Unit 2.1.7 and 2.1.8

Developing New Food Products and Evaluating Foods

Key Knowledge and Key Skills

Key Knowledge 2.1.7

The steps in the process of developing new food products using design briefs: research, design and innovations, product testing, production, evaluation and marketing.

Key Knowledge 2.1.8

Qualitative and quantitative measures used to evaluate foods, including the principles and practices for the sensory evaluation of food products, such as sensory analysis, dietary analysis and nutrition analysis

Key Skills 2.1.6

Use design briefs and other practical activities to explain and apply the process of developing new food products that maximise their nutritional profile.

Key Skills 2.1.7

Compare and evaluate foods using qualitative and quantitative measurements

Key Skills 2.1.9

Undertake practical activities to analyse commercial food production in Australia.

Key Terms and Definitions

A **consideration** is a factor that the food product designer can consider when planning a new food product.

A **constraint** is a factor that the food product designer must meet when planning a new food product.

A **design brief** describes what type of food product is needed. A design brief outlines the requirements of the new food product.

A **dietary analysis** involves nutrition experts analysing an individual's consumption patterns to determine the nutritional quality and quantity of a person's diet.

An **evaluation** is an assessment process carried out on a product to determine how well the product idea or actual product meets the design brief.

Evaluation criteria are the standards by which a food product will be judged. They are used to determine the suitability of the food product. Evaluation criteria are often linked to the considerations and constraints in the design brief and are sometimes presented as questions.

A **focus group** is a group of people who participate in a discussion about a product or service where data are collected through group interaction.

Marketing involves promoting a product or service. A product's most important or unique features are highlighted to generate sales and fulfil customer needs and wants.

A **nutritional analysis** is a process that determines the nutritional content of a food or range of food products.

Product testing involves measuring a food product's characteristics or likely performance and determining if it meets the specifications in the design brief.

A **prototype** is a sample of a proposed product.

The **profit margin** is the difference between how much a product costs and what it is sold for. It is usually represented as a percentage.

A **qualitative test** measures the quality of a product. They tend to be subjective.

A **quantitative test** assesses information about a food product that is more easily measurable.

Sensory analysis is a scientific discipline where the senses of sight, smell, taste, touch, and sound are used to determine a food's sensory properties.

Sensory evaluations are conducted to measure, record, analyse, and interpret reactions to a food's characteristics or sensory properties.

A **target audience** or **target market** is a specific group of people a company hopes to sell a product.

The **sensory properties** of food refer to the appearance, aroma, texture, sound, and taste of food.

Specifications are a list of criteria that the product must or could be like. These specifications can be listed under two subheadings: considerations and constraints.

The Design Process

The design process is a process that professionals follow to design new products and services. Various occupations, including chefs, food designers, and food technologists follow this process when developing new products and services.

The Design Brief

The first step in creating a new food product is to develop a design brief. The design brief is usually established in consultation with a client who wants to sell a new product or service. The design brief describes the type of food product a client wants. It doesn't specify exactly what the product will be; it merely outlines what needs to be made, why it is being made, who it is being made for, when and where it will be made, and what resources are available to make it.

A design brief often includes the following information:

What needs to be made?

A design brief should outline what needs to be made.

Why is the food product needed?

A short description that provides background information about a client or company. This information may include details about a company and its priorities. For example, a company might focus on sustainability or foods rich in probiotics and want this to be incorporated into their food products.

Who will the food product be aimed at?

A design brief should provide details about who a product will be targeted at and their particular interests. For example, a new breakfast cereal that contains less sugar could be aimed at children.

Where and when will the food be eaten?

Details about where and when a food product will be consumed must also be provided. Some food products might be designed for people to take to school or work. Other food products might be designed for special occasions like Christmas or a particular season, like winter.

How will the food product be made?

Some information about the equipment, ingredients, and technology the company has access to must also be provided in the design brief. It is pointless designing a food product that uses specialised equipment and ingredients that the company cannot access.

Specifications

Specifications are a list of criteria that the product must or could be like. There are two types of specifications: constraints and considerations. A **constraint** is something a new product must include, and a **consideration** is something a new product could include.

Below is an example of a design brief. The constraints have been highlighted in red and the considerations have been highlighted in green.

Amy has been rearing insects in a specially designed facility for several years. She has decided to start producing a **range of high protein snack foods** using **insects as the main ingredient**. As a specialty product, the snack food made from insects will **cost slightly more than conventional snack foods** currently available. Her target audience will likely be young adults because they tend to have more money to spend on innovative foods. They also tend to be more adventurous with their food choices. It would be good if the **product was unique** to entice this consumer group to try it!
The main reason that Amy began her insect enterprise was that she was concerned about the impact of protein food sources, like beef, on the environment. It would be good if **sustainability were considered when designing the new food product**.
Amy will begin selling her new food product at farmer's markets. This is where many people who are interested in the environment shop. Amy will need to make the new snack food in the weeks leading up to a market; therefore, it would be **good if the product had a four-week shelf-life.**
Amy does not have much special equipment in her factory, so the new product will **need to be produced using the standard equipment found in a domestic kitchen**.

Once the considerations and constraints have been identified, they are often formed into questions to be used as part of the evaluation process.

Below is an example of how the considerations and constraints in the above design brief can be developed into a series of open-ended questions.

1. How have high protein ingredients and insects been used as the main ingredient in this snack food?
2. How does the price point compare to other conventional snack foods?
3. How could a unique food product be developed using standard equipment in a domestic kitchen?
4. How could sustainability be incorporated into this food product?
5. What could be done to ensure the product has a shelf-life of at least four weeks?

Research

Once food scientists know the food product they need to produce, they must figure out precisely what to make. Various types of research can be conducted when designing new products. Conducting research is essential when developing a product that meets the specifications of the design brief. A well-researched design brief often results in the development of a product or service that meets the customers' requirements.

Primary Research

People conduct primary research when they collect information themselves. They often use primary research to determine what people want. It is important to conduct this research using the target audience or market to which they wish to sell a product. Food designers also often assemble a group of people called a focus group; they seek feedback from this group by asking them questions about their attitudes, beliefs, opinions, and perceptions about a food product or service.

Primary research includes conducting interviews, questionnaires, and surveys with focus groups. It may also involve researching retail establishments online or in person to survey the types of food products already on the market.

Secondary Research

People conduct secondary research when they refer to content first reported in another source. Examples of secondary research include articles, books, and textbooks that interpret or review research.

People designing new food products often need to develop their knowledge about a product before they begin creating it. This may involve researching things such as ingredients high in protein or what foods are considered superfoods. This secondary research should use credible sources of information. Credible sources include information written by someone who is an expert in their discipline and is free of errors and bias. Using websites with URLs that end in .edu or .gov.au are generally considered credible.

Design and Innovations

Thousands of new food products are introduced each year. Unfortunately, the failure rate of new food products is high. It takes a long time for a new food product to be developed; a successful product must be designed to ensure that the time and money spent researching a new food product are not wasted.

Designing innovative food products involves improving existing food products or introducing new ones that fulfil a current or emerging consumer demand or trend. New technologies are often used when developing new trends.

Examples of new innovative changes to food products and services may include things such as the use of technology to develop a unique flavour, more environmentally friendly packaging, or improved production methods.

The Commonwealth Scientific and Industrial Research Organisation, CSIRO, is a government-funded organisation with the most extensive food innovation expertise available in Australia.

Watch this video to find out about food innovation at CSIRO: https://www.youtube.com/watch?v=rys54NpCoLE

Watch this video about CSIRO's innovation with protein-rich food products: https://youtu.be/ANpELTANRdo

Watch this video about an innovative food product developed by CSIRO and Fresh Select: https://youtu.be/6wQyjNaBRZA

Product Testing

Product testing involves measuring a food product's characteristics or likely performance and determining if it meets the specifications in the design brief. The degree to which a product is successful could be measured using open-ended questions that incorporate the brief design specifications, an example of which was provided earlier. During this stage, feedback is gathered directly from customers or potential customers about several product ideas.

Prototypes of the new food product may also be developed at this time. A prototype is a sample of the proposed product.

Prototypes are produced for a range of reasons:

- The aroma, appearance, taste, and texture of the potential product can be tested and modified according to feedback received.
- The suitability of available equipment, ingredients, and resources available can be assessed.
- The suppliers can ensure that the new food product complies with safety and nutritional government policies, regulations, and standards.
- The company that intends to sell the new food product can ensure that its claims are accurate and true.
- The stability and shelf-life of a food product can be assessed.
- The cost of the food product can be determined, and the designs modified to ensure the product is within budget.

Watch this video about the laboratories at Deakin University, where students learn about developing new food products: https://youtu.be/zNkvZVmo6vA

Watch this video about the food product development at McDonald's: https://youtu.be/SRSjY6fWg1s

Production

When the company is satisfied with the prototype, it is then adapted for full-scale production. This involves increasing the quantities of ingredients used and modifying the processes at each stage of development to make much larger quantities. Full-scale production is very different from laboratory-scale production. At this point, manufacturers must ensure that the product performs the same in large-scale production as in small-scale production. Some slight changes may need to be made to the product to ensure it replicates the results achieved in the smaller-scale production. The company proceeds with production when the same or similar results are achieved.

Watch this video about the production process at Arnott's Tim Tam factory: https://youtu.be/AiEGmw10n0c

Product Evaluation

When conducting a product evaluation, the company assesses whether the food product or service meets the specifications in the design brief. They reflect on the questions developed in the earlier stages of the design process to determine whether the specifications were met and whether the design brief was satisfied. This is sometimes referred to as a design brief evaluation.

A range of evaluations may be carried out at any stage in the design process. These include sensory analysis, dietary analysis, and nutrition analysis.

Sensory Analysis

Sensory analysis is a scientific discipline where the five senses of sight, smell, taste, touch, and sound are used to determine a food's sensory properties. Sensory analyses are conducted to determine if the sensory properties of a new food product will appeal to consumers. Sensory tests are also conducted to measure shelf-life and keeping qualities of food. The sensory properties of the food product need to be reviewed to ensure that the product is appealing to consumers and that they will keep buying it.

Food manufacturers employ food technologists and food scientists to conduct sensory tests with larger audiences. These types of audiences are not necessarily trained in taste testing. However, some professionals are educated and trained to undertake sensory tests on food.

Sensory evaluations measure and analyse how people respond to the five senses (aroma, sight, smell, sound, taste, and touch). They are often conducted at various times throughout the design process.

- When discussing the look of food, the term **appearance** is used. When people look at food's appearance, they immediately, often without realising, assess its colour, shape, and size.
- When discussing the **smell** of food, the term aroma is used.
- Food generates **sound** during preparation, cooking, and consumption. An apple makes a crisp, sharp sound when it is cut. The fat on the meat sizzles as it cooks in a frypan. In some cultures, the sound of someone slurping their soup signifies they are enjoying it.
- The term flavour is used when discussing the **taste** of food. While there are only five primary taste sensations, thousands of words can be used to describe these taste sensations.
- When applied to food, the sensory property of touch is known as **texture**. The term 'mouthfeel' is used to describe the texture of food in the mouth. People often detect the texture of food just by looking at it.

Marketing

Once a food manufacturer has produced a food product, they must sell it. In order to sell a food product, it needs to be marketed. Marketing involves promoting a product or service. It is the process whereby a product's most important or unique features are highlighted to generate sales and fulfil customer needs and wants.

Marketing is crucial to the success of the product. If a food product is not marketed, it can mean nobody knows the product exists. If nobody knows about the product, then they can't buy it. Lack of sales means production will cease, and the new product will be one of those failed products mentioned earlier.

Various techniques can be used when marketing new food products, including:

- advergames
- augmented reality
- celebrity endorsements
- competitions and giveaways
- colour
- influencers
- images
- popular culture
- news reportage
- sports sponsorship
- use of language and vocabulary.

Watch this example of a food company sponsoring sport: https://youtu.be/iCg_55NIGqE

Watch this example of an advertisement with rewards, competitions, and a catchy tune: https://www.youtube.com/watch?v=R8dYZM9AdPo

Qualitative Evaluations

Qualitative and quantitative measures can be used to evaluate foods. A qualitative test measures the quality of a product. They tend to be subjective.

There are several different qualitative tests that consumers can undertake.

Preference Tests

Preference tests are subjective and are used to determine how samples of food differ from each other. They do not evaluate specific characteristics, such as crunchiness or smoothness. **Hedonic and ranking tests** are an example of preference tests. In these tests, people are asked to rate a food sample somewhere on the point scale from high to low or most likely to least likely.

Discrimination Tests

Discrimination tests are designed to detect a similarity or difference between food samples. They usually evaluate specific characteristics of a food product, such as the degree of crunchiness or sweetness.

In a **duo-trio test**, a consumer is given three samples of a beverage or food. The first sample is called the reference sample and is the same as one of the other samples. Consumers taste the reference sample first, then taste two other samples – one will be the same as the reference sample, and one will be different.

A **paired comparison test** can determine which one of two samples is preferred. It can also be used to identify which sample has a particular characteristic compared to the other samples.

The **triangle test** assesses whether a consumer can detect sensory differences between two food products. Three samples are provided; two are the same, and one is different. Consumers need to indicate which food product they believe differs from the other two.

A **profiling test** is where people record the intensity of a sensory attribute of one food product or range of food products. This test is a valuable tool for evaluating differences in similar products, analysing specific characteristics, creating a product that meets particular characteristics, comparing various food products, and identifying areas or opportunities for product improvement.

Quantitative Evaluations

Some sensory analyses are quantitative, which means they are based on quantities and can be measured. Quantitative tests are objective; they are not based on personal feelings or opinions but on facts.

A **descriptive analysis** is an objective sensory test. Highly trained panellists measure the qualitative attributes of appearance, aroma, flavour, and texture, assessing them by recording measurable data. Panellists might rank the intensity of the sensory property from 0 to 15. As the panellists are highly trained and experienced, what one panellist measures as a 10 will be the same as what the other panellists measure. This type of test is called a quantitative test because the quantity of the attribute can be accurately measured.

Various scientific equipment is used in industry to conduct quantitative tests. However, some basic equipment available in the home can also be used.

The colours of foods can be measured using sample paint charts available from hardware stores.

Viscosity can be measured by placing a small amount of sauce or other liquid food on top of a plate or flat board. The board is then placed on an angle, and the time it takes for the liquid to run to the end of the board can be measured. A similar test can be completed using a template with a range of concentric circles a uniform distance apart from each other. A sample of the food can be placed in a hollow cylinder of the template. Once the cylinder is lifted, the food will spread. How long it takes to spread can be timed, or how far the food will spread can be observed. The height of the food, once it has stopped spreading, can also be recorded. The results of such tests can be used to modify food consistency as required.

Watch these videos to see how viscosity can be measured in the home: https://youtu.be/69iUhlqFJFk and https://www.youtube.com/watch?v=FB428gucv4Y

Dietary and Nutritional Analysis

Dietary and nutritional analysis play important roles in evaluating and providing information about the nutritional composition of foods.

Dietary analysis involves recording and calculating the food intake of individuals or groups over a specific period. It considers factors such as energy intake, macronutrient distribution (carbohydrates, proteins, and fats), as well as micronutrient intake (vitamins and minerals). The purpose of a dietary analysis is to evaluate the nutritional adequacy and balance of the diet.

The collected data, including energy and nutrient information, is then compared to food composition tables such as the Australian nutrient reference values. These reference values are developed by authoritative organizations like the Australian National Health and Medical Research Council (NHMRC).

Food composition tables, such as the Australian nutrient reference values, serve as references for comparing the energy and nutrient content of foods. These tables provide information on the average composition of various food items, allowing for the calculation of nutrient intake based on dietary data.

Click here for the Australian Nutrient Reference Values.

Click here to calculate the amount of energy and nutrients required by different people living in Australia.

Click here to calculate the amount of nutrients different people in Australia require.

Nutritional Analysis

Nutritional analysis, on the other hand, focuses on determining the precise nutrient content of a food, range of food products or a recipe. This process involves laboratory testing and analysis of food samples to measure macronutrients, micronutrients, vitamins, minerals, and other components. The results of nutritional analysis are utilized to create accurate and informative nutritional information panels on food packaging.

The nutritional information panel provides detailed information about the energy and nutrient content per serving or per 100 grams of the food product. It includes values for energy (calories), protein, carbohydrates, sugars, fats, saturated fats, dietary fiber, and various vitamins and minerals. This panel serves as a valuable resource for consumers to make informed choices about the nutritional content of the food they consume.

Furthermore, nutritional analysis supports nutritional claims made by food manufacturers on food labels. These claims, such as "high in fibre" or "good source of calcium," must be substantiated by accurate and reliable data obtained through nutritional analysis.

Overall, both dietary and nutritional analysis are crucial components in assessing and providing information about the nutritional composition of foods. They contribute to promoting healthier food choices and ensuring transparency in food labeling, empowering individuals to make informed decisions about their dietary intake.

Written Activity One

10 Quick Questions

Read the online text at this link: https://foodstudies.com.au/courses/unit-2-1-7-2-1-8-developing-new-food-products-and-evaluating-foods/

Answer these questions:

1. What is a design brief?

2. Why is it important to identify the target audience in a design brief?

3. What are the two types of specifications in a design brief?

4. What is the purpose of conducting primary research in the design process?

5. What is the difference between primary research and secondary research?

6. What is the role of prototypes in the design process?

7. What is a sensory analysis?

8. How does marketing contribute to the success of a new food product?

9. What are preference tests and discrimination tests in sensory evaluation?

10. What is the difference between qualitative and quantitative evaluations in sensory analysis?

Written Activity Two

CSIRO: Welcome to our food innovation centre

Watch the video at this link:

1. What does CSIRO stand for?

2. What role does CSIRO play in designing new food products?

3. How does CSIRO assist companies in innovating their food products?

4. In terms of sales, what impact has CSIRO had on its clients in the food industry?

5. How many new products has CSIRO assisted in introducing to the retail market nationally?

6. How does CSIRO support companies in developing and launching new food products?

7. What makes CSIRO's pilot plants unique?

8. What areas of expertise does CSIRO offer to food companies?

9. How does CSIRO assist the food industry in managing food safety and meeting regulations?

10. How does CSIRO support companies in developing healthier food options?

Written Activity Three

Designing a Food Product

Imagine you are a food designer tasked with creating a new a new food product marketed to 16 year olds.

Use the information from the design process to complete the following activity:

1. **Develop a design brief for a new food product aimed at 16-year-olds.**

   Consider the following aspects:

   - What needs to be made? Describe the type of food product you will create.
   - Why is the food product needed? Provide background information and specify any unique features or priorities.
   - Who will the food product be aimed at? Describe the target audience and their particular interests.
   - Where and when will the food be eaten? Provide details about the intended consumption occasions.
   - How will the food product be made? Consider the equipment, ingredients, and technology available for production.

2. **Specifications:**
   - Refer to the design brief to identify at least two constraints and two considerations for your food product.
   - Formulate open-ended questions based on these specifications to be used as part of the evaluation process.

3. **Research:**
   - Outline the primary and secondary research you would conduct to gather information about the target audience, market trends, and potential ingredients or flavours.

4. **Design and Innovations:**
   - Brainstorm and describe two innovative changes or improvements you would like to incorporate into your food product, such as using unique technology or introducing eco-friendly packaging.

5. **Product Testing:**
   - Outline the steps you would take to conduct product testing for your food product, including developing prototypes and evaluating sensory properties, consistency, and shelf-life.

6. **Marketing:**
   - Briefly describe three marketing techniques you would use to promote your food product to the target audience.

7. **Qualitative Evaluations:**
   - Explain two different types of qualitative evaluations that could be conducted to assess the quality and sensory properties of your food product.

8. **Quantitative Evaluations:**
   - Identify two quantitative evaluations that could be used to measure specific attributes or characteristics of your food product, such as color or viscosity.

Written Activity Four

Big Industry

Source: https://finefoodaustralia.com.au/fine-food-australia-news/big-industry-turn-out-for-fine-food-australia-2022-as-australias-top-innovations-products-and-industry-stars-shine/

Extract:

One of the highlights was the annual Innovation Awards which recognise the most exciting and innovative products in the Australian marketplace, judged by top food industry experts.

“The calibre of entrants this year for the Innovation Awards was incredible,” said Product and Event Manager, Andrew Lawson. “All the nominees were phenomenal but what really set the winners apart were products that were very unique displaying a high level of innovation.”

Best new food service product, presented by Hello Food Service: Clorox Australia – Glad to be Green Compostable Baking Paper. Comprised of a unique composition of materials, as opposed to regular baking paper which has a high amount of silicone, Clorox’s product is a win for sustainability says Commercial Manager McLean Bennett. “It is costly to make but we believe in economies of scale and the environment, so we are thrilled at how it’s performed over 12 months.”

Best new retail product, presented by Retail World: Mama Emma – Gluten Free Potato Gnocchi with Pea Flour. About to launch on the Australian market through distributor Raw Materials, Marketing Manager Alberto Bianco said, “the product is different to other gnocchi products in that it is made from 68 per cent steamed potatoes unlike others which are made from potato flakes. The result is a superior product.”

1. Select one of the new food products described above and develop a design brief that could have been used in the development of this food product.

2. How does Clorox Australia's "Glad to be Green Compostable Baking Paper" exemplify innovation in the food service industry?

3. Explain the unique composition of materials in Clorox Australia's compostable baking paper and how it contributes to sustainability.

4. In what ways does Mama Emma's "Gluten Free Potato Gnocchi with Pea Flour" differ from other gnocchi products on the market?

5. What are some qualitative measurements that can be used to compare and evaluate the gnocchi?

6. Provide examples of quantitative measurements that can be used to compare and evaluate the gnocchi.

Practical Activity One

Pudding Perfection!

Design Brief

The Pudding Palace is renowned for its exquisitely crafted desserts that tantalise both the eyes and taste buds. They are seeking a new addition to their menu: a mouthwatering pudding with a custard sauce with the following characteristics:

- Taste: The taste should evoke a comforting sensation, reminiscent of homemade goodness.
- Creamy Texture: The pudding should have a velvety, luxurious texture that melts in the mouth.
- Golden Perfection: The cooked pudding should showcase a light golden color, radiating warmth and elegance.
- Drizzle-Ready Consistency: The sauce should have a consistency that is thick enough to cling to the pudding but not overly thick, allowing it to elegantly drizzle down the sides when served.

Working as a team of three food technologists, your groups mission is to develop the perfect pudding and sauce recipe that satisfies the desires of The Pudding Palace.

About the task:

In this group activity, students will work in groups of three to create three servings of pudding with an accompanying custard sauce. Together the group will make one batch of the puddings and cook them in the three methods stated. Each student will be responsible for making a custard sauce, using varying quantities of milk to produce a sauce of varied consistency.

Flavour Selection

Each group is to select a flavour for their groups puddings.

Citrus Burst 1 teaspoon of orange, lemon, or lime zest.	**Chocolate Delight** 2 teaspoons of chocolate chips into the dough or 2 teaspoons of cocoa powder.	**Nutty Sensation** 2 teaspoons chopped nuts such as almonds, pecans, or walnuts. Toasting the nuts beforehand enhances their taste.	**Spiced Infusion** Add 1/4 to 1/2 teaspoons of spices like cinnamon, nutmeg, ginger, or mixed spice.
Fruity Bliss 1 tablespoon raisins, currants, cranberries, blueberries, or chopped dried cherries.	**Coconut Surprise** 1 tablespoon shredded or desiccated coconut.	**Berry Bite** 2 tablespoons frozen berries	**Coffee Kick** Dissolve a teaspoon of instant coffee granules in the milk before adding it to the dough.

Sauce Preparation

Each student must select a different quantity of milk to use in their sauce.

- Student A will use ½ cup of milk,
- Student B will use ¾ cup of milk, and
- Student C will use 1 cup of milk.

Cooking Method Selection

Each student must select a different cooking method from the list below:

- Student A will use the stovetop steaming method,
- Student B will use the oven baking method, and
- Student C will use the microwave method.

Source

Pudding Perfection!

Ingredients:

¼ cup (60g) butter

¼ cup caster sugar

1 egg, beaten

½ teaspoon vanilla essence

¾ cup self-raising flour

¼ cup milk

Flavouring ingredients

Fresh fruit and whipped cream for garnishing

Instructions:

1. **Grease** a small souffle dish or ceramic mug.
2. In a small mixing bowl, **mix** together the flour, baking powder, and salt until well combined.
3. In a separate bowl, **cream** together the softened butter and sugar until light and fluffy.
4. **Add** the vanilla essence and egg, beating well until fully incorporated.
5. **Add** the flavouring ingredient/s.
6. Gradually **add** the dry ingredients to the wet ingredients, mixing until just combined.
7. Using two spoons, **place** the pudding mixture into an oven-safe ceramic cup or ramekin.
8. Select the cooking method you will be using from below and follow the instructions provided.

Steamed Pudding

1. **Cover** the cup or dish with a layer of baking paper or aluminum foil, making sure to secure it tightly with a string or rubber band.
2. **Fill** a saucepan with enough water to reach about halfway up the sides of the cup or souffle dish. **Place** a saucer in the saucepan and then place the cup or dish on the sauce. Otherwise, a suitable steaming basket can be used.
3. **Cover** the saucepan with a lid and steam the pudding over medium heat for approximately 30 minutes, or until a skewer inserted into the center comes out clean.

   If you notice that it's getting dry, **pour** a little bit more water in there so your pudding keeps steaming.
4. Carefully **remove** the mould from the steamer or saucepan, **remove** the covering, and **allow** the pudding cool for a few minutes. **Run** a knife around the edges of the pudding and **invert** it onto a serving plate.
5. **Top** with sauce and **garnish** as desired.

Baking Variation

1. **Preheat** the oven to 180°C or 160°C fan-forced.
2. **Grease** the dish.
3. **Place** the dish in the preheated oven and **bake** for approximately 35 minutes, or until the pudding is golden brown on top and cooked through. The pudding should be firm to the touch and a skewer inserted into the center should come out clean.
4. Once baked, **remove** the dish from the oven and **allow** it cool for a few minutes.
5. **Run** a knife around the edges of the pudding and **invert** it onto a serving plate.
6. **Top** with sauce and **garnish** as desired.

Microwave Variation

1. **Place** the pudding in the greased cup or souffle dish.
2. **Microwave** in pairs on high for 2 minutes, or until puffed up, then carefully **turn out** onto plates.
3. **Top** with sauce and **garnish** as desired.

Custard Sauce

Ingredients:

- 1 ½ tablespoon custard powder
- ½ or ¾ or 1 cup milk
- 1 tablespoon sugar
- 1 egg (optional)

Instructions:

1. In a bowl, blend custard powder with ¼ cup of the milk.
2. **Heat** the remainder of the milk in the saucepan until it is almost boiling**.**
3. **Pour** the hot milk over the custard powder mixture and **stir** with a wooden spoon.
4. **Heat** the mixture on meduim. Keep stirring until it boils and then **reduce** the heat to a simmer for 30 seconds.
5. **Add** egg (if using) and sugar, **stir** until it is well mixed.
6. **Serve** warm over desserts such as pudding.

Quantitative Data Collection

Assessing the colour of the Puddings

1. Choose a well-lit area for colour assessment, preferably with natural or consistent artificial lighting.
2. Place a clean, white surface (such as a piece of paper or a plate) as a background for comparing colours.
3. Identify colours on the chart belowthat closely resemble the desired golden color for your puddings.
4. Hold your pudding next to the selected colors on the chart, placing them side by side for comparison.
5. Observe and analyse the similarities and differences between the puddings color and the chart colors.
6. Document your observations and assessments of the pudding color in relation to the chart (you could also use a paint chart for more accurate results).
7. Create a graph using the results from the experiment.

Image

Assessing the Consistency of the Sauce

1. Place a scone ring in the centre of a plastic sheet of paper.
2. Pour precisely ¼ cup of sauce into the circle ring placed in the center of the plastic sheet.
3. After pouring the sauce, carefully lift the circle ring straight up from the plastic sheet.
4. Use a ruler or measuring tape to measure the distance the sauce runs from the outermost circle on the plastic sheet.
5. Measure from the edge of the circle to the point where the sauce stops.
6. Record any additional qualitative observations about the sauce's flow or behavior.
7. Repeat this procedure for the remaining sauces and record the data.
8. Ensure you clean the plastic sheet thoroughly between tests.
9. Create a graph using the results from the experiment.

Milk measurement	**Spread/ circle Measurement**
½ cup	
¾ cup	
1 cup	

Qualitataive Data Collection

Assessing the Taste of the Pudding

1. Place small individual portions of each pudding on a separate plate or in a small bowl.
2. Sample a small spoonful of each pudding.
3. Students to pay attention to the taste profile and evaluate how it evokes a comforting sensation and reminds them of homemade goodness.
4. Record how you feel about each of the puddings on the scale below. Use a red pen for the baked pudding, a blue pen for the steamed pudding and a red pen for the microwaved pudding.

Low					High
How the pudding evokes a comforting sensation and reminds them of homemade goodness.					

Assessing the Texture of the Pudding

1. Sample a small spoonful of each pudding and use the hedonic rating scale below to indicate how velvety and luxurious the texture of each pudding.

   1 represents a low level of velvety and luxurious texure and 5 represents a high level of velvety and luxurious texure.

Puddings	1	2	3	4	5
Baked Pudding					
Steamed Pudding					
Microwaved Pudding					

Class Discussion Questions:

1. In terms of reliability, how can we ensure that our qualitative observations about the pudding colour are consistent across different individuals or groups? Are there any limitations to relying solely on qualitative data in this context?
2. When assessing the consistency of the sauce, what are the advantages and disadvantages of using a quantitative measurement (distance the sauce runs) versus relying solely on qualitative observations?
3. Discuss the factors that could introduce biases or inconsistencies when using the hedonic rating scale to assess the taste of the pudding. How might personal preferences or subjective experiences impact the reliability of the data collected?
4. How can we ensure that our taste assessments are reliable and consistent across different individuals or groups? Are there any challenges in comparing and analysing qualitative data from multiple sources?
5. Reflecting on the overall data collection process, which method (quantitative or qualitative) do you think provides more reliable information about the characteristics of the puddings and sauce? What are the strengths and limitations of each approach?

Exam Preparation

Multiple-Choice Questions (5 marks)

Choose the response that is correct or that **best answers** the question.

1. A design brief is important because:
    a. It tells food product designers what food product they should design.
    b. It gives food product designers information to consider when designing a new food product.
    c. It provides essential information to the food consumer about the new food product.
    d. All of the above.

2. It is important to conduct sensory analysis on a food prototype before advancing a prototype to full-scale production because it gives information to the food manufacturer about:
    a. How much a consumer is willing to spend on the product.
    b. Where the consumer is likely to purchase the product.
    c. Whether or not the consumer likes the texture of the product.
    d. The suitability of the equipment currently available to produce the product.

3. If a new food product satisfies the constraints and considerations of the design brief, that means that the new food product:
    a. Will be profitable for the food business.
    b. Won't be profitable for the food business.
    c. Is more likely to be profitable for the food business.
    d. Will remain a permanent product produced by the food business.

4. The considerations in a design brief:
    a. Must be followed to meet the requirements for the new product.
    b. Considerations are not part of a design brief.
    c. Are more likely to contribute to the success of the product if they are followed.
    d. All of the above.

5. During a food product evaluation, the following aspects of the design process are considered:
    a. The product and the packaging.
    b. The production of the product.
    c. The marketing of the product.
    d. All of the above.

Short Answer Questions (15 marks)

Question 1 (2 marks)

Read the design brief below and answer the questions that follow:

Our client, Rise 'n' Go Food Company, is seeking to develop a new food product that specifically targets teenagers as a convenient grab-and-go option for breakfast. The grab-and-go breakfast food product will be primarily consumed by teenagers during their morning routines, either on the way to school or during time-constrained mornings. The product should be easy to eat, mess-free, and suitable for on-the-go consumption. The food product must comply with nutritional guidelines for adolescent health, including specific criteria for energy content, macronutrient distribution, and micronutrient requirements. The product must be free from common allergens, such as peanuts, tree nuts, dairy, and gluten, to ensure broader accessibility and safety for teenagers with dietary restrictions or allergies. The product should offer a range of appealing flavors that resonate with the taste preferences of teenagers, providing a delicious and enjoyable breakfast experience.

In the table below, identify one constraint and one consideration in the design brief provided.

Constraints	Considerations

Question 2 (2 marks)

Explain the purpose of a design brief in the process of developing new food products.

Question 3 (3 marks)

Define the term ‘primary research’ and provide one example.

Question 4 (4 marks)

Discuss the importance of product testing in the development of new food products.

Question 5 (4 marks)

a. Outline the difference between a dietary analysis and nutritional analysis. (2 marks)

a. List a type of a dietary analysis and a nutritional analysis. (2 marks)

Summary Activity

What is the main idea about this key knowledge and key skills?
Write two or three sentences in your own words.
Outline what a design brief is and why it is important to use one when developing a new food product.
Explain the concept of considerations and constraints. Outline how they differ.
Suggest ways in which food product designers come up with ideas for new products.

Summarise the purpose of developing a prototype.
List the different types of evaluations that can be conducted and explain their purpose.
List each stage of the design process for a new food product and outline what occurs in each stage.