Baking

Download the teacher notes, technician notes and student workbook that accompany this resource at rsc.li/3O8OLBu.

ROYAL SOCIETY OF CHEMISTRY

Learning objectives

By the end of this session, you will be able to:

- Describe the role of raising agents in baking.
- Explain why it is important to follow baking recipes carefully.

What are raising agents?

Raising agents are usually powders that can be added to other ingredients during baking.

Raising agents are used when baking cakes and bread or brewing beer.

What raising agents do you know?

Raising agents used to make cakes rise include:

- bicarbonate of soda
- cream of tartar – within baking powder
- baking powder.

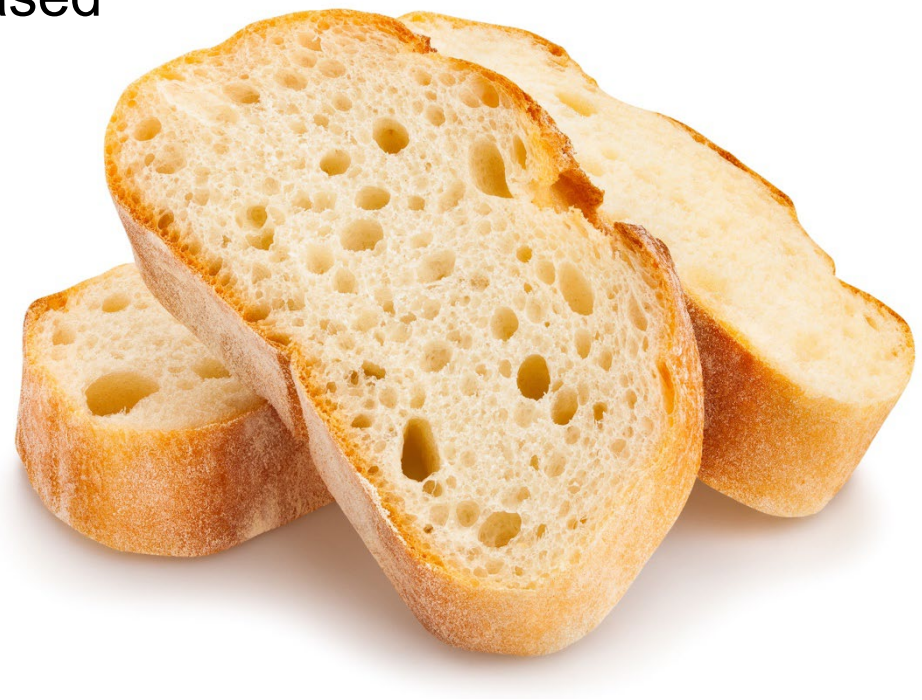
An example of a raising agent used to make bread rise is yeast. Yeast is a living microorganism that respires and releases carbon dioxide.

How do raising agents work?

The raising agents take part in a chemical reaction and release carbon dioxide gas.

The bubbles of carbon dioxide gas released cause the baking mixture to rise.

The holes in bread are made when the dough is kneaded. The holes are made larger by the carbon dioxide gas, which is trapped as the bread dough hardens during baking.



Activity 1

Does cake baking require all the ingredients?

▶ See student workbook

Activity 1

What are the main ingredients used to make cakes?

Flour

Sugar

Eggs

Baking powder

Butter/margarine

Activity 1

Does cake baking require all the ingredients?

Group A will follow the basic cupcake recipe.

Each of the other groups will use a recipe with a certain ingredient removed.

Each group has a different method sheet showing which ingredient is missing.

The different methods you will follow should ensure the cakes work well.

Activity 1

Basic cupcake recipe

1. Put 12 cupcake cases into the cupcake tin.
2. Measure out 110 g of caster sugar and 110 g of butter.
3. Cream the sugar and butter together in the mixing bowl using a wooden spoon.
4. Add the two eggs to the mixture slowly, mixing until smooth.
5. Measure out 110 g plain flour and ½ teaspoon baking powder.
6. Fold the flour and baking powder into the ingredients in the mixing bowl and continue to mix until the mixture is smooth.
7. Distribute the mixture between the cupcake cases in the cake tin.
8. Bake in the oven at 200 ℃ for 12–15 minutes.

Mixing techniques

Why are the sugar and butter creamed together?

- To add air to the mixture, helping the cake to rise. Wooden spoons are good for this stage.

Why ‘fold’ the flour into the mixture?

- To avoid knocking out the air. Metal spoons are good for this.

Activity 2

Baking ingredients

See student workbook

Activity 2

Baking ingredients

1. Why are each of these ingredients used?

   (a) Flour

   (b) Sugar

   (c) Eggs

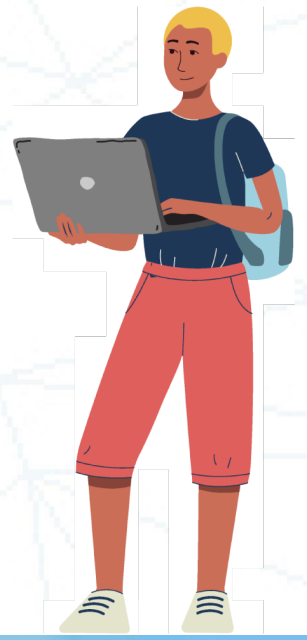
   (d) Baking powder

   (e) Butter

2. How are your cakes going to look?

3. What is the texture going to be like and how will they taste?

4. What do you think will happen to the other groups' cakes? Why?



Baking ingredients answers

1. (a) **Flour** – Contains a protein called ‘gluten’. This stretchy, long molecule allows the mixture to stretch and trap air. This gives cakes and bread their spongy texture.

   (b) **Sugar** – Makes cakes sweet and helps to give cakes their golden brown colour. It also helps to trap air within the mixture.

   (c) **Eggs** – Binds the ingredients together and helps to trap air so the mixture rises well.

   (d) **Baking powder** – Releases carbon dioxide gas, causing the mixture to rise and have a lighter texture.

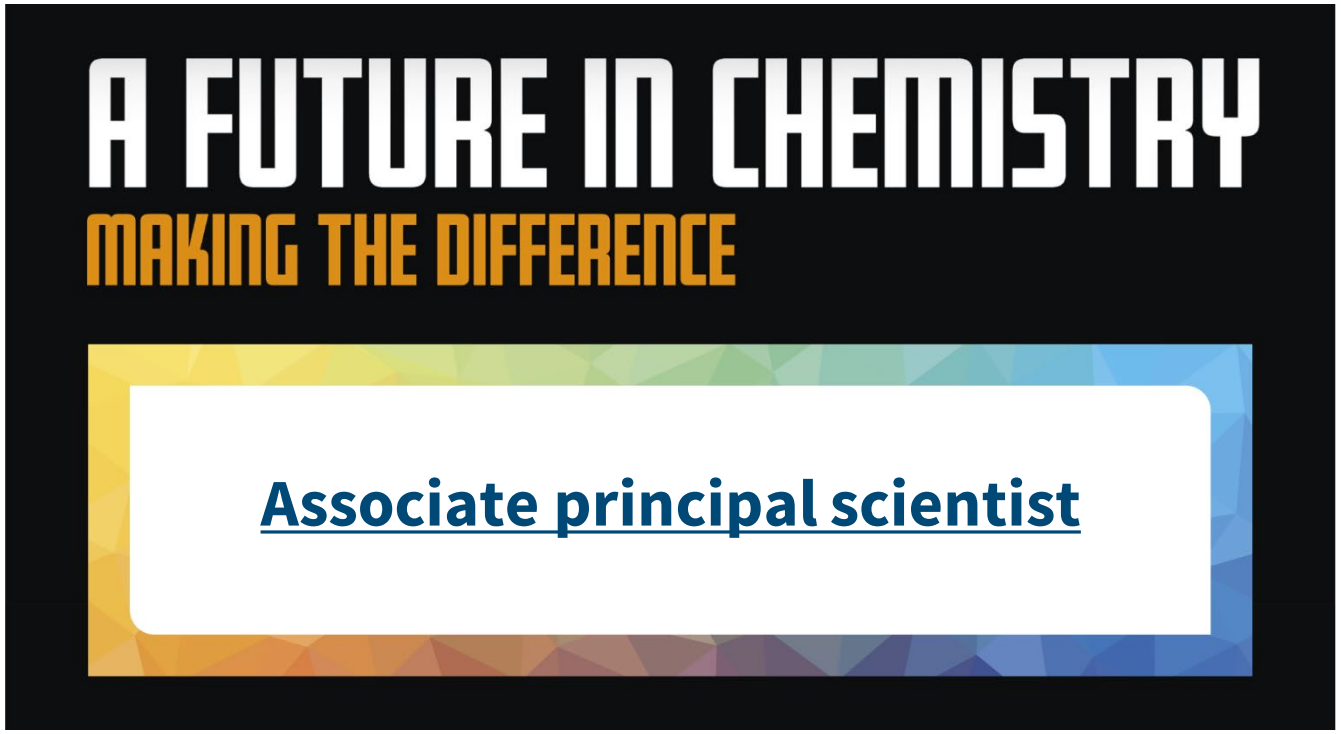
   (e) **Butter** – Provides flavour, fat and colour. The process of creaming the butter and sugar together also traps a lot of air.

Career link

Associate principal scientist, food

The ingredients in our food and how they interact can dramatically influence the taste of the final product.

Meet Robert, an associate principal scientist, who combines chemistry and computer modelling to predict chemical reactions and develop new flavours and textures of food.



Activity 3

Tasting the cakes

See student workbook

Activity 3

Tasting the cakes

Complete the table in your student workbook as you look at and taste each group's cake.

Method used	Appearance	Smell	Taste	Texture
A				
B				
C				
D				
E				
F				

Cupcake mixtures

Your mixtures may have looked like this:

Activity 3

The baked cupcakes

Can you explain any differences between the cakes?

Why is it important to follow recipes carefully?

Acknowledgements

This resource was originally developed by the University of Reading to support outreach work delivered as part of the Chemistry for All project.

To find out more about the project, and get more resources to help widen participation, visit our Outreach resources hub: rsc.li/3CJX7M3.