

Unit 8A(i) Exploring materials

Focus: food

About the unit

The main aim of this unit is for pupils to explore the properties of materials/ingredients when designing, so that they will be able to identify appropriate materials/ingredients for a task.

In this unit, pupils tackle one of two design and make assignments (DMAs) on the themes:

- Layered dessert
- The right combination

These involve designing a layered chilled dessert, or a sauce combined with other ingredients to make a ready-prepared meal. They identify suitable ingredients for their food product, taking into account appearance, function, safety and reliability.

Pupils gain the knowledge, skills and understanding they need to carry out the DMA successfully through product evaluation activities and focused practical tasks. They:

- apply their understanding of the physical and chemical properties of foods, *eg coagulation of protein, gelatinisation of starch, caramelisation of sugar, shortening of fats, water absorption of fibre*
- consider the aesthetics of food, *eg appearance, taste, odour, texture*, and how this affects what consumers choose
- consider nutritional aspects and values, sources and functions, *eg protein, fat, carbohydrate, vitamins, minerals, water*
- standardise the results of sensory testing and use their findings

Where the unit fits in

This is one of three food technology units that focus on understanding materials: one in year 7 on using and understanding materials; this one in year 8 on exploring materials in greater depth; and one in year 9 on critically selecting materials. These units ensure progression in understanding about materials.

This is part of a series of three units in year 8 on exploring materials; there are equivalent units, with similar learning outcomes, on resistant materials and textiles. Together these units are expected to take 15–22 hours. It is important that the department plans as a team so that pupils are able to draw on knowledge, skills and understanding from across the units to reinforce their learning and avoid unnecessary repetition.

If you choose not to teach this unit, then plan to include the essential activities identified by the symbol ■ as part of another unit.

Expectations

At the end of this unit

most pupils will: select materials/ingredients for particular purposes, considering their working properties and performance characteristics, the available tools and equipment, and the form, size and performance specifications of the materials/ingredients available; process materials/ingredients to change their working properties and performance in use, if appropriate, using techniques to alter materials on a temporary basis, to make them easier to work with; apply their understanding of the properties of materials/ingredients and how these can be managed and exploited; select finishing techniques for materials/ingredients that are appropriate to their end use, with the aim of enhancing their appearance and maintaining their performance in use

some pupils will not have made so much progress and will: choose appropriate materials/ingredients from those available, drawing on their previous experience of working with them, and explain reasons for using particular materials/ingredients; cut, shape and form materials/ingredients, working with a range of tools and equipment; use finishing techniques that are suitable for the product's end use

some pupils will have progressed further and will: draw on their knowledge of materials/ingredients and production processes, recognising the advantages and disadvantages of particular tools and equipment and processes; make decisions which resolve conflicting demands, *eg balancing cost and aesthetic appeal against function and performance*; evaluate how effectively they have used information on the properties of materials/ingredients when testing their product

Prior learning

It is helpful if pupils have:

- classified foods by their sources, *eg animals, crops and plants produced organically, grown locally or imported*, by commodity groups and by the plate model in the *Balance of good health* (HEA, 1994)
- considered nutritional information, *eg healthy eating guidelines*
- mixed ingredients with different functional properties and measured and considered the effects of varying ingredients, *eg proportion, ratio*
- carried out sensory tests to evaluate food products

Pupils should have gained the above knowledge, skills and understanding in year 7, through unit 7A(i) 'Understanding materials (food)', or similar projects.

Language for learning

Through the activities in this unit, pupils will be able to understand, use and spell correctly words relating to:

- the properties of materials/ingredients and their working characteristics, *eg decorate, colour, layer, finishing, forming, food commodities, protein, carbohydrate, fat, vitamins, minerals, water, life-cycle analysis, aesthetics, coagulation, shortening, caramelisation, aeration, performance, database, technical, processing, heating, standardise, discrimination, preference*
- texture, *eg brittle, rubbery, clammy, stodgy, tender, waxy, soft, smooth*
- appearance, *eg stringy, flat, fizzy, crystalline, wet, fragile, dull, shiny*
- odour, *eg aromatic, floral, rotten, pungent, fragrant, acrid*
- taste, *eg sweet, cool, bitter, zesty, tangy, sour, sharp, rich, salty*

Reading – through the activities pupils could:

- select relevant information and link to other information, from a range of sources
- undertake independent research using knowledge of how texts, databases, etc are organised and of appropriate reading strategies

Writing – through the activities pupils could:

- organise facts/ideas/information in an appropriate sequence
- group sentences into paragraphs that are clearly focused and well developed
- link ideas and paragraphs into continuous text which is organised and coherent
- show relationships between ideas by links which show purpose, *eg in order to, so that*, and reservation, *eg although, unless, if*
- use punctuation correctly, *eg full stops, commas, dashes, brackets, bullet points, colons*, to extend and clarify sentences

Resources

Resources include:

- *Our healthier nation* report (Department of Health, 1999)
- a collection of products in order to investigate how different materials/ingredients are used
- tools, equipment and materials/ingredients to practise finishing techniques
- useful websites, *eg*
 - www.foodonline.com
 - www.acs.org/education
 - www.ohm.gov.uk

Future learning

Pupils could go on to a further unit on materials/ingredients: unit 9A(i) 'Selecting materials (food)'. Applying an understanding of materials when designing and making is an important part of every design and make assignment.

Out-of-school activities and homework

Pupils could:

- collect labels from food products to show their nutritional content and any nutritional or other claims. They could also find out about legislation and guidelines that restrict nutritional claims
- survey users' reactions to a range of products, including those intended to meet the same need, in order to identify the criteria used to evaluate and compare them

Links with other subjects

- Science: this unit links with work in unit 8A 'Food and digestion' and also builds on year 7 work on particle explanation of change, and year 8 work on compounds and mixtures, by explaining changes of state in ingredients, and chemical changes in terms of atoms.
- ICT: using databases.
- English: displaying and communicating information.

Learning objectives

Pupils should learn:

Possible teaching activities**Learning outcomes**

Pupils:

Points to note**DESIGN AND MAKE ASSIGNMENT (DMA)**

- to design and make a product, identifying materials/ingredients that are appropriate for the task, taking into account appearance, function, safety and reliability, by applying the knowledge, skills and understanding they developed during the product evaluation activities and focused practical tasks

Set the pupils a DMA in which they identify and work with materials/ingredients that are suitable for the task, applying their understanding of the properties of those materials/ingredients.

Examples

These example DMAs have been written so they can be copied and given directly to pupils. Further details and contexts can be added, as appropriate.

Layered dessert

Supermarkets sell many chilled desserts, *eg yoghurts, trifles, cheesecakes, mousses*. Design a layered chilled dessert containing fruit, for one person. Consider presenting it in a vacuum-formed package to show off the layered effect.

The right combination

Many ready-prepared foods on the market consist of sauces combined with other ingredients, *eg pasta with a sauce, curry with rice, casseroles with dumplings*. Develop ideas for a meal in which a sauce is combined with other ingredients.

- take into account appearance, function, safety and reliability
- make preliminary models to explore and test their design thinking
- make their product within constraints
- use their knowledge of how databases are organised, and how to read them to select relevant technical information about materials/ingredients and processes
- consider a range of materials/ingredients and methods
- choose materials/ingredients and methods, and give details of these in a manufacturing specification
- write a report (300 words) justifying and reviewing their choice of materials/ingredients and methods of making. The report should have a clear focus and include linked paragraphs and topic sentences

Language for learning when writing a report

- When pupils write their reports, ask them to:
 - link ideas, *eg on materials/ingredients selected, by purpose links, eg in order to, so that,* and reservation links, *eg although, if*
 - use appropriate punctuation correctly, *eg colons, brackets, dashes*

PRODUCT EVALUATION

Organise a range of activities that give pupils an opportunity to:

- identify the properties of different materials/ingredients and components and consider why they have been used
- identify possible design weaknesses in the choice or processing of the materials/ingredients used
- name and describe the methods and processes used to make and finish the product
- specify design criteria and set up tests to evaluate products objectively, *eg sensory evaluation tests for food products*
- learn words to describe the form and function of products



Health and safety – pupils should understand about hazards, risks and risk control when carrying out sensory testing or disassembling food products

■ essential activities

○ optional activities

Learning objectives

Pupils should learn:

- about the properties of materials/ingredients and the characteristics they give to products
- about ways of processing materials and ingredients
- how to set up a sensory test to evaluate food products
- to use appropriate vocabulary to describe odour, taste, appearance and texture
- about finishing and decoration and its impact on a product's performance
- about processing, assembly and packaging

Possible teaching activities

- Carry out scenario activities. Ask the pupils to discuss choosing materials/ingredients and processes for a product, *eg a ready-made dessert or a ready-prepared meal*. Ask them to choose materials/ingredients and processes from a limited range of options and discuss why they made particular choices, *eg by looking at how specific ingredients can be used to set or thicken a mixture*.
- Ask the pupils to examine a collection of items, *eg ready-prepared meals*, and to investigate the use of different materials/ingredients. Ask them to explore how the materials have been combined and finished, *eg to carry out a life-cycle analysis of a packaged dessert or ready-prepared meal by drawing a flow chart showing the materials used from source to disposal*.
- Ask the pupils to look at the impact of different sorts of processing on the end product, *eg to investigate the effect of freezing on colour, texture, taste, odour, shelf life, nutritional value*.
- Discuss with the pupils the difference between preference and discrimination tests and ask them to list words used to describe food attributes (refer to the list of words in 'Language for learning'). Discuss why aesthetics are important when choosing and eating food products.
- Ask the pupils to investigate finishes and surface decorations used on a variety of materials/ingredients and discuss how they alter performance characteristics.
- Ask the pupils to disassemble a product, *eg a frozen meal*, and to examine how it was processed, assembled and packaged.

Learning outcomes

Pupils:

- apply their understanding of the physical and chemical properties of materials/ingredients, *eg setting using gelatine, foaming of egg white*, and recognise the connection between the properties of a material/ingredient, its performance and how it is used
- understand how the properties and working characteristics of materials/ingredients relate to their structure
- explain how common sorts of processing change the main characteristics of an end product, *eg the effect of freezing vegetables or fruits*
- use preference tests and discrimination tests to evaluate a range of existing products, and explain why the aesthetics of food products affects what consumers buy
- use and spell sensory vocabulary accurately when testing for preference and discrimination
- identify common finishing processes, *eg garnishing*
- understand the processing of raw materials/ingredients and their potential end uses

Points to note**Language for learning about the properties of materials/ingredients**

- Remind pupils of the correct names of a range of properties and their spelling and roots.

Language for learning when testing food products

- Ask pupils to work in small groups to investigate three varied food products and find three words to describe the odour, appearance, taste and texture of each. They could use dictionaries to check spellings and meaning, then produce an attribute analysis or sensory profile for each product.

■ essential activities

○ optional activities

Pupils should learn:

Pupils:

FOCUSED PRACTICAL TASKS (FPTs)

These practical tasks should focus on the knowledge, skills and understanding outlined in 'About the unit'. They should give pupils an opportunity to practise any new skills they will need during the DMA, *eg considering the physical and chemical properties of food*.

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| <ul style="list-style-type: none"> ■ how the physical and chemical properties of foods are used to achieve particular effects | <ul style="list-style-type: none"> ■ Ask the pupils to carry out a range of investigations into the physical and chemical properties of foods, <i>eg</i> <ul style="list-style-type: none"> • <i>thickening or setting a food product</i> <ul style="list-style-type: none"> – <i>gelatinisation (use of flour or potato/starch)</i> – <i>coagulation (use of egg/protein)</i> – <i>caramelisation (use of syrup/sugar)</i> • <i>aerating of food products</i> <ul style="list-style-type: none"> – <i>physical (whisking egg white to a foam)</i> – <i>chemical (use of a raising agent)</i> – <i>biological (use of yeast for fermentation)</i> | <ul style="list-style-type: none"> ■ understand what is meant by 'thickening' and 'aerating', why this is useful, when it is used and how it is achieved, <i>eg it changes the texture or the consistency, it can be achieved by adding ingredients or whisking and is useful for making sauces</i> |
| <ul style="list-style-type: none"> ■ about nutritional value and the function of the macronutrients | <ul style="list-style-type: none"> ■ Discuss with the pupils macronutrients and water. Ask them to make an individual or class display, showing the main sources and functions of macronutrients and water. | <ul style="list-style-type: none"> ■ list the macronutrients, <i>eg protein, carbohydrate, fat</i>, and give two main functions and five main sources of each |

■ essential activities

○ optional activities