

# Student workbook

## Cakes and puddings

Unit code: FBPRBK3010

Unit name: Produce cakes and puddings



**TAFE NSW would like to pay our respect and acknowledge Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of the Land, Rivers and Sea. We acknowledge and pay our respect to the Elders, both past and present of all Nations.**

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## Getting started

This learner workbook will provide you with the knowledge you will need to produce cakes and puddings.

- We recommend that you work through the activities which have been designed to support your learning, and practical tasks to apply your baking skills.
- You will be practicing your skills and knowledge in a bakery at either your workplace or at your TAFE campus.

For some of the content and activities, you will need to use a calculator. If you are unsure about any aspect of your reading, writing or mathematics skills, discuss it with your teacher, assessor or employer.

This unit will be delivered over 6-weeks. Here are three tips:

- If you are looking for the assessment instructions for this unit, you will find it in the Unit Assessment Guide.
- If there is a baking term that is new to you, check the glossary (located at the end of this workbook).
- If you have any questions along the way, remember to ask your teacher for assistance.

Happy learning!

## What will I be doing?

By working through this workbook, you will be:

- reading information and making notes.
- referring to the Bakery Moodle and the Virtual Enterprise.
- following your teacher's instructions for completing the practical activities in this workbook.

## Learning outcomes

Throughout this unit you will learn:

- prepare your work areas and yourself for work.
- demonstrate a range of hand and machine skills to make cake and pudding products.

- identify a range of bakery ingredients and products.
- the various functions of ingredients used in cake and pudding products.
- safely use bakery equipment, and hygienically produce cake and puddings.
- mix, process and bake cake and pudding products.
- package and store cake and pudding products.
- pack up and clean up.

## Topics

There are nine topics to complete within this learner guide.

Topic number	Topic name
Topic 1	Preparing for work
Topic 2	Equipment used in cake and pudding products
Topic 3	Ingredients in cake and pudding products
Topic 4	Mixing techniques
Topic 5	Baking and steaming cake and puddings
Topic 6	Finishing, decorating and storage
Topic 7	Quality and fault finding for cake and pudding products
Topic 8	Packing up and cleaning down
Topic 9	Product spotlight: Cakes

As you work through the topics in this unit you will be asked to repeat the following tasks for each step of the process:

- Measure ingredient quantities to meet recipe specifications.
- Checking cake and pudding products to identify faults and rectify.
- Maintaining records for baking cake and pudding products.



## Measure ingredient quantities to meet recipe, formula and production schedule specifications

Baking requires accuracy. Miscalculations can produce unwanted results and waste. All dry ingredients should be weighed (weight) rather than measured (volume).

You should use good quality digital scales that have been maintained and tested to ensure accuracy. Your workplace will have a system of regularly checking the accuracy of scales by using weights. If there is a discrepancy, the scales should be serviced and re-calibrated.

Temperature is also very important in baking and at various times in the baking preparation and process you will need to measure and check temperature.

The Australian Government also has trade measurement laws which must be followed. You will find more information about this in the [Australian Government National Measurement Institute - Guide to the sale of bread and bakery products](#).

You will learn techniques for calculating yields, adjusting recipes, converting units of measurement and measuring ingredients.



## Check products to identify faults and rectify

If the product made doesn't meet the standard of your workplace, and cannot be sold, it will be costly for your employer. To prevent this, you should check and monitor the preparation, mixing, processing and baking stages when making cake and pudding products.

This doesn't need to be complex or difficult. It may be as simple as:

- only using fresh, quality ingredients
- ensuring the correct measurements
- visually inspecting the batter while it is mixing to make sure it meets the product requirements
- choosing appropriate steaming and baking equipment and then preparing your tins and trays for optimum baking
- use the correct timing and temperatures.

You can then make adjustments, such as changing the speed or timing on a mixer or making a change to the yield or ingredients.

Inspections and corrective actions are vitally important during all processes of creating cake and pudding products. You will learn to recognise faults when things don't go as expected.

Variations will occur for many reasons including:

- different quality of ingredients
- different brands of ingredients
- inaccurate weighing of ingredients
- using the wrong ingredient
- incorrect mixing techniques
- incorrect equipment used
- incorrect temperature and timing
- incorrect processing (proofing, retarding, finishing)
- oven temperatures/settings which are not appropriate for the product being made.

If a finished product doesn't meet expectations, you will need to record that on the production schedule (you will find an example in Topic 1) as this may indicate a problem with the recipe formula, equipment or ingredients.

Throughout the duration of the course, your teacher will explain this in more detail and will provide opportunities for practising this form of problem solving.



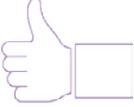
## Maintain records

You will need to know the product types and volume that you will be producing. This is called the production schedule, and there is an example included in this workbook. The production schedule may include the following:

- Date and day
- Person making the batch of products
- Baking parameters and time
- Yield
- Storage requirements
- Variations to formulations
- Outcome/quality
- Time of production

## Icon legends

Icons	Descriptions
	<p><b>Practice activity</b></p> <p>Learning activities are the tasks and exercises that assist you in gaining a clear understanding of the content in this workbook. It is important for you to undertake these activities, as they will enhance your learning.</p> <p>Activities can be used to prepare you for assessments. Refer to the assessments before you commence so that you are aware which activities will assist you in completing your assessments.</p>
	<p><b>Collaboration</b></p> <p>Whether you discuss your learning in an online forum or in a face-to-face environment discussions allow you to create and consolidate new meaningful knowledge.</p>
	<p><b>Self-check</b></p> <p>A self-check is an activity that allows you to assess your own learning progress. It is an opportunity to determine the levels of your learning and to identify areas for improvement.</p>
	<p><b>Readings (required and suggested)</b></p> <p>The required reading is referred to throughout this Student workbook. You will need the required text for readings and activities.</p> <p>The suggested reading is quoted in the Student workbook, however you do not need a copy of this text to complete the learning. The suggested reading provides supplementary information that may assist you in completing the unit.</p>
	<p><b>Video clip</b></p> <p>A video clip is something you will need to watch on your device. You will need to click on the link or copy and paste it in your device browser.</p>

Icons	Descriptions
	<p><b>Measure ingredient quantities to meet recipe, formula and production schedule specifications</b></p>
	<p><b>Check products to identify faults and rectify</b></p>
	<p><b>Maintain records</b></p>

## Self-assessment

Think about what you already know about baking. On a scale of 1-5, place a number in the ratings column to identify your current knowledge and skills for the following tasks.

Likert scale 1-5: [1 = beginner, 2 = practice needed, 3 = good, 4 = very good, 5 = exceptional]

How good are you at...	Your rating
Preparing a workspace before starting an activity to make sure it is safe and clean?	
Using a recipe to bake a cake or pudding?	
Working with baking equipment?	
Using personal protective equipment?	
Using measuring and weighing equipment?	
Operating a mixer to combine ingredients?	
Checking that a mixture is well mixed?	
Working with cake or pudding batters?	
Using an oven and set the temperature?	
Checking to see how your baking was going?	
Unloading an oven and cooled your baked item?	
Preparing and storing baked items?	
Cleaning equipment and your work area when finished baking?	
Disposing of waste after cooking?	
Completing workplace records?	

## Overview: Cakes and puddings

A cake is a sweet confection based on four basic ingredients – flour, sugar, fat and eggs.



Poppy cake with pomegranate by [picfoods](#) under [Pixabay licence](#)

Most modern cake recipes have developed from this basic formula called a pound cake. A pound cake was originally made with equal parts of the four basic ingredients flour, sugar, fat and eggs. It was mixed together by creaming the butter and sugar, then adding the eggs and carefully folding through the flour.

This produces a heavy closed textured rich buttery cake, rich in flavour due to the quantity of fat from both the butter and eggs.

The pound formula and the *sugar batter method* are considered one of the basic recipes and methods of making cakes.

Cakes can be filled, frosted and glazed. Cakes tend to be special and are often decorated, being associated with life's milestones - weddings, showers, engagements, and birthdays - or they can be enjoyed as a simple dessert with fruit or consumed as a snack. You will make several popular cakes in the course, including; a decorated fruit cake, a flavoured bar cake, a cake slice, a flavoured cupcake or muffin and a special dietary cake.

## Drop batters

Modern cake batters are classified as drop batters and are made from various combinations of refined flour, a form of fat (butter or commercial fats), sugar, eggs, milk, leavening agent, and flavourings.

## Fruit cakes and puddings

A Fruit cake is a cake batter with a high level of macerated dried fruits, nuts, and spices with ratios as high as 3 parts fruit to 1 part cake batter. The formula allows for a stable batter capable of carrying the weight of the fruit.

Fruit cakes are carefully baked with lined and insulated tins in an oven to produce a heavy closed textured rich dark fruit cake with a strong flavour due to the quantity of fruits and spices.

A pudding is also made with a cake batter however, it was traditionally deposited into basins and cooked in a bath of gently boiling water. The boiling or steaming baking process aims to produce a crumb texture that is denser than a fruit cake, and yet has no visible crust. This is due to steaming at a lower temperature and the humid baking environment.

Fruit cakes and puddings are very much an English tradition at Christmas time, the origins of which can be traced back to the 17th century. It is also a part of Australian Baking history as far back as 1819 with the arrival of ships filled with the essential ingredients for pudding making.

In this unit you will be making both fruit cake and steamed puddings.

For an interesting article on the history of puddings in Australia, go to the national Library of Australia site: [The proof of the pudding: a search for Christmas pudding in the National Library of Australia](#)



[Old plum pudding advert](#) by National Library NZ on The Commons under [CC0 1.0](#).

Topic 1

# Preparing for work



# Topic 1: Preparing for work

This topic covers:

- regulatory requirements for producing cake and pudding products
- preparing the work area to meet food safety and workplace health and safety requirements
- protective equipment for working safely
- formulas, production scheduling – techniques and considerations.

## The baking industry regulatory requirements

Every food business in Australia is required by law to ensure that their food is safe to eat and that staff have been properly trained. Anyone that handles or prepares food, serves food, transports food or cleans food equipment and utensils must undergo food safety training.

Take a look at these important requirements in the following documents:

- Australian Institute of Food Safety [Guide to Food Safety Laws and Regulations](#)
- NSW Department of Primary Industries [Food Authority Fact Sheet](#)

Preparing your work area to meet food safety and workplace health and safety requirements is a key step in your daily work preparation. Hygiene in your workplace is very important and there are significant consequences for workplaces who fail to meet food safety standards. To stop the spread of bacteria, you should make sure that:

- you regularly clean surfaces, equipment and utensils
- wash hands between tasks
- clean up spills on the floor immediately
- maintain high standards of personal hygiene
- store food items in the correct area when not in use.

All staff in the baking industry must follow the requirements of NSW Work Health and Safety Legislation as well as the [Australian New Zealand Food Standards Code – Standard 2.1.1 Cereal and cereal products.](#)

## Workplace health and safety (WHS)

In the workplace you have a responsibility to help prevent any potential accidents by taking all necessary care and following all safety instructions from your employer, or whilst attending college from your trainer. Report any safety hazard immediately, so corrective action can be taken. Sometimes the hazard may be removed quickly and without fuss, for example a spill of liquid can be mopped up straight away, removing the danger before a slippage can occur.

Other hazards to look out for:

- hot trays, tins and utensils
- knives submerged in washing-up water
- wet/damp oven gloves
- loose clothing/hair
- moving parts of machinery
- lack of machine guards
- lack of fire extinguisher
- cluttered work areas—aisles, benches etc.
- loose floor tiles/mats
- foot wear in bad condition
- dark corners or passageways
- greasy stairways, no handrails
- unattended fat fryers
- careless use of extension cords.

### Important safety regulation

The *Work Health and Safety Act 2011* duties of a worker - while at work a worker must:

- take reasonable care for their own health and safety
- take reasonable care for the health and safety of others
- comply with any reasonable instructions, policies and procedure given by their employer, business or controller of the workplace.

## Personal protective equipment (PPE)

It is very important that you know the personal protective equipment provided by workplace and that you use it, clean and maintain it and store it correctly. These items may include: non-slip footwear, hair/beard net, protective clothing and gloves. Protective equipment helps protect you and ensure hygiene is of a high standard.

## Formula balance

A formula is a group of ingredients in a recipe. The balance is whereby the amounts of those ingredients interact with each other to produce a cake without faults.



Cake ingredients by [CongerDesign](#) under [Pixabay licence](#)

Before you calculate the amounts of ingredients to use in a recipe it is important that you have a good understanding of the functions of each ingredient and how they interact with each other during mixing and baking. Let's look at the example of a pound cake.

There are four basic ingredients necessary in the construction of a cake formula:

1. flour
2. fat
3. eggs
4. sugar

A basic cake can be successfully made using equal amounts of each of these four ingredients — this is known as a pound cake. Originating from the days of imperial weights when a cake was made from a pound of each of the four ingredients:

1. a pound of flour
2. a pound of fat
3. a pound of egg
4. a pound of sugar

The table below summaries the key ingredients and their functions.

Function	Ingredients
Ingredients which open the texture of the cake:	<ul style="list-style-type: none"> <li>• flour</li> <li>• eggs</li> </ul>
Ingredients which have to be carried:	<ul style="list-style-type: none"> <li>• sugar</li> <li>• fats</li> <li>• milk/water</li> </ul>
Ingredients which open the texture of the cake:	<ul style="list-style-type: none"> <li>• sugar</li> <li>• baking powder</li> <li>• fats</li> <li>• eggs</li> </ul>
Ingredients which close the texture and reduce the lightness:	<ul style="list-style-type: none"> <li>• milk/water</li> </ul>

### Important considerations

When developing the recipe, you need to have a balance between those ingredients which open the texture and those which close the texture. This is what is meant by recipe balance. For example, if an increase in sugar in the recipe produces a cake with an open texture, this can be balanced or offset by increasing the water which will help to close the texture.

- Excessive sugar and baking powder will weaken the structure (flour, eggs) of the cake, causing it to collapse.
- Excessive milk/water will create a closed texture with a tough, rubbery feel to the crumb (recognised by a doughy, uncooked appearance).



## Maintain records

### Production schedule

A production schedule is an important document that tells you what work needs to be done and how it is to be done. It should be the first and the last task of the day. Throughout your course practical activities, you will be expected to complete production schedules before you commence work and when you finish your work.

A production schedule will include the following:

- product processing requirements, such as what needs to be produced and in what timeframe
- volume and processing requirements
- recipe reformulation to minimise waste
- finishing parameters for cake and pudding cake products
- bake parameters for cake and pudding cake products
- the person who made the batch of products.

At the end of your work, you record anything on the production schedule that may have happened differently than you had planned. This may include, the amount of bakery items produced may have been different than expected, if there were any faults or discrepancies and how you addressed these.

The following table shows an example of production schedule:

Task	Time	Notes	Baking requirements <i>Include oven temperatures and timer settings</i>
1			
2			
3			

**Note:** Wastage that cannot be reused in production must be less than 5% of the weight of the original production schedule.



## Practice activity

### Activity 1.1: Fresh eggs storage requirements

Read the case study [Salmonella warning – check your eggs](#) (NSW Food Authority) and describe the requirements for storing fresh eggs.



## Collaboration

### Activity 1.2: Workflow and production schedule

Your teacher will provide you with a lesson timetable demonstrating the products you will be baking and finishing. Work with your bench partner (another student) to write a work flow and a production schedule for next week's lesson.



## Self-check questions

### Activity 1.3: Check your knowledge

Read the question carefully. Your answer should be a minimum of 25 words but no longer than 100 words.

1. Continuing from Activity 1.2, your teacher has requested a workflow for a lesson plan. You have not made this particular product (recipe) before. What can you do?

2. Continuing from Activity 1.2, alter the product (recipe) in your workflow. Provide a scenario of why you might need to alter a recipe formula for your product?

3. Why do we use 'standardised recipes'?

- To assist in monitoring the baking process with information on times and temperatures.
- To ensure the correct processing techniques are used.
- To provide quality and consistency to a workplace standard.
- All of the above.

4. Complete the following table by providing a preventative measure for each of the potential safety hazards.

Safety hazard	Preventative measure
A sharp knife left in the bottom of a sink full of water	
Milk spilt on the floor	
Deep fat fryer left unattended	
An extension cord that runs over the top of an oven	
A missing fire extinguisher	

Topic 2

# Equipment



## Topic 2: Equipment used in cake and pudding products

This topic will cover:

- common equipment used to bake cake and pudding products
- using ovens safely
- loading ingredients into the mixer using the correct sequence
- working with steamers and boilers.

### Common equipment

A key task within your bakery is to understand the purpose of all the equipment you will use. Before you start operating any equipment make sure that you know how to use, maintain and clean them safely. Familiarise yourself with the standard operating procedures (SOPs) and participating in any training provided.

It is important to follow workplace procedures for using, cleaning, maintenance and reporting equipment malfunctions. You will learn more about this throughout this workbook.

You will also need to know how to record information at your workplace about using the equipment, cleaning schedules and reporting anything about the equipment you are using, such as when it is not working properly.

The following summarises the main types of equipment and accessories used.

Equipment, accessories	Tools, utensils	Ancillary equipment
<ul style="list-style-type: none"> <li>• industrial oven</li> <li>• industrial mixer and attachments</li> <li>• industrial cook tops</li> <li>• cool room or refrigerator</li> <li>• dish washing sinks, sinks, taps and accessories.</li> </ul>	<ul style="list-style-type: none"> <li>• pallet knives</li> <li>• serrated knife</li> <li>• plastic scrapers</li> <li>• sieves</li> <li>• thermometer</li> <li>• egg wash brushes.</li> </ul>	<ul style="list-style-type: none"> <li>• cake baking trays</li> <li>• cake tins or hoops</li> <li>• cooling wires</li> <li>• mixing bowls</li> <li>• equipment used to steam puddings.</li> </ul>

## Using machinery safely

All machines pose a potential danger. Before using any machinery, you should:

- Be given complete instruction on its correct and safe operation.
- Be supervised while using the machine at all times.
- Give full attention to operating them correctly and safely at all times. If in doubt, always ask for assistance.
- Follow manufacturer's recommendations to avoid damage to the machine and injury to yourself or others.

## Industrial ovens

This table summarises the main parts of an oven.

Oven part	Explanation
Thermostat	<p>A device which controls the oven temperature by regulating the flow of energy (heat) into the baking chamber.</p> <p>Bakers use the thermostat by setting a dial or digital display which is marked with the graduations of temperature in either °C or °F.</p> <p>The oven chamber can be controlled by the top and bottom heat settings. The steam setting can be used for cakes and puddings when required.</p>
Damper (Flue)	<p>A small opening in the side, back or top of the oven.</p> <p>It may be closed or opened by using a lever device or similar, allowing the baker to control the rate at which steam and heat escape the baking chamber.</p>
Oven thermometer	<p>Shows the temperature within the baking chamber by the position of a needle on the graduated scale of the dial face.</p> <p>Some thermometers have a digital display.</p>
Baking chamber	<p>The cavity or area of the oven in which the goods are placed for baking.</p>
Oven sole	<p>The floor of the baking chamber.</p>

Oven part	Explanation
Oven crown	The ceiling of the baking chamber.
Oven refractories	Describes all of the materials, whether insulating or reflecting, in the construction of the oven, such as the steel plating in the walls, the stone in the sole and insulating materials in the wall cavities.

## Using ovens safely

Always preheat the oven well in advance so that you bake with a solid heat. Also:

- To avoid injuries, only one person at a time should attend the oven.
- If baking a small load (e.g. two trays in a four tray oven) you may need to reduce the baking temperature slightly.
- If products start to brown too quickly adjust top and bottom settings on the oven.
- If the products are baking unevenly you may need to turn the tray during baking.
- Space products evenly on the tray for uniform baking.
- Never use wet or badly worn oven gloves/mitts to handle hot trays.
- Where possible, avoid having to walk too far with a hot tray. Position a rack beside the oven for hot trays.



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## Industrial mixer and attachments

Bakeries will use some form of industrial mixer and a multitude of attachments in the production of baked goods. The most commonly used types of mixers for producing cake, batters are:

- planetary mixer using a whisk or beater
- continuous mixer.

These types of mixers use different principles of mixing and varied designed mixing arms. They also operate at different speeds. Mixers have different purposes and configurations of blades dependent on the required production process and mixing method. Mixers can be used for whipping, blending, pasting and mixing, and they can be automated or manual. Understanding your equipment is central to getting the most out of your batters.

### General guidelines for safe use of mixers

Before using a mixer, you should be given complete instruction on its correct and safe operation. You must be supervised while using the machine at all times.

All machines when in use pose a potential danger. Full attention must be given to the correct and safe operation at all times. If in doubt, always ask your teacher to help you.

All machines should be used according to the manufacturer's recommendations to avoid damage to the machine and injury to the operator. Here are more general guidelines:

- Only one person is to operate the machine at any one time.
- Make sure that all mixing attachments/bowls are correctly secured before starting the machine.
- Load ingredients in the required sequence and fold in as per recipe instructions
- Keep hands clear of all moving parts.
- Use the appropriate mixing attachment for each type of mix.
- Do not remove or override any safety devices.
- Start all mixing on low gear before changing to a higher speed.
- If the electrical wiring looks faulty do not use the machine. Isolate the machine, place an 'out of order' tag on the machine and report the danger to your teacher.
- Do not use the safety guard to stop the machine, only use the off switch.
- Do not lean on the machine at any time.
- Do not stand on a wet surface when operating an electrical machine.

- Switch the machine off at the power point before attempting to clean it.
- Do not allow water near the electric motor or switches.
- After use, switch the machine to low gear.
- Use clean, dry hands to operate the machine.
- Do not wear loose clothing when operating the machine.
- Use the mixer according to manufacturer's recommendations.

### Cooling wires (cooling rack)

Placing baked cakes on cooling wires allows the air to circulate under and around the baked goods whilst they are cooling without them getting a soggy base or a build-up of condensation. It also helps to maintain crunchy characteristics of products, for example rock cakes.

### Mixing bowls

Mixing bowls are a deep bowl used for mixing baking ingredients. This may involve blending, emulsification, working batters and mixing dry ingredients. They come in a variety of shapes and sizes and are made from different materials. Often mixers will come with specific sized mixing bowls and attachments – beaters, whisks and dough hooks.

### Using baking trays, tins and hoops

Trays, tins and hoops are normally prepared by using a release agent (greasing), papering or lining with paper. It is important to insulate baking tins and trays to match the richness of cakes and puddings.

The reasons for papering the trays are:

- The paper helps to insulate the cake and pudding batter during baking.
- Minimises the risk of damaging the product by allowing easy removal from the tin
- Improved hygiene –cake can be handled without direct human contact.
- Ensure to cut paper to a size that ensures minimal wastage of paper and makes trimming after baking unnecessary. Single thickness of paper is normally sufficient for cakes.

This table shows examples of tin and tray preparation by products.

Type of cake or pudding	Preparation of trays and tins
Fruit cake	Tin is greased and then lined with paper
Mandarin marmalade pudding	Mould is greased
Bar cake	Tin is lined with paper
Mud cake muffins	Line the muffin tray with café style paper cups
Gugelhupf	Tin is greased
Friands and small cakes	Spray the tins

You will be able to read more about tin and tray preparation in Topic 5.

## Working with tins, trays, hoops and steamers

Tins may also be referred to as hoops.

The selection of appropriate tins and trays are important in the baking and steaming process. The cause of many cake and pudding faults are due to the incorrect use of tins, trays, steamers.

You will need to consider the volume of cake batter and the richness and inclusions of the cake batter when deciding the most appropriate size, shape and type of tray for the best baked or steamed product.

Round tin	Square tin
6 inch (15cm)	5 inch (13cm)
8 inch (20cm)	7 inch (18cm)
9 inch (23cm)	8 inch (20cm)
11 inch (28cm)	10 inch (25.5cm)
12 inch (30cm)	11 inch (28cm)

Round tin	Square tin
13 inch (33cm)	12 inch (30cm)
14 inch (35.5cm)	13 inch (33cm)

## Purchasing and cleaning trays, tins or hoops

- There are a range of tins and trays available. When purchasing tins / trays and hoops, remember industrial tins/trays will last longer. Modern baking tins/trays are now lighter and have a Teflon coating for releasing baked products and eliminate the use of papers and releasing agents.
- Tins and trays should be well cared for and protected to avoid rust and build-up of pan dirt which will result in uneven cooking. Warm soapy water is preferable to washing baking tins/trays. Abrasive cleaning will damage the tin. Silicone moulds can be rinsed in warm water and a soft cloth or sponge.

## Preparation of tins for baking fruit cake

Because of the sugar content in a rich, dense fruit cake, it will take longer to bake than a plain cake. To prevent the formation of a thick crust and a dry crumb it is recommended to insulate the cake by lining the cake tin with several layers of paper or similar.

During baking it may be necessary to bake on inverted trays or place the tins on several layers of paper to prevent a burnt base on the cakes. Alternatively, the bottom heat on the oven may be turned down.

To help retain moisture in the fruit cake keep the oven damper closed during baking and, if need be, place a pan of hot water in the oven to maintain a moist baking atmosphere.

If premature crust formation occurs during baking place a sheet of paper or similar onto the top surface of the cake or turn down the top heat controls on the oven.

## Moulds

There are two types of moulds used for cakes and puddings.

1. Moulds for baking and steaming cake batter shapes such as Gugelhupf, steamed puddings and Friends.
2. Moulds for setting and cooling mousses, creams and jellies that can be used as inclusions to finished cakes.

## Tools and utensils, care and preparation

Your toolkits will be stocked with basic baking equipment and should include at least the following:

- knives – cooks, serrated, palette knife – small and large
- scrapers and spatulas
- sieves
- selection of piping tubes and bags
- scissors
- pastry brush
- thermometer.

As you advance through your training and develop your skills it will become evident that your toolkit needs extra tools and equipment to tackle new demands, for example:

- cutters of various shapes or sizes
- more brushes of differing sizes
- moulds and flower shaped presses
- specialised pieces of equipment
- spare scissors, spoons, skewers, etc.

To avoid damage or loss, all equipment requires careful cleaning and storing. Hygiene is especially important because if you don't clean and store your equipment correctly, bacteria may grow on them causing contamination of your ingredients and baked goods. If you have separate storage compartments for sharp knives and blunt equipment, you will avoid accidental damage to your tools, as well as accidental cuts to yourself.

A common problem with piping tubes is the cleaning out of royal icing after use. To avoid the frustration of blocked tubes, soak them immediately in hot water, using a small paint brush to get all the residual royal icing out of the bottom of the tube, rinse well again in hot water as sugar dissolves in water.

Damage to the ends of the tube will affect the performance. Store these in a separate container away from sharp knives so as to avoid damage to the tubes.



## Collaboration

### Activity 2.1: Cake mixing discussion

Discuss some of the problems that can occur in the mixing stage of the cake making process. What could you do if your equipment failed?

Start by reading this article [Importance of mixing not lost on bakers](#) by Ryan Atkinson, Baking business.



## Practice activity

### Activity 2.2: Baking equipment automation

Hand cake decoration or machine pumped decoration? Hand filled cakes or machine filled cakes? Discuss when it would be beneficial to use automated baking equipment.

Start by looking at all the different kinds of automation possible with this YouTube video:

What we do – portioning equipment for the food and bakery industry

(<https://youtu.be/oji4iTolc1k>, 1:30mins).





## Self-check questions

### Activity 2.3: Check your knowledge

1. List four important safety checks before using / operating the planetary mixer.

2. What equipment is required when steaming a mandarin marmalade pudding?

3. Explain the difference use and functions between a whisk and a paddle in cake production.

4. To ensure your scales are weighing accurately, what can you do?

5. What is the legislation that refers to washing hands and tools in the bakery / food industry?

6. Complete the table by briefly explaining the function or describe each of the following parts of the oven. An example has been given to you.

Oven feature	Function or purpose
<i>Thermostat</i>	<i>Supply of heat</i>
Damper or flue	
Oven thermometer	
Baking chamber	
Oven sole	
Oven crown	

7. You are preparing to make a cake and find that the mixer has some wires exposed on the cord. What should you do?
- Cover the wires over with some tape.
  - Be careful and continue to use the mixer.
  - Do not use the machine and immediately let your teacher/supervisor know.
  - All of the above.

### True or false questions

8. The thermostat regulates the heat in the ovens baking chamber.
- True or  False
9. The damper of flue controls the steam of heat leaving the oven chamber.
- True or  False
10. The thermostat regulates the heat in the ovens baking chamber.
- True or  False

Topic 3

# Ingredients



## Topic 3: Ingredients

This topic will cover the ingredients used to make cakes and pudding and give an overview and suggested storage of basic ingredients.

You will learn about:

- specific volume
- pre-conditioning ingredients
- the basic ingredients used to make cakes and puddings including flour, pre-gelatinised starch, fats and oils, sugars, eggs, milk, baking powder, bi-carbonate of soda, glycerine, sponge, emulsifier, cocoa powder, chocolate paste
- conditioning of fruits
- storage – wet and dry
- special dietary ingredients.

### Basic rules for calculating a recipe for conventional cakes

Using conventional ingredients such as cake margarine/butter, castor sugar, eggs, milk, baking powder and soft or bakers' flour, you may use the following guidelines to develop a recipe for a plain cake batter.

- Flour is the basis for calculating all other ingredients where flour equals 100%.
- The amount of fat can vary between 20% and 100% of the flour weight, depending on the quality of cake you wish to make (20% cheap quality, 100% rich quality).
- The amount of egg is calculated on the amount of fat being used in the recipe – it is 125% of the fat weight.
- Milk or water is calculated at 90% of any flour that is in excess of the amount of egg being used (Subtract the egg weight from the flour weight and multiply the answer by 90%).
- The amount of sugar required is calculated at approximately 25% of the total weight of flour, fat, egg and milk (add the weights of flour, fat, egg and milk together and multiply the answer by 25%).

- The baking powder is calculated at between 4% to 12% of the flour that is excess of the egg weight (subtract the egg weight from the flour weight and multiply by 4% to 12%) depending on:
  - the weight/size of the cake
  - the grade of flour being used.

These rules are a guideline that you can use to develop your own conventional recipes.

## Variations to the basic rules

When eggs or sugar or fat is increased, note the following:

- If sugar has to be increased then either baking powder must be reduced or water/milk increased.
- An increase in egg will toughen the cake unless offset by an increase in fat.
- The structure provided by egg can be used to fix a crumbly cake—increase the egg and reduce the milk/water (remember that eggs contain 75% water whereas milk contains 87% water).
- Any increase in fat must be offset by an increase in egg to provide additional structure.

When using different types of ingredients, other than those listed in the recipe, note the following:

- Cocoa powder—substitute approximately 20% of the flour weight with cocoa powder, increase the liquids by the same amount and increase the baking powder.
- When using liquid sugars (honey, golden syrup etc.) as a substitute for crystal sugar calculate the amount to allow for the 25% moisture content of the liquid sugar and also reduce the liquids in the recipe.
- Ground nuts (almonds, hazelnuts, etc.) can be used as a partial substitute for the flour in the recipe, however ground nuts do not contain gluten, and offer no structure to the cake. Ground nuts contain approximately 50% oil which will help to improve the richness of the cake.



## Practice activity

### Activity 3.1: Observation

Your teacher will demonstrate this activity in class. Following the table and basic rules of calculation develop a recipe for conventional plain cake:

Ingredient	Method of calculation	Amount
Flour	The flour weight is used to calculate the fat weight. What size of mix is required?	1000g
Fat	Determine what quality of cake you wish to make (between 20% - 100% of flour).	
Egg	Egg is calculated on the amount of fat in the recipe: 125% of the fat weight.	
Milk	Subtract the egg weight from the flour and multiply the answer by 90%.	
Sugar	Total the weight of the flour, fat, egg and milk and divide by 4.	
Baking powder	Subtract the egg weight from the flour weight and multiply by a figure between 4% and 12%, depending on size of cake. The smaller the cake the more baking powder required.	
Total weight		

## Specific volume

Specific volume is the ratio of the volume of 1kg of batter or cream to the volume of 1kg of water at the same temperature. It is used to measure the increase of volume of a mechanically aerated batter or egg foam.

To **measure the specific volume** of a cake batter:

1. Firstly, fill a volume cup (e.g. dariole mould) with water and weigh it.
2. Subtract the weight of the cup to give the weight of the water.
3. Using the same volume cup carefully fill it with the aerated batter or foam, using a palette knife. Avoid any air pockets and fill level to the top of the cup, scraping the surface level with the straight edge of a palette knife.
4. Accurately weigh the cup plus the aerated mixture.
5. Subtract the weight of the cup to give the weight of the aerated batter.

To **calculate the specific volume** use the following:

- Weight of the capacity of water divided by weight of the aerated batter.

*Note: The weight should not include the cup.*

Example:

- Capacity of water: 100g
- Aerated butter: 80g
- Specific volume:  $100\text{g} \div 80\text{g} = 1.25\text{g}$

## Using scales to measure ingredients

Before using any scales you must take steps to only weigh the ingredients and not the packaging or container holding the ingredients. The process you follow is referred to as setting a scale to tare or setting a scale to zero.

You should use the scales correctly to be effective and ensure consistency in your baked products. Be sure to practice using the scales in your practical activities before working on practical baking activities. Scales need to be recalibrate regularly to maintain accuracy.



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## Identifying ingredients

Working in the baking industry, you will be required to identify the ingredients that are commonly used, without necessarily referring to the print on the packaging or identification labels on bins or canisters. You will develop an understanding of a vast range of ingredients and be able to use your body's senses to identify the ingredients, sometimes by sight alone, other times with the help of touch, smell and taste.

It is a good idea for you to develop these senses by using them to identify each ingredient as you are using it. Don't be afraid to sample-taste, smell or touch the ingredients you are using, as it is only from regular handling of them that you will develop a good knowledge and understanding of them.

## Preconditioning the ingredients

Preconditioning the ingredients means making sure that the ingredients are in a condition that will produce the best results to gain maximum aeration and stable volume. Pre-conditioning of ingredients is carried out to suit the baking environment and seasonal temperatures. The best baking environment temperature is 200°C with low humidity.

For example:

- Warm the eggs.
- Soften the butter (fat).
- Warm the sugar.

To precondition ingredients, you:

- Measure the eggs into a bowl and warm over a pot of warm water. Mix the eggs with a whisk to emulsify.
- Weigh the sugar into a bowl and place the bowl in a warm oven only long enough to warm the sugar.
- Soften butter by chopping into small cubes until it comes to room temperature.  
Note: You can pre-condition in the microwave but avoid melting it. Melting butter will turn it into oil, which will not mechanically aerate. Also, avoid overheating the eggs, as they will start to cook (coagulate).

## Flour

The majority of flour that we use for making bakery products is milled from wheat.

The grade of flour is determined by the quality and quantity of gluten proteins in the flour. Gluten protein is found only in the part of the wheat grain known as the endosperm.

The wheat grain is made up of three basic parts:

1. Bran
2. Germ
3. Endosperm

Wholemeal flour is milled from the whole berry (containing bran, germ and endosperm) – and as you will see it has a light brown colour to it, caused by the bran.

White flours are milled from the endosperm (the centre of the wheat grain).

Wheaten flour is available in various grades (often identified by the flour millers by product brand names) so that you can produce a range of different bakery products. The various grades of flour have different characteristics but each are of good quality.

Some examples of the uses of the different flour grades are:

- Flour grade for: hi-ratio/sponge flour, hi-ratio cake, sponge, block cakes
- Soft flour for: biscuits, short pastry, conventional block cake, conventional sponge

- Medium flour for: fruit cake, short pastry, biscuits
- Bakers flour for: puff pastry, bread, buns, scones, rock cakes, Danish pastries
- High-protein flour for: bread, buns

**Storage:** Store flour in cool, dry and well-ventilated locations.

## Types of flour suited for cakes

This table summarises the grades of flour most commonly used for making cakes.

Flour	Description
Soft flour	<p>Soft flour contains approximately 8% gluten protein. Because of the low gluten content it minimises the development of gluten during mixing and helps to produce a tenderer eating cake.</p> <p>Note: If a soft flour is not available it may be substituted with a blend of medium/strong flour with cornflour (cornflour does not contain gluten).</p>
Hi-ratio flour	<p>Hi-ratio flour contains approximately 8% gluten. It is also milled finer and chlorinated to denature the gluten. Most suitable for cakes with a high moisture content. The finer flour particles help to absorb/adsorb the high moisture content and the chlorination of the flour prevents the gluten from forming during mixing. It also helps the starch to gelatinise at a lower baking temperature. This flour was originally developed for the production of hi-ratio cakes but has since been used for making a range of other cakes, sponge and pastries which require a low gluten content.</p>
Wholemeal flour	<p>For particular cakes such as those marketed as being 'wholesome' (carrot cake, zucchini cake) it may be an advantage to use wholemeal flour instead of white flour. When using wholemeal flour, you will also need to increase the amount of moisture (eggs, water, and milk) added, because of the higher absorption rate that wholemeal flour has.</p>
Medium to strong flour	<p>If a soft flour is used to produce fruit cake it would normally allow the fruit to sink to the bottom of the cake. Therefore, it is necessary to use a medium to strong grade of flour (9% to 11% gluten).</p> <p>Some recipes for fruit cake may contain a small amount of pre-gelatinised starch, which helps to prevent the fruit from sinking and also assists the preservation of moisture in the crumb.</p>

## Types of fats and oils

The types of fats and oils used in cake and pudding products are:

- Butter: salted, unsalted
- Margarines: cake
- Shortenings: cake, cream
- Oils (vegetable): canola, peanut, olive, safflower

### Butter

Butter is a natural product made by churning milk – it is the natural fat component of milk. Butter is available as salted or unsalted and has physical properties similar to cake margarine. Butter has a low melting point and will melt quickly if it is left in a hot bakery for too long.

**Storage:** Butter has a fat content of 82% - 84% and is best kept in the refrigerator.

### Margarines

Margarines are human made by mixing refined fats and oils with water, salt, milk solids, flavours and colours. During manufacture, margarines need to be chilled under controlled conditions to give it the desired texture and performance.

### Shortenings

Shortenings are human made by mixing refined fats and oils with flavours, colours and emulsifiers. During manufacture shortenings need to be chilled under controlled conditions to give a desired texture and performance. Shortenings do not contain water.

### Cake margarines and cake shortenings

Cake margarines and cake shortenings are made using soft fats with a low melting point. They contain a fairly high proportion of liquid fats in relation to solid fats. They are designed to entrap air during mixing and must be able to form a stable emulsion.

### Cream shortening

Cream shortening is a soft fat with very good mechanical aerating properties. It is able to produce a stable emulsion. Cream shortening contains fats/oils that have a low melting point and produce mock creams that are less greasy on the palette.

## Special cake shortenings (hi-ratio shortenings)

Hydrogenated shortenings designed for the production of hi-ratio cake. They have excellent emulsifying properties and very good mechanical aeration properties.

**Storage:** Store butter between 1°C and 5°C. Store margarines, shortenings and oils in a cool dry location away from ultraviolet light.

## Function of fats

The functions of fats in cake products include:

- Produce a shorter eating product.
- Improve the keeping qualities (moisture retention).
- Adds to the flavour of the product.
- When mechanically mixed, the fat will entrap air which will help to increase the volume of the product.

If the fat being used is coloured (yellow), this will help to produce a creamy coloured crumb in the product.

## Sugars

Sugar is a carbohydrate. This table shows the types of sugars used in cakes and puddings:

Crystal sugars	Liquid sugars
1A (grade of sugar)	Molasses
Castor	Treacle
1C (grade of sugar)	Glucose
Raw	Malt
Brown	Honey
1XD (grade of sugar)	Golden syrup
Icing – pure or mixture	Inverted sugar

## Sugars most suitable for making cakes and puddings

**Castor sugar** is a refined sugar made from sugar cane or sugar beet. It is used in most cake batters. It is a fine white crystal that dissolves easily in the moisture content of the batter.

**Brown sugar** is a moist, brown coloured crystal containing syrups. It is used in dark fruit cakes and spice flavoured cakes. The colour of the sugar helps to colour the cake and the syrup flavour of the sugar helps to add to the overall flavour of the cake.

**Liquid sugars**, such as honey and golden syrup, are sometimes used either as a substitute for or in addition to, crystal sugars in some dark fruit cakes and spice flavoured cakes. Liquid sugars contain approximately 25% water, which must be allowed for when substituting them for crystal sugars. Honey is an invert sugar, which will caramelize at lower temperatures than crystal sugars and, therefore, requires a lower baking temperature.

**Snow sugar** is a non-hygroscopic powdery white sugar similar looking to icing sugar. It is popular as it does not melt in baked goods, and it will not dissolve when cakes and puddings have been refrigerated.

It is made from palm oil, dextrose, vegetable oil and wheat starch. It is great when serving cakes in humid areas or when cake and pudding products are stored for extended periods.

**Rapadura sugar** is popular with the production of organic products. It has a caramel flavour, sweet aroma and is rich golden in colour (this can depend on the soil type). It is a certified organic sugar cane, grown and processed without the use of any artificial additives.

It is made by extracting the pure juice from sugar cane by use of a press. It is then heated at a low heat to evaporate the water and then ground to a fine texture. The molasses has not been separated from the sugar and does not contain any chemicals or anti caking agents.

**Inverted sugar** is a liquid sugar made from a mixture of glucose and fructose that is sweeter than sucrose (crystal sugar) and is referred to as trimoline or invert syrup. Inverted sugar is resistant to crystallisation and is used in some cake batter to promote the retention of moisture and extend shelf life of baked cakes.

## Function of sugars in cake making

- Sweetens the cake.
- Caramelises during baking to produce a golden brown crust colour.
- When crystal sugar is whisked with eggs or beaten with fats it helps to entrap air bubbles.
- Improves the keeping qualities of the cake (sugar is hygroscopic – able to attract moisture to itself).

- Produces a softer crumb in the cake.
- Dusting techniques using Icing and snow sugar can be used to improve visual appeal.

**Storage:** Store sugar in a cool, dry, well-ventilated location.

## Eggs

The domestic hen egg is made up of approximately:

- 75% water + 12% protein + 11% fats + minerals and vitamins.

Each egg is made up of three parts:

1. 11% shell: Calcium + phosphate
2. 31% yolk: 51% water + 30.5% fat + 16% protein + some minerals
3. 58% white: 88% water + 9% protein + some minerals

Eggs are available in various forms:

- fresh shell eggs (store between 1°C and 5°C)
- frozen pulp (store at minus 18°C)
- fresh, liquid pulp (store between 1°C and 5°C)
- dried/dehydrated (store in a cool, dry, well-ventilated location).

The different characteristics when using shell eggs and egg pulp are shown below:

Fresh shell eggs	Liquid egg pulp
Fresh egg has superior aerating properties.	Liquid egg pulp is conveniently dispensed from its 'bladder'/container.
Fresh eggs can be separated into yolks and whites.	Egg pulp (frozen) is conveniently stored at minus -18°C, for up to 6 months.
Eggs that have been cracked need to be stored in the refrigerator (between 0°C and 5°C) and used within 3 or 4 days.	Once thawed, egg pulp, must be kept refrigerated (between 0°C and 5°C) and used within 3 or 4 days.

The functions of eggs in cake and pudding products include:

- Improve the food value of the cake product.
- When eggs are whisked they entrap air bubbles which will aerate the cake product.

- The water content of eggs will help to bind dry ingredients together.
- The protein content of egg will set during baking, helping to provide the structure of the cake product.
- Improve the crust colour of cakes.
- Egg yolks contains lecithin which is a natural emulsifier and help with the emulsification of cake batters.
- The fat in the egg yolk improve the keeping qualities of cake products.
- The natural yellow colour of eggs helps to improve the crumb colour of cake products.
- Add flavour and richness to cake products.

## Milk

Milk is available in various forms.



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## Liquid

- Fresh pasteurised full cream (homogenised)
- Fresh pasteurised skimmed milk
- Evaporated milk—condensed milk (sweetened and unsweetened)
- Butter milk

## Powdered

- Full cream milk powder
- Skim milk powder

**Pasteurisation of milk:** All liquid milks are heat treated (pasteurised) to destroy pathogenic bacteria in the milk. The milk is heated to 72°C, held at that temperature for 15 seconds and then it is cooled to below 4.5°C.

**Homogenisation of milk:** Some liquid milks are homogenised, a process by which the butterfat particles in the milk are physically reduced in size to mix more evenly with the water component of the milk (this produces a more stable emulsion).

**Milk powder** comes in two types:

1. full cream milk powder
2. skim milk powder.

Milk powder has a lower butterfat content than full cream milk powder.

Constituents	Full cream, milk powder	Skim milk powder
Water	2.5%	2.0%
Butterfat	28.2%	0.8%
Casein and albumen (protein)	26.6%	36.7%
Lactose (milk sugar)	36.8%	51.1%
Ash	5.9%	9.4%

The functions of milk in cakes and puddings:

- Milk adds flavour to the cake/sponge/cookie product.
- Milk improves the crust colour by caramelisation of the lactose (milk sugar) and the Maillard reaction.
- Liquid milk will help to bind dry ingredients together.
- The butterfat and lactose content of the milk improve the richness of the cake/sponge/cookie product, as compared to water.
- Milk improves the food value of the cake product.

**Storage:** Store fresh and reconstituted milk at between 1°C and 5°C. Store milk powders in a cool, dry, well-ventilated location.

To make liquid milk from milk powder (reconstituting milk powder):

1. Mix the milk powder with water at the ratio of 1 part milk powder to 10 parts water (10% milk powder) or as recommended by the manufacturer.
2. Place cold water into a bowl/bucket, sprinkle the milk powder on top of the water and then whisk rapidly to mix together.

## Baking powder

Baking powder is made up of 2:1 ratio, 2 parts acid, and 1 part alkali:

- an acid (acid sodium pyrophosphate)
- an alkali (sodium bi-carbonate)
- a neutral agent (flour or starch).

**Tip:** *Baking powder needs heat and moisture to react.*

Baking powder is a mixed blend of food acids (of which there are several types) and bicarbonate of soda with starch added to prevent the baking powder from lumping during storage. During the baking process the acid ingredients react with the bi carbonate of soda contained in the baking powder, forming carbon dioxide gas. None of the acids nor the soda remain in the finished product, because they neutralise each other.

How does baking powder improve cakes and puddings?

- The baking powder is normally added with the flour and mixed through the batter, which is then placed in tins or on trays then baked.

- With the presence of water from the batter and the heat of the oven, the acid acts upon the alkali to release a gas known as carbon dioxide.
- The carbon dioxide gas is entrapped in the batter and causes it to rise. The carbon dioxide also helps to produce what we know as the texture of the cake (the cellular structure).
- The function of the neutral agent (flour/starch) in the baking powder is to help minimise any reaction between the chemicals prior to adding to the batter.
- Gluten free baking powder is available when working with gluten-free products.

**Storage:** Store baking powder in a sealed container, in a cool, dry, well-ventilated location.

## Cocoa powder

Cocoa powder is milled from the cocoa bean. It is added to cake batters to flavour the product with chocolate. Cocoa powder is available in various qualities. The quality of cocoa powder is mainly determined by the level of cocoa butter that it contains. The higher the level of cocoa butter the richer the flavour.

### Dutch cocoa

A type of cocoa known as Dutch cocoa is available to the food industry. This type of cocoa has been treated with an alkaline substance to help produce a cocoa which has:

- a richer, less bitter flavour
- a richer and darker colour.

Plain cake batters may be converted into chocolate cakes by the addition of cocoa powder. Cocoa powder will produce a dry crumb; therefore, you need to add additional water or milk to the batter. The cocoa powder and extra water/milk will close the crumb; therefore, you will need to add extra baking powder to open the texture and produce the desired volume.

To do this successfully use the following guidelines:

- Substitute approximately 10% to 20% of the flour weight with cocoa powder.
- Add extra water/milk equivalent to the weight of the cocoa.
- Add extra baking powder to help open the texture and increase the volume.

### Example:

A recipe containing 1000 g (1 kg) of flour can be adjusted as follows:

- Flour: 800g
- Cocoa: 200g
- Milk: 200g (equal to the weight of the cocoa)
- Baking powder: 10g

### **Flavouring the batter with chocolate paste**

As an alternative to using cocoa to produce a chocolate cake batter you may add a commercial chocolate paste to the batter.

- The chocolate paste contains cocoa, flavours and colours and may be added to the batter at the beginning of the mixing procedure or after the batter has been mixed and is ready to be deposited.
- Make sure that the paste is evenly mixed through the batter to avoid streaks in the baked cake.
- When using chocolate paste there is no need to adjust the recipe, therefore the plain batter may be used to produce varieties other than chocolate cake. The remaining batter can be flavoured with the chocolate paste to produce chocolate cakes.
- Add the paste in the dosage recommended by the manufacturer.

## **Conditioning of dried fruits**

Fruit is an important source of flavour and colour in bakery products. There is widespread use of variations to fruit fillings. They now come frozen, dried, whole, sliced and fresh. Because of the fruit, the cake or pudding will take longer to bake because of the moisture content. Fruit is generally better when it is fresh in season or picked when it is ripe and packaged correctly.

### **Dried fruits**

Dried fruits are available in various grades for use in batters and similar. The most commonly used dried fruits include:

- sultanas
- currants
- glace cherry
- apricots
- sliced apple

- dates
- prunes (plums)
- figs
- pineapple
- cranberry.

## Preparation of dried fruits for use in bakery products

To help improve the qualities of the dried fruit 'wash' the fruit as follows:

- Remove the fruit from the packaging and separate the pieces, removing stalks, etc. when using cheaper ingredients.
- Place in a sieve or similar and remove all seeds, stalks and dirt in cold water.
- Store in a container with an air tight lid.
- For extended storage refrigerate.
- Wash fruits as required and avoid having excessive amounts which may ferment in warmer weather.

Advantages of washing dried fruits include:

- removing seeds, stalks and dirt which improves the eating qualities
- hydration of dried fruit as the fruit is increased by the absorption of water (approx. 10%)
- lengthening moisture duration of the cake and pudding (less migration of moisture from the cake/pudding into the fruit)
- extending the amount of batter making production more cost effective.

### Glaze fruit (cherries, pineapple, apricot, etc.)

Most glaze fruit (pineapple, apricots etc.) may be cut into small pieces approximately the size of a raisin or sultana for more even dispersion of the fruit through the cake. Remove any excess syrup from the fruits before cutting.

Glaze cherries are available as either red or green glaze cherries. When you purchase them you will find that they have been packaged in a sugar syrup. Before use, rinse off the syrup with cold water and allow to drain. Failure to remove the syrup will cause discolouration of the cake batter.

## Candied fruits (mixed peel, candied lemon or orange peel)

Mixtures of chopped citrus peels are commonly used in conjunction with dried fruits. They can be used as purchased or you can chop them as desired (no washing required).

Used straight from the box, they will not need treating or washing, but may require breaking up or loosening if clumped together. If the fruit content of a recipe is soaked in alcohol overnight, add peel to the rest of the fruit as normal. When using a cheaper quality, some peel may be of uneven size and need further cutting.

## Tree fruit (dates, apricots, apple, peaches, etc.)

Cut the fruit into small pieces approximately the size of a raisin or sultana for more even dispersion of the fruit through the cake.

## Soaking with spirits or liqueurs

It is recommended to add the spirits (brandy, rum etc.) or liqueurs to the dried fruits at least 24 hours prior to use. This will allow the spirits/liqueurs to soak into the fruits and retain more flavour during baking. If adding glycerine to the cake it is also common practice to add it to the fruit – this will also help to keep the fruit moist.

Remember that during baking the alcohol content of any spirits/liqueurs will evaporate but the flavours will remain in the cake.

As an alternative you may wish to brush the spirit/liqueur onto the baked cake.

## Special dietary ingredients

### Allergies

The most common triggers of food allergy reactions in childhood are peanuts, tree nuts, milk and egg. Common triggers of food allergy in adults are fish, shellfish, peanut and tree nuts. Insect sting and bite allergies, such as tick, are more common in adulthood.

Australia has a relatively high prevalence of **peanut allergy**. According to *Allergy and Anaphylaxis Australia*, almost 3 in every 100 children have a peanut allergy.

Around 20 percent of children grow out of their peanut allergy. Those children who have had more severe allergic reactions including breathing problems are much less likely to outgrow their peanut allergy than children who have experienced milder reactions. Sometimes, peanut allergies do not appear until later in life.

**Egg allergy** is one of the most common food allergies in childhood, affecting about 8 percent of infants aged 12 months. Eighty percent of these infants are likely to outgrow their egg allergy within the first few years of life. Most children, even those who have had severe reactions, do eventually outgrow their egg allergy although some may not outgrow it until their teen years. A very small number of adults have egg allergy for life.

**Milk allergy** is one of the most common food allergies in childhood, affecting about 1-2 percent of preschool children. Fortunately, most children will grow out of their milk allergy. Current anecdotal observation suggests that whilst, in the past, most children would outgrow their milk allergy before starting school, increasing numbers are now outgrowing their milk allergy much later. Some children enter high school years with milk allergy and outgrow it in their teen years and a small number do not outgrow it. This small group remain milk allergic into adulthood.

Milk or milk products may be found in foods we don't always expect them to be in. It is important to use common sense and read food labels carefully.

This information has been taken from the Allergy and Anaphylaxis Australia website (<https://allergyfacts.org.au/allergy-anaphylaxis/food-allergens>). Students are encouraged to research the website and refer to the Allergen Cards.

## Vegetarian

Vegetarian refers to a dietary requirement where animal meats are not consumed. This includes such products as beef, pigs, poultry and seafood.

## Vegan

Vegan diets do not include any animal products including, milk, cheese, eggs, and honey. They consist of plant foods.

Some people choose to become vegetarian or vegan as a healthy lifestyle choice or for ethical reasons. There are also sound social reasons to be a vegetarian. Livestock production accounts for nearly 80 percent of greenhouse gas emissions from agriculture worldwide. It also places a much heavier burden on water, land and fossil fuel resources than grains and other crops.

When preparing vegetarian and vegan products it is important to ensure you avoid cross-contamination so that meat, poultry and seafood products are not included.

## Lactose free

Lactose is a sugar naturally found in milk and dairy products. A lactose free diet means eating foods that have no lactose. In Australia, Up to five percent of Caucasians and up to 75 percent of non-Caucasians living in Australia are lactose intolerant.

## Gluten-free

A gluten free diet involves avoiding any food containing gluten – found in wheat, rye, barley, triticale and oats. Gluten free diets are common for the treatment of coeliac disease and irritable bowel syndrome (IBS).

## Substitute ingredients

There are many substitute ingredients that can be used when catering for special dietary requirements. Some common ingredients are listed in the table below.

Ingredient	Substitute
Milk	Soy milk, rice milk, oat milk, hemp milk or a variety of nut milks (e.g. almond milk)
Buttermilk	Add 1tsp of vinegar for every cup of plant-based milk due to the higher levels of acidity needed for buttermilk
Cheese	Vegan cheese, nut cheese, nutritional yeast (be careful of casein – this is not vegan)
Bakers Flour	Gluten free flour (includes gums and other ingredients to replicate the function of gluten protein), polenta, chick pea flour, lentil flour, potato starch, corn-starch, rice flour, nutmeal
Eggs	Apple sauce, mashed bananas, flax egg (water and chia/flax seeds), pureed soft tofu, egg replacers, aquafaba (chickpea brine)
Butter	Vegetable oils, coconut oil, vegan butter
Yogurt	Coconut, soy or almond yogurt
Sour cream	Silken tofu, non-dairy yogurt

Ingredient	Substitute
Gelatine	Agar flakes or powder, vegan gelatine
Honey	Agave nectar, maple syrup and coconut nectar
Chocolate	Carob, vegan chocolate chips

## Storage of ingredients

Ingredient storage is not only an essential part of running a successful business, but an essential element of quality control which must be observed by all employees involved in the production, finishing, selling, packaging and handling of bakery items. To avoid wastage and/or spoilage of valuable stock and product, the correct storage conditions must be met.



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## Wet storage

Including refrigeration or freezer space. For the storage of fresh produce such as vegetables, fruits, dairy goods, meats, custards and other prepared fillings or batters. Ideally strong smelling goods such as fish, onions and smoked produce should be stored separately from other perishables to avoid taste transfer and contamination.

Other storage points of importance:

- Avoid overstocking.
- Rotate all stock.
- Wash dried fruits as required to prevent fermentation.
- Wrap/rewrap partly used foods well to avoid flavour transfer or contamination.
- Store foodstuff (especially fats and oils) away from strong sunlight or other heat sources.
- Cooked and uncooked foods should be stored in separate areas.
- Thaw frozen ingredients slowly over a period of time and in a cool room or a refrigerated space.
- Date all stored foods and check regularly.
- Conduct stocktakes regularly.
- Practise safe handling procedures by using lifting gear as needed for heavy or large items.
- Conduct regular pest inspections.
- When receiving stock, be alert to broken seals, dented cans or damaged containers and ask supplier to replace them immediately.

## Dry storage

Cool, dry, well-ventilated area away from damp conditions. Powdered and dry ingredients, such as flour, sugar, milk powder and starches, have been treated to extend their storage capability. They are readily affected by damp conditions, as they are hygroscopic by nature and easily absorb moisture. This attraction of moisture, at best, renders the ingredients lumpy and difficult to mix during production and, at worst, can cause fermentation, also destroying any hygienic barriers introduced by drying. The only solution is to dispose of the affected ingredient.

Canned goods, etc. should also be stored in dry conditions.

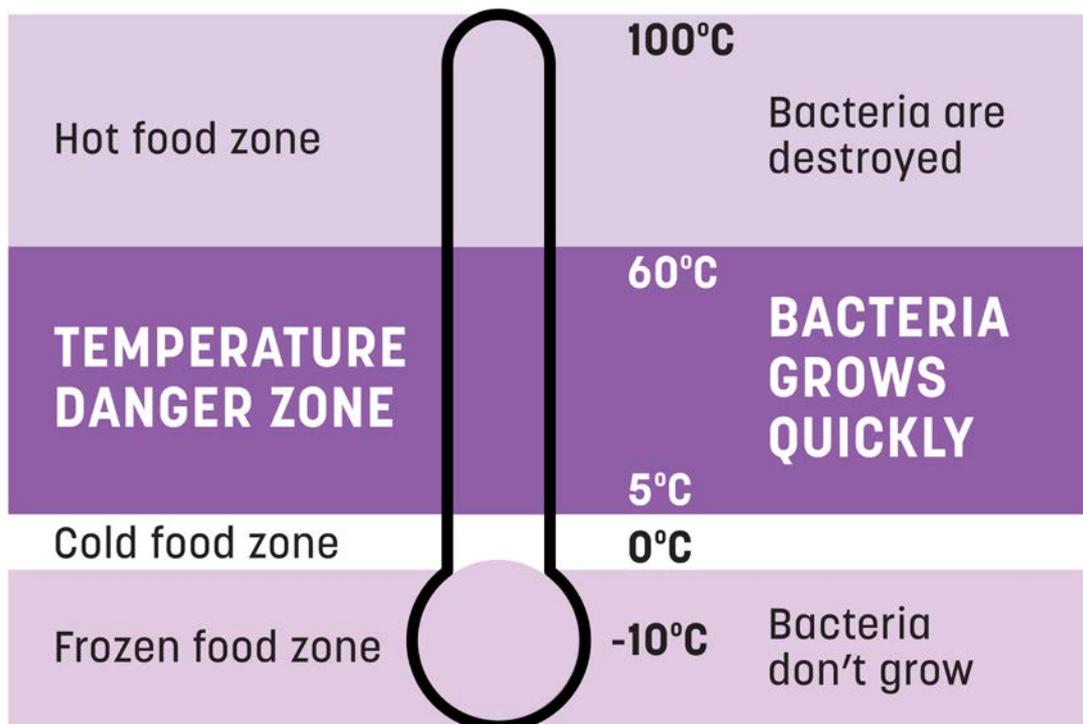
## Higher risk ingredients

There are some ingredients that are considered a higher risk of contamination and have additional food safety requirements, for example Dairy cold stores need to protect food from contamination and keep food at the correct temperatures (i.e.  $< 5^{\circ}\text{C}$ ). For further details, refer to *Standard 3.2.2 - Food Safety Practices and General Requirements, clauses 5, 7 and 10 of the Food Standards Code* and the FSANZ Guide Safe Food Australia.

## Temperature danger zone

The temperature range between  $5^{\circ}\text{C}$  and  $60^{\circ}\text{C}$  is known as the *temperature danger zone*. This is because in this zone food poisoning bacteria can grow to unsafe levels that can make you sick.

### Keeping cold food cold



© TAFE NSW

Keep your fridge below  $5^{\circ}\text{C}$ . At these temperatures most food poisoning bacteria stop growing or they grow slowly. Use a fridge thermometer to check that the temperature stays around  $4^{\circ}\text{C}$  to  $5^{\circ}\text{C}$ . Also make sure you have enough fridge space as fridges won't work properly when they are overloaded or when food is packed tightly because the cold air cannot circulate.

If you are running out of room in your fridge, remove foods that are not potentially hazardous, such as jams, pickles, and vinegar-based dressings, bottled or canned drinks. The temperature of these foods is not critical for safety and they can be kept cool in insulated containers with ice or cold packs.

Freshly cooked food, not for immediate consumption, should be cooled to below the danger zone as quickly as possible. Divide food into small shallow containers and place in the fridge or freezer as soon as it stops steaming.

Keep your fridge below 5°C. At these temperatures most food poisoning bacteria stop growing or they grow slowly. Use a fridge thermometer to check that the temperature stays around 4 to 5°C. Also make sure you have enough fridge space as fridges won't work properly when they are overloaded or when food is packed tightly because the cold air cannot circulate.

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Freshly cooked food, not for immediate consumption, should be cooled to below the danger zone as quickly as possible. Divide food into small shallow containers and place in the fridge or freezer as soon as it stops steaming.

### **Keeping hot food hot**

Hot food needs to be kept and served at 60°C or hotter. If you are keeping it warm for someone put it in the oven at 60°C or at 100°C if that is as low as your oven will go.

### **Two-hour/four-hour rule**

Use the two-hour/four-hour guide below to work out what action you should take to avoid food poisoning if potentially hazardous food is held at temperatures in the danger zone.

This information has been taken from the Food Safety website at:

<http://foodsafety.asn.au/topic/temperature-danger-zone/>



## Practice activity

### Activity 3.2: Check your knowledge

1. List the four ingredients used in the making of a pound cake.

2. List two reasons why it is important to weigh and measure ingredients correctly.

3. What is a simple test you can do to determine whether the sugar is pure icing sugar or icing sugar mixture?

4. List three functions of sugars in cake production.

5. What are two functions of eggs in cake products?

6. What are two different products used for chemical aeration?

7. When making a cake what could you do to precondition the ingredients? Give two examples.

8. Read the article “The costs of Improper Food Storage” at

[https://www.foodsafety.com.au/blog/costs-improper-food-storage.](https://www.foodsafety.com.au/blog/costs-improper-food-storage)

a. What are three ingredients that would be considered potentially hazardous foods (PHF) in a bakery?

b. What does FIFO mean in relation to food storage?

9. Identify the ingredients responsible for opening the texture of a cake.

10. Identify the ingredients responsible for closing the texture of a cake.

11. Refer to the [NSW Food Authority](http://www.foodauthority.nsw.gov.au/) website and your learner guides to answer the following questions. What are the food safety requirements and correct storage for the following ingredients? The link to the NSW Food Authority is:

<http://www.foodauthority.nsw.gov.au/>

Ingredients	Food safety	Storage
Milk		
Eggs		
Cream		
Butter		
Margarine/shortenings		
Chemical aerators		
Sugar		
Flours		
Royal icing		

## Multiple choice questions

12. The basic formula for cake is flour, egg, sugar and which other ingredient?

- Milk
- Salt
- Fat (butter)
- Cocoa powder

13. Which of the following ingredients enrich a cake batter?
- Fat and flour
  - Alcohols and baking powder
  - Fruit and bicarbonate of soda
  - Sugar and eggs
14. Which of the following ingredients make the cake texture dense or heavy?
- Milk
  - Sugar
  - Fat
  - Eggs
15. If you use too much of these ingredients they will weaken the structure of a cake.
- Sugar and flour
  - Eggs and bicarbonate of soda
  - Milk and gluten powder
  - Baking powder and raw sugar
16. Pre-conditioning of ingredients in cakes ensures:
- The greatest amount of product can always be produced from a recipe
  - Best functioning of ingredients during processing is achieved
  - Correct coagulation of flour and egg proteins is achieved
  - Gelatinisation is made possible by warming ingredients
17. What do the fats do in cake and sponge products?
- Helps produce a shorter eating product
  - When mixed mechanically the fat will entrap air and increases volume
  - Helps improve keeping qualities
  - All of the above

### True or false questions

18. All cake recipes contain hi-ratio flour.
- True or  False

19. Flour is the basis for calculating the amounts of all other ingredients in a recipe for a conventional cake.

True or  False

20. When calculating a recipe for conventional cakes the amount of sugar required is calculated at 25% of the total weight of the flour, fat, egg and milk?

True or  False

21. Sugar, baking powder, fats and eggs are all ingredients that open the texture of a cake.

True or  False

22. The two ingredients that provide strength and structure to a cake are flour and eggs.

True or  False

23. When balancing a recipe, you need to have a balance between ingredients that open and close texture.

True or  False

24. Formula balance is not important in recipe calculations.

True or  False

Topic 4

# Mixing techniques



## Topic 4: Mixing techniques

This topic discussed the different mixing and processing techniques required for producing different types of cake and pudding batters.

You will learn about the following:

- measuring ingredient quantities for recipe specifications
- loading ingredients in the required sequence
- mixing batter process
- scraping down the mixing bowl
- aeration
- operating and monitoring mixers to mix batter using the following mixing methods
  - sugar batter method
  - flour batter method
  - blend method
  - all in method
  - using pre-mixes
  - sifting techniques
  - identifying faults.

### Following recipe measurement specifications

A recipe is a list of ingredients in a sequence of processing with a method of preparation and instruction to produce, bake and decorate cake or puddings.

A recipe assumes that you have the knowledge and skills in cake making, selecting correct ingredients to follow these instructions, and how to accurately measure ingredients for that product.

A standardised recipe that has been correctly tested will control the quality of the products being produced no matter who is using the recipe.

A recipe should include:

- the name of the product being produced
- a yield and total batter weight
- scaling weight of product

- a list of ingredients and the exact amount listed in order
- a method
- a list of equipment required to produce the recipe
- baking times, temperatures and conditions.

It is important to:

- Measure all ingredients to the recipe specifications. The measurements are important in gaining consistent yield and quality of cakes and puddings. Any alterations may affect the timing, taste and amount of finished goods.
- Follow the sequence as specified by the recipe when combining the ingredients and adding the ingredients to the mixer. Using the correct equipment and following the correct sequence will assist with producing consistent and high quality products.

## Process of mixing the batter

Apart from using a balanced recipe and accurately weighing the ingredients, it is important to follow through with the correct procedure for making the cake batter, depositing the batter into prepared tins, baking the cake, de-panning and cooling the cake to avoid serious faults that would render the cake unsaleable.

As part of the process of mixing the batter we need to observe the following:

- Carefully follow the mixing instructions provided in the recipe.
- Sieve dry ingredients to remove lumps (particularly cocoa and milk powder).
- Ingredients need to be preconditioned to the correct temperature for optimum mechanical aeration and stable emulsification of fats with liquids.
- Use the correct machine mixing attachment.
- Have sufficiently sized batch for the size of machine mixing bowl.
- Observe what is happening during the stages of mixing (e.g. insufficient mechanical aeration, curdling of the batter) and, if necessary, make modifications to the process to achieve optimum results.

Ensuring the correct amount of chemical aeration of a cake batter is achieved by accurately weighing the baking powder or bi-carbonate soda.

To achieve the correct amount of mechanical aeration requires skill and control of the machining of the batter. Each time you make the cake you aim to produce maximum and stable aeration to the same volume—particularly important for cakes to be packed in standard size packaging. If the cake is too large it will not fit the packaging, if it is too small it appears that the customer is not getting value for money.

Bakeries producing pre-packed cake for sale at various retail outlets (e.g. Top Taste, Sara Lee) use a method of controlling the amount of mechanical aeration in the batter. In this method, the specific volume of the batter is measured (amount of aeration achieved during processing). During the development stages of the cake batter a specific volume measure is determined as providing the desired results. Each time the cake batter is made it is mechanically aerated to the same specific volume measure.

## Chemical aeration

Chemical aeration is achieved by using baking powder and bi carbonate soda (one of the first pre-mixes used in modern baking).

Baking powder is a combination of an acid and an alkali. It often comes with a third ingredient, or neutraliser, added to keep it dry and prevent premature activity during storage.

Types of acids used:

- tartaric acid—fruit acid
- cream of tartar—commercially made as a by-product of wine making
- acid phosphates—derived from phosphoric acid
- gluconic acid delta lactone (GDL).

Type of alkalis used:

- bi-carbonate of soda.

## How chemical aeration works

The acids will react with the alkali to release carbon dioxide gas when mixed with liquid (water, milk or egg, etc.) and then brought into contact with heat (baking source). This gas becomes trapped in the structure (gluten/protein network) of the bakery product, causing it to rise. The baking process during the oven time 'sets' the product in its 'risen' state.

## Mechanical aeration

Mechanical aeration is the physical beating or whipping of a mixture to incorporate air, i.e.:

- whisking eggs with sugar to trap air into the egg foam for cake and puddings
- whipping cream to a light foam as a filling or topping
- whisking egg whites and sugar for meringue production
- beating fats and sugars together to produce a light buttercream ('creaming the fat' is a term used to describe the mechanical aeration of fats).

The two aeration methods, chemical and mechanical, are often used to supplement each other in cake making. The beating of air into a mixture opens the crumb and texture of the cake and baking powder assists with aeration in the baking process. The final product is a well-aerated, even textured and light cake.

### How it works

High-speed mixers are able to incorporate large amounts of air into a mixture very quickly. As the whisk or beater passes through the batter or foam, it creates a draft or pocket of air behind it. The ingredients, when mixed together, form a structure around the air bubbles and, as the mixture 'thickens' during the process, it traps the air. In the case of a conventional cake and pudding, if baking did not take place this air would gradually make way to the surface and be lost.

To achieve good aeration, consider the following:

- Use clean equipment—especially when making meringue. Make sure it is grease-free.
- Pre-condition the ingredients for maximum aeration.
- Carefully weigh all ingredients.
- Scrape down at regular intervals.
- Don't interrupt the mixing cycle.
- Add ingredients in correct sequence/amounts.
- Use the manufacturer's guide when using pre-mixes.
- Maintain batter temperature.

To achieve good results:

- Have cake tins or trays prepared for immediate depositing and baking.
- Have ovens pre-set and ready to bake.

- Scale accurately for consistent product size and weight.
- Work with an assistant to help spread or deposit batter quickly.
- Avoid spillage, drips and waste.

## Preparation and mise en place

For better baking, practice mise en place, or “putting in place.” This refers to having all of your ingredients prepped and measured before getting started. This is essential as it ensures you have all your ingredients available and prepped before you start processing. It also allows efficient workflow as often, time is of the essence.

This also means reading and understanding the instructions from start to finish and making sure the ingredients are the correct temperature. Unless otherwise specified, butter, eggs, and dairy products should be room temperature before starting a recipe. Butter must be softened, but not melted, for creaming with sugar and when making buttercream. Having all of your ingredients pre-conditioned makes for a more homogenous, smooth batter.

## Mixing methods

We will now look at a range of mixing methods and techniques. For each one, it is important to focus on the correct sequence, technique and use of equipment.

- Sugar batter method
- Flour batter method
- Blend method
- All in method
- Using pre-mixes

### Sugar batter method

The sugar batter method is commonly used for making cakes.

The steps for this method are:

1. Pre-condition the ingredients.
2. Cream the fat with the sugar with beater attachment on medium speed until light.
3. Gradually add the egg, emulsifying and scraping well between each addition.
4. Add the sieved flour, baking powder, milk powder, cocoa powder, spices, etc. and blend on low speed until smooth and free of lumps.



Copied Under s113P, Sujas Kitchen (Online), How to bake Sugar Cookies, <http://sujaskitchen.blogspot.com/2017/12/sugar-cookies.html> (accessed 11/03/2019)

## The flour batter method

This method was developed during the Second World War when there was a shortage of ingredients. By using this method, bakers were able to produce cakes of reasonable quality with low levels of fat, sugar and eggs. In this method, the flour is added in two separate portions.

The steps for this method are:

1. Pre-condition the ingredients.
2. Whisk the eggs with an equal weight of sugar to half volume.
3. Cream the fat with an equal weight of flour with the beater attachment on medium speed until light.
4. Gradually beat the egg foam into the creamed fat/flour with beater attachment on a low speed, scraping the bowl between each addition.
5. Add the remaining flour with the baking powder, milk powder, etc. and blend with beater attachment on low speed until smooth and free of lumps.
6. Dissolve the remaining sugar in the water and add to the batter. Blend using the beater attachment on low speed until smooth and free of lumps.

## Advantages of the flour batter method

There are several advantages of using the flour batter method including:

- A good quality cake can be made from a cheap recipe (low in fat, eggs, sugar).
- Because the fat is mixed with a major part of the flour at the beginning of mixing there is little chance of gluten development.
- Since there is a large proportion of flour in the bowl when adding the egg, there is little chance of curdling the batter.
- The amount of mechanical aeration is increased by the stages of whisking eggs, creaming the fat and then gradually beating the egg foam and fat together.

## The blend method

This method is used when the weight of the sugar is equal to or greater than the weight of the flour.

1. Using a beater attachment, blend the sieved dry ingredients on a low speed with the fat to a crumbly consistency.
2. Gradually add the egg and approximately half of the water and blend on low speed for 5 minutes. Scrape the bowl well between each addition.
3. Gradually add the remaining water, scrape down the bowl and blend on low speed for another 5 minutes until the mix is clear.

*Note: All mixing is done on low gear.*



Copied Under s113P, Queen Cakes are Fun (Online), <http://queencakesarefun.blogspot.com/> (accessed 11/03/2019)

## The all-in-one method

All dry and liquid ingredients are mixed together at once. Cakes made by this method are different to other methods relying on an emulsifier or stabiliser. It is a convenient method and does not depend on a long beating process to aerate the batter.

The steps for this method are:

1. Pre-condition the ingredients
2. Place the liquids in the mixing bowl.
3. Place the dry ingredients on top, with the fat on top of the dry ingredients.
4. Blend together on low speed, scrape the bowl, and then mix on high speed for 3 to 5 minutes, until sufficiently aerated.

**Note:** Liquids are placed in the bowl first to prevent the dry ingredients from sticking to the base of the bowl.



Cake dough in a mixing bowl by [pixel2013](#) under [Pixabay licence](#)

## Working with pre-mixes

Premixes have been in use in the baking industry for quite a few years now and, as time goes by, more and more become available.

Premixes are a mixture of dry ingredients that have been blended in a balanced ratio. The baker only needs to add a few ingredients (e.g. egg, water, fat) to produce a batter.

There are premixes available to produce sponge, cake, bread, scones, pastry, custards, cream fillings, mousse fillings, etc.

In earlier times, each baker made their own jams and fondant, but now the majority of bakers purchase these ready-made from suppliers, therefore one could look upon these types of products as being premixes also.

What are the advantages of using premixes?

- It saves time in weighing up ingredients.
- It minimises the chances of making mistakes in weighing up.
- It helps to standardise the finished products.
- It can reduce the amount of ingredients needed to be ordered.
- It helps to simplify the storage of ingredients.
- Premixes are easy to use, most premixes are made by the all-in method or similar.

## Scraping down the mixing bowl

The main reason for scraping down the mixing bowl is to make sure that all ingredients are evenly mixed (no lumps of fat, etc. through the mix), so as to produce the best result possible.

You should scrape the mixing bowl as often as necessary using the correct scraper for the shape of the bowl. You may need to turn your machine off, remove the attachment and scrape where the beater does not reach the base of the bowl.

For an all-in mix it normally only requires to be scraped down after the initial blending of ingredients.

For other methods of mixing, where ingredients are added in various stages, it is necessary to scrape down during each stage and again after all ingredients have been added.

After depositing the batter onto trays it is also necessary to scrape the mixing bowl to remove all batter—to avoid wastage of ingredients, provide maximum yield and make the job of washing the mixing bowl much easier/quicker. Remember, all of these are necessary to make your bakery more cost-efficient.

## Mixing tip: Sieving

Sieving is a technique of distributing micro ingredients like baking powder and milk powder within the flour of a cake formula through a fine sieve.

Sieving is also used to remove lumps, to create fine particles of ingredients when making make icings or dusting.

Most recipes suggest sifting ingredients for better distribution in cake batters and best baking results.

## Identify faults and rectify

You should check cakes and pudding batters regularly to identify faults and rectify if required. The main goal of mixing cake batters are to:

- combine all ingredients in sequence until emulsified and the batter is smooth
- incorporate the correct amount of air cells in the cake batter.

When producing cake and pudding batters it is necessary to be able to identify faults and rectify them before the baking process commences.

Most faults in cake batters are due to:

- too much mechanical aeration (batter over aerated)
- not enough mechanical aeration (batter under aerated)
- incorrect ingredient ratios
- ingredients not pre-conditioned (eggs and fat straight out of cool room)
- incorrect attachment for mixing (using a dough hook to produce a cake batter).

To identify the possible fault and the corrective action required takes experience and knowledge of producing correct aeration and emulsification of ingredients into cake batters. To start building these skills you can check the batter and pay attention to the correct consistency by asking:

- Does it have lumps?
- Are the ingredients mixed well together?
- Do I know how to use the appropriate mixing equipment, and identify equipment faults?



## Practice activity

### Activity 4.1: Methods

Throughout the practical activities you will get the opportunity to practice your skills with the various mixing methods. Take notes, using the table below, for each of the methods to help you to remember the appropriate techniques.

Method	Type of cake or pudding that uses this method	Techniques
All-in-one		
Sugar batter		
Flour batter		
Blend		



## Self-check questions

### Activity 4.2: Check your knowledge

Read the questions carefully.

1. What does “high ratio” mean?

2. What are the duties and functions of chemical aerators when used in the cake making process?

3. What is the main reason for continually scraping down the mixing bowl when making cakes?

4. When adding the flour to the cake batter using a mixer, why is it important to finish mixing on the low gear of your mixer?

5. What is the advantage of using the all-in-one method for cake making?

6. Explain the sugar batter method for cake making.

7. Explain the flour batter method for cake baking.

8. What is the mixing method for producing fruit cake batters?

9. Provide three reasons why pre-conditioning eggs is important.

10. What are the three main causes of faults in cake batters?

Topic 5

# Baking and steaming



## Topic 5: Baking and steaming

This topic will teach you the skills you need to bake and steam cake and pudding batters to produce the required bakery product. You will learn both practical skills and knowledge on the following:

- preparing tins and trays for batters and batter processes
  - depositing
  - spreading
  - piping
- steaming and boiling of puddings
- setting baking and steaming temperatures and times
- loading and monitoring ovens and steamers
- baking of cakes including radiant and conductive heat
- de-panning without damage
- cooling
- sensory identification of baking process
- checking cakes and pudding batter to identify faults and rectify if required.

The baking and steaming process is dependent on several factors. Temperature and time in the oven or steamer are important, however the tin selection and preparation of your tins and trays are just as critical to getting the best bake.

During baking it may be necessary to bake on inverted trays or place the tins on several layers of paper to prevent a burnt base, due to the high sugar content in the cake. Alternatively, the bottom heat on the oven may be turned down.

Puddings are steamed, not baked. There are different equipment and techniques for steaming puddings. In this learner guide, you may learn about using a baking coffin or a bain marie.

## Preparing tins and trays

Tins and trays are prepared by either spraying, greasing or covered with paper to protect the batter from sticking to the tins or trays, and to prevent burning on the base of cakes and puddings. Whichever method you prefer to use, make sure the tin/tray is clean before greasing, and that you grease all of the base and sides of the tins. You don't want to waste precious time and ingredients by remaking a cake that has stuck to the side of tin and been damaged.

### Preparing tins for baking fruit cake

When fruit is added to the batter, sometimes 3: part fruit, 1: part batter (a heavy fruit cake) the cake will take longer to bake than a plain cake. To prevent the formation of a thick, dark crust and a dry crumb it is recommended to insulate the cake by lining the cake tin with several layers of paper or similar.

#### Preparation tips

- It is essential to have the tins or trays prepared before mixing the batter. Delays following mixing can cause premature reaction to baking powder and the stability of the cake batter can be lost due to delays in processing.
- Check the tins or trays for absolute cleanliness before preparing.
- Prepare the tin, tray or hoop by the correct method.
- Achieve a uniform coating of oil (spraying) or tin grease. Too much oil or grease will cause excessive spread and frying of the cake crust, while ungreased sections will prevent rise and cause the cake to stick to the tin when de-panning from the oven.
- The use of paper on the baking tray eliminates the need to clean the trays after each bake and insulates the product during the baking process.

Preparation of the trays will also vary between cake and pudding products. Some tin selection and preparation for basic products are demonstrated below.

Type of cake and pudding	Preparation of trays, tins and moulds
Fruitcake	Combination of spraying, tin grease, paper
Muffins	Cupcake or café papers
Bar cake	Combination of spraying, tin grease, paper

Type of cake and pudding	Preparation of trays, tins and moulds
Cupcakes	Cupcake or café papers
Cheesecake	Combination of spraying, tin grease, paper
Rock cakes	Silicone paper or mats
Pudding	Combination of spraying, tin grease
Gugelhupf	Combination of spraying, tin grease
Friands and financier	Combination of spraying, tin grease

The use of professional release agents will be more effective in a baking environment.

When spraying (oil):

- ensure uniform spraying to gain an even bake
- be careful in corners and grooves. The tin needs to be completely covered to eliminate sticking.

When greasing, the importance of fat coating is to allow for even expansion in the oven, and complete release from tins when baked.

- Apply the grease with a soft brush in a flowing motion to ensure complete and even coverage of the inside surface of the tins.
- The use of paper on the baking trays eliminates the need to clean the trays after each bake.

When using paper as a form of insulation:

- Neatly line the tins with several layers of paper or similar, to insulate the cake during baking.
- If using cake hoops firstly line the sides and then cut the base paper slightly larger than the hoop, cut small incisions into the edge of the paper and place into the hoop so that the batter is contained within the hoop.
- Place the tins or hoops onto several layers of paper or thick cardboard on a baking tray. The paper/cardboard helps to prevent a thick crust from forming on the base of the cake. To prevent a thick crust forming on the surface of the cake, place a sheet of paper during the baking process and/or reduce the top heat in the oven.

## Depositing

Depositing refers to the processing of dropping batter into the tin or tray. This can be done by two methods hand depositing or piping.

Hand depositing refers to the process of using your hand to deposit batter into a prepared cake tin. The prepared cake batter is deposited from the mixing bowl to the prepared tin by hand. This technique is acquired and it is important to scrape your hand on the side of the bowl to ensure a clean transfer of batter into the tin. This is a specialised bakery skill that is attained by regular practice.

- When depositing batter onto a prepared tray for smaller cake products:
- Keep them all the same size.
- Deposit them into a consistent shape.
- Space them sufficiently on the tray
- Carefully deposit the cake batter into the base of the tin/hoop – avoid getting cake batter on the tin/hoop.
- Press the batter down into the tin/hoop.
- Using the back of your glove covered hand, dip in clean water and smooth the top of the cake so that it is level and slightly concaved to the centre (as the cake rises during baking you will find that it will rise with a flat top rather than a domed top).
- If being sold without icing the top of a fruit cake can be decorated with glace cherry halves and almond halves, flakes or filleted almonds. Take care to handle the cherries and almonds with clean hands, as any cake batter baked on them will spoil the appearance.

## Spreading

When making rolls or sheets, spreading refers to the spreading of the batter mixture evenly on to the prepared tray using a crank handle palette knife. To maintain maximum aeration use minimum strokes of the palette knife and spread the mixture uniformly.

Spreading also refers to the spreading of fillings e.g. jam, creams and buttercreams.

## Piping

When making friands and financiers, the cake batter is piped using a piping bag and tube and onto a prepared tray in a uniform manner. This method of depositing is known as the piping method. It is important to monitor filling the piping bag to avoid dripping the batter.

## Steaming and boiling of puddings

As mentioned previously, the steaming baking process aims to produce a crumb texture that is denser than a fruit cake, and yet has no visible crust. This is due to steaming at a lower temperature and the humid baking environment.

The technique includes the following considerations:

- Scale the pudding mix into either foil or heat resistant pudding moulds.
- Baking ovens: Place the puddings (moulds) into steaming coffins. Place the coffins into the oven so that you can safely pour hot water into the coffin, half way up the side of the pudding. Place the lid on and steam/bake for the required baking hours.

Or:

- Atmospheric steamer: Seal the top of the pudding mould with paper, foil and the required lid. Place into an atmospheric steamer for the required baking time.
- To test the pudding for doneness, carefully remove the coffin lid so as not to burn yourself with steam and test as for fruit cake – remove and allow to cool.
- When completely cold, seal the pudding by attaching a lid to the pudding mould or by wrapping airtight in cellophane, plastic wrap or similar.
- Take extreme care to store correctly so as to avoid mould growth on the pudding – you may need to store under refrigeration or freezing temperatures for extended storage.
- Do not wrap the puddings whilst they are warm – this will encourage mould growth.
- Lengthy storage of fruit puddings in foil moulds will lead to a reaction between the acidity of dried fruits and the aluminium foil mould. Holes will appear in the foil.

## Setting the temperatures and times

The baking time and temperature of cakes depends on the recipe you are following. However, as a general rule, cakes are baked at 160–180°C until baked.

Typically, puddings prefer a lower oven temperature and a longer bake time. Bake puddings at approximately 100–160°C.

An atmospheric steamer is commonly set at 100°C with a fan to assist in even steaming.

## The baking process

A square tin holds approximately 25% more than a round tin of the same size. When using a square tin for a round tin recipe, use the specified time shown on the recipe, however turn the cake as you are baking as the corners will tend to cook faster than the middle of the cake.

When depositing, spreading and piping the batter into tins, ensure to spread the batter level to allow even cooking.

## Baking of cakes, including radiation and conductive heat

The process of baking can be broken down into the following:

1. Products containing chemical aerators gases are formed and expand.
2. Any existing gases/air bubbles in the product will expand.
3. The gluten and egg proteins present are stretched to form a new structure. These become firm (coagulate) and provide chewiness in the product.
4. The starches present take on moisture and become firm (gelatinise).
5. Some of the water evaporates.
6. Fats melt and release air bubbles that, in the case of batter, help it to rise. The melted fat then deposits around cell walls and makes them shorter eating.
7. Flavours develop and brown colours appear because of the caramelisation of sugar and the Maillard reaction.

In summary, a crust forms as water is driven off by the heat, a process that occurs first on the surface. The baking process involves heat absorption, gas formation, coagulation of proteins, gelatinisation of starches, vaporisation of water, melting of fats and development of flavours and colour.

## Heat transfer

As a baker we know that ovens generate heat, it is this transfer of heat from one object to another (from source to food) which enables products to be baked in the oven. When we understand how this occurs we can control the cooking and baking process with greater success, we can also monitor the quality of the products we produce.

During the baking process heat can be transferred from the source to the food by three main ways. These are radiation, conduction and convection; most methods of cooking and baking rely on more than one means of heat transfer.

## Radiation

Radiation is a form of indirect heat; the heat travels through space from a warmer object to the cooler surface of the food. When you think about radiant heat think about a hot pot, when you place your hand near the pot but not on the pot you can feel the heat being given off. That's why we call it radiant heat, the heat radiates outwards from the source.

Other examples of radiant heat are toasters, infra-red lamps and conventional ovens. The heat from the sun travelling to earth is another example of radiant heat.

Black or dark coloured trays will radiate a greater amount of heat from their surface than lighter coloured trays; this is because the dark surface absorbs more heat energy to begin with. The dull black tray at work will radiate more heat than a shiny new black tray, in other words they will bake the product faster than the newer tray.

However, if sheet pans or trays are marked with blackened baked on food they radiate heat unevenly – that's why we keep our trays scraped and clean!

If radiant heat travels and is absorbed by the surface of the food only, how does heat penetrate beyond the surface? Heat penetration within the baked product occurs through conduction and convection.

## Conduction

When heat travels by direct contact from the source of the heat to a cooler area we describe this as "conduction". A good example of this in the bakery would be the heat travelling from the sole of the oven to the cool baking tray when it is placed in the oven.

Think also about a tray of cookies in the oven. It is first heated by radiant energy; once the tray and the surface of the cookies are hot the heat is then conducted through the tray and then the cookies.

The difference between radiant heat and conduction is:

- Radiant heat transfers energy quickly.
- Conduction transfers energy slower.

How well heat conduction can occur also is influenced by the type of material through which the heat is conducted. For example, a copper pot will conduct heat faster than a stainless steel pot.

Type of metal	Conductivity	Advantages	Disadvantages
Copper	Very high	<ul style="list-style-type: none"> <li>Enables substances to reach high temperature quickly</li> </ul>	<ul style="list-style-type: none"> <li>Expensive</li> <li>Can react with certain types of foods</li> <li>Can be toxic at high levels</li> </ul>
Aluminium	Conducts heat only half as efficiently as copper.	<ul style="list-style-type: none"> <li>Low cost inexpensive</li> <li>Anodised aluminium is hard and durable, non-reactive with food and easy to clean</li> <li>Anodised aluminium comes as thick gauge and will conduct heat more evenly than thin aluminium gauge</li> </ul>	<ul style="list-style-type: none"> <li>Reacts with acidic food</li> <li>Aluminium is a soft metal that can be easily scratched and marked</li> </ul>
Stainless steel	Not a good conductor unless it contains an aluminium core (found normally in pots)	<ul style="list-style-type: none"> <li>Durable long lasting</li> <li>Does not react with food</li> <li>Moderately priced</li> <li>Has a light reflective, non-reactive surface which enables viewing of food easier</li> </ul>	<ul style="list-style-type: none"> <li>Thin gauge stainless steel cook ware does not conduct heat evenly resulting in hot spots</li> </ul>
Cast iron	Reasonable conductor of heat.	<ul style="list-style-type: none"> <li>Due to its black colour can also transfer heat through radiation</li> </ul>	<ul style="list-style-type: none"> <li>Reacts with some foods resulting in a metallic taste</li> <li>Can discolour food and is rarely used in a bakery environment</li> </ul>
Tin	Good conductor	<ul style="list-style-type: none"> <li>Light weight</li> <li>Inexpensive</li> </ul>	<ul style="list-style-type: none"> <li>Rusts easily</li> <li>Darkens with acidic foods</li> </ul>

## Convection

Convection can be described as heat transferred through liquids and gases; this involves the constant movement of cold currents of air or liquids toward warmer currents.

A convection oven will work faster than a baking oven because the hot air is forced across the surface of the products pushing the cooler air away. The hot air is forced to rise and the cooler air sinks. A convection oven uses a fan to circulate the air, other industrial ovens like the Rotel and Reel ovens work by moving product through the air.

Water has low heat conductivity, this means it is slow to conduct heat; this is why we bake some products such as cheesecakes and puddings in a water bath.

When baking in a convection oven the general rule is to lower the temperature by 15-20°C and reduce the baking time by about 25%. Ensuring the oven is not overloaded and allowing a gap between baking tins or pans will allow for movement of the hot air to circulate unobstructed.

It is important when using a convection oven to remember to minimise the number of times you open the oven door. Each time the door is opened the ovens warm convection currents flow out into the bakery.

### Baking tips:

- Every oven is different, so it is important to monitor regularly throughout the baking process.
- To help retain moisture in a fruit cake keep the oven damper closed during baking and, if need be, place a pan of hot water in the oven to maintain a moist baking atmosphere.
- If premature crust formation occurs during baking place a sheet of paper or similar onto the top surface of the cake or turn down the top heat controls on the oven.

### Important note:

The Maillard reaction is a chemical reaction between carbohydrates (sugar) and amino acids (proteins). In food, it has a profound effect on flavour, colour and aroma.

**Coagulation** is defined as the transformation of proteins from a liquid state to a solid form. Once proteins are coagulated, they cannot be returned to their liquid state. Coagulation often begins around 38°C, and the process is complete between 71°C and 82°C. Within the baking process, the natural structures of the ingredients are altered irreversibly by a series of physical, chemical, and biochemical interactions. The three main types of protein that cause coagulation in the bakery are egg, dairy and flour proteins.

**Gelatinisation** occurs when granules of a starch product, such as flour or corn starch, swell when they come in contact with a liquid or heat. The gelatinisation process begins when the interior reaches 400°C and continues throughout the baking or until 95°C.

## Using your sensors to assess the baking process

To gain a better baked product, it is important to follow the recipe instructions for both correct temperature and the recommended baking time in the oven.

Ovens should be pre-heated to the correct baking temperature and the products monitored by sight throughout the baking process to check if the product is baked and stable, and if adjustments are required.

The cake should have a light golden brown crust colour and has slightly shrunk away from the sides of the tin. A pudding is darker in colour and has some retraction.

Adjustments may include:

- turning the tray in the oven for even baking
- moving the tray to the other side of oven
- reducing temperature settings on either bottom or top heat.

To keep cakes moist close the damper during baking – you may even need to place a pan of hot water in the oven to produce a moist baking atmosphere.

If the cake takes on too much crust colour before being baked, you may place a sheet of paper on top of the cake to prevent excessive crust colour.

To check the cake is baked, once it has a light golden brown crust colour, test in one of the following ways:

1. **Touch:** Using your fingers, lightly stroke or lightly press the cake in the centre. If the cake is baked, it will spring back. If it is not baked, your fingers will leave shallow furrows in the surface.
2. **Skewer test:** Pierce the centre of the cake with a clean skewer. If the cake is baked the skewer will be clean when removed. If the cake is not baked the skewer will be wet and have traces of cake batter on it.
3. **Thermometer test:** Pierce the centre of the cake with a thermometer. If the temperature is showing between 82°C and 95°C the cake is baked and the gelatinisation and coagulation process is complete.

4. **Sight:** Colouring, for lighter-coloured cakes, look for browning. A nice light golden crust is a good indicator of a baked cake.
5. **Edges:** Cakes will begin to pull slightly away from the side of the pan and slightly shrink as they get closer to being fully baked.

## Cooling and de-panning without damage

After baking, remove the cakes and puddings from the tins/pans immediately, otherwise the cakes will continue to shrink and sweat as they sit in the tins/pans. Turn the cakes out onto a cooling wire. Always wear oven mitts or hot pads when handling hot trays.

Puddings and fruit cakes are cooled in the mould. Puddings stay in the mould until served, or unless they have been demoulded for packaging. Fruit cakes are demoulded at the decoration stage.

## Checking to identify faults and rectify if required

Once your cake or pudding product has cooled, check them for faults and defects. Pay attention to the colour, size, texture, taste, and look. Are they ready for the next part of the process of cutting, or decorating? Do you think your customers would be happy to pay the same price for each individual product?

It is important to be on the lookout for any faults throughout the whole production process.

## Portioning, packaging and storage

Most cakes and puddings are decorated whole when they are presented or sold. Slices and some cakes are sold as individual equal portions and need to be portioned.

Portioning is correctly and accurately cutting the finished cakes usually with a serrated cake knife into equal sized pieces. You should refer to the recipe formulation to confirm the portioning specifications. You will get the opportunity to practice your portioning skills when undertaking the practical activities.

Completely cooled cakes are packaged or wrapped in moisture proof bags or cake boxes to extend shelf life of that product.

Cakes and puddings may be stored at room temperature for up to eight hours. For longer storage completely cooled cakes are packaged or wrapped in moisture proof bags to extend shelf life. Some labelling may be required and stored in the cool room. The shelf life will depend on the richness of the cake and any fresh ingredients used as inclusions or to decorate.



## Practice activity

### Activity 5.1: Check your knowledge

1. List two reasons why it is important that the cake batter is deposited evenly into cake tins.

2. Name four examples of what happens to a cake during the baking process.

3. List two reasons why it is important that the cake batter is deposited evenly into cake tins.

4. What are two reasons as to why you would line cake tins or trays with baking paper?

5. List three characteristics of a cake that has been correctly baked.

6. How can you test a cake to determine it is baked correctly? Provide three examples.

7. List two reasons why monitoring the baking process is important.

8. What type of paper is best used for making piping paper bags?

9. List two reasons why monitoring the baking process is important.

10. List two reasons why it is important the Gugelhupf tins are greased properly.

11. State the baking temperatures required for a fruit cake and explain why.

## True or false questions

12. Cakes with high sugar content should be baked at a high temperature.

True or  False

13. Under baking a cake will result in the cake sinking in the centre.

True or  False

14. Over baking product will reduce the keeping qualities of the product.

True or  False

15. A baked cake will spring back when 'pressed' gently in the centre.

True or  False

16. Paper helps to insulate the cake during baking.

True or  False

17. Mud cakes should be baked in a hot oven 200°C.

True or  False

Topic 6

# Finishing, decorating and storage



## Topic 6: Finishing, decorating and storage

This topic covers how to assemble, measure and prepare finishing ingredients to decorate and garnish cakes and puddings to produce a final product. You will work with multiple fillings and tools to learn a range of decorating tips to finish your cake as required. You will also learn how to portion and store your cakes to extend product shelf life.

You will learn both practical skills and knowledge on the following:

- assembling finishing ingredients and equipment for use
- measure finishing ingredients
- operate and monitor mixer to prepare icings and glazes
- masking and combing
- preparing garnishes
- preparing piping bags
- portioning and slicing cakes and slices
- apply icings, glazes, garnishes and decorating finishes
- check finishes and finished cake for faults and rectify
- prepare, portion and transfer products for presentation
- storage and food safety requirements.

### Assembling finishing ingredients and equipment for use

It is important to measure all ingredients and use the correct sequence as per the recipe specifications. This is the same when following garnishing or decorating recipes. Making icings, glazes and fondants need consistency and accuracy to ensure the timing, taste and amount of finished goods is not compromised.

Using the correct equipment and following the correct sequence will assist with producing consistent and high quality products.

Cakes baked for celebratory occasions often use a range of decorating techniques including:

- pipping
- ribboning
- fresh flower
- fondant.

## Masking and combing

Masking and combing takes time and skill. Before starting the process, it is important to have all your tools within reach and to set up your workspace. Your workspace should be clean and at the right height with your equipment and tools within easy reach. Stand in a comfortable position with your feet slightly apart and directly in front of the turntable. You will need plenty of arm space, so be mindful of other staff in the bakery.

### The masking technique in 13 steps:

The following information and graphics are copied under s113P, Good Things Magazine (Online), How to mask a layer cake with step by step photos by Peggy Porschen (photography by Georgia Glynn Smith), <http://goodthingsmagazine.com/how-to-mask-a-cake/>, accessed 15/02/2019



**Step 1:** The first stage is the crumb coat. The crumb coat is useful for keeping the sponge in place and reducing crumb drag. Start by applying a generous amount of buttercream or icing. Use the palette knife to thinly and evenly spread the buttercream. It is important to make a good basic round shape.



**Step 2:** Working from the centre, spread the buttercream or icing towards the edges of the sponge cake and down the sides.



**Step 3:** Work the palette knife in a backward and forward motion whilst spreading the mixture. Rotate the sponge cake/turntable in the opposite direction to the direction of your spreading.



**Step 4:** Make sure all of the sponge cake is completely covered and that there are no gaps around the sides.



**Step 5:** Using a specialised side scraper, start on the far side of the cake and place the long straight edge against the sponge cake at a 45° angle, and the bottom of the side scraper sitting flat on the disc. Place your spare hand on the turntable, as close to your other hand as possible.



**Step 6:** Smooth the icing by rotating the cake against the direction of the side scraper. Ensure you go around the whole sponge cake.



**Step 7:** Repeat the process until all gaps have been filled and the cake is smooth.



**Step 8:** Use a palette knife to make the top of the cake smooth and neaten the edges. Remember to dip your palette knife in warm water and wipe it dry each time.



**Step 9:** Use the specialised scraper and the palette knife to remove any excess mixture.

**Step 10:** You can repeat the crumb coat as many times as you need to ensure the desirable smooth finish; however, ensure you chill the sponge cake in the fridge for at least 30 minutes between each coating. Always use a fresh buttercream or icing for each layer of crumb coat.

**Step 11:** Once complete, refrigerate the sponge cake until set. Once set, further decorating can occur.

## Preparing piping bags

The paper should be of a good grade greaseproof or silicon paper. One single sheet will make 8 good sized piping bags.

Take the sheet lay it out landscape fashion on the bench and fold in half from left to right, creasing well after each fold is made. Cut in two, lay the halves on top of each other and fold again, this time diagonally. Cut and place together – matching the triangles neatly on top of each other. Fold again, this time down the cut edge to create triangles of similar shape/size and make the last cut to produce eight triangles.

## Making the piping bags

The piping bags are folded to make a pointed cone shape. This will be accompanied with a practical demonstration from the teacher, as there are a couple of different techniques that can be used.

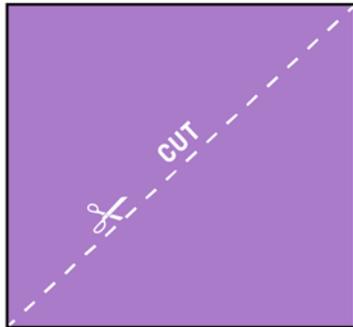
The 'pointy' end is cut away in which to place the tube. Take care not to cut off too much of the point of the cone, as the tube will fall through.

Partly fill with the piping medium to be used. Once again care has to be taken not to overfill the bag as the medium will run out of the top of the bag during piping. The diagram below illustrates these steps.

You will also find more piping bag techniques on how to make a piping bag by watching this video:

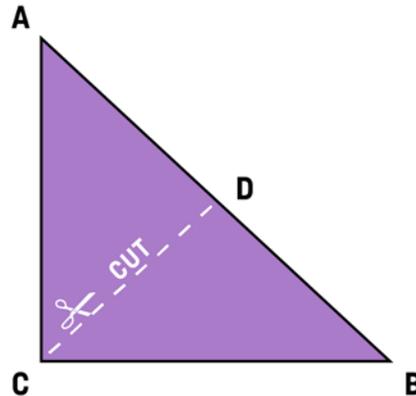
- Piping bag preparation process: <https://vimeo.com/297646005/8dae41670b>  
(7:27mins)

## HOW TO MAKE A PIPING BAG



### Step 1

Take the sheet, lay it out landscape fashion on the bench and fold in half from left to right, creasing well after each fold is made. Cut in two.



### Step 2

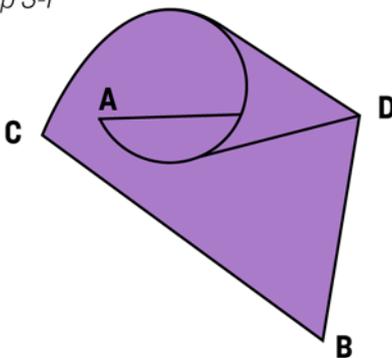
Lay the halves on top of each other and fold again, this time diagonally. Cut and place together - matching the triangles neatly on top of each other.

Fold again, this time down the cut edge to create triangles of similar shape/size and make the last cut to produce eight triangles.

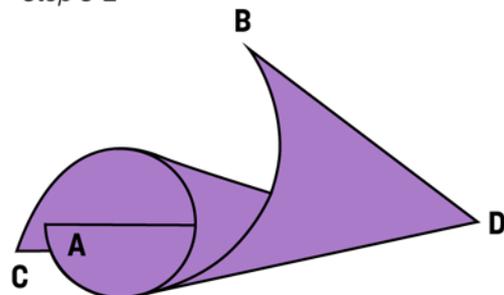
### Step 3

Follow the next steps to learn how to make a pointed cone shape for the piping bags.

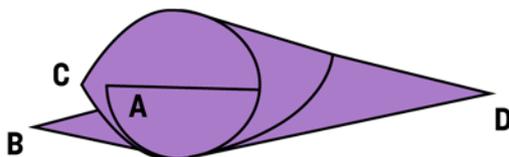
Step 3-1



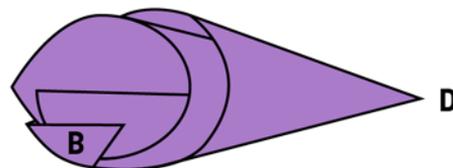
Step 3-2



Step 3-3



Step 3-4



### Step 4

Finally, the 'pointy' end is cut away in which to place the tube. Take care not to cut off too much of the point of the cone, as the tube will fall through.

## Glazes and icings

Icing is a term used both for the action of covering a cake and for the covering itself. There are many variations to icing a cake. Some recipes refer to icing as frosting, particularly in American recipes.

Icings have the following three main functions:

1. Add flavour and richness.
2. Improve appearance.
3. Improve keeping qualities by forming a protective coatings around cakes.

There are eight basic types of icings and cake coatings: poured fondant, flat-type icings, royal or decorators icing, foam type icings, buttercreams, glazes, fudge-type icing and rolled coatings.

The following table summarises types of icings and the ingredients used to make them.

Icing	Ingredients
Water glaze	Icing sugar and water
Fudge icing	Icing sugar, cream shortening, milk powder, water and flavourings
Buttercream	Unsalted butter, sugar, egg and flavourings
Cream cheese icing	Icing sugar, cream cheese and butter
Fondant	Sugar syrup, water, glucose
RTR icing	Pure icing sugar, egg whites and acetic acid
Ganache	White or dark chocolate and cream
Royal icing	Made with pure icing sugar and egg whites (acetic acid can be added)

### Icing method for a bar and block cakes

The main steps involved are:

1. Trim any surplus paper from the cake.
2. Remove any loose skin from the cake.
3. Deposit an amount of fudge icing in the centre of the cake and, using your palette knife, spread the icing evenly over the top of the cake.
4. Be careful not to drag any cake crumb through the icing.
5. You can pattern the surface with the tip of your palette knife or a comb scraper.
6. The iced cake may be decorated with either:
  - a. pieces/halves of glace cherries
  - b. fruit jelly slices
  - c. shaved chocolate
  - d. fine string piping of melted chocolate or similar.

## Fudge icing

Fudge icing is an aerated icing used to decorate cakes. A basic recipe would involve using icing sugar, cream shortening, milk powder, water and vanilla essence. To increase the quality of the icing you can substitute the specialised cream shortening with butter. Milk powder is included to enrich the flavour of the icing, however it is not necessary.

To feather finish on the fudge icing (optional):

1. Make up a small paper piping bag of contrasting coloured fudge icing (chocolate).
2. Spread the fudge icing evenly on the surface of the cake (e.g. pink colour).
3. Immediately pipe fine straight parallel lines across the icing or in rings and, using a skewer or edge of your palette knife, pull across the surface of the icing to create the feather pattern.

## Buttercream

Butter cream is indispensable in the bakery. Its primary use is for filling, icing, and decorating cakes. Here are a few key points:

- Butter cream should be light and smooth and should always be made from a high quality sweet butter.
- Icings made from all bakery specialised margarine and shortening can be unpleasant to eat – because of their higher melting point, they tend to leave a film of fat in your mouth – but a small amount of margarine or shortening added to the butter cream stabilises it without detracting from the taste.

- On very hot days or in hot climates, you can increase the ratio of butter to margarine to equal amounts, but only if absolutely necessary to prevent the butter cream from melting.
- Various types are used in the industry, and varieties are closely related to the richness of the fillings
- Heavy butter creams usually contain added bulky ingredients such as custard.
- Light creams are usually restricted to fewer ingredients, some contain added egg white (meringue) and are well aerated.
- The general rule for type and use would be determined by the lightness or density of the product e.g. sponge - light cream, rich cake - heavy cream.

Buttercreams are made by four different methods including:

1. Swiss
2. French
3. Italian
4. German.

Each method has a slightly different texture and mouth feel. Buttercreams are excellent in the finishing of cake products as they set firm in the cool room and give the product stability as well as providing a medium for flavours and textures.



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## Cream cheese icing

Cream cheese icings have gained popularity as the icing is not as sweet as a traditional fudge icing, and it is often used as an icing for a red velvet cake.

The common ingredients are cream cheese, icing sugar, butter and vanilla paste. Other flavours can also be added to create better balanced cake varieties. These may include lemon juice and zest, rosewater or orange zest.

Generally, they are known as soft cheeses and may be referred to as mascarpone, cream cheese and Neufchatel.

## Royal icing

Basically, three ingredients are used for royal icing. These ingredients are:

1. pure icing sugar
2. egg white
3. acetic acid.

Royal icing is a traditional white icing that is commonly used for decorating fruit cakes, or wedding cakes. It can also be used for making decorative piped shapes.

It is similar to flat icings, except it is thicker. The use of egg whites make it hard and brittle when dry. It consists mostly of icing sugar so whilst it has little taste, it is sweet. Pure white royal icing is most commonly used; however, colouring can be added.

Sift the icing sugar (or premix) before adding to the other ingredients. Use the mixer on the lowest speed to avoid too much aeration to the mix. The icing needs to be beautiful and smooth.

### The effects of acetic acid on egg white

The acetic acid is added to the royal icing to help stabilise the egg foam by strengthening the egg white. It helps the icing to maintain its shape when piped. The acid does this by acting as a semi-coagulant on the egg protein.

To demonstrate this affect you can place some egg white on a plate and add a few drops of acetic acid. Wait a few minutes and you will notice that the acid is causing the egg white to coagulate, form a gel.

## Storage

Royal icing is a firm consistency and sets hard. It takes royal icing 6-8 hours to set hard. It takes a long time to set hard, however, it does dry out very quickly when handling. As royal icing dries quickly, it requires special handling and storage. Cover it tightly whenever it is not in use with a clean damp towel and with plastic wrap. Remove any dried icing carefully so you do not contaminate the moist icing.

Royal Icing can also be used for string work and floodwork (flooding).

## Mixing methods

There are two main mixing methods – by hand and by machine (bulk mix).

Method	Ingredients	Steps
Mixing by hand	50g egg white 350g pure icing sugar 5 drops acetic acid	<ol style="list-style-type: none"> <li>1. Sieve the icing sugar through a fine sieve.</li> <li>2. Place the egg white in a clean bowl.</li> <li>3. Add a third of the sieved sugar and mix well.</li> <li>4. Add another third of the sieved sugar and mix well.</li> <li>5. Gradually add the remaining sieved sugar, mixing well after each addition until the icing becomes stiff and will hold its shape (peak consistency).</li> <li>6. Add the acetic acid and mix through the icing.</li> <li>7. Cover with a damp cloth to prevent the icing from drying out.</li> </ol>

Method	Ingredients	Steps
Mixing by machine (bulk mix)	300g egg white 2000g pure icing sugar 15 drops acetic acid	<ol style="list-style-type: none"> <li>1. Place the egg white in a clean machine bowl.</li> <li>2. Attach the beater.</li> <li>3. Add a third of the sieved icing sugar and blend on low gear until well mixed.</li> <li>4. Add another third of the sieved icing sugar and blend until well mixed.</li> <li>5. Add the remaining third of the sieved icing sugar and blend until it becomes stiff and will hold its shape (peak consistency).</li> <li>6. Add the acetic acid and blend through the icing.</li> <li>7. Cover with a damp cloth.</li> </ol>

## Ready to use fondant

Ready to use Fondant is a commercially prepared product made from sugar, water and glucose. It is used as a finishing medium to decorate cakes. It can come in various colours, flavours and viscosity. It should be stored at 25°C in clean, dry conditions and protected from direct sunlight.

To achieve the maximum benefit from working with fondant you should follow the steps below.

- Prepare the fondant by:
  - Heating the fondant in a bain-marie to 40°C – 43°C. Do not heat above 43°C or the fondant will lose its gloss.
  - Adding the colour and flavour.
  - If required, thin the fondant with stock syrup. Stock syrup is made by boiling 100mls of water with 120gms of sugar and letting it cool before use).
- Dip the top of the cupcake in the fondant. Remove the excess fondant by wiping off with a palette knife. When icing cake rounds, pour the fondant over the cake and use your palette knife to spread uniformly to the edge. Avoid fondant dripping over the edges.
- Garnish the cake whilst the fondant is still warm and before it dries.

## Notes:

For further detailed information for working with Baking commercial products, you should refer to the [Bakels website](#) and download individual product specification sheets. This will assist you in getting the most of your products and more detailed information

Overheating the fondant will cause it to lose its shine and dry hard and brittle.

## Ready to roll (RTR plastic icing)

Ready-to-roll icing, is a sugar paste made from icing sugar, glucose, white fat, gelatine with a little acid added. When manipulated it becomes flexible enough to pin out and use as a covering or a medium for modelling, hence the name ready-to-roll icing being used to describe this sugar paste.

It may also be known as plastic icing or fondant icing in some American decorating books.

It is easily coloured and will smooth out evenly when worked and covers uneven surfaces of cakes to provide a perfect base for royal icing work.

It is readily available for the baker and decorator or it can be made. Various recipes are available.

## Glazes

Glazes are glossy, thin, transparent coatings that give a shine to baked products and help prevent drying.

The simplest glaze is a sugar syrup or diluted corn syrup brushed while hot onto coffee cakes. Syrup glazes may also contain gelatine or waxy maize starch.

Fruit glazes are available commercially prepared. They are melted, thinned with a little water, syrup or liquor and brushed on while hot. Fruit glazes may also be made by melting apricot or other preserves and forcing them through a strainer. It helps to add melted, strained preserves to commercial glazes because these products usually have little flavour.



Chocolate glazed cake by [la-fontaine](#) under [Pixabay licence](#)

A masking coat is always applied to the cake if it is going to be finished with a glaze.

Type of glaze	Description
Gelatine-based glazes	Include many fruit glazes and are usually applied only to the tops of cakes and ring cakes made in ring moulds.
Chocolate glazes	Melted chocolate containing additional fats or liquids. They are applied warm and set to form a thin, shiny coating.

### Additional reading

For more information on icings and cake decorations, refer to the eResource book:

- Professional Baking, 2017 Eighth edition (or latest edition), Wayne Gisslen

This online book is available through the [TAFE NSW Library Catalogue](#) (TAFE NSW student username and password required).

## Decorating with chocolate

Chocolate is a popular decoration medium for most baked products. The options for chocolate decorations are endless. Piping chocolate shapes or inscriptions using templates, chocolate filigrees, chocolate shavings and curls are some examples of contemporary decorations. Consumers tend to choose chocolate decorated sweets over other baked products.

Chocolate decorations are good to have on hand as a finishing touch and can be pre-made and stored for saving time in production.

### Ganache

Ganache is created when chocolate is emulsified with heated fresh cream. Depending on its intended use, the proportion of chocolate to cream varies from equal to more than double the amount of chocolate.

It is made by first bringing the cream to the boil. After removing the cream from the heat source, it is poured onto the chopped chocolate, and stirred until smooth. Ensure the chocolate has melted completely and is thoroughly combined with the cream to produce a smooth and glossy ganache.

Dark or milk chocolate (if preferred, white) or a blend can be used. As milk chocolate contains less cocoa butter than dark, the recipes used have to be appropriately adapted.

If small amounts of liquid (liqueurs, spirits, flavouring pastes, etc) are added, a balance may be achieved by increasing the chocolate or reducing the cream by the same amount. As alcohol easily vaporises when exposed to heat, it should not be added until the chocolate is completely melted and the temperature of the ganache is around 40°C.

The higher content of water and/or air (oxygen) in a ganache, the shorter its shelf life. The higher the proportion of cream (about 60% water) to chocolate, the shorter the time the item will stay fresh, and vice versa.

Refer to the learning guide for FBPRBK3008 Produce sponge cake products to learn more about decorating and finishing cakes using chocolate.



## Video clip

### Activity 6.1: TAFE NSW video resources

Watch the following videos below to learn more decorating techniques:

- The art of tempering chocolate: Part 1 (7mins)  
<https://vimeo.com/296558642/4ab768f5cc>
- The art of tempering chocolate: Part 2 (9mins)  
<https://vimeo.com/296559019/19d3eda0ac>
- The art of tempering chocolate: Part 3 (7mins)  
<https://vimeo.com/296559498/8a186268ef>
- Making a marzipan flower (6mins)  
[Making a marzipan flower](#)

## Check finishes and finished cake for faults and rectify

When finishing and decorating cake and puddings, it is necessary to be able to identify faults and rectify them before they are displayed for sale.

Most decorating faults are due to:

- chocolate not tempered properly
- incorrect mixing resulting in lumpy icings
- not handling, kneading or mixing fondants enough
- colours not blended resulting in inconsistent colouring
- if using fresh ingredients, stored appropriately to reduce wastage (e.g. keeping flowers and strawberries fresh)
- the mixture is under aerated
- incorrect ingredient ratios.

To identify the possible fault and the corrective action required takes experience and knowledge in using different mediums of decoration.

## Prepare and transfer products for presentation

Inspections, control points, and corrective actions during all production processes are vitally important, as this ensures control on all processes, and a better quality and consistency of finished products.

Finished baked products cannot be put up for sale because of its lower quality, or if it doesn't meet a particular standard, it must be identified and either rectified or reported to a supervisor.

How you prepare, transfer and store finished products will depend on whether they are being made ready for immediate consumption or sale, or if they are being made ready for storage (dry storage, refrigeration or freezing).

Presentation at shop front is critical. Make sure any plates, platters or trays are clean, unchipped and appropriately coloured. Products with creams or butter need to be presented at correct temperature and in attractive sealed containers. This may be a glass dome lid. The presentation cabinet should be kept clean inside and out.

If you are portioning products, make sure they are cut clean, are consistent in shape and size and garnished similarly.

Remember any cross contamination at this point will result in inferior product and wastage. Wastage and inferior products affect your profits and the reputation of bakeries.

Once a product is sold, it needs to be placed in appropriate packaging for safe transportation and storage information should be provided to the customer.

## Storage of baked product

There are some common problems with storing baked products. To avoid loss or damage during storage, customised solutions should be addressed for each of the challenges faced by baked products such as:

- drying out – moisture loss
- mould – moisture gain
- foreign matter and dirt transfer
- physical damage – stacking too high, squashing, breakage
- contamination – smell, taste and cross-contamination from uncooked foods or cleaning agents.

Storage temperatures:

- Refrigeration and cool room spaces: 1°C–4°C
- Freezer temperature from as low as -18°C

Careful wrapping by 'heat seal units' or vacuum packing can prevent moisture loss/gain and can extend shelf-life, even at room temperature.



Sponge cake with powdered icing by [ulleo](#) under [Pixabay licence](#)



## Practice activity

### Activity 6.2: Research

Research how to make chocolate shavings. Explain the process on how to making chocolate shavings below.



## Self-check questions

### Activity 6.3: Check your knowledge

Complete the following short answer questions.

1. List the correct temperature range for the use of Fondant as a finishing medium.

2. Name three points of importance when handling chocolate.

3. Name two advantages of using powdered colour in cake decorating.

4. When covering a cake with plastic icing, how do you 'attach' the plastic icing to a cake.

5. Explain the difference between an icing mixture and pure icing sugar used in decorating or finishing.

6. Explain why pure icing sugar is preferred for the production of royal icing.

7. Explain how royal icing is made.

8. Explain the role acetic acid plays in royal icing.

9. Why is it important to continually clean your work area when decorating the surfaces of your cakes?

10. List two possible storage areas for ingredients?

### Multiple choice questions

11. Perishable products should be stored in the refrigerator to:

- Create more room in the bakery
- Prevent bacterial growth
- Give correct colour to product
- Make sure the product does not lose moisture

12. Flooding refers to a technique used in:

- Cake decorating with royal icing
- Cake decorating with whipped cream
- Finishing technique used in torte production
- Finishing technique used in gateaux production

### True or false questions

13. Fudge icing can be used to decorate cupcakes.

- True or  False

14. The term 'oven finished' means that the product requires more decoration.

- True or  False

Topic 7

# Quality and fault finding



## Topic 7: Quality and fault finding

In this topic, you will learn how to eliminate faults and wastage to produce consistent quality products.

Baking staff are required to plan, organise and implement tasks to achieve consistent production outcomes, and this involves interpreting key information from recipes, ingredient labels, baking equipment, operating instruction and end-product specifications. Staff should be able to analyse product and process faults and decide on appropriate action.

You will learn about the common faults specific to each area below:

- ingredients
- mixing and processing
- temperature
- aeration
- emulsifiers and stabilisers
- cake and pudding faults overview.

### Common faults

On occasions cakes will be produced with faults. As part of your duties you will be required to identify the cause of the faults and take measures to prevent them from happening again.

The quality of baked products is the responsibility of all bakery staff. An awareness of corrective actions for predictive and sometimes unpredictable cake and pudding production problems can reduce spoilage and wastage of ingredients and costs. All baking staff should be aware of the risks to quality of baking products.

In your workplace training you will learn to identify or predict risks and hazards in relation to equipment and machinery failure. This could be electrical faults, machinery failure or temperature gauge malfunctions. Predicted risks and hazards can be identified and reported by undertaking training in risk assessments and by following workplace instructions in case of a breakdown. Become familiar with your equipment breakdown procedures in the workplace or training bakery.

Staff should be encouraged to identify problems and provide practical solutions. This may include practising scenarios of injury, machinery failure, electrical risks, poor quality ingredients, contamination of product and a range of similar scenarios.

Faults in cakes are generally caused by one or more of the following:

- ingredient weight incorrect
- poor quality or wrong type/s of ingredients used
- incorrect method of processing the batter
- incorrect baking conditions
- faulty handling during the depanning of the cake
- faulty cooling and/or storage conditions.

## Cause and remedy faults

The main types of faults in cakes and pudding products include:

- Cake sinking in the centre
- Poor volume
- Poor keeping qualities
- Poor texture and crumb
  - Long holes in texture
  - Coarse, open texture
  - Discoloured crumb
  - Sinking during baking
- Fruit sinking during baking
- Cake developing a thick crust during baking
- Cake drying out during baking
- Faults in rock cakes

### Cake sinking in the centre

Cause	Remedy
Too much sugar	Reduce the amount of sugar (balance the recipe)
Too much fat	Reduce the amount of fat (balance the recipe)

Cause	Remedy
Too much baking powder	Reduce the amount of baking powder (balance the recipe)
Under baking	Carefully check the cake before removing from the oven
Too much mechanical aeration	Avoid overbeating the cake batter
Bumping the cake during baking	Carefully handle the tray/tin when turning/moving the cake in the oven

## Poor volume

Cause	Remedy
Too much milk/water/egg	Reduce the amount of liquids (balance the recipe)
Too much flour	Reduce the amount of flour (balance the recipe)
Not enough baking powder	Increase the amount of baking powder (balance the recipe)
Not enough milk/water/egg	Increase the amount of liquids (balance the recipe)
Flour too strong	Use a softer grade of flour
Not enough mechanical aeration	Precondition the fat/eggs and/or increase the amount of creaming of fats or whisking of eggs
Not enough sugar	Increase the amount of sugar (balance the recipe)
Oven too cool	Bake at a higher temperature

## Poor keeping qualities

Cause	Remedy
Overbaking the cake	Use an oven timer to remind you, check the oven more often
Oven too cool	Bake at a higher temperature
Too much flour	Reduce the amount of flour (balance the recipe)
Not enough egg, milk or water	Increase the amount of egg, milk or water (balance the recipe)
Not enough sugar	Increase the amount of sugar (balance the recipe)
Not enough fat	Increase the amount of fat (balance the recipe)
Spoiling of finished product	Store at the correct temperature based on the finished product

## Poor texture and crumb

### 1. Long holes in texture

Cause	Remedy
Not enough chemical aeration	Increase the amount of baking powder
Not enough mechanical aeration	Increase the amount of creaming of fats, whisking of eggs
Poor scaling technique	Deposit the batter in one portion
Too much chemical aeration	Reduce the amount of baking powder
Too much mechanical aeration	Reduce the amount of creaming of fats, whisking of eggs

## 2. Coarse, open texture

Cause	Remedy
Flour not strong enough	Use a stronger grade of flour
Not enough egg	Replace some of the milk with egg
Too much sugar	Decrease the amount of sugar
Too much baking powder	Decrease the amount of baking powder
Too much mechanical aeration	Decrease the amount of creaming of fats and/or whisking of eggs

## 3. Discoloured crumb

Cause	Remedy
Baking powder badly balanced	Purchase the baking powder from a reliable supplier
Machine mixing attachment scraping on mixing bowl	Have machine adjusted to lower the bowl. Avoid lifting bowl when mixing

## 4. Sinking during baking

Cause	Remedy
Too much mechanical aeration	Reduce the amount of creaming of the fat
Too much chemical aeration	Reduce the amount of baking powder
Too much sugar	Reduce the amount of sugar

## Fruit sinking during baking

Cause	Remedy
Fruit too wet (not drained enough)	Drain the fruit well before use
Too much syrup on the glaze fruits	Rinse and drain before use
Too much water in the recipe	Reduce the amount of water
Batter not acid enough.	Replace some water with egg
Flour not strong enough	Use a stronger grade of flour
Not enough egg in the recipe	Add a small amount of food acid to the batter.

## Cake developing a thick crust during baking

Cause	Remedy
Not enough paper lining in the tins	Use several thicknesses of paper to line the tins
Not enough moisture in the oven	Close the damper and/or place a pan of water in the oven
Too much bottom heat in the oven	Bake on inverted trays and/or line the tray with cardboard or several layers of paper
Oven too hot	Bake in a cooler oven
Oven too cool	Bake in a hotter oven

## Cake drying out during baking

Cause	Remedy
Low fat, sugar and egg quantity in recipe	Use a recipe rich in fat, sugar and egg
Fruits not sufficiently moist, absorb moisture from the batter	Wash fruits and drain overnight
Not enough moisture in the oven	Close the damper, place a pan of water in the oven or bake cakes in coffins
Oven too cool	Bake in a hotter oven

## Faults in rock cakes

Fault	Possible cause
Poor shape	<ul style="list-style-type: none"> <li>• too much liquid</li> <li>• too much baking powder</li> </ul>
Too flat	<ul style="list-style-type: none"> <li>• too much sugar</li> <li>• too much margarine</li> </ul>
Poor volume	<ul style="list-style-type: none"> <li>• not enough baking powder</li> <li>• deposited too small</li> <li>• not enough moisture</li> </ul>
Lack of flavour	<ul style="list-style-type: none"> <li>• not enough fruit</li> <li>• not enough margarine</li> <li>• not enough sugar</li> <li>• cheap quality recipe</li> </ul>
Coarse texture	<ul style="list-style-type: none"> <li>• too much sugar</li> <li>• too much baking powder</li> </ul>
Burnt bottoms	<ul style="list-style-type: none"> <li>• too much bottom heat</li> </ul>

Fault	Possible cause
Burnt tops	<ul style="list-style-type: none"> <li>• oven too hot</li> <li>• left in the oven too long</li> </ul>
Broken rock cakes	<ul style="list-style-type: none"> <li>• too much sugar on the tray</li> <li>• poorly greased tray</li> </ul>
Rock cake too smooth	<ul style="list-style-type: none"> <li>• too much milk</li> <li>• poor depositing technique</li> </ul>
Pale crust colour	<ul style="list-style-type: none"> <li>• oven too cool</li> <li>• insufficient baking powder</li> <li>• insufficient sugar and/or milk powder.</li> </ul>



## Practice activity

### Activity 7.1: Produce faults in sample cakes

To illustrate some of the cake faults and the causes, produce a cake batter and follow instructions supplied by your teacher to purposely produce faults in sample cakes for example:

- Double the amount of sugar
- Double the amount of water/milk
- Double the amount of baking
- Bake in a cool oven (130°C)
- Bake in a hot oven (230°C)
- Double the amount of fat
- Double the amount of flour
- Bump the cake in the oven before the batter sets



## Self-check questions

### Activity 7.2: Check your knowledge

1. List three causes of a cake sinking during baking, or state six causes of a conventional cake batter sinking in the middle after baking.

2. List the three areas under which bakery faults are categorised.

3. List three causes of poor volume in a cake.

4. Describe three visual effects (things you can see) when too much sugar is in a baked cake.

5. Scenario: You have just made a batch of muffins and you can see that they have very high peaks and they also feel tough when you eat them. What caused this to happen?

### Multiple choice questions

6. Long holes in the texture of a cake are the result of:
- Too much chemical aeration.
  - Oven too cool when baking.
  - Baking the cake for too long.
  - Too much flour in the mixture (Batter)

### True or false questions

7. A cake that has sunk in the middle may have too much sugar.
- True or  False
8. The addition of a liquid in a cake batter has a closing effect on the cake texture.
- True or  False

Topic 8

# Packing up and cleaning down



## Topic 8: Packing up and cleaning down

This topic is about how you complete your work in the bakery workplace. You will learn about the following:

- cleaning equipment and your work area
- disposing of waste
- completing workplace records.

Cleaning and disposing of waste as you work is important so that the bakery workplace runs efficiently and is safe for everyone.

Your workplace will have processes or instructions that they want you to follow and it is important for you to understand these and the personal responsibilities you have. See Appendix 2 for an example of a workplace procedure.

### Cleaning equipment and your work area

Cleaning equipment so that it is ready to use for the next day or next time is an important step in your work routine. Equipment may include machinery and electrical equipment, kitchen implements and tools, baking tins and trays, racks, ovens, bench tops, walls, sinks, storage shelves, display cabinets, floors.

During the cleaning process it is important to work safely and follow your workplace instructions. You can do this by:

- Understanding the toxicity of any cleaning materials you are using – material safety data sheets (MSDS).
- Using personal protective equipment to prevent skin reactions and injury.
- Working safely, especially with water near or with electrical equipment.
- Ensuring all equipment and products for cleaning are used correctly and re-stored after use.
- Ensuring you use signage on mopped floors.
- Following workplace instructions if more cleaning products are needed or there are any difficulties with cleaning any products.
- Be aware of and follow the equipment maintenance schedule.

## Reporting equipment and machinery

To enable a smooth production processes, staff should report any changes to bakery machinery and equipment. This includes any identified faults, malfunction, or alterations to the cleaning or maintenance schedules. Ensuring your staff are trained for any perceived risks and displaying the breakdown procedure and relevant contact details close to the machinery allows a faster response time.

## Completing workplace records

Workplace records refers to any documents that your workplace needs you to complete as you do your work in the bakery. Examples of these include:

- Accident/injury forms
- Maintenance requirements on equipment
- Production schedules
- Order forms for ingredients or stock needs
- Food safety documentation (e.g. storage temperature readings)
- Stock records (e.g. stock that has been sold and/or disposed of)

## Disposing of waste

Bakery waste includes food products, water and packaging material. Following a production schedule or recipe formula and measuring accurately reduces the likelihood of wasted ingredients and products. Stock which can't be sold may be able to re-purposed or given away.

Some other ways of disposing of waste include:

- metallic scrap, wooden pallets, spent oil from machinery, fat and oil can be sold to recyclers and scrap merchants
- burnt, unsold, damaged bakery goods can be used for cattle feed rather than rubbish
- using recyclable or earth friendly packaging.

It is important that wastage in production must be less than 5% of the weight of the original production schedule. Any variation from this should be recorded on the production schedule so that this can be checked to avoid similar outcomes in the future.



## Practice activity

### Activity 8.1: Your workplace

Thinking about your workplace or the TAFE kitchen/bakery:

1. What documents have you completed as part of your work?

2. How do you dispose of waste?



## Self-check questions

### Activity 8.2: Check your knowledge

Read the questions carefully.

1. Why is it important to record the result of your baking on the production schedule?

2. Give two examples of ways to improve disposing of waste in a commercial bakery ecologically?

- Looking at the log for the fridges and freezers below why did PK ask maintenance to check the cool room on the 9th of July.

**Log for the fridges and freezers:**

Area	Time	3/7	4/7	5/7	6/7	7/7	8/7	9/7	Corrective action	Initials
Fridge	9am	2°C		PK						
	4pm	4°C	5°C	4°C	3°C	3°C	4°C	4°C		PK
Cool room	9am	2°C	2°C	2°C	2°C	2°C	3°C	3°C	9/7 call maintenance to check thermostat	PK
	4pm	5°C	4°C	3°C	4°C	5°C	5°C	8°C		PK
Freezer	9am	-20°C		PK						
	4pm	-18°C	-17°C	-17°C	-17°C	-18°C	-18°C	-18°C		PK

Topic 9

# Product spotlight – Cakes



## Topic 9: Product spotlight – Cakes

This topic provides some additional information on particular types of cakes including the range of ingredients, mixing methods, processing techniques and decorating mediums make each type of cake unique.

We will focus on a few select cakes:

- rock cakes
- muffins
- wholesome cakes
- light fruit cake
- rich fruit cakes and puddings
- special occasion cakes
- high ratio cakes.

### Rock cakes

Rock cakes are so named because of the rough appearance of their outside, which resembles a rock. They are traditionally a cheap recipe low in fat, sugar and egg with a little dried fruit and are normally eaten for morning tea. Because of their dry, firm crumb, some consumers will spread the rock cake with butter, as you would a scone.

Rock cakes stale quickly because they are low in fat, sugar and egg, hence they are normally produced fresh each day.

When depositing the batter onto the prepared tray:

- Keep them all the same size.
- Deposit them into a regular round shape.
- Space them sufficiently on the tray (3 across the tray and 5 or 6 down the tray).
- When brushing with egg wash, avoid splashing it onto the tray. Put the sugar garnish on the rock cake, not on the tray.
- When baking the rock cakes, avoid excessive bottom heat in the oven. Bake the rock cakes at 180-200°C.
- After baking carefully, remove from the tray to avoid breakages.

## Muffin varieties

English muffins are made from a dough containing yeast, whereas the American muffin is richer in fat, sugar and egg and aerated by chemical means (baking powder). American muffins can be likened to a cup cake, with a denser and firmer crumb. They are commonly flavoured by the addition of fruits (banana, apple, blueberries, etc.), nuts, chocolate chips, etc. They are served either cold or warm with butter.

Take care not to overmix the muffin batter as it will produce a tough eating muffin and also cause the muffin to peak during baking.

Flavour each kilogram of muffin batter according to the instructions provided.

Deposit the muffin batter into greased or paper lined muffin pans, either by hand depositing or piping.

Bake the muffins at 200°C.

Type of muffin	General instructions
Apple and cinnamon	To each 1000g (1kg) of muffin batter add 100g diced apple and 2g cinnamon.  Garnish the top of each muffin with a few pieces of diced apple and sprinkle with cinnamon sugar.
Blueberry	To each 1000g (1kg) of muffin batter add 100g of frozen blueberries.  Take care not to break up the fruit which would discolour the batter.
Apricot and walnut	To each 1000g (1kg) of muffin batter add 75g of chopped dried apricots and 25g chopped walnuts.
Chocolate chip	To each 1000g (1kg) of muffin batter add 100g of chocolate chips.

## Light fruitcake

Light fruitcake is made from a light coloured cake batter with a mixture of dried and/or glace fruits blended through it. The added fruit may be sultanas or a mixture of other dried fruits, with or without the addition of glace fruits, such as glace cherries.

## Preparation of tins for baking fruitcake

Because of the fruit, the cake will take longer to bake than plain cake. To prevent the formation of a thick crust and a dry crumb it is recommended to insulate the cake by lining the cake tin with several layers of baking paper/ foil. When you deposit cake batter into tin ensure the inside walls are kept clean from excess batter.

## During baking

During baking, it may be necessary to bake on inverted trays or place the tins on several layers of paper to prevent a burnt base on the cakes. Alternatively, the bottom heat on the oven may be turned down.

To help retain moisture in the fruitcake keep the door closed and if using moisture (steam) setting on the oven to maintain a moist baking atmosphere.

If premature crust formation occurs during baking place, a sheet of baking paper/ foil onto the top surface of the cake or turn down the top heat controls on the oven.

## After baking

Allow cake to cool before removing from cake tin/mould. Store in airtight container until serving.

## Rich fruit cakes and fruit puddings

We have previously looked at light fruit cake, in particular, when making the pound or block cake formulas. These recipes are popular with customers who prefer small amounts of fruit in their cake and who avoid the 'heavily fruited' and 'darker coloured' spicy fruit cake varieties.

The light fruit cakes are limited to approximately 15-25% fruit content compared to batter weight.

The heavy rich fruit cakes such as wedding or Christmas cakes range between 100-150% fruit content to batter weight (if you think that's a lot of fruit – there is a Scottish Black Bun with in excess of 300% fruit content).

Higher proportions of fruits may be added, e.g. 3 parts fruit to 2 parts batter, but care must be taken to produce a cake, which still has the desired cutting and eating qualities. Too much fruit will produce a cake, which is heavy and will tend to crumble when cut because there is insufficient cake to hold the fruit together.

Heavily fruited cakes are generally darker due to the brown sugars, black treacle, caramel colour, spices and in some cases, the use of bi-carb soda. The flavour is enriched by the use of spices, nuts, grated zest and alcohols. Traditionalists maintain this is the only type of cake for such special occasions as weddings and Christmas time. With changing tastes people are being more diet conscious and for budget weddings you are able to offer mud cake, carrot cake or similar, as alternatives.

## Preparation of the tins

To prepare the tins for the fruit cake:

- Neatly line the tins with several layers of baking paper or similar, to insulate the cake during baking.
- If using cake hoops firstly line the sides and then cut the base paper slightly larger than the hoop, cut small incisions into the edge of the paper and place into the hoop so that the batter is contained within the hoop.
- Place the tins/hoops onto several layers of paper or thick cardboard on a baking tray. The paper/cardboard helps to prevent a thick crust from forming on the base of the cake. To prevent a thick crust forming on the surface of the cake, place a sheet of brown paper or baking paper / foil during the baking process and/or reduce the top heat in the oven.

## Depositing the batter into the tin

Carefully deposit the cake batter into the base of the tin/hoop – avoid getting cake batter on the tin/hoop.

### Press the batter down into the tin/hoop

- Using the back of your glove covered hand, dip in clean water and smooth the top of the cake so that it is level and slightly concaved to the centre (as the cake rises during baking you will find that it will rise with a flat top rather than a domed top).
- If being sold without icing the top of the fruit cake can be decorated with glaze cherry halves and almond halves, flakes or filleted almonds. Take care to handle the cherries and almonds with clean hands, as any cake batter baked on them will spoil the appearance.

## Baking of rich fruit cakes

- Because of the richness of the cake and the high ratio of dried fruits in the cake it is necessary to bake the cakes at a lower temperature than a plain cake, e.g. plain cake normally baked at 190° C may need to be baked at 150° C or lower because of the addition of large amounts of dried fruit.
- To keep the cake moist close the damper during baking – you may even need to place a pan of hot water in the oven to produce a moist baking atmosphere.
- If the cake takes on too much crust colour before being baked you may place a sheet of baking paper / foil on top of the cake to prevent excessive crust colour. It may be necessary to bake on inverted trays or place the tins on several layers of paper to prevent a burnt base on the cakes.

To check the cake is baked you may:

- test the cake by pressing in the centre checking for firmness or
- place a clean skewer into the centre and check for dryness of the skewer.

After baking:

- you may brush the cake with a mixture of water and glycerine (50/50) to help keep the cake moist – this will also inhibit surface mould growth
- you may brush the cake with a sugar syrup flavoured with rum or brandy to add flavour and help keep the cake moist
- allow the cake to cool in the tin to prevent breakages and to help keep the cake moist
- when cold the cake is removed from the tin and wrapped in plastic wrap or similar to retain moisture.

**Note:** Fruit cakes may also be baked by placing the tins/hoops in coffins (without added water) to help retain moisture in the cakes during baking.

## Steaming the puddings

- Scale the pudding mix into either foil or heat resistant pudding moulds, 3 x 700g each.
- Place the puddings into steaming coffins.

- Place the coffins into the oven so that you can safely pour hot water into the coffin, half way up the side of the pudding. Place the lid on and steam/bake for a minimum of 2 hours, alternatively seal the top of the puddings with greaseproof paper and foil or the supplied lids for the moulds and place into an atmospheric steamer for a minimum of 2 hours.
- To test the pudding for doneness, carefully remove the coffin lid so as not to burn yourself with steam and test as for fruitcake – remove and allow to cool.
- When completely cold, seal the pudding by attaching a lid to the pudding mould or by wrapping airtight in cellophane, plastic wrap or similar.
- Take extreme care to store correctly so as to avoid mould growth on the pudding – you may need to store under refrigeration or freezing temperatures for extended storage.
- Do not wrap the puddings whilst they are warm – this will encourage mould growth.
- Lengthy storage of fruit puddings in foil moulds will lead to a reaction between the acidity of dried fruits and the aluminium foil mould. Holes will appear in the foil.

### **The addition of spirits or liqueurs to fruit cakes**

It is recommended to add the spirits (brandy, rum etc.) or liqueurs to the dried fruits at least 24 hours prior to use. This will allow the spirits/liqueurs to soak into the fruits and retain more flavour during baking. If adding glycerine to the cake it is also common practice to add it to the fruit – this will also help to keep the fruit moist. Remember that during baking the alcohol content of any spirits/liqueurs will evaporate but the flavours will remain in the cake. As an alternative you may wish to brush the spirit/liqueur onto the baked cake.

### **Wholesome cakes**

Due to market demands the baking industry is producing a range of products, which could be considered as having better nutritional properties. This is achieved in various ways such as the use of wholemeal, wholegrain flour instead of white flour, the use of vegetable fats instead of animal fats, the reduction in added salt to recipes, the reduction of added sugar to recipes.

Some traditionally wholesome cakes include:

- banana cake
- carrot cake
- zucchini cake.

However, there are many new ingredients appearing in cakes as people experiment with low calorie, allergies and diet preferences. These include sweet potato, orange, beetroot, figs and dates, carob and berries.

A wholesome cake is one that could be described as complying with the Australian Dietary Guidelines, for example:

- adding of fruits and vegetables
- increasing the fibre content with wholemeal flour, addition of fruits and vegetables
- reducing the amount of added sugar
- reducing the amount of fats
- substituting saturated fats with mono-unsaturated and polyunsaturated fats
- reducing the amount of added salt.

You will make a healthy cake as part of your practical activities.

## Special occasion cakes

These items give the bakery staff an opportunity to expand the services to customers with little or no restriction to imagination. The topics are wide and varied, but include many aspects of everyday life, e.g. novelty cakes, birthdays, anniversaries, promotions, advertising, sales, footy finals parties, celebrations, 21st birthdays, 50th wedding anniversaries, engagements, etc.



Baked cake with candies on top by [Daria Shevtsova](#) under [Pexels licence](#)

## Just remember:

- Do not create designs that are too complex or too busy. Simplicity, accuracy and cleanliness of the designs are essential for best results.
- Turn the cake upside down so as to create a flat surface with square shoulders.
- Trim and fill the cakes so that they are level.
- Clean your work area progressively to avoid getting crumbs, etc. onto the decorated surface of your cakes.
- Use appropriate colour schemes.
- Keep all aspects of the designs in proportion.
- Do not overheat the fondant.

## High ratio cakes

High ratio is the term used to describe cakes made from formulas containing levels of sugar and total liquid (egg and milk), each of which is in excess of the flour weight.

### Why are high ratio goods made?

Traditional formulas made by bakers contain levels of sugar and liquids occasionally equal to, but more often less than, the flour weight. These produce firm eating cakes still popular with many people.

However, at the time when high ratio shortenings were first introduced, it became apparent that there was a demand for lighter, tender, richer eating cakes, which was not satisfied by the traditional formulas. These qualities called for the development of high ratio formulas with a number of special characteristics.

### How does high ratio affect formula balance?

It is well known that the technique of increasing the liquid level in otherwise well-balanced formulas results in cakes that collapse or have a close texture. As stated, high ratio formulas require extra quantities of total liquid (egg and reconstituted milk). To achieve results of the required quality, a special formula balance is necessary which involves the use of additional sugar together with certain specialty ingredients developed to carry the extra liquid.

## What are speciality ingredients?

There are two essential ingredients:

1. High ratio shortenings, which contain a special emulsifier
2. High ratio flours, which are specially milled to have high liquid absorption properties

### What are the properties of high ratio shortenings?

High ratio shortenings differ in an important way from general purpose shortenings used for making pastry and cakes of traditional balance. They are made from a blend of pure edible oils into which is co-plasticised and emulsifier of the mono glyceride type. Co-plasticisation is essential if reliable high performance speciality shortenings are to result, emulsifiers added separately do not function as effectively.

You can easily illustrate for yourself the built-in emulsifying property by whisking together equal part of high ratio Shortenings and water. A stable emulsion will result. If this test is repeated with a general purpose shortening the separation of the shortening and water will be noticeable.

This test shows the way that the emulsifier locks the liquid into the fat. Through the ability of the fat to carry extra liquid it is possible to increase the quantity of liquid (i.e. water, milk, eggs) in special cake formulas.

### What are the properties of high ratio flours?

In all cake and sponge formulas when high ratio shortenings are used it is essential that special cake flours – High Ratio Flours – are employed instead of standard cake flours, because of their ability to hold the greater liquid content. High ratio flours are defined as the finest fraction, and treated heavily with chlorine in order to modify the starch. This allows starch to set or gelatinise at a lower temperature than normal. This is necessary in High Ratio Cakes, which, because of the high moisture content is less stable during the early stages of baking than traditional batters.

Chlorination of flour also denatures protein, reduces ability of proteins to form gluten.

Because the flours are made from a finer fraction they have increased starch surface area exposed to the liquid. The fine, modified starch particles take up liquid more readily than the larger particles of normal medium flour, and thus allow a further increase in the liquid content of the formulas.

## What sort of goods can be made with high ratio?

High ratio formulas are used for many varieties of cake – in slabs, layers, cupcakes, sandwiches and gateau bases – in many flavours and colours.

## Processing techniques for high ratio cakes

Low batter temperature 18°C – 21°C for high ratio cakes.

Orthodox cake batter temperature 21°C – 24°C.

### Reasons

High ratio cakes are made from formulas containing high liquid or sugar ratio. Because of this balance the batters are less viscous (comparatively runnier than the traditional batters) and therefore a lower finished temperature helps to stabilise the mixture/batter.

This table summarises the advantages and disadvantages of the process and products.

Disadvantages	Advantages
<ul style="list-style-type: none"> <li>• Not suitable for additions of fruit, etc.</li> <li>• Lack of flavour compared to butter cakes</li> </ul>	<ul style="list-style-type: none"> <li>• Large variety of cakes</li> <li>• Rapid production</li> <li>• Cost saving/time labour</li> <li>• Ease of handling</li> <li>• Ease of flavouring</li> <li>• Longer than usual shelf-life due to:               <ul style="list-style-type: none"> <li>○ Greater moisture retention</li> <li>○ Higher sugar content giving a preservative effect</li> </ul> </li> </ul>

## High ratio cake – points of importance in production

Batter temperature control keep at 18°C–21°C to maintain stability.

Scraping down of mixing bowl on a regular basis to ensure complete and even incorporation of ingredients.

Mix only to recommended times to minimise toughening.

Care in addition of colours and flavours – moderation to prevent over-addition. Fold in carefully to prevent toughening and loss of aeration.

# Appendix 1: Templates

## Production schedule (requirements)

Task no.	Type of cake	No. of pieces	Weight	Shape required	Weight for each	TDW	Notes
1							
2							
3							
4							

## Production workflow

Time	Task	Notes	Setting

## Appendix 2: Sample workplace procedure

### Bakery/central kitchen cleaning procedure daily task

Daily tasks	Procedure
<b>Showcases and back bar</b>	<ol style="list-style-type: none"> <li>1. Clean the inside of cases with a warm detergent solution and wipe dry. The glass must be cleaned with <i>Glass &amp; Surface Cleaner</i> prior to opening and as often as necessary during the day.</li> <li>2. Light fixtures and showcase baseboards should be cleaned daily.</li> </ol>
<b>Telephones showers</b>	<ol style="list-style-type: none"> <li>1. Spray sanitize with <i>Quat Rinse</i> and wipe clean</li> </ol>
<b>Bread slicers (manual and automatic)</b>	<ol style="list-style-type: none"> <li>1. Slicers should be cleaned with a nylon brush and bucket filled with detergent every four hours during usage. Pay close attention to crevices and corners.</li> <li>2. Spray sanitizer after cleaning.</li> </ol> <p>CAUTION: When dismantling and cleaning, always wear a mesh glove.</p>
<b>Wrapping station</b>	<ol style="list-style-type: none"> <li>1. Equipment should be wiped down daily with <i>Liquid Detergent</i> solution.</li> </ol>
<b>Floor</b>	<ol style="list-style-type: none"> <li>1. Sweep floor thoroughly, including the corners and along base-boards. Move everything on wheels and other easily moved equipment to thoroughly clean under and behind those areas.</li> <li>2. Mop the floor thoroughly with a floor cleaner solution. Allow the solution to remain on the floor for a few minutes before remopping.</li> <li>3. Using hot water rinse, go back over the floor, rinse it, and mop it dry.</li> <li>4. Sanitize the floor with a second mop soaking in sanitizer solution.</li> </ol>

Daily tasks	Procedure
<b>Drains</b>	<ol style="list-style-type: none"> <li>1. Clear drains of any debris and scrub with <i>Food Service Degreaser</i>.</li> <li>2. Do not use this brush for anything other than drains.</li> <li>3. Treat drains with <i>Micro-Digestant</i> when department is least active.</li> </ol>
<b>Cleaning tools</b>	<ol style="list-style-type: none"> <li>1. Wash, rinse, sanitize and air-dry scrapers, brushes, towels, mops and buckets.</li> </ol>
<b>Wash room cleaning</b>	<ol style="list-style-type: none"> <li>1. Wash the toilet room, hand wash basin.</li> </ol>

Copied under s113P, Rupesh Singh on Slideshare.net (Online), Bakery/central kitchen cleaning procedure daily task, <https://www.slideshare.net/rupesh717/bakery-cleaning-daily-03>, accessed 11/03/2019

# Glossary

Common words and terms specific to making cake and pudding products are provided in the Glossary. Talk to your teacher if you can't find what you are looking for.

Common words	Description
Absorption	Refers to the ability of a flour to hold water in the required amounts to form a dough of a workable consistency.
Acetic acid (ethanoic acid)	The organic acid responsible for the acidity of vinegar, which contains 4% acetic acid.
Acidic	A substance with a pH less than 7.0 is said to be acidic. The lower the pH value the more acidic the substance.
Aerobic respiration	Cellular respiration requiring oxygen where glucose is broken down to release energy in a series of steps.
Air classification	Refers to flour milling whereby the flour particles are separated according to size and density by the use of air currents.
Alkaline	A substance with a pH greater than 7.0. The higher the pH value the more alkaline the substance.
Amino acid	The basic component of proteins composed of an amino group (NH <sub>2</sub> ), a Carboxyl Group (COOH) and which possess both alkaline and acidic properties.
Amylograph	An instrument used for the determination of the amylase activity of a flour, by measuring the effect of the flour amylase in reducing the viscosity of a flour-water paste.
Antioxidant	A material which, when added to a shortening, extends shelf life by protecting it against oxidation. In biscuit baking antioxidants may be used to extend the storage life insofar as rancidity is concerned.
Ascorbic acid (vitamin C)	A water soluble organic compound found in citrus fruits and some vegetables. It may be used in the absence of oxygen as a reducing agent or oxygen scavenger to prevent oxidation of foodstuffs.

Common words	Description
Baking	The transformation of dough by the use of heat application into a light porous product which is palatable and digestible.
Best before date code	On most products with this coding, the product exhibits its best performance characteristics before the "Best Before" date on the product when handled and stored correctly.
Boiling point	The temperature at which the vapour pressure of a liquid equals the absolute external pressure at the liquid-vapour interface. When this happens the liquid boils.
Calorie	Heat required to raise the temperature of 1 gram of water by 1°C. 1,000 calories equal one great calorie or kilo calorie. The calorie used in diet calculations is the kilo calorie.
Carbohydrate	Substances that contain carbon, hydrogen and oxygen. Simple sugars through to complex starches and cellulose. One of the major groups of organic compounds.
Carbon dioxide	A gas produced by the action of yeast on sugar, or by baking powders. It is the same gas found in carbonated beverages. When dissolved in water it forms carbonic acid, which is partially responsible for the increase in acidity of a dough or cake and pudding caused by fermentation.
Carrier	An ingredient, usually flour, used as a base that allows accurate measuring of another ingredient or combination of ingredients contained within the carrier in minute amounts.
Catalyst	A substance that increased the speed of a reaction in the chemical change of other substances without itself undergoing change. Enzymes are examples of a catalyst.
Centigrade	A thermometric scale, in general use in many countries, in which 0° represents the freezing point and 100° the boiling point of water at sea level. To convert Fahrenheit degrees to Centigrade degrees, subtract 32 from the Fahrenheit temperature. Then, multiply the result by five. Finally, divide this number by nine.

Common words	Description
Clear	A final stage of dough development. When the dough has achieved a smooth silky texture, and translucent appearance.
Compound	A substance composed of two or more elements, substances or products, with a constant composition. A compound is never a simple material.
Denaturation	The transformation of a protein by the application of heat into an insoluble form.
Dextrin	A polysaccharide carbohydrate, primarily a product of the breakdown of starch by amylase enzymes.
Dextrose	See Glucose.
Disaccharide	A double sugar made up of monosaccharide molecules linked together. Maltose, lactose and sucrose are all disaccharides.
Elasticity	Dough has an elastic limit of approximately 30%, contributed in dough by developed gluten.
Emulsification	Formation of a dispersion of small droplets of one liquid in another, in which it does not dissolve.
Emulsifiers	Emulsifiers reduce surface tension between two immiscible substances, such as oil and water, enabling them to form a stable mixture or emulsion.
Enzyme	A protein molecule that catalyses a biochemical reaction. Enzymes are usually specific to particular substrates and are sensitive to pH and temperature.
Enzyme, fungal	An enzyme prepared from a mould.
Extensibility	The amount of pressure applied to the stretching of a dough without causing rupture or tearing. Usually this test is applied to a dough using the extensograph.

Common words	Description
Farina	Wheat middlings-coarse endosperm particles containing the starchy portion of the wheat. Farina can be further processed into white flour.
Farinograph	A small recording dough mixer in which the consistency of a flour-water dough or other dough may be measured throughout the entire mixing process.
Fat	A fat has the same type of composition as an oil, the difference being that a fat has a higher melting point and is a plastic-solid at room temperature. Both are triglycerides made up of three molecules of fatty acid and one molecule of glycerine.
Flavour	The total sensation experienced when baked goods are taken into the mouth, including taste, odour and mouth feel.
Freezing point	Temperature at which a given liquid substance will solidify or freeze. The freezing point of water is 0°C (32°F).
Fructose (levulose)	A monosaccharide usually found together with glucose in many fruits. Also combines with glucose to form sucrose. It is one product of the action of the enzyme invertase on cane sugar.
Gelatinisation	The swelling and bursting of a starch cell in solution when heat is applied usually above 60°C, with the resulting uptake of free water to form a paste or gel.
Germ, wheat	The embryonic wheat plant found in each grain of wheat. The germ is high in oil content but contains compounds which have a retarding effect on bread doughs.
Gliadin	One of the main proteins found in wheat flour. It is insoluble and combines with glutenin and to a lesser extent, globulin in a dough to form gluten. Present in approximately equal proportion to glutenin. See Gluten.
Globulin	A group of proteins that are soluble in salt solution and coagulated by heat. They combine with gliadin and glutenin to form gluten. See Gluten.

Common words	Description
Glucose	Another name for dextrose. A single sugar unit (C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> ).
Glucose syrup	A solution of glucose, maltose and dextrans, made by the breakdown of starch. Also known as corn syrup.
Gluten	A mixture of proteins that provides the framework for the characteristics of baking with dough. Gluten is primarily divided into two main groups of proteins, gliadin and glutenin, which have different functions in baking. To a much lesser extent a third group of proteins, globulins, also makes up gluten.
Glutenin	One of the main proteins found wheat flour. It is insoluble and combines with gliadin and to a lesser extent, globulin in a dough to form gluten. Present in approximately equal proportion to gliadin. See Gluten.
Glycerine (glycerol)	A water soluble liquid manufactured from fats and oils. Glycerine is used in the baking industry to retain moisture in baked goods.
Glycerol monostearate (GMS)	A monoglyceride, made up of one molecule of a fatty acid (stearic acid) combined with one molecule of glycerol.
Grain	The character of the cell structure and size of crumb cells. The grain should be moderately close, even and firm, with small, elongated, thin-walled cells. The "grain".
Homogenise	The process of making a stable suspension of oil in water or water in oil. In the homogenising process either the water or the oil droplets are divided so finely that separation is slow. Broadly used in the baking industry, homogenising refers to fine dispersion of ingredients. Emulsified shortenings, salad dressings and ice cream are examples.
Humidify	To add water vapour to the atmosphere; add moisture to any material.
Humidity	Water vapour content in the atmosphere; at ambient temperatures.

Common words	Description
Humidity, relative	The ratio of the amount of water vapour present in the air to the amount of water vapour present in saturated air, at the same temperature and barometric pressure. This ratio is usually expressed as a percentage.
Hydrogen Ion	The chemical entity which is responsible for the acidity of acids. A substance which forms a high concentration of hydrogen ions when dissolved in water is considered to be strongly acidic.
Hydrogenated fats/oils	Fats and oils treated with hydrogen to give types of shortenings which have a higher melting point. Hydrogenated fats and oils also have less tendency to become rancid by oxidation.
Hydrophilic-lipophilic balance (HLB)	Low HLB surfactants are lipophilic, or 'fat loving'. HLB value: 2-4. High HLB surfactants are Hydrophilic or 'water loving'. HLB value: 13-20. Surfactants in the mid-range exhibit little tendency to form emulsions.
Hygrometer	A device for measuring the humidity of air or gasses. Used frequently in the bakery as a guide for the control of the moisture in air coming in contact with fermenting doughs or cake and puddings.
Hygroscopic	Absorptive of moisture; readily absorbing and retaining moisture.
Invertase	An enzyme occurring in yeast which converts sucrose (cane sugar) into invert sugar.
Kilojoule	The metric unit used to express the energy value of food.
Lactose	Disaccharide (glucose and galactose) found in the milk of mammals. Lactose is converted to lactic acid by bacteria present in milk.
Lecithin	An emulsifying agent found in several bakery ingredients such as egg yolk and soya flour or oil. The lecithin sold to bakers is mostly soy lecithin. Chemically lecithin is a fatty substance containing phosphorus.
Lipase	An enzyme that breaks down fat into free fatty acids and glycerol.

Common words	Description
Matrix – gluten matrix	Formed by combination of glutenin and gliadin (insoluble proteins found in flour) and water. Developed into a network of strands through the stretching action of the mixer on the dough etc.
Monoglyceride	A simple emulsifier comprising one molecule of a fatty acid combined with one molecule of glycerol. The resulting compound has a water soluble (hydrophilic) end – the glycerol end – and the other end is oil soluble (lipophilic) – the fatty acid end.
Monosaccharides	Simple sugars, such as glucose and fructose. They are the basic units of more complex sugars. (C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> ).
Mould	An infection caused by contamination after the product has been baked, for example of bread or cake. Yellow, green, black, white and red bread moulds occur. Moulds are related to fungi.
Mould Inhibitors	Compounds which can be added to bread or cake doughs or batters prior to baking, to delay or inhibit mould development.
Oil (see Fat)	A triglyceride which is liquid at ambient temperatures.
'Oil in water' dispersion	A term to describe the dispersion of oil in water where the proportion of water exceeds the proportion of oil and in which the water is the continuous phase.
Optimum	The best or most favourable conditions.
Osmosis	The transfer of fluid through a permeable cell wall without rupturing of the cell wall, resulting in an equalising of pressures across the cell wall.
Oven spring	The difference in the size of the unbaked product to the baked product attained in the oven.
Oxidant	A compound that brings about the chemical change known as oxidation.

Common words	Description
Pasteurisation	A method devised by Louis Pasteur of partially sterilising certain foods, such as milk, by heating to approximately 62°C for 30 minutes. Modern methods utilise higher temperatures and shorter times (72°C for not less than 15 seconds).
Peptide	Compound formed by the combination of two or more amino acids.
pH	The pH scale 1–14 describes the degree of acidity or alkalinity of a substance. Acid substances fall below 7.0, alkaline substances fall above 7.0 with water being neutral, at 7.0.
Plasticity	When pressure is applied to a substance, which changes the shape of the substance, and that force is removed yet that substance retains the new shape permanently, it is said to be plastic. Under pressure, plastic substances behave like fluids, otherwise they behave like solids. Over mixing of a dough breaks the gluten coils which can result in a more plastic characteristic in the dough than may be desired. Starch contributes to plasticity in doughs.
Polysaccharides	Contain many monosaccharide units. Starch, gums and cellulose are examples of disaccharides joined together in chains and branches to form complex molecules.
Porosity	The openness or closeness of grain.
PPM	Parts per million (abr.).
Protease (proteinase)	An enzyme that acts upon the proteins in the dough to produce greater dough extensibility.
Protein	Nitrogen containing compounds occurring in all living matter. Chemically proteins are chains of amino acids, combined through peptide linkages. Examples are gluten (from wheat), casein (from milk), gelatine (from skin) and albumen (from egg and soya).
Rancidity	A condition of being rancid usually applies to fats and fatty foods. The main type of rancidity is oxidative. It is manifested by the appearance of an objectionable odour. This type may be responsible for off-flavour in bakery products, especially under long storage. Anti-oxidants have the effect of delaying the onset of such rancidity.

Common words	Description
Recipe	The precise formula of ingredients, quantities and method required to produce a particular product.
Reduction	The reverse process of oxidation. Disulphide bonds are broken (softening) and teased out, opening the gluten strand, so that it will subsequently link up to reform disulphide bonds in a three dimensional network. Reducing agents gain electrons.
Sheen	Reflection from the cell surfaces of the crumb.
Shortening	A fat, or fatty preparation, used in the production of bread, cakes and other bakery products. It derived its name from its effect in making the product short and tender.
Shred	Character of surface within the break. The break may be smooth, ragged or broken.
Solubility	The extent to which a substance may be dissolved in a liquid to form a solution.
Specific gravity	Density of a liquid or batter compared to density of water.
Staling	Refers to the drying out of freshly baked goods over a period of time. Starch crystallisation over time contributes to a dry eating character that is no longer perceived as fresh.
Starch	Starches are carbohydrates and are derived from plant sources. Starch is the major component of wheat flour, being present to the extent of 70% in bakers flour. The starch molecules are large and consist of straight and branched chains of glucose units. There are two kinds of molecules in natural starches-amylose (straight chain) and amylopectin (branched chain). When they are acted on by alpha amylase dextrans are formed and when by beta amylase the fermentable sugar maltose is formed.
Steam	Water in the vapour phase at boiling point (100°C).
Steam, superheated	Steam at a temperature higher than the saturation temperature corresponding to the pressure.

Common words	Description
Steam, wet saturated	Steam at the saturation temperature corresponding to the pressure and containing water particles in suspension.
Sucrose	(see Sugar, Cane)
Sugar, beet	Sugar derived from beet; identical to cane sugar.
Sugar, cane	Sugar derived from sugar cane.
Sugar, invert	Sugar of an equal mixture of glucose and fructose resulting from the hydrolysis of sucrose.
Temperature	The measure on a scale (°C) of heat intensity.
Temperature, room	Temperature of any room as, for example, a dough room for the purpose of calculating dough temperature or a room being conditioned for the comfort of occupants.
Texture	The feel of the crumb of a baked product. A good texture is one which is soft, yet resilient and elastic; however, grain properly refers to the size and shape of gas cells and texture refers to the feel of the crumb.
Thermometer	Instrument for measuring temperature.
Tin crust	That part of the crust that has come in direct contact with the tin during baking.
Top crust	That part of the crust above the tin and above the break
Viscosity	The resistance to flow. Thus a dough of 60% absorption will have higher viscosity than a dough made from the same ingredients at 64% absorption.
Vitamins	Substances required in animal and human diets in very small amounts for the normal and proper functioning of the body.

Common words	Description
Water in oil – see Emulsifiers	A term to describe the dispersion of water in oil where the proportion of oil exceeds the proportion of water and in which the oil is the continuous phase.
Yeast	A single-cell microorganism used in bread making which is capable of fermenting certain sugars to produce carbon dioxide and alcohol.
Yeast, active dry (ADY)	Yeast having a low moisture content and extended shelf life but having a lower activity than compressed yeast. Must be rehydrated before use.
Yeast, compressed	Fresh yeast having a firm consistency and formed into a block. Requires refrigeration but can be added directly to the dough.
Yeast, cream	Fresh yeast in liquid form. Primarily used by plant bakeries and stored in large refrigerated stainless steel tanks. Normally added directly to the dough via metering equipment.
Yeast, high activity instant dry (HADY)	Yeast having a low moisture content and extended shelf life. Can be added directly to the dough without hydrating.
Yeast food (see Bread improver)	Refers to all the substances necessary to support the growth of the yeast cell.
Yeast, protected active dry (PADY)	Yeast having a low moisture content and extended shelf life, similar to ADY but does not have to be hydrated before use. Not as active as HADY.
Zymase	A collective name for the group of enzymes in yeast that convert sugar to alcohol, carbon dioxide and water.

## Additional resources

Resource	Information
<a href="#">NSW TAFE Catalogue</a> and e-Resources	There are a range of electronic resources and books that you can access through the TAFE NSW Library. Check out the catalogue online for more details or see the Librarian at your TAFE campus.
Professional Baking ( <a href="#">link to this resource</a> )	Gisslen, W, & Smith, JG 2017, Professional Baking, Eighth edition, Wiley, Hoboken, New Jersey
<a href="#">NSW Food Safety</a> Website	Australian Institute of Food Safety 2018, <i>Food safety regulation in New South Wales</i> , Australian Institute of Food Safety, viewed on 2 November 2018, <a href="https://www.foodsafety.com.au/resources/articles/food-safety-regulation-in-new-south-wales">https://www.foodsafety.com.au/resources/articles/food-safety-regulation-in-new-south-wales</a>
<a href="#">NSW Food Authority Keeping food safe</a> Website	NSW Food Authority n.d., <i>Keeping food safe</i> , The Authority, viewed on 2 November 2018, <a href="http://www.foodauthority.nsw.gov.au/foodsafetyandyou/keeping-food-safe">http://www.foodauthority.nsw.gov.au/foodsafetyandyou/keeping-food-safe</a>
<a href="#">NSW Food Authority</a> Website	NSW Food Authority 2015, <i>Health and hygiene requirements of food handlers</i> , Department of Primary Industries, Silverwater NSW, viewed on 2 November 2018, <a href="http://www.foodauthority.nsw.gov.au/_Documents/retailfactsheets/health_hygiene_of_food_handlers.pdf">http://www.foodauthority.nsw.gov.au/_Documents/retailfactsheets/health_hygiene_of_food_handlers.pdf</a>
<a href="#">Safety starts with you</a> Website	Safe Work NSW n.d., <i>Safety starts with you</i> , Safe Work NSW, viewed on 2 November 2018, <a href="http://www.safetystartswithyou.nsw.gov.au/workers">http://www.safetystartswithyou.nsw.gov.au/workers</a>
<a href="#">Western Australia Department of Mines, Industry Regulation and Safety - Bakeries</a> Website	Government of Western Australia, Department of Mines, Industry Regulation and Safety n.d. <i>Safety and health in bakeries</i> , viewed 02 November 2018, <a href="https://www.commerce.wa.gov.au/publications/safety-and-health-bakeries">https://www.commerce.wa.gov.au/publications/safety-and-health-bakeries</a>

Resource	Information
<a href="#">Guide to Food Safety Laws and Regulations</a>	Guide to Food Safety Laws and Regulations fact sheet from the Australian Institute of Food Safety
<a href="#">Food Authority Fact Sheet</a>	Health and Hygiene requirements of food handlers fact sheet from Department of Primary Industries Food Authority
<a href="#">Australian New Zealand Food Standards Code – Standard 2.1.1 Cereal and cereal products</a>	Australia New Zealand Food Standards Code – Standard 2.1.1 – Cereal and cereal products website
<a href="#">Standard Australian Cooking Measurements</a>	Allrecipes.com, Inc 2018, <i>Standard Australian cooking measurements</i> , Allrecipes Australia, viewed 02 November 2018, < <a href="http://allrecipes.com.au/how-to/17/standard-Australian-cooking-">http://allrecipes.com.au/how-to/17/standard-Australian-cooking-</a> >.
<a href="#">Assessment of Dried Grapes</a>	Doerflinger F & Pagay V 2018, 'Objective assessment of dried sultana grape quality using digital image analysis', Australian Journal of Grape and Wine Research, vol. 24, no. 2, pp. 234-240, viewed 02 November 2018, <a href="https://www.researchgate.net/publication/321532305_Objective_assessment_of_dried_sultana_grape_quality_using_digital_image_analysis">https://www.researchgate.net/publication/321532305_Objective_assessment_of_dried_sultana_grape_quality_using_digital_image_analysis</a>
<a href="#">NSW Food Authority Food Contamination</a> Fact Sheet	<a href="http://www.foodauthority.nsw.gov.au/_Documents/retailfactsheets/protecting_food_from_contamination.pdf">http://www.foodauthority.nsw.gov.au/_Documents/retailfactsheets/protecting_food_from_contamination.pdf</a>
<a href="#">NSW Food Authority</a> Website	<a href="http://www.foodauthority.nsw.gov.au/industry">http://www.foodauthority.nsw.gov.au/industry</a>
<a href="#">4-hour / 2-hour rule</a> Fact Sheet	<a href="http://www.foodauthority.nsw.gov.au/_Documents/retail/4_hour_2_hour.pdf">http://www.foodauthority.nsw.gov.au/_Documents/retail/4_hour_2_hour.pdf</a>
<a href="#">Summary of Religious Food Requirements</a>	<a href="https://www.cultura.org.au/sites/default/files/2017-02/Summary_of_Religious_Food_Requirements.pdf">https://www.cultura.org.au/sites/default/files/2017-02/Summary_of_Religious_Food_Requirements.pdf</a>

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