diet.



## Activity 25

- 1 Using the food tables at the back of this book, look up the iron and calcium rich foods that could be suitable to feed a baby that is gradually being introduced to eating solid foods.

When you have made your list, your teacher will ask someone to share their findings with the class. This list can then be added to by other people in the class and become a class list.

- 2 Working individually, go through the list of suitable foods and next to each one make a suggestion for how you would serve it or include it in the diet of a baby being introduced to solids.

## Food For Children

As the baby becomes a toddler and young child, the need for a variety of foods from the THREE groups below every day continues, just as it does throughout the life span. This next section provides some guidance about the number, type and size of servings that should be provided for preschool and school children. It is intended to provide guidance only. The total number of servings cannot always be achieved especially when the family is living on limited resources. The important thing is to have a goal to aim at.

### Health and protective group

Vegetables and fruit food groups continue to provide vitamins and minerals which help to regulate body processes keeping the child well. They also provide fibre which regulates the digestive system, stopping a child from suffering constipation, plus complex and simple carbohydrates for the child's endless need for energy. Growing is a very energetic process!

**Preschoolers** should be eating at least 2 servings of vegetables and 2 servings of fruit every day.

**School Children** should be eating at least 3 servings of vegetables and 2 servings of fruit every day.



Figure 21.2 Fruits and vegetables





## Energy group

Breads, cereals, pasta and rice being high in carbohydrates and fibre will provide the main source of energy for active youngsters. **Preschoolers** have small stomachs and cannot eat the same amount of fibre as older children and adults. Increase fibre gradually with a variety of vegetables, fruit, breads and cereals.

**Preschoolers** should eat at least four servings every day. Breads and cereals make good snack foods for school children. Choose some wholegrain breads and cereals if possible. Unfortunately these tend to be more expensive than white bread and cheaper cereals like Cornies and for that reason they may not be an option for all children.

**School children** should have at least five servings every day. Older children need at least six servings every day.

## Body-building group

**Children and preschoolers** need milk and milk products for protein and calcium. These are the essential food groups for all aspects of a child's growth and development, calcium being the mineral that is responsible for the development of strong bones and teeth. Both groups should be aiming towards having at least two to three servings each day.

**Did you know** that ice cream is a good source of calcium? However, do you know why it should not be eaten every day?

Lean meats, chicken, seafood, eggs and dried peas, beans and lentils are also protein foods and rich in vitamins and minerals, including iron. Young children need iron for the formation of red blood cells and for the carrying of oxygen round the body in the blood. Lean red meats, seafood and chicken have lots of iron.

**Preschoolers and school children** should eat at least two servings every day. Children eat small amounts of food. For variety make up one serving size from a number of part servings. For example serve a small amount of Taro, with a small amount of green vegetable and an equal amount of a protein food like fish. This way the child is more likely to eat some of each food rather than fill up on just the taro for example, which might be their favourite food. If there is some yellow or orange vegetable like pumpkin or carrot available, this will add some additional colour to the plate which can make the food more attractive to eat.





Figure 21.3 Which of these children are making good food choices?

As they grow, children eat different amounts of food. Children have small stomachs and need small meals and snacks often. As they get older, encourage them to eat at regular family meal times. Children may be very hungry after exercise or when they get home from school or preschool. Give them snacks low in salt and sugar.

### Snack suggestions:

- Sandwiches – banana, vegemite, fish, jam. Use butter thinly or only on one slice of the bread. Peanut butter is a nutritious spread but expensive and it is a food that a small number of children are allergic to. Use bread rolls, cabin bread, crackers and scones or muffins to add variety. Try to stay away from potato chips and similar foods, because of their fat and salt content.
- Fresh vegetable sticks made of foods like carrots or beans are a far better option than potato chips!
- Cold cooked vegetables – cook a few extra taro, potatoes, pumpkin or sweet potato at meal times.
- Fresh fruit – serve whole or cut up.
- Frozen fruit – melon, pineapple or chunks of banana are fun in summer.
- Cereals – choose cereals low in fat and sugar.
- Home-made popcorn – pop using a little oil, margarine or butter, or use the microwave.
- A glass of cold milk, ice cream, yoghurt or cubes of cheese are all ways of ensuring children are getting the important mineral calcium, that they need for their bone and teeth development.



The information in this section will be used to help you solve the design brief in Activity 26: Creating your own design brief.

In Year 9–11 you will have got used to being given a design brief to follow. In Year 12 and 13 as you work towards the PSSC Design Technology Certificate there is an expectation that you will be able to write your own brief. Below is a descriptor for the design process strand of the Food and Technology Curriculum

<i>Year 12</i>	<i>Year 13</i>
<ul style="list-style-type: none"> <li><input type="checkbox"/> Write a design brief for a perceived need or situation identified as an issue.</li> <li><input type="checkbox"/> Use a range of specifications effectively in the development of a design solution.</li> <li><input type="checkbox"/> Use a range of investigation skills to make appropriate choices about materials, processes and equipment.</li> <li><input type="checkbox"/> Develop a range of design skills that demonstrate appropriate use of available materials and equipment.</li> <li><input type="checkbox"/> Appropriately explain their design thinking and product proposals.</li> <li><input type="checkbox"/> Reflect on each stage of the design process, giving consideration to the function and fitness for purpose of the design solution.</li> <li><input type="checkbox"/> Evaluate the strengths and weaknesses of the solution from different perspectives, e.g. safety, health, environment, economics and appropriate use of resources.</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Write a design brief to solve a perceived need or situation identified as an issue.</li> <li><input type="checkbox"/> Solve an existing design brief for an identified complex issue.</li> <li><input type="checkbox"/> Understand the importance and complex role of specifications in the development of a valid design solution.</li> <li><input type="checkbox"/> Use a range of investigation skills effectively to make appropriate choices about materials, processes and equipment.</li> <li><input type="checkbox"/> Develop a range of design skills that maximise the use of available materials and equipment.</li> <li><input type="checkbox"/> Competently explain design thinking and production plans.</li> <li><input type="checkbox"/> Confidently reflect on each stage of the design process giving consideration to qualities like simplicity and elegance when discussing the function and fitness for purpose of the design solution.</li> <li><input type="checkbox"/> Evaluate the strengths and weaknesses of the solution from a range of different perspectives, e.g. safety, health, environment, economics and appropriate use of resources.</li> </ul>

It is important when writing your design brief to show you have a good understanding of what a perceived need might be in a specific situation. The next activity is going to explore this and the brief will be based on the work covered in the last section on pregnant women and children.



## Activity 26

Creating a design brief about a pregnant woman and then setting out to solve the specific needs of the person in the brief.

As we have seen in the last chapter, pregnancy is a very important event in the well-being of a mother and her child. Think about a particular situation that you are familiar with or create a situation to explore, based around a pregnant woman meeting her nutritional needs in a family situation. The brief you design will need to involve planning meals and snacks for a week for the pregnant woman and her family, being realistic about the time available for food preparation and the amount of money that is likely to be available. This may mean making alterations/additions to what the family is eating daily. Create a brief that provides you with an opportunity to show your skills and understanding in planning food to meet the specific needs of different family members.

Having created your 'brief' remember to consider the lifestyle factors which could be 'barriers' and think of ways to 'overcome' them. To start you thinking about the type of case study you might write, here is an example for you to use as a guide.

This case study represents a reasonably prosperous Sāmoan family lifestyle:

- ❑ The father in this family has his own boat and works with his brother fishing six days a week whenever the weather is good. He shares in the care of his two-year-old son because his wife went back to work when the boy was a year old. Her mother who lives in the village cares for the son during the day.
- ❑ The family have access to some produce grown in their village. In return the father has to help maintain the small garden behind their house.
- ❑ The wife travels into Apia by bus to work in a bank. She has just found that she is two months' pregnant and plans to continue working for as long as she can. Normally she buys food from one of the food outlets in town for her lunch and picks up shopping for evening meals at one of the supermarkets. She tries to keep her spending for meals down to \$40 tala a week. This must cover the cost of feeding herself, her son, mother and husband. Needing to ensure that all the nutrients important to a pregnant woman are present may require extra expense. How will the family accommodate this?

The charts on the following pages will be helpful for recording your food plans for the family. You will need to draw up or photocopy seven sheets, one for each day of the week.

Start by planning food that meets the pregnant woman's nutritional needs. When you come to plan the father's and son's meals, the menus for each day will be basically serving the same foods with possibly some additions and subtractions. Remember the father has a high energy job and the two-year-old boy whilst being active, will not have the need for the same quantity of food.

However, he will require nutrients for growth.



**FOOD PLAN FOR PREGNANT MUM**

MENU DAY Circle below *Weekend or Weekday	FOOD GROUP AND SERVING SIZE				LIQUID INTAKE	EXTRAS: Foods from the Eat Least section of Food Pyramid that do not belong in the food group	METHOD OF COOKING (where appropriate) List the food & method next to it, e.g. egg – poached
	ENERGY Bread & Cereals Food Group	HEALTH & PROTECTIVE Fruit & Vegetables Food Group	BODY-BUILDING				
			Milk & Milk Products Food Group	Meat & Alternatives Food Groups			
Breakfast							
Lunch							
Evening meal							
Snacks served during the day							
Total Servings for each Food Group/Liquid Intake/Extras							



**FOOD PLAN FOR FATHER**

MENU DAY Circle below *Weekend or Weekday	FOOD GROUP AND SERVING SIZE				LIQUID INTAKE	EXTRAS: Foods from the Eat Food Pyramid that do not belong in the food group	METHOD OF COOKING (where appropriate) List the food & method next to it, e.g. egg – poached
	ENERGY	HEALTH & PROTECTIVE	BODY-BUILDING				
			Bread & Cereals Food Group	Fruit & Vegetables Food Group			
Breakfast							
Lunch							
Evening meal							
Snacks served during the day							
Total Servings for each Food Group/Liquid Intake/Extras							



**FOOD PLAN FOR TWO-YEAR-OLD SON**

MENU DAY Circle below *Weekend or Weekday	FOOD GROUP AND SERVING SIZE				LIQUID INTAKE	EXTRAS: Foods from the Eat Food Pyramid that do not belong in the food group	METHOD OF COOKING (where appropriate) List the food & method next to it, e.g. egg – poached
	ENERGY Bread & Cereals Food Group	HEALTH & PROTECTIVE Fruit & Vegetables Food Group	BODY-BUILDING				
			Milk & Milk Products Food Group	Meat & Alternatives Food Groups			
Breakfast							
Lunch							
Evening meal							
Snacks served during the day							
Total Servings for each Food Group/Liquid Intake/Extras							







Choose at least one of the meals on your food plan to cook for the family. Carry out sensory and nutritional evaluation to assess how well the food prepared meets the nutritional requirements of the following people

- the pregnant woman
- the two-year-old child
- the father.

Make recommendations for any changes necessary.



## Vegetarian Eating

Vegetarianism has been practised by many communities throughout the centuries. The avoidance of eating certain meats and other animal products is built into the philosophy of several religious faiths, such as the Seventh Day Adventists, Buddhists, Hare Krishnas and Bahais.

Today many people are becoming vegetarian because of their concern about:

- the environment
- the slaughter of animals
- achieving optimum health.

### Key Words

Optimum  
Environment  
Philosophy  
LDL-cholesterol  
Pulse

**Did you know** that the famous Greek Philosophers Socrates, Plato and Aristotle were all vegetarians?

While only a small percentage of the population are completely vegan in Sāmoa there are an increasing number of people who eat meals with little or no meat. Being a vegetarian used to be viewed as being 'different', difficult and even 'extremist'. There are more restaurants and cafes now offering a wider choice of meat-free meals. Many of the tourists coming to Sāmoa are vegetarian. Religious beliefs and the cost of animal products would be the main reasons for people becoming vegetarian in Sāmoa, but there are additional reasons which relate to the health benefits. These are listed below.

## Health Benefits Of Vegetarian Diets

Research has shown that compared with the general meat-eating population, vegetarians tend to have:

- lower blood pressure
- lower levels of the 'bad' LDL-cholesterol.
- less risk of heart disease
- less risk of suffering from cancer of the bowel, breast and lung.
- less body weight to carry
- lower risk of type-2 diabetes.

These positive effects of a vegetarian diet are attributed to two diet factors:

- ❑ eating less fat from meat and dairy products, and
- ❑ eating more fibre and antioxidants from nuts, grains, pulses, fruits and vegetables.

Vegetarians are likely to be more aware of their soifua mālolōina, so may also tend to value exercising, smoke less, drink less alcohol and little or no caffeine and practise stress-lowering techniques like meditation.

But being a vegetarian is more than just leaving the meat, fish and chicken off the plate. Like any other diet, a vegetarian diet requires planning to ensure that all essential nutrients are provided.

## Types Of Vegetarian Diets

- ❑ Vegans are total vegetarians who avoid all foods of animal origin, They live on plant products, relying on grains, vegetables, pulses, nuts and fruit.
- ❑ Lacto-vegetarians eat grains, vegetables, pulses, nuts and fruit and dairy foods.
- ❑ Lacto-ovo vegetarians eat dairy products and eggs as well as plant foods.
- ❑ Semi-vegetarians eat dairy foods and eggs plus fish or chicken (white meats).

The last two types of diet are the best for vegetarian children, pregnant and breast feeding women.

**Did you know** that anyone who follows a strict Vegan diet needs to supplement their food intake with vitamin B12 because it is only found in animal foods?

Although vitamin B12 is only needed in small quantities, it is essential for healthy red blood cells. Vitamin B12 is stored in the liver and it would take three to five years for a healthy vegetarian to develop deficiency. Once Vitamin B12 is totally missing in the diet the nervous system will start to fail and the person can suffer from anaemia.

Most vegetarian diets contain sufficient protein for repair and renewal of body tissues. Pulses, grains, nuts and seeds are generally good sources of protein. However, strict vegans can find it difficult to meet requirements if their protein needs are high, as happens with pregnant or breast feeding women, children, teenagers and athletes. The best way to overcome this is to combine two plant proteins so the final mix of amino acids is sufficient (in quality and quantity) for the body's needs. The description of how protein is made up from different amino acids is found in Patricia Bawden's book *Food Health and Well-being for New Zealanders*.



The quality of any protein depends on the range of essential amino acids it contains. Animal proteins rank as high-quality because they provide all eight 'essential' amino acids in the proportions required by humans. Plant proteins are short of one or more essential amino acids. However, nutritionists recognise that each plant protein has different 'essential' amino acids missing. So by combining two plant protein foods together when preparing a meal, all the essential amino acids are likely to be covered. By combining cereal grains which are low in lysine but high in methionine with beans which are high in lysine and low in methionine the meal will end up containing protein which is of equal quality to a meal containing an animal product like meat. This combining of a grain (such as rice or pasta) in a dish with a pulse, is used in many parts of the world that follow a vegetarian eating pattern.

**Did you know** that when we look at traditional vegetarian eating patterns in other countries we find that when the Lebanese eat hummus with flatbread, the Indians eat dhal with rice or a wheaten chapati, the English eat baked beans on toast and the Japanese tofu and avocado sushi, they are all applying the complementary protein principle which is essential for vegans or strict vegetarians who do not eat any animal products?



Figure 22.1 Hummus with flatbread, rice and chapati, baked beans on toast and sushi

## Guidelines For A Vegetarian Diet

Each day it is recommended that the following minimum quantities of each food group should be eaten.

### Grains – 6 serves

Rice, pasta, bread, noodles, breakfast cereal, oats.

### Vegetables – 5 serves

Some raw and some cooked.

### Fruit and juices – 2 serves

### Protein sources – 2 serves of any of the following combinations

Cooked or canned pulses – 1 serve (1/2 cup) cooked beans, peas and lentils or 125 grams or 2 serves nuts or nutmeal.

#### OR

1 serve (1/4 cup) of almonds, walnuts, pecans, macadamias, hazelnuts, peanuts etc.

#### OR

2 eggs

#### OR

40 grams cheese

#### OR

1 carton (200 grams) yoghurt

## Activity 27

- Investigate the ingredients used in hummus, dhal, baked beans and tofu and avocado sushi that supply good sources of incomplete vegetable protein in these dishes.
- In groups of three or four check out the following list of foods which provide sources of protein in the diet of a strict vegetarian who eats no animal products. Circle the ones that are available in the diet of Sāmoans.
  - Grains. Wheat, rice, oats, barley, rye, maize (corn), buckwheat.
  - Dried Beans. Adzuki, black, black-eyed, butter or haricot, lima, mung, pinto, red kidney, soy (soy beans are one of the richest sources of protein and of very high quality), peanuts (botanically a legume, not a nut).
  - Dried Peas. Whole or split peas, pea flour, chickpeas.
  - Lentils.
  - Nuts. Almonds, Brazil, cashew, coconut, pine, pistachio, pecan, macadamia, walnut, hazelnut.
  - Seeds. Sesame, tahini (sesame seed paste), linseed, sunflower, pumpkin (pepitas).

Try to add other foods of plant origin eaten in Sāmoa that contribute protein to the diet. Use the food tables to help you do this.



- 3 Refer to the section on 'Creating Your Own Design Brief' page 108 to revise how to write a design brief.

Now write a design brief for a vegetarian family living on a fixed amount of money. You will need to think about the number of people in the family, their ages, occupations, state of health and likely income. The brief must involve you in:

- planning a variety of food for three days for the family
- costing the food over the three days
- indicating how the protein, iron and Vitamin C, calcium and Vitamin B12 requirements of the vegetarian will be met over the three days
- selecting one evening meal from the three day plan to cook (you only need to cook enough for two people – this will allow you to invite a friend to share the meal with you and help in the evaluation process)
- evaluating the meal in terms of its nutrition, cost, appearance, taste, texture and any other aspects you wish to include.

You can copy the food planning sheets from page 110 of this book to record your menu plans on.



## Part 2

## Work Related Skills

### Unit

# 23

## Career Opportunities

The Food and Textiles Technology Curriculum offers a lead into a wide range of career opportunities. From your study of technology in school you will be experienced with using the design process and therefore familiar with the work of Food and Textiles Technologists. It is possible to seek work experience with local companies where food is processed or clothes are produced if you are considering a career in either area.

The work you have done during your course of study may have stimulated your interest in family studies and the career opportunities that exist in this field. Working as a nanny and housekeeper to a family where parents are working and there is income to support employing a caring person to take on some of the family responsibilities can be a very rewarding role. The skills needed are likely to have been learned growing up in your own family. There are courses available overseas that will enable people to become qualified with certification that is recognised internationally. Many young people manage to 'see the world' by becoming a fully trained nanny.

There are also training courses in 'Housekeeping' overseas. This training is based on equipping people to work in the hospitality area rather than in a domestic situation. The work you are trained for can also be used in hospitals and nursing homes.

Social work is another career which requires people to have specific knowledge and understanding of people's needs and empathy for others. Being a good communicator is high in the ranking of skills needed. As with courses for nannies the training required has to be sought overseas. Training in social work not only offers young Sāmoan people a profession which they can use to enhance the lives of people in the community, but it can also provide openings for work overseas. People from the Pacific in overseas countries, especially in New Zealand and Australia where so many of our people go to live, can encounter problems which are best addressed by someone from the same cultural background.

Nursing is another career where people choose to work because they have a desire to make a difference. The training for this is easier in that courses are available. The National University of Sāmoa has a Nursing Diploma in collaboration with the School of Nursing at Motootua. There is also a course for Nurse Aids. There is a need for people working in this area to have a good understanding of science as well as a desire to work with people at a very personal level.

Another career that is likely to appeal to students who have enjoyed working in the area of Food Technology is Dietetics. Again it will be important to have a good grounding in Science and a desire to work with people who don't always want to hear your advice! This job normally involves trying to get people to make changes to their eating patterns. This is never a simple task. Anyone working in this area needs to see themselves as a counsellor, teacher and mentor which means that once again good communication skills are essential.

There is currently a distance education 'Community Nutrition Certificate' course offered as part of the Continuing Education Certificate through the University of the South Pacific in Fiji. This course runs for three semesters.

Also in Fiji at the School of Medicine, the Nutrition and Dietetics department offers a 1 year certificate and a 2 year diploma course in Food and Nutrition and Dietetics. The certificate course is aimed more at community nutrition work, and the diploma for working as a Dietitian in a hospital setting.

At present probably the most attractive career for young people interested in the area of Food and Textile Technology is Catering and Hospitality. Travel is a global experience for many more people these days. Television has brought the world into our homes. It has given people with disposable income a chance to experience different places, cultures and history. The growth in the tourist industry with its range of clientele from backpackers to people who seek 5-star accommodation has created a need for professionally trained staff.

The Sāmoa Polytechnic started a course in Catering and Hospitality at the end of the 1990s which has proved very successful.



Figure 23.1 The National University of Sāmoa





Figure 23.2 The Sāmoa Polytechnic

## Activity 28

- 1 Working in pairs make a list of the advantages and disadvantages of working as a nanny overseas. As a class share your ideas. Add any new ideas to your original list and write up into your book.
- 2 Make a list of the knowledge, skills and attitudes you would need to work in these two related areas. You should head this work up in your book in the following way. Below is an example for each career to get you started.

When you have completed this exercise you could evaluate your knowledge, skill and attitudes to carry out each of the occupations.

Career	Knowledge	Skill	Attitude
Nanny	Development stages of babies/ young children	Be able to prepare milk formula and bottle feed correctly	Patience with a crying baby
Housekeeper	The appropriate order to tackle daily domestic tasks in	How to make the bed correctly	Respect for other people's belongings

## Responsibilities When Working In The Customer Service Industry

Whatever work we do, whether it is with colleagues, patients, students or customers, there will always be times when we need to put others first. This section explores issues that can lead to personal grievances and complaints.

One of the most common complaints is unfriendly service. Some of the issues that customers find most offensive are related to service providers:

- being unwilling to smile and acknowledge people in a pleasant manner
- keeping customers waiting unnecessarily while having personal conversations with friends who are present, or chatting on the phone
- being rude to the customer if they ask to see something and then do not buy it
- judging customers' ability to pay for goods and services by their appearance.

Whatever job we do, it is vital to ensure that we are caring and respectful. We need to make the customer:

- aware that they come first
- feel comfortable in their environment
- feel at ease about being served
- feel important and valued for who they are
- want to return for further business.

This last point is of paramount importance because it will **encourage the customer to be a repeat customer**.

### Attitudes And Behaviour

If a customer is rude or aggressive it is important not to be rude or aggressive in return. **Behaviour is a choice**, and it is important to select the behaviour which is appropriate for the customer. Remaining calm and using skills of patience may mean that a customer may even get to the point of apologising for showing anger.

#### Key Words

Grievances

Offensive

Aggressive

When dealing with customers, it is essential to be welcoming and helpful. Customers have a basic human desire for warmth and approval. Behaviour should be professional and polite by showing:

- ❑ Understanding – customers want a service and are paying for it, so the person serving should understand their needs.
- ❑ Enthusiasm – this creates an atmosphere in the workplace which is positive and contagious.
- ❑ Confidence – can increase a customer's trust in the business.

## Appearance

Customers judge a business organisation by the appearance of staff as well as their behaviour. People involved in customer service **never get a second chance to make a first impression**. The clothes people wear to serve the public should be clean, tidy and suitable for the role we are performing in the workplace.

## Body Language

Body language is the term used to describe the ways we communicate that do not involve speaking. When we have a conversation with others it is not just their words that have an impression on us. It is everything about them:

- ❑ how they dress
- ❑ their body posture and stance
- ❑ the gestures they use as they speak
- ❑ the distance they stand or sit from the person they are talking to
- ❑ the nature of their body movements
- ❑ the facial expressions used
- ❑ their eye contact.

By learning how to read 'body language' it is possible to find out more about the messages others are sending. This is because we do not just send verbal messages to others. Being a good reader of body language adds another dimension to communication. It helps people to see what others are thinking. If someone is telling a lie their body language will usually give them away. By focussing on other people's body language it is possible to discover their true feelings. This has a clear value in business situations and is therefore very important in customer care. To improve knowledge of body language it is important to study other people, so it is possible to read them better.

It is just as important for people in customer service to recognise how to use their own body language. Being able to control body language that sends negative messages will be most important when dealing with customers.



**Did you know** that positive body language is universal but does mean different things in different cultures? For example, making eye contact with other people is considered essential good manners in many cultures whereas other cultures will see this as being very rude.

So eye contact is one form of body language that should be practised and used carefully. It should be used as a way of acknowledging customers, making them feel welcome and as a foundation of building a good relationship. Eye contact should be used to show the customer you are listening but beware of focusing directly into a customer's eyes.

Research has shown that up to 70% of the meaning of a message is gained through its non-verbal elements. Until people are aware of the powerful non-verbal messages they can send others through their body language, they will not be effective communicators.

However, it is always important to remember that one single piece of body language does not give the whole picture. One gesture on its own doesn't show how the other person is thinking. For example, 'arms folded' may mean that the person is:

- being defensive about something
- feeling cold
- feeling comfortable.

Some body language gestures are open, expansive and positive. For example,

- Leaning forward with open palms facing upwards shows interest, acceptance, and a welcoming attitude.

Plenty of gestures mean warmth, enthusiasm and emotion.

Some body language gestures are closed, defensive and show lack of interest. For example,

- leaning backwards, arms folded, head down
- using gestures sparsely, cold, reserved.

## Distance And Personal Space

**Did you know** that each person has an area around them that they regard as personal space?

It is important to know about personal space if you are working with others especially if they come from a different country or culture. Humans like to have a certain distance between themselves and others. The more crowded a person's upbringing the smaller personal space they require.

It is very important to be aware of this, so that customers never feel their personal space is being invaded. Although some customers may regard closeness as friendliness, it is easy to make others feel uncomfortable. For this reason it is important to judge carefully how close to stand to a customer.



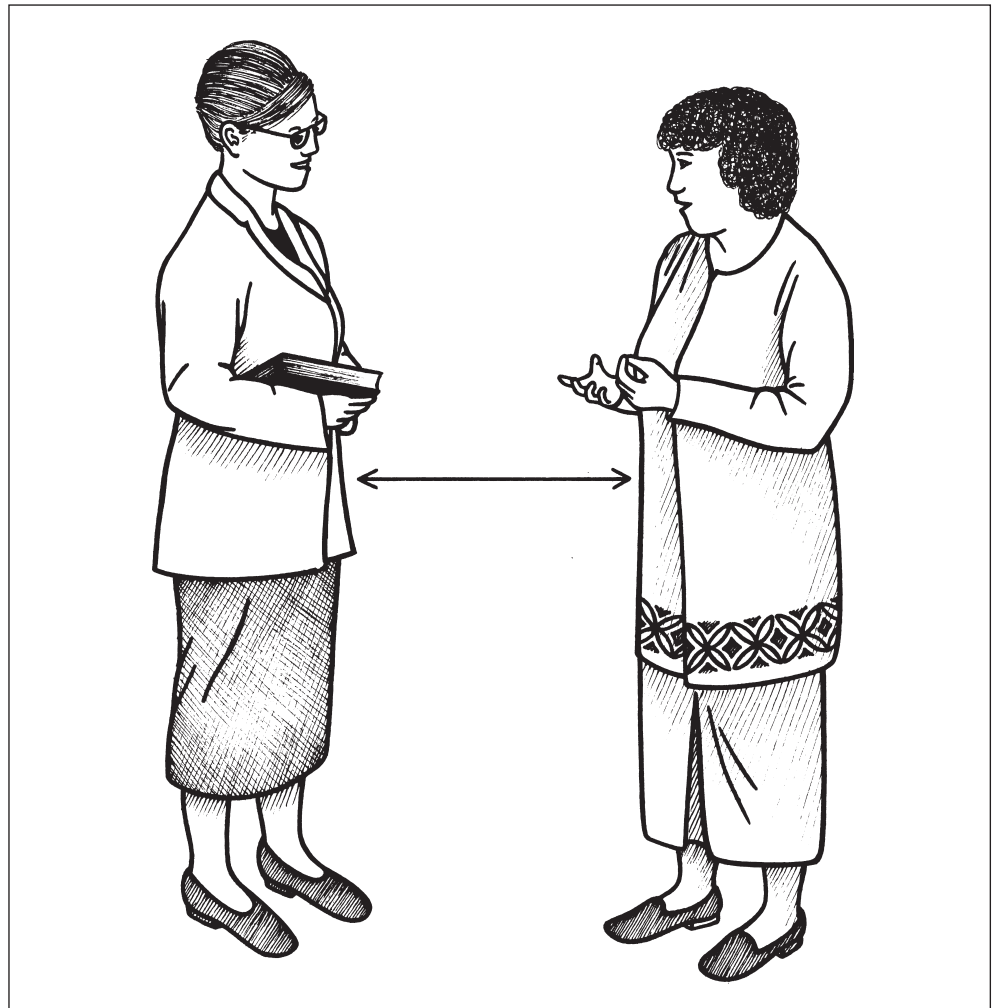


Figure 24.1 The acceptable distance between people who are used to living in the city.

## Active Listening

Active listening is the highest form of courtesy and involves all the following points:

- looking at the customer and using their name whenever possible in the conversation
- ignoring any negative thoughts you may have about them
- leaning towards them
- thinking at the pace they are talking
- listening to every word
- avoiding interrupting the person speaking – seek any necessary clarification at the end
- using facial expressions and body language to show you understand
- sticking to the subject being discussed.

## Communicate Effective Ways Of Handling Customer Complaints

It is important that people involved in customer service learn to adjust their behaviour to suit certain customers and to treat all customers equally as if they were special. It is essential to give customers time and full attention. Using body language correctly is the first step to putting customers at ease. A person involved in customer service needs to concentrate on:

- ❑ their appearance
- ❑ maintaining a clean, tidy environment
- ❑ answering the phone within three rings and responding in a friendly way
- ❑ achieving positive results for customers by finding out what makes the customer happy.

When the customer's needs are not being met they will either:

- ❑ complain to the person giving service or responsible for the workplace
- OR
- ❑ go away without making a direct complaint but tell others about the bad service they got and never return to that business.

So when customers make complaints it is essential to take them seriously. **Remember they are complaining because their needs are not being met.**

When anyone makes a complaint they expect their grievance to be taken seriously. They want their problem to be resolved quickly and they expect to be listened to respectfully.

When dealing with a customer who is complaining, it is essential not to take the complaint personally. The customer is not usually intending to attack the service provider. Listening to what the customer is saying and trying to put ourselves in the position of the customer helps enhance relationships and builds better understanding. It is essential to remember that **the customer is always right.**

Here are the steps for dealing with a complaint

- 1 **Listen** – be open to what the customer is saying and handle the complaint with sensitivity and discretion.
- 2 **Acknowledge** – establish the nature and details of the complaint.
- 3 **Respond** – advise the customer of the course of action to be taken and check that this is acceptable.
- 4 **Take action** – resolve the complaint to the customer's satisfaction within the range of authority that is available.
- 5 **Report** – if the situation cannot be resolved refer the issue to a higher authority.
- 6 **Follow up** – any necessary paper work should be completed promptly while the information is current and fresh in the memory.



To ensure that employees give their best in the workplace, they need to feel valued. Staff must have a sense of identity with the company or organisation. At McDonalds there is a 700-page Operations and Training Manual which explains every stage of the cooking process and the correct behaviour to be used when dealing with customers.

Disney gives all new staff an induction programme called 'traditions' which explains about Walt Disney, the characters, what it is like to work in Disneyland and their role. It stresses that all visitors are not customers, but guests, and they must be treated that way. Although on most days there will be more than half a million of them, they must be dealt with as individuals, not as a crowd. These individuals look to the staff to help them enjoy their day and the staff therefore have a crucial role to play. Disney explains to all their staff that they:

- are part of show business
- are performers in a live show
- must make sure that nothing spoils the perfect picture the guests see
- must make a clear distinction between 'on stage' and 'off stage': off stage they are able to relax, on stage they must play the perfect role; they must never be seen with their masks off.

This should be the same in any workplace dealing with customers. When a person is involved in customer service the focus is on their behaviour and attitude. It is vital that customers are made to feel welcome and valued.

## Activity 29

- 1 As a class, brainstorm the most common causes of complaints in the service sector. For each cause come up with the most useful way of overcoming the problem.
- 2 Use role play to act out some of the issues and demonstrate an ability to handle customer complaints effectively.



# Food Composition Tables

The following Food Composition Tables are extracts from *The Pacific Islands Food Composition Tables*. Information from the New Zealand Food Composition Database (OCNZ94) is copyright and is used with the permission of the New Zealand Institute for Crop & Food Research Ltd.

A comprehensive list of foods and their composition can be found in *The Pacific Islands Food Composition Tables*, which is available from your teacher as a classroom resource.



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure		Water	Energy	Energy	Protein	Total fat	CHO Avail.	Dietary fibre	Cholesterol	Sodium	Potassium	Calcium	Magnesium
	g	g												
<b>STARCHY STAPLES</b>														
Arrowroot, Polynesian, flour	100	12	1400	340	0.1	0.2	85	0.1	0	0	2	12	35	4
Banana, cooking, boiled, unsalted	100	69	455	110	0.8	0.2	26	1.2	0	0	4	400	5	33
Breadfruit, baked	100	74	409	99	1.3	0.6	22	2.5	0	0	1	436	18	23
Potato fries, deep fried	100	50	1010	246	4	13.9	26	3.7	12	5	158	520	9	29
Potato salad, canned	100	75	499	121	1.5	6.9	13	1	0	0	340	156	4	8
Potato, baked, salt & fat added	100	65	731	177	2.3	10.1	19	2.8	0	0	148	774	11	26
1 whole	60	39	439	106	1.4	6.1	12	1.7	0	0	89	464	7	16
Potato, hash brown, McDonald's	100	44	1290	314	2.4	21.7	27	1.4	38	0	520	360	23	21
Potato, pale skin, peeled, boiled	100	79	266	64	2.6	0.2	13	1.1	0	0	7	415	2	17
1 cup	260	206	692	166	6.8	0.5	34	2.9	0	0	18	1080	5	44
Sweet potato, composite, boiled	100	74	369	89	1.4	0.2	21	1.7	0	0	45	166	29	27
Sweet potato, konime, baked	100	67	524	127	1.9	0.1	30	1.2	0	0	31	414	33	22
Taro chips, fried	100	3	2070	501	2	25.5	66	1.2	-	-	369	-	44	84
Taro, common, baked	100	64	564	137	1.2	0.1	33	1.2	0	0	2	421	48	115
Taro, common, black, boiled	100	79	339	82	0.8	0.4	19	0.7	0	0	1	264	28	114
<b>CEREALS AND CEREAL PRODUCTS</b>														
All-bran	100	3	1090	263	13.9	4.8	41	28.9	0	0	1020	940	66	-
1 cup	45	2	491	118	6.3	2.2	19	13	0	0	459	423	30	-
Bread roll, white	51	17	541	131	4.9	1.3	25	1.6	0	0	357	62	31	15
Bread roll, wholemeal	70	23	686	165	7.1	1.7	31	4	0	0	508	140	34	38
Bread, white, regular	100	39	992	240	8.2	2	47	2.7	0	0	450	110	32	27
1 medium slice	26	10	258	62	2.1	1	12	0.7	0	0	117	29	8	7
Bread, white, regular, toasted	100	26	1220	295	10.3	3	57	3.2	0	0	540	132	60	32
1 medium slice	21	5	257	62	2.2	0.6	12	0.7	0	0	113	28	13	7
Bread, wholemeal	100	40	921	222	10.1	2.9	39	6.5	0	0	470	270	54	60
1 medium slice	28	11	258	62	2.8	0.8	11	1.8	0	0	132	76	15	17
Bread, wholemeal, toasted	100	28	1110	267	12.2	3.5	47	7.8	0	0	565	325	65	72
1 medium slice	22	6	244	59	2.7	0.8	10	1.7	0	0	124	72	14	16
Cake, chocolate, home prepared	100	27	1550	376	6.9	17.9	47	1.5	105	0	500	152	77	27
Cake, cream cake, sponge	100	36	1250	302	5.8	10.3	46	0.9	73	0	240	94	46	-
Cake, fruit, dark, commercial	100	20	1410	340	5.3	11.6	54	3.4	24	0	310	375	56	25
Cake, plain, commercial	100	24	1480	358	8.2	15.3	47	1.2	75	0	485	111	53	14
Corn flakes	32	1	494	120	2.1	0.3	27	1.1	0	0	381	33	1	-
1 cup	100	3	1670	403	10.5	9.7	68	12.5	0	0	410	340	29	99
Crispbread, wholemeal	100	22	1630	395	10	23.6	36	2.9	18	0	370	130	52	22
Croissant	100	42	844	204	5.6	0.8	44	2.5	0	0	1050	88	92	19
Crumpet, regular, toasted	100	25	1530	371	6.6	20.6	40	2.2	34	0	380	120	61	20
Doughnut, cinnamon and sugar	100	25	1530	371	6.6	20.6	40	2.2	34	0	380	120	61	20

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit. A equiv. g	Retinol $\mu$ g	$\beta$ -carotene equiv. $\mu$ g	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 $\mu$ g	Vitamin C mg	Vitamin E mg
<b>STARCHY STAPLES</b>												
Arrowroot, Polynesian, flour	100	0.5	0.6	0	0	0	0.1	0.02	1	0	0	T
Banana, cooking, boiled, unsalted	100	0.5	0.2	19	0	116	0.03	0.04	1	0	9	T
Breadfruit, baked	100	0.3	-	4	0	23	0.08	0.04	1	0	22	1
Potato fries, deep fried	100	1.1	0.5	1	1	0	0.1	0.04	2	0	10	T
Potato salad, canned	100	1	0.2	8	0	50	0.02	0.02	1	0.2	2	1
Potato, baked, salt & fat added	100	0.8	0.4	1	0	10	0.1	0.05	1	0	13	T
1 whole	60	0.5	0.2	1	0	6	0.06	0.03	1	0	8	T
Potato, hash brown, McDonald's	100	2.6	0.4	1	1	0	0.01	0.03	1	0	6	T
Potato, pale skin, peeled, boiled	100	0.5	0.3	0	0	0	0.07	0.02	1	0	21	T
1 cup	260	1.3	0.8	0	0	0	0.18	0.05	3	0	55	T
Sweet potato, composite, boiled	100	0.5	0.3	10	0	57	0.07	0.03	1	0	18	4
Sweet potato, konime, baked	100	2.1	-	11	0	63	0.1	0.04	1	0	48	5
Taro chips, fried	100	1.4	-	0	0	0	0.05	0.03	T	0	0	5
Taro, common, baked	100	1.4	-	7	0	42	0.12	0.04	1	0	7	3
Taro, common, black, boiled	100	0.9	-	6	0	38	0.07	0.02	1	0	4	2
<b>CEREALS AND CEREAL PRODUCTS</b>												
All-bran	100	8.6	-	1	0	7	0.95	1.21	14	0	0	-
1 cup	45	3.9	-	T	0	3	0.43	0.54	6	0	0	-
Bread roll, white	51	0.7	0.3	0	0	0	0.07	0.04	1	0	0	T
Bread roll, wholemeal	70	2.3	0.6	0	0	0	0.18	0.07	2	0	0	T
Bread, white, regular	100	1.1	0.6	0	0	0	0.13	0.08	1	0	0	T
1 medium slice	26	0.3	0.2	0	0	0	0.03	0.02	T	0	0	T
Bread, white, regular, toasted	100	1.5	0.7	0	0	0	0.13	0.08	2	0	0	T
1 medium slice	21	0.3	0.1	0	0	0	0.03	0.02	T	0	0	T
Bread, wholemeal	100	2.3	1.3	0	0	0	0.23	0.12	3	0	0	T
1 medium slice	28	0.6	0.4	0	0	0	0.06	0.03	1	0	0	T
Bread, wholemeal, toasted	100	2.7	1.5	0	0	0	0.24	0.14	3	0	0	T
1 medium slice	22	0.6	0.3	0	0	0	0.05	0.03	1	0	0	T
Cake, chocolate, home prepared	100	1.2	0.5	250	220	170	0.07	0.14	1	1	0	-
Cake, cream cake, sponge	100	1	-	96	87	53	0.07	0.11	T	1	0	-
Cake, fruit, dark, commercial	100	2.7	0.5	18	10	45	0.06	0.08	T	T	0	-
Cake, plain, commercial	100	1.2	0.5	50	40	62	0.06	0.17	1	T	0	-
Corn flakes	32	3	-	4	0	22	0.58	0.46	3	0	0	-
Crispbread, wholemeal	100	2	1.7	2	0	9	0.39	0.05	6	0	0	-
Croissant	100	1	0.8	126	104	130	0.11	0.09	2	T	0	T
Crumpet, regular, toasted	100	1.1	3.6	0	0	0	0.16	0	1	0	0	-
Doughnut, cinnamon and sugar	100	1	0.5	5	5	1	0.14	0.11	2	T	0	-

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure		Water	Energy	Energy	Protein	Total fat	CHO	Dietary	Cholesterol	Sodium	Potassium	Calcium	Magnesium
	g	g												
<b>STARCHY STAPLES</b>														
Flour, wheat, white, plain	130	16	1870	451	14	1.6	95	4.9	0	3	211	23	44	
Flour, wheat, white, self-raising	130	15	1790	432	12.7	1.6	92	4.9	0	904	198	139	40	
Flour, wheat, wholemeal	134	16	1540	371	16.2	2.8	70	15	0	7	422	40	137	
Muesli, Swiss-style	100	10	1420	342	12.1	9.2	53	12.5	0	62	550	104	—	
1 cup	125	12	1770	428	15.1	11.5	66	15.6	0	78	688	130	—	
Noodles, egg, unenriched, cooked	100	69	526	127	4.8	1.5	24	1.1	33	7	28	12	19	
Oats, rolled, cooked	100	87	208	50	1.6	1.1	9	1.3	0	1	41	7	19	
Pasta, white, boiled	100	67	485	117	4	0.3	25	1.8	0	2	20	7	9	
Pastry, puff, commercial, baked	100	18	1850	449	7	26.5	46	1.6	30	545	70	11	16	
Pastry, short, commercial, baked	100	11	2060	498	7.2	30	50	2	36	460	71	12	14	
Rice bubbles	100	3	1450	351	5.2	0.4	82	1.2	0	1060	88	6	—	
1 cup	14	1	203	49	0.7	0.1	11	0.2	0	148	12	1	—	
Rice, brown, boiled	100	66	570	138	3	0.7	30	0.5	0	2	62	6	—	
Rice, white, boiled	100	69	509	123	2.3	0.2	28	0.8	0	5	10	4	13	
1 cup	216	149	1100	266	5	0.4	61	1.7	0	11	22	9	28	
Roti, cooked	100	33	1030	248	6.3	4.6	45	2.2	0	520	110	10	—	
Scone, plain, home prepared	100	26	1430	346	8.4	10.6	54	1.8	10	695	163	93	29	
Weet-bix	100	6	1330	321	12.7	2.4	62	10.4	0	275	363	40	108	
1 biscuit	15	1	200	48	1.9	0.4	9	1.6	0	41	54	6	16	
<b>GREEN LEAVES</b>														
Cabbage, Chinese, cooked	100	96	74	18	2.3	0.1	2	1.2	0	3	90	88	8	
Cabbage, European white, raw	100	93	72	17	1.3	0.1	3	3.8	0	14	320	33	15	
Cabbage, European, boil with salt	100	93	75	18	0.8	0.6	2	2.1	0	100	130	42	—	
Cress, garden, leaves & stems, raw	100	89	131	32	2.6	0.7	4	1.8	0	14	606	81	38	
Fern, leaves, raw	100	85	143	34	4.7	1.7	T	8	0	5	535	59	40	
Lettuce, common, raw	100	96	26	6	0.9	0.1	T	1.7	0	23	230	16	8	
Puha, boiled	100	94	69	16	2.3	0.7	T	5.1	0	26	160	101	16	
Puha, leaves & upper stem, raw	100	91	72	17	2.7	0.6	T	4.6	0	36	229	60	12	
Silverbeet, boiled	100	90	142	34	2.8	0.3	5	3.1	0	144	421	68	38	
Silverbeet, raw	100	91	94	23	2.6	0.3	2	2.9	0	138	426	65	36	
Spinach, New Zealand, boiled	100	95	42	10	1.3	0.2	1	2.2	0	107	103	48	32	
Spinach, New Zealand, raw	100	93	47	11	1.7	0.2	1	2.6	0	145	145	65	44	
Taro, leaves, cooked	100	84	119	28	4.6	0.8	1	5.7	0	3	803	206	183	
Taro, leaves, raw	100	83	123	29	4.8	0.8	1	6	0	3	843	216	192	
Watercress, leaves, cooked	100	92	41	10	2	0.2	T	4.4	0	4	391	117	15	
Watercress, leaves, raw	100	92	41	10	2	0.2	T	4.5	0	4	399	119	15	

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit A equiv. g	Retinol µg	β-carotene equiv. µg	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 µg	Vitamin C mg	Vitamin E mg
<b>STARCHY STAPLES</b>												
Flour, wheat, white, plain	130	1.7	0.7	0	0	0	0.35	0.2	4	0	0	T
Flour, wheat, white, self-raising	134	4	1.7	0	0	0	0.56	0.15	7	0	0	2
Flour, wheat, wholemeal	100	8.3	-	5	0	31	0.97	1.17	11	0	0	-
Muesli, Swiss-style	125	10.4	-	6	0	39	1.21	1.46	13	0	0	-
1 cup	100	0.6	0.6	6	6	0	0.03	0.02	T	0.09	0	T
Noodles, egg, unenriched, cooked	100	0.7	0.3	1	0	6	0.08	0.02	0	0	0	-
Oats, rolled, cooked	100	0.4	0.2	0	0	0	0.02	0.02	1	0	0	-
Pasta, white, boiled	100	0.3	0.2	19	9	59	0.05	0.02	1	0	0	-
Pastry, puff, commercial, baked	100	0.3	0.2	5	5	0	0.05	0	1	0	0	-
Pastry, short, commercial, baked	100	8.3	-	0	0	0	0.99	1.05	9	0	0	-
Rice bubbles	100	1.2	-	0	0	0	0.14	0.15	1	0	0	-
1 cup	100	1.1	-	0	0	0	0.13	0.03	2	0	0	T
Rice, brown, boiled	100	0.3	0.6	0	0	0	0.03	0.01	1	0	0	T
Rice, white, boiled	216	0.6	1.3	0	0	0	0.06	0.02	1	0	0	T
1 cup	100	1	-	147	0	882	0.06	0.03	1	0	0	-
Roti, cooked	100	0.8	0.5	90	81	51	0.12	0.09	1	T	0	-
Scone, plain, home prepared	100	4	2.6	T	0	T	0.13	0.25	5	0	0	1
Weet-bix	15	0.6	0.4	T	0	T	0.02	0.04	1	0	0	T
1 biscuit												
<b>GREEN LEAVES</b>												
Cabbage, Chinese, cooked	100	1.9	-	290	0	1740	0.05	0.04	T	0	19	T
Cabbage, European white, raw	100	0.6	0.3	5	0	30	0.05	0.04	T	0	45	T
Cabbage, European, boil with salt	100	0.3	-	17	0	100	0.12	0.02	T	0	19	T
Cress, garden, leaves & stems, raw	100	1.3	-	930	0	5580	0.08	0.26	1	0	69	-
Fern, leaves, raw	100	14.7	-	263	0	1580	0.01	0.1	3	0	7	T
Lettuce, common, raw	100	0.6	0.2	15	0	90	0.03	0.03	T	0	4	1
Puha, boiled	100	1.1	0.5	1360	0	8130	0.02	0.03	T	0	22	1
Puha, leaves & upper stem, raw	100	1.3	0.5	1300	0	7790	0.02	0.03	T	0	33.1	1
Silverbeet, boiled	100	1.2	-	552	0	3310	0.02	0.04	T	0	16.1	-
Silverbeet, raw	100	1.2	-	529	0	3170	0.02	0.04	T	0	24.4	-
Spinach, New Zealand, boiled	100	0.7	-	362	0	2170	0.03	0.11	T	0	16	-
Spinach, New Zealand, raw	100	0.9	-	491	0	2950	0.05	0.15	1	0	34	-
Taro, leaves, cooked	100	2.6	-	709	0	4250	0.09	0.3	2	0	47	2
Taro, leaves, raw	100	2.7	-	744	0	4460	0.15	0.39	2	0	90	2
Watercress, leaves, cooked	100	2.9	-	490	0	2940	0.08	0.08	1	0	29	-
Watercress, leaves, raw	100	3	-	500	0	3000	0.1	0.1	1	0	60	-

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure		Water	Energy	Energy	Protein	Total fat	CHO	Dietary	Cholesterol	Sodium	Potassium	Calcium	Magnesium
	g	g												
<b>OTHER VEGETABLES</b>														
Asparagus, boiled	100	91	78	19	2.8	0.1	2	1.5	0	0	2	290	10	14
Broccoli, boiled	100	89	103	24	4.7	0.3	1	4.1	0	0	20	325	29	21
Brussels sprouts, boiled	100	90	107	26	3.5	0.3	2	3.5	0	0	29	340	14	17
Brussels sprouts, frozen, boiled	100	86	123	30	3.3	0.3	3	3.5	0	0	25	310	27	21
Capsicum, raw	74	69	58	14	1.2	0.1	2	0.7	0	0	1	108	4	5
Carrot, mature, peeled, boiled	100	87	111	27	0.9	0.1	6	4.4	0	0	41	235	29	-
1 carrot	49	43	54	13	0.4	T	3	2.2	0	0	20	115	14	-
Carrots, raw	100	89	110	27	0.9	0.2	5	3.3	0	0	43	260	40	-
Cauliflower, boiled	100	91	78	19	2.2	0.2	2	1.8	0	0	14	305	13	12
1 cup chopped	138	126	108	26	3	0.3	3	2.5	0	0	19	421	18	17
Cauliflower, raw	100	91	78	19	2.2	0.2	2	1.8	0	0	15	340	14	14
1 cup chopped	114	104	89	22	2.5	0.2	2	2.1	0	0	17	388	16	16
Celery, boiled	100	95	55	13	0.7	0.1	2	2.2	0	0	84	225	34	7
Celery, raw	100	95	50	12	0.6	0.1	2	1.8	0	0	88	250	36	7
Corn, cob, sweet, boiled, drained	100	70	457	110	3.3	1.3	21	3.7	0	0	17	249	2	32
1 cob	128	89	585	141	4.3	1.6	27	4.7	0	0	22	319	3	41
Corn, sweet, creamed, can, heated	100	76	334	81	2	0.7	17	3.4	0	0	310	120	2	20
Cucumber, common, raw, flesh	100	96	45	11	0.4	0.1	2	0.4	0	0	21	97	13	9
1 cup chopped	150	144	68	17	0.6	0.2	3	0.6	0	0	32	146	20	14
Mixed vegetables, frozen, boiled	100	89	139	34	1.8	0.3	6	5.9	0	0	33	110	28	15
Mushrooms, common, raw	100	92	97	23	3.6	0.3	2	2.5	0	0	7	305	2	9
1 cup chopped	68	62	66	16	2.4	0.2	1	1.7	0	0	5	207	1	6
Onion, mature, boiled	100	90	114	27	1.8	0.1	5	1.7	0	0	12	125	17	5
Parsley, raw	100	89	48	11	2	0.2	T	4.7	0	0	50	950	199	33
1 tablespoon	3.7	3	2	T	0.1	T	T	0.2	0	0	2	35	7	1
Parsnip, peeled, boiled	100	83	203	49	1.8	0.2	10	2.5	0	0	18	380	36	23
Peas, green, boiled	100	81	211	50	5.4	0.4	6	7.2	0	0	1	155	20	-
Pumpkin, boiled	100	82	171	41	2.3	0.4	7	1.4	0	0	1	310	27	13
Radish, oriental, raw, peeled	100	93	71	17	0.7	0.3	3	1.5	0	0	28	210	30	13
Swede, boiled	100	91	85	20	1	0	4	2.8	0	0	11	280	21	10
Tomato, common, raw	100	95	52	13	1	0.1	2	1.2	0	0	6	200	8	10
1 tomato	127	120	66	17	1.3	0.1	2	1.5	0	0	8	254	10	13
Vegetables, mixed, European, boil	100	81	189	46	3.2	0.3	8	5.9	0	0	34	136	25	18
Zucchini, boiled	100	94	63	15	1.3	0.3	2	1.7	0	0	1	148	17	14
<b>FRUITS</b>														
Apple	100	84	212	51	0.3	0.1	12	2	0	0	1	107	5	4
1 apple	130	109	276	66	0.4	0.1	16	2.6	0	0	1	139	7	5

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit. A equiv. g	Retinol $\mu$ g	$\beta$ -carotene equiv. $\mu$ g	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 $\mu$ g	Vitamin C mg	Vitamin E mg
<b>OTHER VEGETABLES</b>												
Asparagus, boiled	100	1	0.2	8	0	45	0.13	0.11	1	0	12	-
Broccoli, boiled	100	1	0.7	59	0	350	0.07	0.21	1	0	85	-
Brussels sprouts, boiled	100	0.9	0.3	26	0	150	0.08	0.14	1	0	88	-
Brussels sprouts, frozen, boiled	100	0.7	0.2	23	0	140	0.1	0.1	1	0	56	-
Capsicum, raw	74	0.4	0.2	67	0	400	0.03	0.03	1	0	81	-
Carrot, mature, peeled, boiled	100	0.3	-	1560	0	9320	0.07	0.04	1	0	4	-
I carrot	49	0.1	-	762	0	4560	0.03	0.02	T	0	2	-
Carrots, raw	100	0.7	-	1730	0	10400	0.06	0.06	1	0	6	-
Cauliflower, boiled	100	0.6	0.3	2	0	9	0.07	0.1	1	0	56	-
I cup chopped	138	0.8	0.4	3	0	12	0.1	0.14	1	0	77	-
Cauliflower, raw	100	0.6	0.2	2	0	10	0.08	0.1	1	0	70	-
I cup chopped	114	0.7	0.2	2	0	11	0.09	0.11	1	0	80	-
Celery, boiled	100	0.2	0.3	6	0	36	0.03	0.02	T	0	4	-
Celery, raw	100	0.2	0.3	7	0	40	0.03	0.02	T	0	5	-
Corn, cob, sweet, boiled, drained	100	0.6	0.5	50	0	300	0.22	0.07	2	0	6.2	1
I cob	128	0.8	0.6	64	0	384	0.28	0.09	2	0	7.9	1
Corn, sweet, creamed, can, heated	100	0.5	0.6	8	0	47	0	0.02	1	0	2	T
Cucumber, common, raw, flesh	100	0.3	0.4	6	0	35	0.02	0.01	T	0	8	T
I cup chopped	150	0.5	0.6	9	0	53	0.03	0.02	T	0	12	T
Mixed vegetables, frozen, boiled	100	0.8	0.3	440	0	2630	0.07	0.02	1	0	4	-
Mushrooms, common, raw	100	0.2	0.2	5	0	29	0.03	0.41	4	0	1	-
I cup chopped	68	0.1	0.1	3	0	20	0.02	0.28	2	0	1	-
Onion, mature, boiled	100	0.4	0.1	2	0	9	0.03	0.02	T	0	5	-
Parsley, raw	100	8.4	1.1	790	0	4760	0.16	0.29	1	0	100	-
I tablespoon	3.7	0.3	T	29	0	176	0.01	0.01	T	0	4	-
Parsnip, peeled, boiled	100	0.3	0.4	5	0	27	0.07	0.1	1	0	8	-
Peas, green, boiled	100	1.8	-	76	0	453	0.25	0.14	2	0	20	-
Pumpkin, boiled	100	0.5	0.3	450	0	2680	0.05	0.07	1	0	11	2
Radish, oriental, raw, peeled	100	0.3	0.5	7	0	40	0.03	0.01	1	0	17	-
Swede, boiled	100	0.3	0.2	0	0	0	0.04	0.03	1	0	19	-
Tomato, common, raw	100	0.3	0.2	58	0	350	0.04	0.02	1	0	18	1
I tomato	127	0.4	0.3	74	0	445	0.05	0.03	1	0	23	1
Vegetables, mixed, European, boil	100	1.3	-	430	0	2580	0.12	0.07	1	0	8	-
Zucchini, boiled	100	0.5	0.3	50	0	300	0.03	0.06	1	0	17	T
<b>FRUITS</b>												
Apple	100	0.2	0.1	2	0	10	0.02	0.01	T	0	5	T
I apple	130	0.3	0.1	3	0	13	0.03	0.01	T	0	7	T

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure		Water	Energy	Energy	Protein	Total fat	CHO Avail.	Dietary fibre	Cholesterol	Sodium	Potassium	Calcium	Magnesium
	g	g												
<b>FRUITS</b>														
Apricot	100	86	139	34	0.8	0.1	7	2.1	0	0	2	335	16	9
1 apricot	54	46	75	18	0.4	0.1	4	1.1	0	0	1	181	9	5
Avocado	100	73	875	213	1.9	22.6	T	1.5	0	0	2	470	20	23
1 avocado	162	118	1420	345	3.1	36.6	1	2.4	0	0	3	761	32	37
Banana, Australian	100	73	384	93	1.6	0.1	21	2.5	0	0	1	340	7	25
1 banana	128	94	492	119	2	0.1	27	3.2	0	0	1	435	9	32
Date, dried	100	16	1150	279	2	0.2	67	9.7	0	0	14	730	47	50
Fruit salad, canned in syrup	100	85	207	50	0.4	0.1	12	1.1	0	0	4	100	5	7
1 cup	263	224	544	132	1.1	0.3	31	2.9	0	0	11	263	13	18
Grapefruit	170	152	173	43	1.5	0.3	8	1	0	0	7	204	36	14
Kiwifruit, flesh & seeds	100	84	192	47	0.9	0.6	9	1.6	0	0	4	236	26	17
1 kiwifruit	100	84	192	47	0.9	0.6	9	1.6	0	0	4	236	26	17
Lemon	150	134	71	17	0.9	0.3	3	3.8	0	0	3	180	30	14
Lychee, canned in syrup	100	81	287	70	0.4	0	17	0.6	0	0	6	69	3	69
Mandarin	100	88	155	37	0.9	0.2	8	2	0	0	2	141	26	11
Melon, honey dew	100	91	130	32	0.7	0.3	7	1	0	0	43	158	39	14
Nectarine	100	87	149	36	1.1	0.1	8	2.4	0	0	1	235	8	7
1 nectarine	143	125	213	51	1.6	0.1	11	3.4	0	0	1	336	11	10
Orange	100	87	151	37	1	0.1	8	2	0	0	2	145	29	11
1 orange	128	111	193	47	1.3	0.1	10	2.6	0	0	3	186	37	14
Pawpaw, Australian	100	89	124	30	0.4	0.1	7	2.3	0	0	7	140	28	14
Peach	100	89	125	30	0.9	0.1	6	1.4	0	0	2	186	6	6
1 peach	138	123	173	41	1.2	0.1	9	1.9	0	0	3	257	8	8
Peach, canned in syrup	100	85	216	52	0.6	0	13	1.4	0	0	3	102	2	4
Pear, Packhams	100	83	225	55	0.3	0.1	13	2.4	0	0	2	83	4	6
1 pear	148	123	333	81	0.4	0.1	19	3.6	0	0	3	123	6	9
Pineapple, Australian	100	86	153	37	1	0.1	8	2.1	0	0	2	180	27	11
1 cup chopped	164	141	251	61	1.6	0.2	13	3.4	0	0	3	295	44	18
Pineapple, canned in heavy syrup	100	75	358	87	0.6	0	21	1.3	0	0	1	82	5	10
Plum, red flesh	100	87	138	33	0.6	0.1	8	2.2	0	0	2	167	7	6
Raisin	154	18	1920	465	3.5	1.4	110	7.5	0	0	89	1620	63	54
1 cup	100	92	90	22	0.5	0.1	5	1	0	0	10	190	7	4
Rockmelon	100	92	77	19	1.7	0.1	3	2.2	0	0	6	130	13	8
Strawberry	100	16	1300	315	2.8	0.4	75	4.4	0	0	36	910	56	37
Sultana	153	25	1990	482	4.3	0.6	115	6.7	0	0	55	1390	86	57
1 cup	100	93	95	23	0.3	0.2	5	0.6	0	0	2	87	6	4
Watermelon, Aust, red pulp														

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit A equiv. g	Retinol $\mu$ g	$\beta$ -carotene equiv. $\mu$ g	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 $\mu$ g	Vitamin C mg	Vitamin E mg
<b>FRUITS</b>												
Apricot	100	0.3	0.2	35	0	210	0.03	0.04	1	0	12	-
1 apricot	54	0.2	0.1	19	0	113	0.02	0.02	1	0	6	-
Avocado	100	0.7	0.5	49	0	290	0.07	0.13	2	0	9	-
1 avocado	162	1.1	0.8	79	0	470	0.11	0.21	3	0	15	-
Banana, Australian	100	0.5	0.2	11	0	66	0.05	0.1	T	0	14	T
1 banana	128	0.6	0.3	14	0	84	0.06	0.13	1	0	18	T
Date, dried	100	2.6	0.6	3	0	19	0.02	0.1	1	0	0	-
Fruit salad, canned in syrup	100	0.4	0.2	39	0	232	0.02	0.02	T	0	1	-
1 cup	263	1.1	0.5	103	0	610	0.05	0.05	1	0	3	-
Grapefruit	170	0.3	0.2	7	0	43	0.05	0.05	T	0	61	-
Kiwifruit, flesh & seeds	100	0.3	0.5	10	0	59	0.01	0.02	T	0	92.6	-
1 kiwifruit	100	0.3	0.5	10	0	59	0.01	0.02	T	0	92.6	-
Lemon	150	0.5	0.2	3	0	15	0.06	0.03	T	0	72	-
1 lemon	100	0.5	0.6	0	0	0	0.05	0.07	1	0	49	-
Lychee	100	0.3	0.1	15	0	87	0.06	0.03	T	0	47	-
Mandarin	100	0.3	0.2	6	0	36	0.02	0.02	T	0	18	-
Melon, honey dew	100	0.1	0.1	19	0	110	0.02	0.04	1	0	12	-
Nectarine	143	0.1	0.1	27	0	157	0.03	0.06	2	0	17	-
1 nectarine	100	0.4	0.2	21	0	130	0.11	0.03	T	0	52	-
Orange	128	0.5	0.3	27	0	166	0.14	0.04	T	0	67	-
1 orange	100	0.5	0.3	150	0	910	0.03	0.03	T	0	60	1
Pawpaw, Australian	100	0.2	0.1	17	0	100	0.01	0.04	1	0	10	-
Peach	138	0.3	0.1	23	0	138	0.01	0.06	1	0	14	-
1 peach	100	0.3	0.2	55	0	330	0	0.02	T	0	4	-
Peach, canned in syrup	100	0.2	0.1	3	0	20	0.02	0.02	T	0	5	-
Pear, Packhams	148	0.3	0.1	4	0	30	0.03	0.03	T	0	7	-
1 pear	100	0.3	0.2	4	0	25	0.04	0.03	T	0	21	T
Pineapple, Australian	164	0.5	0.3	7	0	41	0.07	0.05	T	0	34	T
1 cup chopped	100	0.3	0.2	3	0	17	0.04	0.03	T	0	12	-
Pineapple, canned in heavy syrup	100	0.3	0.1	30	0	180	0.03	0.04	1	0	5	-
Plum, red flesh	154	6.5	1.2	6	0	39	0.22	0.03	1	0	0	-
1 cup	100	0.3	0.1	140	0	830	0.02	0.02	T	0	34	-
Rockmelon	100	0.6	0.2	4	0	25	0.01	0.03	T	0	45	-
Strawberry	100	2	0.5	4	0	23	0.18	0	1	0	0	-
Sultana	153	3.1	0.8	6	0	35	0.28	0	1	0	0	-
1 cup	100	0.4	0.4	33	0	200	0.01	0.01	T	0	7	-
Watermelon, Aust, red pulp												

(cont.)





## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure		Water g	Energy kJ	Energy kcal	Protein g	Total fat g	CHO Avail. g	Dietary fibre g	Cholesterol mg	Sodium Na mg	Potassium K mg	Calcium Ca mg	Magnesium Mg mg
	g	g												
<b>NUTS AND SEEDS</b>														
Almond, Indian, ripe	100	1400	43	339	10.7	31.7	3	7.4	0	740	19	—	—	—
Macadamia nut, kernels, raw	100	3020	2	734	7.6	76.2	5	6	0	330	48	95	—	—
Nuts, mixed, salted	100	2620	2	633	20.8	55.3	13	7	0	625	71	181	—	—
Peanut, kernel & skin, raw	100	2310	5	558	24.7	47.1	9	8.2	0	540	55	160	—	—
Peanut, roasted, salted	100	2570	2	621	24.4	51.7	14	8.3	0	670	50	180	—	—
1 cup	150	3850	2	932	36.6	77.6	22	12.5	0	1010	75	270	—	—
Pumpkin seeds, raw	100	2320	4	560	29.4	40.4	20	5.4	0	820	39	270	—	—
Watermelon, seeds, dried	100	2340	5	565	22.7	41.2	26	4.2	0	606	82	513	—	—
<b>LEGUMES</b>														
Bean salad, commercial	100	560	71	136	2.1	4.8	21	4.2	0	450	19	13	—	—
Beans, baked, can in tomato sauce	100	282	76	68	4.6	0.5	11	4.8	0	400	220	34	—	—
Beans, broad, boiled	100	169	76	40	6.9	0.5	2	4.2	0	4	225	16	—	—
Beans, green, boiled	100	69	92	17	1.5	0.2	2	2.8	0	3	80	30	—	—
1 cup	136	94	126	23	2	0.3	3	3.8	0	4	109	41	—	—
Beans, lima, dried, boiled	100	288	74	69	6.4	0.3	10	5.3	0	7	350	16	—	—
Beans, red kidney, canned, drained	100	352	69	85	6.6	0.6	13	6.5	0	320	270	36	—	—
Beans, red kidney, dried, boiled	100	303	71	73	7.9	0.5	9	7.2	0	8	290	34	—	—
Beans, soya, dried, boiled	100	538	65	129	13.5	7.7	1	7.2	0	9	420	76	—	—
Beans, sprouts, raw	100	83	92	20	3.1	0.1	2	3	0	1	150	10	—	—
Lentils, dried, boiled	100	287	74	69	6.8	0.4	10	3.7	0	8	220	17	—	—
Peas, green, frozen, boiled	100	209	79	50	5.8	0.4	6	5.8	0	3	120	27	—	—
1 cup	164	343	129	82	9.5	0.7	10	9.5	0	5	197	44	—	—
Soya bean curd, unsweetened	100	107	94	26	1.9	0.4	4	0	0	2	79	66	—	—
Soya bean milk, packet	100	249	87	60	1.3	2.2	9	0.8	0	2	42	7	—	—
<b>FISH</b>														
Cod, steamed	100	350	79	83	18.6	0.9	0	0	50	—	15	—	—	—
Eel fish	100	307	75	73	16.1	0.9	T	—	—	—	330	—	—	—
Fish, battered, deep fried,	100	1050	57	254	14.2	15.7	14	0.5	25	470	180	24	—	—
Fish, finger, frozen, grilled	100	930	55	225	11.6	11.3	19	1	31	320	219	35	—	—
Mullet, steamed	100	559	72	133	22	5	0	0	95	144	315	40	—	—
Salmon, pink, solids & liquid, can	100	560	69	134	19.8	6.1	0	0	55	554	326	213	—	—
Sardines, canned in oil, drained	100	952	61	229	21.8	15.7	0	0	114	608	310	381	—	—
Snapper, steamed	100	511	73	121	24.2	2.7	0	0	89	102	403	30	—	—
Tuna, canned in brine	100	457	75	108	22.1	2.2	0	0	43	390	272	8	—	—
Tuna, canned in oil, drained	100	922	62	221	24.4	13.7	0	0	40	441	276	7	—	—

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit A equiv. g	Retinol $\mu$ g	$\beta$ -carotene equiv. $\mu$ g	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 $\mu$ g	Vitamin C mg	Vitamin E mg
<b>NUTS AND SEEDS</b>												
Almond, Indian, ripe	100	5.5	—	0	0	0	0.19	0.05	T	0	0	14
Macadamia nut, kernels, raw	100	1.8	1.2	0	0	0	0.28	0.1	2	0	1	2
Nuts, mixed, salted	100	2.7	3.4	1	0	7	0.38	0.3	11	0	0	—
Peanut, kernel & skin, raw	100	2.3	3	1	0	4	0.79	0.1	15	0	0	10
Peanut, roasted, salted 1 cup	100 150	2.4 3.6	3 4.5	1 2	0 0	4 6	0.35 0.53	0.15 0.23	18 27	0 0	0 0	1 1
Pumpkin seeds, raw	100	10	6.6	38	0	230	0.23	0.32	2	0	0	20
Watermelon, seeds, dried	100	7.7	7	2	0	9	0.22	0.1	3	0	T	17
<b>LEGUMES</b>												
Bean salad, commercial	100	0.6	0.3	17	0	100	0.06	0.02	T	0	0	T
Beans, baked, can in tomato sauce	100	1.6	0.5	7	0	42	0.05	T	1	0	0	T
Beans, broad, boiled	100	1.8	1.1	31	0	185	0.17	0.32	2	0	29	1
Beans, green, boiled 1 cup	100 136	1.1 1.5	0.8 1.1	77 105	0 0	460 626	0.03 0.04	0.07 0.1	T T	0 0	13 18	T T
Beans, lima, dried, boiled	100	1.3	0.7	T	0	T	0.06	T	1	0	0	T
Beans, red kidney, canned, drained	100	2.1	0.8	T	0	T	0.1	0.06	1	0	0	T
Beans, red kidney, dried, boiled	100	1.7	1	T	0	T	0.07	T	T	0	0	T
Beans, soya, dried, boiled	100	2.2	1.6	T	0	1	0.1	0.07	1	0	0	1
Beans, sprouts, raw	100	0.4	0.6	3	0	20	0.03	0.11	1	0	11	—
Lentils, dried, boiled	100	2	0.9	1	0	5	0.08	0.06	1	0	0	T
Peas, green, frozen, boiled 1 cup	100 164	1.6 2.6	1.8 3	89 146	0 0	535 877	0.2 0.33	0.09 0.15	2 3	0 0	11 18	T T
Soya bean curd, unsweetened	100	0.4	—	0	0	0	0.01	0.02	T	0	0	—
Soya bean milk, packet	100	0.2	0.2	T	0	T	0.05	0.03	T	0	0.3	1
<b>FISH</b>												
Cod, steamed	100	0.5	—	0	0	0	0.09	0.09	2	—	0	—
Eel fish	100	0.8	—	—	—	—	—	—	—	—	3	—
Fish, battered, deep fried,	100	0.7	0.5	0	0	0	0.09	0.04	4	—	0	T
Fish, finger, frozen, grilled	100	1	0.5	410	410	0	0.07	0.05	2	0.8	0	—
Mullet, steamed	100	0.6	1.1	8	8	T	0	0.13	5	2	0	1
Salmon, pink, solids & liquid, can	100	0.8	0.9	17	17	T	0.02	0.19	7	4.4	0	2
Sardines, canned in oil, drained	100	2.7	1.8	65	65	T	0	0.25	8	11.4	0	T
Snapper, steamed	100	0.3	0.6	8	8	0	0.09	0.05	5	—	T	1
Tuna, canned in brine	100	1	0.9	15	15	T	T	0.1	7	3.8	0	1
Tuna, canned in oil, drained	100	0.8	0.9	20	20	T	0.05	0.11	8	3.7	0	2

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure		Water g	Energy kJ	Energy kcal	Protein g	Total fat g	CHO Avail. g	Dietary fibre g	Cholesterol mg	Sodium Na mg	Potassium K mg	Calcium Ca mg	Magnesium Mg mg
	g	g												
<b>SEAFOOD</b>														
Cockles, boiled for 5 minutes	100	184	85	44	44	8.5	0.5	1	0	136	350	130	49	—
Cockles, fresh	100	258	80	61	61	12	1.2	1	0	68	264	280	238	—
Lobster, cooked	100	407	75	96	96	22	0.9	0	0	116	395	310	49	40
Mussel	100	485	72	115	115	20.1	2.8	2	0	33	479	126	64	—
Oyster, flesh, raw	100	306	80	73	73	12.2	2.4	1	0	81	315	230	134	50
Prawn, cocktail	100	511	78	123	123	8.1	7.4	6	0.1	86	830	100	25	29
Turtle, cooked	100	379	78	90	90	16.4	2.7	0	0	—	121	297	8	24
<b>MEAT AND POULTRY</b>														
Bacon, breakfast, fried	100	638	60	152	152	21.9	5.8	3	0	53	2000	330	28	26
1 rasher	21	134	13	32	32	4.6	1.2	1	0	11	420	69	6	5
Bacon, breakfast, grilled	21	123	13	29	29	4.7	0.9	1	0	12	441	74	6	5
Beef sausage, grill & serve	100	1300	55	315	315	12	28.5	3	2.2	61	1030	166	20	3
1 sausage	79	1030	43	249	249	9.5	22.5	2	1.7	48	811	131	16	2
Beef stew with potatoes & gravy	100	346	80	83	83	9	2	7	0.7	23	162	343	7	18
Beef, blade steak, grill, lean	100	740	65	176	176	28.7	6.8	0	0	65	73	365	14	23
Beef, blade steak, grill, lean&fat	100	863	62	206	206	27.7	10.6	0	0	67	71	355	13	22
Beef, corned, canned	100	804	63	192	192	22.6	11.2	T	0	69	1140	150	15	16
Beef, hamburger patty, froz, fried	100	1210	50	291	291	16.7	21.9	7	4.1	58	670	320	35	27
1 patty (1.0 x 7.5 cm diam.)	61	735	31	178	178	10.2	13.4	4	2.5	35	409	195	21	16
Beef, mince, regular, simmer, drain	100	764	66	183	183	23.6	9.8	0	0	69	57	260	9	24
Beef, rump steak, grilled, lean	100	804	61	191	191	32.7	6.7	0	0	82	54	360	5	18
Beef, sausage, grilled	100	1070	54	258	258	18.3	18.2	5	0	68	930	260	15	23
1 sausage	70	750	38	181	181	12.8	12.7	4	0	48	651	182	11	16
Beef, topside, roast, baked, l & f	100	798	63	191	191	25.2	10	0	0	68	54	325	4	28
Chicken, breast, baked, lean	100	660	66	157	157	28.4	4.8	0	0	92	63	285	11	27
Chicken, drumstick, baked, lean	100	873	60	209	209	28.3	10.6	0	0	154	96	280	19	20
Ham and chicken roll	100	965	60	233	233	13	18	5	1.7	50	800	79	30	24
Lamb, chump chop, grill, 50% trim	100	1030	54	246	246	31.1	13.5	0	0	109	74	380	19	28
1 chump chop	57	586	31	140	140	17.7	7.7	0	0	62	42	217	11	16
Lamb, chump chop, grill, lean&fat	100	1180	50	284	284	29.6	18.4	0	0	109	72	370	20	27
1 chump chop	61	722	31	173	173	18.1	11.2	0	0	66	44	226	12	16
Lamb, liver, fried	100	1010	53	242	242	26.5	13.7	3	0	585	100	370	7	23
Mutton flaps, lean and fat, fried	100	1400	48	336	336	22.4	27.4	0	0	109	45	152	18	19
Pork, midloin chop, grilled, l & f	100	1520	46	366	366	23.7	30.1	0	0	92	56	245	14	12
Pork, sausage, fried, home prepare	100	1090	54	262	262	15.4	20	5	1.4	60	900	220	14	20
1 sausage	71	772	39	186	186	10.9	14.2	4	1	43	639	156	10	14
Veal, loin chop, grilled, lean & fat	100	674	66	160	160	29.2	4.8	0	0	111	100	355	8	24

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit A equiv. g	Retinol µg	β-carotene equiv. µg	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 µg	Vitamin C mg	Vitamin E mg
<b>SEAFOOD</b>												
Cockles, boiled for 5 minutes	100	7.9	-	87	87	T	0.02	0.1	2	-	0	2
Cockles, fresh	100	13.2	-	108	108	T	0.01	0.77	3	-	0	2
Lobster, cooked	100	0.2	3.4	4	0	23	0	0.06	2	3.2	0	2
Mussel	100	3.8	-	218	159	356	0.06	0.2	4	15.5	3.6	1
Oyster, flesh, raw	100	3.9	65.6	24	22	14	T	0.37	2	17	2	1
Prawn, cocktail	100	1.5	0.8	-	15	-	0.03	0.05	2	-	3	3
Turtle, cooked	100	4.9	2	7	7	0	0.1	0.6	3	-	0	1
<b>MEAT AND POULTRY</b>												
Bacon, breakfast, fried	100	1.6	2.9	0	0	0	0.68	0.2	4	1.75	2	T
1 rasher	21	0.3	0.6	0	0	0	0.14	0.04	1	0.37	T	T
Bacon, breakfast, grilled	21	0.4	0.6	0	0	0	0.15	0.04	1	0.37	T	T
Beef sausage, grill & serve	100	1.4	2.2	26	17	54	0.05	0.1	2	1.54	24.1	T
1 sausage	79	1.1	1.7	21	13	43	0.04	0.08	2	1.22	19	T
Beef stew with potatoes & gravy	100	1.3	2	T	T	0	0.06	0.1	2	0.99	5.8	T
Beef, blade steak, grill, lean	100	2.5	6	0	0	0	0.11	0.22	4	1.6	0	T
Beef, blade steak, grill, lean & fat	100	2.4	5.6	2	2	0	0.1	0.21	4	1.5	0	T
Beef, corned, canned	100	3.8	4.5	21	10	69	0	0.26	2	1.8	0	1
Beef, hamburger patty, froz, fried	100	3.6	2.2	3	0	16	0.08	0.11	3	2.1	0	1
1 patty (1.0 x 7.5 cm diam.)	61	2.2	1.3	2	0	10	0.05	0.07	2	1.3	0	1
Beef, mince, regular, simmer, drain	100	2.3	5.2	0	0	0	0.05	0.13	2	1.4	0	T
Beef, rump steak, grilled, lean	100	3.9	5.2	0	0	0	0.1	0.37	7	1.6	0	T
Beef, sausage, grilled	100	2.4	3.7	28	18	62	0	0.16	3	T	0	T
1 sausage	70	1.7	2.6	20	13	43	0	0.11	2	T	0	T
Beef, topside, roast, baked, 1 & f	100	2.4	3.7	3	3	0	0.1	0.16	6	1.5	0	T
Chicken, breast, baked, lean	100	0.6	0.8	T	T	0	0.06	0.12	9	0.3	0	1
Chicken, drumstick, baked, lean	100	1.2	2.4	10	10	0	0.07	0.29	5	0.7	0	1
Ham and chicken roll	100	1	1.6	174	172	11	0.02	0.14	2	0.8	2	T
Lamb, chump chop, grill, 50% trim	100	3.3	4.5	3	3	0	0.06	0.29	5	2.2	0	T
1 chump chop	57	1.9	2.6	2	2	0	0.03	0.17	3	1.3	0	T
Lamb, chump chop, grill, lean&fat	100	3.2	4.3	6	6	0	0.05	0.27	5	2	0	T
1 chump chop	61	2	2.6	4	4	0	0.03	0.16	3	1.2	0	T
Lamb, liver, fried	100	11.1	5	35400	35400	60	0.25	4.5	15	74	23	T
Mutton flaps, lean and fat, fried	100	2	3.2	4	4	0	0.11	0.4	8	2.8	0	T
Pork, midloin chop, grilled, 1 & f	100	1	1.7	7	7	0	0.63	0.15	4	0.9	0	T
Pork, sausage, fried, home prepare	100	1.6	2.3	19	17	9	0	0.16	3	1.1	1	T
1 sausage	71	1.1	1.6	13	12	6	0	0.11	2	0.8	1	T
Veal, loin chop, grilled, lean & fat	100	1.9	3	7	6	9	0.07	0.18	3	0.9	0	T

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure		Water	Energy	Energy	Protein	Total fat	CHO	Dietary	Cholesterol	Sodium	Potassium	Calcium	Magnesium
	g	g												
<b>MILK AND MILK PRODUCTS</b>														
Cheese, cheddar	100	36	1680	406	25.4	33.8	T	0	101	655	73	775	30	
1 cup shredded	118	42	1990	479	30	39.9	T	0	119	773	86	915	35	
Cheese, cheddar, processed	21	9	291	70	4.5	5.8	T	0	17	284	13	131	5	
1 cup	241	175	1470	354	36.9	22.4	1	0	87	482	234	161	22	
Cream, pure	100	52	1660	404	1.9	42.8	3	0	136	21	95	60	5	
Ice cream, vanilla	100	63	814	197	4.1	11.2	20	0	20	70	192	133	13	
1 cup	143	90	1160	282	5.9	16	29	0	29	100	275	190	19	
Infant formula, Similac, & water	100	90	281	68	1.5	3.6	7	0	—	19	73	51	4	
Milk powder, skim	100	4	1500	359	36.9	0.8	51	0	33	425	1690	1290	118	
Milk powder, whole	100	3	2060	497	27.2	26.4	38	0	105	340	1200	935	89	
Milk, skim, fluid	100	91	147	35	3.6	0.1	5	0	3	44	159	125	12	
1 cup	260	236	382	91	9.4	0.3	13	0	8	114	413	325	31	
Milk, whole	100	88	274	66	3.3	3.8	5	0	13	41	152	114	11	
1 cup	258	226	707	170	8.5	9.8	12	0	34	106	392	294	28	
Yoghurt, natural, low fat, unsw	100	85	203	49	5.9	0.2	6	0	5	70	260	215	18	
Yoghurt, natural, unsweetened	100	85	283	68	4.7	3.4	5	0	16	55	220	171	15	
<b>EGGS</b>														
Egg, chicken, fried	46	28	492	119	7.5	9.8	T	0	233	67	70	32	4	
1 egg (no. 7)	50	38	314	76	6.2	5.6	T	0	214	44	39	27	5	
Egg, chicken, poached	100	73	683	165	10.4	13.5	T	0	314	141	128	750	9	
Egg, chicken, scrambled	62	45	423	102	6.4	8.4	T	0	195	87	79	465	6	
1 egg	64	46	443	107	7.8	8.4	0	0	260	93	70	31	4	
Omelette, plain	100	1	3660	890	0.2	98.8	T	0	90	T	0	0	0	
Butter, regular	100	15	3040	740	0.8	81.4	1	0	200	720	22	23	2	
1 tablespoon	15	2	456	111	0.1	12.2	T	0	30	108	3	3	T	
Coconut cream, canned/UHT	100	71	844	205	1.9	20.3	4	1.7	0	21	—	4	29	
Coconut cream, fresh, no water	100	54	1350	327	4.4	32.3	5	1.7	0	13	—	15	—	
Margarine, poly-unsat, reduce fat	100	57	1480	361	0.1	40	T	0	4	300	47	3	T	
Margarine, poly-unsat., regular	100	16	2990	728	0.4	80.5	1	0	7	780	20	9	1	
Oil, olive	100	T	3680	895	T	99.4	T	0	T	7	0	14	T	
Oil, peanut	100	T	3680	895	T	99.4	T	0	1	0	0	T	1	
Vegetable oil, polyunsaturated	100	1	3670	894	T	99.3	0	0	1	0	0	0	T	

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit A equiv. g	Retinol µg	β-carotene equiv. µg	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 µg	Vitamin C mg	Vitamin E mg
<b>MILK AND MILK PRODUCTS</b>												
Cheese, cheddar 1 cup shredded	100	0.3	3.6	389	353	212	0.02	0.5	T	1.2	0	1
Cheese, cheddar, processed 1 slice	118	0.4	4.2	459	417	250	0.02	0.59	T	1.4	0	1
Cheese, cottage 1 cup	241	0.1	0.8	57	51	34	T	0.08	T	0.2	0	T
Cream, pure	100	0.1	1.4	231	210	125	0.05	0.96	1	1.9	0	T
Ice cream, vanilla 1 cup	100	0.1	0.3	580	530	320	T	0.2	T	-	0	-
Infant formula, Similac, & water	100	0.1	0.4	156	140	100	0.05	0.3	1	0.3	0	T
Milk powder, skim	143	0.1	0.6	223	200	143	0.07	0.4	1	0.4	0	T
Milk powder, whole	100	1.2	0.5	60	-	-	0.07	0.1	1	0.17	5.5	2
Milk, skim, fluid 1 cup	100	0.3	3.8	0	0	0	0.25	1.99	1	5.3	2	T
Milk, whole 1 cup	100	0.3	2.8	370	340	170	0.37	1.6	1	3.1	3	1
Yoghurt, natural, low fat, unsw	100	T	0.4	0	0	0	0.04	0.2	T	0.38	1	T
Yoghurt, natural, unsweetened	100	T	1	0	0	0	0.1	0.5	T	0.99	3	T
	258	T	1	124	114	67	0.05	0.2	T	0.35	1	T
	100	0.1	0.6	0	0	0	0.13	0.5	T	0.9	3	T
	100	0.1	0.5	39	36	19	0.03	0.3	T	0.03	0	T
	100	0.1	0.5	39	36	19	0.03	0.3	T	0.2	0	T
<b>EGGS</b>												
Egg, chicken, fried 1 egg (no. 7)	46	0.9	0.6	92	92	0	0.05	0.17	T	0.6	0	1
Egg, chicken, poached 1 egg (no. 7)	50	1	0.6	108	108	0	0.05	0.15	T	1	0	1
Egg, chicken, scrambled 1 egg	100	1.5	0.8	218	211	43	0.08	0.38	T	1.5	0	1
Omelette, plain 1 egg omelette	62	0.9	0.5	135	131	27	0.05	0.24	T	0.9	0	1
	64	0.9	0.5	95	93	14	0.04	0.22	T	1.6	0	1
<b>FATS AND OILS</b>												
Beef, dripping	100	T	T	4	0	23	T	T	T	T	0	T
Butter, regular 1 tablespoon	100	T	T	947	870	460	0.01	0.06	1	0.2	T	2
Coconut cream, canned/UHT	15	T	T	142	131	69	T	0.01	T	T	T	T
Coconut cream, fresh, no water	100	1	0.4	0	0	0	0	0	T	-	0	T
Margarine, poly-unsat, reduce fat	100	1.8	-	0	0	0	0.02	0.01	1	0	-	1
Margarine, poly-unsat, regular	100	T	T	1230	990	1410	T	T	T	0.1	0	16
Oil, olive	100	T	T	933	850	500	T	T	T	T	0	12
Oil, peanut	100	1.2	0.1	T	0	T	T	T	1	0	0	5
Vegetable oil, polyunsaturated	100	0.1	0.1	T	0	T	T	T	T	0	0	15
	100	T	T	T	0	T	T	T	T	0	0	16

(cont.)



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure		Water	Energy kJ	Energy kcal	Protein g	Total fat g	CHO Avail. g	Dietary fibre g	Cholesterol mg	Sodium Na mg	Potassium K mg	Calcium Ca mg	Magnesium Mg mg
	g	g												
<b>PROCESSED FOODS</b>														
Baby food, apricot & tapioca, jun.	100	266	82	64	0.3	0	16	1.5	0	0	6	125	8	4
Baby food, beef, junior	100	428	80	102	14.5	4.9	0	0	13	0	66	190	8	9
Baby food, mix vegetable, strain	100	145	89	35	1.2	0.1	7	2.2	0	0	8	121	22	11
Baby food, vegetable & beef, strain	100	205	89	50	2	2	6	1.1	6	0	21	101	12	5
Cheeseburger, double patty & bun	100	1180	43	285	13.8	13.5	27	0.7	50	0	557	178	140	21
1 burger	160	1890	69	456	22.1	21.6	43	1.1	80	0	891	285	224	34
Cheesecake, commercial	100	1430	38	346	6.4	22.2	30	1	46	0	270	170	110	20
Corn chips, flavoured 1 small packet	50	1030	1	249	3.6	14.5	26	5.1	1	0	255	73	62	17
Hamburger, cheese	100	1080	48	260	13.6	13.3	21	1.7	34	0	760	210	83	12
Hamburger, egg	100	979	50	236	12.4	11.8	20	1.6	110	0	600	210	26	16
Hamburger, plain	100	929	51	224	10.7	10.2	22	1.8	26	0	660	190	21	17
Peanut butter, no added sugar	100	2510	1	608	27.7	51.6	8	10.9	0	0	300	610	46	180
1 tablespoon	17	427	T	103	4.7	8.8	1	1.9	0	0	51	104	8	31
Peanut butter, smooth, with salt	100	2510	1	607	24.6	50	15	5.9	0	0	478	721	34	157
Pie, fruit, commercial	100	1030	48	250	3.1	10.6	36	1.3	13	0	260	89	14	11
1 slice (1/6 pie)	80	826	38	200	2.5	8.5	29	1	10	0	208	71	11	9
Pie, meat, individual size	100	937	51	227	7.7	13.8	18	1.1	19	0	605	113	11	17
1 pie	172	1610	88	390	13.2	23.7	31	1.9	33	0	1040	194	19	29
Pizza, ham & pineapple, froz, bake	100	1010	47	243	13.4	10.1	25	2.6	14	0	725	150	157	19
Potato crisps, plain	100	2080	3	505	6.4	32.1	48	11.9	0	0	640	1200	25	50
1 small packet	50	1040	1	253	3.2	16.1	24	6	0	0	320	600	13	25
Potato crisps, plain, salted	100	2200	2	533	7	34.6	48	4.5	0	0	594	1280	24	67
1 small packet	50	1100	1	267	4	17.3	24	2.3	0	0	297	638	12	34
Pretzels	100	1530	5	370	11.7	7.2	65	3.3	0	0	1980	170	25	28
Pudding, plum, canned	100	1160	32	281	5	7.1	49	2.6	22	0	345	215	51	20
Quiche, ham & cheese, comm., baked	100	1300	46	315	9.8	22.1	19	0.7	129	0	535	137	14	20
Sausage roll	129	1540	54	373	10.3	22.8	31	1.7	26	0	813	126	23	22
1 sausage roll	258	199	243	49	2.1	0.3	9	0	3	0	1140	196	13	10
Soup, chicken noodle, dry	100	221	89	53	1.5	2.6	6	0.5	5	0	390	79	37	6
1 cup	258	190	85	46	3.3	1.4	5	3.7	3	0	200	260	26	20
Soup, cream vege, canned, prepared	100	179	89	43	1.3	0.9	8	0.2	3	0	340	190	35	10
Soup, minestrone, home prepared	100	263	82	64	1.9	0.4	13	0.7	0	0	420	110	12	10
Soup, tomato, canned, prepared	100	613	69	148	5.8	12.7	3	5.4	0	0	763	199	54	174
Spaghetti, canned-tomato sauce	100	383	81	93	3.9	4.9	8	0.6	11	0	25	120	13	11
<b>MIXED COOKED DISHES</b>														
Beef and sweet potato stew	100	481	75	116	4.6	5.3	13	T	11	0	76	—	113	9
Custard	100	227	85	54	5.8	2.3	3	2.3	32	0	46	229	54	9
Fish salad, Tahitian, raw	100	613	69	148	5.8	12.7	3	5.4	0	0	3	763	199	174
Palusami, taro leaf & coconut	100	613	69	148	5.8	12.7	3	5.4	0	0	3	763	199	174

(cont.)



THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit. A equiv. g	Retinol µg	β-carotene equiv. µg	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 µg	Vitamin C mg	Vitamin E mg
<b>PROCESSED FOODS</b>												
Baby food, apricot & tapioca, jun.	100	0.3	T	72	-	-	0.01	0.01	T	0	17.9	1
Baby food, beef, junior	100	1.7	2	31	31	0	0.01	0.16	3	1.47	1.9	T
Baby food, mix vegetable, strain	100	0.3	0.2	273	0	1640	0.02	0.03	1	0	2.8	1
Baby food, vegetable & beef, strain	100	0.4	0.3	171	-	-	0.02	0.03	1	0.25	1.2	T
Cheeseburger, double patty & bun 1 burger	100	2.3	2.7	41	34	42	0.21	0.24	4	1.2	0	1
	160	3.7	4.4	66	54	67	0.34	0.38	6	1.9	0	1
Cheese cake, commercial	100	0.7	0.5	140	120	110	0	0.23	1	-	0	1
Corn chips, flavoured 1 small packet	50	1.1	0.9	3	0	18	0.06	0.05	1	0	1	1
Hamburger, cheese	100	1.7	2	110	110	10	0.05	0.16	2	-	2	1
Hamburger, egg	100	1.9	2.2	100	100	10	0.05	0.19	2	-	2	1
Hamburger, plain	100	1.7	2	72	70	10	0.05	0.13	2	-	2	-
Peanut butter, no added sugar	100	2	2.9	1	0	5	0.11	0.12	16	-	0	5
1 tablespoon	17	0.3	0.5	T	0	1	0.02	0.02	3	-	0	1
Peanut butter, smooth, with salt	100	1.7	2.5	0	0	0	0.14	0.1	13	0	0	5
Pie, fruit, commercial	100	0.6	-	42	0	250	0.02	0	1	-	13	-
1 slice (1/6 pie)	80	0.5	-	34	0	200	0.02	0	1	-	10	-
Pie, meat, individual size	100	1.2	1.1	20	20	0	0.06	0.13	3	0.77	0	-
1 pie	172	2.1	1.9	34	34	0	0.1	0.22	5	1.32	0	-
Pizza, ham & pineapple, froz, bake	100	1	1.2	91	63	170	0.02	0.14	2	-	3	-
Potato crisps, plain	100	2.5	1.3	0	0	0	0.12	0.07	3	0	44	3
1 small packet	50	1.3	0.7	0	0	0	0.06	0.04	2	0	22	2
Potato crisps, plain, salted	100	1.6	1.1	0	0	0	0.17	0.2	4	0	31.1	3
1 small packet	50	0.8	0.6	0	0	0	0.08	0.1	2	0	15.6	2
Pretzels	100	3.4	0.7	10	9	6	0.11	0.09	3	-	0	-
Pudding, plum, canned	100	1	0.5	5	1	25	0.02	0.07	1	-	0	-
Quiche, ham & cheese, comm., baked	100	0.5	0.1	120	110	64	0.02	0.23	2	-	0	-
Sausage roll 1 sausage roll	129	1.8	1.3	26	26	0	0.08	0.1	2	-	0	2
Soup, chicken noodle, dry 1 cup	258	0.3	0	0	0	3	0.13	0.15	0	0.1	0	-
Soup, cream vege, canned, prepared	100	0.2	0.4	10	7	18	0	0.14	0	-	0	-
Soup, minestrone, home prepared	100	1.1	0.4	68	25	260	0.05	0.02	1	-	1	-
Soup, tomato, canned, prepared	100	0.2	0.2	28	10	110	0.12	0.07	1	-	1	-
Spaghetti, canned-tomato sauce	100	0.3	0.3	35	31	24	0.07	0.01	1	T	T	T
<b>MIXED COOKED DISHES</b>												
Beef and sweet potato stew	100	0.6	1.3	4	0	24	0.04	0.03	1	0.2	7	2
Custard	100	0.5	0.4	8	5	20	0.05	0.2	T	0.5	0	-
Fish salad, Tahitian, raw	100	0.6	0.2	117	17	603	0.1	0.05	1	0.6	33	1
Palusami, taro leaf & coconut	100	3.2	-	673	0	4040	0.15	0.36	2	0	83	2

(cont.)





## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure	Water g	Energy kJ	Energy kcal	Protein g	Total fat g	CHO Avail. g	Dietary fibre g	Cholesterol mg	Sodium Na mg	Potassium K mg	Calcium Ca mg	Magnesium Mg mg
<b>MIXED COOKED DISHES</b>													
Palusami, taro leaf&coconut&beef	100	66	684	165	9.9	12.9	2	4.4	16	263	658	166	146
Poke recipe, boiled	100	54	737	179	0.6	0.2	44	0.7	0	7	158	24	1
Sandwich, toasted, cheese & ham	100	43	1180	285	14.3	16.2	21	–	82	690	225	270	23
<b>CONFECTIONERY</b>													
Chocolate bar, Mars Bar	50	3	879	213	2.6	8.6	31	0.8	8	95	145	80	17
Chocolate, dark	50	T	1090	264	2.6	14.3	31	0.6	0	28	220	26	60
Chocolate, milk and nuts	50	T	1080	261	5.6	14.8	27	2.5	11	36	240	115	36
Honey	100	16	1360	330	0.3	0	82	0	0	14	62	8	3
1 tablespoon	21	3	286	69	0.1	0	17	0	0	3	13	2	1
Jam	20	6	218	53	0.1	0	13	0.3	0	3	14	1	1
Marmalade, orange	20	6	216	52	T	0	13	0.2	0	7	5	3	6
Muesli bar, fruit	100	8	1550	376	4.8	14.8	56	3.9	0	49	300	32	52
Sugar, brown	100	2	1600	388	0.2	0	97	0	0	21	300	150	21
Sugar, white	100	T	1650	400	T	0	100	0	0	0	2	1	0
1 cup	214	T	3530	856	T	0	214	0	0	0	4	2	0
Syrup, golden	20	3	248	60	0.1	0	15	0	0	26	122	46	7
<b>BEVERAGES</b>													
Cocoa powder, Australian	3.6	T	45	11	0.7	0.5	1	0.2	0	9	92	5	18
Coffee powder, instant	1.0	T	4	1	0.1	T	T	0.2	0	T	37	1	4
Cordial, blackcurrant, prepared	100	93	188	46	0	0	11	–	0	9	12	4	2
Fruit drink, orange	100	93	162	39	0.1	0	10	0.1	0	7	37	4	3
200 ml	208	194	337	81	0.2	0	20	0.2	0	15	77	8	6
Juice, orange, commercial	100	94	149	36	0.6	0	8	0.3	0	3	150	9	7
1 cup	264	247	393	95	1.6	0	22	0.8	0	8	396	24	18
Milo powder	20	T	318	77	2.5	2.1	12	0	6	58	190	84	34
Softdrink, cola	100	93	180	44	0	0	11	0	0	12	T	T	T
Softdrink, lemonade	100	93	178	43	0	0	11	0	0	17	T	1	0
Softdrink, lemonade, diet	100	93	0	0	0	0	0	0	0	17	T	1	1
Tea, Indian, infused	251	251	5	0	0.3	T	T	T	0	5	43	T	3
Thick shake, McDonald's	100	75	459	111	5.2	3.6	14	0	10	78	163	210	–



## THE PACIFIC ISLANDS FOOD COMPOSITION TABLES

Foods	Measure g	Iron Fe mg	Zinc Zn mg	Tot. vit A equiv. g	Retinol $\mu$ g	$\beta$ -carotene equiv. $\mu$ g	Thiamin mg	Riboflavin mg	Niacin mg	Vitamin B12 $\mu$ g	Vitamin C mg	Vitamin E mg
<b>MIXED COOKED DISHES</b>												
Palusami, taro leaf&coconut&beef	100	3.5	1	555	2	3320	0.12	0.35	2	0.4	67	2
Poke recipe, boiled	100	0.7	0.2	72	0	434	0.05	0.04	1	0	36	T
Sandwich, toasted, cheese & ham	100	1.9	-	131	120	70	0.2	0.16	2	-	T	1
<b>CONFECTIONERY</b>												
Chocolate bar, Mars Bar	50	0.8	0.4	33	32	10	0.03	0.19	T	T	0	T
Chocolate, dark	50	2.2	1	11	10	6	0.03	0.07	1	T	0	1
Chocolate, milk and nuts	50	1	0.8	40	38	10	0.05	0.28	2	-	0	3
Honey	100	0.2	2.6	0	0	0	0	0	0	-	0	-
1 tablespoon	21	T	0.5	0	0	0	0	0	0	-	0	-
Jam	20	0.1	T	1	0	3	0	0	T	-	1	-
Marmalade, orange	20	0.1	0	0	0	T	0	0	0	-	T	T
Muesli bar, fruit	100	1.6	1.1	27	0	160	0.12	0.06	1	-	0	2
Sugar, brown	100	1.2	0	0	0	0	0	0	0	0	0	0
Sugar, white	100	T	0	0	0	0	0	0	0	0	0	0
1 cup	214	T	0	0	0	0	0	0	0	0	0	0
Syrup, golden	20	0.7	0	0	0	0	0	0	T	-	0	-
<b>BEVERAGES</b>												
Cocoa powder, Australian	3.6	0.6	0.3	T	0	1	T	0.01	T	-	0	T
Coffee powder, instant	1.0	T	T	0	0	0	T	0.01	T	-	0	T
1 teaspoon	100	0.1	T	0	0	T	0	-	0	-	55	-
Cordial, blackcurrant, prepared	100	T	0	18	0	108	0	0	T	-	5	-
Fruit drink, orange	208	T	0	37	0	225	0	0	T	-	10	-
200 ml	100	T	T	16	0	99	0.05	0	1	-	47	-
Juice, orange, commercial	100	T	T	42	0	261	0.13	0	2	-	124	-
1 cup	264	T	T	176	174	11	0.52	0.24	1	-	22	T
Milo powder	20	5	0.4	0	0	0	0	0	0	-	0	-
2.5 tablespoons	100	0	0	-	0	-	0	0	0	-	0	-
Softdrink, cola	100	0	0	-	0	-	0	0	0	-	0	-
Softdrink, lemonade	100	0	0	0	0	0	0	0	0	0	0	0
Softdrink, lemonade, diet	100	0	0	0	0	0	0	0	0	0	0	0
Softdrink, lemonade, diet	251	0.1	0.1	0	0	0	T	0.03	T	0	0	T
Tea, Indian, infused	100	0.1	0.5	30	21	51	0.04	0.23	T	0.38	0	T
Thick shake, McDonald's	100	0.1	0.5	30	21	51	0.04	0.23	T	0.38	0	T



## Glossary

Word/phrase	Meaning
<b>abdominal</b>	In the gut where most digestion takes place.
<b>acidic</b>	A substance that has become acid or sour.
<b>acquisition</b>	A thing that has been acquired or gained.
<b>aggressive</b>	Pushing other people around, therefore causing arguments.
<b>alkaline</b>	Any base that has the following qualities – able to neutralize acids and soluble in water.
<b>allergy</b>	A condition where the body is unusually sensitive to certain substances.
<b>antitoxin</b>	A substance found in the blood that acts against specific toxins.
<b>bacteria</b>	Micro-organisms that can cause disease.
<b>blanch</b>	To place in boiling water to stop enzymes action.
<b>blander</b>	Having a mild flavour.
<b>breeding</b>	Reproducing, creating more, multiplying.
<b>collapse</b>	Unable to do anything due to lack of energy.
<b>composition</b>	Putting together several ingredients.
<b>consistency</b>	How liquid or solid a food is.
<b>contamination</b>	Harmful substances getting into food which can cause illness.
<b>counterpart</b>	A thing which when added to another completes or complements it.
<b>decompose</b>	When living material goes rotten and breaks down.
<b>dehydration</b>	Not having enough water.
<b>dense</b>	Having a thick consistency.
<b>diarrhoea</b>	An illness causing frequent bowel movements.
<b>documented</b>	Written down or recorded in writing.
<b>environment</b>	The conditions and circumstances surrounding life.
<b>enzyme</b>	A organism in living substances that causes decay and rotting.
<b>extravagance</b>	Spending more than is sensible or reasonable.
<b>foetus</b>	The unborn young of a human.
<b>germinate</b>	To develop and grow, e.g. a seed.
<b>glutamate</b>	A colourless crystalline acid found in certain foods.
<b>grievances</b>	Complaints or resentment over an issue.
<b>hypertension</b>	Abnormally high blood pressure.
<b>immune</b>	Protected against certain disease or illness.
<b>immunity</b>	Resistance to or protection against certain diseases or illnesses.
<b>impairment</b>	Being weakened or disabled.
<b>impressive</b>	Having the power to have an effect or influence.
<b>incubation</b>	Keeping a substance in the conditions needed for its growth and development.
<b>intellectual</b>	Requiring or using intelligence.
<b>interrelationship</b>	Having a close connection or relationship with each other.
<b>intertwined</b>	At least two things woven or dependent on each other.
<b>legislation</b>	Rules to be followed.
<b>media</b>	The various forms of communication used to inform the public, e.g. newspapers, TV, radio advertisements.
<b>micro-nutrient</b>	Any nutrient only required in small quantities by the body.
<b>micro-organisms</b>	Small vegetable or animal organism that cannot be seen by the naked eye.
<b>modifying</b>	Changing or making alterations.
<b>negatively</b>	Lacking in positive action, having a bad effect.
<b>neutral</b>	A substance that is not acid or alkaline.
<b>offensive</b>	Behaviour or habits that people find inappropriate.



Glossary	
Word/phrase	Meaning
<b>optimum</b>	The most or best use of a situation.
<b>paralysis</b>	Loss of power to move.
<b>parasites</b>	Animals or plants which live on or in an organism of another species.
<b>pasteurization</b>	A method using heat to destroy disease-producing bacteria.
<b>perishable</b>	Liable to spoil, deteriorate or decay.
<b>permeability</b>	A substance that allows liquid or gases to pass through it.
<b>pertaining</b>	Having to do with or belonging to.
<b>philosophy</b>	Principles for living.
<b>physiological</b>	The branch of biological study dealing with the functions and vital processes of living organisms.
<b>pickling</b>	Preserving food in brine (salt solution) or vinegar.
<b>placenta</b>	Within the uterus which provides nourishment for the foetus.
<b>polymers</b>	Commonly known as plastics used for many purposes including food packaging.
<b>prevalence</b>	Frequent occurrence, widespread.
<b>productivity</b>	Being able to produce.
<b>profile</b>	A written outline of what the customer wants and needs are.
<b>pulse</b>	The edible seeds of peas, beans, lentils and similar plants that grow in pods.
<b>putrefy</b>	To cause to rot.
<b>radioactivity</b>	Capable of producing energy in the form of particles and rays which can be harmful to the body.
<b>reconstitute</b>	To recreate or rebuild into the original substance.
<b>regulated</b>	Controlled by certain rules.
<b>sanitise</b>	To remove dirt and prevent infection.
<b>sterile</b>	Unable to reproduce or grow infectious organisms.
<b>stimulants</b>	Things that increase activity.
<b>sublimation</b>	Turning ice into steam without the middle step where the ice would melt into a liquid.
<b>surveillance</b>	Watching or observing closely.
<b>symptoms</b>	Signs that something is not as it should be.
<b>toxins</b>	Poisonous or harmful compounds produced by some micro-organisms.
<b>uterus</b>	The woman's womb in which the foetus develops.
<b>vacuum packed</b>	Packing food in a container from which all air has been removed.



## Key Vocabulary

Vocabulary	Collocations	Derivations
access	to have access to to have access to sufficient nutritious food	
absorption	the absorption of solar energy	
adequate	an adequate protein intake	
adequately	adequately reheated	
appropriate	the most appropriate method	
aspects	the emotional and spiritual aspects of people's lives	
assist	to assist they assist in cell formation	
availability	the availability of materials	
avoid	to avoid, to avoid contaminating the food exposure to some foods should be avoided until . . . substances that should be avoided	
awareness	awareness in the community awareness about food and nutrition increasing awareness to promote awareness of	
contribute	to contribute to contribute to	
convert	to be converted excess kilojoules are converted into fat	
deteriorate	to deteriorate deterioration in our food	deterioration
enable	this will enable you to . . . this will enable people to . . .	
ensure	to ensure to ensure this happens this method ensures the food . . . the combination of different foods ensures . . .	
essential	iron is an essential nutrient for a baby the essential food groups an essential part of a balanced diet the essential amino acids essential polyunsaturated fatty acids	
excess	excess fat avoid excess butter an excessive amount	
extract	to extract they extract the sun's energy	
factor	a helpful and positive factor a negative factor the factors that cause food contamination the lifestyle factors	
implement	to implement to implement programmes	
macronutrients		nutrients
maintain	to maintain to maintain hygienic standards to maintain an appropriate body weight a nutrient balance needs to be maintained to be maintained	maintenance
micronutrients		
nutrient	the nutrient content nutrients for growth	
nutritional	the best nutritional value nutritional requirements nutritional needs our nutritional requirements	

(cont.)



## Key Vocabulary

Vocabulary	Collocations	Derivations
nutrition	nutritional quality nutritional deficiencies	
nutritious	nutrition professionals	
obtain	nutritious food options to obtain the energy we obtain from our food this energy is obtained from. . . to be obtained	
particularly	particularly well	
prevent	to prevent to prevent constipation	
process	the recycling process the process of recycling the manufacturing process the canning process the preservation process	
promote	to promote healthy diets and lifestyles to promote breast feeding and infant feeding	
provide	to provide they provide energy vegetables provide enzymes	
reaction	an adverse reaction an allergic reaction to trigger a reaction to react to react negatively to	
recommend	to recommend the Healthy Food Pyramid recommends the recommended intake of protein above the recommended level the dietary recommendations the doctor can make recommendations	recommended recommendations
retain	to retain food retains its Vitamin C	
role	the role of the micronutrients the role of antioxidants in the prevention of . . .	
sources	from different sources a variety of sources common sources animal sources plant sources a major source of energy for human beings	
suitability	the suitability of foods for freezing	
suitable	suitable for freezing unsuitable for freezing	unsuitable
suffer	to suffer from to suffer from food poisoning	
sufficient	sufficient protein and iron	
supply	to supply to supply energy	
susceptibility	their susceptibility to greater susceptibility to disease	
susceptible	to be susceptible to to be more susceptible to bacterial spoilage	
tend	to tend both tend to raise cholesterol levels people tend to consume more protein than is necessary	
tolerant	to be tolerant of to be less tolerant of acid conditions	



## Topic Specific Vocabulary

### Part 1 Food And Nutrition

#### Unit 1 Checking Up On Food Safety

food contamination  
commercially produced food  
safe food handling  
personal hygiene  
food-borne illness  
the symptoms  
enzymes  
bacteria  
chemicals  
metals  
radioactivity  
parasites  
toxic

#### Unit 2 Keeping Food Safe From Micro-Organisms

food spoilage  
micro-organisms  
moulds  
yeasts  
to putrefy  
food poisoning  
single-cell plants or organisms  
fermentation  
enzymes  
enzyme activity  
the acidity and alkalinity of food

#### Unit 3 Close Up On Bacteria

salmonella  
cross-contamination  
thawing  
dehydration  
toxins  
a breeding ground  
the incubation period  
food handlers  
an anti-toxin  
staphylococcus aureus bacteria  
clostridium perfringens  
clostridium botulinum  
bacillus cereus  
listeriosis  
septicaemia  
meningitis

#### Unit 4 Keeping Food Safe

perishable food  
blanching

#### Unit 5 Development Of Commercial Preservation Methods

the conventional method  
the aseptic method  
commercial sterility  
heat treatment  
the consistency of the food  
contact freezing  
snap freezing  
blast-freezing  
freeze-drying  
air drying  
spray drying  
immersion freezing  
ice crystals  
rupture  
food preservation technique  
palatability  
water-soluble nutrients  
sublimation

#### Unit 6 Nutrients In Our Food

manufactured foods  
a well-balanced diet

supplement tablets  
harmful side effects  
fortified foods  
food fortification

#### Unit 7 Carbohydrates

the food cycle  
simple molecules (monosaccharides and disaccharides)  
large complex molecules (polysaccharides and fibre)  
soluble fibre  
insoluble fibre  
the Healthy Food Pyramid  
dental decay  
glucose  
glycogen  
fatigue  
dietary fibre  
faeces  
the bowel  
constipation  
eliminated

#### Unit 8 Protein

HBV (high biological value)  
LBV (low biological value)  
amino acids  
lysine  
methionine  
vegetarians  
vegans  
protein complements  
protein deficiency  
protein-deficient diseases

#### Unit 9 Lipids: Fats And Oils

trans-fatty acids  
saturated fatty acids  
polyunsaturated fatty acids  
saturated fats  
polyunsaturated fats  
monounsaturated fats  
unsaturated fats  
blood-cholesterol levels  
fat-soluble vitamins  
intake  
lipids  
Omega-6 and Omega-3  
cholesterol  
cholesterol buildup  
blood cholesterol levels  
arteriosclerosis  
lipoproteins  
high-density lipoprotein (HDL) cholesterol  
low-density lipoprotein (LDL) cholesterol  
at-risk groups  
coronary heart disease

#### Unit 10 Energy

resting energy  
kilojoules (kJ)  
calories  
the consumption of foods  
the preferred source of energy  
metabolic rate  
the basal metabolic rate (BMR)  
basal metabolism  
kilojoules  
adipose tissue  
obesity  
food intake

#### Unit 11 Digestion

enzymes  
mastication  
saliva



## Topic Specific Vocabulary

the oesophagus  
peristalsis  
pepsin  
rennin  
chyme  
the duodenum  
the duodenum  
the pancreatic juice  
villi  
glycogen  
the liquid residue  
the colon  
the rectum  
the anus

### Unit 12 What Is Available To Eat?

traditional foods  
imported food  
retail food outlets

### Unit 13 Making Sense Of The Food Label

an informed consumer  
an allergy to . . .  
an intolerance to . . .  
additive intolerance  
gluten  
Coeliac's disease  
cholesterol

### Unit 14 Packaging Food

the package  
active packaging  
environmentally friendly packaging  
recyclable packaging  
recycling

### Unit 15 Decoding Food Labels

lite or light  
unsaturated vegetable oils  
a hydrogenated vegetable oil  
reduced fat foods  
a nutrition information panel  
a complex carbohydrate  
a simple carbohydrate  
MSG  
artificial colours or flavours  
preservatives  
pasteurization  
vacuum sealing

### Unit 16 Becoming Familiar With Food Prices

convenience foods  
informed decisions  
budgeting for food  
processed foods

### Unit 18 Why Is Sound Nutrition So Important?

food consumption patterns  
economic and social systems

### Unit 19 Support For The Sāmaon National Plan Of Action For Nutrition

diabetes hypertension  
obesity  
a marked increase  
infectious diseases  
a lifestyle disease  
balanced meals  
enablers  
barriers  
food security  
micronutrient deficiencies  
the dietary guidelines  
a mobile dental clinic

dental therapists and dentists  
dietary guidelines  
breast milk substitutes  
to trace people  
nutritionally vulnerable  
nutritionally at-risk groups  
family planning  
supplementary feeding  
malnourished children

### Unit 20 Meeting Soifua Mālōlōina Problems With Different Family Members

a pregnant woman  
mood changes  
the absorption of iron  
nicotine and carbon monoxide  
harmful substances  
expectant mother  
miscarriage  
prematurity  
foetal alcohol syndrome  
acute  
illegal drugs  
toxoplasmosis

### Unit 21 Food For Infants And Toddlers

constipated  
formula milk  
digestive system  
solids  
haem iron  
non-haem iron  
iron deficiency  
intolerance to some foods  
the formation of red blood cells  
the health and protective group  
the energy group  
the body-building group

### Unit 22 Vegetarian Eating

a vegetarian diet  
to develop deficiency  
anaemia  
amino acids  
lysine  
methionine  
the complementary protein principle

### Part 2 Career Opportunities

a nanny  
the hospitality area  
social work  
nursing  
dietetics  
a counselor  
catering  
hospitality

### Unit 23 Responsibilities When Working In The Customer Service Industry

complaints  
service providers  
customer care skills  
attitude  
professional  
body language  
personal space  
team work  
job satisfaction  
standards of performance  
a sense of identity





## Useful Structures

### Giving advice and warning

- The use of these foods should be limited.
- Beware of hidden sugar in manufactured foods.
- We should aim to eat 30 g of fibre a day.
- Vegetarians need to be aware of the need for protein in the diet.
- Reduce energy-dense foods for those with abdominal obesity ('pot-belly' fatness).

### Expressing possible effect

- Soluble fibre may assist the absorption of nutrients.
- A low intake of dietary fibre may lead to an increased risk of bowel cancer and coronary heart disease.
- It appears that a high-fibre, low-fat diet may reduce the risk of bowel cancer.
- It is possible that fibre binds some fats preventing their absorption into the bloodstream, lessening the risk of heart disease.
- Fibre-rich foods can help prevent obesity when used in conjunction with regular physical activity.

### Ways of listing

- Symptoms include a high temperature, vomiting, diarrhoea, headache and abdominal pain.
- Symptoms of a food allergy can be quite mild, with a slight skin rash, to as serious as the heart racing, swelling of the mouth and throat and eventually an inability to breathe.
- This step consists of identifying . . .

### Ways of expressing cause

- Often the cause is poor standards of equipment or lack of facilities.

### Ways of expressing contrast

- Unlike other micro-organisms, moulds are not harmful.

### Ways of expressing obligation and necessity

- Fresh is a term that should only be applied to foods which have not been preserved.
- The major concern has been that the packaging material should not contaminate the food.
- Manufacturers should abide by the voluntary Code of Practice.
- Families of malnourished children should also receive dietary counselling.
- This energy should come largely from the increased amounts of complex carbohydrates and not from high fat and sugar foods.
- It is essential that everyone . . .
- This type of help is essential.
- The vitamin B group is essential in the release of energy from food.
- The cause of the problem must be addressed.

### Ways of expressing degree

- The range of food products has increased considerably over recent . . .
- A considerable length of time.

### Ways of giving strong advice

- Avoid too much high-fibre food like certain breads and some breakfast cereals. High-fibre foods may cause diarrhoea.

### Ways of expressing changing patterns

- Lower blood pressure.
- Lower levels of the 'bad' cholesterol.
- Less risk of heart disease.
- Less body weight to carry.
- Lower risk of type-2 diabetes.



