



Stage 5 Food Technology, Year 10 - Unit 3:

Food Product Development

Student Name:

Key Terms

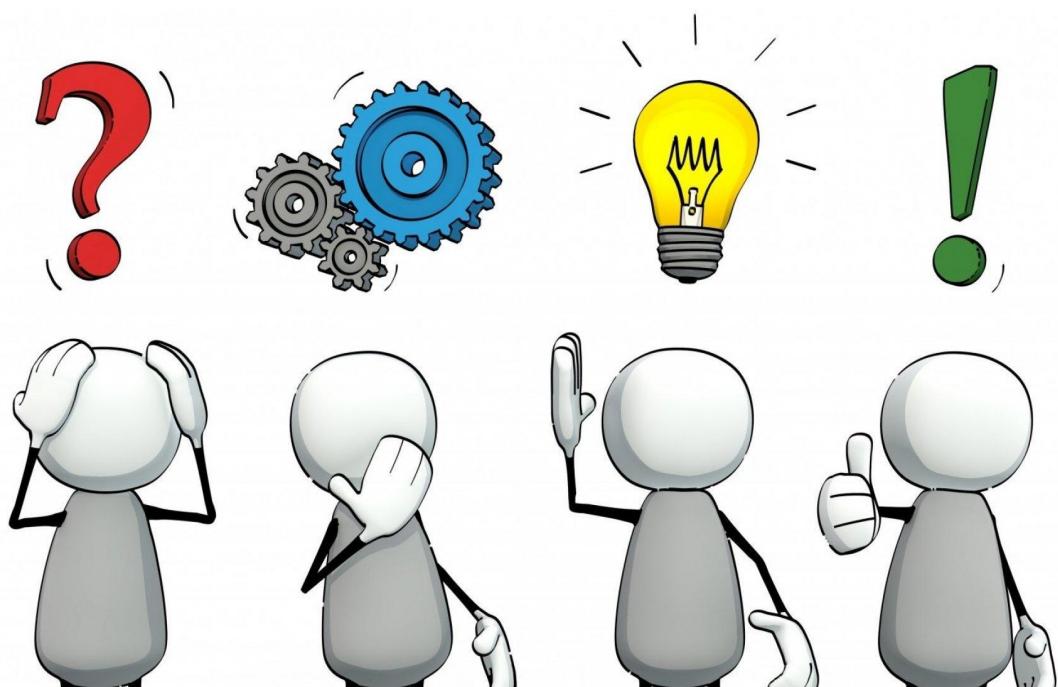
Term	Definition
Commercially	
Constraint	
Consumer	
Convenience	
Criteria	
Domestically	
Evaluate	
Modified	
Palatability	
Sensory	
Tamper	
Target market	

What is Food Product Development?

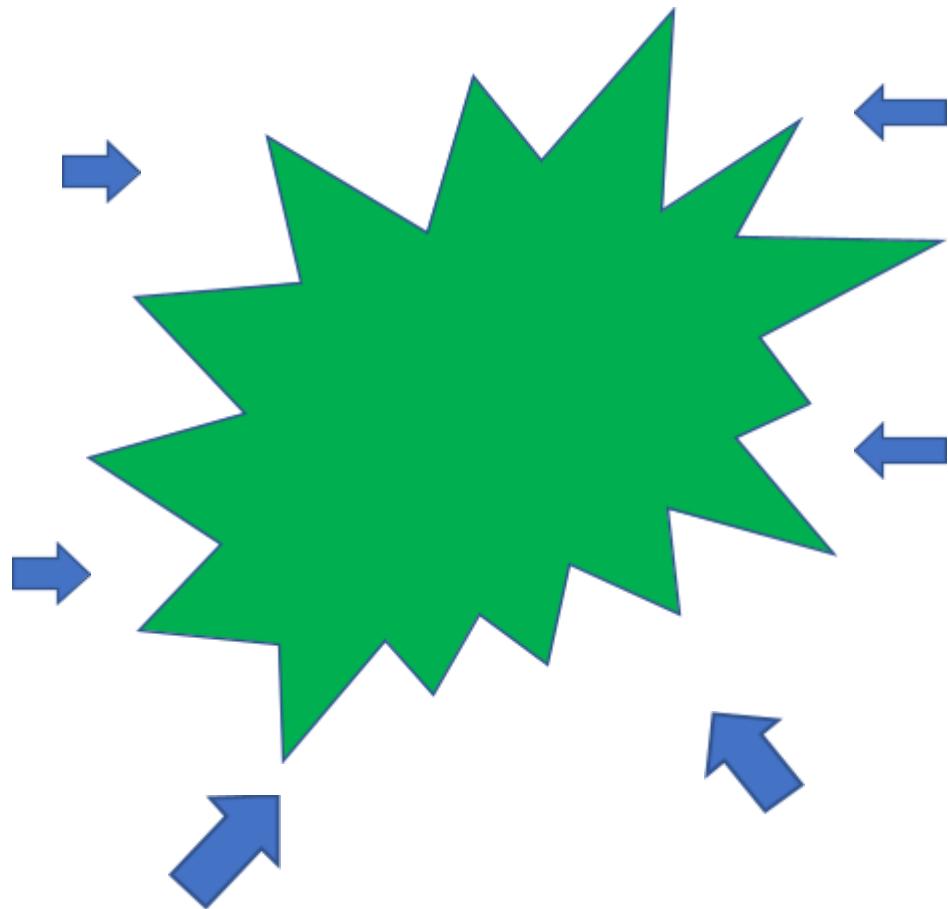
Food product development is a series of stages that a business goes through, whether a home-based company or corporate business, to bring a new food product or innovation to the consumer market.

Some New Food Products that come to mind are....

-
-
-
-



Why are new food products developed?



Food product development descriptions

Describe a range of food product developments, including definition, advantages and disadvantages. Answer in the spaces provided.

New to world

Definition:

Advantages of new to world products	Disadvantages of new to world products
<ul style="list-style-type: none">•••	<ul style="list-style-type: none">•••

Line extension

Definition:

Advantages of line extension products	Disadvantages of line extension products
•	•
•	•
•	•

Me too products

Definition:

Advantages of me too products	Disadvantages of me too products
•	•
•	•
•	•

Food Product Development Examples



For each of the categories listed in the table below, provide examples of each including a picture and explanation as to why the product in an example of the category identified.

Answer in the table below.

Product	Example	Explanation
Line extension	Kit Kat Gold	This is a new flavour of the original Nestle KitKat product – an extension of their existing line of products.
Line extension		
Line extension		
New to world		

New to world		
Me too products		
Me too products		

CASE STUDY: MUESLI ENTREPRENEUR

Read the case study about Carolyn Cresswell and answer review questions 1-4 in the boxes provided.



CAROLYN CRESSWELL MUESLI ENTREPRENEUR

Carolyn Cresswell was 18 years old and in her first year of university with a part-time job working for a small muesli-maker who supplied their muesli to cafes in Melbourne, when the owners decided to sell the business and told Carolyn she may lose her job.

She and a friend offered the owners \$2000 to buy the business. The offer was accepted and, for the next five years, Carolyn worked at developing her product and expanding the business.

The big breakthrough finally came in the late 1990s when Coles Supermarket agreed to stock Carman's muesli in 20 supermarkets around Melbourne. Carolyn personally delivered the stock to the supermarkets and presented it on the shelves!

Within six months, Coles was displaying her product throughout Victoria, followed by NSW. Carman's is now a \$50 million business supplying to Coles, Woolworths and other independent retailers.

Carman's began as a premium-label breakfast cereal and has benefitted from positioning in this niche market. Sales have not been affected by discounted 'house' brands.

The brand has now diversified into muesli bars and muesli biscuits, which account for more than 50 per cent of sales. Carolyn is now exploring export opportunities and extending the product line to include a bread line.

Source: Adapted from 'Hard work paid off for muesli queen' by Miriam Steffens, *Sydney Morning Herald*, 30 July 2012. This work has been licensed by Copyright Agency Limited (CAL). Except as permitted by the Copyright Act, you must not re-use this work without the permission of the copyright owner or CAL. This work has been licensed by Copyright Agency Limited (CAL). Except as permitted by the Copyright Act, you must not re-use this work without the permission of the copyright owner or CAL. Photo: Newspix/Norm Oorloff

ACTIVITIES

- 1 Why are Carman's muesli sales not affected by price cutting of other breakfast cereals?
- 2 What kind of consumer would purchase Carman's products? Why?
- 3 Explain the advantage of extending the Carman's product range to muesli bars and biscuits.
- 4 Speculate on the potential success of a Carman's bread range. Describe the advantages and disadvantages of entering the bread market.

Review Questions

1. Why are Carman's muesli sales not affected by price cutting of other breakfast cereals?



2. What kind of consumer would purchase Carman's products and why?

3. Explain the advantages of extending the Carman's product range to muesli bars and biscuits

4. Speculate on the potential success of a Carman's bread range.
Describe the advantages and disadvantages of entering the bread market.



Reasons for Food Product Development

There are many reasons as to why food products are developed. They include; Health and Environmental Issues, Company Profitability, Technological Developments, Increasing Demand for Convenience Foods and Societal Changes.



In the table below, explain and give examples for each reason for developing food products.

Reason	Explanation	Examples
Health and Environmental Issues		<ul style="list-style-type: none">•••
Company Profitability		<ul style="list-style-type: none">•••
Technological Developments		<ul style="list-style-type: none">•••

Reason	Explanation	Examples
Increasing demands for convenience foods and packaging		<ul style="list-style-type: none"> • • •
Societal Changes		<ul style="list-style-type: none"> • • •

Technological Developments and Increasing Demands for Convenience Foods



With your knowledge and understanding from the following links, answer questions 1 and 2 in the boxes provided.

Watch the clip 'Digital agriculture strategy'.

<https://agriculture.vic.gov.au/farm-management/digital-agriculture/what-is-digital-agriculture#h2-1>

Read the information on 'Agrosense Cultivation Monitoring System'.

<https://www.agrosense.com/>

Read 'From Wood to Food'.

<https://www.greenqueen.com.hk/from-wood-to-food-arbiom-is-tapping-fermentation-to-transform-timber-into-sustainable-protein/>

1. How has technology influenced the future of food?

2. Outline FOUR innovations that could build the food of the future?

INNOVATION 1:

INNOVATION 2:

INNOVATION 3:

INNOVATION 4:

Food Products and their Effect on Society



Describe how food products have impacted the environment, emerging technologies, nutrition and dietary needs. Answer the questions in the spaces provided.

1. Name a new food product and outline its effect on the environment.

2. Name a new food product and explain the effect of emerging technologies on its production.

3. Name a new food product and explain its effect on nutrition.

4. Name a new food product and describe its effect on special dietary needs such as vegan, gluten or dairy free.

Research Activity

Visit the Australian Bureau of Statistics web link (<https://www.abs.gov.au/>) to find the latest statistics on households with two or more income earners.



1. In how many families are both parents working?



2. Use this statistic to explain why convenience foods are an expanding market.

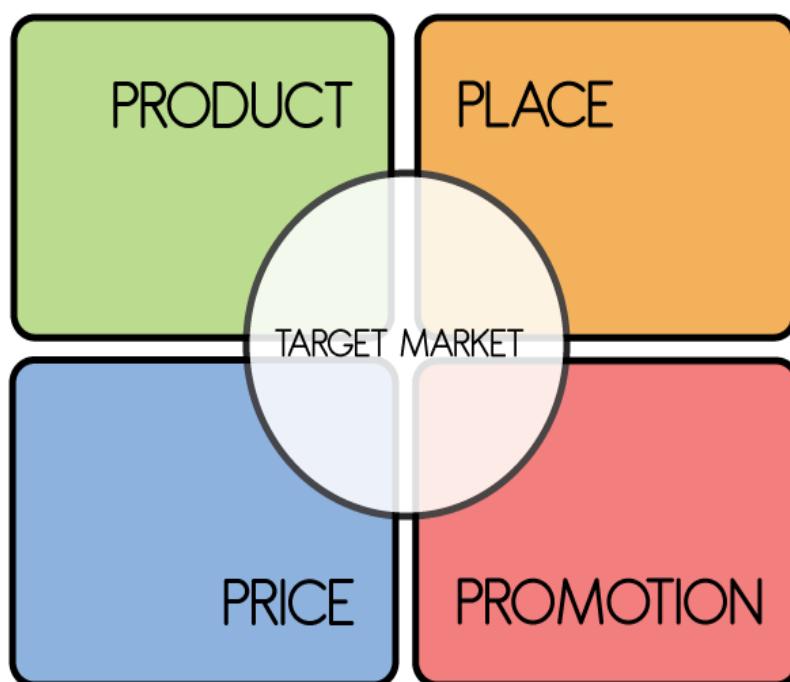
3. Design an advertisement for a bottled sauce of your choosing (pasta, curry, stir fry). Target your advertisement at working parents.

INSERT AD HERE

PROMOTING THE PRODUCT

Marketing Mix

The four components of food marketing are called the "four Ps" of the marketing mix. This refers to **product**, **price**, **promotion**, and **place**.



PRODUCT



PRODUCT

PRICE



PLACE



PROMOTION



PROMOTION

ACTIVITY: Watch the video ['A New Look at the 4Ps of Marketing'](#).

Apply each of the 4P's to the bottled sauce that featured in your advertisement last lesson. Record your marketing mix in the spaces provided.

REMEMBER: Your target market for the sauce was working parents.

Product	Place
Price	Promotion

What role do food additives play in food processing?



In the space below, define food additives.



Food Additives

Substances we add to food to make them taste better, last longer, look, nicer, etc.

Natural

Substances found naturally, such as beetroot juice, which we use to color foodstuffs.

Nature Identical

Synthesized copies of substances that exist in nature, such as ethyl acetate.

Artificial

Synthesized substances that do not exist in nature, such as vanillin or ethyl maltol.

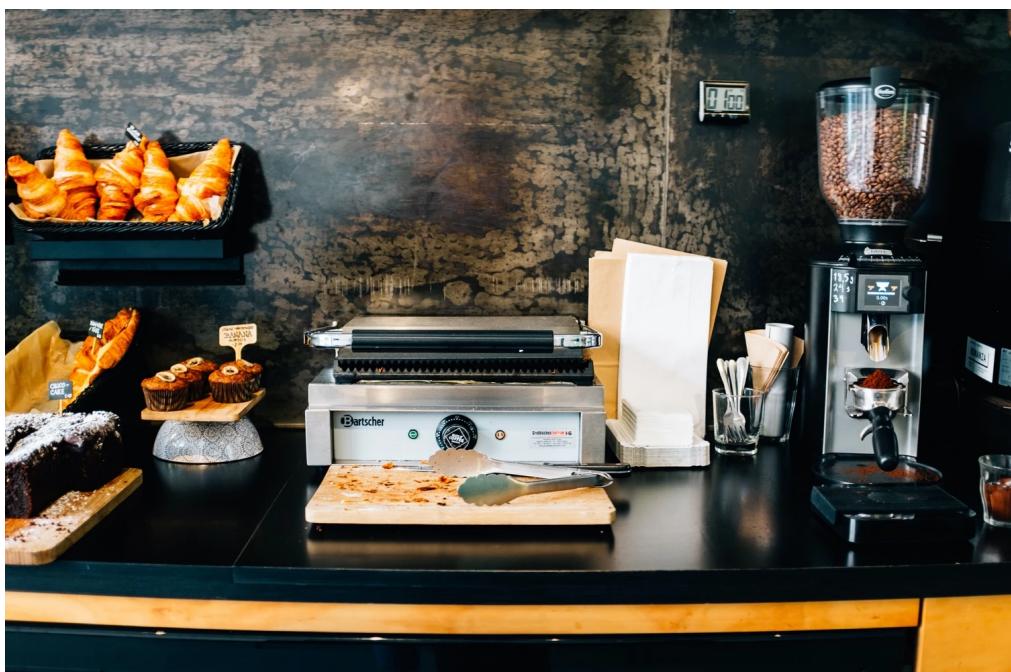
Group Work

Working in groups of 2-4, research the role of food additives and complete the summary table below.

The role of food additives	Types of food additives	Examples
Maintain product consistency		
Improve or preserve the nutrient value		
Maintain the wholesomeness and the palatability of foods		

Control the acidity and alkalinity, and to provide leavening		
Provide colour and improve flavour		
Artificial Colourings		
Artificial flavourings		

The Role of Technology in the Preparation of Food



What is the major difference between domestic food preparation and commercial food preparation?



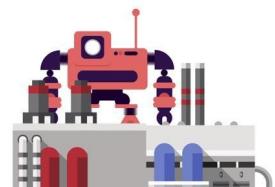
Outline the role technology has had in the preparation of food domestically.

Read 'The Top 10 Commercial Kitchen Trends',

<https://www.foodequipment.com.au/blog/top-10-commercial-kitchen-trends-of-2019/>

View 'How Robots are taking over the Food Industry',

<https://www.youtube.com/watch?v=1ALE7wlphsY&t=156s>



Outline the role technology has had in the preparation of food commercially.

Steps in Food Product Development



Complete the table below

Steps	Explanation
Brief	
Market research	

Design specification	
Shortlisting and testing	
Manufacturing Specifications	
Quality Control	

Textbook Reference

Read the following pages from Food Tech Focus: 2nd Edition to answer questions 1- 7.

Reference: Pages 164- 167

5.3

Steps in new product development design

An idea for a new product may come from:

- the manufacturer's need to cut costs and find a more cost-effective way to produce the product
- a drop in the market share for the product
- a competitor's successful product
- market research indicating that a consumer need is not being met
- environmental concerns.

Most big companies today employ teams of people in the research and development department.

Their job is to keep up to date with sales figures of product lines and to stay aware of competitors in order to pinpoint areas for product development (for example, a revamp for a product with declining sales, or development of a new product to compete with another in an area related to the company's area of expertise).

Developing a new product is a step-by-step process. At each step, the project is **evaluated** to determine whether it should continue.

Product design is a cyclic process, as shown in Figure 5.10.

Creating a brief

A brief is a statement of the aims of the project and **criteria** to measure the success of the product. It may be broad or very specific and includes limitations such as budget and timing.

Often detailed briefs specify raw ingredients or a method of processing to be used and the market the product is targeting (for example, snack food for

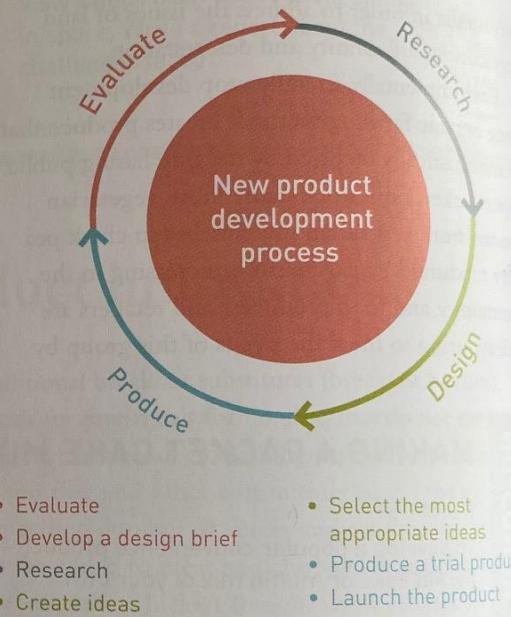


Figure 5.10 Designing a new product is a continuous process.

children, low-fat product for health-conscious people packaged prepared vegetables for working parents).

Research: identify the target market

The manufacturer must investigate the consumer market to clarify the wants and needs of consumers, as well as provide a description of the proposed product and target market. The results will determine whether the original idea needs to be modified, or even dropped completely if the research shows there is no need for it.



Figure 5.11 The research and development team meets regularly to discuss ideas and directions for product development.

Creating and developing ideas

This is the stage at which ideas are ‘dreamed up’, based on what the team thinks the consumer will want to buy. These ideas then generate research – looking for available ingredients, investigating processing methods, watching competitors and consulting again with consumers to clarify strengths and weaknesses of existing related products.

Assessing options and selecting the most appropriate

The list of ideas generated is examined and each suggestion matched against the criteria given in the design brief. Ideas that fail this test are discarded.

The ideas that remain (usually about 10 or so) are then investigated more closely to determine whether they will meet budget **constraints**. For example, will the purchase of a new processing or packaging machine be necessary? Will the ingredients be available all year round? Does this idea meet the consumers’ demands?

Producing

Developing a recipe and prototype

Laboratory experimentation is aimed at developing a prototype or model product that satisfies the design brief. Samples are produced that demonstrate changes in single aspects of the basic recipe. All steps and results are recorded carefully so that recipes can be reproduced when a decision is made.

In-house **sensory** testing is used to evaluate colour, flavour and/or texture.



Figure 5.12 Test kitchens are used to develop recipes, which are then evaluated against the criteria and tasted.

If the product is developed to compete with another established product, sensory testing will compare the new product with the competitor. Development of a trial product or prototype is a time-consuming process. There may be extensive fine-tuning to match colour, flavour and texture to consumer requirements.

During this stage, the packaged and unpackaged product is tested for spoilage and deterioration under a variety of conditions, such as refrigeration, pantry storage, sunlight exposure and heat.

Calculating the actual cost of the product will determine whether the cost of producing the product is within the financial budget, and will also act as a starting point for calculating retail price (which includes company and retail profit). The cost of a product is determined in this way:

Ingredient costs

+

Production costs

+

Packaging costs

+

Marketing costs

=

Total cost

The cost per product is the total cost divided by the number of product units manufactured.

Pilot production

Pilot production is adaptation of the successful prototype for full-scale production. Manufacturers often simulate full-scale production in smaller pilot production plants. This enables them to refine ingredient amounts, cooking times and energy costs for large-scale production.

Packaging

The development of a package for the new product is integral to its success and recognition in the consumer market. Package design occurs at the same time as product design and it follows a similar design process.



Getty Images/Monty Rakusen

Figure 5.13 Factory production is undertaken on a small scale first with small batches, so that production concerns can be fine-tuned before full-scale production.

Evaluating

Evaluation is a continuous process, undertaken at every stage of the product development process.

Once a product has been developed into a successful prototype and appears to be 'the one' the company would like to add to its existing line, market evaluation occurs. This means confirming that the product has met the needs identified earlier in the project.

Market evaluation: sensory assessment

Sensory analysis is carried out to determine the answers to three main questions.

- Does the target market like it?
- Does it differ from what is currently available?
- How does it differ from what is currently available?

Sensory analysis is used to evaluate and describe the new product in terms of the senses:

- taste or flavour; for example, sweet, sour, bitter, salty, strong, mild or weak
- texture or mouthfeel; for example, smooth, lumpy, juicy, moist, gritty or sticky
- aroma; for example, strong, weak, spicy, yeasty, sweet or pungent
- appearance; for example, light, dark, golden, glossy, bright or dull
- noise; for example, crunchy, crackly, fizzy or dull.

The attitudes of consumers to aspects of the new product such as the aroma are tested. Testers may have to tick on a scale where their preference lies, from 'like very much' to 'dislike very much'.

Researchers also want to know how consumers feel about a product and may ask them to select words they would use to describe the product, such as 'nourishing', 'natural', 'healthy', 'artificial' or 'enjoyable'.

Consumers often participate in taste tests, which are usually blind tests; that is, tasters do not know

which product they are tasting. This is especially important if a company wants a comparison between their new product and that of a competitor. More accurate answers are gained when testers do not know which the well-known product is.

If the results from the sensory evaluation are favourable, the product is launched onto the market.



Alamy Stock Photo/Jaymi Heimbuch

Figure 5.14 In a blind taste test, the products for testing are not identified and taste-testers do not speak to each other. Can you guess why?

Review Questions

1. Describe the characteristics of a design brief.

2. Discuss the role of research at the early stage of designing a new product.

3. Write an equation to calculate the cost of producing a product.

4. What is a pilot plant?

5. Why is package design so important?

5. Why is constant evaluation throughout the product development process crucial?

6. Explain the need for consumer opinion in the form of sensory analysis.

Designing Our Food Future from Concept to Prototype



Watch [Clickview](#), 'From Concept to Prototype', and answer the comprehension questions in the spaces provided.

Comprehension Questions

1. Tamu's design process began with a usually discarded raw material sourced from the processing of sugar cane. After deciding to sell the eventual end product to other companies rather than direct to the consumer, what became the focus of the research and development they undertook?

2. Why is it important to identify the opportunities for the end product?

3. **Five10Fibre**, the end product of Tamu's development process, is a flour-like ingredient sold to other food production companies. Why did their prototyping involve manufacturing complete food products, such as breakfast biscuits?



4. Why is trial and error an important part of the prototyping process?

5. Explain why production of a commercial product should be tested in a commercial kitchen in commercial quantities.

5. At what point is the prototyping process complete and the product can move into its trial phase?

Functions of Food Packaging



Read the article. '*6 futuristic food packaging technologies*', and complete the activity.

<https://www.fooddive.com/news/6-futuristic-food-packaging-technologies-that-could-change-everything/94763/>

ACTIVITY:

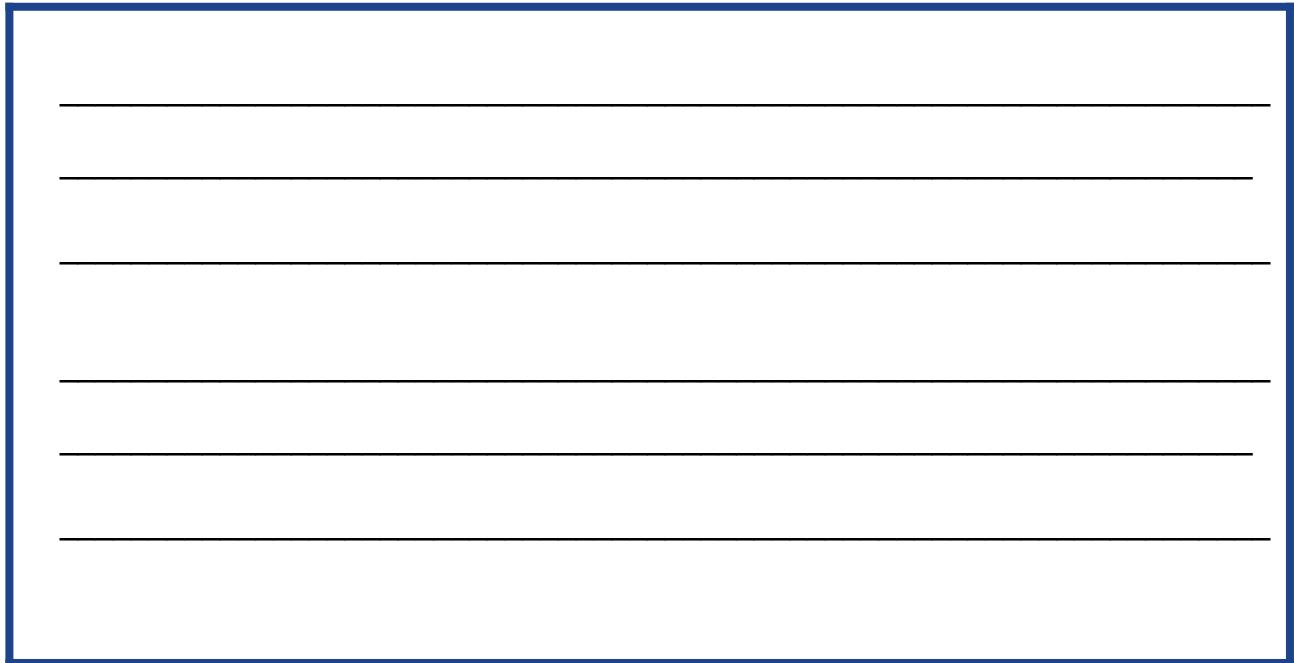
Summarise the SIX examples of food packaging from the article and analyse what each is made from, why is it used, and the technology used in its production.

Example 1: Edible Packaging

Example 2: Micro Packaging

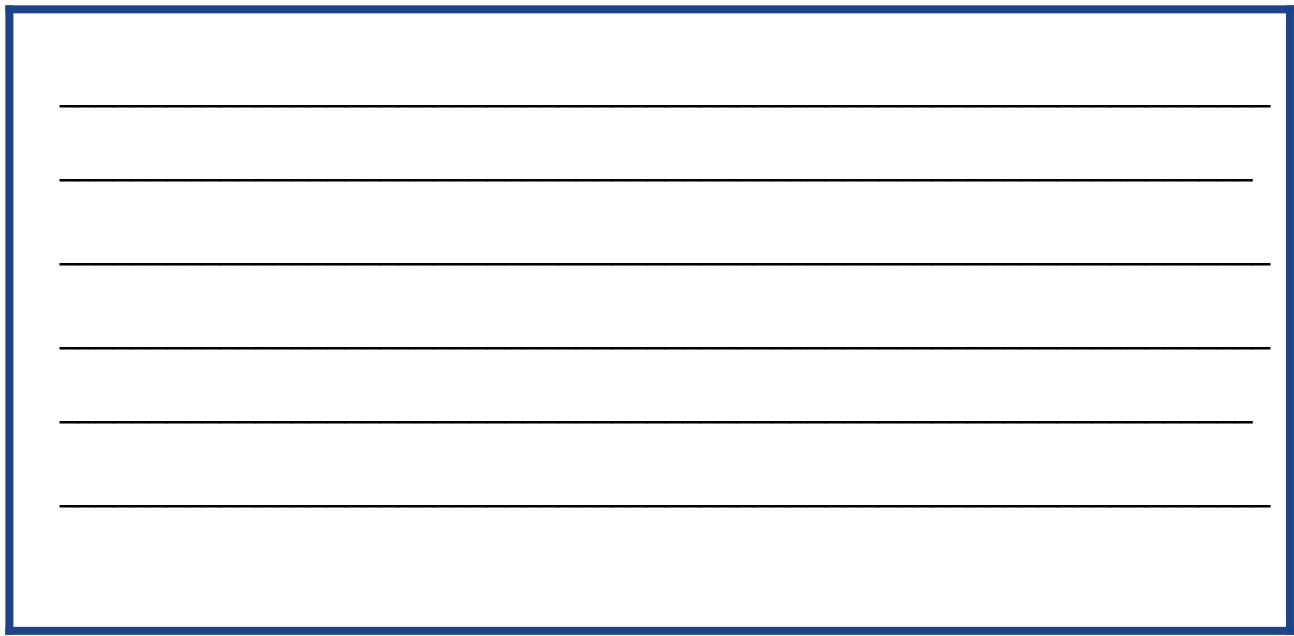
Example 3: Smart Packaging

Example 4: Anti- Microbial Packaging



A large rectangular box with a dark blue border, intended for writing notes about anti-microbial packaging.

Example 5: Water Soluble Packaging



A large rectangular box with a dark blue border, intended for writing notes about water soluble packaging.

Example 6: Self- cooling/ Self- heating Packaging

Suitable Packaging Options



Watch the clip, '*Packaging and the environment*'.

https://www.youtube.com/watch?app=desktop&v=0siDq8TqOgM&ab_channel=EducationWithVision

Read the article, '*10 product packaging design mistakes to avoid*'.

<https://medium.com/@grandprints/10-product-packaging-design-mistakes-to-avoid-right-now-402d4c390fa1>

In the table below, for each package listed, identify the possible environmental issues, possible solution and package examples currently on the market.

The product	The problem – environmental issues	The solution – environmental solution	Examples
The clip packet			
Single serving foods			
Plastic drink bottles-			
Pizza box			
Other – Choice 1			
Other – Choice 2			

Legislative Food Labelling Requirements in NSW



"Food labels can provide a wide range of information to help consumers make food choices. Food labels also help to protect public health and safety by displaying information such as use by dates, ingredients, certain allergens, instructions for storage and preparation, and advisory and warning statements. FSANZ sets standards for what information must be on food labels".

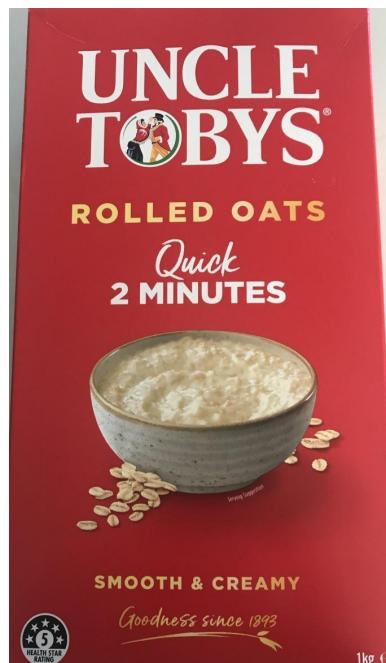
Food Standards Australia New Zealand (2021) *Labelling*. Available at:
<https://www.foodstandards.gov.au/consumer/labelling/pages/default.aspx>
(Accessed: 11 September 2021).



Observe the packaging views pictured below. Label the food package using the following requirements:

- Product name
- Date marking
- Health star rating
- Health and nutrition information
- Country of origin
- Instructions for use
- Allergy information
- Storage requirements
- Food recall information

Front View



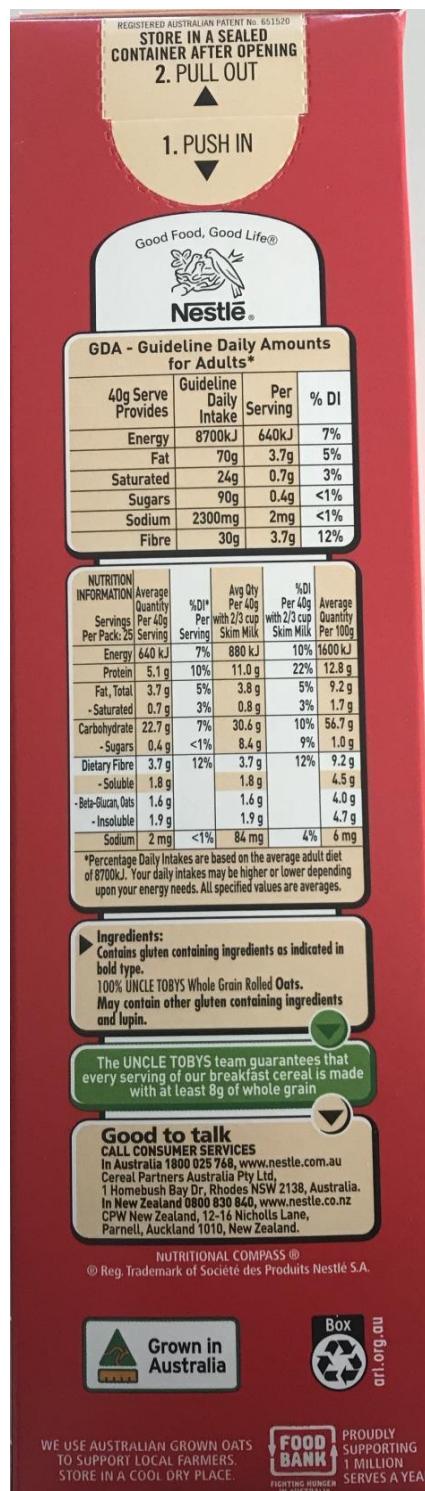
Back View



Top View



Side View



Impacts of the Food Supply Chain

You are to manage a supply chain in a food-focused corporation like McDonald's. It shows the negative impact on modern society, environment and health from the rising demand for products created by consumers.



Access the link [McDonalds video game- sustainability](#) and attempt the game a couple of times to perfect the applications.

TASK:

In the space below, outline the steps involved in the production task undertaken in the McDonalds video game.

The Impact of Food Production on Society, the Environment and Health

After playing the game a few times, to perfect its application, record the outcomes you achieved in the table below.

Impact	Advantages	Disadvantages
Society		
Environment		
Health		

Evaluation of a New Food Product



Write an evaluation on a new food product of your choice. This could be something you have purchased and is in your pantry or you could choose a 'New Food' product from the internet.

Name of chosen 'New Food' product: _____

Within the evaluation you need to discuss the packaging and labelling of the product, and the clarity of the instructions provided on the package itself.

Complete the table below, rating each question and giving a reason for your rating.

1 = poor

5 = excellent

Question	Rating 1 – poor 5 – excellent	Reason
How well does the package attract the target market/ audience		
How well does the package protect the product		
How well does the label attract the target market/ audience		

How well is the package labelled		
How informative is the label, including instructions for use		
How likely is the package to be recycled		
How well is the product promoted		
How edible is the product		
How could the product, package and / or label be improved		

