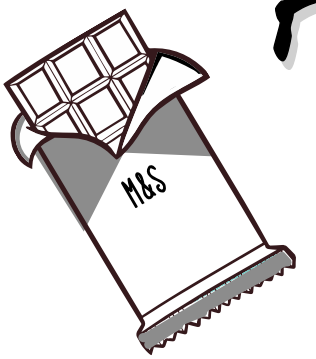
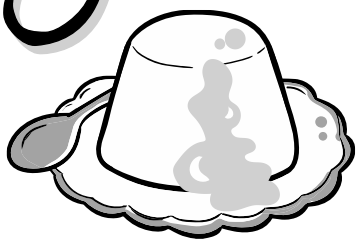
M&S **ARCHIVE**

PROOF OF *the pudding*





KS4 GCSE
Teacher's Notes
Lessons 1, 2 & 3

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?

M&S Proof of the Pudding 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.

Food Technology Learning Objectives

Lesson 1

- Understand how information about food is made available to the customer, including labelling and marketing, and how this influences food choice.
- Awareness of the range of factors that guides customer food choices including sensory perception, enjoyment, preferences, availability, time of day, activity, celebration or occasion.

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.

Lesson 3

- Understand how to set up and conduct a fair sensory evaluation.
- Understand the functional properties and chemical processes of ingredients to achieve a particular result: Fats – modifying fat content.

Cross-curricular links: Science, Literacy – developing vocabulary

Resources provided with this pack:

- **Lesson 1** Classroom PowerPoint slides
- Film 1: Promoting the Pudding
- Film 2: Perfect Pudding?

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

- **Lesson 3** Classroom PowerPoint slides
- Film 4: Ice Cream
- Ice Cream Instruction sheet
- Ice Cream Observation Record
- Sensory Evaluation worksheet

You will need (not supplied with this pack):

Lesson 3:

- M&S Chocolate Melt in the Middle Puddings (sold as a 2 pack – we suggest sharing one pudding between 2 pupils).
- Alternative puddings for students with allergies.
- Spoons and plates
- Access to a microwave and someone to prepare the puddings

For the ice cream activity per small group

- 2 large freezer bags
- 1 small ziplock freezer bag
- Stopwatch/timer
- Tablespoon and ¼ teaspoon measures
- Plates and spoons for serving
- Ice
- 180 ml whole milk OR
- 180 ml skimmed milk
- 4 tbsp sugar
- 6 tbsp salt
- ¼ tsp vanilla essence

ALLERGENS AND DIETARY REQUIREMENTS

- The puddings do not contain nuts but are **not suitable for people with nut/peanut allergies** due to the manufacturing process.
- Puddings contain **milk, egg, gluten** and **soya**.
- They are suitable for vegetarians.

Plan

	Activity	Content	Resources
Lesson 1	Starter	Starter discussion **Q. What do you know about M&S food?** Mind map everything you know, think and feel about M&S food. See M&S Food Facts slide. **Q: What is an archive, and why would a business like M&S have/value one?** Discuss. Did you know? M&S Food facts.	Slides 2-4 Paper & pens
	Introduction	Watch the Promoting the Pudding film (film 1) **Q: Why do you think the 'This is not just food…' TV advert was so successful?**	Slide 5 Promoting the Pudding film
	Creating the Pudding	The pudding was in development for 18 months. **Q: Why do you think it took so long to get this product right?** Watch the Perfect Pudding? film (film 2), students note the ways the pudding goes wrong and suggest what these represent in food technology terms. **ACTIVITY:** Working in groups, students discuss **Q: What would a failed pudding look, smell and taste like?** **Q: What about a successful pudding?**	Slides 6-9 Perfect Pudding? Film Paper & pens
	Plenary	**Q: Why do you think M&S chose to invest so much time into developing this product?** List pros and cons of longer product development times.	Slide 10 Paper & pens
Lesson 2	Ingredients	Students identify key ingredients of this type of pudding. **ACTIVITY:** Match ingredient pictures to functional description and molecular structure.	Slides 12-15 Ingredients cards
	Helpful additions	**Q: Why are there more ingredients in the M&S pudding than in a homemade pudding?** Have a closer look at emulsifiers, find out what they do and why they are important. Watch the Emulsifiers film (film 3).	Slides 16-17 Emulsifiers film
	Modify the pudding	**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.	Slides 18-19 Dietary Reqs Resource, Modify the Pudding sheet
	Plenary	Peer review – students share their work and offer constructive comments to their peers.	Slide 20 Completed worksheets
Lesson 3	Ice Cream in a bag	Watch the Ice Cream film (film 4) and make your own ice cream in a bag. **ACTIVITY:** Make with both full fat and skimmed ice cream to explore the role of fats in foods.	Slides 22-26 Ice cream film, worksheets
	Sensory Evaluation	**Q: What is sensory evaluation and why is it important?** **ACTIVITY:** Sensory evaluation at M&S. Students conduct a sensory evaluation of the pudding.	Slides 27-29 SE worksheet
	Plenary	**Q: What makes an iconic food product?** **ACTIVITY:** Mind map all the factors that have contributed to the success of the Chocolate Melt in the Middle Pudding.	Slide 30 Paper & pens

Starter

Slides 2-3

Class discussion

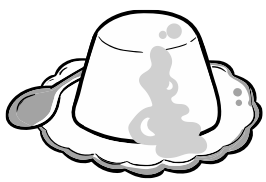
You will need: Paper and pens for mind maps

Students can work individually or as a group.

Q. What do you know about M&S food?

Mind map everything you know, think and feel about M&S food.

Prompts:



- What foods can you buy at M&S?
- Is it a large or small company?
- Old or new company?
- See the M&S Food Facts slide to find out more.

Did You Know? A Few M&S Food Facts

- **1884** Our Penny Bazaar market stalls sold some basic food items like flour, spices and confectionery.
- **1935** Cafe Bars opened in a selection of stores.
- **1948** Nathan Goldenberg is appointed as Technical Executive and Chief Chemist, his Food Technology Department improves quality control, hygiene and safety standards.
- **1960** M&S invents the cold chain in order to provide fresh, chilled chicken (not frozen). It's an immediate success with customers.
- **1972** We introduce 'sell-by' dates, which later become a legal requirement
- **1992** Percy Pigs are launched.
- **2019** We launch food ranges for specific food preferences including Plant Kitchen for vegans, Halal and Kosher ranges.

Starter cont.

Slide 4

Q: What is an archive?

A: An archive is a collection of information, which can come in many different forms such as: letters, reports, photographs, films, digital files, sound recordings and design work.

Our archive contains a lot of merchandise (items sold by M&S), which means we also have large food packaging, advertising and clothing and homeware collections.

Q: Why would a business like M&S have an archive - what value does it have to the company?

A:

- M&S can celebrate and use the heritage of the company to remind customers how long our business has been around and about our most popular products – it helps us to stand out from competitors.
- Being able to show the history of our products helps us protect our copyright and ideas, to stop competitors copying our exact recipes or designs.
- We can use the archive for inspiration and ideas for brand new products which will generate new sales for M&S.
- We can use the archive for school workshops, public events and reaching out to people interested in history – this helps us to make a positive contribution to our communities.

Introduction

Slide 5

You will need: Promoting the Pudding film (film 1)

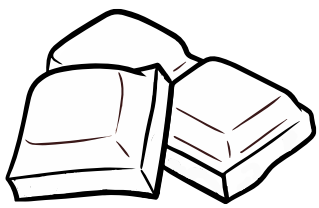
Watch the Promoting the Pudding film to introduce the product and the wider context of how the pudding was launched.

Q: Why do you think the 'This is not just food…' TV advert was so successful?

Students can take notes while watching the film to answer the question.

Answers might include:

- Focus on the product
- New product
- Slow motion
- Soothing voiceover
- Description of product
- Included an offer



Extension ideas

Analyse the advert further

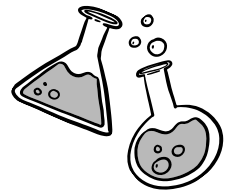
- How does the advert appeal to a customer's senses?
- What sort of information does the advert provide?
- What doesn't it provide?

Creating the Pudding

Slides 6-7

You will need: Perfect Pudding? Film (film 2), paper and pens

Students can work individually or in small groups.



Explain that the pudding was in development for 18 months, a long time in food development terms.

Q: Why do you think it took so long to get the pudding right?

Answers might include: totally new product, liquid centre, heating methods.

Watch the Perfect Pudding? film. **Ask students** to note the ways the pudding goes wrong and suggest what this represents in food technology terms.

Answers might include;

Time	Image	What's happened?	Possible explanation
01:11	Conveyor belt	Sauce has dried up	Sponge has absorbed sauce, sauce is too thin
01:22	Lorry	Pudding is damaged	Sponge is too thin, too much sauce to sponge, unsuitable packaging
01:57	Oven	Collapsed sponge, leaking pudding, dried out pudding	Wrong ingredient proportions, sauce to sponge ratio, over cooking
01:59	Puddings	Pudding is burnt	Cooking temperature too high and/or cooking time too long, sugar content too high

Continues overleaf

Creating the Pudding cont.

Slides 8-9

ACTIVITY: Working in groups or individually, students consider the following questions and list or mind map their ideas on paper. They can use the examples already discussed as starting points for further ideas.

Q: How would you describe a failed pudding? Think about what it would look, smell and taste like and why. Students list all the ways the pudding could go wrong and the explanation for the failure. Answers may include;

- Bitter taste – incorrect ingredients or ingredient proportions
- Too dry/too sloppy – ingredients not in correct proportion or incorrect cooking time or method
- Damage to pudding – poor packaging design
- Contamination – poor hygiene, incorrect storage, short shelf-life

Q: How would you describe a successful pudding? Think about what it would look, smell and taste like and why?

Students list the characteristics of a successful pudding, and the explanation for the success.

Extension ideas

Q: In what other ways could the pudding succeed or fail as a product?

Answers may include:

- Sales – appealing packaging, marketing
- Customer satisfaction - portion size too small or too big, user-friendly cooking methods and instructions

Slide 10

Lesson 1 Plenary

You will need: Paper and pens for lists

Students work individually or in small groups

Q: Why do you think M&S chose to invest so much time into developing this product?

List pros and cons of having longer product development times for food products that present a challenge.

Lesson 2

Slides 12-14

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.

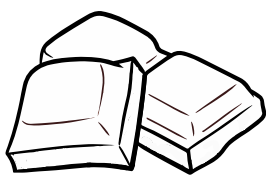
A: Flour, butter, sugar, eggs and chocolate.

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.

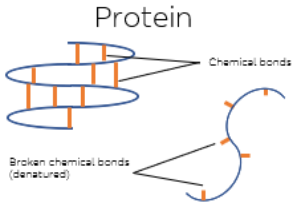


Extension ideas

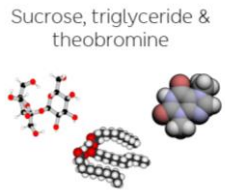
Ask students to suggest alternative ingredients that would perform the same function e.g. how could they make the pudding vegan, gluten-free, low fat, sugar-free?

Ingredients Card Match Answers

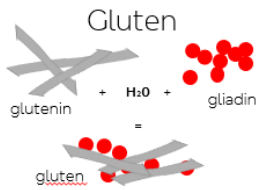
Slide 15



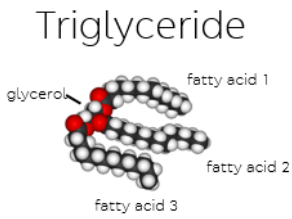
This ingredient serves many functions in baked goods. It adds flavour and colour, contributing to structure (when the molecules are denatured – change their shape – due to heat). It incorporates air when beaten, provides liquid and emulsifies fats with liquid ingredients. It's also used as a thickener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



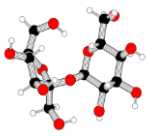
This ingredient is solid at room temperature, but when consumed its fat content absorbs heat from the mouth and melts at body temperature – producing a melt-in-the-mouth effect.
It also contains a weak stimulant as well as sugar and caffeine which may be responsible for the characteristic 'buzz' experienced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



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.



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.

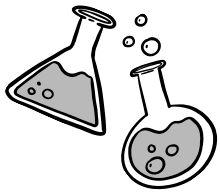
- Which ingredient helps the pudding to coagulate? *Egg*
- Which ingredient flavours by sweetening and colours by caramelising when heated? *Sugar*
- Which ingredient moistens a baked mixture such as the sponge whilst adding a longer shelf life? *Butter*
- Which ingredient helps the pudding keep it's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

Helpful Additions

Slide 16

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

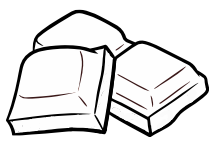
Students can work individually or in small groups.

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.

Slide 20

Lesson 2 Plenary

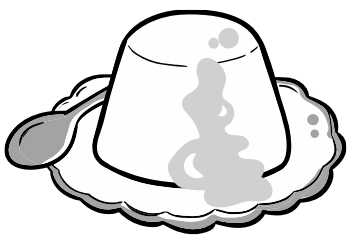
You will need: Completed Modify the Pudding worksheets, sticky notes and pens (optional)

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.



Lesson 3: Ice Cream in a Bag

Slides 22-25

You will need.

- Ice Cream film (film 4), Ice Cream Observation Record, Ice Cream Instruction Sheet
- Per group: 2 large freezer bags, 1 small ziplock freezer bag, stopwatch/timer, tablespoon and ¼ teaspoon measures, ice, 180ml whole milk OR 180ml skimmed milk, 4 tbsp sugar, 6 tbsp salt, ¼ tsp vanilla essence, cups/bowls and spoons for serving

Students work in small groups - half the groups use whole milk and half use skimmed milk. Groups swap finished ice creams to allow comparison.

Explain we're going to investigate the functional properties of fats. Students make ice cream using two different milks, then compare the results analysing texture, flavour and the time it takes for the mixture to thicken until it coagulates.

Watch the Ice Cream film (film 4)

Instructions

- Put one of the large freezer bags inside the other, then half fill the inner bag with ice.
- Add 6 tablespoons of salt to the ice.
- Put the milk into the small ziplock bag. Add 4 tablespoons of sugar and ¼ teaspoon of vanilla essence.
- Seal the milk bag. Check that the milk bag is sealed.
- Place the milk bag directly on top of the ice. Seal the ice bag.
- Shake the bag until the ice cream is ready, set the timer off and start shaking.
- Don't shake too hard, if the bags split you'll have to start again.
- After 5 minutes pause the timer, stop shaking and see if the mixture has solidified, if it's the texture of soft ice cream then it's ready.
- If it's too runny, start the timer again and keep shaking until it's ready. Remember to pause your timer each time you check.
- Complete the Ice Cream Observation Record – see slide 25 for fat content information.

Continues overleaf

Ice Cream in a Bag cont.

TOP TIPS

- Aprons and gloves are recommended, this can be a messy activity.
- Using two large freezer bags for the ice is recommended to safeguard against the bag splitting during shaking.
- Keeping one hand on the bottom of the bag when shaking also helps to prevent splitting.
- The ice bags get cold! Working in groups means that students can share the shaking and avoid their hands getting too cold.
- Try to make sure the milk bag stays upright when put into the ice bag, and that it also has contact with plenty of ice.
- Have several spare bags, ice and milk on hand in case of any spills or splits.

Extension ideas

Students can try making ice cream with other types of milk or milk substitutes and analyse the results.

Ice Cream in a Bag cont.

Slide 26

Ask students

Q: What can you conclude about the effect of fat content on the qualities of ice cream?

- Answers may include descriptions of texture and flavour.
- Fats are important because they trap air, giving a silky, rich texture to ice cream.
- When skimmed milk is used, it will lack the creamy texture and won't be as light because the air isn't incorporated into it as effectively.

What's happening inside the bag?

When ice cream is made, it's simultaneously aerated and frozen. Ice cream contains a lot of air trapped within the fats and that's the reason you need to keep shaking the bag. Air can make up about half of the ice cream's final volume.

As the mixture is cooled, it freezes. If it's frozen quickly, small ice crystals are dispersed throughout the mixture, giving a smooth texture. If it's frozen slowly, these ice crystals can grow and result in an unpleasant crunchy ice cream texture.

Further information - Why do we add salt to the ice?

Ice cream can freeze at zero degrees Celsius, but freezes quicker at lower temperatures. When you add salt to an ice cube, briefly, its temperature is above its melting point. As it melts, it cools down as energy is being used to break bonds in the solid state. This salt water has a lower freezing point so the temperature can get colder, freezing the ice cream more effectively. The more salt in the water, the lower the freezing point will be.

Slides 27-28

Sensory Evaluation

Ask students;

Q: What is sensory evaluation and why is it important?

- It is a scientific discipline that analyses how people respond to food products based on the five senses.
- Results of sensory evaluation tests are analysed to ensure products meet the high quality standards set by M&S.

Sensory Evaluation at M&S

- All food products have a Quality Contract to be followed by the company that supplies M&S. The contract includes details like the product dimensions and how it should look and be labelled.
- Each supplier has a trained Taste Panel Coordinator who oversees taste panels (of 3 or more assessors), and a Controlled Assessment Area, a space with controlled conditions for sensory evaluation.

Q: What do you think 'controlled conditions' means?

A: Quiet, no smells, natural light, random samples taken from stores and supply chain, controlled procedure for tasting by trained assessors e.g. drinking water to cleanse the palate

- Taste panels score products against the Quality Contract requirements e.g. packaging, appearance, taste and texture.
- All taste panel results are recorded and tracked using a traffic light system. Products are rated either red (fail/reject), amber (borderline) or green (acceptable) for each requirement.

Sensory Evaluation Test

Slide 29

You will need:. M&S Chocolate Melt in the Middle Puddings, access to a microwave or oven, plates, spoons, Sensory Evaluation worksheet.

Explain that students are going to conduct a sensory evaluation of the Chocolate Melt in the Middle Pudding using a star chart test.

Why are we using a star chart test?

This test allows us to evaluate the attributes of one product, rather than compare different products.

- Ask students how they will ensure a fair test.
- Prepare the puddings in the microwave or oven following the instructions on the packaging.
- Each student selects 8 attributes to evaluate e.g. chocolate flavour, sauce flavour, soft sponge, odour, sweetness. Students tasting alternative products (for dietary reasons) can select appropriate attributes for their product.
- Taste.
- Record findings on the worksheet.

Extension ideas

- Evaluate a range of M&S desserts using traffic light ratings (see previous page for details).
- Evaluate a range of melting middle desserts using a different type of sensory evaluation test.

Plenary

You will need:. Paper and pens for mind maps

Students work in groups or individually.

The Chocolate Melt in the Middle Pudding has become an iconic product for M&S.

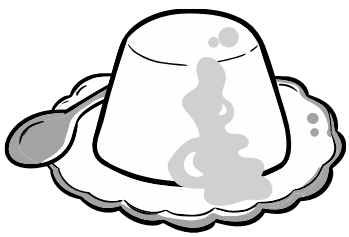
Q: Can you name any other (non-M&S) iconic food products?

Q: What do you think makes a food product iconic?

ACTIVITY Mind map all the factors that have contributed to the success of the Chocolate Melt in the Middle Pudding.

Think about:

- The idea
- How the pudding came about
- The quality of the product
- Appearance and promotion
- Continued appeal



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 Archive resources to colleagues?

Why?

Thank you for your comments

Please email your answers to archive@mands.com

or post to M&S Archive, Michael Marks Building,

University of Leeds, LS2 9JT

M&S ARCHIVE

Useful information

M&S Archive Schools

https://archive.marksandspencer.com/learning/schools

M&S Archive with My Learning

https://mylearning.org/collections/the-mands-company-archive

Contact us

archive@mands.com