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CURRICULUM ELEMENTS

Foundation

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| **Year level description** |
| Learning in Design and Technologies builds on the Early Years Learning Framework, and each student’s prior learning and experiences.  By the end of Foundation students should have had the opportunity to create at least one type of designed solution for one of the technologies contexts or one identified by the school. There are rich connections to Digital Technologies, and other learning areas, including Science and Humanities and Social Sciences.  Students should have opportunities to experience designing and producing a product, service or environment. They explore technologies – materials and equipment – through play experiences in a context and generate ideas to design a solution for a purpose. Students develop an awareness of how people design products, services and environments. They evaluate design ideas and choose the most suitable idea. Students use a range of methods to communicate design ideas, including drawings or models, for example changing perspectives from front view to plan view. They explore working with materials such as cardboard, fabric and other common household items and using equipment such as scissors, glues, trowels or kitchen utensils. Students learn techniques to safely make a designed solution. |
| **Design and Technologies Achievement standard** |
| By the end of Foundation students identify familiar products, services and environments. They create a designed solution for a school-selected context. Students create, communicate and choose design ideas. They follow steps and use materials and equipment to safely make a designed solution. |
| **Learning area Achievement standard** |
| By the end of Foundation students identify familiar products, services and environments and develop familiarity with digital systems, using them for a purpose. They create, communicate and choose design ideas. Students follow steps and use materials and equipment to safely make a designed solution for a school-selected context. They show how to represent data using objects, pictures and symbols and identify examples of data that is owned by them. |

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| **Strand: Knowledge and understanding** | | **Foundation** |
| **Sub-strand: Technologies and society** | | |
| **Content descriptions** *Students learn to:* | **Content elaborations**  *This may involve students:* | |
| explore how familiar products, services and environments are designed by people  AC9TDEFK01 | * identifying how First Nations Australians have long designed and produced domestic items including clothing, tools and shelter, for example the Lamalama Peoples of the eastern Cape York Peninsula weave the reddish coloured fibres from *Acacia latifolia* alternately with white coloured fibres from *Brachychiton diversifolium* to produce a striped woven bag * exploring how local delivery services meet different needs of people, for example describing how gift packages can be sent to and from people who live in different locations and how online shopping items arrive at a  person’s home * exploring how an environment such as a local playground may have shade structures to protect users and be designed to allow access for all * describing how community gardens, public swimming pools and parks are designed to help people stay healthy * asking questions about the design of products from the local store, for example why certain packaging materials might have been selected, and how people design the text and images on the packaging to attract people’s attention | |

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|  | | **Foundation** |
| **Sub-strand: Designing and making** | | |
| **Content descriptions** *Students learn to:* | **Content elaborations**  *This may involve students:* | |
| generate, communicate and evaluate design ideas, and use materials, equipment and steps to safely make a solution for a purpose  AC9TDEFP01 | * identifying a purpose for designing and making a solution, for example the sand keeps blowing out of the sandpit, the birds keep flying into the waste bin and taking food scraps or people with disability need to know where they can park at school * exploring ideas by drawing or modelling and choosing the most suitable idea, for example drawing or modelling designs for bee hotels to attract native bees to the school garden and choosing one to make, and changing perspectives from front view to plan view * evaluating what they have made using personal preferences, for example using a smiley face Likert scale * exploring how available materials can be used or re-used in construction play, for example using blocks and rain gutters or cardboard to make a ramp to roll a ball or toy car down * practising a range of technical skills safely using equipment, for example joining techniques when making a product from materials, such as a greenhouse to keep a seedling warm or a trellis for holding up tomato plants * assembling components of systems and checking they function as planned, for example making and testing a bowling, stacking or obstacle game with discarded food containers or packaging | |

Years 1–2

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| **Band level description** |
| By the end of Year 2 students should have had the opportunity to create 3 types of designed solutions, and addressed each of these 2 technologies contexts:   * Engineering principles and systems; Materials and technologies specialisations * Food and fibre production; Food specialisations.   Students should have opportunities to experience designing and producing products, services and environments. There are rich connections to Digital Technologies, and other learning areas, including Science and Humanities and Social Sciences.  Students explore and investigate technologies – tools, equipment, processes, materials, systems and components – including their purposes and how they meet personal and social needs within local settings. Students learn about how society and environmental sustainability factors influence design and technologies decisions. They begin to consider the impact of their decisions and of technologies on others and the environment.  They evaluate designed solutions using questions such as: How does it work? What purpose does it meet? Who will use it? What do I like about it? How can it be improved? They reflect on their participation in a design process. This involves students developing new perspectives and engaging in different forms of evaluating products, services and environments based on their personal preferences.  Students use a range of technologies to communicate and explain design ideas, including drawings and models. They label drawings and draw objects as 2-dimensional images from different views.  They plan steps, follow directions and manage their own role to complete their own or group design projects. Students are aware of the need to work safely and cooperatively when making designed solutions. |
| **Design and Technologies Achievement standard** |
| By the end of Year 2 students describe the purpose of familiar products, services and environments. For each of the 2 prescribed technologies contexts they describe the features and uses of technologies and create designed solutions. Students select design ideas based on their personal preferences. They communicate design ideas using models and drawings and follow sequenced steps to safely produce designed solutions. |
| **Learning area Achievement standard** |
| By the end of Year 2 students describe the purpose of familiar products, services and environments, including digital systems. They represent and process data in different ways and follow and describe basic algorithms involving a sequence of steps and branching to show how simple digital solutions meet a need for known users. For each of the 2 prescribed technologies contexts they identify the features and uses of technologies and create designed solutions. Students select design ideas based on their personal preferences. They access and use the basic features of common digital tools to create, locate and share content, and collaborate and communicate design ideas using models and drawings. Students safely produce designed or digital solutions and recognise that digital tools may store their personal data online. |

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| **Strand: Knowledge and understanding** | | **Years 1–2** |
| **Sub-strand: Technologies and society** | | |
| **Content descriptions** *Students learn to:* | **Content elaborations**  *This may involve students:* | |
| identify how familiar products, services and environments are designed and produced by people to meet personal or local community needs and sustainability  AC9TDE2K01 | * exploring how First Nations Australians have long understood their dependence on living systems to meet their local and community needs, for example exploring the material culture of the Ngarrindjeri Peoples who sustainably make woven items from a grass-like sedge * exploring how particular services meet different needs of people in the community, for example describing why doctors provide medical care to people in many ways including by phone, video conference, plane, car or outdoor clinic * asking questions about the design of a range of shelters provided for the public and how they meet the needs of people in the community, for example the structures of a school or local sportsground or how to  improve accessibility * exploring how local products are designed, for example brainstorming the materials and processes needed to create a costume for a school or community event including using recycled clothing or components to minimise waste * exploring how people come up with new ideas or modify existing designs, for example preventing water wastage when caring for plants | |
| **Sub-strand: Technologies context: Engineering principles and systems; Materials and technologies specialisations** | | |
| explore how technologies including materials affect movement in products  AC9TDE2K02 | * investigating First Nations Australians’ instructive toys and how such toys are designed and made to produce movement, for example propeller toys made from pandanus across northern Australia * selecting materials to show how material properties are appropriate for particular designed solutions, for example materials that enable sliding, floating or flying * exploring how to manipulate materials using a range of tools, equipment and techniques to create movement, for example when constructing a toy boat that floats or a kite that flies * exploring a system such as a marionette or Indonesian wayang kulit shadow puppet to see that by combining materials with forces movement can be created * testing materials to see how they affect movement and speed, for example the movement of a wheeled toy on different surfaces such as timber, carpet, rubber and plastic | |
| **Sub-strand: Technologies context: Food and fibre production; Food specialisations** | | |
| explore how plants and animals are grown for food, clothing and shelter  AC9TDE2K03 | * exploring how First Nations Australians grow plants and animals for food, for example how land is transformed through the construction of terraces at Wagadagam on Mabuiag Island in the Torres Strait, or how the Kombumerri Peoples of South East Queensland developed an important aquaculture industry farming  mangrove worms * identifying which plants and animals can provide food or materials for clothing and shelter, for example looking at a range of items and sorting them according to plant or animal source * exploring where plants and animals are grown for food, clothing and shelter in Australia, for example citrus fruit in South Australia; cotton in New South Wales, which is harvested and made into yarn and fabric for clothing; or timber for building homes from sustainable forests in Tasmania * identifying products that can be designed and produced from plants and animals, for example food products, paper and wood products, fabrics and yarns * considering a range of tools and equipment that can be used to grow plants for a purpose and their suitability, for example naming and describing tools such as a spade or rake used to cultivate or mulch a home vegetable garden, or equipment such as a seed spreader or global positioning system (GPS) tractor to sow wheat, or a tubestock planting tool and drones to manage forestry plantations | |
| explore how food can be selected and prepared for healthy eating  AC9TDE2K04 | * identifying a wide range of foods, categorising them into food groups according to the *Australian Guide to Healthy Eating* or the *Aboriginal and Torres Strait Islander Guide to Healthy Eating* and discussing ways to eat a variety of food groups, including cooking methods, tools and equipment needed to prepare them for healthy eating * exploring how people including peoples from the countries of Asia design and produce food for healthy eating based on the available plants and animals in their region, the influence of cultural practices, and locally available tools and equipment * exploring the *Australian Guide to Healthy Eating* and the *Aboriginal and Torres Strait Islander Guide to Healthy Eating* and identifying foods in each of the 5 food groups which contribute to health and wellbeing, for example choosing foods from each of the 5 food groups which they are familiar with and designing a menu for a day * exploring the local supermarket to observe the variety of foods and the placement of foods on shelves, in aisles and displays; and considering how their design may influence the purchase of foods for healthy food eating * exploring different ways of preparing the products from the school kitchen garden, farmers’ market or supermarket, for example preparing vegetables for a salad, steaming or roasting vegetables and noticing the changes in flavour and texture | |

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| **Strand: Processes and production skills** | | **Years 1–2** |
| **Sub-strand: Generating and designing** | | |
| **Content descriptions** *Students learn to:* | **Content elaborations**  *This may involve students:* | |
| generate and communicate design ideas through describing, drawing or modelling, including using digital tools  AC9TDE2P01 | * comparing and contrasting features of existing products to develop new ideas, for example designing and making a puppet with a movable part after experimenting with other toys with several movable parts * communicating design ideas by modelling or producing and labelling 2-dimensional drawings using a range of technologies, for example designing a new environment such as a cubbyhouse or animal shelter and showing different views (top view and side view) with descriptions of materials and features * communicating an opinion about their design ideas, for example expressing own likes and dislikes about a design idea for felt finger puppets including how they have made changes to their design ideas * describing the results from exploring design ideas, for example recording the results from people taste-testing a food product | |
| **Sub-strand: Producing and implementing** | | |
| use materials, components, tools, equipment and techniques to safely make designed solutions  AC9TDE2P02 | * exploring how available materials can be used or re-used in construction play, for example using used wrapping paper and gift cards to design and make decorations or signage for the classroom or a school event to minimise waste * practising a range of technical skills using tools and equipment safely, for example joining techniques when making products, watering and mulching gardens, preparing a recipe using a knife safely * assembling components and checking they function as planned, for example containers, contents and joining materials when making musical shakers | |

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| **Sub-strand: Evaluating** | |
| evaluate the success of design ideas and solutions based on personal preferences and including sustainability  AC9TDE2P03 | * reflecting on and recording a judgement about design ideas, for example describing how design ideas meet the needs of those who will use the solution using audio-recording or video-recording software * sharing design strengths and weaknesses, for example explaining how the equipment in a playground might be unsuitable for some children to use and suggesting areas for design improvement * reflecting on the environmental impacts of the production of a solution and considering alternative approaches that would minimise future negative impacts, for example identifying the negative environmental impacts of different food packaging and how these could be minimised * reflecting on the challenges of designing and producing a solution and recording these reflections, for example when growing a food product, designing a structure to take a load or making a nutritious snack |
| **Sub-strand: Collaborating and managing** | |
| sequence steps for making designed solutions cooperatively  AC9TDE2P04 | * using lists or storyboarding when planning and making, for example when creating an electronic planting calendar * recording the procedure for making a product, for example the ordered steps for making a salad, instructions for making a container or bag * identifying roles for each member of a group when working cooperatively, for example when making a number of items for a school fete |

Years 3–4

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| **Band level description** |
| By the end of Year 4 students should have had the opportunity to create 3 types of designed solutions, and addressed each of these 2 technologies contexts:   * Engineering principles and systems; Materials and technologies specialisations * Food and fibre production; Food specialisations.   Students should have opportunities to experience designing and producing products, services and environments. There are rich connections to Digital Technologies and other learning areas, including Science and Health and Physical Education.  Students investigate technologies – tools, equipment, processes, materials, systems and components – developing a sense of self and ownership of their ideas and thinking about their peers and communities and as consumers. They consider the purpose of technologies and how they meet needs. Students explore and learn to harness their creative, innovative and imaginative ideas and approaches to achieve designed products, services and environments. They do this through planning and awareness of the characteristics and properties of materials and the use of tools and equipment.  They learn to reflect on their actions to refine their processes, develop their decision-making skills and improve their solutions. Students examine social and environmental sustainability implications of existing products and processes. They become aware of the role of those working in design and technologies occupations and how these people think about the way a product might change in the future.  Students clarify and present ideas, using a range of technologies and graphical representation techniques, for example drawing annotated diagrams and modelling objects as 3-dimensional images from different views. Students use symbols, flow diagrams and charts for documenting design and production ideas.  Students become aware of appropriate ways to manage their time and co-develop and use design criteria. They list the major steps needed to complete a design task. They show an understanding of the importance of planning when designing solutions, in particular when collaborating. Students identify safety issues and learn to follow safety rules when producing designed solutions. |
| **Design and Technologies Achievement standard** |
| By the end of Year 4 students describe how people design products, services and environments to meet the needs of people, including sustainability. For each of the 2 prescribed technologies contexts they describe the features and uses of technologies and create designed solutions. Students select design ideas against design criteria. They communicate design ideas using models and drawings including annotations and symbols. Students plan and sequence steps and use technologies and techniques to safely produce designed solutions. |
| **Learning area Achievement standard** |
| By the end of Year 4 students describe how people design products, services and environments to meet the needs of people, including sustainability. They process and represent data for different purposes, follow and describe simple algorithms involving branching and iteration, and implement them as visual programs. For each of the 2 prescribed technologies contexts they describe the features and uses of technologies and create designed solutions. Students select design ideas against design criteria. Students securely access and use digital systems and their peripherals for a range of purposes, including transmitting data. They communicate design ideas using models and drawings including annotations and symbols. Students plan and sequence steps and use technologies and techniques to safely produce designed solutions. They use the core features of common digital tools to plan, create, locate and share content, and to collaborate, following agreed behaviours. Students identify their personal data stored online and its risks. |

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| **Strand: Knowledge and understanding** | | **Years 3–4** |
| **Sub-strand: Technologies and society** | | |
| **Content descriptions** *Students learn to:* | **Content elaborations**  *This may involve students:* | |
| examine design and technologies occupations and factors including sustainability that impact on the design of products, services and environments to meet community needs  AC9TDE4K01 | * exploring how many First Nations Australians were and continue to be recognised for their specialist skills in designing and producing products made from local materials and providing related services, using sustainable practices to ensure future access to meet community needs, for example traditional adhesives * exploring how design and technologies occupations in the local area (urban, suburban, regional or rural) meet community needs, for example bakers, builders, engineers, farmers, seafood industry workers, mechanics, radiographers, textile designers and others in science, technology, engineering and mathematics roles * examining the suitability of a service or system and proposing improvements, for example a water-saving system for a bathroom at home or school, traffic management systems to reduce traffic jams around the school, remote and regional services including medical services * exploring how Australian designers consider sustainability when designing products, services or environments, for example designing products from 100% recycled materials, designing services that use minimal energy, or designing landscapes that require minimal water * examining products and environments to discover the factors that may have influenced the design and choice of technologies used, for example discussing energy-efficient cooking with a wok, or sustainable wood products for home use including furniture made from plantation timbers, bamboo toothbrushes or coconut shell bowls * conducting a survey to identify a community need that involves accessibility and social sustainability, for example design features that improve access to the school | |

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| **Sub-strand: Technologies context: Engineering principles and systems; Materials and technologies specialisations** | |
| describe how forces and the properties of materials affect function in a product or system  AC9TDE4K02 | * researching how First Nations Australians consider buoyant forces as they select materials for watercraft, for example making bark or dugout canoes * looking at models to identify how materials are used and movement is created, for example in the design of a toy with wheels or moving parts * exploring through play how movement can be started by combining materials and using forces, for example releasing a wound rubber band to propel a model boat, how different materials may impact a marble roll speed, or how various surfaces from carpet to grass to concrete might affect a robot’s movement * deconstructing a product or system to identify how motion and forces affect performance, for example in a puppet such as a Japanese *bunraku* puppet or a model windmill with moving sails * identifying engineered systems and experimenting with available local materials, tools and equipment to solve problems, for example designing a container or parachute that will keep an egg intact when dropped from a height; a pop-up card; a tower; or a vehicle |
| **Sub-strand: Technologies context: Food and fibre production; Food specialisations** | |
| describe the ways of producing food and fibre  AC9TDE4K03 | * researching food and fibre production techniques and technologies developed by First Nations Australians, such as burning, tilling, planting, transplanting, watering, irrigating, weeding, thinning, cropping, storing and trading food * describing tools, equipment and procedures to improve plant and animal production, for example when growing vegetables in the school garden and producing environments such as a glasshouse (protected cropping) or animal housing including safe chicken shelters * comparing farming methods for food in Australia and a country in Asia, for example the use of different types of plants and animals and how diverse technologies are used to produce them * researching how animal fibres (for example wool, alpaca) and plant fibres (for example timber, cotton, bamboo) are produced in Australia, for example how production of plantation timbers may be different from bamboo production |
| describe the ways food can be selected and prepared for healthy eating  AC9TDE4K04 | * exploring how First Nations Australians consider the nutrient content of seasonal foods as a means of maintaining a balanced diet * recognising the benefits food technologies provide for health and food safety and to ensure that a wide variety of food is available and can be prepared for healthy eating, for example pasteurisation of milk for food safety and freezing of vegetables to retain nutrients and reduce food waste * exploring the differences between fresh food and processed food by researching nutrient content of fresh food using a nutrition calculator app and examining nutrition information labels on processed foods for  nutritional values * considering creative ways foods can be prepared for maximum taste and appeal, for example locating and discussing images online that show colourful or fun ways to present food that might encourage healthy eating * describing foods using the senses, for example describing the colour, aroma, sound, texture and taste of the ingredients in a salad or stir-fry and how our senses influence what we select to eat |

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| **Strand: Processes and production skills** | | **Years 3–4** |
| **Sub-strand: Investigating and defining** | | |
| **Content descriptions** *Students learn to:* | **Content elaborations**  *This may involve students:* | |
| explore needs or opportunities for designing, and test materials, components, tools, equipment and processes needed to create designed solutions  AC9TDE4P01 | * exploring the designs and performance of models of First Nations Australians’ watercraft, and the opportunities for their designs to inform the design of a floating toy * examining the production of local products, services and environments to enhance their own design 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 * selecting and making judgements about appropriate joining techniques for materials to produce designs, prototypes, structures or working models, for example joining fabric, paper or cardboard in various ways * exploring and testing a range of materials under different conditions for suitability including sustainability considerations, for example the compostability of paper-based materials or the strength and durability of natural materials * exploring the different uses of materials in a range of products, including those from a country in Asia, to inform design decisions, for example in shelters, boats, handmade tools, baskets, wooden items, musical instruments, clothing and fabric | |

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| **Sub-strand: Generating and designing** | |
| generate and communicate design ideas and decisions using appropriate attributions, technical terms and graphical representation techniques, including using digital tools  AC9TDE4P02 | * visualising innovative design ideas by producing thumbnail sketches, models and labelled drawings to explain features and modifications, for example drawing one or more designs for a machine to collect waste, and including labels and descriptions to explain materials used, their properties and the intended function of components or the whole system * planning, sharing and documenting creative designs, ideas and processes using digital tools and appropriate terms and privacy considerations, for example a class blog or collaborative document that has been selectively shared with peers * communicating design ideas using annotated diagrams, for example labelling a diagram for a pushcart with technical terms and explanations about components such as the chassis, axle, wheels and steering * generating design ideas for solutions using Safety by Design principles, for example designing communication that is accessible for all parents and carers |
| **Sub-strand: Producing and implementing** | |
| select and use materials, components, tools, equipment and techniques to safely make designed solutions  AC9TDE4P03 | * exploring ways of joining, connecting and assembling components that ensure success including the impact digital tools have on these processes, for example using virtual reality or simulations to experience assembling materials or using tools * using tools and equipment accurately when measuring, marking and cutting, for example when creating a template or pattern, measuring ingredients in a recipe or preparing a garden bed for sowing seeds * explaining the importance of safe, responsible, inclusive and cooperative work practices when designing and making, for example when handling sharp equipment such as knives and scissors * selecting and using materials, components, tools, equipment and processes with consideration of the environmental impact at each stage of the production process, for example considering how packaging and offcuts could be recycled or used for other purposes before choosing materials for a project * using appropriate technologies terms to describe and share with other students the procedures and techniques for making, for example how to safely make an engineered solution such as a robotic device |

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| **Sub-strand: Evaluating** | |
| use given or co-developed design criteria including sustainability to evaluate design ideas and solutions  AC9TDE4P04 | * developing design criteria with others including considering universal design principles to address social sustainability, for example a criterion that specifies flexible or intuitive use or low physical effort * using design criteria to evaluate, revise and select design ideas, for example when designing an e-textile toy for a young child to ensure it will be safe * comparing the amount of waste that would be produced from different design ideas and the potential for recycling waste, for example 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 * reflecting on how well their designed solution meets design criteria, such as ensuring safety and wellbeing of users and meeting the needs of communities or different cultures, for example reviewing and discussing the choice of fabrics used to make re-usable bags and how they could be made more appealing to all cultural groups by considering modifications to style |
| **Sub-strand: Collaborating and managing** | |
| sequence steps to individually and collaboratively make designed solutions  AC9TDE4P05 | * determining planning processes as a class, for example recording when parts of a project need to be completed on a timeline, in a spreadsheet, calendar or list * discussing 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 resources they will each need * identifying 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 |

Years 5–6

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| **Band level description** |
| By the end of Year 6 students should have had the opportunity to create 3 types of designed solutions, and addressed each of these 3 technologies contexts:   * Engineering principles and systems * Food and fibre production; Food specialisations * Materials and technologies specialisations.   Students should have opportunities to experience designing and producing products, services and environments. There are rich connections to Digital Technologies and other learning areas, including Science and Health and Physical Education.  Students investigate technologies − tools, equipment, processes, materials, systems and components − that are used in the home and in local, national, regional or global communities, with consideration of society, ethics, and social and environmental sustainability factors. Students consider why and for whom technologies were developed. They engage with ideas beyond the familiar, exploring how design and technologies and the people working in technologies occupations contribute to society. They seek to explore innovation and establish their own design capabilities for designing products, services and environments. Students are given new opportunities for clarifying their thinking, creativity, analysis, problem-solving and decision-making. They explore trends and data to imagine what the future could be like and suggest design decisions that contribute positively to preferred futures.  Using a range of technologies including a variety of graphical representation techniques to communicate, students represent objects and ideas in a variety of forms such as thumbnail sketches, models, drawings, diagrams and storyboards to illustrate the development of designed solutions. They use a range of techniques such as labelling and annotating sequenced sketches and diagrams to illustrate how products function; and recognise and use a range of drawing symbols in context to give meaning and direction.  Students work individually and collaboratively to identify and sequence steps needed for a design task, including negotiating criteria for success. They develop and follow plans to complete design tasks safely, adjusting when necessary. Students identify and maintain safety standards and practices when making designed solutions. |
| **Design and Technologies Achievement standard** |
| By the end of Year 6 students explain how people design products, services and environments to meet the needs of communities, including sustainability. For each of the 3 prescribed technologies contexts they explain how the features of technologies impact on design decisions and they create designed solutions. Students select and justify design ideas and solutions against design criteria that include sustainability. They communicate design ideas to an audience using technical terms and graphical representation techniques. Students develop project plans, including production processes, and select technologies and techniques to safely produce designed solutions. |
| **Learning area Achievement standard** |
| By the end of Year 6 students explain how people design products, services and environments to meet the needs of communities, including sustainability. For each of the 3 prescribed technologies contexts students explain how the features of technologies impact on design decisions and they create designed solutions. They process data and show how digital systems represent data, design algorithms involving complex branching and iteration, and implement them as visual programs including variables. They select and justify design ideas and solutions against design criteria. Students share and communicate ideas or content to an audience using technical terms, graphical representation techniques and appropriate digital tools. They develop project plans, including production processes, and select technologies and techniques to safely produce designed or digital solutions. Students securely access and use multiple digital systems and describe their components and how they interact to process and transmit data. They identify their digital footprint and recognise its permanence. |

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| **Strand: Knowledge and understanding** | | **Years 5–6** |
| **Sub-strand: Technologies and society** | | |
| **Content descriptions** *Students learn to:* | **Content elaborations**  *This may involve students:* | |
| explain how people in design and technologies occupations consider competing factors including sustainability in the design of products, services and environments  AC9TDE6K01 | * investigating how First Nations Australians have long considered competing factors especially those related to sustainability in the design of fish harvesting technologies, for example fish traps and fish poisons that allow for selective harvesting and release of bycatch, as compared with high-yield, non-selective harvesting practices such as trawling * describing the impact and sustainability implications of designed products, services or environments on local, regional and global communities, for example the emergence of small businesses that are recycling materials, such as plastic tags and bottle tops into prosthetics * explaining the importance of aesthetics, function and sustainability in product design, for example a textile product that gives ultraviolet protection and is appealing; an odour-fighting wool fabric that minimises washing; a motor that moves a vehicle and uses a sustainable power source; a modification to a home to reduce environmental impact; restoring a natural environment and enabling low-impact access for the public such as boardwalks in fragile wet heath or swamp ecosystems * identifying the components of a service that contribute to its success and assessing potential risk or failure, for example a community service announcement to communicate a message in the school or to a wide audience; a service that manages an aspect of the environment such as Clean Up Australia Day in different communities * considering how engineers resolve competing factors to produce innovative solutions, for example experimenting with novel ideas such as biomimicry to engineer a solution such as a soft robotic device * considering how Safety by Design principles have been used in the design of products, services or environments, for example considering how prevention, protection and proactive change can be used to improve safety of designed solutions | |

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| **Sub-strand: Technologies context: Engineering principles and systems** | |
| explain how electrical energy can be transformed into movement, sound or light in a product or system  AC9TDE6K02 | * investigating how automated, labour-saving photovoltaic systems are expected to provide opportunities for First Nations Australians to expand their aquaculture industries in coastal regions of northern Australia * explaining how sun tracking of solar panels assists renewable energy production in communities classified as remote * describing the process needed to carefully plan and select components for a system to perform a specific task, for example planning the arrangement of switches, light globes and a power source in a lighting design * producing models using materials, tools and equipment to show how to control movement, sound or light, for example constructing an automation or lifting system including a pulley to raise a bucket or toy * deconstructing a product or system to discover how movement, sound or light can be controlled, for example taking apart a torch or buzzer, or exploring circuit design in a security system and investigating the properties of materials to solve problems including the amount of light reflected from different surfaces to control a sensor |
| **Sub-strand: Technologies context: Food and fibre production; Food specialisations** | |
| explain how and why food and fibre are produced in managed environments  AC9TDE6K03 | * exploring how before colonisation, First Nations Australians lived in discrete communities that cared for, protected and sustainably harvested food and fibre resources, some of which are now cultivated to meet domestic and international demand, for example bunya nuts, macadamia and finger limes * investigating and experimenting with different tools, equipment and methods of preparing soil and the effect on soil quality and sustainability including conserving and recycling nutrients, for example building a food composting system, including mulch when designing a sustainable school vegetable garden or cropping area * describing the relationship between plant types and animal breeds and their environmental suitability when selecting suitable plants or animals for an environment, for example growing tropical fruits in northern Australia due to higher temperature, and raising sheep in the cooler regions of Australia * sequencing the process of converting on-farm food or fibre products into a product suitable for retail sale, for example creating a digital flowchart to record a paddock-to-plate supply chain, or the fibre-to-garment life cycle (fibre, yarn, fabric, garment) * visiting a farm or participating in a virtual tour to ask questions about how and why food and fibre are produced in that environment |
| explain how the characteristics of foods influence selection and preparation for healthy eating  AC9TDE6K04 | * investigating how First Nations Australians have long selected and prepared foods for healthy eating, for example based on their nutritional value, availability, spoilage, preparation and processing requirements * using the *Australian Dietary Guidelines* to determine the recommended number of serves for an individual, for example describing and planning a healthy meal or lunchbox for a particular individual with recommended serving sizes to inform choices and then explaining the characteristics of the selected foods * experimenting with tools, equipment, ingredients and techniques to design and make food products or meals for selected groups for healthy eating taking into consideration environmental impacts and nutritional benefits, for example experimenting with preserving techniques including pickling, fermentation, air drying or sun drying and presenting information on the benefits for an audience * exploring a variety of tastes and how they may influence the selection or preparation of food, for example the sour, salty, sweet, spicy and umami flavours of many foods from countries across Asia * developing strategies to communicate healthy choices based on the *Australian Dietary Guidelines*, for example designing a website with food preparation tips for healthy eating for pre-teens * exploring the food service options of a local restaurant, café, fast food or takeaway establishment and identifying the food preparation skills needed to prepare food for healthy eating |
| **Sub-strand: Technologies context: Materials and technologies specialisations** | |
| explain how characteristics and properties of materials, systems, components, tools and equipment affect their use when producing designed solutions  AC9TDE6K05 | * investigating how First Nations Australians have long used material science knowledge to identify materials and preparation techniques to meet performance needs, for example twining techniques of string and rope fibres to ensure suitability for use in wet, dry, freshwater and saltwater applications * identifying and describing the properties of materials for the design and construction of a household product or system to improve household sustainability, for example a product for storing harvested water or reducing energy consumption * describing the materials and systems used in public places and facilities that benefit the way people live, for example a community exercise environment, arts facility, water treatment plant or garbage collection service * comparing and describing the tools, equipment and techniques used to manufacture products in factories with those used by local and regional enterprises including cost and impacts, for example clothing made in factories compared with local handmade garments * comparing the design and production of products, services or environments in Australia and a country in Asia, for example comparing the diversity, availability and properties of preferred materials and the design of public shelters and housing in Indonesia and Australia * investigating the properties of fibres and how these are used to create products, for example designing an experiment to test which fabrics are warmest and explaining how those properties influence what they are used for |

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| **Strand: Processes and production skills** | | **Years 5–6** |
| **Sub-strand: Investigating and defining** | | |
| **Content descriptions** *Students learn to:* | **Content elaborations**  *This may involve students:* | |
| investigate needs or opportunities for designing, and the materials, components, tools, equipment and processes needed to create designed solutions  AC9TDE6P01 | * investigating First Nations Australians’ traditional fibre sources as potential commercial solutions for biodegradable string or rope, and researching the materials, systems, components, tools and equipment needed * surveying people in the school community about their needs in order to design an appropriate product, service or environment that addresses the need, for example planning the requirements for a community meal, creating more shade in the school by determining where trees could be planted or designing a security system for the community garden * investigating designed solutions from around the world to make suitable, quality decisions that meet needs or opportunities, for example locating information online about small-space gardening ideas from different countries and judging their suitability for the local environment * investigating the importance of complementary parts of working systems by deconstructing the components, structure and purpose of products, services or environments, for example labelling a diagram of a robotic weeder or vacuum cleaner and explaining the function of parts * testing a range of materials, components, tools and equipment to determine the appropriate technologies needed to make products, services or environments, for example the materials for a product such as a rubber-band-powered vehicle or item of protective clothing * investigating how to minimise material use and manage waste by comparing the environmental and social impacts of materials, components, tools and equipment, for example comparing the cost and environmental impact of repurposing an old item of clothing to create a carry bag with buying a new one, or using vegetable scraps to make a healthy soup versus buying takeaway soup | |

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| **Sub-strand: Generating and designing** | |
| generate, iterate and communicate design ideas, decisions and processes using technical terms and graphical representation techniques, including using digital tools  AC9TDE6P02 | * generating a range of design ideas for products, services or environments using prior knowledge, skills and research, for example a security system for a community garden, a product made from a repurposed item of clothing, a permaculture vegetable patch or a healthy meal for a family picnic * analysing, modifying and developing design ideas to enhance and improve the sustainability of the product, service, environment or system, for example analysing eco-friendly alternatives to non-recyclable decorations for a community event or replacing paper-based newsletters with online formats * representing and communicating design ideas using modelling and drawing standards including the use of digital tools, for example including scale, symbols and codes in plans and diagrams; using pictorial maps and aerial views; and using digital mapping applications or infographics to present research and ideas to others * developing and using models to iterate and improve design ideas, for example using modelling applications to design the layout and features of an enclosure for a chosen animal * experimenting with materials, tools and equipment to refine design decisions and processes, for example considering the selection of materials and joining techniques to suit the purpose of a product, such as a pop-up book, a fabric bag or an electric circuit * considering the social values and ethics of clients when designing an environment, for example interviewing users of a space or seeking permission to use designs or images created by others including respect of cultural and intellectual property |
| **Sub-strand: Producing and implementing** | |
| select and use suitable materials, components, tools, equipment and techniques to safely make designed solutions  AC9TDE6P03 | * matching material and joining techniques to the design intention, for example accurately and safely cutting and sewing the fabric pieces to make a community banner or joining components to produce an electric circuit * using appropriate personal protective equipment (PPE) required for the use of some tools and equipment, for example protective eyewear and working safely, responsibly and cooperatively to ensure safe work areas, for example the safe use of equipment when making a water-resistant, floating craft * choosing appropriate materials, tools, equipment and techniques for a specific purpose, for example when safely and hygienically preparing food, cultivating garden beds or constructing electronic products * identifying 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, being aware of food allergies |

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| **Sub-strand: Evaluating** | |
| negotiate design criteria including sustainability to evaluate design ideas, processes and solutions  AC9TDE6P04 | * deciding on design criteria collaboratively for a designed solution, for example including an environmental sustainability criterion such as product should be recyclable * developing 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 * iterating and modifying design ideas based on evaluation to improve solutions, for example modifying the sensitivity of sensors in the design of an automated light * evaluating their designed solutions including considering the benefits and costs of production processes and the environmental impact, for example for the production of an animal shelter * reflecting on designed solutions to evaluate and assess suitability and sustainability and determine how well they meet design criteria, for example gathering relevant data 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 |
| **Sub-strand: Collaborating and managing** | |
| develop project plans that include consideration of resources to individually and collaboratively make designed solutions  AC9TDE6P05 | * setting milestones for production processes and allocating roles to team members, for example using a cloud-based or server-based document or spreadsheet to list tasks, deadlines and roles for team members working on a project collaboratively, including setting document sharing permissions with selected people * identifying the human resources, materials, tools and equipment that will be needed to make the designed solution as part of the project plan and specifying when these will be needed, for example access to a wildlife expert at the planning stage and scheduling access to shared tools when building a habitat for local animals * planning production steps needed to produce a product, service or environment using digital tools, for example making a flowchart or using a digital planner to record the sequence of tasks and deadlines needed to complete a project |