In an increasingly technological and complex world, it is important to develop knowledge and confidence to critically analyse and creatively respond to design challenges. Knowledge, understanding and skills involved in the design and use of technologies are influenced by social and play a role in enriching and transforming societies and our natural, managed and constructed environments.

The Australian Curriculum: Design and Technologies enables students to become creative and responsive designers. When they consider ethical, legal, aesthetic and functional factors and the economic, environmental and social impacts of technological change, and how the choice and use of technologies contributes to a sustainable future, they are developing the knowledge, understanding and skills to become discerning decision-makers.

Design and Technologies actively engages students in creating quality designed solutions for identified needs and opportunities across a range of technologies contexts. Students manage projects independently and collaboratively from conception to realisation. They apply design and systems thinking and design processes to investigate ideas, generate and refine ideas, plan, produce and evaluate designed solutions. They develop a sense of pride in personal achievement from their ability to develop innovative designed products, services and systems.

The practical application of technologies including digital technologies, students develop dexterity and coordination through experiential activities. Design and Technologies motivates young people and engages them in a range of learning experiences that are transferrable to family and home, constructive leisure activities, community contribution and the world of work.

### Aims

In addition to the overarching aims for the Australian Curriculum: Design and Technologies more specifically aims to develop the knowledge, understanding and skills to ensure that, individually and collaboratively, students:
- develop confidence as critical users of technologies and designers and producers of designed solutions
- investigate, generate and critique innovative and ethical designed solutions for sustainable futures
- use design and systems thinking to generate ideas and communicate these to a range of audiences
- produce designed solutions suitable for a range of technologies contexts by selecting and manipulating a range of materials, systems, components, tools and equipment, creatively, competently and safely, and managing processes
- evaluate processes and designed solutions and transfer knowledge and skills to new situations
- understand the roles and responsibilities of people in design and technologies occupations and how they contribute to society.

### Key Ideas

#### Overarching idea: Creating preferred futures

The Australian Curriculum: Design and Technologies provides students with opportunities to consider how solutions are created now will be used in the future. Students will identify the possible benefits and risks of creating solutions. They will use critical and creative thinking to weigh up short- and long-term impacts.

#### Rationale

As students progress through the Technologies curriculum, they will begin to identify possible and probable futures, and their preferences for the future. They develop their preferences to meet needs considering impacts on livelihoods, economic and environmental sustainability. Students will learn to recognise that views about the priority of the benefits and risks will vary and that preferred futures are contested.

#### Project management

Students will develop skills to manage projects to successful completion through planning, organising and monitoring timelines, activities and the use of resources. This includes considering resources and constraints to develop resource, finance, work and time plans; assessing and managing risks; making decisions; controlling quality; evaluating processes and collaborating and communicating with others at different stages of the process.

Students are taught to plan for sustainable use of resources when managing projects and take into account ethical, health and safety considerations and personal and social values and beliefs.

### Thinking in Technologies

#### Systems thinking

Systems thinking is critical because it involves the understanding of the patterns and relationships that underpin all events and systems and work with complexity, uncertainty and risk. Students recognise the connectedness of interactions between people, places and events in local and wider world contexts and consider the impact their designs and actions have in a connected world.

Participating in and shaping the future of information and communication technology in a holistic approach to the identification and solving of problems where the local points are treated as one and the general points and interrelationships are analysed individually to see how they influence the functioning of the entire system.

In Design and Technologies, the success of designed solutions is more complex than the sum of their parts. The interdependence of simple and complex ideas and decisions made throughout design processes. It requires students to develop knowledge of systems and systems work with complexity, uncertainty and risk. Students recognise the connectedness of interactions between people, places and events in local and wider world contexts and consider the impact their designs and actions have in a connected world.

#### Design thinking

Design thinking involves the use of strategies for understanding problems and designing solutions to these problems. The process needs an element of risk-taking that allows students to explore and experiment with innovative ideas and decisions made throughout design processes. It requires students to develop knowledge of systems and systems work with complexity, uncertainty and risk. Students recognise the connectedness of interactions between people, places and events in local and wider world contexts and consider the impact their designs and actions have in a connected world.

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Types of designed solutions

Across each band from Foundation to Year 8, students will have the opportunity to produce at least three types of designed solutions (product, service, and environment) through the technologies contexts identified for a band.

These different designed solutions have been specified to give students opportunities to engage with a broad range of design thinking and production skills. For example, in Year 5–6 students may design and produce an engineered product, a food and fibre production/fodds specialisations environment and a materials or technologies specialisations service. Whereas in another school students may design and produce an engineered environment, a food and fibre production/fodds specialisations service, and a materials and technologies specialisation product. The combination of contexts and types of designed solutions is a school decision.

Design and Technologies processes and production skills

The Design and Technologies processes and production skills strand is based on the major aspects of design thinking, design processes and production processes. The content descriptions in this strand reflect a design process and would typically be addressed through a design brief.

The Design and Technologies processes and production skills strand focuses on creating designed solutions by:

- investigating and defining
- generating and designing
- producing and implementing
- evaluating
- collaborating and managing.

The processes and production skills that students will use throughout a design project are described below.

Investigating and defining

Investigating and defining involves students critiquing, exploring and investigating needs, opportunities and information. As consumers the students will critically reflect on the intention, purpose and operation of technologies and designed solutions. Critiquing encourages students to examine values, analyse, question and review processes and systems. Students reflect on how decisions they make may have implications for the individual, society and the local and global environment now and in the future. Students explore and investigate technologies, systems, products, services and environments as they consider the needs of society. They progressively develop effective investigation strategies and consider the contribution of technologies to their lives and make judgments about them. Students may respond to design briefs or develop design briefs in response to needs and opportunities.

Generating and designing

Generating and designing involves students in developing and communicating ideas for a range of audiences. Students create change, make choices, weigh up options, consider alternatives and document various design ideas and possibilities. They use critical and creative thinking strategies to generate, evaluate and document ideas to meet needs or opportunities that have been identified by an individual, group or wider community. Generating creative and innovative ideas involves thinking differently; it entails proposing new approaches to existing problems and identifying new design opportunities considering preferred futures. Generating and developing ideas involves identifying various competing factors that may influence and dictate the focus of the idea. Students will evaluate, justify and synthesise what they learn and discover. They will use graphical representation techniques when they draw, sketch, model and create innovative ideas that focus on high-quality designed solutions.

Producing and implementing

Producing and implementing students learn and apply a variety of skills and techniques to make products, services or environments designed to meet specific purposes and user needs. They apply knowledge about components, materials and their characteristics and properties to ensure their suitability for use. They learn about the importance of adopting safe work practices. They develop and apply production skills to achieve quality designed solutions. Students develop the capacity to select and use appropriate materials, systems, components, tools and equipment and use work practices that respect the need for sustainability. The use of generating and prototyping and accurately develop simple and complex physical models supports the production of successful designed solutions.

Evaluating

Evaluating involves evaluating and making judgements throughout a design process and about the quality and effectiveness of their designed solutions and those of others. They identify criteria for success. In the early years, the teacher may guide the development of these criteria. Progressively, students develop criteria which become increasingly more comprehensive. Students consider the implications and consequences of actions and decision making. They determine effective ways to test and judge their designed solutions. They reflect on processes and transfer their learning to other design opportunities.

Collaborating and managing

Collaborating and managing students learn to work collaboratively and to manage time and other resources to effectively create designed solutions. Progressively, students develop the ability to communicate with others and about the process, negotiate roles and responsibilities and make compromises to work effectively as a team. Students work individually and in groups to plan, organise and monitor timelines, activities and the use of resources. Students progress from planning steps in a project through more complex project management activities that consider various factors such as time, cost, risk and quality control.