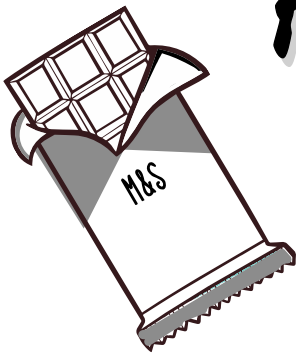




PROOF OF *the pudding*



KS4 GCSE Teacher's Notes Lesson 2

Lesson 1: What do you know about M&S Food? Creating and marketing the Chocolate Melt in the Middle Pudding.

Lesson 2: The science behind the ingredients. Emulsifiers. Modifying the pudding for dietary needs.

Lesson 3: Make your own ice cream and investigate fat content. Sensory evaluation. What makes a product iconic?

Lesson 2



This is Lesson 2 of M&S Proof of the Pudding, a resource made up of three lesson plans.

Food Technology Learning Objectives

Lesson 2

- Understand the functional properties and chemical processes of ingredients to achieve a particular result: Emulsifiers.
- Understand how to adapt food products for specific dietary needs.

Cross-curricular links: Science, Literacy – developing vocabulary

Summary

How does an iconic M&S food product come about? Through analysis of our famous Chocolate Melt in the Middle Pudding, students will gain an understanding of what makes a product successful or otherwise. They will develop and apply their own food science knowledge in a series of engaging practical activities including modifying the pudding for dietary requirements and sensory evaluation.

Resources provided with this pack:

- Lesson 2 Classroom PowerPoint slides
- Ingredients cards
- Film 3: Emulsifiers
- Modify the Pudding worksheet
- Dietary Requirement cards



Lesson 2 Overview



Activity	Content	Resources
Ingredients	<p>Students identify key ingredients of this type of pudding.</p> <p>ACTIVITY: Match ingredient pictures to functional description and molecular structure.</p>	<p>Slides 2-5</p> <p>Ingredients cards</p>
Helpful additions	<p>Q: Why are there more ingredients in the M&S pudding than in a homemade pudding?</p> <p>Have a closer look at emulsifiers, find out what they do and why they are important.</p> <p>Watch the Emulsifiers film (film 3).</p>	<p>Slides 6-7</p> <p>Emulsifiers film</p>
Modify the pudding	<p>ACTIVITY: Students work to a design brief to modify the pudding for a specific dietary requirement, and then complete the worksheet to record their thinking.</p>	<p>Slides 8-9</p> <p>Dietary Requirements Resource</p> <p>Modify the Pudding sheet</p>
Plenary	<p>Peer review – students share their work and offer constructive comments to their peers.</p>	<p>Slide 10</p> <p>Completed worksheets</p>

Ingredients

You will need: Ingredients card pack – 1 pack per small group of students (print and cut along dotted lines)

Students can work individually or in small groups of 4-6.

Q: What were the five key ingredients used to make the pudding in the Perfect Pudding? film.

A: Flour, butter, sugar, eggs and chocolate.

Explain that there would be other ingredients added to the recipe but we are going to explore these essential ingredients and their function in the baking process.

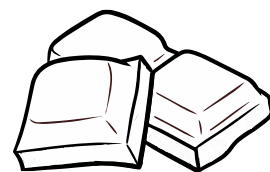
ACTIVITY: Each card pack contains 5 photographs (1 of each ingredient), 5 written descriptions and 5 pictures of molecular structures. Students match the descriptions and the molecular structures to the correct photograph.

Ask students to answer the questions on slide 14

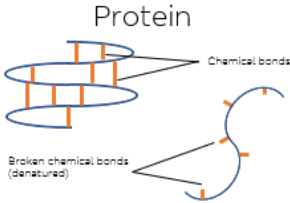
See next page for the answers.

Extension ideas

Ask students to suggest alternative ingredients that would perform the same function e.g. how could they make the pudding vegan, gluten-free, low fat, sugar-free?



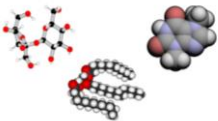
Ingredients Card Match Answers



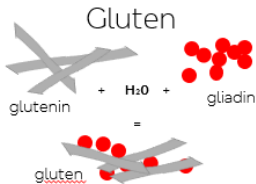
This ingredient serves many functions in baked goods. It adds flavour and colour, contributing to structure (when the molecules are denatured – change their shape – due to heat). It incorporates air when beaten, provides liquid and emulsifies fats with liquid ingredients. It's also used as a thickener in custards. It coagulates (sets) at 60°C to 70°C, so when these temperatures are reached it begins to thicken the mixture.



Sucrose, triglyceride & theobromine



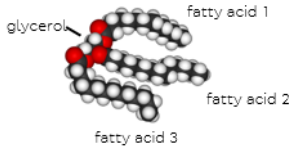
This ingredient is solid at room temperature, but when consumed its fat content absorbs heat from the mouth and melts at body temperature – producing a melt-in-the-mouth effect. It also contains a weak stimulant as well as sugar and caffeine which may be responsible for the characteristic 'buzz' experienced when eating it.



This ingredient provides some of the structure in baked goods. It contains glutenin and gliadin that when mixed with water, form gluten. It is this elastic gluten framework which stretches to contain the expanding leavening gases during rising. When the dough network is baked, the proteins coagulate and combine with gelatinised starch to form the open foam or honeycombed structure typically seen in bread and cakes.



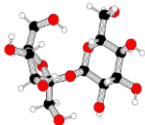
Triglyceride



This triglyceride is a mixture of glycerol and three fatty acids. It contributes tenderness, moistness and a smooth mouth-feel to baked goods. It is a source of vitamins A, D, E, B12, and K2 and enhances the flavours of other ingredients as well as contributing its own flavour. It can trap air bubbles when beaten and whipped with sugar it has plasticity. During baking, these air bubbles expand forming a light, airy structure.



Sucrose



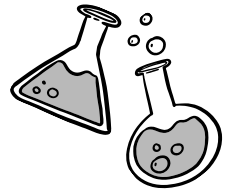
This ingredient provides sweetness, tenderizes dough and batter and helps to retain moisture. During baking it undergoes a series of complex browning reactions which form the characteristic crust on many baked goods. The reactions, known as Maillard reactions, are amino acid and reducing sugars caramelising to give browned food its distinctive 'baked' flavour. Reducing the amount of this ingredient by more than a third can cause loss of tenderness, moisture, browning and sweetness.

- Which ingredient helps the pudding to coagulate? *Egg*
- Which ingredient flavours by sweetening and colours by caramelising when heated? *Sugar*
- Which ingredient moistens a baked mixture such as the sponge whilst adding a longer shelf life? *Butter*
- Which ingredient helps the pudding keep it's structure? *Flour*

Helpful Additions

You will need: Emulsifiers film (film 3)

Explain that the slide shows the ingredient list for the Chocolate M&S Melt in the Middle Pudding.



Ask students:

Q: Why are there more ingredients in the M&S pudding than in a homemade pudding?

A: Most mass-produced convenience foods have more ingredients than the food you'd cook at home. This is because;

- Convenience foods must reach the consumer in perfect condition.
- Consistency across different batches is key - texture, flavour and colour have to be identical every single time.
- Flavourings, modifiers, preservatives and stabilisers maintain the quality of the product throughout the production process.
- Preservatives and stabilisers also extend the shelf life of a product.

Continues overleaf

Helpful Additions cont.

Slide 17

You will need: Emulsifiers film (film 3)

Explain we're going to look at one of these ingredients in more detail.

Watch the Emulsifiers film and then ask students to answer the following questions.

Q: What function do emulsifiers perform?

- Emulsifiers prevent separation and create a smooth texture.
- They act as an interface between two immiscible liquids; in this case oil and water.
- One end of the emulsifier molecule likes oil-based environments and the other likes water-based conditions so the emulsifiers surround the oil globules, leaving their water-loving portion on the outside, suspended in the water, creating a stable emulsion.

Q: Why is that an important function in chocolate products?

- Chocolate is a suspension of non-fat solids (cocoa solids and sugar) dispersed in fatty cocoa butter.
- Emulsifier improves how well the oil and water portions stay mixed.
- It also reduces viscosity and means the texture can be well controlled, allowing it to be poured more easily and maintain a uniform texture throughout the manufacturing and storage process.

Extension ideas

- Ask students to discuss why emulsifiers are particularly important ingredients in convenience foods.

Modify the Pudding

Slides 18-19

You will need: Modify the Pudding worksheet, Dietary Requirements Resource sheet

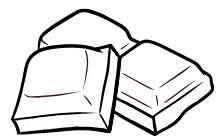
Students can work individually or in small groups.

Explain that our Food Technologists develop products that are suitable for a wide range of dietary requirements and choices.

ACTIVITY: Students will choose, or be allocated, a design brief for a specific dietary requirement and then complete the worksheet to record their thinking.

Example briefs (Edit Slide 18 if you want to make any changes)

- Brief 1: Create a Chocolate Melt in the Middle Pudding that is suitable for a customer who follows a vegan diet.
- Brief 2: Create a Chocolate Melt in the Middle Pudding that is suitable for a customer who has coeliac disease.
- Brief 3: Create a Chocolate Melt in the Middle Pudding that is suitable for a customer who has to follow a low-sugar diet.



Extension ideas

- Design packaging or an advert for your modified pudding.
- Invent a new pudding product – draw a picture, label the features and write a list of ingredients.

Lesson 2 Plenary

You will need: Completed Modify the Pudding worksheets, sticky notes (optional)

Students work individually

Peer Review

Students share their work and offer constructive comments to their peers.

This could be done verbally or as written comments 'posted' next to each worksheet on sticky notes.



Resource Evaluation Form

We hope you've enjoyed using this resource. To make sure that we're providing the best resources that we can, we'd be grateful if you could answer the following questions and let us know how we're doing.

School name:

Date you used the resource:

How did you find out about the resource?

How does this resource link to your classroom activities or planning?

What did you like most about the resource?

What would you change?

Would you recommend the M&S Company Archive resources to colleagues?

Why?

Thank you for your comments

Please email your answers to company.archive@mands.com

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