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MATERIAL**

**LEVEL 1/2
TECHNICAL
AWARD**

FOOD AND COOKERY

Helen Buckland

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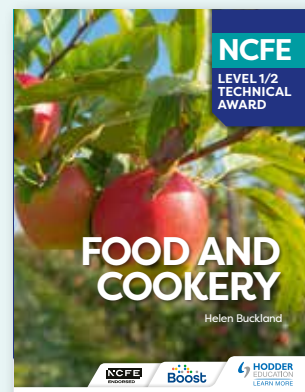
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Helen Buckland

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Published by Hodder Education. ISBN 978 1 3983 7658 8

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INTRODUCTION

This sample chapter introduces the Student Book for the NCFE Level 1/2 Technical Award in Food and Cookery for first teaching from September 2022.

Approach

The Student Book has been designed to help your students develop the knowledge, understanding and practical skills they will need to complete the NCFE Level 1/2 Technical Award in Food and Cookery.

The book provides complete coverage of the specification's content areas and assessment objectives. As well as preparing your students for the final exam and non-exam assessment, the book will introduce them to food, nutrition, the cooking environment and the wider food industry: all elements of the book and its design support this, to engage and inspire students and encourage them to make immediate connections to their ambitions and career goals.

Your students will learn about a wide range of themes relating to food and cookery, including health and safety relating to food, nutrition and the cooking environment, and legislation relevant to the food industry. They will learn about food provenance, the main food groups, key nutrients and what is needed as part of a balanced diet. The book will help them to understand factors that affect food choice. It will introduce them to the concept of recipe development and how recipes can be adapted, including to cater for people with specific dietary requirements. Students will develop their ability to evaluate their dishes and make suggestions for improvement and will develop a wide range of practical food preparation and cooking skills and techniques.

The book has been written and developed to be accessible to the typical Level 1/Level 2 learner. This is reflected in the style and approach of the text and learning features and based on the author's extensive teaching knowledge and experience. It includes simple, clearly explained and purposeful learning features and clear and concise content. The chapters and section headings all follow the structure of the specification. 'Key terms' boxes appear in the page margins to define important terms and phrases; these are compiled in a glossary at the back of the book for easy reference. Accessibility has also been considered when finalising the book's page design, which includes numerous artworks and photos that provide a visual reference for the key concepts covered in the text.

The book is both student-focused (appropriate/accessible language, engaging examples, activities and assessment practice features that complement and enhance the learning sequence) and teacher-focused (a style and approach that is easy to use and works in the classroom with a range of students and for teachers of various levels of experience and confidence).

Assessment

The book is designed to facilitate your formative and summative assessment using a range of assessment features:

- **Test your knowledge:** Quick and formative knowledge-recall questions throughout the book to check student understanding.
- **Practice questions:** Summative practice questions will allow students to test their knowledge and understanding at the end of each chapter in preparation for the written exam.
- **Assignment practice:** Summative assessment questions will allow students to apply the skills and knowledge they have learned in the unit to support their preparation for the non-examined assessment.

These assessment features are showcased in this sample chapter.

All assessment features will be accompanied by answers or a mark scheme. These will be available on the Hodder Education website, to give you the flexibility in how and when to use them with your students.

Summary of assessment

The table below summarises how students will be assessed for NCFE Level 1/2 Technical Award in Food and Cookery.

Assessment	Time	% of qualification
Written examination	1 hour 30 minutes	40%
Synoptic project	16 hours 30 minutes	60%

HOW TO USE THIS BOOK

This book is designed to help you develop the knowledge, understanding and practical skills you will need during the NCFE Level 1/2 Technical Award in Food and Cookery qualification.

A range of different features appear throughout this book to support your learning.

About this content area



A brief introduction to the topic, so that students know exactly what is covered.

Getting started

A short activity to get students thinking about the topic area being covered.

Key terms



Definitions for important terminology are included throughout.

Activities



Short tasks to help develop understanding. These include individual, group and research tasks.

Extend



Activities designed to increase depth of knowledge and understanding of the topic.

Case studies

Examples of how different concepts can be applied to the food and cooking environment.

Remember



A bullet-list summary of the key points appears at the end of each topic to help students remember the most important aspects and to help with revision.

Test your knowledge

Questions to test knowledge and understanding of the content.

Read about it



References to books, websites and other sources of useful information for further reading and research.

Practice questions

Includes practice questions to help prepare for the exam.

Assignment practice

Helps to prepare students for the non-examined assessment.

1

Health and safety relating to food, nutrition and the cooking environment

About this content area



In order to ensure your food and cookery practice is as safe and hygienic as possible you need to understand how important it is to follow the current food safety legislation guidelines. This will make sure that your customers and those people who eat your food are protected from harm, and that you and your fellow workers are as safe as possible when you are working in a food-based environment.

In this chapter, you will be:

- 1.1** given information about safe and hygienic practices when working in a cooking environment, including how to prepare yourself and your cooking environment to remain safe and hygienic
- 1.2** shown how to identify potential hazards and be able to minimise the risk
- 1.3** shown how catering establishments use a system called HACCP to maintain the correct hygiene and safety standards
- 1.4** taught how to minimise the risk in the cooking environment
- 1.5** introduced to safe and hygienic working practices when using kitchen equipment and utensils.

Getting started

Imagine that you are employed to work in a kitchen. The safety of the work force, and the need to ensure that the customers do not receive contaminated food or become ill from food poisoning, are essential to ensure that the business is successful.

List 10 things that could happen to the food while it is being prepared that can be avoided if you work safely and hygienically.

1.1 Safe and hygienic working practices relating to self and the cooking environment

When food is being prepared, care needs to be taken to avoid introducing any **contamination** that will make the person eating the food unwell, or spoil the food.

There are food hygiene regulations that have to be followed to ensure that food is safe to eat and there are no outbreaks of **food poisoning**. These apply to catering establishments, hotels, guest houses and food production factories, and cover the food premises, the personal hygiene of employees

Key terms



Contamination: the presence of any unwanted foreign body in food that can cause illness or harm.

Food poisoning: illness caused by bacteria or other toxins in food.

and hygienic practices when preparing food. This means that the *person* preparing the food needs to be as safe and hygienic as possible; and the *environment* in which the food is prepared must also be safe and hygienic.

Following these guidelines will mean that anyone who prepares food is doing so in a safe and hygienic manner, ensuring that if someone is working in a kitchen, the food they are preparing is safe to eat.

Key terms



Personal hygiene:

preparing yourself to be as hygienic as possible to minimise the chance of food contamination.

Cross-contamination:

when bacteria are transferred from one source to another by contact, incorrect hand washing, incorrect cleaning of utensils or equipment, or during incorrect storage of foods.

Safe and hygienic working practices for yourself

A person preparing food needs to have high standards of **personal hygiene** and cleanliness. Good personal hygiene will minimise the risk of any contamination entering food. Good personal hygiene means that you ensure that germs found in or on the body do not transfer onto the food that is being prepared.

It is important to apply these hygiene standards to people when producing food:

- in a home environment
- in a school or college
- in a catering kitchen.

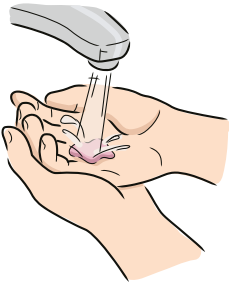
All food handlers should:

- wear the correct clothing: either chef's whites or a clean apron, to protect clothing from contaminating food
- tie long hair back and/or wear a chef's hat and cover beards with a beard net to prevent loose hair dropping into food
- have short, clean nails to prevent dirt collecting under them, which could fall into the food or contaminate it
- cover any cuts, sores or boils with a blue, waterproof plaster to prevent bacteria from cuts entering the food, and so that if the plaster falls into the food it is easily spotted
- be in good health with no stomach upsets
- wear flat, non-slip footwear to prevent slipping or tripping
- wear discreet make-up, and no heavy perfume or aftershave that could flavour the food
- have a daily shower or bath.
- wash their hands with hot soapy water and dry hands thoroughly with a paper towel:
 - before starting to cook, to remove any harmful bacteria from their hands (the hot soapy water will help destroy bacteria)
 - after preparing raw meat or vegetables, to prevent **cross-contamination** of bacteria from raw meat and vegetables to cooked products
 - after going to the toilet, blowing their nose, smoking, vaping or handling waste, to prevent cross-contamination, as all of these actions will transfer bacteria to their hands.



Figure 1.1 Cuts, grazes and boils need to be covered with a blue plaster

The correct hand washing technique is shown in Figure 1.2.



Step 1: Wet your hands thoroughly under warm running water and squirt liquid soap onto your palm.



Step 2: Rub your hands together, palm to palm, to make a lather.



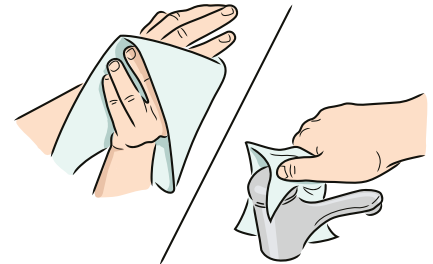
Step 3: Rub the palm of one hand along the back of the other and along the fingers. Repeat with the other hand.



Step 4: Put your palms together, with fingers interlocked, and rub in between each of the fingers thoroughly.



Step 5: Rub around your thumbs on each hand, and then rub the fingertips of each hand against your palms.



Step 6: Rinse off the soap with clean water and dry your hands thoroughly on a disposable towel. Turn off the tap with the towel and then throw the towel away.

Figure 1.2 Correct hand washing technique

Food handlers should NOT:

- wear outdoor clothing in the kitchen, as the clothing will carry harmful bacteria, which can be transferred onto food and work surfaces. Kitchen clothing should not be worn outside of the kitchen, so food handlers should change in a designated area before they enter the kitchen
- wear nail varnish, false nails or jewellery (apart from a plain wedding ring), as these can contaminate food
- have facial piercings (or if they do, they should cover them up with a blue plaster)
- work with food if they are suffering from stomach upsets, diarrhoea or sickness, because they could transfer harmful bacteria to food from their hands, particularly after they have been to the toilet. They should stay out of the kitchen for at least 48 hours after the symptoms have finished
- cough or sneeze over food, as the bacteria in the nose and mouth can cause food poisoning if they are transferred to food or work surfaces
- smoke, eat or drink around food.



Figure 1.3 Do not sneeze over food, as you will transfer bacteria onto the food

Test your knowledge

- 1 Why do you think that the plasters used in the kitchen need to be blue?
- 2 Why should someone suffering from a stomach upset not work with food?
- 3 List two reasons why it is important to wash your hands after preparing raw meat.

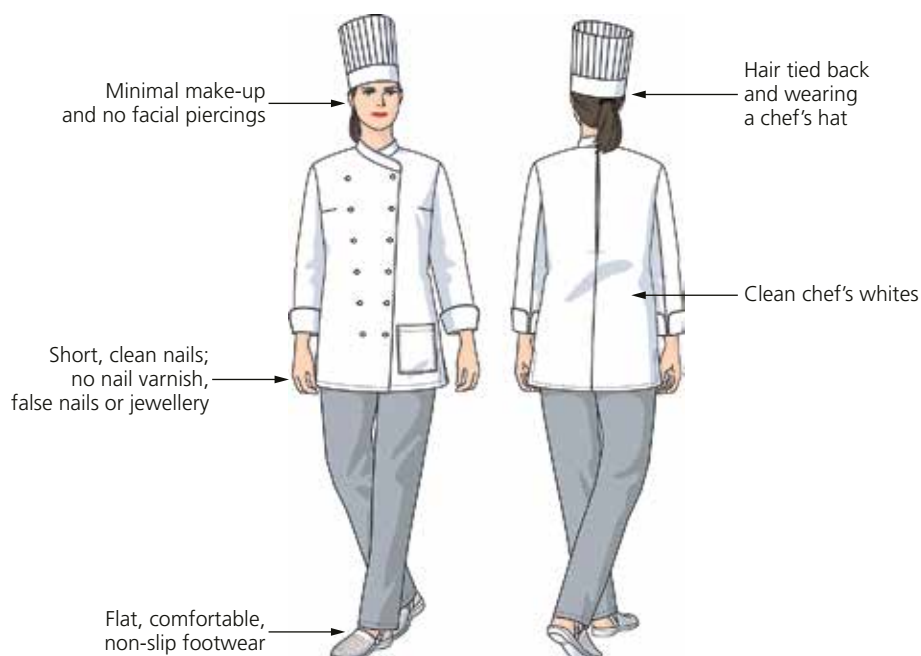


Figure 1.4 A correctly attired chef

Safe and hygienic working practices for the cooking environment

Good kitchen hygiene means that kitchens are clean and well organised. This reduces the risks of contamination of food.

Before you begin cooking, you should check:

- the work surface you are using is clean, and the work surface is wiped down with a **sanitiser**
- the equipment and utensils are clean. If not, they need to be washed in hot, soapy water that is above 60°C, to kill bacteria
- the floor for any spillages that could cause a slip hazard, and clean up any spills immediately
- all electrical equipment you are using is safe, with no trailing leads that could fall into water.



Figure 1.5 Your kitchen and working area needs to be clean before you start cooking

Key term



Sanitiser: a type of cleaning product that kills or inactivates 99 per cent of all bacteria, fungi and viruses present on a surface.

Test your knowledge

- 1 List three things you should do before you begin cooking to make sure that you are safe and hygienic.
- 2 Explain why a food handler should not wear false nails while preparing food.
- 3 Why should you take care to ensure electrical leads do not trail in water?
- 4 Explain why kitchen floors should be cleaned regularly.

Remember

- Safety and hygiene are very important during food preparation to prevent the transfer of food poisoning bacteria that can cause severe illness.
- Preparing yourself to be hygienic involves correct hand washing, wearing clean clothes, tying long hair back, and wearing no jewellery, make-up or nail varnish.
- Preparing the cooking environment means using the correct cleaning procedures, checking equipment and utensils, preventing cross-contamination and using food that is fresh and uncontaminated.

Activity

Produce a booklet, leaflet or poster for a catering establishment to give to a new catering assistant, outlining how someone needs to prepare themselves to be hygienic and safe before they start cooking.

1.2 Potential risks and hazards in the cooking environment

Risks

A **risk** is an opportunity for the food you are preparing to become contaminated by something you are doing or have not put in preventative measures to stop happening. You have a duty when you are preparing food to make sure all the potential risks are reduced to a minimum.

A **hazard** is something that is dangerous and can make things (the food or environment) unfit or unsafe.

One of the hazards during cooking is **food contamination**. Food contamination refers to the presence of any unwanted foreign body in food that can cause illness or harm.

There are different types of contamination.

Physical contamination

Physical contamination of food is when something that can be seen visibly falls into food. Physical contamination can occur from the sources shown in Table 1.1.

Key terms

Food contamination: the presence of any unwanted foreign body in food that can cause illness or harm.

Physical contamination: when something that can be seen visibly falls into food.

Table 1.1 Sources of physical contamination

Source	Examples	
People	Items from clothing, e.g. buttons Hair and fingernails Plasters	Items from pockets, e.g. coins Jewellery
Equipment and machinery	Glass Wood Screws, nuts and bolts	Metal Plastic
Premises	Dirt and waste Plaster or brick Broken tiles	Flakes of paint Broken glass
Packaging materials	String Cardboard Glass	Polythene Plastic



Figure 1.6 Ensure you dispose of waste appropriately

To reduce the possibility of physical contamination you should:

- always ensure you are safe and hygienic when cooking
- always ensure your environment is safe and hygienic
- check and maintain all equipment and utensils regularly
- safely dispose of all packaging and waste food before you begin cooking.

Chemical contamination

Chemicals are used in food businesses to clean and maintain equipment, utensils and the cooking environment.

Food may become contaminated by chemicals if:

- cleaning chemicals are not used correctly, or the wrong chemicals are used. Always follow instructions as to how chemicals should be mixed or diluted. Failure to rinse equipment and utensils properly can leave a residue of chemicals. Kitchen areas will display safety data sheets with information on chemicals, how they are to be used and how to deal with spillages and accidents
- you need to oil or grease machinery or equipment. You should use 'food-safe' oil or grease and follow the manufacturer's instructions
- fridges and cookers are not maintained properly, as some metals, such as zinc and cadmium, used in the construction of kitchen equipment, could come into contact with food
- acidic foods react with the coating inside a tin can, breaking it down and causing it to be absorbed in the food. Once you have opened a can, you should store any unused food in a sealed plastic container, not in the can
- fly sprays, insect control chemicals, or pest control products are not used correctly.

When using chemicals, care must be taken to follow the manufacturer's instructions. This applies to chemicals that you use in the kitchen, such as cleaning fluids. There will be **Control of Substances Hazardous to Health** (COSHH) information available for all cleaning products.

Key term

Chemical contamination: when chemicals such as cleaning chemicals or pest control products get into food.

An example is using a degreaser for a deep fat fryer in a hotel kitchen. The degreaser may:

- harm skin, so gloves must be provided for the person using the degreaser
- release harmful fumes, so the area must be well ventilated
- be splashed onto clothing, so overalls must be worn. The overalls are then washed in the workplace and not taken home
- dry out skin, so hand cream should be provided for the user to replace any natural oils that are lost from the skin.

To reduce the possibility of chemical contamination happening you should:

- always store cleaning chemicals away from food
- never store cleaning chemicals in food containers
- never use food containers for cleaning jobs, for example mixing bowls rather than buckets
- train staff to use chemical cleaners according to the manufacturer's instructions
- ensure the correct quantity of cleaning chemical is used, because excess may be difficult to rinse away
- never clean near open food; cover all food and put it away before you begin to clean
- choose cleaning products that are 'food-safe', which means they are non-toxic, non-tainting, usually non-perfumed and non-corrosive, so they will not react with materials used for food equipment
- never use spray pesticides such as fly spray
- contact a pest control specialist to deal with any infestation of insects, rats or mice.

Biological contamination

Biological contamination is when **bacteria** or **toxins** contaminate food. When this occurs it can either cause food spoilage (see pages 17–18) or food poisoning.

There are many different types of bacteria. All of them have different shapes. If they are in the correct conditions, they will grow rapidly and produce toxins, which can be very harmful to humans, causing food poisoning.

There are many reasons why food poisoning occurs, including:

- poor hygienic practices, including incorrect handling of food and cleaning of food preparation areas
- incorrect temperature control when storing, reheating or keeping food hot
- incorrect preparation of food
- reheating pre-prepared ready meals at home for the wrong or insufficient times.

Food poisoning bacteria rarely change the smell, appearance or taste of food, so it is impossible to know if food has been contaminated.



Figure 1.7 Always use 'food-safe' chemicals for cleaning

Key terms

Biological contamination: when bacteria or toxins contaminate food.

Bacteria: extremely small, single-celled organisms that can only be seen under a microscope. Bacteria are found everywhere, in air, water and on food, humans and animals. Bacteria are able to divide and multiply very quickly if they have food, water, oxygen and warmth.

Toxins: poisons that can cause illness.

There are different types of pathogenic bacteria that will cause different food poisoning symptoms. Table 1.2 shows the main types of food poisoning bacteria, the symptoms, food sources and where the bacteria are found, and measures that can be taken to prevent contamination.

Table 1.2 Food poisoning bacteria

Food poisoning bacteria	Symptoms	Which foods contain this bacteria	Where it is found	How to prevent contamination
Salmonella	Nausea, vomiting, fever, diarrhoea, headache and abdominal pain Elderly people and very young children can become extremely ill and can die from <i>Salmonella</i> poisoning	Chicken, poultry, some dairy foods and raw or undercooked eggs	Dirty water, raw foods, transferred from people or pests	■ Wash hands before and after handling raw meat. ■ Never wash raw chicken, as this will spread bacteria. ■ Store raw meat at the bottom of the fridge. ■ Cook meat and eggs thoroughly. ■ Wash all fruit and vegetables thoroughly before use.
E. coli	Severe abdominal cramps, fever, fatigue, bloody or watery diarrhoea, nausea and vomiting	Raw meat, cooked meat and gravy or other meat products, unpasteurised cheeses and juices, raw fish and oysters	Raw meat that has become contaminated, waste from animal intestines, dirty water and human waste	■ Wash hands before and after handling raw meat. ■ Never wash raw chicken, as this will spread bacteria. ■ Store raw meat at the bottom of the fridge. ■ Cook meat thoroughly. ■ Correctly store cooked meat, cheeses, raw fish and oysters and check packaging and sell-by dates. ■ Never reheat gravy more than once.



Food poisoning bacteria	Symptoms	Which foods contain this bacteria	Where it is found	How to prevent contamination
<i>Staphylococcus</i>	Diarrhoea, vomiting, can cause people to collapse	Egg products, milk, cream, cooked meat and meat products, chicken, salads containing chicken, tuna and egg	On people in the nose, on the skin, in the mouth, on the hair From cuts, burns, scratches and skin infections From raw, untreated milk	■ Wash hands before and after handling raw and cooked meat. ■ Cover or tie back hair, do not sneeze over food and wash hands after blowing your nose. ■ Cover all cuts and scratches with blue plasters. ■ Store cooked foods correctly: cover and place in the fridge.
<i>Bacillus cereus</i>	Nausea, vomiting and diarrhoea	Beef, chicken, beans, rice, cheese, pasta	Transferred from people by poor hygiene practices Found in incorrectly stored or prepared food in warm temperatures Also found in undercooked food	■ Wash hands before and after handling raw and cooked meats. ■ Cook meat thoroughly. ■ Correctly store all foods at the correct temperature. ■ Wash all vegetables thoroughly before use.
<i>Campylobacter</i>	Nausea, vomiting, diarrhoea, sometimes bloody, stomach cramps, high fever	Chicken and other raw meats	Cross-contamination from raw chicken or other raw meats	■ Store meat correctly at the bottom of the fridge. ■ Do not wash raw chicken as this can spread the bacteria. ■ Cook chicken and other meats thoroughly so no pink meat is seen. ■ Wash hands thoroughly after dealing with raw chicken.

Key term

High-risk foods: foods that have the ideal conditions for bacterial growth.



High-risk foods

Bacteria grow quickly on **high-risk foods**. These are foods that have the ideal conditions for bacterial growth, and are often high in protein and moisture.

The main high-risk foods are:

- meat and meat products: any fresh or frozen meats and any products that contain meat
- fish: all fish and any products that contain fish
- rice is a particular risk for food poisoning. Rice should never be reheated more than once after cooking as it will encourage bacterial growth
- dairy foods: any foods made with dairy products are a high risk
- eggs: products made with eggs are an ideal environment for bacterial growth. This includes products such as mayonnaise and quiches, which are often used for buffets, and are left out for a length of time.

Conditions for bacterial growth

Bacteria need the following to multiply:

- **Food:** bacteria need nutrients to grow. The best food for bacteria to reproduce is high-risk food that contains protein and moisture.
- **Warmth:** bacteria like warm temperatures. The optimum temperature for bacterial growth is 37°C, which is human body temperature. The temperature span between 5°C and 63°C is known as the Danger Zone. This is the temperature at which bacteria grow the fastest.
- **Moisture:** bacteria need moisture to be able to reproduce. Liquid foods such as gravy provide a perfect environment for bacteria to multiply. Bacteria cannot reproduce without moisture, so dried food is safe.
- **Time:** bacteria need time to reproduce. They divide and then multiply every 10 to 20 minutes. This means that one bacterial cell can multiply to millions in 24 hours.

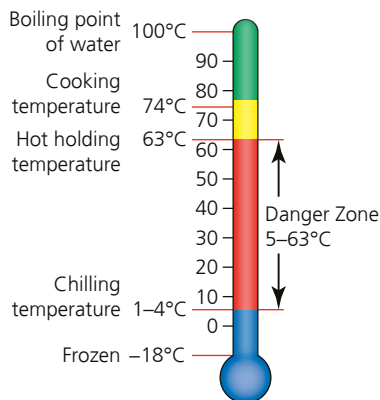


Figure 1.8 Bacteria multiply quickly when in the Danger Zone

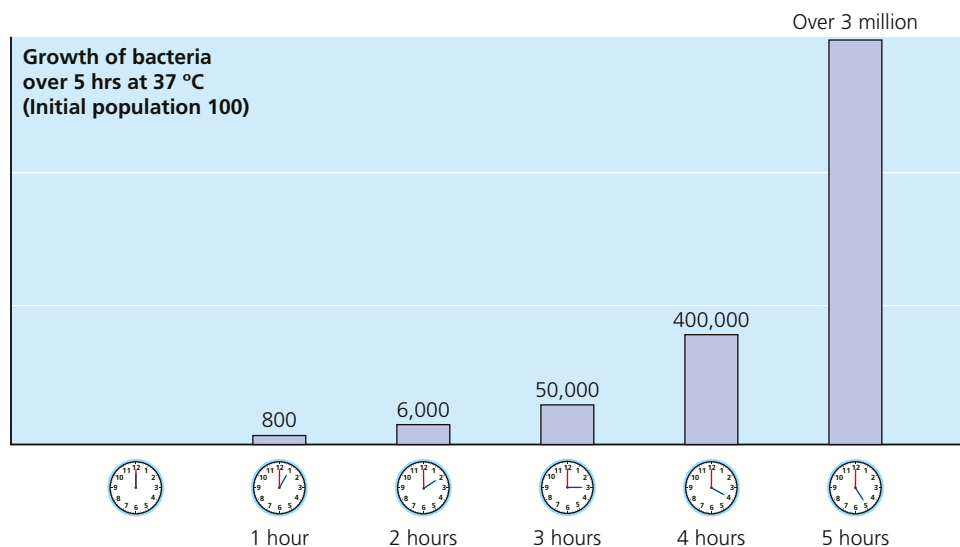


Figure 1.9 Growth of bacteria at 37°C

If you take away one of the conditions that bacteria need to grow, you can slow down or prevent the bacteria reproducing.

How to prevent and control bacteria production:

- Store food in a refrigerator that is kept at the correct temperature of between 0°C and 5°C.
- Food that has been cooked to eat later, or that is left over from a meal, should be rapidly cooled to 0–5°C to prevent harmful bacteria from being active, as they love warm, moist conditions. The food should be cooled within 90 minutes and placed in the refrigerator.
- Left-over foods should be eaten within 24 hours, and must only be reheated once. Reheating activates the bacteria and causes them to multiply.
- Bacteria can be destroyed, or prevented from multiplying, by the use of a strong acid, such as vinegar, or a high amount of sugar or salt.

How to reduce the possibility of food poisoning

The easiest way to remember how to control the risk of food poisoning bacteria is by following the rules of the **4Cs**:

- **Chill:**
 - Cool left-over food quickly, cover and place in the fridge; use up within 24 hours. Never put hot food into the fridge.
 - Keep the fridge at the correct temperature of between 0°C and 5°C.
- **Cook:**
 - As all raw meat carries bacteria on the surface and inside, meat must be cooked to a temperature of 75°C to kill the bacteria.
 - Use a meat thermometer or temperature probe to check the temperature has been reached in the middle of the meat, or meat product such as a pie.
- **Clean:**
 - Wash hands before starting to cook, after handling raw ingredients, after going to the toilet, blowing your nose, smoking or vaping, or handling food waste.
 - Keep work surfaces clean.
 - Wash and store equipment and utensils correctly.
 - Keep dishcloths and oven cloths clean.
- **Cross-contamination:** bacteria can be spread from one food to another by poor hygiene. Minimise the risks by:
 - washing hands before starting cooking, after handling raw ingredients, after going to the toilet, blowing your nose, smoking or vaping, or handling food waste
 - disposing of all food waste and food packaging before you begin cooking
 - using colour-coded equipment
 - washing, drying and storing all equipment and utensils correctly.

Key term

The 4Cs: the easy way to remember how to prevent food poisoning bacteria being introduced into food: chill, cook, clean, cross-contamination.

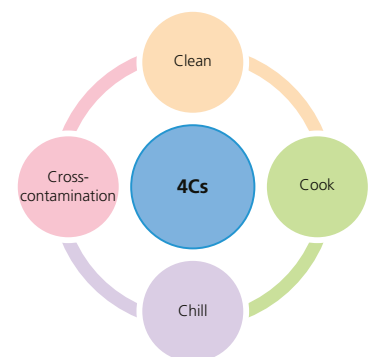


Figure 1.10 Follow the 4Cs to reduce the chance of food poisoning bacteria being introduced into food

Food spoilage

Test your knowledge

- 1 What conditions are needed for yeasts, moulds and bacteria to grow and reproduce?
- 2 Why is it important not to eat food that has mould growing on its surface?

Food spoilage can occur quickly if the food is:

- not stored correctly
- contaminated by poor handling during transportation
- contaminated by poor hygiene during food preparation.

There are many signs of food spoilage. These include:

- areas of mould on the food
- a sour smell or taste
- the food feels slimy on the surface
- the food looks dry on the surface and is wrinkled and discoloured
- the food can look over wet or over dry.

Food spoilage can be caused by **micro-organisms**. Table 1.3 shows the main micro-organisms that will cause food spoilage, conditions for their growth and how to prevent them.

Table 1.3 Micro-organisms that cause food spoilage

Micro-organism	Description	Conditions for growth	How to prevent and control growth
Bacteria	Extremely small organisms that can only be seen under a microscope. Found everywhere, including in the air, in soil, on skin, in food, in water, on animals and on humans. Bacteria can reproduce very quickly, dividing in two every 20 minutes, so after 24 hours there can be millions of bacteria. They grow particularly quickly on high-risk foods. Bacteria produce toxins, which can be very harmful to humans, causing food poisoning.	■ A food supply ■ Moisture ■ A suitable temperature: 37°C is best but bacteria will grow in a temperature range of 5°C to 63°C	■ Store food in a refrigerator that is kept at the correct temperature of between 0°C and 5°C. ■ Food that has been cooked to eat later, or that is left over from a meal, should be rapidly cooled to 0°C to 5°C to prevent harmful bacteria from being active as they love warm, moist conditions. The food should be cooled within 90 minutes and placed in the refrigerator. ■ Left-over foods should be eaten within 24 hours, and must only be reheated once. Reheating activates the bacteria and causes them to multiply. ■ Bacteria can be destroyed or prevented from multiplying by the use of a strong acid, such as vinegar, or a high amount of sugar or salt.
Moulds	A type of fungi. Can be black or blue/green in colour. Moulds reproduce by producing spores that travel through the air and land on food, then grow in the correct conditions.	■ Warmth ■ Moist conditions (room temperature is ideal) ■ A food supply	■ Store suitable foods in a chilled place, such as a refrigerator. ■ Foods that do not need refrigerating should be stored in a cool, dry place. ■ Heat food to a very high temperature (e.g. above 100°C) to prevent the production of heat-resistant spores. ■ Store foods, if suitable, in highly acidic conditions.



Micro-organism	Description	Conditions for growth	How to prevent and control growth
Yeasts	One-celled organisms which are from the fungi group. Found in the soil, the air and on the skins of some fruits. Yeasts reproduce by budding, which means splitting from one cell into two.	■ Warmth ■ Water/moist conditions ■ A food supply (e.g. sugar) ■ Time to be able to reproduce	Keep high-sugar foods, such as jam, in a refrigerator once they have been opened.

Cross-contamination

One of the main ways that bacterial contamination occurs is when the bacteria are transferred from one place to another. This is called cross-contamination.

Cross-contamination is one of the 4Cs (see page 17).

Bacteria can be transferred from one place to another by:

■ Wearing dirty clothing

What to do instead:

- Good hygienic practice means you do not wear your work clothing outside your work area. Instead you should change from your outdoor clothing into your work uniform in a designated safe area.
- Your outdoor clothing should then be stored in a locker in a separate room. You should wash your hands as soon as you enter the work area, before you begin to work with food or equipment.
- All dirty work clothing should be washed at high temperatures to kill any bacteria.

■ Using the same utensils and equipment for raw and cooked food

What to do instead:

- All equipment should be thoroughly washed after preparing raw food.
- Work surfaces should be cleaned down.
- Separate, colour-coded chopping boards should be used for raw and cooked food preparation.

■ Poor personal hygiene

What to do instead:

- Follow all the rules regarding strict personal hygiene listed in Section 1.1 to minimise the risk of cross-contamination.

■ Correct control of waste products

What to do instead:

- Follow the rules on safe disposal of waste products to minimise this risk (see Section 1.4).

Test your knowledge

- 1 Give **three** examples of physical contamination and state how they can be prevented.
- 2 List **two** signs of food spoilage.
- 3 What are the **three** main food spoilage micro-organisms?
- 4 Identify **one** of the main types of food poisoning bacteria, list the symptoms, and where it is found.

Remember

- Bacteria produce toxins that can cause food poisoning. Foods must be stored correctly to prevent bacterial growth.
- Food that is contaminated by bacteria can look, taste and smell perfectly normal.
- Food poisoning bacteria will cause illness that can be fatal.
- By following the 4Cs, you can reduce the possibility of introducing food poisoning bacteria into the food you are preparing.
- Using the correct colour-coded equipment and utensils will reduce the possibility of cross-contamination.
- Correct and regular hand-washing procedures will ensure the correct personal hygiene and prevent cross-contamination.
- Yeasts, moulds and bacteria all need certain conditions to grow or reproduce: food, warmth, moisture, time and sometimes oxygen.
- Yeasts require liquid, warmth, food and time to reproduce. They can cause unwanted fermentation in sugary foods.
- Mould growth can be seen on the surface of foods. Foods that have moulds should not be eaten.

Case study

Work in a group. Read the following article and then answer the questions that follow.

Using your answers from the questions, prepare a short presentation explaining what has happened and how you would prevent this happening again in the shop.

Salmonella outbreak linked to local butcher's shop

Two people have become seriously ill and 30 others have been infected by *Salmonella* in the local area.

Investigations have found the outbreak was linked to infected pork which had been bought from a local butcher's shop. Local environmental health inspectors found that cooked pork products, including pork pies and sausage rolls, from the

shop contained the same strain of the *Salmonella* bug found in those people who were unwell.

The shop was investigated, and several problems were found in the way that both personal hygiene and cleaning routines were carried out at the shop.

The shop has been shut temporarily while further investigations are carried out.

- 1 List **four** ways that the cooked pork could have become infected by poor personal hygiene.
- 2 List **three** ways that poor hygienic practice during preparation of the pork pies and sausage rolls could have caused the infection.
- 3 Explain how this infection could have been prevented and what procedures you would put in place to make sure this does not happen again.

Safe temperature control of foods

Table 1.6 shows an HACCP that identifies the correct temperatures for storing, cooking, cooling and holding foods to minimise bacterial growth. The Danger Zone for bacterial growth is between 5°C and 63°C. Food must be kept out of these temperatures as much as possible.

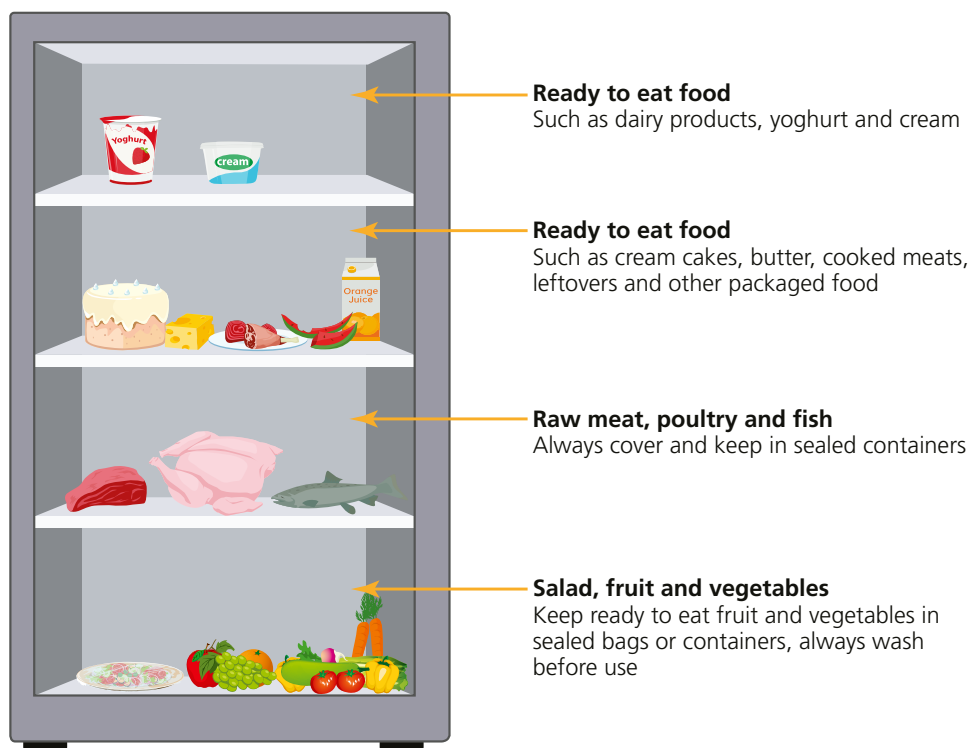
Temperature probes can be used to check that the temperature in the centre of cooked food reaches a minimum of 75°C for at least two minutes. This will ensure the food is safe to eat. They can also be used when reheating foods.

Key term

Temperature probe: device used to check the temperature in the centre of cooked food.

Table 1.4 Safe temperature control when storing, serving and reheating food

Storage	- Fridges should be kept between 0°C and 5°C. - Freezers should be kept below -18°C. - Use the 4Cs during food preparation (see section 1.2). - All foods should be stored on the correct shelves in the fridge (see Figure 1.15).
Serving	- The Food Standards Agency states that legally food that is on display for sale, which has been cooked or reheated and needs to be kept hot, must be kept at a temperature at or above 63°C for a maximum of two hours. - The food should then be quickly chilled to below 8°C before storing in a fridge or freezer. Chilled food should be kept at below 8°C while being served.
Reheating	- Food should only be reheated once. This is because every time it is reheated, bacteria grow and increase in numbers. - Food should be reheated to above 82°C for at least two minutes. - It can then be stored at 63°C, as above.



Activity

Visit your school kitchen and check the fridges. Can you see how the correct storage system is in use?

Figure 1.11 Correct storage of foods in the fridge

Practice questions

- 1 Which of the following is a cause of cross-contamination? [1 mark]
 - a Allowing an electrical lead to trail across a sink.
 - b Not washing your hands after going to the toilet.
 - c Wearing a facial piercing to work.
 - d Wearing high heels in the kitchen.
- 2 Which **one** of the following is the *minimum* temperature which you must wash equipment and utensils at in order to kill bacteria? [1 mark]
 - a 40°
 - b 60°
 - c 80°
 - d Above 90°
- 3 Which **one** of the following is an example of physical contamination? [1 mark]
 - a Something that can be seen visibly falls into food.
 - b Bacteria are transferred from a dirty cloth onto a work surface.
 - c Chemicals are used incorrectly during cleaning.
 - d Food is incorrectly reheated.
- 4 Which **one** of the following is an example of chemical contamination? [1 mark]
 - a A plaster is used to cover a cut and then falls into the food.
 - b A worker does not wash their hands after touching raw meat and then prepares cooked meat.
 - c The incorrect chemical is used to wash a piece of equipment.
 - d Rat droppings are found in a storage cupboard near to stored food.
- 5 Salmonella is a type of food poisoning bacteria. [2 marks]

List **two** foods which may contain *Salmonella* bacteria:

 - 1 _____
 - 2 _____
- 6 List **three** high-risk foods. [3 marks]
 - 1 _____
 - 2 _____
 - 3 _____
- 7 Explain why **one** of the foods you have listed in Question 6 is a high-risk food. [2 marks]
 - 1 _____
 - 2 _____
 - 3 _____
- 8 State **three** conditions needed for bacteria to grow. [3 marks]
 - 1 _____
 - 2 _____
 - 3 _____
- 9 Give **two** reasons why a risk assessment is important in a kitchen. [2 marks]
 - 1 _____
 - 2 _____
- 10 List **two** pieces of kitchen equipment and explain their use in the kitchen. [4 marks]

Piece of equipment	Use in the kitchen
1	
2	

Read about it

The website Food – a fact of life (www.foodafactoflife.org.uk) has excellent resources on food poisoning and food poisoning bacteria.

Search online for food poisoning quizzes to test yourself.



Assignment practice

Project brief

The restaurant you work in has a recipe for making a chicken curry.

Ingredients for chicken curry recipe:

- 2 chicken breasts
- 2 tbsp sunflower oil
- 1 onion
- 2 cloves garlic
- 1 red chilli
- 1 tsp each of cumin, cardamom pods, curry powder
- 150 ml chicken stock
- 2 tsp mango chutney
- 100 ml natural yoghurt
- 2 tbsp lemon juice

Task

This task is about showing that you can apply knowledge and understanding (AO2).

Write a list of safety points next to each part of the recipe that need to be followed when making the dish. The aim of these is to ensure that:

- cross-contamination does not happen
- there is no possibility of harm happening to the person preparing and cooking the dish
- the dish will be safe to eat once prepared.

Method:

Stage	Safety points
Cut the chicken breasts into cubes.	
Heat the oil in a pan and fry the chicken.	
Remove the chicken and put to one side.	
Add the chopped onions and garlic to the pan and cook.	
Add the spices and fry for a few minutes.	
Stir in the stock and bring to the boil.	
Add the chicken to the pan and cook for a further 8 minutes.	
Stir in the yoghurt, lemon juice and mango chutney. Serve with rice.	

[12 marks]

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