Australian Curriculum

YEAR 1
AGES 6–7

DESIGN & TECHNOLOGIES

PROJECT-BASED LEARNING

RIC PUBLICATIONS
ricpublications.com.au
AUSTRALIAN CURRICULUM LINKED

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 where food comes from, how plants are grown for food, where food can be bought, the needs of plants and animals that provide food, how a specific vegetable grows, and about healthy and unhealthy food.

This unit concentrates on the role of plants in providing food.

Students participate in projects to:

- design and create a mini garden from recycled materials in which to grow carrots.
- design a recipe for, then create a colourful, healthy vegetable salad (with at least four different ingredients) for the class salad bar.

UNIT 2: Clothing and textiles

In this unit, students learn that clothing is made of different materials with different observable properties; that different clothing is used for different activities; about fibres that come from plants and animals; what fibres are best suited for particular clothing; and simple processes used to make clothing.

Students participate in projects to:

- design and create a simple loom, then weave a blanket to keep a soft toy or doll warm.
- design and create a simple finger-knitted or no-sew scarf for a friend or family member.

UNIT 3: Building and construction

In this unit, students learn that places are important to people; that people live in homes, suburbs, neighbourhoods, towns and rural areas; that places have natural, managed and constructed features; that places should be cared for, and are looked after, by different people; that some activities in places uses forces; and that places can be mapped or modelled.

Students participate in projects to:

- design and create a model of their home, including a door that opens and shuts, as well as some natural features.
- design and create a model of a park with two natural features and at least two types of equipment that use a push or pull force to move.

UNIT 4: Technological advancements

In this unit, students learn about how the size and shape of objects, such as traditional Aboriginal and Torres Strait Islander peoples' instructional toys, influence the way they move; how objects when struck make sound; ways different objects move; games that were played in the past; what tops are and how they move; and what a bowling game is, what it includes and how it is played.

Students participate in projects to:

- design and create a colourful top that spins, using recycled materials
- design and create 10 colourful pins for a bowling game, using recycled 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

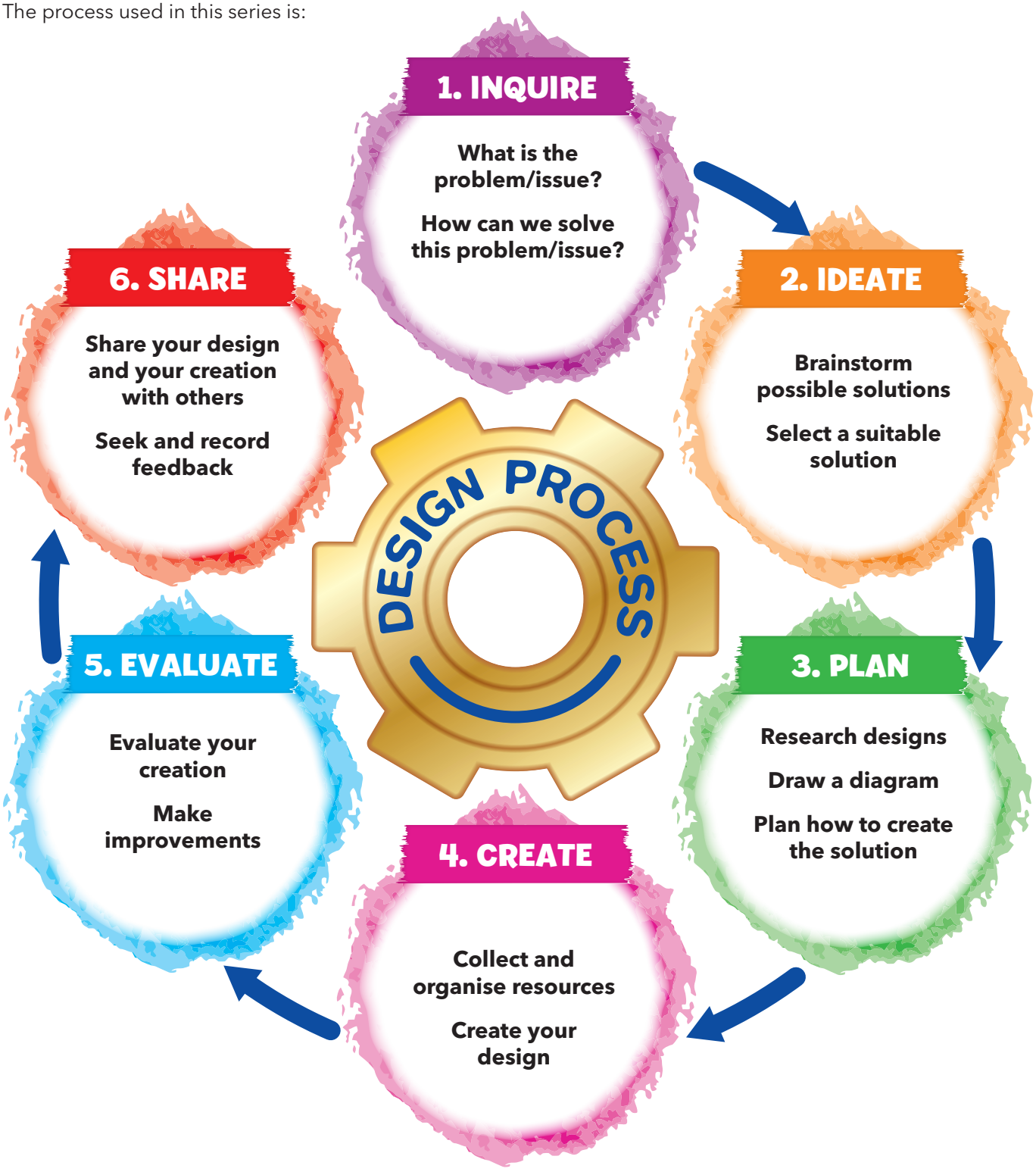
It is recommended that Lesson 1 is always used as a diagnostic assessment lesson to ensure you cater for students' individual learning needs throughout the unit; however, Lessons 2 and Lessons 6 may be taught during weeks 2 and 3 to allow a longer block of time for students to conduct a project. Depending 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 lesson

- Food from plants includes fruit, vegetables, grains such as wheat and rice, and nuts and seeds. Most of these are grown on farms, orchards, or in greenhouses.
- Foods like pasta, pastries, bread, cakes, biscuits and noodles are made from flour, which is made from wheat.
- Foods from animals include dairy products, meat, seafood, eggs and honey.
- The basic needs of both plants and animals include water, light/sunshine, nutrients (or food), air, space to grow and move, and protection from the elements. Plants get nutrients from the soil in which they grow. Farm/Domestic animals get nutrients from food provided by humans.
- Humans obtain their food in different ways. Some grow their own fruit and vegetables. It is becoming more common to keep hens for eggs because they consume food scraps that would otherwise be wasted. Most people buy their food from supermarkets, specialty stores or markets. It is also increasingly common for the average family, to buy ready-made food at cafes, restaurants, takeaway outlets and bakeries.

LESSON 2: How plants grow

- Plants can grow almost anywhere and are capable of adapting to their environment. For the purposes of this unit, students are only expected to suggest the usual places plants grow.
- For healthy growth, plants need sufficient sunshine (or light) for energy to make their own food. They need soil with sufficient nutrients to feed them as they grow. Plants need air to take in carbon dioxide to use in the process of photosynthesis (to make their own food energy) which produces oxygen. Finally, plants need water to help them move the nutrients in the soil through their stems and leaves.
- The main parts of a plant are flowers, leaves, stems, roots and fruit. The flowers produce seeds. Leaves vary in shape and size for different plants, and make food for the plant. The stems carries water and food from the roots to other parts of the plant; as well as supporting leaves and flowers. The roots hold the plant in the soil. They have tiny hairs and take in water and food from the soil. The fruit grows from the flower. It protects the seeds and helps spread them around.

PROJECT 1: Mini garden* for carrots (Lessons 3–5)

- Carrots grown from seed take 8–10 weeks to mature and produce food.
- The timing of planting will determine if, and how, the seeds grow. Seeds can be planted from September to March in temperate areas; all year round (except the middle of summer) in warm areas; and between August and February in cool/cold areas.
- When, grown in pots, carrots need full sun, water and thinning out to remove weak seedlings. Teachers should provide students with more than two carrot seeds per container because some may not germinate. All containers/pots should have good drainage.
- For this project, a mini garden means a pot or container.

LESSON 2

How plants grow

OBJECTIVES

In this lesson, students demonstrate their prior knowledge of:

- where plants live and grow
- how these places provide for the needs of plants
- the parts of plants and their purposes

LESSON RESOURCES

- ☐ Information books:
  - *How a plant grows* by Bobbie Kalman
  - *How do plants grow? (My science library)* by Julie Lundgren
  - *How a seed grows (Let's-read-and-find-out science 1)* by Helene J Jordan
  - *The carrot seed* by Ruth Krauss
  - *Oh say can you seed? All about flowering plants* (*Cat in the Hat's Learning Library)* by Bonnie Worth
  - *The tiny seed* by Eric Carle (also available online at <https://tinyurl.com/qbr232r>–9.58)
- ☐ Internet access–computers, laptops or iPads® etc.
- ☐ Resource sheets

TIPS FOR ADAPTING THE LESSON PLAN

Each of the three parts of the research sheet the resource sheet 'About plants' may be conducted at a different time. This decision will be influenced by the competency of students to work cooperatively and their experience carrying out research. If they are inexperienced, do the research with the whole class (as a demonstration) and groups can complete the sections of the sheet as directed.

Give a craft activity to create their own 'Parts of a plant' poster with labels. Around the labelled image, they can write things plants need– water, air, sunlight, food, space, protection etc.

Teachers may complete Part 3 of the research activity orally, by selecting and discussing one place at a time where plants grow. Students suggest how these places provide plants with their needs.

How plants grow

1. LESSON STARTER

Display and discuss images from an online search of 'unusual places plants grow'. *Why are the plants growing there? How do you think they got there? How are they surviving?*

2. INTRODUCTION

Where do plants usually grow? Provide pairs with small cards or pieces of paper. Students draw and/or write places plants usually grow. Allow only a limited time (such as five minutes) for this activity.

As a class, 'bundle' the cards, quickly grouping cards/pieces of paper that say the same thing. Discuss the ideas.

3. DEVELOPMENT

Form groups of three. Using the research cards, groups answer the first section of the resource sheet 'About plants' previously listed.

Discuss ideas as a class. Check to make sure all groups are receiving the correct information.

As a class, research or brainstorm Parts 1 and 2 of the resource sheet. After researching, groups write words and/or draw pictures to answer each part.

Notes:

- *Enlarge the resource sheet 'About plants' to A3 so students have plenty of room to draw a diagram.*
- *Part 1 will revise basic needs of plants.*
- *Part 2 will require students to apply their general knowledge of places where plants grow how these places provide what plants need. For example, students may suggest pots with potting/soil are placed where they will get enough sunshine and so on.*

4. PLENARY

Select one or two students to be the teacher(s). Their responsibility is to summarise things that were covered in the lesson; they can also ask classmates questions. (Other students might ask them questions too and may also help.)

5. CONCLUSION

Read one of the books listed in lesson resources and ask students to repeat the important words about plant parts and plant needs.

WALT and WILF cards

We are learning to understand

- where plants live and grow
- the parts of plants and what they do
- what plants need
- how places provide the things plants need

What I'm Looking For

- A labelled diagram of a plant's parts.
- Facts about what plants need.
- Facts about places plants grow.
- Facts about how plants get the things they need.

Challenge: Find out which part of different plants the foods we eat come from; e.g. carrots are roots.

Suggested inquiry questions

Where do plants grow?

Why do plants grow where they do?

What do plants need to grow?

Where do plants get the things they need?

What are the parts of a plant?

What do the different parts of a plant do?

What happens if plants don't get the things they need?

How do plants help us?

How do we help (look after) plants?