Food Science behind Food Product Development (Re-run)

Practical Worksheet

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Ivy NG, HKU SPACE

Design Task

Design task

- Cookies are an all-time favourite for all age groups. People have cookies between or instead of meals or at parties and picnics, so different recipes of cookies are needed to cater for the needs of different target groups.

Design brief

- Design and produce an alternative to the basic soft cookie recipe that caters for one of the following target markets.
  - Advocate for medicinal cuisine
  - Carbo-lover
  - Extravagant
  - Horticulturist
  - Pregnant woman
  - Spicy eater
  - Tea-lover

Flow of work

- In a group of 4, each group will carry out the design brief (different for each group) by modifying the basic soft cookie recipe to cater for the needs of the specified target market.
  - Product concept development
  - Product development Phase I
  - Product evaluation – to determine the acceptability of recipe
  - Product development Phase II – modify recipe
  - Product evaluation – informal sensory evaluation to see if the product meets the set specification criteria
- Presentation & Discussion

Development Goals

- Advocate for medicinal cuisine
  - Health-preserving ingredients, rejuvenating
- Carbo-lover
  - Starchy ingredients, satiety
- Extravagant
  - Luxurious, lavish, high class
- Horticulturist
  - Plant research, landscaping, eye-appealing
- Pregnant woman
  - Pregnancy craving, reduce morning sickness
- Spicy eater
  - Spicy ingredients, exciting sensation
- Tea-lover
  - Astringent, antioxidant property

Basic Soft Cookie Recipe

Ingredients

115g unsalted butter, softened

190g light soft brown sugar

25g caster sugar

1 tsp vanilla extract

1 large egg

200g plain flour

1 level tsp bicarbonate of soda

Yield: 12-15 large cookies

Method

1. Beat the butter, brown sugar, caster sugar and vanilla extract together until light and fluffy.
2. Beat in the egg
3. Sift the flour and bicarbonate of soda together and mix well.
4. Spoon tablespoon-sized dollops on to a greased tray
5. Bake in a 170°C oven for 12-14 minutes

NFPD Practical

- Factors to consider
  - Control samples for sensory evaluation
  - Size
  - Visual impact
  - Taste/Texture
  - Suitability/Appeal to your target market
  - Design specification
  - Proposed packaging
  - Pricing

Consider these examples:

Design Specification

Example 1:

Design Specification

Use: part of main meal for older babies, toddlers and pre-school children

Target group: parents and child carers of older babies, toddlers and pre-school children

Nutrients: nutrients from whole milk; vitamins, minerals, and fibre from fruits; carbohydrate from sugar

Ingredients: pasteurised, whole milk, puree fresh fruit, sugar

Size: 75g

Shape: round, 80 mm in diameter

Flavour: natural fruit flavouring from added fruit

Colour: natural colouring from added fruit

Cost: manufacture: approximately HK$25.00, recommended retail price HK$40.00

Manufacture: added fruit to be stirred into set yoghurt before packaging

Packaging: plastic pot with easy to remove plastic lids, in packs of 6 with cardboard sleeve. Colourful cartoon characters on label.

Storage: chilling cabinet, can be frozen

Image: healthy, easy to eat, an aid to a baby learning to feed itself, right size for small appetites

Advertising: baby magazines, 'women's' magazines, afternoon and early evening TV commercials

Example 2:

Design Specification

My food product must:

- be a nutritious, filling savoury product that could be served in the school canteen
- appeal to vegetarians and meat-eaters
- include fibre and protein and be a good source of vitamins
- use fresh, tasty and colourful ingredients, with a variety of textures.
- serve two child's portions
- cost between HK$20.00 - HK$25.00
- be suitable for small batch production
- be stored in a refrigerator with a shelf-life of 5-6 days
- use a heat resistant food container that can be recycled

Initial Analysis

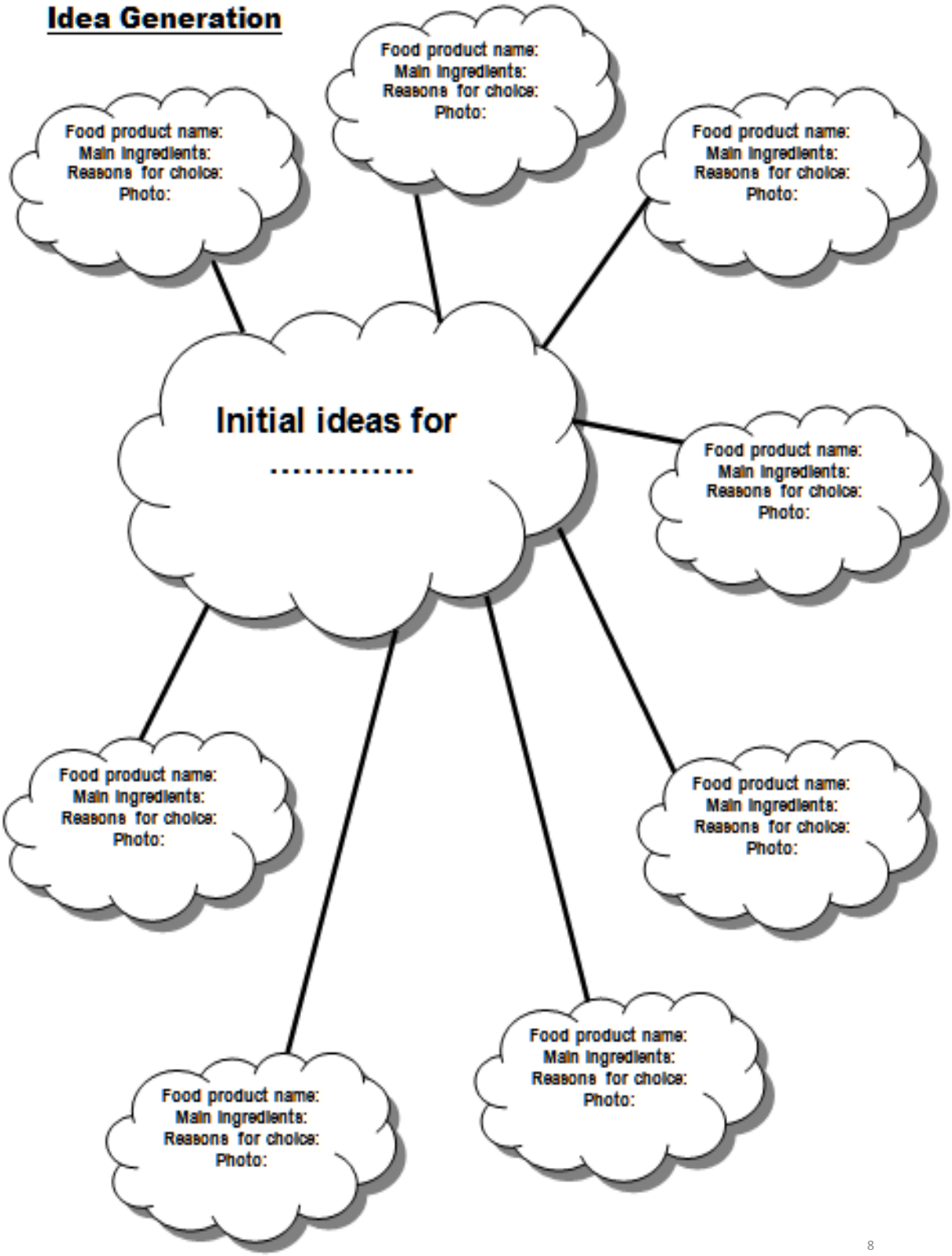
Suggested template/layout

Research: Product Analysis

To compare and analyse a selection of food products similar to what you intend to design and make

Name of the food product	Food Product A	Food Product B	Food Product C
	Photo of the food product	Photo of the food product	Photo of the food product
Cost / Retail price			
Weight			
Appearance			
Texture			
Flavour/aroma			
Nutritional information			
Packaging			
How does the food product suit its target market group?			

Idea Generation



Sensory Evaluation

- Which test will give the best indication that your product will be accepted by your target market?

Question	Method
Are products different?	Discrimination Tests ➢ Triangle Test ➢ Duo-Trio Test ➢ Paired Comparison Test
If products are different, how are they different?	Descriptive Analysis ➢ Trained panellists
What is the acceptability of a product? Is one product preferred over another?	Affective/Hedonic Tests ➢ Preference tests

Suggested template/layout

Developing Idea (1)

Food Product Name: _____

Ingredients / quantities / equipment / method / time plan	Photo of the food product
	Sensory evaluation results

Nutritional Information

Costing (per product / portion)

Specification point	Idea 1 [✓/ ✓/ ×]

Evaluation of the food product / problems encountered / suggestions for modifications

Descriptors for reference

SENSORY DESCRIPTORS (Tasting words)

We use our senses to evaluate what we eat, so **sensory descriptors** are words for describing the appearance, taste and texture of food.

The following word bank gives examples of words used for food tastings. The list is not exhaustive, add your own words to the list. Some words fit under more than one heading.

SENSORY DESCRIPTORS			
Appearance (Looks) – colour, aesthetics	**Texture** (Mouthfeel) – how food and drink feels in your mouth		**Taste, flavour and smell**
Appetising	Airy	Lumpy	Acid
Attractive	Brittle	Mushy	Bitter
Boring	Chewy	Powdery	Bland
Bright	Cold	Rubbery	Burnt
Clear	Crispy	Slimy	Creamy
Cold	Crumbly	Smooth	Dry
Colourful	Crunchy	Soft	Fatty
Crumbly	Dry	Soggy	Fishy
Dry	Fine	Springy	Fruity
Dull	Firm	Sticky	Herby
Fattening	Fizzy	Stiff	Old
Fresh	Flaky	Stringy	Peppery
Fruity	Foamy	Tender	Salty
Glowing	Greasy	Thick	Sharp
Greasy	Gritty	Thin	Sickly
Healthy	Hard	Tough	Smoky
Hot	Hot	Watery	Soggy
Moist	Juicy	Warm	Sour
Mouth-watering			Spicy
Smooth			Stale
Soggy			Sweet
Tasty			Watery
			Wet
			Tasteless
			Tasty
			Undercooked

USES OF SENSORY ANALYSIS IN FOOD INDUSTRY

- food product development
- studying effects of ingredients, formulation, and process on final product
- measuring, predicting shelf life
- quality control and quality assurance
- competitor benchmarking
- investigation and prediction of taints

Discussion Points

- Right first time?
- What would you try next time?
- What other alternative ingredients would you consider using?
- What limitations did you encounter in your sensory evaluation?
- Who would be your competitors in the HK market.
- Would you compete by price, quality or brand?

Time	Order of Work
At least __ hours prior to class	**Food Preparation (I)** [Ingredient] ● Steps
mins	**Food Preparation (II)** [Ingredient] ● Steps [Ingredient] ● Steps ● Steps [Ingredient] ● Steps
	In-between washing up
mins	**Food Preparation (III)** [Semi-finished Product] ● Steps ● Steps
	In-between washing up
mins	**Food Processing** [Semi-finished Product] ● Steps ● Steps Garnish ● Prepare garnish
mins	**Serving** [Finished Product] ● Steps
mins	Final washing-up

食品研究與開發背後的食品科學原理 (重辦) 實習工作紙

2017年7月4日

Ivy NG, HKU SPACE

設計任務

設計課業

- 曲奇餅是不同年齡組別在任何時間也愛吃的食物。人們會在兩餐之間吃曲奇餅或甚至吃曲奇餅來代替正餐，或在聚會和野餐中也會吃曲奇餅，因此需要不同的曲奇餅配方來滿足不同目標群組的需求。

設計概要

- 設計和生產一種替代基本軟身曲奇餅的配方，以滿足以下的目標市場。
    - 推崇藥膳的人
    - 愛減粉質的人
    - 愛奢華飲食的人
    - 園藝師
    - 孕婦
    - 嗜辣食者
    - 嗜茶人士

工作流程

- 每組通過修改基本軟身曲奇餅的配方來滿足指定目標市場的需要（每組的目標市場是不同）實踐設計概要。
    - 產品概念的開發
    - 產品開發的第一階段
    - 產品評估 – 確定配方的可接受性
    - 產品開發的第二階段 – 修改配方
    - 產品評估 – 非正式感官評估，以確定產品是否符合設定的規格標準。
- 演示和討論

開發目標

- 推崇藥膳的人
  - 養生食材、恢復體力
- 愛澱粉質的人
  - 含澱粉的材料、飽腹感
- 愛奢華飲食的人
  - 豪華、闊氣的、高檔次
- 園藝師
  - 植物研究、景觀設計、外觀吸引
- 孕婦
  - 懷孕時渴望吃的食物、減輕作悶感
- 嗜辣食者
  - 辛辣的材料、刺激的感覺
- 嗜茶人士
  - 澀味、抗氧化特質

基本軟身曲奇餅的配方

材料

115克無鹽牛油，軟化

190克輕軟黃砂糖

25克幼砂糖

1茶匙香草油

1隻大雞蛋

200克麵粉

1茶匙食用梳打粉

產量：12-15塊大餅乾

方法

1. 把牛油，黃砂糖，幼砂糖和香草油攪打至鬆軟。
2. 加入雞蛋中，打勻。
3. 將麵粉和食用梳打粉一起過篩，混勻。
4. 把匙勺大小的麵糊放在一個已塗用油潤滑的托餅盤上。
5. 在170°C焗爐中焗12-14分鐘。

實習

- 考慮因素
  - 對照樣本進行感官評估
  - 尺寸
  - 視覺衝擊
  - 味道/質感
  - 對你的目標市場的適合度/吸引力設計規格
  - 建議包裝
  - 價錢

考慮以下例子:

設計規格

例1

設計規格

用途：適合較年長的嬰兒、幼童和學前兒童在正餐時食用

目標群體：較年長的嬰兒、幼童和學前兒童的父母和照顧者

營養素：全脂牛奶中的營養素加上水果的維生素、礦物質和纖維；糖中的碳水化合物

材料：採用經巴斯德消毒法處理過的全脂牛奶、新鮮水果茸、糖

含量：75克

形狀：圓型，直徑80毫米

味道：由水果而來的天然水果味，少甜。

顏色：天然水果顏色。

成本：生產：約25港元；建議零售價：40港元。

生產：包裝前將水果加入製成的酸奶酪中攪拌。

包裝：塑料瓶裝，採用塑料蓋方便打開，一排6瓶採用

例2

設計規格

我的食品必須：

- 營養豐富、飽腹、鹹，可在學校飯堂售賣
- 吸引素食者和肉食者
- 含有纖維和蛋白質及豐富的維生素
- 採用新鮮、美味和色彩繽紛的材料，質感豐富
- 份量適宜兩位兒童食用
- 成本介乎 20 港元至 25 港元
- 適合小量生產
- 在雪櫃冷藏，保質期 5 至 6 天
- 採用可回收的耐熱食品容器包裝

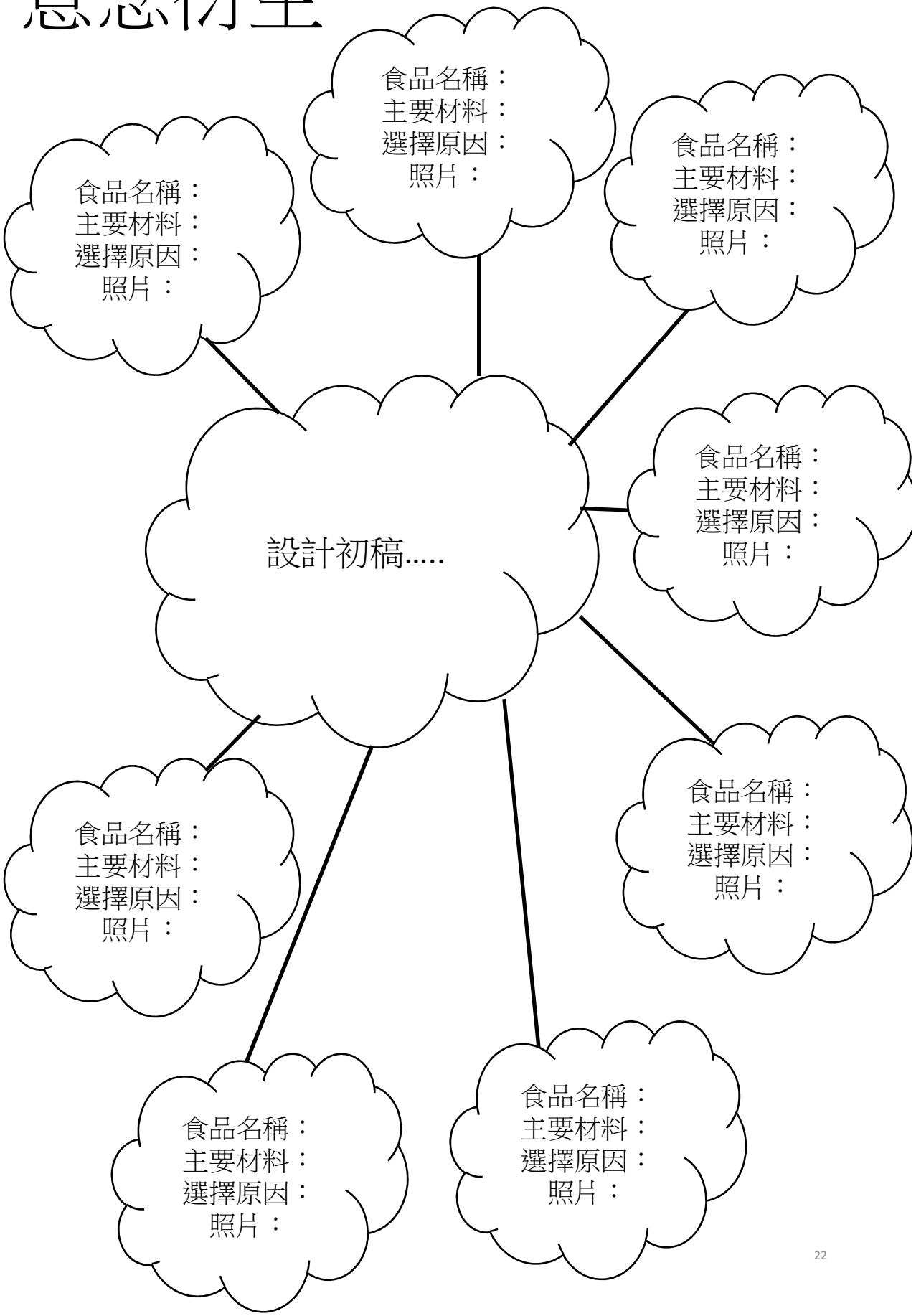
初步分析

研究：產品分析

比較和分析與你打算設計和製造的食品相似的產品

食品名稱	食品A 食品照片	食品B 食品照片	食品C 食品照片
成本/零售價格			
重量			
外觀			
質感			
味道/香氣			
營養資料			
包裝			
該產品如何適合其市場的目標群組？			

意念衍生


食品名稱：
主要材料：
選擇原因：
照片：
食品名稱：
主要材料：
選擇原因：
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主要材料：
選擇原因：
照片：

感官評估

- 哪個測試是你的產品被目標市場接受的最佳指標？

問題	方法
產品是否不同？	辨別測試 • 三角測試 • 二對三測試 • 配對比較測試
它們如何不同？	描述分析測試 • 曾經受訓的品評員
一種產品相對另一種產品的可接受性是什麼？	情感/喜好測試 • 喜好測試

發展意念(1)

Developing Idea (1)

食品名稱
Food Product Name: _____

Suggested template/layout 8

建議格式範本 / 版面編排

Ingredients / quantities / equipment / method / time plan 材料/數量份量/設備使用工具/方法/時間計劃生產時間表	Photo of the food product 食品照片 Sensory evaluation results 感官評估結果

Nutritional Information

營養資料

Costing (per product / portion)

成本（每個產品/份量）

規格點　　意念1

Specification point	Idea 1 [✓/ ✓/ ×]

Evaluation of the food product / problems encountered / suggestions for modifications

食品評估/遇到的問題/建議改良方法

描述詞供參考

感官描述詞語（形容味道的詞語）

我們使用感官來評價食物，因此感官描述語是指用來描述食物的外觀、味道和質感的詞語。

以下詞庫列舉部分用來形容食物味道的詞語，部分詞語可用來描述食物的多項特質。列表並未納入所有描述感官描述的詞語，請自行添加。

感官描述詞語				
外觀（外表）- 顏色，美感	質感（口感）- 食物和飲品在口中的感覺		風味、味道和香味	
開胃 / 刺激食慾	輕的	塊狀	醋酸味	美味可口
吸引 / 引人注目	薄脆易碎	糊狀的	苦	未煮熟
單調 / 沉悶	耐嚼 /有嚼勁	粉狀	淡而無味	
明亮	冰凍	橡膠狀	燒焦 / 焦味	
清澈	酥脆	粘糊糊	奶香味 / 滑膩	
冰冷	鬆脆	平滑	乾身	
色彩繽紛	香脆	柔軟的	肥膩	
鬆脆	乾身	濕軟	魚腥味	
乾身	精細	有彈性	果味	
暗沉 / 平淡	結實 / 堅固	黏	香料味	
肥膩	有汽 / 起泡	僵硬	舊 / 過老	
新鮮	片狀 /易碎成小薄片/ 易脫落	柴硬 / 多筋	胡椒味 / 辣味	
果味濃郁 / 有果味	泡沫 /冒泡	肉質細嫩	鹹	
亮眼 / 發光	油膩	濃稠 / 厚	濃烈刺激	
油膩	砂礫狀	稀薄	令人作嘔	
健康	堅硬	硬又嚼不動	煙燻味	
熱 / 辛辣	熱 / 辛辣	水淋淋	濕軟	
濕潤	多汁	暖 / 溫熱	酸	
垂涎三尺 /令人垂涎欲滴			辛辣	
光滑			變質走味	
濕軟			甜	
美味可口			水淋淋	

食品工業中感官分析的應用

- 食品開發
- 研究最終產品的材料，配方和過程的影響
- 測量和預測保質期
- 品質控制和品質保證
- 競爭對手的基準
- 調查和預測污點

討論要點

- 第一次成功？
- 你下次會嘗試什麼？
- 你會考慮使用什麼其他材料替代？
- 你在感官評估中遇到了什麼限制？
- 誰是您在香港市場的競爭對手？
- 你會按價格，質量或品牌競爭嗎？

所需時間	製作次序
開課前至少 __ 小時	預備工作 (I) [材料] ● 步驟
分鐘	預備工作 (II) [材料] ● 步驟 [材料] ● 步驟 ● 步驟 [材料] ● 步驟
	於空閒時間洗碗碟及整潔地方
分鐘	預備工作 (III) [半製成品] ● 步驟 ● 步驟
	於空閒時間洗碗碟及整潔地方
分鐘	食物製作 [半製成品] ● 步驟 ● 步驟 點綴 ● 準備點綴
分鐘	上菜 [製成品] ● 步驟
分鐘	最後清洗碗碟及整潔地方