Reception to year 6

Technologies

Design and technologies

September 2022

Scope and sequence

Revised to align with the Australian Curriculum V9.0 (2022)

V2.0

Government of South Australia
Department for Education

Design and technologies: Reception to year 6

Contents

Context statement

Design and technologies is about building on students' curiosity and creativity. It enables students to create products, services or environments that address authentic problems.
Learning in design and technologies occurs across 2 strands:

- **Knowledge and understandings – learning about technologies and society, and the contexts which produce designed solutions.**
- **Process and productions skills – the ways people plan and solve problems.**

Developing the disposition to approach problems with curiosity and a determination to find solutions requires 3 distinct thinking strategies.

Systems thinking
Systems thinking helps people to think holistically about the interactions and interconnections that shape the behaviour of systems. It could involve:

- making distinctions – knowing what something is and isn't by looking for similarities and differences, making comparisons and evaluating against agreed criteria
- parts and wholes – understanding the way each of the parts of a system contributes to the whole and if one part breaks down this can impact on the whole system
- relationships – identifying the relationship between cause and effect by looking at the interactions between all parts of a system, understanding that systems have input and outputs
- perspectives – considering varying points of view, understanding biases and the impacts of systems on people and the planet.

Design thinking
Design thinking helps people to empathise and understand needs, opportunities and problems; generate, iterate and represent innovative, user-centred ideas; and analyse and evaluate those ideas.
It could involve:

- empathy – **investigating** a problem by understanding a potential end user by finding out their story
- **defining** a problem by considering the end user, data and the potential impacts of a solution
- ideation – the process of **generating** and imagining multiple solution ideas, no matter how farfetched, to find innovative solutions
- prototyping – **designing**, **producing** or **implementing** a model or an iteration of a solution that is simple and inexpensive to present to an end user
- testing – understanding what works for an end user and **evaluating** whether to reiterate, refine or modify solutions to better meet design criteria.

Computational thinking
Computational thinking is a specific problem-solving process that involves the following cyclic process:

- **Pattern recognition** – Data is all around us and is increasingly a valuable resource to indicate people's preferences. Identifying and understanding patterns, trends, similarities and differences in data is key to defining problems.
- **Decomposition** – Breaking big problems down into smaller parts to make them more manageable to solve in a logical step-by-step process.
- **Algorithmic design** – Creating and communicating a specific set of steps to solve problems using graphics, symbols, text and diagrams which supports the development of efficient solutions.
- **Abstraction –** Removing unnecessary detail to simplify the steps to a solution. In design and technologies this means creating simplified models to prototype a solution.
- **Modelling and simulating** – Implementing by acting out or trialling solutions with a prototype.
- **Evaluating** – Once the solution has been modelled and simulated it's time to iron out the 'bugs' and test the solution with real users. This allows us to see if the solution meets design criteria and user needs.

When using these thinking strategies together, students can develop powerful solutions.

Prescribed contexts

There are no prescribed contexts for **reception**; educators make site-based decisions about which contexts to situate the learning of the strands. By the end of a 2-year band, students should have had the opportunity to create 3 types of designed solutions – a product, service and an environment.

By the end of year 2, the 2 prescribed technologies include:

- Engineering principles and systems, and Materials and technologies specialisations
- Food and fibre production, and Food specialisations.

By the end of year 4, the 2 prescribed contexts include:

- Engineering principles and systems, and Materials and technologies specialisations
- Food and fibre production, and Food specialisations.

By the end of year 6, the 3 prescribed contexts include:

- Engineering principles and systems
- Materials and technologies specialisations
- Food and fibre production, and Food specialisations.

This document is designed to:

- provide clarity and context for teaching design and technologies in South Australia
- identify the discipline-specific knowledge, skills and understanding learners need at each year level
- guide educators to teach and model computational, systems and design thinking.

Achievement standards

Reception	Years 1 to 2	Years 3 to 4	Years 5 to 6
By the end of reception, students: • **identify** familiar products, services and environments • **create** a designed solution for a school-selected context • create, communicate and choose design ideas • **follow** steps and **use** materials and equipment safely to **make** a designed solution.	By the end of year 2, students: • **describe** the purpose of familiar products, services and environments • **describe** the features and uses of technologies for each of the 2 prescribed technologies contexts • **create** designed solutions for each of the 2 prescribed technologies contexts • **select** design ideas based on their personal preferences • **communicate** design ideas using models and drawings • **follow** sequenced steps to safely **produce** designed solutions.	By the end of year 4, students: • **describe** how people design products, services and environments to meet the needs of people • **describe** the features and uses of technologies for the 2 prescribed technologies contexts • **create** designed solutions for each of the 2 prescribed technologies contexts • **select** design ideas against design criteria • **communicate** design ideas using models and drawings which include annotations and symbols • **plan** and **sequence** steps to safely produce designed solutions • **use** technologies and techniques to safely **produce** designed solutions.	By the end of year 6, students: • **explain** how people design products to meet the needs of communities, including sustainability • **explain** how the features of technologies impact on design decisions for each of the 3 prescribed technologies contexts • **create** designed solutions for each of the 3 prescribed technologies contexts • **select** and **justify** design ideas and solutions against design criteria which include sustainability • **communicate** design ideas to an audience using technical terms and graphical representation techniques • **develop** project plans including production processes • **select** technologies and techniques to safely produce designed solutions.

Scope and sequence

Strand: Knowledge and understanding

Sub-strand	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Technologies and society As part of exploring people and technologies students will understand the outcomes of production, for example: • **product** – a thing we use or consume • **service** – systems to help us live well • **environment** – inside and outside places that produce things like food, shelter, clothing, raw materials or recreation. Students will have opportunities to learn from the practices of First Nations peoples to support ethical and sustainable design decisions to solve problems. Students use **systems, design** and **computational thinking** to understand the entire process that results in the delivery of a product, service or environment to end users, and understand the impact of designed products	**Explore** how familiar products, services and environments are designed by people. **Students:** • **apply** safe handling techniques to **use** common tools • **notice** some of the design features and purposes of common tools, for example scissors, pens or pencils, hammers, nails, computers, toys, tablets and other common inventions • safely **explore** familiar services, for example police and emergency services, health care, commercial, and volunteer organisations, and how they are designed and managed by people • safely **explore** familiar environments such as local native scrublands, kitchen gardens, and school or community spaces, and **identify** common features or purposes.	**Explore** the ways designed solutions have been changed to meet different needs. **Students:** • safely **explore** common tools or products and how they have changed over time. For example, looking at the evolution of toys including toys created by First Nations peoples and how they have been designed for multiple purposes like learning a life skill through play[1]. • safely **explore** common services by **listening** and **responding** to people who do paid or volunteer work in community service organisations, for example police, CFS fire workers, ambulance operators and animal rescue volunteers • safely **explore** common environments and **consider** how maintaining them could be improved by	**Identify** how familiar products, services and environments are designed by people to meet personal or local community needs and sustainability. **Students:** • **pose questions** about common products or objects and **observe** how they have changed from the past to the present to meet changing needs or opportunities. For example, looking at shelters provided for the public that meet accessibility needs. • **identify** common services and how they have changed over time to meet the changing needs of people, for example, providing medical advice and treatment to people remotely • **identify** common environments, for example playgrounds, local native scrublands, parks and beaches • **consider** the intent of designed solutions. For example, learning	**Examine** how products, services and environments have changed over time. **Consider** the ways technologies influence designed solutions. **Students:** • **consider** sustainable service delivery, for example, the ways Kaurna peoples of the Adelaide Plains maintain Kaurna as a living language[3] • **investigate** design and technologies occupations including the paid and unpaid work of people in the local area, for example bakers, builders, engineers, farmers, growers, artists, makers and volunteers • **investigate** the design and sustainability of existing products and **imagine** improvements or innovations.	**Examine** design and technologies occupations and factors including sustainability that impact on the design of products, services and environments to meet community needs. **Students:** • **explore** how First Nations peoples were and continue to be recognised for their specialist skills in designing and producing from local materials, for example, the ways grass and spinifex plants are a source of resin for natural adhesives[4] • **listen** to people in design and technologies occupations and **ask questions** about how they manage competing demands and the impacts of products, services and environments on people and place • **explore** and **identify** sustainable practices to develop products, services or environments. For	**Identify** and **explain** competing factors in the design of products, services, or environments. **Students:** • **investigate** and **consider** the practices of First Nations peoples who have long considered competing factors in relation to designing technologies that support the community, for example, sustainable land management and food production[5] • **consider** the ways designers plan, produce and collaborate to develop products, services or environments that meet community needs, and **interpret** this into their own designs • **analyse** the ways that services adapt and change to meet new and emerging needs of communities • **examine** manufacturing processes and environments. For	**Explain** how people in design and technologies occupations consider competing factors, including sustainability, in the design of products, services and environments. **Students:** • **identify** and **explain** competing factors such as people, time and resource management to manufacture sustainable products • **inquire about** services that are designed to meet competing demands, for example, the establishment of the single-use plastic ban in South Australia and the ways people have adapted their services to meet this demand • **investigate** competing factors in creating food producing environments, for example, considering sustainable land management practices such as those used by First Nations peoples and other growers[5].

Sub-strand	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
through a variety of lenses. When studying people in design and technologies occupations, students will understand that 'occupations' refers to the ways people pursue solutions, and includes both paid and unpaid occupations.		adopting sustainable behaviours or modifying their design.	from First Nations peoples' land management practices, such as the Narungga peoples in South Australia advocating for and supporting dune restoration to prevent coastal degradation[2].		example, considering the impact of a water bottle or a toothbrush made from plastic compared with alternatives.	example, comparing mass production in factories with additive manufacturing (like 3D printing) or niche cottage industries.	

Contexts: By the end of a 2-year band, students need to have experienced all of the prescribed contexts. There are no prescribed contexts for reception.

Sub-strand	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Engineering principles and systems Students use **systems thinking** to understand how forces and energy can be transformed to produce light, sound, heat, movement, control, or support in systems and solutions. Students use **systems** and **design thinking** to understand how and why products, services and environments are made to meet changing needs of people and places. Students use **computational thinking** to understand the ordered steps used when producing engineered solutions. Note that from reception to year 4, 'Engineering principles and systems' and 'Materials and technologies specialisations' are combined and taught as complimentary content. These are dealt with separately in years 5 and 6.	Choosing a design and technologies context to explore is a local site-based decision in Reception and can be considered within the context of the interests of the child. With guidance, students could explore designed solutions such as: • how products, services or environments are made • how food is grown • how food is prepared for healthy eating.	**Investigate** the ways products, services and environments are made. **Explore** the materials used to make products, services or environments, and how the properties of materials can influence design decisions. **Students:** • **explore** a variety of materials and their uses in common products • **notice** the ways objects move due to forces, for example, those that push, pull, bounce, slide, lift, fall, spin and float • **identify** materials that support movement, for example, observing a wheeled toy on different surfaces including timber, carpet and vinyl • **create** models that consider both the techniques used to make them and materials that are used for specific purposes**.**	**Explore** how technologies, including materials, affect movement in products. **Students:** • **explore** and **describe** a variety of materials and their uses in common products • **investigate** First Nations peoples' knowledge of forces and materials, for example, in the creation of instructive toys that fly or spin[1] • **consider** the evolution of familiar products, for example, children's toys and the ways they use forces to create movement such as a pullback toy car • **discuss** the ways products, services or environments have remained the same or changed over time to meet changing needs. For example, exploring a system such as a marionette or Indonesian wayang kulit shadow puppet in comparison to animated characters • **explore** materials that allow for different types of movement,	**Explore** the ways designers and engineers use knowledge of forces to create products services or environments. **Explore** the properties of materials and technologies and how these influence design decisions. **Students:** • **identify** engineered products, their purposes and impact • **describe** observable design decisions, for example, considering watercraft and the ways they are waterproofed, including the ways many First Nations peoples create watercraft from different materials (bark, dugout, rafts) and waterproof them with natural resins[4] • **examine** familiar systems and **consider** how forces are used to create movement, for example, the cogs, wheels or mechanisms in bikes, toy cars and scooters • **deconstruct** a product or system to **examine**	**Describe** how forces and the properties of materials affect function in a product or system. **Students:** • **identify** engineered systems and **deconstruct** them to see how the parts connect and work together. For example, looking at the ways engineers use the properties of magnets in a variety of products. • **explore** the ways in which First Nations peoples consider forces when designing tools, for example, flaked stone to make cutting implements[6] • **examine** how movement is created by combining materials and forces, for example, creating a marble run, balloon rocket or releasing a wound rubber band to propel a model boat • **investigate** a range of materials and technologies used to create products, services or environments for new and challenging	**Investigate** how forces can be used to control sound, light or movement in a designed solution or system. **Students:** • **investigate** the ways new technologies and automation influence design decisions • **investigate** and **create** movement in models with or without electricity • **consider** simple machines and how they are used in everyday objects to create tools and equipment, and to perform tasks • **experiment** with the ways forces can be used to create movement, sound or light in common products, services or environments.	**Explain** how electrical energy can be transformed into movement, sound or light in a product or system. **Students:** • **investigate** and **explain** how electricity is produced and used to produce light, sound, heat or movement. • **deconstruct** a system with moving parts and circuitry to see how the parts work together in closed and open circuits to trigger or stop light, sound or movement • **describe** the processes needed to carefully plan and select components for a system powered by electricity to perform a certain task • **produce** models using materials, tools and equipment to demonstrate how to control movement, sound or light using electricity

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Materials and technologies specialisations Students use **systems** and **design** thinking to understand a broad range of traditional, contemporary and emerging materials that can be used to design products, services and environments. Students use **computational thinking** to work effectively with specific knowledge of materials and the safe use of tools in production steps. Note that from reception to year 4, 'Engineering principles and systems' and 'Materials and technologies specialisations' are combined and taught as complimentary content. These are dealt with separately in years 5 and 6.			for example, the suitability of materials to enable floating, flying or sliding • **experiment** with making for a purpose using a variety of techniques and materials, and **describe** design decisions**.**	how it works and the ways each of the parts work together • **consider** environments that use systems of moving parts to produce resources, for example, farms, factories, playgrounds. • **identify** the natural resource origins of common materials • **explore** a variety of products, services or environments and **pose questions** about design decisions involving choice of materials and technologies • **explore** the suitability of designs while considering competing demands, for example, identifying the materials bags or carriers are made from and considering their sustainability • **explore** a variety of materials and technologies and consider their applications in creating products, services or environments.	possibilities. For example, living in weightless environments in space, or under the ocean in submarines. • **consider** the origins and suitability of materials compared to purpose and impact • **consider** new and emerging technologies and how they are used to create designed solutions.	**Investigate** the properties of materials and technologies and how this influences design decisions. **Students:** • **identify** the differences between natural and processed materials • **investigate** First Nations peoples' use of technologies to design products for communities using sustainable materials • **investigate** the ways designed solutions need to consider the environmental or social sustainability and suitability of materials used, for example, exploring the properties of adhesives and how effective they are as well as their impact • **identify** tools and techniques to explore the suitability of materials and designs, for example, using various joining techniques to strengthen or create movement in a product • **investigate** the properties of different materials and why they are used for a variety of purposes, for	**Explain** how characteristics and properties of materials, systems, components, tools and equipment affect their use when producing designed solutions. **Students:** • **sort** and **classify** materials into natural and processed materials • **investigate** how First Nations peoples' knowledge of materials informs design solutions, for example, twining techniques to make string and rope from natural materials to ensure suitability in different circumstances[7] • **identify** and **describe** the properties of materials used in designing and constructing commonly used products, for example, household products made from alternatives to plastic to improve environmental sustainability considerations • **describe** the materials and systems used in different spaces that benefit the needs of end users and their

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						example, examining the durability and absorbency of fabrics to select the most appropriate for a specified purpose • **plan** and **create** designed solutions based on the characteristics of materials and their suitability for purpose against defined criteria • **identify** a range of technologies used to process raw materials into a finished product, service or environment.	communities, for example, exploring food growing apparatus for small spaces • **compare** and **describe** tools, equipment, techniques and systems used in producing designed solutions, for example, compare mass manufacturing to local hand-made products in the garment industry • **research** and **compare** the design and production of products, services and environments locally and globally, for example, considering the diversity in shelter design based on varying weather conditions and locations • **explore** a range of technologies used to process raw materials into a finished product, service or environment.
Food and fibre production Students use **systems thinking** to understand the whole process from the origins of materials to the processing and production of food,		**Identify** the basic needs of plants and animals, such as light, food, nutrients, water, space and protection. **Recognise** that the ways food is grown and	**Explore** how plants and animals are grown for food, clothing and shelter. **Explore** how food can be selected and prepared for healthy eating.	**Investigate** food-producing environments and ways they are altered to be more productive or sustainable. **Explore** the ways food can be selected and	**Describe** the ways of producing food and fibre. **Describe** the ways food can be selected and prepared for healthy eating.	**Consider** the efficiency of production systems, consumer satisfaction, and the availability of resources in food and fibre production. **Investigate** the characteristics of food	**Explain** how and why food and fibre are produced in managed environments. **Explain** how the characteristics of foods influence selection and

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clothing, shelter or structures. They use **design thinking** to imagine innovative ways to produce and use raw materials. Students use **computational thinking** to understand the step-by-step processes of safely producing food or fibre into a range of products, services or environments. Note that 'Food and fibre production' and 'Food specialisations' are taught as one content area from reception to year 6. They are dealt with separately from year 7 onwards.		prepared can influence food choices. **Students:** • **identify** and **consider** the ways First Nations peoples work with the land sustainably to grow animals and plants for food, clothing and shelter to sharing within their communities • **observe** the ways plants and animals grow and identify the tools and conditions required to ensure they are healthy. For example, observe the requirements – soil, water, light – for a snow pea or sweet corn seed to become a seedling, then a mature plant that can be harvested. • **make connections** between products and the plants or animals from which they are sourced, for example, understanding that tomato sauce begins with a tomato seed or seedling • **identify** a range of foods and **sort** them according to the Australian Guide to Healthy Eating or the Aboriginal and Torres	**Students:** • **explore** the ways First Nations peoples create environments to grow and harvest foods in sustainable ways that meet the dietary needs of communities • **identify** and use a range of tools and equipment needed to grow food or fibre • **identify** and **sort** the origins of familiar products, for example, identifying that certain fabrics come from cotton or sheep farms, juices from citrus growers, cheese from dairy farms, and so on • **investigate** a range of foods and **categorise** them according to the Australian Guide to Healthy Eating or the Aboriginal and Torrs Strait Islander Guide to Healthy Eating • **discuss** how food choices influence health and wellbeing and can be supported by using guides to healthy eating • **discuss** food preparation techniques and how these influence eating preferences • **identify** food services and how they are	prepared for healthy eating. **Students:** • investigate food and fibre production developed by First Nations peoples to take advantage of seasonal and local produce[8] • **identify** technologies, tools and equipment used to produce food and fibre, for example, tools used in a home garden compared to a farm • **explore** farming environments in Australia and a country in Asia and compare how they use technologies to grow food and fibre to meet local and global demands. For example, exploring wool or wheat and how they are processed into a variety of products. • **identify** the optimal environments for certain plants and animals • **investigate** the ways food is prepared and produced for consumption and how this influences dietary decisions using Australian Guide to Healthy Eating or	**Students:** • **research** food and fibre production techniques and technologies developed by First Nations peoples, for example, burning, tilling, transplanting, irrigating, weeding, thinning, cropping, storing and trading food[9] • **describe** technologies and procedures that have improved food and fibre production over time • **compare** farming methods for growing animal and plant fibres in Australia and how these are processed into a variety of products and materials • **compare** the environments for certain plants and animals • **explore** how First Nations peoples harvest seasonal foods for healthy eating • **recognise** the benefits and impacts of food technologies for heath and food safety, ensuring food is available and can be prepared for healthy eating	and choices about food preparation and preservation. **Students:** • **explore** how First Nations peoples used techniques and technologies to grow and harvest food and fibre • **investigate** the technologies and costs associated with producing food and fibre on small and larger scales • **consider** the relationship between plant types and animal breeds and their suitability for environments • **describe** the process from a managed environment to consumer, for example, paddock to plate • **consider** food security and Australia's role in providing food locally and globally • **explore** Australian indigenous ingredients and how they have been used by First Nations peoples for food production to meet culinary, dietary, nutritional or medicinal needs[11]	preparation for healthy eating. **Students:** • **explore** the ways First Nations peoples grew and prepared food pre-colonisation and how lessons in sustainability can be applied to present practices[10] • **investigate** and **experiment** with different tools, equipment and methods of creating environments suitable for growing food products • **explain** the relationship between plant types and animal breeds and their suitability for certain environments • **sequence** and describe the process of creating food or fibre products from farm to consumer • **investigate** food security locally and globally and suggest opportunities to solve nutritional problems • **investigate** the ways First Nations peoples have long selected and prepared food for healthy eating based on nutritional value, availability, spoilage, preparation and processing or

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Food specialisations Students consider the ways foods can be prepared and consumed for healthy eating and consider how food choices can be influenced by production, seasonal availability, environmental, cultural, ethical and sustainability factors. Note that 'Food and fibre production' and 'Food specialisations' are taught as one content area from reception to year 6. They are dealt with separately from year 7 onwards.		Strait Islander Guide to Healthy Eating • **investigate** ways to **prepare** a variety of fresh produce and how this influences dietary choices, for example, increasing vegetable intake by preparing them in ways that make them more enjoyable • **identify** and, with support**, follow** safe food practices and guidelines to create food products and growing environments • **identify** food services and how they are delivered, for example, school canteens, supermarkets, restaurants or mobile delivery services	provided to meet the needs of communities • **identify** and **follow** food safety guidelines when preparing and handling food.	Aboriginal and Torres Strait Islander Guide to Healthy Eating**.** For example, tracing the origins of some of the students' favourite foods and their nutritional value. • **recognise, describe** and **use** safe food preparation practices and use dietary guidelines when creating food products.	• **explore** the differences between processed and unprocessed food • **explore** food using the senses and describe food experiences, for example, noticing colour, aroma, texture and taste • **consider** creative ways of preparing food for taste and visual, taste or aromatic appeal • **identify, describe** and **use** safe food practices to maintain hygiene and minimise spoilage and waste • **identify** the features of a balanced diet comparing and using food guidelines.	• **examine** the Australian Guide to Healthy Eating or Aboriginal and Torres Strait Islander Guide to Healthy Eating and the nutritional content of fresh and processed foods • **experiment** with and use tools, ingredients and techniques to design, make or preserve food products for an identified consumer • **experiment** with preparing and tasting food to diversify food repertoires • **investigate** eating patterns and how to promote healthy eating choices • **explore** the ways food is provided in services for consumers • **identify** and **use** food safety practices including maintaining hygienic surfaces and tools, safe handling techniques and common sanitary routines like handwashing, keeping meat and vegetables separate on chopping surfaces and keeping hair out of the way.	preservation techniques[12] • **apply** the Australian Guide to Healthy Eating or Aboriginal and Torres Strait Islander Guide to Healthy Eating when planning and preparing food products to meet the requirements of a balanced and nutrition-rich diet • **experiment** with tools, equipment ingredients – including Australian indigenous ingredients – and techniques to design, make or preserve food for selected groups to meet their dietary, taste and nutritional needs • **apply** and **promote** food safety practices including maintenance of hygienic surfaces and tools, safe handling techniques and common sanitary routines like handwashing, keeping meat and vegetables separate on chopping surface and keeping hair out of the way • **explore** a variety of foods from diverse cultures and compare and respectfully describe tastes,

Sub-strand	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
							aromas and textures to broaden experience and food repertoires • **research** healthy eating patterns and design food experiences that support healthier choices • **explore** new and emerging food technologies and diverse food preservation and service provision.

Strand: Process and production skills

Sub-strands	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Investigating and defining Students use **design thinking** to: • develop **empathy** for end users' needs and find problems that need solutions • consider the limitations of current solutions • define problems and develop design briefs and success criteria.				**Compare** and **contrast** the needs or opportunities for creating designed solutions. **Students:** • **evaluate** the suitability of a variety of materials, components, tools, and equipment, and the techniques needed for designed solutions • **explore** the ways designers use different materials and technologies according to availability, durability and sustainability considerations • **investigate** the ways designers deliver services, products or environments to meet community needs and solve problems • **select** or **co-develop** design criteria for a selected product, service or environment that meets the needs of an identified user.	**Explore** needs or opportunities for designing, and testing materials, components, tools, equipment and processes needed to create designed solutions. **Students:** • **explore** the ways in which First Nations peoples design existing products using locally sourced materials and how these meet the needs of communities. For example, looking at how watercraft are made by the Kaurna peoples which, when coated in ochre, stops borers and protects from other wood-eating insects[13]. • **examine** the production of local products, services and environments to enhance their own design solution ideas, for example, discussing the processes and systems that might be used to distribute hot food to a large number of people at a community event • **select** and **make judgements** about appropriate joining	**Consider** the needs or opportunities presented by a target group of end users. **Consider** the possibilities for designed solutions based on the suitability and availability of materials, components, tools and equipment needed. **Students:** • **investigate** the technologies used by First Nations peoples to solve design problems using sustainable materials • **identify** the needs of end users by investigating local design problems • **identify** design criteria by testing materials, tools and equipment and deciding on the most appropriate solution to a design problem • **understand** how to minimise waste and use of materials when designing and constructing designed solutions.	**Investigate** needs or opportunities for designing, and the materials, components tools, equipment and processes needed to **create** designed solutions. **Students:** • **investigate** the way First Nations peoples use traditional fibre sources as potential solutions for existing problems, for example, creating biodegradable rope as an alternative to acrylic • **identify** needs or opportunities using a needs analysis process and **design** an appropriate product, service or environment that provides a solution • **investigate** existing designed solutions from around the world and how they meet design criteria to inform design decisions • **investigate** the component parts of a working system through deconstruction and reconstruction, and

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					techniques to produce designs, prototypes, structures or working models, for example, joining fabric, paper or cardboard in various ways to solve construction problems • **explore** and **test** several materials under different conditions for suitability, including sustainability considerations, and create design criteria based on observations • **explore** the different uses of materials in a range of products, to inform design decisions.		**identify** the ways the parts work together to provide a product, service or environment that solves a problem • **review** a range of materials, components, tools and equipment to **determine** the appropriate technologies needed to solve a design problem • **investigate** waste minimisation and using materials economically when creating, producing and delivering products, services or environments.
Generating and designing Students use **design thinking** to develop an **ideation** process, where designers pose 'How might we…' questions to generate lots of solutions. Some may be far-fetched and impossible, but divergent thinking is a necessary part of this process Students decide upon a solution and begin to visualise and graphically document the final	**Generate** and **communicate** design ideas. **Students:** • **draw, build**, or **record** design ideas • **make** choices about the suitability of design ideas, materials and tools • **refer** to success criteria when designing solutions.	**Generate** and **communicate** design ideas using a range of methods. **Students:** • **list** and **consider** the positive and negative aspects of a product, service or environment, for example, explaining aspects of a garden they like or dislike • **list** their preferences for a designed solution, for example, identifying ingredients	**Generate** and **communicate** design ideas through describing, drawing or modelling, including using digital tools. **Students:** • **compare** and **contrast** features of existing products to **develop** new ideas, for example, designing a puppet with moveable parts after experimenting with various other puppets with moving parts	**Generate** and **communicate** design ideas and decisions through explaining labelled diagrams, drawings or models. **Students:** • **select** and **communicate** design ideas, explaining suitability and success criteria • **record** and **label** design ideas using models or drawings, and seek feedback	**Generate** and **communicate** design ideas and decisions using technical terms and graphical representation techniques, including using digital tools. **Students:** • **plan**, **share** and **document** creative designs, ideas and processes using appropriate terms with and without digital tools • **visualise** innovative design ideas by using analogue and digital	**Generate** and **communicate** design ideas and make adjustments based on user feedback. **Students:** • **generate** design ideas based on co-developed or given design criteria • **visualise** and **communicate** design ideas using analogue and digital tools to create annotated drawings or explanations of models or prototypes	**Generate**, **iterate** and **communicate** design ideas, decisions and processes using technical terms and graphical representation techniques, including using digital tools. **Students:** • **generate** design ideas for products, services or environments using prior knowledge, skills and research • **analyse**, **modify** and **develop** design ideas to enhance and improve the

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product, service or environment. Students **iterate** on designs. To **iterate,** means that students follow a cycle of producing, reviewing and improving their designs throughout the process so the final design is a better or more practical version of the original idea.		they like and don't like in a smoothie • **generate** design ideas based on improving a product, service or environment • **describe**, **draw** or **make** models of design ideas • **attempt** to label drawings or verbalise explanations • **use** digital drawing tools to visualise design ideas • **pose** questions about the suitability of design solutions • **refer** to a list of success criteria when designing solutions.	• **investigate** their own and their peers' personal preferences for designed solutions, for example, graphically representing the popular contents of the class' lunch boxes and designing a balanced lunch box • **communicate** design ideas by modelling or producing and labelling 2-dimensional (2D) drawings or 3-dimensional (3D) models using a range of technologies, for example, showing the top and side view of a product • **communicate** an opinion about their design ideas by expressing their likes and dislikes • **describe** the results of a feedback process on design ideas and identify the aspects of their design that may need improving • **refer to** simple design briefs when designing solutions.	• **adjust** designs based on feedback • **use** digital tools to communicate design ideas, for example, using drawing tools or 3D modelling programs to generate a model of a design that can be viewed from more than one angle • **review** and **refer** to success criteria when designing an end product, service or environment.	tools to produce thumbnail drawings, models and labelled diagrams to explain features and modifications • **communicate** design ideas using analogue and digital tools, for example, labelling a diagram for a pushcart with technical terms and explanations about components like chassis, axle, wheels and steering, or creating a 3D virtual model and narrating a 'fly though' • **generate** design ideas for solutions using guidelines such as Safety by Design principles • **review** and **add to** design briefs that identify constraints, resources, roles and responsibilities while designing solutions.	• **modify** and **develop** design ideas based on user input and feedback • **experiment** with tools, equipment and materials to make decisions about suitability for purpose • **consider** the impact of designs on people and place • **reference, review** and **redevelop** success criteria when designing solutions to allow for changing constraints, roles and responsibilities, materials and processes • **consider** Safety by Design principles when generating design ideas.	sustainability of a product, service, environment or system • **represent** and **communicate** design ideas using modelling and drawing standards, including using digital tools • **develop** and **use** models to iterate on and improve design ideas • safely **experiment** with materials, tools and equipment to refine design decisions and processes • **consider** the social values and ethics of users when designing • **reference, review** and **redevelop** design briefs that consider variable constraints, success criteria, roles and responsibilities and changing needs or opportunities.
Producing and implementing Students use **design thinking** to **prototype**, where designers create	**Use** materials, equipment and steps to safely make a solution for a purpose.	**Identify** and **use** safe procedures when designing solutions with a range of tools and equipment.	**Use** materials, components, tools, equipment and techniques to safely make designed solutions.	**Identify** and **use** appropriate materials, tools, components and techniques when safely	**Select** and **use** materials components, tools, equipment and techniques to safely make designed solutions.	**Identify** and **make** decisions about the use and suitability of materials, components, tools, equipment and	**Select** and **use** suitable materials, components, tools, equipment and techniques to safely make designed solutions.

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and trial models or simulations. Students can continue to iterate by rebuilding and improving their prototypes.	**Students:** • **explore** how available materials can be used or re-used in construction play • safely **practise** a range of technical skills using equipment • **assemble** components of systems and check they function as planned • **follow** steps to draw, make, build or produce a solution.	**Students:** • **explore** 'upcycling' or reusing discarded materials to create new designed solutions • **identify** and safely **practise** a range of technical skills required to create designed solutions, for example, safely using appropriate utensils to mix ingredients for a recipe.	**Students:** • **explore** how available materials can be used or re-used in designed solutions • **practise** a range of technical skills using tools and equipment safely, for example, using appropriate joining techniques when constructing designed solutions • **assemble** components and check they function as planned, for example, testing containers, contents and joining materials when making musical shakers.	making designed solutions. **Students:** • **explore** techniques and technologies that allow products, environments or systems to be successfully constructed • **explore** the ways digital tools can support modelling, design and construction of products, services or environments • **identify** and safely **use** the correct tools and techniques when using materials and equipment, including digital tools • **identify** and **use** safe collaborative practices to achieve shared project goals • **select** and **use** appropriate materials, tools, equipment and techniques while considering environmental impact, for example, deciding to minimise waste or use biodegradable materials • **document** processes to achieve design goals using technical terms, for example, creating and sharing annotated	**Students:** • **explore** ways of joining, connecting and assembling components that ensure success, including the impact digital tools have on these processes. For example, creating prototypes out of cardboard and 3D printed PLA plastic and making comparisons. • **use** tools and equipment accurately when measuring, marking and cutting, for example, measuring ingredients in a recipe, preparing a garden bed for sowing seeds, or creating a template or pattern before cutting fabric • **explain** the importance of safe, responsible, inclusive and cooperative work practices when designing and making, for example, when handling and sharing sharp implements • **select** and **use** materials, components, tools, equipment and processes while considering the environmental impact at each stage of the production process.	techniques to safely make designed solutions. **Students:** • **identify** and **select** the most appropriate materials and joining techniques to create sustainable products, services or environments • **identify** and **use** safe procedures and equipment to protect themselves and others when designing solutions, for example, using safety glasses, gloves or other personal protective equipment (PPE) when handling models or foodstuffs • **select** and **use** tools, equipment and techniques appropriate to the purpose, for example, safely following operating procedures for equipment like blenders when preparing smoothies • **identify** and **follow** agreed safety protocols when creating solutions, for example, following kitchen rules and procedures to ensure they are using equipment safely, such as making sure pan handles are turned	**Students:** • **develop** an impact effort matrix to decide on the most efficient method of production • **match** material and joining techniques to the design intention, for example, accurately and safely cutting and sewing fabric pieces to make an enrichment toy for an animal housed in a shelter, or joining components to produce an electric device • **use** appropriate personal protective equipment (PPE) when using some tools and equipment, for example, protective eyewear, and working safely, responsibly and cooperatively to ensure safe work areas, for example, the safe disposal of batteries when constructing an electronic device • **choose** appropriate materials, tools, equipment and techniques for a specific purpose, for example, when safely and hygienically preparing food, cultivating garden beds

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				diagrams that explain the materials, tools and steps to create a product.	For example, considering how packaging and offcuts could be recycled or used for other purposes before choosing materials for a project. • **use** appropriate technologies terms to describe and share with others the procedures and techniques for making. For example, how to safely make an engineered solution to move a robotic device through a maze.	away from people moving in the space to avoid potential burns • **develop** awareness of injury prevention, basic first aid and reporting processes if injury does occur while creating designed solutions.	or constructing electronic products • **identify** work practices that show an understanding of nutrition, environmental considerations, hygiene and food safety when designing and making a food product. For example, washing fruit and vegetables carefully to remove residues, safe disposal of cooking oils to avoid environmental damage, refrigerated storage of highly perishable foods, and being aware of food allergies. • **develop** an understanding of injury prevention, basic first aid and reporting processes if injury does occur while creating designed solutions.
Evaluating Students use **design thinking** to **evaluate** the design ideas, processes and solutions against specific success criteria, as outlined in a design brief. They understand design briefs can change		**Evaluate** the success of design ideas based on co-developed success criteria. **Students:** • **explain** strengths or weaknesses in a design idea • **consider** the impact of design ideas on the environment and whether more	**Evaluate** the success of design ideas and solutions based on personal preferences and sustainability. **Students:** • **share** design strengths and weaknesses, for example, explaining how the equipment in a playground might be unsuitable for some	**Evaluate** against given or co-developed design criteria, including sustainability, to **make considered judgements** about designed solutions. **Students:** • **explore** agreed protocols for designing and **incorporate** them into design criteria, for example,	**Use** given or co-developed design criteria, including sustainability, to **evaluate** design ideas and solutions. **Students:** • **develop** design criteria with others including agreed protocols, for example, universal design principles to	**Co-develop**, **monitor** and **review** design criteria, including sustainability, and **reference** these when reflecting on ideas, designed solutions or processes. **Students:** • **reference, alter** and **document** design briefs, including success criteria, as new	**Negotiate** design criteria, including sustainability, to **evaluate** design ideas, processes and solutions. **Students:** • **decide** on design criteria collaboratively for a designed solution, for example, including an environmental sustainability criterion

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according to evaluation results. Evaluation does not necessarily only happen at the end of a process, but is part of the cycle of creating, reviewing and reiterating on design ideas.		sustainable materials could be used • **identify** what went well and what needed improvement when reflecting on their designed solutions • **reflect** on others' design solutions and, with support, **provide** constructive feedback, for example, using reflective prompts such as 'I really like…because', 'One thing you could change is…'.	children to use and suggesting areas for improvement • **reflect** on the environmental impacts of a solution and consider alternatives that would minimise future negative impacts. For example, identifying the negative environmental impacts of different food packaging and how these could be minimised. • **reflect** on and **record** a judgement about design ideas, solutions, processes or challenges, for example, describing how their designs met or did not meet needs of users.	understanding accessibility issues for people with disabilities and redesigning solutions to make them easier to use • **model**, **simulate** or **test** the suitability of design ideas and get feedback from end users • **understand** the need for waste minimisation in designed solutions and **demonstrate** an awareness of meeting sustainability criteria • **reflect** on how well their designed solutions met design briefs and criteria, and suggest improvements to the processes or end products.	address factors that make a solution more inclusive, such as designing a game controller for a visually impaired person that uses sounds or vibrations to signal actions • **use** design criteria to **evaluate**, **revise** and **select** design ideas, for example, ensuring food is stored and served in ways that are safe for consumers • **consider** environmental sustainability in design solutions, for example, compare the amount of waste that would be produced from different design ideas and the potential for recycling waste, such as exploring the choice of materials to construct a toy and whether these materials are repairable or able to be recycled once the toy breaks or is no longer wanted • **reflect** on how well their designed solutions met design criteria, such as ensuring the safety and wellbeing of users and meeting the needs of communities or diverse cultures. For	and emerging challenges arise • **co-develop** design criteria to meet social, ethical, legal or sustainability considerations, for example, including a constraint that requires construction using only natural or biodegradable adhesives • **reiterate** and **modify** designs based on user feedback and experiences with processes and production challenges • **document** and **reflect** on costs and benefits of designed solutions to inform improvement goals • **reflect** on designed solutions by gathering, analysing and synthesising user feedback.	such as 'product should be recyclable' • **develop** and **refer** to design criteria with others to **evaluate** the suitability of materials, tools and equipment for specific purposes, for example, considering the most suitable fabric, tools and equipment needed to make beeswax wraps • **iterate** on and **modify** design ideas based on evaluation to improve solutions, for example, modifying the sensitivity of sensor values in the design of an automated light • **evaluate** their designed solutions, including considering the benefits, risks and costs of production processes and the environmental impact. For example, looking at the costs, risks and benefits of the establishment of a food-producing garden environment. • **reflect** on designed solutions to **evaluate** and assess suitability and sustainability, and determine how well they met design criteria, for example gathering relevant data

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					example, reviewing and discussing the choice of fabrics used to make re-usable bags and how they could be made more appealing or accessible to diverse end users.		to make judgements about a school or community fundraising event in relation to waste reduction, attendance and funds raised, and considering how these aspects could be handled in future events • **document** reflections as part of an ongoing process of creating and reviewing designed solutions.
Collaborating and managing Designers rarely work alone. It is important that diverse teams work together using each other's strengths to develop solutions. Students use **systems thinking** to develop **project management** skills and plan how to best use resources, people and time from the start to the end of the design process.		**Cooperate** with others to safely design, plan, make and evaluate solutions. **Students:** • **negotiate** roles and responsibilities when completing shared design projects • safely **share** and **distribute** resources and consider how to minimise waste • actively **contribute** to shared projects using listening and dialogue, fulfilling a role or supporting decision making.	**Sequence** steps for making solutions cooperatively. **Students:** • **use** recording techniques like lists, recipes, diagrams or storyboards for planning or making designed solutions, for example, recording the procedure for making a product, which includes ordered steps or instructions, and indicating who will be responsible for which parts of the process • **identify** and carry out roles and responsibilities as a contributing member of a group when working cooperatively on shared design projects	**Collaborate** with others to identify and implement safe processes required to complete shared design projects. **Students:** • **establish** a planning process that clearly identifies roles, responsibilities and deadlines • **sequence** production steps to completion and distribute resources fairly, minimising waste • **consider** and **document** production steps that will make sure the design project is completed on time and matches the design criteria in the design brief	**Sequence** steps to individually and collaboratively **make** designed solutions. **Students:** • **determine** planning processes as a class or group, for example, recording when parts of a project need to be completed on a timeline using a spreadsheet, calendar or list • **discuss** the importance of managing time and resource allocation throughout production, for example, discussing the roles different people might take in a team and identifying the tasks they will complete and the	**Develop** project management skills by understanding how to **share** roles, responsibilities, materials, tools and equipment to safely **complete** design solutions. **Students:** • **identify** deadlines and milestones to **keep track** of shared projects • **allocate** and fairly **distribute** roles and responsibilities, managing challenges and using effective conflict resolution or relationship building processes to completion shared design projects • **identify**, **plan** and **document** production	**Develop** project plans that consider resource use to individually and collaboratively **make** designed solutions. **Students:** • **plan** production steps, **set** milestones and support the allocation of roles to team members to effectively **complete** design projects, for example, using digital tools to contribute to shared documents or spreadsheets including tasks, deadlines and roles, ensuring access by setting sharing permissions with selected people • **identify** the human resources, materials, tools and equipment that will be needed to

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			• **identify** and **share** materials, tools and equipment to complete shared projects**.**	• **manage** relationships so that team members are aware of their roles and responsibilities.	resources they will each need • **identify** the steps in a mass production process, for example, drawing a flowchart or making a video recording of a procedure for packing identical boxes of food for community members in need, where each student in a group has a separate task as part of the production process • **share** materials, tools, equipment and tasks, and **manage** relationships by using effective conflict resolution strategies if issues arise.	steps to complete design projects • **share** limited resources fairly and **minimise** waste.	make a designed solution as part of a project plan and specify timelines, for example, ensure access to a wildlife expert at the planning stage of a project • **schedule** and **share** access to human resources, materials, tools and equipment when creating designed solutions in individual or shared projects • **build** and **manage** collaborative working relationships when working on shared design projects.

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