NSW GOVERNMENT

Department of Primary Industries

Australian Hamburgers

Technology Mandatory

Area of Study - Agriculture and Food Technologies

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DPI in SCHOOLS

Design Folio

Supporting document

NSW DPI Schools Program

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Contents

Information for teachers

Syllabus context – Agriculture and food technologies

This Australian Hamburger unit of work is mapped to outcomes from *Agriculture and Food Technologies* context of the NSW Technology Mandatory (2017) syllabus. It integrates content from agriculture (food and fibre production) and food technologies to enable delivery considering the school context and available resources.

Agriculture (food and fibre production) focuses on investigating managed environments, such as farms and plantations. Students learn about the processes of food and fibre production and investigate the innovation and sustainable supply of agriculturally-produced raw materials. Students develop deep knowledge and understanding about managed systems that produce food and fibre through designing and producing solutions.

Food technologies focuses on the use of resources produced and harvested to sustain human life. Students learn about the characteristics and properties of food. Students develop knowledge and understanding about food selection and preparation, food safety and how to make informed choices when experimenting with and preparing nutritious food.

Source: NESA, 2017. Technology Mandatory Syllabus.

Learning outcomes

This unit of work provides students with the opportunity to investigate the importance of Australian agricultural production to our society and gain a broad understanding of some of our main agricultural industries including: beef, sheep, poultry, pork, cropping (wheat) and horticulture.

Resource description

The Australian Hamburgers unit of work consists of three resources including a workbook, an answer guide, and a design folio.

These resources are designed to be used together. However, teachers are advised to alter the resources to suit the learners, school facilities and individual skills.

The unit of work has been designed as a digital resource, so to research all information and complete the learning activities, students will require access to the internet to follow embedded links throughout the documents.

Glossary

Term	Definition
Aesthetic	Aesthetic judgement is concerned with the visual impact or appeal of a product or environment and is influenced by social, emotional and demographic factors.
Criteria for success	A descriptive list of essential features against which success can be measured.
Design brief	A concise statement clarifying a project task and defining a need or opportunity to be resolved after some analysis, investigation and research. It usually identifies users, criteria for success, constraints, available resources and timeframe for a project and may include possible consequences and impacts.
Design process	A process that typically involves investigating and defining; generating and designing; producing and implementing; evaluating; and management to create a designed solution.
Design solution	A product, service or environment that has been created for a specific purpose as a result of design thinking, design processes and production processes.
Designing	A process that typically involves investigating and defining; generating; producing and implementing; evaluating; and collaborating and managing to create a designed solution.
Evaluating	Measuring performance against established criteria. Estimating nature, quality, ability, extent or significance to make a judgement determining a value.
Functionality	Design of products, services or environments to ensure they are fit for purpose and meet the intended need and identified criteria for success. Criteria for success in relation to functionality are likely to include such things as operation, performance, safety, reliability and quality. That is, does the product, service or environment do what it was meant to do, or provide what it was meant to provide? (For example, does the torch provide light, is it easy to hold, and is it safe to use?)
Material	A substance from which a thing is or can be made. Natural (e.g. animals, food, fibre, timber, mineral) and fabricated (e.g. metal alloys, plastics, textiles, composites) materials. Materials are used to create products or environments and their structure can be manipulated by applying knowledge of their origins, structure, *characteristics*, *properties* and uses.
Paddock to plate	All steps in the growing, processing and preparation of food.
Product	Products are the end results of natural, human, mechanical, manufacturing, electronic or digital processes to meet a need or want.
Resources	In Design and Technologies, this includes technologies, energy, time, finance and human input.
Risk management	A practice of identifying potential risks in advance, analysing them and taking precautionary steps to reduce the risk. Risk management involves risk identification, analysis, response planning, monitoring, controlling and reporting.
Technologies	Materials, data, systems, components, tools and equipment used to create solutions for identified needs and opportunities, and the knowledge, understanding and skills used by people involved in the selection and use of these.

Source: Adapted from the Australian Curriculum (ACARA) Glossary

Australian Hamburgers – the design process

Design situation

Food is a large part of our lives and culture. Every day we are given choices for the selection of the food we consume. In Australia we are very lucky, as we live in a country where we have the option to grow or buy our own healthy, delicious, affordable and environmentally sustainable fresh produce, to satisfy our culinary desires and nutritional needs.

Whether it's our fascination with America or just our general love of affordable and accessible food, burgers have become a popular choice in Australia throughout the mid to late 20th century since their introduction in milk bars and fast food chains.

Fast food burgers have traditionally been viewed as a convenient—but often not so healthy—food option. Burgers are easy to cook and eat, and by including healthy ingredients can provide a nutritious and balanced meal.

***THINK ABOUT* how you can design, prepare and produce a burger that is healthy and uses only home-grown or Australian grown produce to support our farmers.**

Design brief

Use your skills in food preparation and knowledge of the nutritional value of food to design and produce a healthy Australian agriculture 'paddock to plate' burger.

Constraints

- Use at least one ingredient from each of the seven Australian agricultural industries studied.
  - Wheat and cropping
  - Beef
  - Dairy
  - Horticulture
  - Sheep meat and wool
  - Poultry meat and eggs
  - Pork
- Grow or produce at least two of the ingredients in your own school garden.
- Use research to only select healthy Australian grown ingredients and products.
- Use research and practical skills to select healthy cooking and preparation techniques specific to your chosen ingredients.

Design folio production

Your design folio is an important communication tool for design projects. It should show the journey of your design project's development, from recording your first rough ideas on paper, to the final evaluation of your design brief solution.

The design and production process

Throughout this unit, you will explore and learn about design process and how to apply it in your design project. The folio will assist you to work through the design process.

The design and production process:

- Involves a sequence of organised steps that provide a solution to design needs and opportunities
- May take a few seconds or minutes, or years depending on the complexity of the task
- May involve one person or many people
- May be simple or complex, depending on the task
- Involves the designer questioning (or evaluating) throughout the process (Department of Education, 2018)

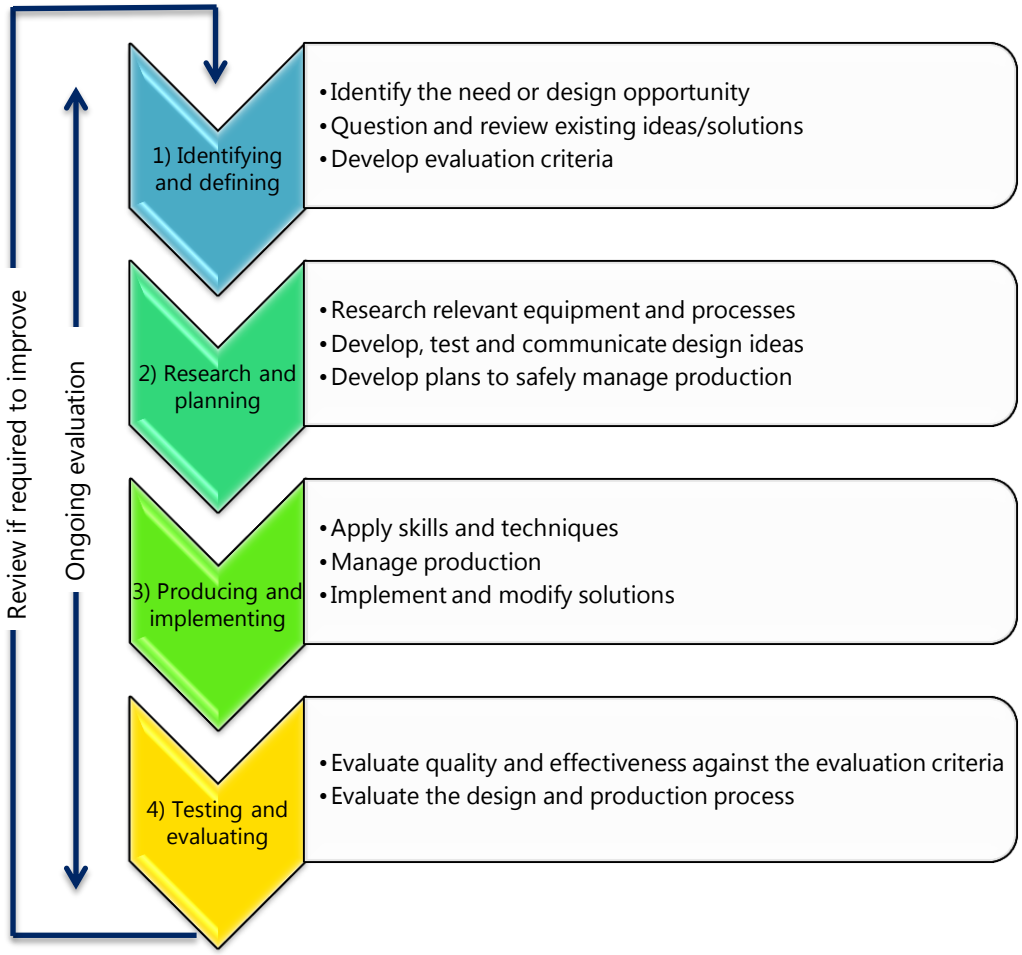


Figure 1 the design and production process. Source Department of Education, 2018, Crack the Code

Design activities

1. Identifying and Defining

Thinking about the design brief

Underline circle or highlight words in the design brief that give you specific information or instructions.

Design brief: Use your skills in food preparation and knowledge of the nutritional value of food to design and produce a healthy Australian agriculture 'paddock to plate'

Criteria for success

In order to complete this project, what will you need to do? Make a list of the things you believe will make your project a success. Add more lines if required.

☑ _____

☑ _____

☑ _____

☑ _____

☑ _____

☑ _____

☑ _____

Prior knowledge

What knowledge and skills do you already have that you could use to solve the problem or make the product?

- **I know** _____
- **I can** _____

Probe

What are the gaps in your knowledge? What else do you need to find out about the problem before you start?

_____

_____

Personal goals

What new skills and or information will you need to learn to complete this project?

_____

_____

Question and review existing ideas and solutions - group activity

1. **In groups brainstorm 'hamburgers'. Ideas to think about include: ingredients, taste, types, marketing, packaging, availability, aesthetics, price, nutrition.**
2. **Make a list of possible ingredients and types of burgers.**
3. **For the ingredients you chose in question 2, identify which industries they come from.**
4. **Propose a list of alternative ingredients and burger types.**
5. **Make a list of ingredients you might grow to include in your burger.**

2. Research and planning

Learning activity - Agricultural industries

You have discussed the ingredients found in hamburgers and which agricultural industries they come from.

1. **Choose TWO ingredients from plants and TWO ingredients from animals and complete the following tables:**
   Plant ingredient 1_____ Plant Ingredient 2_____

	Plant ingredient 1	Plant ingredient 2
Name the agricultural industry that produces this ingredient		
Where in NSW is it grown?		
When is it grown?		
Name 3 different varieties of the plant		
How many hectares of land is used in NSW to produce the plant?		
How many tonne is harvested each year in NSW?		
How long does it take to grow from planting to harvest?		
Describe how the plant is grown – include soil, plant spacing, needs during the growing period (for example fertilising and spraying)		
Name the agricultural industry that produces this ingredient		

Animal ingredient 1_____ Animal Ingredient 2_____

	Animal ingredient 1	Animal ingredient 2
Name the agricultural industry that produces this ingredient		
Where in NSW is this ingredient produced?		
How many of these animals were in NSW last year?		
Name 3 different breeds of this animal type?		
How many tonnes of this animal were processed last year?		
Give a brief description of how the animal product is produced		
How much money was made from this product in NSW last year?		
What is the export value of this animal?		
What countries does Australia export this animal to?		
What other products come from this animal?		

Learning activity - Intensive or extensive?

Australian farming systems can be carried out in two ways, as intensive or extensive systems.

1. **Select one type of intensive farming and one type of extensive farming and investigate the advantages and disadvantages of each system. Present your findings in the space below. Include pictures where possible.**

Intensive agriculture

Advantages	Disadvantages

Extensive agriculture

Advantages	Disadvantages

Learning activity - What is in a hamburger?

1. **List at least 5-8 ingredients you would like to include in your burger. Research these ingredients to complete the table below.**

Ingredient	Calories	Protein	Fat	Cholesterol	Sodium	Sugar

2. **Make a comment about the ingredients you have chosen. Do you think they are all healthy options or do you need to make some changes?**

   _____

   _____

3. **What other factors may come into action when deciding what to put on your hamburger?**

   _____

   _____

4. **Give a final list of the ingredients you will put on your burger.**

   _____

   _____

   _____

   _____

Learning activity - What to grow in the garden?

As part of the major design project you will need to grow and harvest at least two ingredients for your burger from your own school garden.

Things you need to think about before you decide what to grow:

- time of the year
- time it takes to harvest
- space you have
- what you like to eat

Find a list of vegetables that you can grow in your local climatic conditions. Investigate the Australian Bureau of Meteorology to investigate your local climate.

For each plant, you will also need to know:

- best sowing method
- sowing depth
- spacing between plants and rows
- how to care for your plants (fertiliser, water, sunlight and other management requirements)
- time to harvest

Investigate the seed packets page on the Yates website, to complete the following table.

Vegetable type	Months it can grow	Sowing method	Sowing depth	Time till emergence	Light requirements	Plant distance	Row distance	Time to harvest	Suitable (✓/✗)

Learning activity - Designing your garden layout

You will need to sketch a layout for your vegetable garden to scale. But first, what are scale drawings and how do you draw them?

This is a blueprint layout for a vegetable garden. Every 1cm on the blueprint represents 50cm in the real garden so the scale is 1cm:50cm

1. **What is the width of the garden in the diagram?**

   _____

2. **What is the length of the garden in the diagram?**

   _____

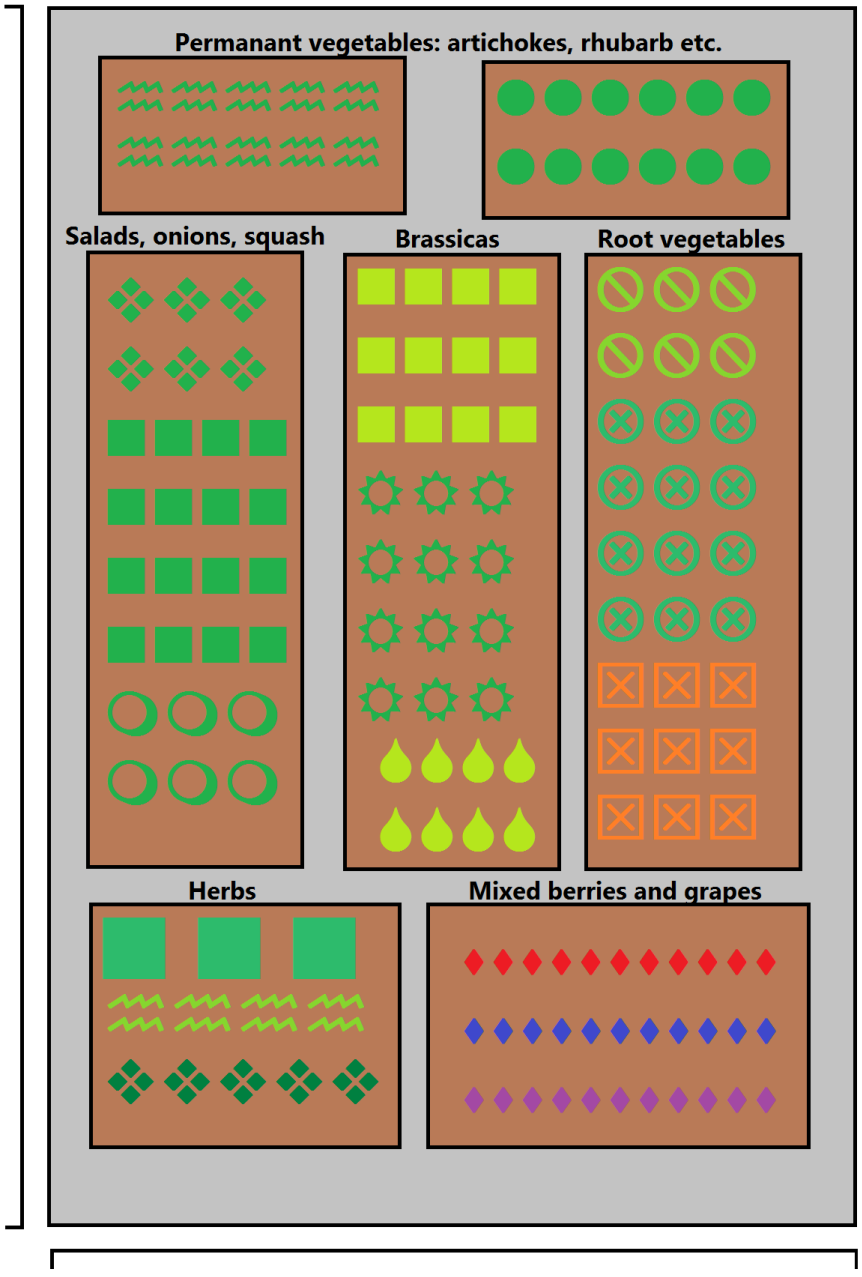
3. **What would the width of the real garden be?**

   _____

4. **What would the length of the real garden be?**

   _____

5. **Complete the table below by selecting three vegetable or herb garden sections from the blueprint and calculating their area in the real garden.**

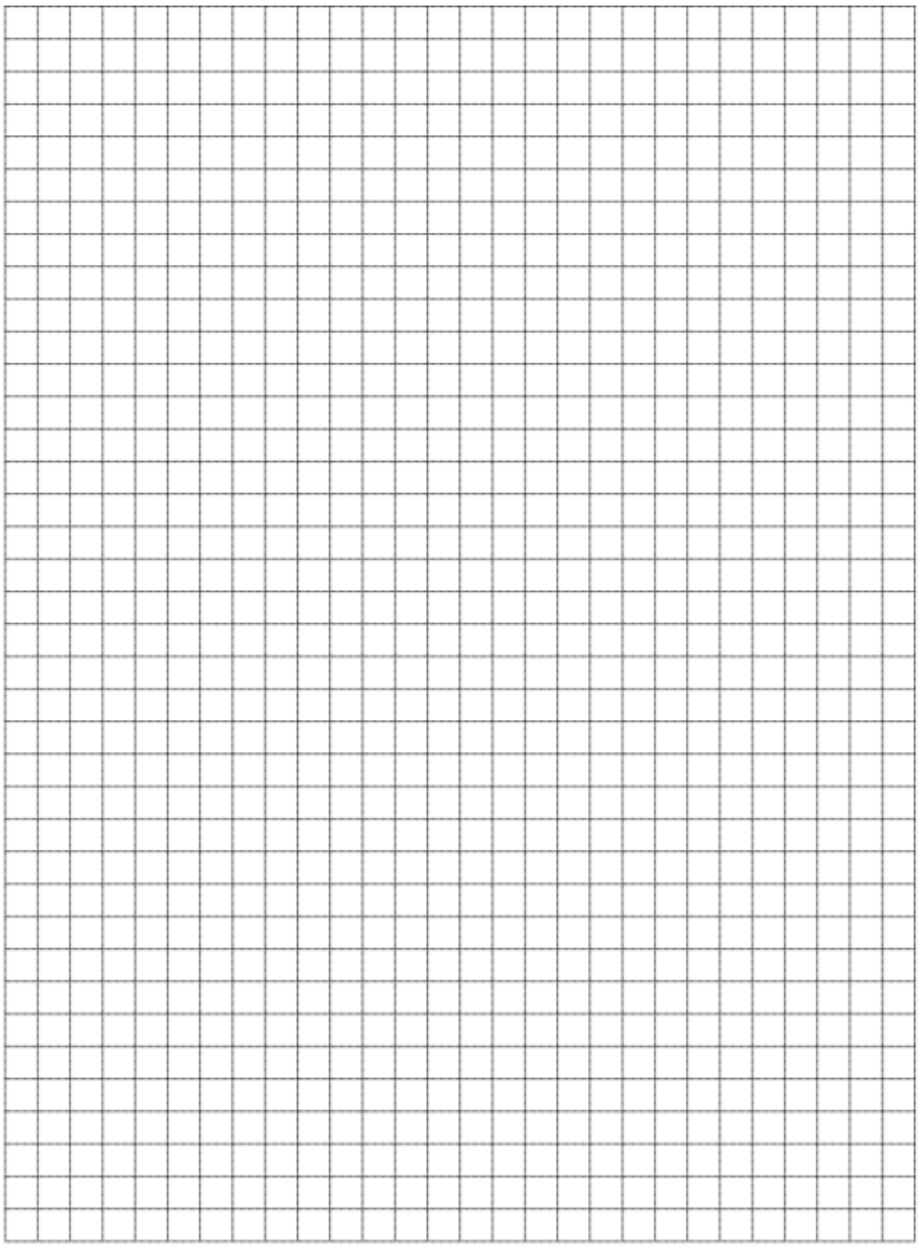


Garden section	Blueprint measurement	Real life measurement	Real life area

Now it's your turn to design a garden to grow the plants you chose in the last activity.

6. **Measure the width and length of your school garden plot to create a scale drawing below. Your design should consider plant space, row space, plant types and the layout for where the plants will grow.**
7. **You will use this blueprint for planting out your garden.**
8. **Create a calendar of operations to care for your garden. Identify sowing, harvesting and when inputs of fertiliser, watering, weeding and maintenance must be carried out.**

Width of your garden_____ Length of your garden_____



Learning activity - Burger concepts

Develop at least 4 different burgers and sketch them below. Label each ingredient in your burger with the agricultural industry that produces it and cooking methods.

Burger 1

Burger 2

Burger 3

Burger 4

1. **Complete the table on your ideas.**

Burger	Possible? Practical? (✓/✗)	Potential for success (✓/✗)	Identify the positives and negatives
1			
2			
3			
4			

2. **Ask students in your class their opinion of your burger concepts - which burgers were the most popular? _____**
3. **From the table above identify which burger is the most practical and has the greatest potential for success? This is the burger that you will put into action. Give your burger a name.**

_____
_____

4. **List all the ingredients you need for your project. This will become your shopping list.**

_____
_____
_____
_____
_____
_____
_____
_____

5. **List the tools that you will use to complete your project.**

_____
_____
_____
_____
_____

6. **List the preparation techniques you will use for each ingredient in your burger.**

_____
_____
_____
_____
_____

7. **Sketch and describe in detail your final design burger.**

Learning activity - Action plan

Write an action plan for producing your burger. Your plan should include all key steps that you must carry out to successfully create your burger. For each step in your plan, consider and answer the following questions in your table. Add more rows if required.

- *What* action must be carried out?
- *Who* is responsible for the action?
- *How* will it be achieved?
- *Where* will this step happen?
- *When* is this step due to be finished?

Step	What	Who	How	Where	When	Complete (✓)

3. Producing and Implementing

Learning activity - Safe and ethical work practices

Throughout this unit you will have the opportunity to work both inside and outside such as in a kitchen facility and the school garden. Complete the table below to outline workplace health and safety elements at your school farm and kitchen.

School Garden	School Kitchen
List at least 5 specific tools or equipment	List at least 5 specific tools or equipment
Identify 5 risks	Identify 5 risks
Identify 5 school garden rules to minimise risk	Identify 5 school kitchen rules to minimise risk

Learning activity - Record your progress

Follow your action plan to create your burger and garden. Use this page to attach photos of your progress for both.

Learning activity - Record your recipe

On this page write your recipe including a list of ingredients and the method you will use to prepare your burger. Ensure that there is enough detail so that anyone could pick up your recipe and recreate your burger.

Ingredients

Instructions

4. Testing and Evaluating

1. **List two things about this project that you are most proud of.**

   _____

   _____

2. **How did your burger meet the design brief?**

   _____

   _____

   _____

   _____

3. **List any criteria for success that you did not meet.**

   _____

   _____

   _____

   _____

4. **What would do differently if you were to repeat this project?**

   _____

   _____

   _____

   _____

5. **Overall what do you think were the best parts of your folio and final product?**

   _____

   _____

   _____

   _____

   _____

   _____

6. **What did other people say about your work?**

   _____

   _____

   _____

   _____

References and Further Reading

Crack the Code

Department of Education, 2018, '*Crack the Code*', Sate of NSW, Department of Education, NSW Government, Education, Public Schools, https://education.nsw.gov.au/teaching-and-learning/curriculum/key-learning-areas/tas/s4-5/resources/crack-the-code, viewed July 24 2018

Glossary

Australian Curriculum, 2018 '*Glossary*', Australian Curriculum Assessment and Reporting Authority, https://www.australiancurriculum.edu.au/f-10-curriculum/technologies/glossary/?letter=A, viewed October 10 2018

Technology Mandatory Years 7-8 Syllabus

NESA, 2018, '*Technology Mandatory Years 7-8 Syllabus'*, NSW Education Standards Authority, http://educationstandards.nsw.edu.au/wps/portal/nesa/k-10/learning-areas/technologies/technology-mandatory-7-8-new-syllabus, viewed October 10 2018

NSW Syllabus outcomes

Technology Mandatory 2017 Stage 4

Outcomes	Content
Agriculture and Food Technologies	
TE4-1DP designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities **TE4-2DP plans and manages the production of designed solutions** **TE4-3DP selects and safely applies a broad range of tools, materials and processes in the production of quality projects** **TE4-5AG investigates how food and fibre are produced in managed environments** **TE4-6FO explains how the characteristics and properties of food determine preparation techniques for healthy eating** **TE4-10TS explains how people in technology related professions contribute to society now and into the future**	**Identifying and defining** • investigate the importance of food and fibre production to Australia's food security and economy including Asia's imports and exports (ACTDEK029) • investigate how food and fibre production is managed in environments as a system and how sustainability can be improved, for example: (ACTDEK032) **ST** – plants and/or animal species grown in managed environments – land management by Aboriginal and/or Torres Strait Islander Peoples – boundaries, inputs, outputs, processes and feedback occurring in a managed environment • evaluate environments that have been designed in consultation with community groups, for example: – a bush tucker garden – a school or community garden • investigate the characteristics and properties of a variety of nutritious foods, for example: **CT** – high in fibre, such as fruits and vegetables – high in protein, such as meat and meat alternatives • explore the nutritional needs of a group of people, e.g. adolescents, toddlers **CT** • develop criteria to evaluate design ideas, processes and solutions, the functionality, aesthetics and a range of constraints, e.g. accessibility, cultural, economic, resources, safety, social, sustainability, technical (ACTDEP038, ACTDIP027, ACTDIP031) **DT ST** **Researching and planning** • design and plan a product associated with agricultural production (ACTDEP036) **DT ST** • research legal and ethical requirements associated with agricultural production, e.g. keeping animals • investigate ideal conditions for growth and development of an agricultural plant or animal (ACTDEK032) **ST** • develop a schedule or calendar for ongoing care of a plant or animal species associated with an agricultural project (ACTDEP039) **ST** • acquire and interpret data, for example: (ACTDIP025, ACTDIP026) **CT ST** – local environmental and/or physical conditions, e.g. rainfall, temperature – nutrition information panels, e.g. saturated fat, sugar content • plan nutritious dish(es) to suit a group within society, for example: **DT** – high calcium and iron for adolescents – food for cultural celebrations • identify a range of food preparation techniques and analyse the impact on nutrient value (ACTDEK033) **CT** • investigate and communicate how a recipe can be improved to enhance nutritional value, and justify the recipe adjustment, for example: (ACTDEP039) **DT** – using wholemeal flour instead of white flour for increased dietary fibre **Producing and implementing** • produce and implement an agricultural project and/or produce nutritious food (ACTDEP039) **DT** • select, justify and use a range of appropriate tools and techniques in an agricultural project and/or food preparation (ACTDEK037) **DT ST** • identify and apply safe and ethical work practices, for example: **DT** – correct use of tools and equipment – food safety and hygiene practices **Testing and evaluating** • evaluate the effectiveness and suitability of choices made during the development and production of the solution • assess the solution against the predetermined criteria

Engineered Systems	
TE4-1DP designs, communicates and evaluates innovative ideas and creative solutions to authentic problems or opportunities	• investigate the way Aboriginal and/or Torres Strait Islander Peoples use engineered solutions to serve community needs including those of cultural identity,