

Adequately Feeding a Rising World Population

Key Knowledge

4.2.1

Key issues of the challenge of adequately feeding a rising world population, with particular focus on proposed solutions to global food insecurity, including the potential contribution of technologies and improved equity in food access and distribution.

Key Skills

4.2.1

Identify environmental and ethical questions and issues affecting food systems.

Key Terms and Definitions

Access to food refers to our ability to source good, quality food that is filling and adequate for our individual needs. How effectively access is achieved depends on whether the food can be provided on an ongoing basis.

Distribution refers to how something is shared among a group or spread over an area. It is how food is made available (physically moved).

Equality occurs when a resource is shared equally among individuals or groups.

Equity occurs when someone is fair and reasonable in a way that considers the needs of individuals or groups.

Global food security exists 'When all people at all times have physical and economic access to sufficient, safe and nutritious food to meet dietary needs and food preferences for an active and healthy life.'

Food Insecurity is the state of being without reliable access to a sufficient quantity of affordable food.

The World's Increasing Population

Currently, one in nine people worldwide does not have access to enough food. As of June 2022, the current world population is 8 billion. It is estimated the population will be 9.7 billion by 2050 and nearly 11 billion by 2100. There is some concern that, as the population increases, there will not be enough food to feed everyone.

Watch this video to find out why our rapid population growth is of concern: <https://youtu.be/VcSX4ytEfcE>

Watch this video about population growth and its impact on food security: <https://youtu.be/VCYeLuURxRM>

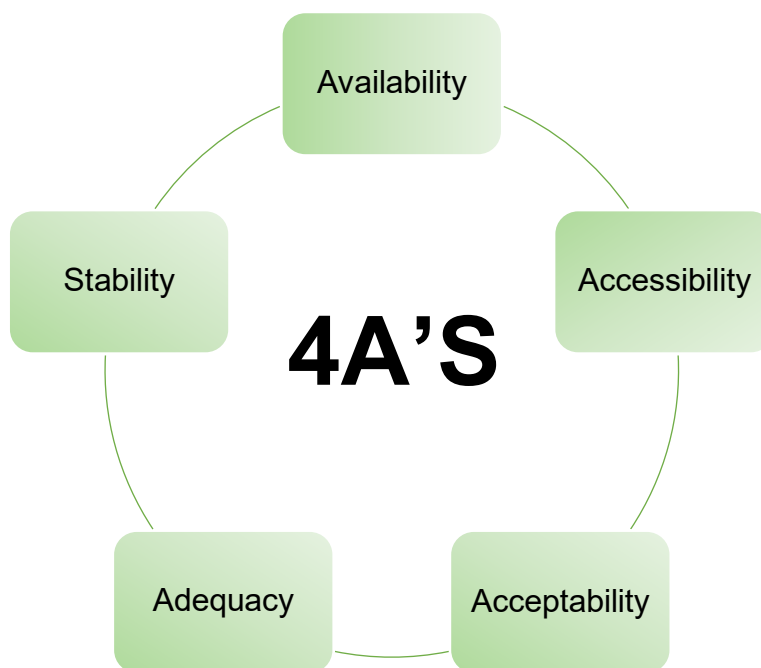
Global Food Security

Global food security exists 'When all people at all times have physical and economic access to sufficient, safe and nutritious food to meet dietary needs and food preferences for an active and healthy life.'

Prime Minister's Science, Engineering and Innovation Council. (2010). Australia and Food Security in a Changing World. (p. 1). Office of the Chief Scientist, Government of Australia.

Five Food Security Dimensions

For food security to be achieved, we must work towards achieving each of the five interconnected dimensions listed in the diagram below:



Availability

Availability refers to the provision of sufficient quality food for all people at all times, regardless of whether it is provided by aid or purchased by the consumer.

Accessibility

Accessibility is achieved when everyone has physical and economic access to quality, affordable, nutritious foods that meet their individual needs.

Acceptability

Acceptability occurs when the food people have access to culturally acceptable food that is obtained in ways that do not compromise people's dignity, self-respect, or human rights. For example, in some cultures, people do not eat meat, or animals must be slaughtered in a particular way. Acceptability would mean these people have access to food that meets their cultural needs without compromising their values and beliefs.

Adequacy

This dimension relates to the provision of adequate food that is nutritious, safe to eat, and sustainably produced.

Stability

For stability to be achieved, a population, household, or individual must always have access to an adequate food supply. Stability can only be achieved when external influences, such as economics, climate, and weather, do not impact the provision of food.

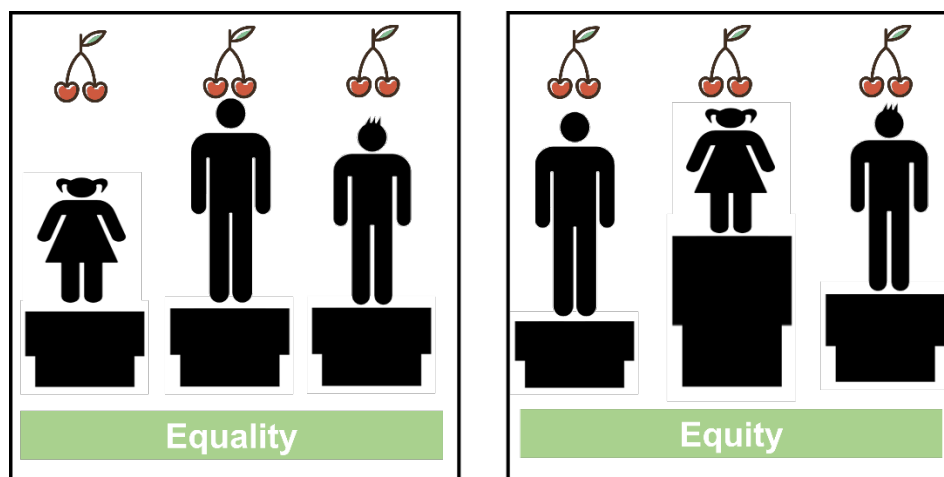
Prime Minister's Science, Engineering and Innovation Council. (2010). *Australia and Food Security in a Changing World*. (p. 9). Office of the Chief Scientist, Government of Australia.

Food Equity

In a food system where equity exists, everyone gets the food they need based on their own situation and needs. This food system recognises that not all people are the same and that various factors, such as accommodation, culture, education, income, location, and even personal beliefs and values, mean that different people have different food needs. Food equity is achieved when everyone has access to quality, affordable, nutritious foods that meet their individual needs.

Equality refers to everyone having access to the same resources. In a food system focused on equality, everyone is treated the same regardless of how many people need to be fed, their knowledge and skills, what culture they come from, or where they live. They all have access to the same resources and food, which may seem to be a fair scenario. However, not all people have the same needs; therefore, they have different food requirements. For this reason, today's food systems need to focus on food equity rather than solely on equality.

The diagram below demonstrates the difference between equality and equity. While the two concepts may seem similar, they have distinct meanings that are important to understand. The purpose of the diagram is to emphasize that treating everyone equally may not always be the most fair or effective approach, and that equity is important in ensuring that everyone can succeed.



Global Food Insecurity

Global food insecurity is an ongoing problem in many countries across the world, in particular, in Ethiopia, Nigeria, South Sudan, and Yemen. A range of factors contributes to global food insecurity. However, it is important to note that the focus of food security in this course relates to Australian issues. In terms of feeding a global population, this course examines how Australia can improve its ability to produce food for the global population.

Factors that Contribute to Global Food Insecurity

One in nine people in the world experiences food insecurity every day. Yet, the world now produces enough food to feed everyone. So why do some countries have high levels of food security while other countries struggle to feed their populations?

Various factors can contribute to food insecurity:

Climate change

Climate change refers to the long-term changes to global weather patterns, such as changes in temperature, precipitation, and weather extremes. It is caused by an increase in greenhouse gas emissions, primarily from human activities such as burning fossil fuels, deforestation, and industrial processes. Climate change is leading to a range of negative impacts, including rising sea levels, more frequent and intense natural disasters, and changes

in ecosystems. These changing climate and weather conditions make it more difficult for farmers to produce crops and rear animals. This may decrease the amount of available food.

Watch this video about the impact of climate change on food security: <https://youtu.be/ZCiRzSgo3A0> and <https://youtu.be/lsT246lrNxg>

Limited resources such as water and energy

Water shortages can decrease crop yields and limit agricultural production, particularly in areas where irrigation is necessary to grow crops. Similarly, energy shortages can disrupt food supply chains, making it difficult to transport and store food.

Inequalities

Income inequality can limit access to healthy and nutritious food for some individuals and families, particularly those living in poverty. It can also result in unequal access to education and training, which can limit opportunities for people to gain employment. Inequalities can also affect food distribution and availability, as some regions or populations may have more limited access to fresh, healthy food than others.

People's diets

Diets that consist of a significant amount of meat products, can put pressure on livestock production and contribute to environmental issues such as deforestation and greenhouse gas emissions. In contrast, an increase in demand for plant-based foods can have a positive impact on the environment, as it can reduce the environmental impact associated with livestock production.

Consuming processed foods can have a significant impact on global food security in Australia. The production of processed foods often requires more resources than the production of whole foods, such as fruits and vegetables. This can include more water and energy which can contribute to environmental degradation and use up valuable non-renewable resources. The manufacturing of processed foods can also contribute to greenhouse gas emissions, which can exacerbate climate change and impact global food security.

Consuming the same types of food can have a significant impact on global food security in Australia. Firstly, monoculture farming, where only one type of crop is grown in a large area, can lead to soil depletion and erosion, reducing the soil quality of the land. In addition, only planting a limited range of food crops can increase the risk of pests and diseases ruining crops. For example, if a farmer only grows one type of crop and it fails due to being attacked by a pest or disease then there will be less food available. This can reduce the amount of food availability and increase the prices of the food that is available. Additionally, a reliance on a limited range of crops can lead to a loss of biodiversity and reduce the availability of different types of food for future generations.

Urbanisation or the Urban Sprawl

Urban sprawl or urbanization refers to the expansion of urban areas. It results in more buildings, houses, schools, shops and services like hospitals being built in the outer areas of cities, on land that was previously natural, like forests or fields.

As urban areas expand and take over surrounding farmland, there is less land available for farming. This can result in a reduction in local food production and an increase in the need to source food from further away. The further food travels, the more the cost can increase.

The need to drive to shops or take public transport to access food is common in urban areas. This can impact people's access to fresh food, particularly for low-income individuals who may not have access to private transport or live near supermarkets or grocery stores. This can lead to a reliance on convenience stores or fast-food outlets, which may not offer nutritious food options; thereby decreasing food security.

Due to urbanisation, we are seeing an increase in the number of people undertaking urban agriculture in Australia to reduce food security problems in urban areas.

Watch this video about vertical farming and how it can address food insecurity: https://youtu.be/N9SZCS_9xFo

Food Waste

Food waste contributes to global food insecurity in several ways. Valuable resources, such as energy, land and water are used to produce food. If this food is not consumed, then not only is the food wasted; but the resources that went into producing the food are also wasted. Secondly, the loss of food due to waste means that less food is available for consumption, which can lead to higher prices and reduced availability for individuals who are already

food insecure. Finally, decomposing food waste that ends up in landfill creates methane gas which contributes to global warming and climate change. Which, impacts global food security significantly.

Watch this video about food waste, food insecurity and climate change: <https://youtu.be/wgLuXvtaLyQ>

Soil degradation

Soil degradation is a term used to describe the deterioration of soil quality over time. It often happens as a result of intensive agriculture, deforestation, overgrazing, pollution or overuse of fertilisers, pesticides, and water. Soil degradation can lead to a decline in the quantity and quality of crops produced, reduced biodiversity, and increased soil erosion. It can also lead to the release of carbon into the atmosphere, contributing to climate change.

Soil that is of poor quality and lacking in nutrients often produces lower crop yields and lower-quality crops, which can reduce the availability and affordability of food. This can lead to increased food prices, which can result in some people being unable to purchase the food. Secondly, soil degradation can lead to the loss of farmland, which can contribute to food shortages and malnutrition. Thirdly, soil degradation can lead to changes in the nutrient content of crops, which can reduce access to nutritious foods.

Supply chain interruptions

The Russian and Ukraine conflict provides an example of how conflict can cause supply chain interruptions. Russia and Ukraine export a significant amount of wheat, sunflower oil and fertiliser. The conflict between these two countries has impacted their ability to export these commodities and, in turn, has led to shortages and price increases in countries that not only relied on these imports but countries worldwide. The unavailability of fertiliser, which, for many farmers is essential for agricultural production, has led to reduced crop yields.

The COVID-19 pandemic is another example of how supply chain interruptions can impact global food security. The pandemic led to disruptions in global transportation networks, border closures, and labour shortages, which impacted food supply chains. The closure of restaurants and schools led to changes in the type of food people were consuming, and disruptions in the processing and distribution of food, often due to employees in isolation with COVID, led to significant food shortages. The pandemic also highlighted that people have become dependent on the current food system and it has raised awareness of the need for more resilient and local food systems.

Watch this video about how the war in Yemen impacts food security: https://youtu.be/hjuzev_UigQ

Watch this video about how the war in Russia and Ukraine in 2022 will likely impact food insecurity: <https://youtu.be/I5gHbCfhDE> (Please note: the first 30 seconds shows the war in Russia and Ukraine).

Trade policies and agreements

A trade policy is similar to a set of rules that a government implement to control trade with other countries. These rules can include things like taxes on imports and exports, laws about what can and can't be traded, and how much money the government gives to businesses to help them trade. Trade policies can impact the price of the foods exported and the price and availability of the foods imported.

Trade policies that promote free trade can result in increased food security for individuals. Countries that do not make companies pay high taxes to import their food in their country might have more food choices available and food might cost less.

In contrast, if a country imposes high taxes on imported food; it can make the imported food more expensive, and people might not be able to afford it.

Trade policies can promote the free flow of goods and services between countries, which can help ensure access to food in regions where food is scarce. Trade agreements can also promote market competition, which can help to reduce the cost of food for consumers. However, trade policies can also have a negative impact on global food security.

In November 2020, China introduced a series of tariffs on Australian wine, coal, lobsters, and other goods. These tariffs made some products more expensive for people living in China, which could impact their level of food security.

Biofuels

The use of land to produce biofuels rather than food can contribute to food insecurity.

Much of the energy we currently use is from non-renewable sources such as fossil fuels, which will eventually run out. Biofuels were developed as a renewable alternative to overcome this problem. Biofuels are a form of energy made from biological materials such as algae, food crops, grass, trees, and waste material. First-generation biofuels are made from edible crops such as canola, corn, soybeans, and sugarcane, while second-generation biofuels are made from non-food crops and third-generation biofuels are made from algae. The production of biofuels is increasing. The use of land to produce biofuels instead of food can contribute significantly to food insecurity, as first-generation biofuels are made from crops that could be used to feed people. This decreases the amount of available food and, in many instances, drives up the cost of food. Despite these challenges, biofuels have the potential to reduce greenhouse gas emissions and provide energy security.

Watch these videos to learn how technology is being used in Australia to develop non-food-based biofuels:

<https://youtu.be/tPHyYM7UqSo> and <https://youtu.be/Psq9jz7LVNA>

Food Insecurity in Australia

In 2021, the Global Food Security Index listed Australia as the 32nd most food-secure country in the world. The Global Food Security Index is an annual assessment of food security conditions in 113 countries. An assessment is made by looking at the affordability, availability, and quality of food in each country. Other factors, such as climate and availability of natural resources, are also considered.

As shown in the table below, food insecurity in Australia has been gradually declining since 2018. The table also indicates how dire the state of food insecurity is in Australia compared to other countries we assimilate with.

Country	Global ranking	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
United Kingdom	3rd	74.9	76.7	77.3	80.2	79.7	80.1	79.3	80.6	80.6	81.0
United States	=9th	77.8	77.9	80.0	77.7	79.8	80.0	79.5	79.3	80.0	79.1
New Zealand	16th	75.4	77.2	77.2	77.0	78.2	78.3	77.3	78.2	77.7	76.8
Australia	=32nd	70.9	74.4	76.5	75.9	77.1	76.1	78.1	75.9	73.9	71.6

Source: <https://impact.economist.com/sustainability/project/food-security-index/Index>

Food insecure people are more likely to suffer a higher incidence of anaemia, cognitive problems, low nutrient intake, and even mental health issues. Pregnant women experiencing food insecurity are more likely to have babies with congenital disabilities and lower birth weights. Being unable to access culturally appropriate food may also impact a person's ability to connect with their culture and further impact their mental wellbeing.

Watch this video to find out more about food insecurity in Australia: <https://youtu.be/VWp5OAdqzY>

Who Experiences Food Insecurity in Australia?

In 2020, the [Australian Institute of Family Studies](#) reported that around 4–13% of Australians experienced food insecurity. A diverse range of people experience food security in Australia. However, Australians more susceptible to food insecurity include homeless people, Indigenous Australians, low-income earners, migrants and refugees, people living in remote and rural areas, older people, and international university students.

Aboriginal and Torres Strait Islander Peoples

Aboriginal and Torres Strait Islander Peoples in Australia are more likely to experience food insecurity due to factors such as the loss of cultural knowledge and skills, poverty, poor health outcomes, social isolation, and limited access to fresh food in remote communities. Addressing food insecurity requires improving access to healthy and affordable food, addressing all disadvantages, and promoting recognition of Indigenous food systems and knowledge.

Solar Stimulus Project

The World Wide Fund for Nature (WWF) is an international conservation organisation currently working to provide communities living in remote areas of Australia with solar energy. This \$70 million Aboriginal Solar Stimulus project aims to help lower electricity bills for Indigenous Australians, create job opportunities, and promote a sustainable future. It seeks to ensure that all remote communities have reliable, affordable, and accessible access to energy. Without a consistent energy supply, people living in remote areas cannot power fridges and freezers to store food and cook food.

Watch this video that gives an overview of the Solar Stimulus project: <https://youtu.be/SDhtzjxJp78>

Households on single incomes

Households on single incomes can find it challenging to afford sufficient and healthy food, especially in cases where there are additional expenses such as housing, utilities, and medical bills.

People with a disability

People with a disability are more likely to be food insecure due to factors such as limited employment opportunities, lower incomes, and increased medical expenses. These factors can make it difficult to afford sufficient and healthy food, especially when living on a fixed income.

People who are Homeless

For some people, living on a lower income and being unable to find employment can result in homelessness. Food insecurity for homeless people is a significant concern. People without accommodation often sleep on friends' couches, on the streets, or in cars. Food insecurity is exceptionally high among homeless people who do not have a place to store, prepare, and eat food.

Watch this video about how people on lower incomes struggle to pay for living expenses:

<https://youtu.be/6pEGSJO7vEq>

Newly Arrived Migrants and Refugees

Some culturally and linguistically diverse groups may experience food insecurity for a variety of reasons. The foods from their 'home' countries might not be available in Australia. The foods in Australia may be unfamiliar to them, or they may only be able to access foods from supermarkets. They may be unsure how to cook the foods available due to the preparation and storage instructions being written in English.

New migrants and refugees in Australia are more at risk of food insecurity because of a low income. They may initially find it hard to find work if they cannot speak and understand English. They may also have experienced trauma and consequently have physical and mental health conditions that further impact their ability to work. Those that do find work are often employed in low-skilled occupations that pay very little.

Watch this video to gain more understanding of food security issues facing newly arrived migrants in Australia:

<https://youtu.be/zKyturkBKc>

People Living in Remote and Rural Areas

People living in rural and remote areas are more likely to experience food insecurity than those closer to larger towns or cities. People may have an inadequate food supply in rural and remote areas because transporting goods there may be too expensive, particularly when perishable foods need to be stored at specific temperatures. Climate and weather conditions can also make transporting food to these areas impossible.

The cost of transportation and setting up shops in these areas with small populations deters many larger companies from establishing commercial supermarkets and shops. This results in townspeople relying on smaller convenience stores where food is often sold at a higher price and is not very fresh.

A significant portion of Aboriginal and Torres Strait Islanders often live in remote and rural areas, which further increases the likelihood of them experiencing food insecurity.

Watch this video about the cost of food in rural and remote Australia: <https://youtu.be/6an8mMJ6txc>

People on low Incomes

People with a disability are more likely to be food insecure due to factors such as limited employment opportunities, lower incomes, and increased medical expenses. These factors can make it difficult to afford sufficient and healthy

food, especially when living on a fixed income. Additionally, people with a disability may have difficulty accessing food due to physical limitations or transportation challenges.

Young People, particularly those who are unemployed

Young people, particularly those who are unemployed, are more likely to suffer from food insecurity due to a lack of financial resources. Unemployment can also make it difficult to afford sufficient and healthy food, especially for those who are not yet established in the workforce.

Refugees and asylum seekers

Refugees and asylum seekers are more likely to suffer from food insecurity due to factors such as limited access to employment, language barriers, and social isolation. These factors can make it difficult to afford sufficient and culturally appropriate food, especially when adjusting to a new country and culture.

People experiencing homelessness or housing insecurity

People experiencing homelessness are more likely to suffer from food insecurity due to a lack of housing and money. Homelessness and housing insecurity can make it difficult to access sufficient and healthy food, as individuals may not have accommodation where they can store or prepare food. Additionally, people experiencing homelessness or housing insecurity may have limited access to employment, which can make it more challenging to access food.

People living in rural and remote Australia, single-parent families, and older people may experience food insecurity as they are more likely to have lower incomes.

Older Australians, students, and other people on low incomes

Older Australians, students, and other people on low incomes are more likely to suffer from food insecurity due to a lack of money. These groups may have limited income and face high expenses related to housing, healthcare, and other necessities. This can make it difficult to afford sufficient and healthy food.

People living in rural and remote locations

People living in remote and rural locations are more likely to suffer from food insecurity due to limited access to affordable and healthy food options. These areas may have limited grocery stores or food outlets, resulting in higher food prices and limited selection. Additionally, transportation costs can be high, making it difficult to access food from other locations. This can be especially challenging for those living on low incomes, such as Indigenous communities in remote areas.

Proposed Solutions to Food Insecurity in Australia

Improving Equity in Food Access and Distribution in Australia

To address and overcome food insecurity for all Australians, multiple and diverse strategies are needed. Government and organizations at different levels are currently working towards overcoming this issue. A successful program that aims to improve food security should not merely provide food to individuals who are facing food insecurity. Rather, it should address the underlying causes of this problem and equip people with the necessary knowledge and skills to overcome it and prevent its recurrence in the future.

Community Garden Programs

Community gardens are local gardens managed by community members who grow food for themselves and others.

Pakenham Community Garden is a good example of a community garden program. This program provides a space for residents to come together and grow their own food, learn about sustainable gardening practices, and engage with their local community. The garden is in a public park and is run by a volunteer committee. Members of the community can rent a plot of land to grow their own vegetables and fruits, and there are also communal areas for group projects and events. The Pakenham Community Garden is a great example of a community-led initiative that promotes sustainable living and healthy eating habits.

The Food Ladder Project

The National Indigenous Australian Agency is involved in a Food Ladder project helping young Indigenous Australians learn about how to build and grow vegetables in hydroponic greenhouses. This project enables

Indigenous Australians to receive training and employment in horticulture and provides local communities better access to fresh produce, which they can use in their cooking.

Watch this video that provides an outline of the project: <https://youtu.be/X54HNcSnWmk>

Education and skills programs

These programs teach people about nutrition, budgeting, meal planning and growing food.

The Koori Cooking Program

The Koori Cooking Program is a 4-week healthy cooking and eating program initially developed and delivered in Indigenous communities south of Sydney by the Heart Foundation. This program aims to improve food security for people living in Indigenous communities by strengthening their knowledge and skills in healthy cooking on a budget, learning how to make healthier food choices, and understanding food labels.

After participating in the Koori Cooking Program, 70% of participants stated they had improved their eating habits; they ate more vegetables, tried new foods, decreased their salt intake, and only ate when hungry.

Watch this video about a program facilitated by the Heart Foundation to improve food security among Aboriginal and Torres Strait Islanders: <https://youtu.be/LcXFX-JTKM0>

Food Relief Organisations provide food for people who cannot afford it

Foodbank

Foodbank is an organisation that distributes food to those who are food insecure or are at risk of being food insecure. It is the largest food charity organisation in Australia. Businesses, various organisations, and people in the community donate food and a range of household consumables to Foodbank. Foodbank then distributes these items to needy people in multiple ways, including breakfast programs at schools, soup kitchens, and community pantries.

One initiative that Foodbank has introduced to improve food distribution is a mobile Foodbank program. They also work with transport providers and logistics companies to source and distribute food and groceries Australia-wide.

Watch this video to discover more about the mobile Foodbank program: <https://youtu.be/gpQo0SPmprk>

The Asylum Resource Centre

The Asylum Resource Centre is an organisation that assists refugees living in Melbourne. It provides free groceries to around 1000 people, most of whom have no income or are unable to work. For many people seeking asylum, the Asylum Seeker Resource Centre in Melbourne is where refugees can eat a hot meal and receive free groceries to feed their families.

Watch this video to discover how the Asylum Resource Centre addresses food security: <https://youtu.be/EDegGmTF3Mq>

Food Coops are community-based organisations that sell food at discounted prices.

The Peoples Pantry is a food co-op located in Norlane, Victoria, Australia. The co-op was established in 2016 by a group of local volunteers who were concerned about food insecurity in their community. The Peoples Pantry operates as a non-profit organization and aims to provide affordable and healthy food options to residents in the Norlane area.

The co-op offers a variety of products including fresh produce, dry goods, and household items. Members of the co-op can purchase food items at discounted prices by volunteering their time to help with the co-op's operations. The Peoples Pantry also partners with local food producers and suppliers to source their products and support the local economy.

In addition to providing access to affordable food options, The Peoples Pantry also aims to promote community engagement and education about sustainable food practices. The co-op hosts workshops and events on topics such as cooking, gardening, and composting.

Watch this video to find out about The Peoples Pantry: <https://youtu.be/Hb-MD0PcxUs>

Food policy councils consist of representatives from government and the community that improve food security through policy and advocacy efforts. Currently Melbourne is currently updating its Food City Policy to promote a food system that is healthy, sustainable, fair, thriving and inclusive.

Watch this video to find out more about Melbourne's food policy council in Melbourne: <https://youtu.be/DqDITrTctn8>

Food Recovery Programs collect unused food from retailers and distribute it to people in need.

Food is Free

Food Is Free Ballarat is a community-based project that aims to provide fresh, healthy food to its residents in and to encourage the sharing of resources and skills within the community. The project was started in 2014 by a group of volunteers and has since grown to include several garden sites throughout the city.

The project operates on the concept of sharing excess produce from gardens, with a focus on providing free, healthy food to those who might not have access to it. Community members are encouraged to grow and donate produce from their gardens, and the project also receives donations from local businesses and organizations. The food is then distributed through several channels.

In addition to providing fresh food, the Food Is Free Ballarat project aims to build community connections and resilience by fostering a sense of shared ownership and responsibility for the project. Volunteers work together to maintain the garden sites and organize events, workshops, and other activities that promote sustainable living and community engagement.

Watch this video about a community initiative: <https://youtu.be/kWuvZzCn2U0>

Farmers' Pick

Rescuing food that would typically end up in landfills and distributing it at a reduced cost is one way to improve food security in Australia. Farmers' Pick is a Melbourne-based produce delivery service that distributes low-priced fresh produce that does not meet retail standards due to being odd-shaped or blemished to Australian households.

Watch this video about Farmers' Pick and find out how they are improving people's access and distributing nutritious, fresh produce to households: <https://youtu.be/onhusEkzTrE>

SecondBite, OzHarvest, and Foodbank

SecondBite, OzHarvest, and Foodbank are all Australian non-profit organizations that work to reduce food waste and address food insecurity in the community.

SecondBite collects surplus fresh food from food retailers, wholesalers, and farmers and redistributes it to over 1,300 community food programs across Australia, such as schools, charities, and other not-for-profit organizations.

OzHarvest collects excess food from supermarkets, restaurants, and other food businesses and delivers it to over 1,300 charities and schools across Australia. The organization also runs education programs to promote healthy eating and reduce food waste.

Foodbank sources and distributes food and grocery items to over 2,400 charities and community groups across Australia, such as soup kitchens, food pantries, and homeless shelters. The organisation also provides assistance during emergencies and natural disasters.

Government Grants and Subsidies

A subsidy is a sum of money granted by the government or another organisation to help industries, businesses, and/or individuals access a commodity or service at a low price. The government, other companies, and organisations often fund or subsidise programs that help reduce food insecurity for Australians. To be effective, these programs should address as many of the five dimensions of food security as possible.

Outback Stores

Outback Stores is a program developed by large retail businesses and Indigenous Business Australia (a federal government statutory authority). The Australian Government has provided over \$48.1 million to assist in setting up this program. The Outback Stores program helps local communities open and operate retail shops in remote areas. This need arose because of rising nutrition-related health problems, unreliable food suppliers, stores closing because of poor management, and increasing debt in remote communities. The Outback Stores program works with people in rural areas to ensure the community store they establish is financially secure and provides fresh, competitively priced nutritious foods. If the store is not making a profit, the Outback Stores program continues working with the community until their shop is viable and food security is improved.

Outback Stores began in 2006 with one store in Canteen Creek; there are now 27 Outback Stores in Queensland, Western Australia, and the Northern Territory. After almost 15 years, Outback Stores has helped improve food

security in remote areas by ensuring the provision of nutritious foods, providing employment, and stimulating the economy in Indigenous communities.

Click here to find out more about the Outback Store program: <https://outbackstores.com.au/>

Improving Equity in Food Access and Distribution in Australia Using Technology and Innovations

Technology is a broad term used to describe when people use and apply their practical skills and knowledge of science, engineering, and industry-based skills (using tools and machinery) to design and invent things that solve problems. Australians often share their technological expertise and innovations to help improve global food security.

There are numerous types of technological innovations aimed at improving food security, and the following list of technologies will be discussed at various points throughout this learning outcome.

- Online cooking and educational programs
- Mobiles Apps
- Use of Big Data
- Agricultural Biotechnology (AgriTech)
- Artificial Intelligence
- Cell-based, lab-grown, synthetic or 3D printed meat
- Drone and GPS Technologies
- Internet of Things (IoT)
- Nanotechnology
- Solar Technology
- Sonar (sound navigation and ranging) technology, shockwaves, ultrasounds and satellite imagery

Online Cooking and Educational Programs

One online cooking program and education program that has helped address food insecurity in Australia is the "Community Kitchen Program" by Oz Harvest.

Oz Harvest is a food rescue organization in Australia that collects excess food from restaurants, supermarkets, and other food providers, and distributes it to charities that feed people in need. As part of their mission to reduce food waste and hunger, they also offer the Community Kitchen Program, which is a free cooking and nutrition education program for vulnerable communities. The Community Kitchen Program has been successful in addressing food insecurity in Australia by empowering vulnerable communities with the knowledge and skills to prepare healthy meals using affordable ingredients.

Mobile Apps

The Good Tucker App

The Good Tucker App is a government-funded App that is free of charge and available for everyone. However, it was developed to help remote Aboriginal and Torres Strait Islander communities make healthier food and beverage choices. Users scan a food product's barcode with their mobile phone; the App reveals a thumbs up symbol if the food is healthy, a sideways thumb symbol if it is okay to eat in small amounts, and a thumbs down symbol if it should be avoided altogether.

Watch this video that shows an Outback Store in remote Australia and an App they use to help people in their communities choose healthier food products: <https://youtu.be/nA1xuHQC1T0> or <https://www.youtube.com/watch?v=IF3UC23gj-Y>

Use of Big Data

The Use of Big Data refers to using of specialised software and tools that collect and process large amounts of data from a range of sources.

Here are some other examples of how Big Data is being used to address food insecurity.

Government agencies: Government agencies in Australia are using big data to monitor food security and to identify areas where food insecurity is prevalent. By collecting data from various sources, such as census data, weather patterns, and food prices, government agencies can make informed decisions about where to allocate resources to address food insecurity.

Non-governmental organisations (NGOs): NGOs in Australia are using big data to improve their food assistance programs. By analysing data on food donations, distribution channels, and client demographics, NGOs can optimize their programs to ensure that they are reaching those who need them the most.

Food retailers: Supermarkets and other food retailers are using big data to optimize their supply chains and reduce food waste. By analysing data on consumer demand, inventory levels, and transport logistics, retailers can ensure that food is delivered to where it is needed most, reducing the likelihood of shortages and waste.

Technology companies: Technology companies in Australia are developing innovative solutions to address food insecurity using big data. For example, some companies have developed apps that help connect food donors with food banks and other organizations that distribute food to those in need.

Watch this video to find out more about Big Data: <https://youtu.be/TzxmjbL-i4Y>

Written Activity One

Question Time

Global Food Insecurity

1. What are the potential consequences of the projected global population increase by 2050 and 2100 on food security and the environment?

2. How do the five interconnected dimensions of food security contribute to ensuring access to sufficient and nutritious food for all? Briefly discuss each dimension in your response.

3. What are the specific ways in which climate change impacts food security globally, considering changes in weather patterns and extremes?

4. How does income inequality affect individuals' access to quality food and contribute to food insecurity, and what measures can address this issue?

5. What are the environmental challenges associated people's diets in general, and how do they impact global food security?

6. How does urbanisation impact local primary food production and accessibility to fresh and nutritious food in urban areas? What could be done to ensure people living in these areas can access a stable supply of nutritious food?

7. Why is it problematic to send food waste to landfills instead of composting it?

8. Monoculture can result in soil degradation. Why does it affect crop yields, ultimately impacting global food security?

9. How do supply chain interruptions, such as conflicts or pandemics, disrupt global food security?

10. How does the utilisation of consumable food as a biofuel source contribute to food insecurity, and what are some alternative sources of biofuels that could potentially impact food security differently?

Who experiences food insecurity in Australia?

1. Which specific groups in Australia are particularly vulnerable to food insecurity? Briefly outline why these groups are particularly vulnerable to food insecurity.

2. Food insecurity has a significant impact on Aboriginal and Torres Strait Islander Peoples in Australia. What factor/s contribute to this impact?

3. The Solar Stimulus project is an initiative led by the Worldwide Fund for Nature (WWF) aimed at providing solar energy to remote Indigenous communities in Australia.

How might a program like this address food insecurity in remote Indigenous communities?

4. What are some challenges faced by newly arrived migrants and refugees in terms of food security? Provide an example of a strategy to address food insecurity for newly arrived migrants and refugees.

5. Why are people living in rural and remote areas more likely to experience food insecurity, and what are some contributing factors? Provide an example of a strategy to address food insecurity in these regions.

Proposed Solutions to Food Insecurity in Australia

1. How does the Pakenham Community Garden program contribute to improving equity in food access and distribution in Australia?

2. How might the Koori Cooking Program address the underlying causes of food insecurity among Indigenous communities?

3. What is the Asylum Resource Centre and how does it assist refugees and asylum seekers in alleviating food insecurity?

4. Why are food co-ops like The Peoples Pantry important in improving food security in local communities?

5. What role do organisations like SecondBite, OzHarvest, and Foodbank play in reducing food waste and addressing food insecurity in Australia?

6. How do government grants and subsidies contribute to improving equity in food access and distribution in Australia?

Improving Equity in Food Access and Distribution in Australia Using Technology and Innovations

1. How has the "Community Kitchen Program" by Oz Harvest used online cooking and educational programs to address food insecurity in Australia?

2. What is the purpose of the Good Tucker App, and how does it assist remote Aboriginal and Torres Strait Islander communities in making healthier food choices?

3. How is Big Data being used by government agencies in Australia to monitor and address food insecurity?

4. In what ways are non-governmental organizations (NGOs) in Australia utilizing Big Data to improve their food assistance programs?

5. How are food retailers in Australia utilizing Big Data to optimise their supply chains and reduce food waste?

Written Activity Two

The Big Debate

Instructions:

- You will work in groups of 6-8 to debate a question related to food insecurity.
- Half of your group will form Team A (Agree) and the other half will form Team B (Oppose).
- Each team will need a researcher, speaker and rebuttal specialist.
- You will have 30 minutes to research and prepare your arguments.
- You will need to research some supporting evidence, examples, and relevant data to strengthen your argument.
- You will need to consider both sides of the debate to anticipate counterarguments.

Each group will consist of a researcher, first speaker, second speaker and a third speaker.

Debate Topic: Providing food and meals to people is the most effective way of reducing food insecurity.

This debate topic explores the effectiveness of providing food and meals as a means of reducing food insecurity. One team will argue in favour of this statement, while the other team will argue against it.

Here's how the debate can be structured:

- Team A (Affirmative Side): Providing food and meals is the most effective way of reducing food insecurity.
- Team B (Negative Side): Alternative approaches are more effective than solely providing food and meals in reducing food insecurity.

Speech Sequence:

Team A - First Affirmative Speaker:

- Presents the opening statement for the affirmative side, supporting the idea that providing food and meals is the most effective way of reducing food insecurity.
- Introduces arguments highlighting the benefits of food provision programs and their impact on immediate food needs.
- Provides supporting evidence, examples, and case studies.

Team B - First Negative Speaker:

- Presents the opening statement for the negative side, arguing that alternative approaches are more effective than solely providing food and meals in reducing food insecurity.
- Counters the arguments presented by Team A's first speaker.
- Introduces alternative strategies, such as income support, education, and capacity-building initiatives, to address the root causes of food insecurity.
- Provides supporting evidence, examples, and case studies.

Team A - Second Affirmative Speaker:

- Delivers a rebuttal speech in response to the arguments raised by Team B's first speaker.
- Challenges and refutes the points made by the negative side, emphasizing the immediate relief and nutritional impact of food provision programs.
- Reinforces the main arguments supporting the effectiveness of providing food and meals.
- Provides additional evidence, examples, and case studies.

Team B - Second Negative Speaker:

- Delivers a rebuttal speech in response to the arguments raised by Team A's second speaker.
- Challenges and refutes the points made by the affirmative side, highlighting the long-term impact of alternative approaches on reducing food insecurity.
- Reinforces the main arguments supporting the effectiveness of alternative strategies.
- Provides additional evidence, examples, and case studies.

Team A - Third Affirmative Speaker:

- Delivers the closing statement for the affirmative side.
- Summarises the main arguments supporting the effectiveness of providing food and meals in reducing food insecurity.
- Reiterates the key points made by the affirmative team.
- Makes a final persuasive appeal to the audience.

Team B - Third Negative Speaker:

- Delivers the closing statement for the negative side.
- Summarises the main arguments supporting the effectiveness of alternative approaches in reducing food insecurity.
- Reiterates the key points made by the negative team.
- Makes a final persuasive appeal to the audience.







Throughout the debate, students should use evidence, statistics, and real-life examples to support their arguments and engage in respectful and constructive dialogue. The debate will provide an opportunity to critically analyze the effectiveness of providing food and meals in reducing food insecurity and explore alternative approaches to address the issue.

Written Activity Three

De Bono's Thinking Hats Analysis

Select one of these resources to watch and analyse:

- When food becomes scarce: <https://youtu.be/KIEOuKD9KX8>
- Outback Store program: <https://outbackstores.com.au/>
- Farmers' Pick: <https://youtu.be/28nFAhhVH7Y>
- Food is Free: <https://youtu.be/kWuvZzCn2U0>
- Melbourne's Food Policy: <https://youtu.be/DqDITrTctn8>
- The Peoples Pantry: <https://youtu.be/Hb-MD0PcxUs>
- Asylum Resource Centre addresses food security: <https://youtu.be/EDegGmTF3Mg>
- The Mobile Foodbank program: <https://youtu.be/gpQo0SPmprk>

White Hat 	What issue is raised in this video? What is the issue?
Yellow Hat 	What are the good things about this?
Black Hat 	What are the negative things about this?
Red Hat 	How do you think people feel about this?
Green Hat 	How can we solve this problem? What are some solutions?
Blue Hat 	What needs to happen now?

Written Activity Four

Key Issues Analysis

Addressing Key Challenges in Feeding a Rising World Population

The goal of this activity is to understand the key issues that hinder food security and explore technological solutions to address them.

In small groups, choose one of the following key issues that pose challenges in feeding a rising world population:

- Low incomes
- Living in remote regions
- Being a refugee or migrant
- Impact of war and conflict
- Production of biofuels
- Loss of farmland
- Lack of water

Conduct some research on your chosen key issue so you can answer the following questions:

a) How does this issue relate to food security?

b) How could this issue be solved using technology?

c) Why would implementing this solution contribute to improving equity, food access, and distribution for individuals facing food insecurity?

You need to provide well-reasoned and supported responses based on research findings. You can include examples, statistics, and real-world case studies to enhance their explanations.

Present your research findings to the rest of the class.

Encourage them to discuss the similarities and differences in their chosen key issues and the potential technological solutions they identified.

Practical Activity One

Food Security Kitchen Challenge

In this activity, you will work in pairs to prepare a meal for two using limited resources and staple ingredients commonly found in food donation hampers. The goal of this task is to raise awareness about food insecurity and stimulate creative problem-solving in the kitchen.

Instructions:

Form a pair with another student.

Your teacher has placed some cards face down on a table.

Select one of the cards. The card lists the ingredients you will have available for this task.

The following staple ingredients will be available:

- Flour
- Oil
- Bread
- A selection of herbs and spices
- Tomato Sauce
- Salt and pepper
- butter

Select five utensils or equipment:

- 1 cooks knife
- 1 wooden or silicone spatula
- 1 plate
- 1 frypan
- 1 egg flip or spatula
- 1 chopping board
- 1 set of eating cutlery
- 1 oven-proof dish
- 1 sieve
- 1 bowl
- 1 medium-sized saucepan

Select two cooking appliances:

- Stove top
- Microwave
- Grill
- Oven
- Steamer
- Rice cooker

To add to the experience of this activity, you will only have 4 litres of water to use for this entire activity. This water will need to be used for drinking, food preparation and cleaning.

Discussion and Planning:

- Share the card you selected with your partner.
- Engage in a discussion to decide what dish you want to cook using the limited resources available to you.
- Consider what is listed as available on the ingredient card as well as the staple items (for example, flour, spices, herbs, and oil) that your teacher has provided.
- Consider the cooking utensils and equipment, cooking appliance, and the amount of water provided to you.
- Brainstorm creative ways to combine the ingredients and make the most of the available resources.

Meal Preparation:

- Work together to plan and prepare your chosen dish.
- Incorporate the ingredients and resources you have at hand. Use appropriate cooking techniques, adapt recipes if needed, and be creative with the limited resources to create a flavourful and nutritious meal.

Presentation, Reflection and Discussion:

- Once your dish is cooked, present it to the class.
- Explain the ingredients used, the cooking process, and any challenges or adaptations made due to the limited resources.
- Share insights and reflections about the experience and its connection to food insecurity with the rest of the class:
 - How did the activity make you feel? Did it provide you with a better understanding of the difficulties faced by individuals experiencing food insecurity? Explain your thoughts.
 - What strategies did you employ to make the most of the available resources? How did these strategies reflect the resourcefulness and creativity needed in real-world situations of food insecurity?
 - Did the activity change your perspective or deepen your understanding of food insecurity? If so, in what ways? If not, what were your expectations and how were they met or not met?

- How might the activity and your experience in preparing a meal with limited resources influence your future food choices, cooking practices, or empathy towards individuals facing food insecurity?
- In what ways did the activity highlight the importance of equitable access to nutritious food? How did it emphasise the need to address systemic issues and promote sustainable solutions to ensure food security for all?

Practical Activity One

Food Security Kitchen Challenge Cards

Group 1

1 can of corn and peas
1 small can of diced capsicum
1 small can of Cannellini Beans
Can of crushed tomatoes
1 can whole baby potatoes

Group 2

1 packet chicken noodle soup
1 can stir fry mixed vegetables
1 small tin diced capsicum
1 packet of noodles
1 can shredded chicken breast in Springwater

Group 3

1 can Mexican Style Three Bean Mix
1 packet dehydrated peas
1 small tin sliced beetroot
1 small tin diced capsicum
1 packet cous cous

Group 4

1 can of corn and peas
1 small tin diced capsicum
1 small tin sliced beetroot or okra
1 small tin edamame beans
White rice

Group 5

1 small tin tuna
1 small packet pasta
1 small block Dairy Lea Cheddar Cheese (shelf life)
1 can of corn and peas
1 small tin diced capsicum

Practical Activity Two

Food Security Choices: Shelf-Stable vs. Fresh

In today's activity, we will be exploring the topic of food insecurity and its impact on individuals and communities. Food insecurity is a pressing issue that affects many people around the world, including some regions within Australia.

One of the challenges faced by individuals experiencing food insecurity is limited access to fresh and perishable food items. Fresh produce, such as fruits, vegetables, and meat and dairy food, can be expensive, less available, or difficult to store in certain circumstances. As a result, individuals may rely on shelf-stable or canned food options as a more accessible and affordable alternative.

Today, we will be comparing a shelf-stable meal to a similar fresh one. By analysing the nutritional aspects, sensory attributes, and overall experience of these meals, we can gain insights into the challenges faced by individuals with limited access to fresh food and explore potential solutions to address food insecurity effectively.

You will work in a group of four to make both pasta bake recipes below. Once the pasta bakes are ready you will conduct a nutritional and sensory analysis of both dishes.

Pasta Bake – Shelf-Life Version

Ingredients:

- 1 cup canned chicken breast or canned tuna, fish or salmon (drained)
- 1 cup pasta (such as penne or macaroni)
- ¼ cup canned corn and peas
- ¼ can condensed cream of mushroom or chicken soup
- ¼ cup UHT milk
- ¼ cup shredded cheddar cheese, Dairyless shelf-life
- ¼ teaspoon garlic powder
- ¼ teaspoon dried thyme
- ¼ teaspoon dried parsley
- Salt and pepper to taste
- Optional toppings: dried breadcrumbs, grated Parmesan cheese, chopped fresh parsley

Instructions:

1. **Preheat** your oven to 190°C. Lightly **grease** a small baking dish.
2. **Cook** the pasta and canned vegetables according to the package instructions. Set aside.
3. In a bowl, **combine** the condensed cream of mushroom or chicken soup, milk, shredded cheddar cheese, garlic powder, dried thyme, salt, and pepper. **Mix** well until all the ingredients are evenly incorporated.
4. In the prepared baking dish, **layer** the cooked chicken or tuna, cooked pasta, and frozen mixed vegetables.
5. **Pour** the soup mixture over the ingredients in the baking dish, making sure to cover everything.
6. If desired, **sprinkle** a layer of breadcrumbs and grated Parmesan cheese on top for a crunchy topping.
7. **Cover** the baking dish with foil to prevent excessive browning.
8. **Bake** in the preheated oven for 20 minutes.
9. **Remove** the foil and continue baking for an additional 10-15 minutes, or until the top is golden and bubbly.
10. Once baked, **let** the Chicken or Tuna Bake cool for a few minutes.
11. **Garnish** with dried parsley and **serve**.

Pasta Bake – Fresh Version

Ingredients:

- 1 cup chicken breast or fresh tuna, fish or salmon, shredded
- 1 cup pasta (such as penne or macaroni)
- ½ cup fresh mixed vegetables, 1cm x 1cm cubes
- ½ cup fresh mushroom, sliced
- 2 tablespoons + 2 teaspoons butter
- 2 tablespoons all-purpose flour
- 1 cup milk
- ½ cup shredded cheddar cheese
- ½ garlic clove, crushed
- 2 sprigs thyme, finely chopped
- 2 sprigs parsley, finely chopped
- Salt and pepper to taste
- Optional toppings: breadcrumbs, grated Parmesan cheese, chopped fresh parsley

To cook the pasta:

1. **Fill** a large pot half full with water.
2. **Place** the pot on the stove over high heat and **bring** the water to a rolling boil.
3. Once the water reaches a vigorous boil, **add** a pinch of salt. This helps to season the pasta and enhance its flavour.
4. Carefully **add** the pasta to the boiling water, ensuring it is fully submerged. **Stir** gently to prevent the pasta from sticking together.
5. **Cook** the pasta until it reaches your desired level of doneness.
6. **Test** the pasta for doneness by carefully removing a strand or piece from the pot using a slotted spoon or tongs. **Allow** it to cool slightly, then taste it. The pasta should be tender but still slightly firm to the bite (al dente).

Once the pasta is cooked to your desired texture, immediately **drain** it in a colander or use a pasta scoop to remove it from the pot. **Shake** the colander gently to remove excess water.

To cook the vegetables:

1. **Fill** the bottom pot of the double steamer with about 1-2 inches of water. **Make sure** the water level is below the bottom of the steamer basket or insert.
2. **Place** the pot on the stove over medium heat and bring the water to a simmer. The water should be gently simmering, not boiling vigorously.
3. Meanwhile, **wash** the vegetables, **peel** (if desired) and **cut** them into desired sizes. Ensure they are evenly sized for even cooking.
4. Once the water is simmering, carefully **place** the vegetables in the steamer basket or insert.
5. **Cover** the pot with the lid, ensuring it fits tightly to trap the steam inside.
6. **Steam** the vegetables for approximately 5 to 10 minutes or until they are tender but still retain some crispness.

Carefully **remove** the steamer basket or insert from the pot using oven mitts or tongs. **Set** the vegetables aside.

To make the pasta bake:

1. **Preheat** your oven to 190°C. Lightly grease a small baking dish.
2. **Heat** a frypan on a medium heat. **Melt** the butter.
3. **Add** the sliced mushrooms and **sauté** until they release their moisture and become tender.
Remove the mushrooms from the pan and **set aside**.
4. In the same saucepan, **add** the flour and **whisk** continuously for 1-2 minutes to form a roux.
Remove the saucepan from the heat.
5. Gradually **pour** in the milk while whisking continuously to avoid lumps.
6. **Return** to the heat. **Cook** for a few minutes until the sauce thickens. **Stir** constantly.
Remove the saucepan from heat and **stir** in the shredded cheddar cheese until melted and smooth.
Season with garlic, thyme, salt, and pepper.
7. In the prepared baking dish, **layer** the cooked chicken or fresh tuna, cooked pasta, steamed vegetables, and sautéed mushrooms.
8. **Pour** the homemade creamy sauce over the ingredients in the baking dish, making sure to cover everything.
9. If desired, **sprinkle** a layer of fresh breadcrumbs and grated fresh Parmesan cheese on top for a crunchy topping.
10. **Cover** the baking dish with foil to prevent excessive browning. **Bake** in the preheated oven for 20 minutes.
11. **Remove** the foil and **continue** baking for an additional 10-15 minutes, or until the top is golden and bubbly.
12. **Garnish** with freshly chopped parsley and **serve**.

Nutritional Analysis of Shelf-life and Fresh Pasta Bake

Answer the questions below based on your observations, analysis, and information from food labels and ingredient lists.

Guideline 2: Enjoy a wide variety of nutritious foods from these five groups every day.

- a. Identify the food groups represented in each pasta bake.

Food Groups	Shelf-life version	Fresh Version
Grains		
Vegetables		
Fruits		
Meat and Meat Alternatives		
Dairy and alternatives		
Use small amounts		
Only sometimes and in small amounts		

- b. How well do the pasta bakes align with Guideline 2 in terms of incorporating a variety of food groups?

Guideline 3: Limit intake of foods containing saturated fat, added salt, added sugars, and alcohol.

- a. Using your knowledge and the food labels of the packaged foods, compare the saturated fat content of the food in each pasta bake.

- b. Using your knowledge and the food labels of the packaged foods, compare the sodium (salt) content of the food in each pasta bake.

- c. Using your knowledge and the food labels of the packaged foods, compare the sugar content of the food in each pasta bake.

The Australian Guide to Healthy Eating

- a. How do the nutritional profiles of both pasta bakes meet the nutritional efficacy of the Australian Guide to Healthy Eating?

Consider the overall balance and proportions of the different food groups.

Sensory Analysis of Shelf-life and Fresh Pasta Bake

Assess the sensory aspects of both pasta bakes.

Taste

- a. How would you describe the taste of the shelf-stable pasta bake?

- b. How would you describe the taste of the fresh pasta bake?

- c. Did either pasta bake have an overly salty or sweet taste?

Texture

- a. Compare the texture of the shelf-stable pasta bake to the fresh pasta bake. How do they differ?

- b. Did the texture of either pasta bake impact your enjoyment of the dish?

Appearance

- a. Describe the appearance of the shelf-stable pasta bake.

- b. Describe the appearance of the fresh pasta bake.

- c. Did the appearance of either pasta bake influence your perception of the meal?

Aroma

- a. What aromas were present in the shelf-stable pasta bake?

- b. What aromas were present in the fresh pasta bake?

- c. Did the aroma of either pasta bake enhance or detract from the overall experience?

Overall Enjoyment

- a. Which pasta bake did you find more enjoyable overall?

- b. Explain the factors that influenced your preference for one pasta bake over the other.

Reflection Questions:

- a. Based on your assessment of the nutritional and sensory aspects, discuss the strengths and weaknesses of the shelf-stable pasta bake compared to the fresh pasta bake in relation to the Australian Dietary Guidelines.

- b. Consider the challenges and benefits of using shelf-stable ingredients in creating a nutritious and satisfying meal. How might these challenges impact individuals facing food insecurity?

- c. How could technology and innovation contribute to improving the nutritional quality and sensory experience of shelf-stable meals while still meeting the Australian Dietary Guidelines?

Summary Activity

Adequately Feeding a Rising World Population

What is the main idea about this key knowledge & key skill? (Two or three sentences in your own words)

What are the five interconnected dimensions of food security that need to be achieved?

Why is the increasing world population a concern in relation to global food security?

How does food equity differ from food equality, and why is food equity important in today's food systems?

What are three factors that contribute to global food insecurity and why do they impact global food security?

What are three specific groups of people in Australia that are more susceptible to food insecurity and why do they face food security challenges?

What are three proposed solutions to address food insecurity in Australia, and how do they aim to tackle the underlying causes of the issue?

How is technology, particularly online cooking programs, mobile apps, and the use of big data, being used to improve equity in food access and distribution in Australia?

Exam Preparation

Multiple-Choice Questions (5 marks)

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

1. Which concept recognises that different individuals have different food needs based on their situation and factors such as culture, education, income and sex?
 - a. Equality
 - b. Equity
 - c. Fairness
 - d. Effectiveness
2. Which of the following factors contributes to global food insecurity?
 - a. Urbanisation and urban sprawl
 - b. Consumption of processed foods
 - c. Soil degradation
 - d. All of the above
3. How can trade policies impact have a positive impact on global food security?
 - a. Trade policies can promote free trade and decrease food choices and affordability.
 - b. Trade policies can impose high taxes on imported food, making it more expensive.
 - c. Trade policies can promote market competition and reduce the cost of food.
 - e. All of the above.
4. What factors contribute to an increased likelihood of experiencing food insecurity in Australia?
 - a. Limited employment opportunities and lower incomes.
 - b. Reduced food waste and loss.
 - c. Stable and reliable food supply chains.
 - d. Climate resilience and adaptation strategies.
5. What is one example of how big data is being used to address food insecurity in Australia?
 - a. Monitoring food security and identifying areas of food insecurity by analysing census data, weather patterns, and food prices.
 - b. Developing mobile apps for remote communities to make healthier food choices.
 - c. Offering free cooking and nutrition education programs for vulnerable communities.
 - d. All of the above.

Short Answer Questions (15 marks)**Question 1** (3 marks)

Identify one the five interconnected dimensions of global food security and explain how it contributes to ensuring a sufficient and sustainable food supply for the world's increasing population. Provide an example of this dimension of global food security.

Question 2 (5 marks)

Explain the difference between food equity and food equality.

Question 3 (4 marks)

Read the case study below:

In regional Victoria, Australia, the "Food for All" initiative was launched to address food security issues and improve access to nutritious food in rural communities. The initiative aimed to enhance food security through a multi-faceted approach involving community engagement, local food production, and collaboration with various stakeholders.

Describe two strategies and initiatives that the "Food for All" could implement that could enhance food security in regional Victoria.

Question 4 (3 marks)

Identify one way that technology and innovation can be used to address equity in food access and distribution. Explain how this technology and innovation can be used to improve equity in food access and distribution.