

Unit 1.2.3

Food Production, Processing and Manufacturing

Key Knowledge and Key Skills

Key Knowledge 1.2.3

The factors influencing the development of food production, processing and manufacturing industries across Australia.

Key Skills 1.2.2

Explain influences on the development of Australian food production, processing and manufacturing industries.

Key Skills 1.2.7

Participate in and reflect on practical activities to explore the history and culture of food in Australia

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Key Terms and Definitions

Broadacre crops are crops that are produced on a huge scale and require large areas of land for their production.

Convenience foods are foods that have been partly or fully prepared in order to reduce the time and/or food preparation skills required to prepare meals in the home.

Food manufacturing occurs when ingredients are purchased and used with other ingredients to make a final product.

Food processing is the set of processes required to remove the raw food from where it is grazed or grown and make it safe and suitable for use.

Food production is the grazing of animals and the cultivation of crops to provide a food source.

Horticulture is the cultivation of crops in gardens, orchards, or other smaller and enclosed areas.

Produce is a term used to describe the fruits and vegetables and animal products (not including meat) produced as a result of agriculture and horticulture.

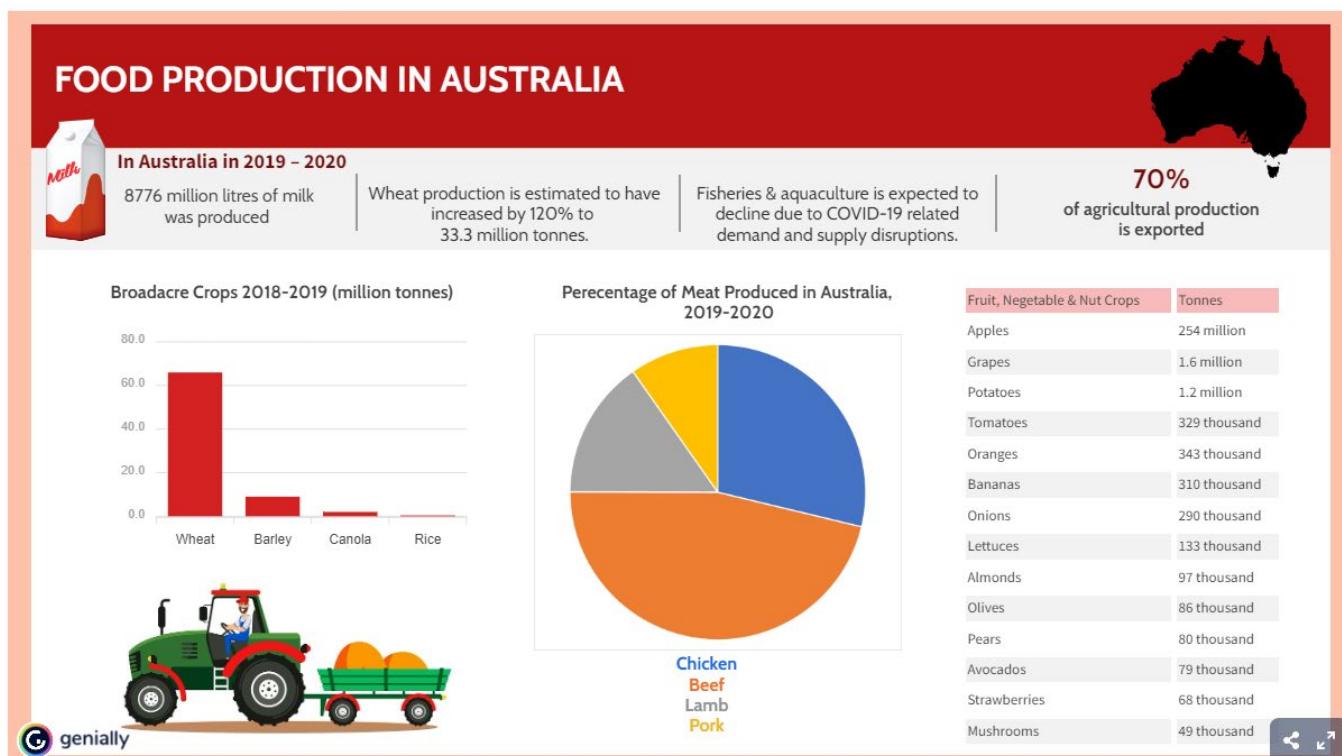
Food Production, Processing, and Manufacturing

Australian farmers grow and supply a diverse range of food in Australia. Ninety per cent of fresh produce, fruit and vegetables, meat, milk, and eggs sold in our supermarkets are produced in Australia. Australian produce is considered high quality; more than 50% of the food produced in Australia is exported overseas. Australia imports a small amount of food, not because of necessity but because Australians desire more variety and flavours from other world regions. The food imported is generally highly processed.

Food production in Australia involves both agriculture and horticulture. Agriculture is the science of preparing land for crop cultivation and raising animals for meat and meat products. Horticulture also involves the cultivation and harvesting of plants, but it does not include raising animals. Food processing refers to the processes used to transform animals, crops, and plants into usable products. Food manufacturing is the term used to describe the processes required to turn a food item into a new product.

Food Production

The infographic below provides an outline of the foods produced in Australia.



Factors Influencing the Development of Food Production

Do you ever wonder how we went from being a colonial country struggling to farm enough food to supply a small population to exporting this amount of food? How did these industries develop from the few animals, seeds, and plants brought over by the First Fleet to today's large and successful enterprises?

Various factors have influenced the development of food production, processing, and manufacturing industries in Australia.

Land Grants and Squatting

A land grant is a gift of real estate; in colonial times, people were given land in Australia to encourage settlement and farming. Captain Arthur Phillip, the commander of the First Fleet to Australia, had been given the power to give land grants to convicts when they finished their sentences. An unmarried man was eligible to receive up to 30 acres. If a man was married, he could be granted up to 50 acres, and for every child he fathered, he would acquire an extra 10 acres. On top of this, for the following 10 years, he would not be required to pay tax, rent, or any other

fees for 10 years. By 1789, retired marine officers were granted 100 acres, and retired marine privates could receive 50 acres. Similar grants were extended to free settlers until 1831.

The grants were given to the early settlers to encourage them to develop and improve food production in the area. Fairly soon, the Australian population increased, and people began living across the country. During the 1820s, many wealthy men arrived in Australia. They purchased large amounts of animals and grazed them on large areas of land that they had not purchased. This illegal practice was called squatting.

In 1829, Australia was divided into 19 counties, and settlers were only permitted to take up land within their counties' boundaries. However, many people continued to squat on lands to graze their animals. Consequently, in 1836, the *Squatting Act* was introduced. This Act stated that settlers needed to have a licence to graze animals outside their counties boundaries. By the 1850s, a large number of immigrants started to arrive in Australia. These immigrants wanted to buy land. However, most of the prime land had already been claimed by wealthy squatters. By 1860, 1.2 million acres in Australia were being used for agriculture. Many landowners in New South Wales found that their land was well suited to meat and wool production.

The Invention of Specialised Farming Equipment

As discussed earlier, the settlers from Great Britain and European countries used farming methods they were familiar with. However, many of these farming methods were unsuitable for Australian conditions. Australia's climate was much drier and warmer, and the soil lacked moisture. While some farming methods were successfully used, others failed dismally. For the first 100 years after the First Fleet arrived, Australia continued to rely heavily on imported food, except meat.

Until the 1820s, settlers had little farming equipment. The lighter ploughs that the English and Europeans invented did not effectively break up the hard Australian soil or remove tree roots. This resulted in the farmers having to remove tree roots, stumps, and large rocks by hand; this slow and labour-intensive work hindered the agricultural expansion in Australia for some time.

Two South Australian brothers, Richard and Clarence Smith, invented the stump jump plough in 1876, which removed tree stumps and roots much more easily. This innovation resulted in more land being cleared to use for farming and the establishment of towns.

While large combine harvesters were designed in America, James Marrow of Victoria invented the combined stripper harvester that stripped, threshed, and winnowed wheat in one action. Later, Headlie Taylor of New South Wales invented the header harvester that was used worldwide. Eventually, other effective farming equipment and techniques were invented that made farming easier in Australia. As a result of these inventions, Australian farmers began producing more food for their population and exporting produce to other countries.

Watch this video about farm life in the 1950s: <https://youtu.be/Q0V7hKWIw38>

Watch this video about a new type of harvester invented by Headlie Taylor: <https://youtu.be/JyH99PMdNFI>

Emigrant Guides

Due to the success of the agricultural industry in Australia and the overcrowded conditions and lack of employment in England, people were encouraged to migrate to Australia. These new immigrants had to purchase land as land grants were not available after 1831; many spent their savings buying land. By around the 1830s, those thinking of migrating to Australia and new settlers received Emigrant Guides containing various maps and information about Australian climate, history, and politics with an emphasis on farming. Much of the information in the Emigrant Guides was about success stories rather than how to farm the land. Later publications advertised anything related to agriculture, such as farming clothing and equipment, feed, and manure supplies. Many new settlers struggled to establish successful farms because they had limited assistance in finding suitable land and lacked knowledge and experience in farming in Australia.

Expansion into Other Parts of Australia

Over time, people started to move away from the coast to explore Australia's inland areas, where they established new colonies. Large farmland areas opened up in Tasmania, Victoria, South Australia, and Western Australia. The development of roads and the railway resulted in the transportation of crops around the country. Improved transport systems made Australia a significant crop exporter in the early 20th century.

Education in Farming

In the late 1890s, educational institutions began providing advice and education to farmers and potential farmers. Experimental farms were established where new farming crops, equipment, fertilisers, and techniques were trialled and tested. The information farmers gained from this education helped them farm successfully.

Irrigation

The first irrigation records appear in Hobart; however, Victoria embraced and developed irrigation the most. A major drought in Victoria from 1877 to 1884 resulted in government officials visiting California to view their irrigation systems. During this visit, government officials met the Chaffey Brothers, who were responsible for successful irrigation systems in California. In 1886, the Chaffey brothers came to Australia and developed an irrigation system in Mildura, Victoria, then in Renmark, South Australia.

By the early 1900s, the New South Wales, Victorian and South Australian governments signed an agreement to develop the Murray-Darling Basin so that water could be stored for use in farming. The Murray-Darling Basin extends over large areas of New South Wales and Victoria, the Australian Capital Territory, and some of Queensland and South Australia.

The use of irrigation to produce crops in Australia has increased significantly since then. The Snowy Mountains Hydro-Electric Scheme was Australia's most significant project ever. The project started in 1949 and was not completed until 1972. It includes 16 dams and 80 km of aqueducts, which still provide an essential source of power and irrigated water to Australians.

Watch this video to find out more about the Snowy Mountains Hydro-Electric Scheme:

<https://youtu.be/xtluvJQwYK4>

Watch this video to discover more about food production in the Murray-Darling Basin: <https://youtu.be/s8L-GaQA71Y>

Factors Influencing the Development of Food Processing Industries

The Establishment of Flour Mills

The first crop of Australian wheat was harvested shortly after the arrival of the colonists in January 1788. These crops produced poor results due to the harsh climate, poor soil, and lack of people's knowledge in farming.

James Ruse, a First Fleet convict, had some experience farming. When his wheat crop was successful, Governor Phillip rewarded him with a 30-acre land grant, which Ruse named Experiment Farm. From there, wheat became Australia's most important crop. The amount of grain produced increased as the country expanded in the mid-19th century. Australian wheat exports began in 1845 but were inconsistent until the 1870s. As wheat production became more successful, many flour mills were built, resulting in flour being a valuable and vital export product for many years.

Flour is the most common product that results from milling. Early mills crushed or ground the grains. However, today many more steps are involved in the milling process. These steps include washing, separating, aspirating, tempering, blending, grinding, sifting, purifying, and bleaching the grain.

In the 1870s, the number of flour mills in Australia peaked at 500. Flour was a food commodity that was readily available at this time. Many bakeries and factories manufactured flour-based products like biscuits, cakes, and puddings. As technology has improved over time, the flour mills became larger. But, the number of mills and workers required to operate the mills reduced significantly. Today, there are only 28 mills in Australia.

Watch this video to discover how flour was milled in a water mill many years ago: <https://youtu.be/nY06Bw5zh-k>

Watch this video to discover how flour is milled in a modern-day mill: <https://youtu.be/u6k9zyi3OKo>

Profit Margins

Sheep and cattle are the main grazing herds farmed in Australia because they are suited to grazing in dry inland areas. Dairy herds need lush, green grass to eat to produce milk and are more likely to be grazed in the cooler and wetter regions of the coast of New South Wales, Tasmania, and Victoria.

Initially, Australian farmers mainly grazed sheep to produce wool. However, around 1890, farmers began to focus on grazing them for meat because wool production was no longer as profitable as it had once been. This was mainly due to reduced wool prices, drought, the impact of World War One, and the onset of the Great Depression.

While lamb and mutton are essential livestock products in Australia, beef is Australia's most extensive red meat product that we produce. Australia is second only to Brazil in regards to the amount of beef produced. Despite the popularity of lamb and beef, meat from other animals is starting to become more widely eaten in Australia, particularly kangaroo and goat.

Watch this video about 1950s cattle farming in Australia: <https://youtu.be/CEmtMuPqc2c>

Watch this video about the beef industry in Australia: https://youtu.be/80_vW-oDkj0

New Breeds and Processing Techniques

Chicken is now the most consumed meat in Australia. But this has not always been the case. Before the 1950s, Australians rarely consumed chicken meat as no one was farming it on a large scale. People only ate chickens once they stopped producing eggs and the flesh from them was not particularly appealing. The older hens' meat was tough because their muscles had done a lot of work, and they had a strong taste.

Before 1960, one company was responsible for rearing chickens for meat and another would kill and prepare the bird for sale. In 1959, Australian producers introduced a chicken bred specifically for meat consumption. At this time, single companies started to perform all the stages of chicken production. As a result, the processing of chickens became faster and more efficient, making the cost of chicken meat much more affordable for consumers. The arrival and rapid spread of KFC outlets in the late 1960s and early 1970s also increased the popularity of chicken.

Watch this video about chicken processing in Australia: <https://youtu.be/RsxVy2ek-8k>

Watch this video about a day in the life of a chicken farmer: <https://youtu.be/Wkht0q4VzBo>

Establishment of Commercial Dairies and Factories

Within 6 years, the two bulls and seven cows that arrived in Australia in 1788 grew to a herd of 61. The dairy industry grew quickly through rapid adaption by dairy farmers to the Australian climate and the need to provide dairy products to the growing colony. By 1800, through breeding and importing, Australia had a population of 322 bulls and 712 cows.

The first commercial dairy and commercial cheese factories were established in the 1820s. By 1832, the dairy industry had spread to Melbourne, and the Port Phillip Bay area went from having just 155 cattle to 347,000 within 20 years. By 1891, just over 100 years since the First Fleet landing, there were almost one million dairy cows in Australia. By 1900, nearly every Australian town had access to a fresh supply of milk!

Increased Demand for Horticulture Products

Fruit growing in Australia began very soon after the First Fleet's arrival using species that were introduced to Australia. Early settlers wanted fruit. To meet this demand, many early settlers planted gardens, orchards, and vineyards.

As the population increased, so too did the demand for fruit. Developments in canning and drying fruit, irrigation, and refrigeration during the late 19th century meant this demand could be met. In fact, the supply was so plentiful that many fruits and vegetables were exported. The major horticulture growing areas in Australia include the Goulburn Valley of Victoria, Murrumbidgee Irrigation Area of New South Wales, Sunraysia district of Victoria and New South Wales, Riverland region of South Australia, Northern Tasmania, southwest Western Australia, and coastal strips of both northern New South Wales and Queensland.

Watch this video about dairy farming in Australia: <https://youtu.be/hYa1rbhMWOW>

Watch this video to discover how an early settler contributed to worldwide horticulture:

<https://youtu.be/HoewjSofvu4>

Factors Influencing the Development of Food Manufacturing

Since Australia's settlement, a range of factors has contributed to food manufacturing in Australia.

Our Food Preservation Knowledge and Skills

Bottling of Foods

Preserving foods by bottling them became widespread in Australia in 1915 when Joseph Fowler began selling his home bottling kit. This food preservation method used a vacuum rather than chemicals to preserve food. Jars were filled and then sealed with a rubber ring, lid, and clip. The filled jars were heated for an hour to a temperature high enough to kill food poisoning bacteria. Special lids allowed air to escape during heating but created a vacuum seal when the food cooled down after heating.

Canning of Meat

Sizar Elliot was an English emigrant who is said to have started the first meat-canning business in Australia in the early 1840s. There was an over-supply of mutton lamb at the time, and canning meant that it could be preserved. This canned meat business proved successful; however, the business failed due to a lack of financial support. Later in the 1840s, other canneries were established at Camperdown in Victoria and Newcastle in New South Wales. The Newcastle cannery produced canned soup, beef, and mutton in a range of sizes. Unfortunately, drought and the gold rush pushed up meat prices in the 1850s and the Newcastle cannery closed in 1855. Widespread cattle disease in Britain meant that canned meat soon came in demand again. As a result, a meat cannery was opened in 1865 and another in 1870. In the following decade, Australia exported massive amounts of canned meat to Great Britain.

Canning of Fruit and Vegetables

Canning of fruit and vegetables commenced in Australia in the 1860s to prevent unused fresh fruit and vegetables from being wasted. Canneries were established in New South Wales, Queensland, Tasmania, and Victoria – where most fruits and vegetables were grown. Many fruit and vegetable canneries in Australia have now closed down. Unfortunately, imported products tend to be produced more economically, and private label (home brand) products that may often contain ingredients from overseas are more affordable and are increasing in popularity.

Watch this video about how peaches were canned in the 1930s: <https://youtu.be/WAYZCj8JNEM>

Watch this video that shows how baked beans are canned in modern facilities: <https://youtu.be/SvESLo07tec>

Innovation in Machinery and Technology

Innovation in machinery and technology has changed how food ingredients are processed and the kinds of foods made. Foods can be processed and manufactured at much quicker rates, thanks to technological advancements.

Advances in dairy farming technology have made life on the farm much easier than it was many years ago. In the past, each cow was milked by hand for around 10–15 minutes each. Depending on age and breed, each cow produces approximately 10–40 l per day. That's a lot of milking! Nowadays, fully automated computerised systems milk cows, a process that requires no human contact at all. Many of today's cows are also impregnated artificially and kept pregnant permanently. These changes mean that today's dairy cows can produce much higher amounts of milk each day for more extended periods of their life.

Like the dairy industry, the meat industry has become highly automated and uses sophisticated technology to process meat into the cuts we purchase at the supermarket.

Watch this video to find out how cows are milked using robotic technology: <https://youtu.be/KuTd0npDWp0>

Watch this video to find out how cows are being butchered using robotic technology: <https://youtu.be/BLrfJ0UvPhg>

Technologies such as pasteurisation have increased the shelf-life of products, as well as enabled new products like fruit juices to be manufactured. This video explains how technology is now used to pasteurise products: <https://youtu.be/jOMu-irZDVQ>

The Need for Convenience

When Australia was first settled, a woman's traditional role was to marry, have children, and care for her family. Caring for her family included preparing, making, and cooking meals. It was rare for married women to work in paid

employment, so they usually had available time to prepare meals. However, more women started to enter the workforce in the 1960s and 1970s, consequently, they no longer had as much available time to make meals.

Food manufacturers responded to this need by developing convenience foods that would decrease the amount of time people spent making meals. These foods included frozen vegetables, pasta sauces, and pre-prepared foods such as cake mixes and casserole bases. Into the 1980s, complete frozen meals were available to purchase. With the increased income from working mothers, families could now afford to buy them. The divorce rate at this time had also increased and these frozen meals provided a meal alternative for men with limited cooking knowledge and skills. During this time, more take-away food products and home-delivered meals were also produced.

Nowadays, food consumers still want convenience, but they also want to know where their food came from and to be involved in some of the preparation of meals. As a result, food meal kit services have become popular as they deliver food packages to the home that contain the ingredients and recipes to make quick and easy meals.

Written Activity One

Is this Production, Processing, or Manufacturing?

The list below includes various significant events in the Australian food industry.

Working in small groups, decide if these events are linked to production, processing, or manufacturing.

Year	Event	Production	Processing	Manufacturing
1805	Dr. John Harris built the first commercial dairy in Sydney.			
1812	Ex-convict Thomas West built the first water mill in Sydney.			
1820s	The first commercial cheese factory was established in Tasmania.			
1838	Pineapples were introduced.			
1839	Breweries and wineries began appearing.			
1830s	The first ice arrived in Sydney.			
1838	Melbourne's <i>first</i> confectioner's shop was opened in a wattle-and-daub hut.			
1840s	Ridley stripper harvester was invented.			
1846	Canned corn beef was called 'Bully Beef,' the first canned meatworks opened.			
1854	Australia introduced the first food laws.			
1854	Swallow and Ariell established the first biscuit factory in South Melbourne.			
1861	George Peacock began canning fruit & jam; it was later sold and named IXL.			
1862	The first thriving commercial sugar plantation was established.			
1864	The first sugar cane mill was opened.			
1879	Forty tonnes of frozen meat was exported from Sydney to the United Kingdom.			
1880s	Chinese workers from the goldfields established banana plantations in Qld.			
1876	The stump jump plough was invented, which allowed farmers to go over stumps.			
1880s	Oyster farming began.			
1886	The Chaffey brothers established their first irrigation settlements in Australia.			
1898	Sanitarium's first baker made the first batch of ready-to-eat cereal, Granola.			
1901	The first peanut farmers in Queensland began.			
1906	The first large-scale pie maker, Sargent's, began in Sydney.			
1907	American migrant Fred Peters sold 'Peters' ice cream from a horse & cart.			

1922	Minties were created with the phrase, 'It's moments like these you need Minties'.		
1922	A chemist invented vegemite to rival Marmite, a similar British food product.		
1923	Weetbix was developed by Sanitarium.		
1923	Cadbury began exports to <i>Australia</i> in 1881 and built the factory in Tasmania.		
1924	The first commercial rice crop was grown.		
1927	Peter's ice cream factory was opened in Melbourne.		
1937	Sunshine milk powder was launched and became a staple food in the war years.		
1939	Oliver Triggs, a Melbourne grocer, founded Meadow Lea.		
1940	Quick-frozen vegetables were sold.		
1947	The Four'n Twenty pie company in Bendigo produced about 50 pies per day.		
1949	Vegetables were grown to be frozen.		
1955	For the first time, milk was packaged in a carton in Australia.		
1955	Sliced bread was introduced in Australia.		
1959	The chicken industry began breeding chickens specifically for consumption.		
1965	Thomas Angove, a winemaker from SA, invented the packaging for cask wine.		
1967	The first, Taco Bills, was opened in QLD and offered takeaway food only.		
1968	The first KFC outlet in Sydney was established.		
1970	The first Pizza Hut outlet in Sydney was established.		
1971	The first Burger King and Hungry Jacks was established in Australia.		
1972	The first McDonalds was opened in Sydney.		
1976	The first 'jaw-breaking' muesli bar was released by Uncle Toby's.		
1986	Heather Mitchell & Joan Kirner launched 'Landcare' in a small Victorian town.		
1989	The Heart Foundation introduced the Tick Program.		
1995	Australia's first takeaway sushi rolls appeared.		
2003	A new rice breed was released that used less water during cultivation.		
2006	The Australian Certified Organic Trademark was established.		
2013	Nestle reduced the sugar content of its rainbow killer python by half.		
2016	Plant-based meat alternatives were introduced to the Australian market.		
2019	The Victorian Government introduced a ban on lightweight plastic shopping bags.		

Written Activity Two

It Gets Better with Age

<https://theconversation.com/it-gets-better-with-age-a-brief-history-of-cheese-in-australia-153377>

As a class, **brainstorm** the factors that have influenced the production and consumption of cheese in Australia.

Take notes in the box below.

Written Activity Three

We're Happy, Little Vegemites!

Conduct some research to find out as much as you can about vegemite.

1. When was vegemite introduced in Australia?

2. What company first-produced vegemite?

3. How was vegemite discovered?

4. What factors influenced this food to become a major food product in Australia?

Get into a Chicko!

Conduct some research to find out as much as you can about the iconic Australian Chicko roll.

1. When was the Chicko roll first introduced in Australia?

2. What company first produced the Chicko Roll?

3. How was the Chicko roll discovered?

4. What factors influenced this food to become a major food product in Australia?

Practical Activity One

Design Brief: The Family Business

As new settlers to Van Diemen's Land (Tasmania), your ancestors established a dairy farm in 1850. They began exporting butter and cheese to the mainland quite soon after this. They then launched the first butter factory in Tasmania in 1892. This factory used a mechanical milk separator which saved time and labour while producing beautiful creamy butter. Shortly later, refrigeration was invented, and your family began exporting their butter to the United Kingdom.

Many dairy businesses experienced difficulty in the 1900s, so the Tasmanian government appointed a Dairy Expert and a Council of Agriculture to educate dairy farmers. In no time at all, most dairy farmers were using hand separators on farms, which meant that the cream for butter only had to be collected just twice a week. By 1912 the dairy industry in Tasmania was thriving once again.

During the First World War, your family was the first to use pasteurisation in their factory, which produced butter of even better quality. They were also involved with testing which cows would produce better milk for butter production and began using milking machines.

Federal government laws helped your family by introducing the Dairy Produce Export Control Act in 1924. Of course, Cadbury also established their factory in Hobart, which relied on dairy farmers in Tasmania for milk.

Your family hit some hard times during the Second World War due to government legislation and labour shortages.

After the war, new immigrants began arriving in Australia who demanded much more of a range of dairy products. Since then, your family has always produced different products to satisfy the changing Australian market.

It is now 1980, and the Australian market is obsessed with low-fat food products. You are employed in your family's business to design new dairy products. Your task is to create a new yoghurt dessert-style snack product using the basic recipe provided.

Source: https://www.utas.edu.au/library/companion_to_tasmanian_history/D/Dairying.htm

Let's Design

1. **Design** your new food product by drawing a picture and annotating it to show how you will prepare the ingredients and present your dessert-style yoghurt snack.
2. **Use** any of the ingredients listed.

Cereals	Dried Fruits	Nuts & Seeds	Fruits	Spices & Herbs	Syrups
<input type="checkbox"/> Rolled oats	<input type="checkbox"/> Craisins	<input type="checkbox"/> Chia seeds	<input type="checkbox"/> Frozen berries	<input type="checkbox"/> Ground cinnamon	<input type="checkbox"/> Maple Syrup
<input type="checkbox"/> Puffed Quinoa	<input type="checkbox"/> Sultanas	<input type="checkbox"/> Linseeds	<input type="checkbox"/> Canned pineapple	<input type="checkbox"/> Ground nutmeg	<input type="checkbox"/> Honey
<input type="checkbox"/> Granola	<input type="checkbox"/> Coconut flakes	<input type="checkbox"/> Flaxseed meal	<input type="checkbox"/> Canned mango	<input type="checkbox"/> Turmeric	<input type="checkbox"/> Golden Syrup
<input type="checkbox"/> Wheat Flakes	<input type="checkbox"/> Raisins	<input type="checkbox"/> Almonds	<input type="checkbox"/> Canned peaches	<input type="checkbox"/> Fresh mint	
<input type="checkbox"/> Bran	<input type="checkbox"/> Dates	<input type="checkbox"/> Pistachios	<input type="checkbox"/> Fresh kiwi fruit		
<input type="checkbox"/> Granola	<input type="checkbox"/> Apricots	<input type="checkbox"/> Pecan nuts	<input type="checkbox"/> Fresh oranges		

Let's Make

1. **Follow** the yoghurt recipe to make your yoghurt.
2. **Using** the yoghurt you made, make the 1980s dessert-style yoghurt snack food you designed.

Homemade Plain Yoghurt

Ingredients:

1 litre full cream milk

40 grams full cream milk powder

90 grams full cream natural yoghurt with live cultures

Method:

1. **Half-fill** the sink with cold water.
2. **Place** the milk and milk powder in a medium saucepan. **Whisk** well to combine.
3. **Set aside** 125ml (1/2 cup) of the milk mixture.
4. **Heat the** remaining milk mixture over medium-high heat until it just comes to a boil.
5. **Remove** from the heat.
6. **Place** the saucepan in the sink of cold water, and stir occasionally.

Stop when the milk cools to 43°C.

Heating and boiling the milk helps it set and kills any bacteria that may interfere with the live cultures (yoghurt).

If you add the yoghurt when the milk mixture is too hot, you will destroy the cultures, and the mixture will not thicken. If the milk mixture is not warm enough, it will take longer to thicken, and the yoghurt may have an acidic or tart flavour.

7. **Whisk** the reserved milk mixture (125ml) and yoghurt in a small bowl.

Combining the yoghurt with the cold milk reduces the chance of it curdling or separating when added to the warm milk. It also makes it easier to distribute the bacteria throughout the milk and helps ensure it sets evenly.

8. **Add** the yoghurt mixture to the warm milk and **whisk** to combine.
9. **Pour** the mixture into two x 500ml sterilised glass jars. **Put** the lids on. **Place** them into an esky.
10. **Heat** 4 litres of water to around 50-55°C and **pour** into the esky.
11. **Shut** the esky lid and **leave** for 6 – 8 hours.
12. After 6-8 hours, **open** the jars of yoghurt.

You will find liquid around the edge of the yoghurt known as 'whey.' Carefully drain off the excess whey and place yoghurt in the fridge to chill for 3-4 hours.

13. **Replace** the lid on the jar and **place** the yoghurt in the refrigerator.

Consume within five days.

To sterilise the jars:

1. **Tie** back long hair, **wash** hands and **put** your apron on.
2. **Preheat** the oven to 110°C.
3. **Wash** the jars and lids in hot, soapy water.
4. **Place** jars upright onto a baking tray.
5. **Place** tray into a low oven at 100°C for about 15 minutes.

Practical Activity Two

Food Preservation

Food preservation refers to any of a number of techniques used to prevent food from spoiling.

Some basic methods of food preservation include canning, curing, drying, fermenting, pickling and sugaring.

Nowadays, more advanced forms of food preservation have been developed. Modern methods include canning, pasteurization, freezing, irradiation, and the addition of chemicals. Advances in packaging materials have also played an important role in modern food preservation.

Make the recipe for chutney below.

Chutney Recipe	
Ingredients:	Method:
<p>500g tomatoes, chopped $\frac{1}{2}$ green apple, peeled and chopped $\frac{1}{2}$ large brown onion, chopped 40g sultanas 160 ml malt vinegar 125 grams brown sugar $\frac{1}{2}$ garlic clove, finely chopped 1 teaspoon mustard powder 1 teaspoon mild curry powder $\frac{1}{2}$ teaspoons whole black peppercorns 1 teaspoon cornflour</p>	<ol style="list-style-type: none"> Prepare ingredients. Place tomatoes, apples, onions, sultanas, vinegar, sugar, garlic, mustard and curry powders, and peppercorns in a medium saucepan with 2 teaspoons salt. Stir over low heat until sugar dissolves, then increase to medium-high and bring to a boil. Reduce heat to medium-low and cook, occasionally stirring, for 30-45 minutes until the ingredients have broken down and the mixture is thick. (To test, press the back of a metal spoon into the mixture. If a pool of liquid forms in the spoon, cook for a little longer.) Mix cornflour with 1 tablespoon cold water until a smooth paste, then stir into chutney. Cook, stirring occasionally, for a further 10 minutes until thickened. Cool, then pour into sterilised jars. Serve with your favourite cheese, crackers, or sourdough bread.

Original Source: <https://www.delicious.com.au/recipes/tomato-chutney-aged-cheddar/5501f9d4-caee-4135-b415-a3523c922a06>

Summary Activity

Answer the questions below:

What is the main idea about this key knowledge and key skills?		
<p>Write two or three sentences in your own words.</p>		
Define food production, food processing, and food manufacturing.		
Food Production	Food Processing	Food Manufacturing
Provide some examples of food production, food processing, and food manufacturing.		
Food Production	Food Processing	Food Manufacturing
List some factors that influenced the development of these industries in Australia:		
Food Production	Food Processing	Food Manufacturing
Select one food and suggest how the production, processing, and manufacture of this food have changed over time.		
Food Production	Food Processing	Food Manufacturing

Exam Preparation

Multiple-Choice Questions (5 marks)

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

Question 1

Making a muffin from flour, eggs, and milk is an example of:

- a. Food production.
- b. Food processing.
- c. Food manufacturing.
- d. All of the above.

Question 2

The 'stump jump plough' made the following agricultural task much more manageable:

- a. Harvesting crops.
- b. Fencing fields.
- c. Clearing land.
- e. Rounding up animals.

Question 3

Which of the following factors opened up more land for settlers to practice agriculture on:

- a. The abolishment of land grants.
- b. Increased number of canning factories.
- c. Laws making squatting illegal.
- d. Improved transportation.

Question 4

The most commonly consumed meat in Australia is:

- a. Lamb.
- b. Beef.
- c. Kangaroo.
- d. Goat.

Question 5

Chicken consumption significantly increased in Australia from the late 1950s because:

- a. People did not like eating red meat anymore due to increased knowledge of animal welfare issues.
- b. Chickens started to be bred for consumption making farming chickens more cost-effective.
- c. People decided they liked the taste of chicken.
- d. It was a widely consumed food in England.

Short Answer Questions (10 marks)**Question 1 (3 marks)**

In the table below, identify one factor that has impacted the production, processing, and manufacturing of food in Australia. (3 marks)

Production	Processing	Manufacture

Question 2 (2 marks)

Explain how land grants impacted food production in Australia. (2 marks)

Question 3 (3 marks)

Identify one food item produced in Australia.

Provide an example of the production, processing, and manufacturing this item may undergo. (3 marks)

Question 4 (2 marks)

Explain the difference between the terms food processing and food manufacture.

Exam Preparation

Multiple-Choice Questions (5 marks)

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

Question 1

Making a muffin from flour, eggs, and milk is an example of:

- a. Food production.
- b. Food processing.
- c. Food manufacturing.
- d. All of the above.

The answer is not A. Food production refers to grazing animals and cultivating crops to provide a food source.

The answer is not B. Food processing is the set of processes required to remove the raw food from where it is grazed or grown and make it safe and suitable for use.

The answer is C. Food manufacturing occurs when ingredients are purchased and used with other ingredients to make a final product.

The answer is not D.

Question 2

The 'stump jump plough' made the following agricultural task much more manageable:

- a. Harvesting crops.
- b. Fencing fields.
- c. Clearing land.
- d. Rounding up animals.

The answer is C. The stump jump plough, removed stumps and therefore made clearing land easier.

Question 3

Which of the following factors opened up more land for settlers to practice agriculture on:

- a. The abolishment of land grants.
- b. Increased number of canning factories.
- c. Laws making squatting illegal.
- d. Improved transportation.

The answer is not A. Abolishing land grants would reduce the amount of land available for people to practice agriculture.

The answer is not B. Increasing the number of canning factories meant that more food could be canned. It did not mean more land would be opened to farm the produce.

The answer is not C. Laws making squatting illegal would decrease the amount of land available to practice agriculture on.

The answer is D. Improved transportation around the country meant farms in remote areas could transport their produce. This resulted in more people starting farms in more remote areas.

Question 4

The most commonly consumed meat in Australia is:

- a. Lamb.
- b. Beef.
- c. Kangaroo.
- d. Goat.

The answer is not A, C, or D.

The answer is B. Beef has always been and continues to be Australia's most widely produced meat.

Question 5

Chicken consumption significantly increased in Australia from the late 1950s because:

- a. People did not like eating red meat anymore due to increased knowledge of animal welfare issues.
- b. Chickens started to be bred for consumption making farming chickens more cost-effective.
- c. People decided they liked the taste of chicken.
- d. It was a widely consumed food in England.

The answer is not A. Animal welfare was generally not a significant issue people considered in the 1950s.

The answer is B. In the late 1950s, a new breed of chicken was explicitly introduced for meat consumption.

The answer is not C. This is partly true; people only decided they liked the taste of the chicken that was explicitly introduced for meat consumption. Therefore, response B is the best answer.

The answer is not D. Chickens were not widely consumed in England.

Short Answer Questions (10 marks)**Question 1 (3 marks)**

In the table below, identify one factor that has impacted the production, processing, and manufacturing of food in Australia. (3 marks)

Production	Processing	Manufacture
<p>Any of the following responses were accepted:</p> <p>Land grants and squatting Specialised farming equipment Emigrant Guides Expansion into other parts of Australia Education in farming Irrigation</p>	<p>Any of the following responses were accepted:</p> <p>Establishment of flour mills Increased demand for horticultural products New breeds and processing techniques Establishment of dairies and factories Profit margins Processing techniques</p>	<p>Any of the following responses were accepted:</p> <p>Food Preservation techniques Innovation and technology Machinery Increased need for convenience</p>

Question 2 (2 marks)

Explain how land grants impacted food production in Australia. (2 marks)

One of the following responses was accepted:

The reason for these grants was to help develop the country's ability to produce food. The more land that was farmed, the more food was likely available.

or

Most arrivals to Australia did not have the money to purchase land, so the promise of free land encouraged people to come to Australia and try their hand at agriculture.

Question 3 (3 marks)

Identify one food item produced in Australia.

No marks were awarded for this response.

Provide an example of the production, processing, and manufacturing this item may undergo. (3 marks)

One mark was awarded for each description.

Production: Grazing the cattle on pasture and ensuring they have access to water.

Processing: Slaughtering of the animal and transforming the carcass into various cuts of meat

Manufacturing: Cuts of meat may be processed further into other food items. For example, a cut used as a roast may have a marinade added, and offcuts of the carcass may be minced and made into burgers and sausages.

Question 4 (2 marks)

Explain the difference between the terms food processing and food manufacture.

The student needed to explain the difference between food processing and food manufacturing.

Food processing refers to a raw agricultural product being transformed into something ready to be used as an ingredient. Food manufacturing involves taking the ingredient and making it into something new.

Starter Activity One

Read each statement carefully and record the chronological order that you think each event occurred in.

	Oliver Triggs, a Melbourne grocer, founded Meadow Lea.
	Australia's first takeaway sushi rolls appeared.
	The first commercial cheese factory was established in Tasmania.
	Ridley stripper harvester was invented.
	The Heart Foundation introduced the Tick Program.
	The first KFC outlet in Sydney was established.
	Sliced bread was introduced in Australia.
	A chemist invented vegemite to rival Marmite, a similar British food product.
	Australia introduced the first food laws.
	The Four'n Twenty pie company in Bendigo produced about 50 pies per day.
	George Peacock began canning fruit & jam; it was later sold and named IXL.
	Nestle reduced the sugar content of its rainbow killer python by half.
	The first sugar cane mill was opened.
	The first 'jaw-breaking' muesli bar was released by Uncle Toby's.
	The Chaffey brothers established their first irrigation settlements in Australia.
	The chicken industry began breeding chickens specifically for consumption.
	A new rice breed was released that used less water during cultivation.
	The Victorian Government introduced a ban on lightweight plastic shopping bags.
	Sanitarium's first baker made the first batch of ready-to-eat cereal, Granola.
	The first McDonalds was opened in Sydney.
	The first large-scale pie maker, Sargents, began in Sydney.
	The Australian Certified Organic Trademark was established.
	Minties were created with the phrase, 'It's moments like these you need Minties'.
	Peter's ice cream factory was opened in Melbourne.
	Dr. John Harris built the first commercial dairy in Sydney.
	Plant-basedmeat alternatives were introduced to the Australian market.
	The first commercial rice crop was grown.