Australian Curriculum

YEAR 3
AGES 8–9

DESIGN & TECHNOLOGIES

PROJECT-BASED LEARNING

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TECHNOLOGIES AND SOCIETY | FOOD AND FIBRE PRODUCTION | ENGINEERING PRINCIPLES AND SYSTEMS | MATERIALS AND TECHNOLOGIES SPECIALISATIONS | INVESTIGATING AND DEFINING | GENERATING AND DESIGNING | PRODUCING AND IMPLEMENTING | EVALUATING | COLLABORATING AND MANAGING

- FOOD AND COOKING
- CLOTHING AND TEXTILES
- BUILDING AND CONSTRUCTION
- TECHNOLOGICAL ADVANCEMENTS

FOREWORD

Australian Curriculum Design and Technologies: Project-based learning (Year 1 to Year 6) is a series of teacher resource books designed to help you plan for, teach and assess students' learning in Design and Technologies using a project-based learning approach. Throughout this series, students develop their knowledge, skills and dispositions for working with materials, tools and equipment in a range of contexts while learning about the importance and use of sustainable practices to support environmental health and human survival for future generations.

Each book in the series contains four similarly-themed units which allow students to build on their prior knowledge and skills as they progress. These units follow a student-centred approach in which students build on their understandings of the world around them through hands-on and inquiry-based learning experiences, while the teacher facilitates and guides. Similar assessment checklists are used in each year level to help you assess, guide and extend students' learning.

CONTENTS

Unit overview

This book contains four units—Food and cooking; Clothing and textiles; Building and construction; and Technological advancements. Below is an overview of each unit.

UNIT 1: Food and cooking

In this unit, students learn about the role of farmers, market gardeners and plantation workers in growing/rearing/raising animals for use in food production; and how bakers, chefs and other food industry workers use ingredients to prepare, cook and serve meals/snacks to consumers. They investigate ways people design and create a range of raw, processed and cooked food products for others to consume, and explore different eateries—including restaurants and fast food outlets—and the services these places offer.

Students participate in projects to:

- design and create an edible garden that produces good-quality, fresh produce that people can purchase and/or consume.
- design and create a range of sweet and/or savoury baked food products for sale at a school bake sale.

UNIT 2: Clothing and textiles

In this unit, students learn about how natural fibres such as cotton and wool are produced, processed and manufactured into yarn/fabric for use in clothing products. They investigate how different clothing products are designed and manufactured for commercial sale, including which type of yarn/fabric is used, the role of people and machines in making these products and why these products are created for people in the community to buy.

Students participate in projects to:

- design and create a handmade, French-knitted product using yarn made from natural fibres, that can be given as a gift for a special occasion.
- design and create a handmade textile product by upcycling unwanted and donated clothing, linen and scrap fabric.

UNIT 3: Building and construction

In this unit, students learn about the role of people who work in the building and construction industry and how they use materials, tools and equipment to construct buildings and other structures. Students explore why and how transport infrastructure such as roads and railways are constructed, and how public transport services assist people in the community.

Students participate in projects to:

- design and create a model of an architecually-interesting multistorey building that will provide a place for people to live, work or visit without being injured in the event of an earthquake.
- design and create a bridge that is engineered to be structurally sound so it will support the weight of peak-hour traffic.

UNIT 4: Technological advancements

In this unit, students learn about the role of people in designing and creating toys, games and vehicles, including how technological advancements are changing the way these products are designed and manufactured. Students explore how and why different features and sources of power assist toys and vehicles to function (work).

Students participate in projects to:

- design and create an interactive single-player or multiplayer arcade game that is engineered to include motion, lights and sound, and which challenges players to compete for the highest score or a prize.
- design and create a lightweight, powered vehicle which drives, flies or floats autonomously from one place to another using recycled and craft materials.

Key features of the units

Unit planning documents

At the beginning of each unit, planning information is provided including:

- curriculum connections to the Design and Technologies learning area
- cross-curricular links to other learning areas
- background information with links to websites for further reading (where necessary)
- a list of key vocabulary separated into Tier 1, 2 and 3 words to support learning throughout the unit
- resource preparation checklist for the whole unit

For each lesson, a suggested **lesson plan** has been provided with a supporting **teacher notes page** that contains:

- lesson objectives
- suggested resources
- tips for adapting the lesson

For each project, a **project plan** which spans multiple lessons has been provided with supporting teachers notes that contain:

- project objectives
- suggested resources
- alternative project ideas

Lessons

Lesson 1 is a **diagnostic assessment lesson**. It is designed to assess students' prior knowledge of the main concepts that will be taught throughout the unit. The work samples produced by individual students should be assessed and used to modify Lessons 2 and 6 to suit students' level of understanding.

Lessons 2 and 6 are designed to **'level-up' students' understandings** of a topic related to the unit context before they engage in a hands-on project. The work samples produced by individual students should be assessed and used to develop students' understandings as they participate in the projects.

Projects

Two projects are designed to develop students' process and production skills as they engage in different inquiry and hands-on learning tasks relating to the design and creation of a product, service and/or environment in each unit context.

In these projects, students follow a six-step design process to design and create a solution to an identified problem/issue and learn how to use materials, tools, equipment, systems and processes safely when creating designed solutions independently and/or cooperatively. Students' knowledge and understanding, and process and production skills should be assessed throughout each project and used to provide feedback to set personal learning goals for future projects.

Differentiation

The lessons/projects in the unit can be easily differentiated to cater for students' learning needs by:

- using the associated lesson/project from a lower or higher level book that best caters for students' level of understanding (based on the observations/assessment made in Lesson 1).
- modifying the sample lesson plan provided to suit students' learning needs, using the suggestions provided in the teaching/assessment notes.
- using the additional lesson ideas on the teachers notes page for each lesson/project to develop alternative lessons/projects that focus on a slightly different concept.

Assessment tips and tools

Assessment checklists and rubrics are provided in each unit to assist you with monitoring students' level of understanding and process and production skills.

How to use the product

This series is designed to be used flexibly while providing support to help you plan for, teach and assess student learning across four design and technologies themed contexts. Each unit follows a consistent teaching sequence that can be easily adapted to suit the teaching and learning needs of your class.

Semester planning

Intended use:		
Semester 1	Unit 1: Food and cooking Unit 2: Clothing and textiles	Focus/Report on the knowledge and understanding content descriptions relating to: • Technologies and society • Food and fibre production and Food specialisations • Materials and technologies specialisations
Semester 2	Unit 3: Building and construction Unit 4: Technological advancements	Focus/Report on the knowledge and understanding content descriptions relating to: • Technologies and society • Engineering principles and systems • Materials and technologies specialisations

Flexibility:

The units have been designed to be independent of the others changing the unit sequence should not affect students' learning and development. If you would prefer to cover all four knowledge and understanding sub-strands of the Design and Technologies curriculum in each semester, you may wish to cover Units 1 and 3 in Semester 1 and Units 2 and 4 in Semester 2.

Term planning

Intended use:		
Week 1	Diagnostic assessment	See Lesson 1
Week 2	'Levelling up' students' knowledge and understanding	See Lesson 2
Weeks 3–5	Developing students' process and production skills	See Project 1
Week 6	'Levelling up' students' knowledge and understanding	See Lesson 6
Weeks 7–9	Developing students' process and production skills	See Project 2

Flexibility

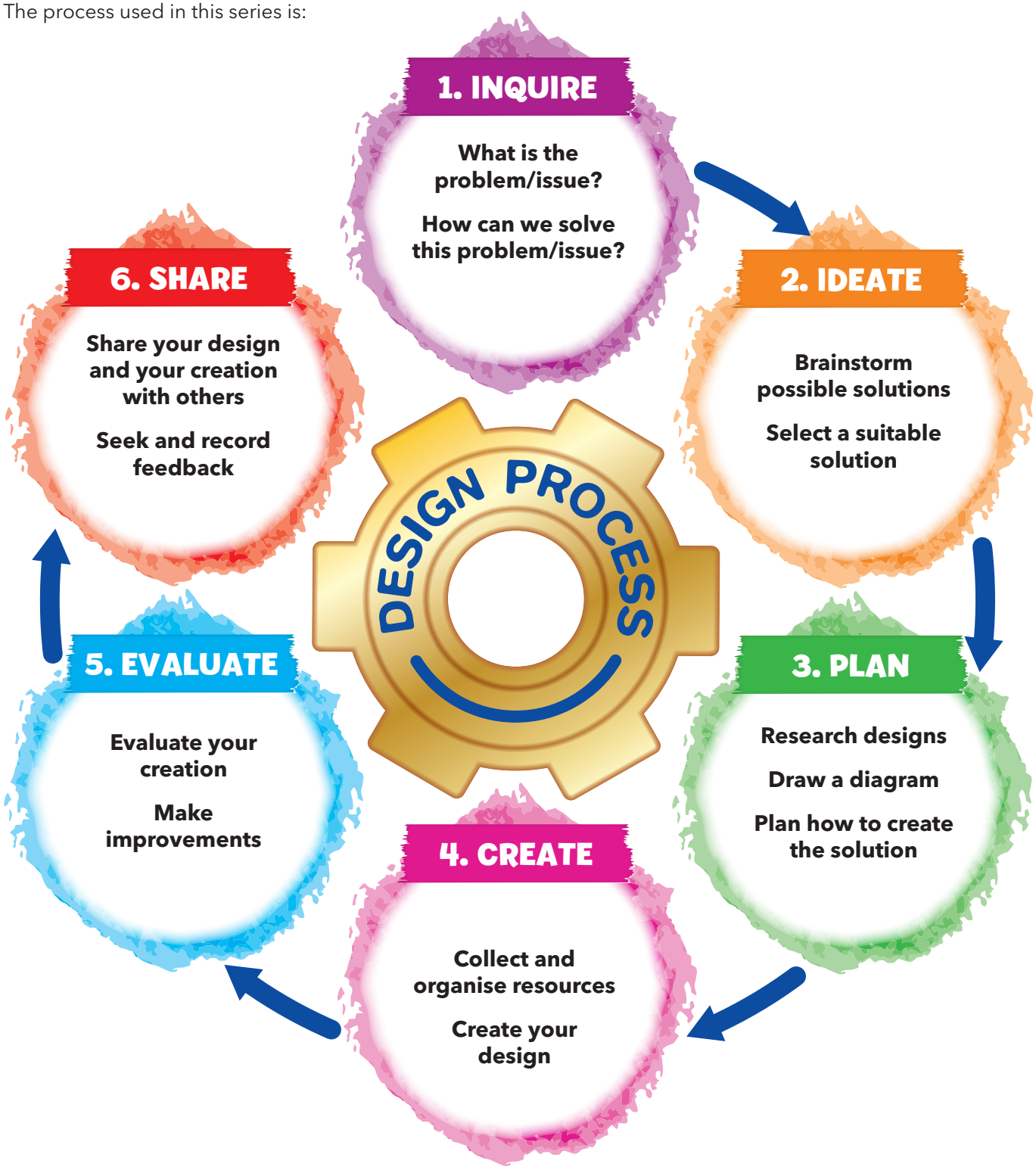
It is recommended that Lesson 1 is always used as a diagnostic assessment lesson to ensure you cater for students' individual learning needs throughout the unit; however, Lessons 2 and Lessons 6 may be taught during weeks 2 and 3 to allow a longer block of time for students to conduct a project. Depending on students' learning needs and pace, and time restrictions/interruptions throughout the term, you may wish to use one or both of the projects suggested in each unit.

Understanding the design process

The design process for the projects provides a simple six-step process that allows students to investigate problems and possible solutions, plan how to solve the problem, design and create an appropriate solution and evaluate and reflect on their designed solution for effectiveness, before making any improvements necessary.

At the completion of the project, students are then given opportunities to present their designed solution to an audience and explain the challenges they faced and how they overcame these.

The process used in this series is:



**A copy of this poster can be found at www.ricpublications.com.au/dtbooks*

Background information

LESSON 1: Diagnostic assessment

- All humans need nourishment from food and water to live.
- Natural food products from plants and animals include fruit, vegetables, herbs and spices, grains, legumes, meat, poultry, seafood and dairy.
- Processed food products are those which have been altered in some way from their original state. These products include tinned/canned foods, cereals, drinks, frozen foods, junk foods, dried herbs/spices, pre-cut products and ready-made meals.
- A large range of food products are available at various places, including supermarkets, bakeries, butchers, delis and greengrocers. These products are kept dry, refrigerated or frozen in various sections of the store.
- People who work in food-related occupations, including farmers, plantation workers, market gardeners, bakers, butchers, fast-food workers, food-factory workers, chefs and other restaurant staff work in different environments which are used in the production, processing and preparation of food products.

LESSON 2: Food production in Australia

- Australian farmers, plantation workers, market gardeners and other food production workers grow plants and/or rear animals for use in the production of natural food products, which are consumed raw or manufactured into processed food products.
- Food production occurs in many places in Australia. The Murray–Darling Basin is known as 'Australia's food bowl' because it's where most of Australia's fresh produce is grown.
- Most of Australia's sugar is produced on cane fields along the Queensland coast, where they receive adequate sunlight and water.
- A large portion of Western Australia is used for livestock farming, as it is spacious and allows farmers to rear sheep, cattle and/or pigs which provide a variety of meat and dairy products.

PROJECT 1: An edible garden (Lessons 3–5)

- Many people produce their own fresh food at home either by growing fruit trees, creating vegetable or herb gardens, or raising chickens and collecting their eggs.
- Edible gardens are those which produce food from plants. These plants can be grown indoors or outdoors in different environments.
- When creating an edible garden, it's important to pay careful attention to the environmental factors that may impact plant growth, such as the soil quality and the amount of sunlight, water and space available. These factors will impact the types of plants that can be grown in your local area.
- As food produced by plants is often seasonal, it is important to consider which plants will thrive in each season. This allows the grower to maximise their yield while still growing fresh, good-quality produce.
- Some people prefer to grow their food organically, which reduces potential personal and environmental harm from fertilisers, pesticides and other chemicals. Instead, they use natural compost, companion planting and crop rotation to promote healthy plant growth and reduce potentional harm.
- While creating their edible gardens, it is important students are made aware of how to handle, use, clean and store gardening materials, tools and equipment safely. See tips for gardening safety at <https://www.betterhealth.vic.gov.au/health/HealthyLiving/gardening-safety>.

Food production in Australia

OBJECTIVES

In this lesson, students demonstrate their prior knowledge of:

- the types of natural food products produced in Australia
- the role of farmers in growing and harvesting food products from plants/animals
- the materials, tools and equipment used to produce food from plants/animals
- how farmers take care of the environment while producing food for people to eat
- the impact of environmental conditions such as climate on the production of food

LESSON RESOURCES

- ☐ Online video–*Food production in the Murray–Darling Basin* (13.39) <https://tinyurl.com/y5morrzm>
- ☐ Website–Australian Government: Murray–Darling Basin Authority–Geography (map) <https://tinyurl.com/ycffqscn>
- ☐ Online video–*I want to be a farmer – Kids dream job – Can you imagine that?* (5.00) <https://tinyurl.com/y4mxsfeu>
- ☐ Computer/iPad® access (optional)
- ☐ Print/Online dictionary access (optional)
- ☐ Notepad/Print or digital graphic organisers
- ☐ Resource sheets

TIPS FOR ADAPTING THE LESSON PLAN

During the lesson starter, students may look at a range of food packaging to locate information about where it is produced. They classify the products as 'made in Australia' and 'made overseas'. As a class, discuss the importance of buying Australian-made products to support Australian farmers.

During the development, guest speakers may be invited in to assist students in learning about the production of food from plants and/or animals. These guest speakers may include sheep farmers, dairy farmers, plantation workers, crop farmers and/or market gardeners.

To engage students in the community, take them on an excursion to a local farm, market garden or plantation and ask the farmer/worker to discuss how they help with food production and the steps involved in producing, harvesting, transporting, preparing and manufacturing these products for sale.

Food production in Australia

1. LESSON STARTER

As a class, watch the first three minutes of *Food production in the Murray–Darling Basin* at <https://tinyurl.com/y5morrzm> then view the location of the Murray–Darling Basin using the map at <https://tinyurl.com/ycffqscn>.

Display the resource sheet on 'Australia's food production' to see a map of Australia showing where the major food production regions are located.

2. INTRODUCTION

As a class, discuss the questions, *What is a dairy farm? What is a wheat field? What is a sugarcane crop? What is an orchard? What is a plantation?* Compare noticeable similarities and differences between each of these places.

Write 'good quality', 'fresh produce', 'organic', 'locally-grown', 'irrigation', 'harvesting' and 'environmental conditions' on the whiteboard. Using a think-pair-share, students discuss the meaning of each.

Note: Students may compare their definitions to a print/online dictionary.

Display the WALT and WILF cards and read and discuss these with students.

3. DEVELOPMENT

As a class or in small groups, students brainstorm inquiry questions that can be used to research food production in Australia.

Students use books, the online videos and websites suggested or conduct their own online research to answers the inquiry questions identified. They record their research notes using a notepad, print/digital graphic organisers or an audio recorder.

Note: Students may work individually or in small groups to research different aspects of food production in Australia. They can then teach their peers during the plenary.

Individually, students record a written or spoken summary of their research notes using ICT or traditional methods of writing/speaking (e.g. handwritten/typed written paragraphs or short oral presentations).

4. PLENARY

As a class or in small groups, students use their summary of research to share what they've learnt about food production in Australia. Encourage students to discuss why products are produced in large quantities and how they help meet people's needs and wants.

5. CONCLUSION

As a class, watch *I want to be a farmer – Kids dream job – Can you imagine that?* at <https://tinyurl.com/y4mxsfeu> to hear a young child explaining what he thinks it would be like to work as a farmer.

In pairs or small groups, students discuss the question *If you were a farmer, what would you produce and why?*

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WALT and WILF cards

We Are Learning To understand

- the types of food products produced in australia
- how people help to produce food products
- where food is produced in australia
- why food is grown in different regions of australia
- how farmers take care of the environment

What I'm Looking For

- Detailed research notes about food production in Australia.
- A spoken/written summary explaining food production in Australia, including why different products are produced in different environments.

Challenge: Can you explain how the environment and weather/climate affects food production?

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Suggested inquiry questions

Where and how is fruit grown in Australia?

Where and how is sugar produced in Australia?

How do farmers help to provide people with milk?

What is meant by the term 'Australia's food bowl'?

Why do citrus trees grow well in New South Wales?

Where and how is meat produced in Australia?

Why is Western Australia good for sheep farming?

How is food production affected by weather/climate?