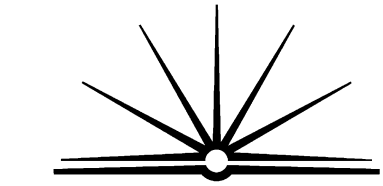

Technology (Mandatory)
Years 7–8

Syllabus

June 2003

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Contents

1 Introduction

1.1 The K–10 Curriculum

This syllabus has been developed within the parameters set by the Board of Studies NSW in its *K–10 Curriculum Framework.* This framework ensures that K–10 syllabuses and curriculum requirements are designed to provide educational opportunities that:

- engage and challenge all students to maximise their individual talents and capabilities for lifelong learning
- enable all students to develop positive self-concepts and their capacity to establish and maintain safe, healthy and rewarding lives
- prepare all students for effective and responsible participation in their society, taking account of moral, ethical and spiritual considerations
- encourage and enable all students to enjoy learning, and to be self-motivated, reflective, competent learners who will be able to take part in further study, work or training
- promote a fair and just society that values diversity
- promote continuity and coherence of learning, and facilitate the transition between primary and secondary schooling.

The framework also provides a set of broad learning outcomes that summarise the knowledge, understanding, skills, values and attitudes essential for all students to succeed in and beyond their schooling. These broad learning outcomes indicate that students will:

- understand, develop and communicate ideas and information
- access, analyse, evaluate and use information from a variety of sources
- work collaboratively with others to achieve individual and collective goals
- possess the knowledge and skills necessary to maintain a safe and healthy lifestyle
- understand and appreciate the physical, biological and technological world and make responsible and informed decisions in relation to their world
- understand and appreciate social, cultural, geographical and historical contexts, and participate as active and informed citizens
- express themselves through creative activity and engage with the artistic, cultural and intellectual work of others
- understand and apply a variety of analytical and creative techniques to solve problems
- understand, interpret and apply concepts related to numerical and spatial patterns, structures and relationships
- be productive, creative and confident in the use of technology and understand the impact of technology on society
- understand the work environment and be equipped with the knowledge, understanding and skills to evaluate potential career options and pathways
- develop a system of personal values based on their understanding of moral, ethical and spiritual matters.

The ways in which learning in the *Technology (Mandatory) Years 7–8 Syllabus* contributes to the curriculum and to the student's achievement of the broad learning outcomes are outlined in the syllabus rationale.

In accordance with the *K–10 Curriculum Framework*, the *Technology (Mandatory) Years 7–8 Syllabus* takes into account the diverse needs of all students. It identifies essential knowledge, understanding, skills, values and attitudes. It enunciates clear standards of what students are

expected to know and be able to do in Years 7–8. It provides structures and processes by which teachers can provide continuity of study for all students, particularly to ensure successful transition through Years 5 to 8 and from Year 10 to Year 11.

The syllabus also assists students to maximise their achievement in Technology (Mandatory) through the acquisition of additional knowledge, understanding, skills, values and attitudes. It contains advice to assist teachers to program learning for those students who have gone beyond achieving the outcomes through their study of the essential content.

1.2 Students with Special Education Needs

In the K–6 curriculum, students with special education needs are provided for in the following ways:

- through the inclusion of outcomes and content in syllabuses which provide for the full range of students
- through the development of additional advice and programming support for teachers to assist students to access the outcomes of the syllabus
- through the development of specific support documents for students with special education needs
- through teachers and parents planning together to ensure that syllabus outcomes and content reflect the learning needs and priorities of students.

Students with special education needs build on their achievements in K–6 as they progress through their secondary study and undertake courses to meet the requirements for the Record of School Achievement.

It is necessary to continue focusing on the needs, interests and abilities of each student when planning a program for secondary schooling. The program will comprise the most appropriate combination of courses, outcomes and content available.

Life Skills

For most students with special education needs, the outcomes and content in sections 6 and 7 of this syllabus will be appropriate but for a small percentage of these students, particularly those with an intellectual disability, it may be determined that these outcomes and content are not appropriate. For these students the Life Skills outcomes and content in section 8 and the Life Skills assessment advice below can provide the basis for developing a relevant and meaningful program.

Access to Life Skills outcomes and content in Years 7–10

A decision to allow a student to access the Technology (Mandatory) Years 7–8 Life Skills outcomes and content should include parents/carers and be based on careful consideration of the student's competencies and learning needs.

The decision should establish that the outcomes and content in sections 6 and 7 of the *Technology (Mandatory) Years 7–8 Syllabus* are not appropriate to meet the needs of the student. Consideration should be given to whether modifications to programs and to teaching, including adjustments to learning activities and assessment, would enable the student to access the syllabus outcomes and content.

As part of the decision to allow a student to access the Technology (Mandatory) Years 7–8 Life Skills outcomes and content, it is important to identify directions and goals for the student's program of study, relevant settings, strategies and resource requirements that will assist the student in the learning process. Clear time frames and strategies for monitoring progress, relevant to the age of the student, need to be identified and collaborative plans should be made for future needs.

It is not necessary to seek permission of the Office of the Board of Studies for students to undertake the Technology (Mandatory) Years 7–8 Life Skills outcomes and content, nor is it necessary to submit planning documentation.

Life Skills assessment

Each student undertaking a Technology (Mandatory) Years 7–8 Life Skills will have specified outcomes and content to be studied. The syllabus content listed for each outcome forms the basis of learning opportunities for students.

Assessment should provide opportunities for students to demonstrate achievement in relation to the outcomes and to generalise their knowledge, understanding and skills across a range of situations or environments including the school and the wider community.

Students may demonstrate achievement in relation to Technology (Mandatory) Years 7–8 Life Skills outcomes independently or with support. The type of support will vary according to the particular needs of the student and the requirements of the activity. Examples of support may include:

- the provision of extra time
- physical and/or verbal assistance from others
- the provision of technological aids.

2 Rationale

Technology and an understanding of design processes enable people to manage, interpret, shape and alter their environment to improve their quality of life at home, school, in work places and in the broader community. The rapid rate of technological change in an increasingly knowledge-based society highlights the need for flexible technological capability, innovative thinking and effective communication skills.

Technology education integrates both procedural and conceptual knowledge based on a holistic view of design. Students identify needs that have personal relevance, apply design theory and use design processes that encourage flexibility, resourcefulness and imagination in the development, communication and production of quality solutions.

Students learn about technologies and use a range of materials, tools and techniques relevant to the personal, commercial and global areas of human activity. Technologies assume increased importance when they are applied to solve real problems and to create ideas and solutions in response to needs and opportunities for customers, clients or themselves. They can be used to add functional, aesthetic and environmental value to products.

Students can further develop a fascination with, and enjoyment of, innovating and creating through making decisions and in their production of working solutions. They will experience a core of design processes and technological experiences. In the broader community, the application of this process can involve the consideration of factors relating to organisations, people, environments, sustainability, appropriateness, materials, machines and equipment, systems, communication infrastructures, social and ethical solutions.

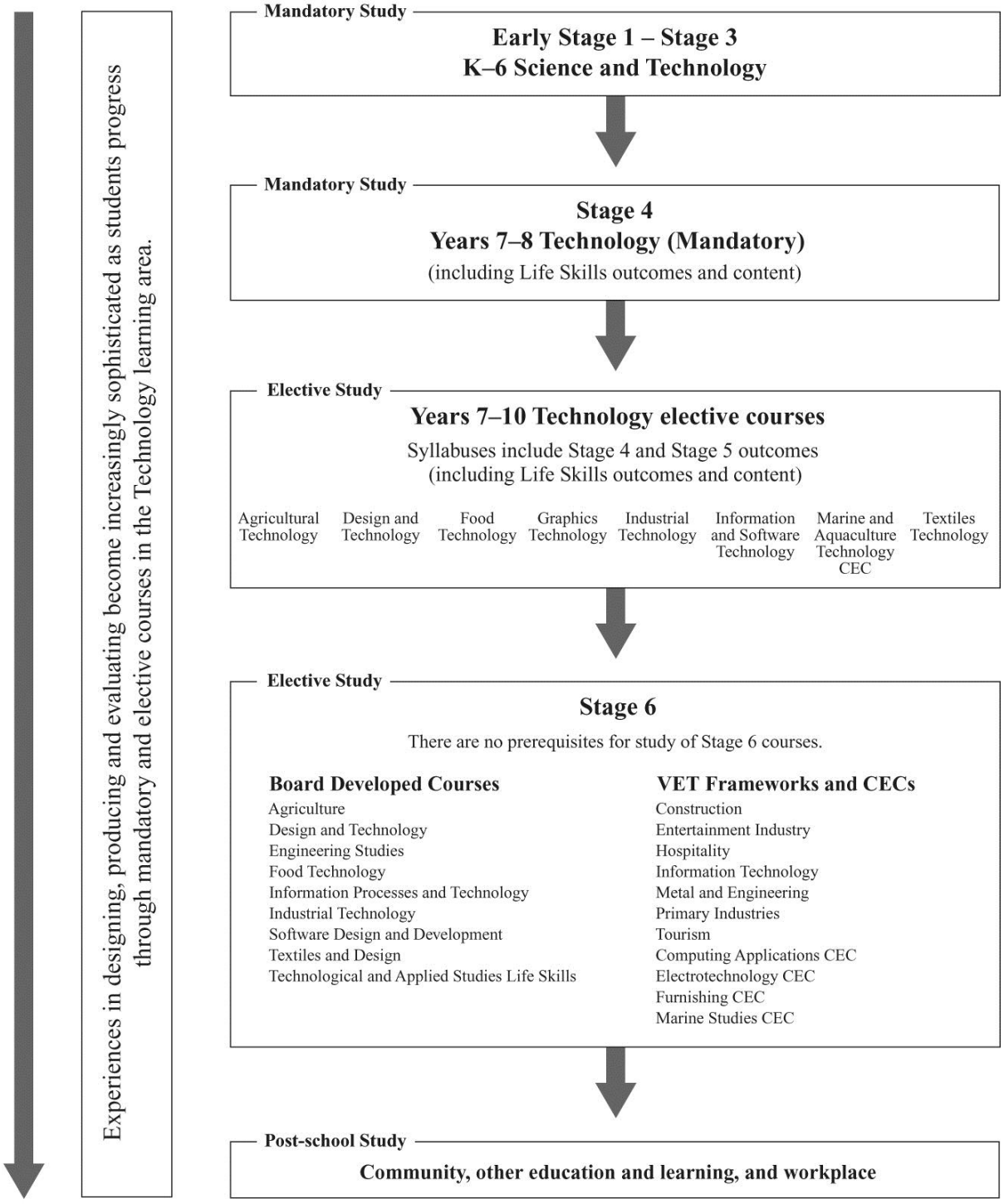
Thinking skills are developed experientially through the Technology (Mandatory) course as students design and make. The use of reflective, flexible and creative thinking skills are encouraged to build understanding of underlying principles that can be transferred to different project settings and applications. Study in technology develops skills in enterprise and initiative. Through practical experience it leads students to develop, select and apply technological skills involved in designing and producing. This includes processes of analysing, planning, producing, evaluating and maintaining the material and information needs of our society. Technology (Mandatory) builds on Science and Technology K–6 and is the foundation course in Secondary education that provides broad experience in a range of contexts that can be further explored in Technology elective courses 7–10 and Stage 6.

The development of knowledge, skills and understanding gained through study of Technology (Mandatory) will enable students to contribute positively to Australia's future. They will be given opportunities to learn how to function safely in a working environment and in a society driven by rapid technological change, communication and in a global society with increasingly competitive knowledge-driven economies.

The capacity to solve problems and generate ideas through the use of new conceptual approaches, models, drawings and information and communication technologies, and the ability to develop, produce and implement quality solutions are keys to technological competence. These know-why and know-how capabilities often distinguish leading companies, innovators and regions from their competitors.

Students will be prepared for lifelong learning and career opportunities in the study of design and related fields. They will be given further opportunity to develop an inspired interest in developing innovative solutions, an appreciation of, and satisfaction in producing products and projects of enduring functional quality. Students will learn to meet the requirements of an identified need through a design brief.

3 The Place of the Technology (Mandatory) Years 7–8 Syllabus in the Technology K–12 Curriculum



4 Aim

The aim of the *Technology (Mandatory) Years 7–8 Syllabus* is to develop students' ability to design, produce and evaluate quality solutions that respond to identified opportunities and needs. It enables students to justify solutions and to responsibly, safely and creatively use and select materials, tools and techniques.

5 Objectives

Knowledge, understanding and skills

Students will develop:

1 knowledge, understanding and appreciation of and skills in design processes, design theory and the work of designers

2 knowledge of and skills in researching, experimenting, generating and communicating creative design ideas and solutions

3 knowledge and understanding of and skills in the responsible selection and safe use of materials, tools and techniques

4 knowledge, understanding and appreciation of the impact of innovation and emerging technologies on the individual, society and the environment

5 knowledge of and skills in managing quality solutions to successful completion

6 understanding and appreciation of and skills in evaluating and reflecting on the success of their own and others' design activities.

6 Outcomes

Objectives Students will develop:	**Stage 4 Outcomes** A student:
1 knowledge, understanding and appreciation of and skills in design processes, design theory and the work of designers	4.1.1 applies design processes that respond to needs and opportunities in each design project 4.1.2 describes factors influencing design in the areas of study of Built Environments, Products, and Information and Communications 4.1.3 identifies the roles of designers and their contribution to the improvement of the quality of life
2 knowledge of and skills in researching, experimenting, generating and communicating creative design ideas and solutions	4.2.1 generates and communicates creative design ideas and solutions 4.2.2 selects, analyses, presents and applies research and experimentation from a variety of sources
3 knowledge and understanding of and skills in the responsible selection and safe use of materials, tools and techniques	4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects 4.3.2 demonstrates responsible and safe use of a range of tools, materials and techniques in each design project
4 knowledge, understanding and appreciation of the impact of innovation and emerging technologies on the individual, society and the environment	4.4.1 explains the impact of innovation and emerging technologies on society and the environment
5 knowledge of and skills in managing quality solutions to successful completion	4.5.1 applies management processes to successfully complete design projects 4.5.2 produces quality solutions that respond to identified needs and opportunities in each design project
6 understanding and appreciation of and skills in evaluating and reflecting on the success of their own and others' design activities	4.6.1 applies appropriate evaluation techniques throughout each design project 4.6.2 identifies and explains ethical, social, environmental and sustainability considerations related to design projects

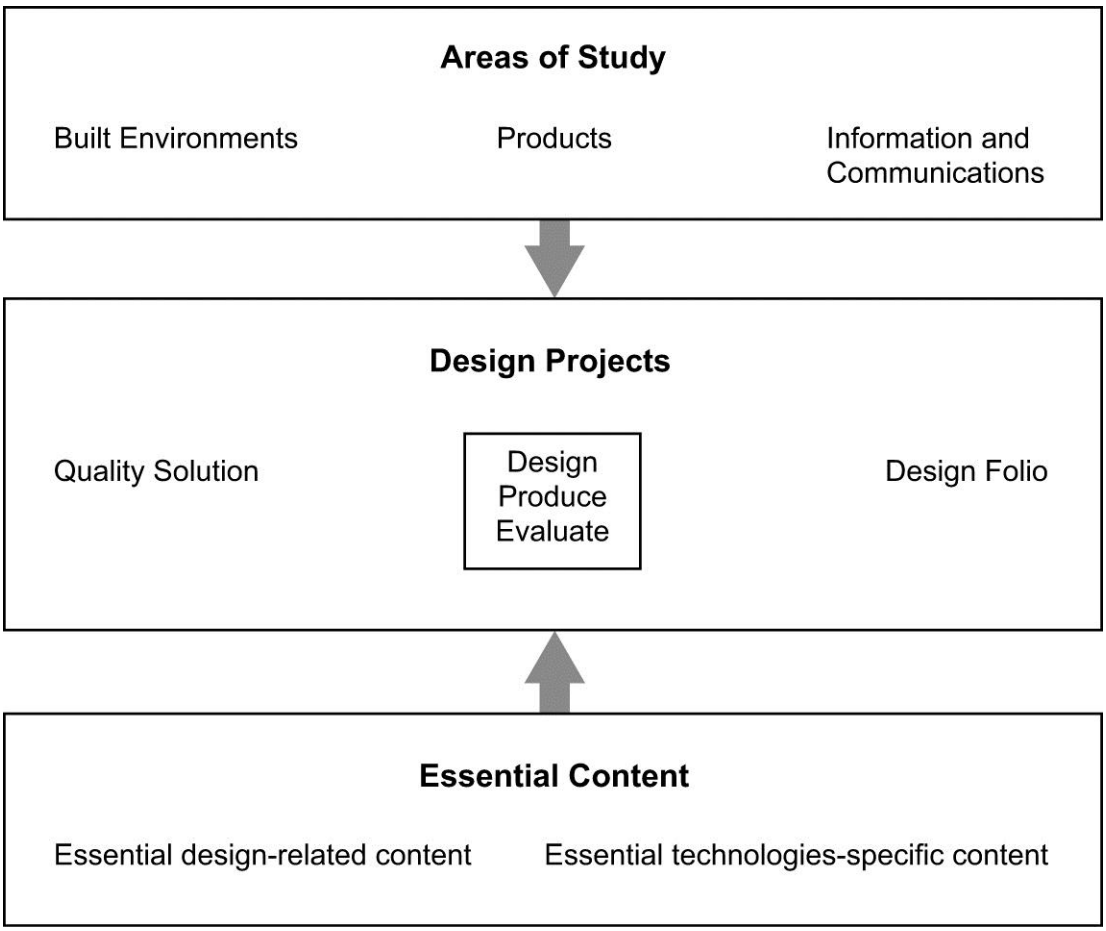
Life Skills

For some students with special education needs, particularly those students with an intellectual disability, it may be determined that the above outcomes are not appropriate. For these students, Life Skills outcomes and content can provide the basis for the development of a relevant and meaningful program – see section 8.

7 Content

7.1 Organisation of Content

Technology (Mandatory) involves designing, producing and evaluating quality design solutions. When developing design projects teachers are required to integrate essential content through the focus area of study. The needs and interests of students should be addressed when developing design projects.



Design Projects involve the design, production and evaluation of quality solutions that are functional and meet identified needs or opportunities. Students must undertake a minimum of four and a maximum of eight design projects.

For each design project students will develop a design folio as a document that provides ongoing evidence of the application of a design process and the specific technologies used in this process.

Areas of Study
The areas of study are the Built Environments, Products and Information and Communications. These provide the situation or context for the design project.

At least one design project must be based on each of the three areas. Each area of study includes a number of design specialisations. To provide a breadth of study for students, no more than three design specialisations can be selected from any one area of study. A specialisation can be studied only once during the course.

Built Environments
The focus of this area is on space, place and use. People create, construct and modify their surroundings for a wide range of purposes. The environments people build are an important part of our communities and culture. When designing environments, it is important to consider the functional, physical and material properties, aesthetic, ethical, environmental, socio-cultural, human form and scale and safety aspects of the development.

This area may include the following design specialisations:
- Architectural Design – design projects may result in plans, drawings, models and construction for buildings, set designs, facility design, exhibit design
- Environmental Design – design projects may result in plans, drawings, models and construction that enhance or support natural environments such as public access routes, habitats, aquariums, land management systems, water management strategies, responses to environmental issues, plant production systems
- Interior Design – design projects may result in plans, drawings, models and construction for layout and styling of spaces, finishes and furnishings
- Landscape Design – design projects may result in plans, drawings, models and construction of residential, commercial and recreational spaces both internal and external
- Structural Design – design projects may result in plans, drawings, models and structures such as bridges, shelters, enclosures for animals, play equipment.

Products
The focus of this area is on objects, systems and artifacts. People produce, distribute, use and consume both an enormous quantity and variety of goods and commodities. A considerable proportion of human activity is aimed at providing these products. These range from items that are individually crafted through to those mass produced. When designing products, it is important to consider aesthetics, material properties, ergonomics, human form, environmental, socio-cultural, safety and functional impacts of the development.

This area may include the following design specialisations:
- Accessories Design – design projects may result in bags, hats, masks, belts
- Agricultural Product Design – design projects may result in animal produce, plant produce, systems for producing animal or plant produce
- Fashion Design – design projects may result in clothing, presentations to display fashion design
- Food Design – design projects may result in food products, menus, food preparation systems, diets for special purposes, food presentation
- Industrial Design – design projects may result in toys, mechanisms, furniture, leisure products, production systems
- Jewellery Design – design projects may result in products for body adornment and personal expression.

Information and Communications
The focus of this area is on various types of data and information – text, images, audio, video and numbers for the purposes of conveying a message. Information and communications systems are fundamental to human activity. Communication involves the accessing, processing and transferring of information and ideas through a range of media including written, oral, graphical and electronic. The principles of audio and visual communications design are important in the study of this strand. When designing Information and Communications solutions it is important to consider the aesthetic, socio-cultural, ethical, and functional aspects of the development.

This area may include the following design specialisations:

- Communication Systems Design – design projects may result in radio broadcasting, signage, video production, event design, multi-media design
- Information Systems Design – design projects may result in design of databases, information management systems, information kiosks
- Promotional Design – design projects may result in videos, websites, packaging, presentations, brochures, advertisements, branding
- Software Design – design projects may result in simple games programs, data management and analysis systems
- Digital Media Design – design projects may result in websites, on-screen presentations for purposes such as entertainment, education.

When developing a design project within a design specialisation, essential design-related content must be integrated with essential technologies-specific content. Content from a minimum of 6 technologies must be addressed by the end of the course. The specific content of each technology can be addressed in a single project or across a number of projects.

Design-related content is provided for:
- design processes
- factors influencing design
- roles of designers
- generating and communicating design ideas and solutions
- research and experimentation
- responsible and safe use of tools, materials and techniques
- innovation and emerging technologies and their impact on society and the environment
- managing quality design projects
- producing quality design projects
- evaluation techniques
- ethical, social, environmental sustainability considerations.

Details of essential design-related content are provided on pages 20–25.

Technologies-specific content includes:
- materials
- tools
- techniques

associated with:
- animal production technologies
- control technologies
- electronics technologies
- food technologies
- graphics technologies
- information technologies
- media technologies
- metals technologies
- mixed material technologies
- model-making technologies
- plant production technologies
- polymer technologies
- textile technologies
- timber technologies
- school-developed technologies (see page 40).

Details of essential technologies-specific content are provided on pages 26–40.

Life Skills
Life Skills outcomes and content are in Section 8.

Cross-curriculum content

Cross-curriculum content assists students to achieve the broad learning outcomes defined in the Board of Studies *K–10 Curriculum Framework*. It is incorporated in the content of the Technology (Mandatory) Years 7–8 Syllabus in the following ways:

Information and Communication Technologies (ICT)

ICT will assist students to achieve educational outcomes more efficiently and with greater quality through the development of analytical, organisational and problem-solving skills to cope with expanding access to computerised/digital information. This is consistent with advances in ICT in all aspects of workplaces and the community.

Students are required to engage with ICT throughout the Technology (Mandatory) course and this is specifically embedded in the content. Students will utilise ICT within each design project and have the opportunity to study ICT in depth in the Information and Communications area of study. Projects will integrate a variety of ICT applications including:

- word processing to assist planning, data collection and recording, and specifically the presentation of design folios
- graphics in the form of existing and created images in design development and presentation
- electronic communication in the researching of information
- software management in the efficient storage of electronic information.

Work, Employment and Enterprise

The use of processes to design, produce and evaluate give students the opportunity to develop skills highly sought after in the workplace. In Technology (Mandatory) students develop initiative, an ability to work in groups, an appreciation of quality and the ability to manage with flexibility. They develop technological literacy and are encouraged to become independent thinkers and confident communicators. Students study careers in a range of fields of technology and design. They study the cooperation, gender and leisure issues related to work and employment.

Aboriginal and Indigenous

Through designing, producing and evaluating Technology (Mandatory) students consider the appropriateness of design for different groups, including Aboriginal and Torres Strait Islanders and other Indigenous peoples. This provides students with the opportunity to develop awareness of issues relevant to these groups.

Civics and Citizenship

In studying the role and responsibility of designers, Technology (Mandatory) students learn their individual roles as responsible citizens. They are better prepared to become active members of a society driven by change, emerging technology and increasingly sophisticated communication and information systems.

Difference and Diversity

Through designing, producing and evaluating Technology (Mandatory) students become aware of diversity and differences in society as they respond to the needs of a particular market through design projects. When working collaboratively, students develop an appreciation of the opinions and ideas of all group members.

Environment

Technology (Mandatory) students develop an appreciation of technologies through a study of design. They consider environmental impacts of technologies, encouraging them to become globally aware of sustainability issues.

Gender

Technology (Mandatory) students consider issues such as access to and interest in design and technological activities for all. Technological activities will be gender-inclusive and accessible to all students and will provide the opportunity to consider the impact of different gender perspectives in the development of projects. Students will discuss gender stereotypes in paid/unpaid work and leisure time applications. The roles and contributions of successful designers and technologists, both men and women, will be studied.

Key Competencies

Technology (Mandatory) Years 7–8 provides a defined context within which to develop general competencies considered essential for the acquisition of effective, high-order thinking skills necessary for further education, work and everyday life. Technology (Mandatory) students will:

- source, select and sequence information with regard to design research and idea generation, developing competence in ***collecting, analysing and organising information***
- debate, describe, discuss and explain design-related issues in written, graphic and oral form, developing competence in ***communicating ideas and information***
- work as individuals and as members of groups to conduct investigations and analysis, developing competence in ***planning and organising activities***
- cooperate with individuals and groups, developing competence in ***working with others and in teams***
- design, implement and evaluate solutions to materials-based problems, developing competence in ***solving problems***
- plan, develop and modify projects including costing, quantities, measurement and time, developing competence in ***using mathematical ideas and techniques***
- experiment with a range of tools, materials and techniques, developing competence in ***using technology*.**

Literacy

Technology (Mandatory) students are provided with opportunities to develop literacy skills, particularly technological literacy, in recording their project work as they complete a minimum of four design projects.

Students learn to include subject-specific vocabulary, to describe, classify, and interpret meaning in order to develop and present design solutions using a range of media, including word processing. They evaluate information and construct text for specific audiences at various stages of design development.

Multicultural

Technology (Mandatory) students engage in activities that often involve them in analysing the appropriateness of design for different cultural groups, enhancing their appreciation of contributions made from people of all backgrounds.

Numeracy

In the development of solutions to design problems, students use numeracy concepts such as size, proportion and measurement as tools to assist in the communication of design ideas.

7.2 Content for Stage 4

A note to teachers about practical experiences

To satisfy the requirements of the syllabus students must undertake a range of practical experiences that occupy the majority of course time. Practical experiences will be used to develop knowledge and understanding of, and skills, in designing, producing and evaluating. Student capability, confidence and expertise at their current stage of development is an important consideration in determining the teaching and learning sequences in the course.

In developing and delivering teaching programs teachers should be aware of and adopt relevant guidelines and directives of their education authorities and/or schools. Teaching programs should recognise and reflect relevant State and Commonwealth legislation, regulations and standards including Occupational Health and Safety, Chemical Safety in Schools and Animal Welfare guidelines. Teachers need to be aware of activities that may require notification, certification, permission, permits and licences.

Teachers should be aware that students may have food allergies that can result in anaphylaxis, a severe and sometimes sudden allergic reaction which is potentially life-threatening and always requires an emergency response. This is an important consideration in selecting the foods to be handled and consumed.

Essential design-related content
The essential design-related content assists students to understand the application of design processes in the completion of design projects. Structured design processes assist people to apply technological know-how in the creative development and production of quality solutions to identified needs and opportunities.

Outcomes A student:	**Students learn about:**	**Students learn to:**
4.1.1 applies design processes that respond to needs and opportunities in each design project	• design processes including – analysing needs, problems and opportunities – establishing criteria for success – researching – generating creative ideas – communicating ideas – experimenting and testing ideas – risk management – managing resources – producing design solutions – evaluating ideas and solutions • needs and opportunities in the areas of study	• establish a design process that responds to an identified need and opportunity • apply a design process when developing quality solutions for each design project • establish criteria for successful achievement of needs and opportunities • record design processes and decision making in a design folio for each design project. • consider short-term and long-term consequences of design in the design process • evaluate design processes • identify needs and opportunities that require solutions in the areas of study

Outcomes A student:		**Students learn about:**	**Students learn to:**
		– Built Environments – Products – Information and Communications	
		• design processes used by designers	• identify a design process used by a designer
4.1.2	describes factors influencing design in the areas of study of Built Environments, Products, and Information and Communications	• definitions of design	• recall a definition of design
		• factors affecting design – function – aesthetics – human form – scale – ergonomics – ethical – environmental – legislation including OHS – cost – socio-cultural – resource availability – physical and material properties – safety	• examine factors affecting design in the areas of study of Built Environments, Products, and Information and Communications • describe the factors affecting design in the development of each design project • evaluate the appropriateness of specific design solutions for different cultural groups including Aboriginal and Torres Strait Islanders and other Indigenous peoples
4.1.3	identifies the roles of designers and their contribution to the improvement of the quality of life	• relationship of design to the areas of study of Built Environments, Products, and Information and Communications	• identify relationships of design to each area of study • describe the nature of each of the areas of study of Built Environments, Products, and Information and Communications
		• different design specialisations	• identify a range of design specialisations relevant to each area of study
		• the nature of the work of designers as individuals and as collaborators	• apply group work and collaborative strategies to project development
		• the contributions of females and males who engage in design and technology	• identify the contribution the designer makes to the improvement of everyday life
		• work and training opportunities for people who engage in design and technology in each area of study	• explore work and training opportunities for people who engage in design and technology relevant to each area of study

Outcomes A student:	**Students learn about:**	**Students learn to:**
4.2.1 generates and communicates creative design ideas and solutions	• methods used to generate creative design ideas including – mind mapping – brain storming – sketching and drawing – modelling – experimenting and testing	• use a variety of methods to generate creative design ideas for each design project
	• use of design folio to record and reflect on design ideas and decisions	• use a design folio to record and reflect on design ideas and decisions
	• communication methods including – drawings, sketches and models – written reports – oral presentations – digital presentations	• sketch, draw and model to aid design development • manipulate images with tools such as editing, resizing, grouping, aligning and positioning
	• communication methods suitable for specific audiences including – users and clients – technical experts – peers	• communicate information appropriate to specified audiences
	• using ICTs to plan, develop and document design projects	• compose a design folio for a specific audience in electronic format including features such as tabs, indents, headers and footers, margins and line and paragraph spacing and using appropriate layout and graphic design • use ICTs to communicate information including saving a document in various file types and storage locations from within the application • use word processing features including page numbering and page breaks, find and replace, word count, spell check and thesaurus, columns and sections, inserting text/objects/images

Outcomes A student:		**Students learn about:**	**Students learn to:**
4.2.2	selects, analyses, presents and applies research and experimentation from a variety of sources	• experimentation and testing of design ideas	• apply the results of experimentation to designing and making when developing each design project
		• relationship of experimentation to success criteria	• identify, interpret and evaluate data from a variety of sources
		• research methods – needs analysis – surveys and interviews – searching techniques including use of the Internet	• use effective research methods to identify needs and opportunities and locate information relevant to the development of each design project
			• identify solutions to other similar needs and opportunities
			• use the internet when researching
4.3.1	applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	• For outcome 4.3.1 refer to pp 26–40 (Essential technologies-specific content)	
4.3.2	demonstrates responsible and safe use of a range of tools, materials and techniques in each design project	• risk management strategies	• manage risk when developing design projects
		• responsible behaviour in working environments	
		• Occupational Health and Safety practices	
		• the safe and responsible use of materials, tools and techniques in each design project	• use tools, materials and techniques in a responsible and safe manner in each design project.
		• maintenance of tools and equipment	• maintain tools and equipment including computer equipment

Outcomes A student:		**Students learn about:**	**Students learn to:**
4.4.1	explains the impact of innovation and emerging technologies on society and the environment	• innovation and emerging technologies relating to tools, materials, techniques or products in each area of study	• identify and describe a selected innovation or emerging technology in each area of study of Built Environments, Products, and Information and Communications
		• the impact of innovation and emerging technology on society and the environment	• explain the impact of innovations and emerging technologies on society and the environment including new ICTs
4.5.1	applies management processes to successfully complete design projects	• resource availability including – time – money – materials, tools and techniques – human resources including skills and expertise – other resources	• identify resource availability and apply realistic limitations to each design project
		• management techniques including action, time and budget planning	• develop and apply action, time and budget plans in design projects
4.5.2	produces quality solutions that respond to identified needs and opportunities in each design project	• suitable materials, tools and techniques for design projects	• identify suitable materials, tools and techniques for each design project
		• skill development and refinement	• practice and refine skills needed for design projects
		• construction steps that contribute to a quality solution	• apply a design process that responds to needs and opportunities for each design project
		• relationship of quality solutions to needs and opportunities and the criteria for success for each design project	• produce solutions reflecting quality standards appropriate to each design project

Outcomes A student:	**Students learn about:**	**Students learn to:**
4.6.1 applies appropriate evaluation techniques throughout each design project	• developing criteria for success as a tool for assessing design development and production • ongoing evaluation of design ideas and decisions • final evaluation considering – design process used – design solutions – reflection on learning	• apply criteria for success in decision making during the development of each design project • use criteria for success to reflect on the design process used and the solutions • evaluate prior to, during and at completion of each design solution • self-assess and peer-assess design solutions
4.6.2 identifies and explains ethical, social, environmental and sustainability considerations related to design projects	• ethical and responsible design • environmental and sustainability considerations	• identify ethical, social, and environmental and sustainability considerations relevant to each design project • be responsible and ethical in the decisions made in the development and production of each design project • explain the responsibilities of designers • demonstrate appropriate ethics and etiquette in relation to computer use such as general computer care, passwords, file security, network use, printing and shared resources

7.3 Content for Stage 4

Essential technologies-specific content
Technological know-how in the context of the Technology (Mandatory) syllabus assists students to use materials, tools and techniques in the development of quality projects.

Animal Production Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials/Inputs** • characteristics of different breeds of animals	• research, select and justify the selection of animals for a specific purpose
	• nutritional requirements of animals	• select, justify and provide the appropriate feed and environment for a design project
	• the ideal environment suitable for the type of animal/s studied to satisfy both physical and behavioural needs	
	Tools/equipment • specific tools relating to animal production technologies	• select and correctly use appropriate tools and equipment for a design project
	• the function, selection and correct use of a range of contemporary tools and equipment	
	Techniques • handling and feeding of animals and other tasks	• select and use techniques appropriate for the purposes of a design project
	• animal welfare codes of practice	• apply techniques in accordance with identified codes of practice
	• keeping records of animals	• maintain animal records
	• handling and packaging of animal products	• correctly handle and package animal products if it is appropriate to the design project

Control Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials/Inputs** • data types, formats and information as inputs of design and production • component categories for hardware, including input devices, processors and output devices • robots and other mechatronic devices, sensors, actuators such as motors, switches, lights • programmable logic controllers (PLCs) and associated hardware	• identify and select appropriate data for use in a design project • recognise, connect and use input and output devices to construct systems including sensors, switches, wiring, lights and motors for a design project
	Tools • specific tools relating to control technologies • the function, selection and correct use of a range of contemporary tools including – simple programming languages – simple programs that meet identified needs – construction tools – simple testing tools including multimeter	• select and correctly use tools appropriate for the construction, maintenance and management of systems for a design project
	Techniques • program design • compiling programs • connecting interdependent devices • modelling and prototyping systems • testing systems in the working environment • industrial production methods	• select and use appropriate program development techniques and structures for an identified need • connect interdependent devices for the purposes of a design solution • troubleshoot problems with systems • test function of solutions for a design project

Electronics Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials/components** • types and functions of common electronic components such as diodes, resistors, capacitors, switches and batteries **Tools** • specific tools relating to electronics technologies • the function, selection and correct use of a range of contemporary tools used for – cutting – marking out and measuring – construction including soldering irons • machine tools including drill press **Techniques** • techniques such as – soldering – drilling – cutting • methods of production of circuits and circuit boards	• identify and categorise common electronic components • select and use electronic components for a design project • select and correctly use tools of electronics technology for a design project • solder efficiently • set out and construct simple circuits for a design project

Food Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics and properties of foods appropriate to a design project	• identify common properties of food within each of the food groups • select and prepare food for a design project
	Tools • specific tools related to food technologies • the functions and correct and safe use of a variety of contemporary food utensils and appliances used for – cutting – measuring – preparation, processing and cooking	• select and correctly use a variety of appropriate food utensils and appliances to prepare quality food items for a design project
	• recipes including the format and abbreviations commonly used	• select, interpret and/or modify/develop recipes for a design project
	Techniques • specific techniques used in – food preparation – food processing – cooking food • presenting food for visual appeal	• select and use techniques appropriate for the purposes of a design project

Graphics Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials/Resources** • the range, suitability and use of materials, resources and data types according to industry standards eg AS1100 • the features of common graphic data types **Tools** • specific tools relating to graphics technologies • the function, selection and correct use of a range of contemporary tools used for – marking out and measuring – construction – CAD and 3D modelling **Techniques** • simple drafting including multi-view drawing • CAD / paint /draw software • rendering to enhance communication • editing a graphic for use in a publication • printing technologies • industrial production methods	• select and use appropriate materials, resources and data types for particular purposes • select and use correct graphic formats appropriate for a design project • select and correctly use the appropriate tools of graphics • use computer aided drawing (CAD) in the development of the design project • view and interpret a 3D model • select and use techniques appropriate for the purposes of a design project

Information Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • range, suitability and use of data types including hypertext	• select and use appropriate data types for particular purposes
		• select and justify the use of correct file formats in a design project
	• the internet as a source of information	
	Tools • software including presentation, draw and paint, word processing, databases and spreadsheets	• select and use software for specific purposes in a design project
	• the function, selection and correct use of a range input and output tools including – printer – scanner – storage devices	• select and correctly use the appropriate tools of information technology for a design project
	Techniques • information processes – collecting – organising – analysing – storage and retrieval – processing – displaying	• select and use techniques appropriate for the purposes of a design project

Media Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • range, suitability and use of data types • a range of media such as video, animation, audio • the internet as a source of information	• select and use appropriate data types for particular purposes
	Tools • software including desktop publishing, presentation, video editing, draw and paint, word processing, web design • the function and correct use of a range of input and output tools used for – capturing images such as digital cameras, videos, scanners – storing – printing	• select and use appropriate computer hardware and software in the development of a design project
	Techniques • uses of media technologies • collecting information from primary and secondary sources including digitising sound, text, graphics • organising information for an appropriate audience • planning including storyboards, scripts • storing and retrieving • processing techniques for combining and manipulating such as special effects, cropping, tweening, morphing • displaying the final product	• select and use techniques appropriate for the purposes of a design project

Metals Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics and properties of metals including alloys and sheet metals • a range of appropriate fittings and hardware **Tools** • specific tools relating to metals technologies • the function, selection and correct use of a range of contemporary tools used for – cutting – measuring and marking out – bending and joining • machine tools for finishing, drilling and folding **Techniques** • construction techniques including cutting, shaping, joining and finishing metals	• select and use metals in the development of a design project • investigate and use accessories where appropriate for a design project • select and correctly use appropriate hand and machine tools for a design project • cut, shape and finish metals • select and use appropriate techniques for the purpose of a design project

Mixed Material Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics and properties of a wide range of materials such as – metals – polymers – textiles – timber • the use of materials in traditional and non-traditional ways	• experiment with combinations of a wide range of materials considering their characteristics and properties • identify how materials have been used in innovative and non-traditional ways • select and use a wide range of materials for the identified needs and opportunities of a design project
	Tools • specific tools related to materials appropriate to a design project • the function and safe use of a range of contemporary tools used for – measuring – marking out – cutting – construction	• explore ways that tools can be safely used to achieve new results • select and safely use tools and equipment for a design project
	Techniques • traditional and non-traditional techniques used for – cutting – shaping a variety of materials – joining different materials – finishing	• experiment with traditional and non-traditional techniques • select and use traditional and non-traditional techniques for the identified needs and opportunities of a design project

Model-Making Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics and properties of model-making materials such as – adhesives and joining materials – balsa – card – figures and other incorporated objects – foamboard – modelling clay – paper – polymers – textiles – timber	• experiment with combinations and types of materials • select and use appropriate materials for the purposes of a design project
	Tools • specific tools related to model-making technologies • the function and correct use of a range of contemporary tools used for – measuring – marking out – cutting – construction – finishing	• select and correctly use tools and equipment to produce a design project
	Techniques • techniques such as – systematic planning for model development – working to pre-established scale – cutting accurately – shaping and sanding – joining a range of different materials – clamping and pinning – finishing including painting, lacquering, polishing	• experiment with a variety of techniques for cutting, shaping, joining, clamping and finishing • select and use a variety of techniques appropriate for the purposes of a design project

Plant Production Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics of different plant types and varieties • plant requirements which may include the use of nutrients, chemical, fertilisers and growing medium **Tools** • specific tools relating to plant production technologies • the function, selection and correct use of a range of contemporary tools used for – planting – managing – harvesting **Techniques** • techniques used for – planting – managing – harvesting	• identify a variety of plants appropriate to the design project • research and evaluate plant requirements in the development of a design project • select, maintain and correctly use tools and equipment for specific purposes in design project development • select and use techniques appropriate for the purposes of a design project

Polymer Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics and properties of common thermosetting and thermoplastics materials • common uses of polymers	• identify and select materials appropriate to a design project
	Tools • specific tools relating to polymer technologies • the function, selection and correct use of a range of contemporary tools used for – measuring and marking out – construction – finishing • machine tools including scroll saw and local bender (strip heater)	• select and correctly use polymer technology tools for a design project
	Techniques • construction techniques including – scoring and snapping – sawing – filing – abrading, polishing – moulding	• select and use techniques appropriate for the purposes of a design project

Textile Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics and properties of different fabric types including – wovens – knits – non-wovens • properties of fibres including – naturals – synthetics – fibre blends	• investigate fibre properties and fabric characteristics appropriate to the design project • select and use appropriate textile materials for a design project
	Tools • specific tools related to textiles technologies • the function and correct use of a range of contemporary tools used for – measuring and cutting – patterns and pattern marking – joining, constructing, and assembling – surface decoration of textiles	• select and correctly use appropriate tools and equipment for a design project
	Techniques • specific techniques used to construct and embellish textile items including – joining textiles – finishing – colouring and decorating • care and maintenance of textile products	• select and use techniques appropriate for the purposes of a design project

Timber Technologies

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics and properties of timber and timber products • a range of appropriate fittings and hardware such as hinges, handles, catches, locks	• identify, select and use appropriate materials for a design project
	Tools • specific tools related to timber technologies • the function, selection and correct use of a range of contemporary tools used for – marking out and measuring – cutting – joining – finishing including abrasives • machine tools including scroll saw, drill press and disc sanding machines	• select and correctly use tools of timber technology for a design project
	Techniques • construction techniques including – cutting – shaping – finishing • industrial production methods	• cut, shape and finish timber or timber products • select and use appropriate techniques for the purposes of a design project • use appropriate surface preparations and finishes for a design project

School-developed Technologies

The school-developed technologies allows for local relevance and the use of available expertise and resources (eg glass, automotive, ceramics). The following is a guide to be used when developing the essential technologies-specific content for the school-developed technologies.

Outcome A student:	**Students learn about:**	**Students learn to:**
4.3.1 applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects	**Materials** • characteristics and properties of materials relating to school-developed technologies	• select and use appropriate materials for the purposes of a design project
	Tools • specific tools related to school-developed technologies • the function and correct use of a range of contemporary tools used for the school-developed technologies	• select and correctly use the appropriate tools and equipment for a design project
	Techniques • specific techniques used for the school-developed technologies	• select and use techniques appropriate for the purposes of a design project

Life Skills

For some students with special education needs, particularly those students with an intellectual disability, it may be determined that the above content is not appropriate. For these students, Life Skills outcomes and content can provide the basis for the development of a relevant and meaningful program – see section 8.

8 Life Skills Outcomes and Content

The Board of Studies recognises that a small percentage of students with special education needs may best fulfill the mandatory curriculum requirements for Technology (Mandatory) by undertaking Life Skills outcomes and content. (Requirements for access to Life Skills outcomes and content are detailed in section 1.2.)

Life Skills outcomes will be selected on the basis that they meet the particular needs, goals and priorities of each student. Students are not required to complete all outcomes. Outcomes may be demonstrated independently or with support.

In order to provide a relevant and meaningful program of study that reflects the individual needs, interests and abilities of each student, schools may integrate Technology (Mandatory) Life Skills outcomes and content across a variety of school and community contexts.

8.1 Outcomes

Objectives Students will develop:	**Outcomes** A student:
1 knowledge, understanding and appreciation of and skills in design processes, design theory and the work of designers	LS 1.1 recognises that a process is used to produce design projects LS 1.2 recognises factors that influence design
2 knowledge of and skills in researching, experimenting, generating and communicating creative design ideas and solutions	LS 2.1 gathers and uses information in the context of producing design projects LS 2.2 uses a variety of techniques to communicate ideas in the context of producing design projects
3 knowledge and understanding of and skills in the responsible selection and safe use of materials, tools and techniques	LS 3.1 recognises safe and unsafe conditions when undertaking design projects LS 3.2 selects the appropriate tools, equipment and materials for specific design projects LS 3.3 demonstrates safe practices in the use of materials, tools and equipment in the context of producing a design project LS 3.4 cares for materials, tools and equipment
4 knowledge, understanding and appreciation of the impact of innovation and emerging technologies on the individual, society and the environment	LS 4.1 explores the impact of innovation and emerging technologies
5 knowledge of and skills in managing and producing quality solutions to successful completion	LS 5.1 participates in producing design projects LS 5.2 produces design projects across areas of study LS 5.3 manages and produces design projects across areas of study using a variety of technologies
6 understanding and appreciation of and skills in evaluating and reflecting on the success of their own and others' design activities	LS 6.1 evaluates the success of completed design projects LS 6.2 evaluates the design of everyday products in terms of intended use

8.2 Content

The content forms the basis for learning opportunities. Content will be selected on the basis that it meets the individual needs, goals and priorities of each student. Students are not required to complete all of the content to demonstrate achievement of an outcome.

The examples provided are suggestions only.

<table>
<tr><td colspan="2">Outcomes
A student:
LS 1.1 recognises that a process is used to produce design projects
LS 1.2 recognises factors that influence design</td></tr>
<tr><td>Students learn about:
• the steps in a process to produce a design project

• communicating throughout the process of producing a design project

• management throughout the process of producing a design project

• factors that influence design</td><td>Students learn to:
• recognise the steps in producing a project including
– identifying a need
– exploring ideas
– choosing a preferred idea
– planning steps for producing the design project
– selecting tools, equipment and materials
– producing a design project
– evaluating a design project
• recognise that the design of an object is related to its function and purpose eg a tea pot has a spout to assist pouring; an oven mitt is shaped for a hand and is made of heat-resistant material

• consider the factors that influence design in the context of making a design project including
– function
– aesthetics
– available resources (cost, skills, time)
– cultural and social appropriateness
– environmental impact

Examples
decorate a place card to put on the table for a special occasion meal; design a menu card to be placed on the table in a school café; choose a dinner menu for four friends, one of whom is a vegetarian (Food Design)</td></tr>
</table>

<table>
<tr><td colspan="2">Outcomes
A student:
LS 2.1 gathers and uses information in the context of producing design projects
LS 2.2 uses a variety of techniques to communicate ideas in the context of producing design projects</td></tr>
<tr><td>Students learn about:</td><td>Students learn to:</td></tr>
<tr><td>• obtaining information from a variety of sources</td><td>• access sources of information which could include
– electronic media
– people
– newspaper
– library
– internet
– CD-ROM

Examples
visit a nursery to investigate plants with perfume for a sensory garden; compile a folio of pictures of decorative plants that could be used in a sensory garden; access a variety of sources including the internet/CD-ROMs to find ideas for designing a sensory garden (Landscape Design)</td></tr>
<tr><td>• using a variety of communication techniques</td><td>• use techniques to communicate ideas
– draw pictures
– take photographs
– use a digital camera
– video
– use computer graphics
– discussions

Examples
use communication techniques to indicate choice of fish to place in a class tank; use photos from magazines to identify a suitable habitat for raising frogs; make a presentation of ideas for an outdoor water feature for native fish (Environmental Design)</td></tr>
</table>

Outcomes

A student:

LS 3.1 recognises safe and unsafe conditions when undertaking design projects

LS 3.2 selects the appropriate tools, equipment and materials for specific design projects

LS 3.3 demonstrates safe practices in the use of materials, tools and equipment in the context of producing a design project

LS 3.4 cares for materials, tools and equipment

Students learn about:	**Students learn to:**
• factors that influence the safety of conditions – in the classroom – in specialist classrooms – in external areas	• recognise factors that influence the safety of conditions *Examples* • in the classroom: the potential hazard of wet or slippery floors; the state of repair of materials or equipment; the effect of thunderstorms on the operation of electrical equipment • Specialist Classrooms (Industrial Arts/Food Technology): the need for adult supervision; safe number of people in a working area; state of repair of materials or equipment; essential use of personal protective clothing and devices; potentially hazardous materials • external areas: worksite safety and security; safe use of power supply and cords in external areas; effect of weather conditions on the safe use of materials and equipment
• the nature and purpose of a range of tools and equipment which could include – hand tools – hammer, scissors, shovel, whisk – power tools – electric drill, garden trimmer – machinery – disc sander, drill press, lathe, sewing machine, mower – appliances – blender, iron, sandwich maker – computer equipment – computer, printer, scanner	• select the appropriate tools and equipment for a design project *Examples* using a touch switch to generate a computer graphic for an iron-on design for a T-shirt; choose an ironing press to transfer iron-on design to a T-shirt; use an overlocker to hem a piece of fabric for a tablecloth (Fashion Design)
• properties of materials including – strength – absorbency – transparency – rigidity	• select materials that are appropriate for a design project *Examples* select an absorbent cloth to wipe off excess glue; choose a fine grain abrasive paper to finish a cutting board; choose plywood over solid timber to make a tool box (Industrial Design)

Students learn about:	**Students learn to:**
• the application of Occupational Health and Safety practices in relation to – handling and using a variety of materials safely – handling and using hand tools, power tools and appliances safely – handling and using machines and computer equipment safely	• recognise properties of materials, equipment and tools that make them dangerous eg – flammability – toxicity – sharpness – weight – temperature
• safe lifting practices	• recognise and follow safety labelling eg – international symbols – safety signage – colour coding • carry and transfer materials, tools and equipment safely eg – passing scissors, knives, chisels – transferring hot dishes from an oven – carrying objects of varying weights and lengths • consider weight, size and bulk when lifting objects eg – bend knees – keep back straight and feet apart – share the load
• safety with gas and electricity	• take precautions when using gas and electricity eg – light match before turning on gas – keep cords clear of tools – check regularly that flame is still alight – keep electrical appliances clear of water – turn off gas or electricity when not in use • use materials, tools and equipment safely in the context of participating in or undertaking design projects eg making a milkshake using a switch-driven blender – wait for instructions – check stability of blender – check power safety (Food Design)

Students learn about:	**Students learn to:** • prepare a salad – wash hands prior to handling food – choose correct knife for cutting – choose correct board – keep fingers clear of blade (Food Design) • prepare a meal in a microwave oven – choose microwave safe cookware – use oven mitt to remove cookware – be cautious of steam release when removing covers (Food Design) • grow vegetables in a pot – wear protective clothing – use a mask when handling potting mix – take precautions when using sprays – lift and transfer pots safely – wash hands after handling soils (Agricultural Product Design) • construct a raised garden bed – select a safe location – identify and select appropriate tools – demonstrate safe lifting – consider safety of others (Landscape Design) • incubate eggs – handle heat lamps with care – organise materials to minimise fire hazard – wash hands after handling (Agricultural Product Design) • produce a cheese board – correctly support timber while sawing – wear a dust mask when sanding – use eye protection when operating an electric sander – wash hands after oiling surface (Industrial Design) • produce a plastic desk tidy – ensure room is well-ventilated – wear protective clothing when handling hot plastic – use heating apparatus safely (Industrial Design)

Students learn about:	**Students learn to:**
	• produce a brass bowl – use cutting tools with care – keep fingers clear when using a mallet – hold sheet metal securely while filing (Industrial Design)
• caring for materials, tools and equipment	• undertake regular checks of equipment eg – electrical cords and plugs for faults – check LPG containers for use by dates • store materials, tools and equipment appropriately eg – flammable materials in a steel cupboard – knives and chisels in a block/rack • regularly and safely maintain tools and equipment after use eg – toaster – microwave – shovels – telephones • keep workplaces clean and clear of hazards eg – floors – benches – tool shed

<table>
<tr><td colspan="2">Outcome LS 4.1 A student explores the impact of innovation and emerging technologies.</td></tr>
<tr><td>Students learn about:
• the impact of emerging technology on
– the individual
– society
– the environment</td><td>Students learn to:
• recognise the impact of technology on the individual eg
– mobility – wheelchairs, ramps, motorised scooters for seniors
– communication – telephone, SMS, email

• explore the impact of technology on society eg
– media – internet, computer games, interactive media
– transport – speed, globalisation, space

• explore the impact of technology on the environment eg
– packaging – global warming, recycling

• recognise that technology can have positive and negative effects eg
– Information Technology
– positive – efficiency, decentralisation, access
– negative – socialisation, employment changes, health impacts

• use emerging technologies in the context of a design project

Examples
use a fax machine to send a picture to a friend at another school; use a computer wizard to design a fax coversheet; compare the efficiency of communication methods – email, fax, letter and others
(Information Systems Design)</td></tr>
</table>

Outcomes

A student:

LS 5.1 participates in producing design projects

LS 5.2 produces design projects across areas of study

LS 5.3 manages and produces design projects across areas of study using a variety of technologies

Students learn about:	**Students learn to:**
• managing resources and time to complete a design project • using communication strategies and techniques • applying the design process in the context of producing a design project • using a variety of technologies to produce a design project	• participate in designing and producing a product eg – thread beads to produce a bangle (Jewellery Design) – use given materials to produce a key ring (Industrial Design) – use 20 drinking straws and masking tape to construct a design to support the weight of a container of water (Structural Design) • follow the steps to complete a design project *Example* • design and produce a banner as part of a celebration of an event – explore ideas: symbols, colours, size, materials, aesthetically pleasing from a long distance, portable, weatherproof – plan: timeline and date for completion – select tools, equipment, materials: choose and list requirements such as fabrics, paint, dowel, check availability of tools or machinery, organise purchase of materials – produce design project: cooperate with others in group tasks, prepare materials (cut fabric, cut dowel), complete allocated task and assemble project – evaluate design project: consider such things as portability, visual impact from distance, quality of construction • produce a design project using a range of technologies eg – produce a planter box as a gift: cultivate a flowering plant (Plant Production Technologies); produce a planter box (Timber Technologies); generate a gift tag (Graphics Technologies).

<table>
<tr><td colspan="2">Outcomes
A student:
LS 6.1 evaluates the success of completed design projects
LS 6.2 evaluates the design of everyday products in terms of intended use</td></tr>
<tr><td>Students learn about:</td><td>Students learn to:</td></tr>
<tr><td>• evaluating a design project in terms of
– function
– aesthetics
– available resources
– social and cultural appropriateness
– environmental impact
– marketability</td><td>• evaluate the progress of a design project eg
– can the design project be completed within available resources such as time, cost, skills, equipment?
– have the correct materials, tools and equipment been chosen?
– do I need help?
– am I working safely?

• evaluate a completed design project eg
– does the finished product require modification?
– what changes, if any, need to be made?
– will it be used?
– do I like it?
– does the project meet an identified need?

• evaluate a design project in terms of marketability eg
– presentation
– packaging
– price/cost
– safety
– impact on individuals, society, environment</td></tr>
<tr><td>• considering the design of everyday objects in meeting their end use</td><td>• evaluate everyday products in terms of their
– function, finish, appeal
– usefulness, durability
– stability, ergonomics
– construction, safety
– materials used

• be a discerning consumer eg
– select products that will meet consumer needs: choose a vase to hold a large bunch of flowers
– select products that provide value for money: compare a sports brand T-shirt with a home brand T-shirt
– select products that are environmentally friendly: purchase furniture made from plantation timber as opposed to rainforest timber</td></tr>
</table>

9 Continuum of Learning in Technology (Mandatory) K–10

Stage outcomes and stage statements illustrate the continuum of learning in the *Technology (Mandatory) Years 7–8 Syllabus*.

9.1 Stage Outcomes

Content	Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
	A student:				
Built Environments	explores and identifies ways in which built environments suit their users	creates, modifies or models built environments to suit the needs of users	creates, models and evaluates built environments reflecting consideration of functional and aesthetic factors	creates and evaluates built environments demonstrating consideration of sustainability and aesthetic, cultural, safety and functional issues	**4.1.2** describes factors influencing design in the areas of study of Built Environments, Products, and Information and Communications
Information and Communications	recognises and uses various means of communication	creates a range of information products and communicates using a variety of media	creates and evaluates information products demonstrating an under-standing of the needs of particular audiences	creates and evaluates infor-mation products and processes, demonstrating consideration of the type of media, form, audience and ethical issues	**4.2.1** generates and communicates creative design ideas and solutions
Living Things	identifies ways in which living things are different and have different needs	identifies and describes ways in which living things grow and change	identifies and describes the structure and function of living things and ways in which living things interact with other living things and their environment	identifies, describes and evaluates the interactions between living things and their effects on the environment	**4.6.2** identifies and explains ethical, social, environmental and sustainability considerations related to design projects
Physical Phenomena	explores and identifies ways some forms of energy are used in their daily lives	identifies and describes different ways some forms of energy are used in the community	identifies various forms and sources of energy and devises systems that use energy	identifies and applies processes involved in manipulating, using and changing the form of energy	Not specifically addressed in outcomes. Forms of energy can be addressed optionally within suitable design projects
Products and Services	recognises the relationship between everyday products and people's needs	grows, makes or processes some products using a range of techniques and materials	creates and evaluates products and services considering aesthetic and functional factors	creates and evaluates products and services, demonstrating consideration of sustainability, aesthetic, cultural, safety and functional issues	**4.1.2** describes factors influencing design in the areas of study of Built Environments, Products, and Information and Communications

Content	Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
	A student:				
					4.5.2 produces quality solutions that respond to identified needs and opportunities in each design project **4.6.2** identifies and explains ethical, social, environmental and sustainability considerations related to design projects
Earth and its Surroundings	explores and identifies ways the environment influences their daily lives	identifies and describes ways in which people and other living things depend upon the earth and its environments	identifies some of the features of the solar system and describes interactions that affect conditions on earth	recognises that the earth is the source of most materials and resources, and describes phenomena and processes, both natural and human, that form and change the earth over time	**4.6.2** identifies and explains ethical, social, environmental and sustainability considerations related to design projects

Learning Processes	Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
	A student:				
Investigating	investigates their surroundings by observing, questioning, exploring and reporting	conducts guided investigations by observing, questioning, predicting, collecting and recording data, and suggesting possible explanations	conducts investigations by observing, questioning, predicting, testing, collecting, recording and analysing data, and drawing conclusions	conducts their own investigations and makes judgements based on the results of observing, questioning, planning, predicting, testing, collecting, recording and analysing data, and drawing conclusions	**4.2.2** selects, analyses, presents and applies research and experimentation from a variety of sources
Designing and Making	generates own ideas and designs through trial and error, play, modelling and making	develops and implements own design ideas in response to an investigation of needs and wants	develops, implements and evaluates ideas using drawings, models and prototypes at appropriate stages of the design process	develops and resolves a design task by planning, implementing managing and evaluating design processes	**4.1.1** applies design processes that respond to needs and opportunities in each design project

Learning Processes	Early Stage 1	Stage 1	Stage 2	Stage 3	Stage 4
	A student:				
					4.5.1 applies management processes to successfully complete design projects **4.6.1** applies appropriate evaluation techniques throughout each design project
Using Technology	identifies and uses a limited range of equipment, computer-based technology, materials and other resources when undertaking exploration and production	selects and uses a range of equipment, computer-based technology, materials and other resources to undertake an investigation or design task	selects and uses a range of equipment, computer-based technology, materials and other resources with developing skill to enhance investigation and design tasks	evaluates, selects and uses a range of equipment, computer-based technology, materials and other resources to meet the requirements and constraints of investigating and designing tasks	**4.3.1** applies a broad range of contemporary and appropriate tools, materials and techniques with competence in the development of design projects **4.2.1** generates and communicates creative design ideas and solutions **4.3.2** demonstrates responsible and safe use of a range of tools, materials and techniques in each design project
Innovation and emerging technology. Stage 4 outcomes only. Not specifically addressed in Stages 1–3 outcomes.	Nil	Nil	Nil	Nil	**4.4.1** explains the impact of innovation and emerging technologies on society and the environment

Outcomes	Stages 1–3	Links to Stage 4 Outcomes
	A student:	
Values and Attitudes	• demonstrates confidence in their own ability and a willingness to make and implement decisions when investigating, designing, making and using technology • exhibits curiosity and responsiveness to scientific and technological ideas and evidence • initiates scientific and technological tasks and challenges and perseveres with them to their completion • gains satisfaction from their efforts to investigate, to design, to make, and to use technology • works cooperatively with others in groups on scientific and technological tasks and challenges • shows informed commitment to improving the quality of society and the environment through science and technology activities • appreciates contributions made by individuals, groups, cultures and communities to scientific and technological understanding • appreciates the significance of Australian scientific and technological expertise across gender and cultural groups	**4.1.2** describes factors influencing design in the areas of study of Built Environments, Products, and Information and Communications. **4.3.2** demonstrates responsible and safe use of a range of tools, materials and techniques in each design project **4.6.2** identifies and explains ethical, social, environmental and sustainability considerations related to design projects

9.2 Stage Statements

Stage statements are summaries of the knowledge, understanding, skills, values and attitudes that have been developed by students as a consequence of achieving the outcomes for the relevant stage of learning.

Early Stage 1 – Science and Technology

Students who have achieved Early Stage 1 show a growing awareness of, and interest in, the natural and made environments. They demonstrate confidence in proposing ideas for designs they develop through play and modelling. They demonstrate curiosity about artefacts, events, phenomena, places and living things around them.

Early Stage 1 students use play to explore ideas, manipulate materials and trial solutions. They develop and begin to refine their understanding of environments, materials, equipment and other resources through trial and error. They ask questions, suggest ideas, propose their own explanations and are able to report verbally and graphically on their actions and observations.

Students in this stage use their senses to observe features of their immediate environment and to explore the properties of a range of common materials. They identify and group living and non-living things according to some common characteristics.

Students explore and identify the needs of people and other living things. They recognise the use of some forms of energy and their ideas about it are beginning to develop as they experience energy in different contexts.

Students generate their own ideas, using make-believe, and express these verbally, pictorially and through modelling. They are unlikely to perceive the steps in a designing and making process as they often work in situations where these aspects occur at the same time. They identify what they like or dislike about their designs or explorations.

Students in Early Stage 1 recognise that information can come from a variety of sources, including other people and from different media, for example, books and videos. They demonstrate an awareness of a range of uses for computer-based technology as well as showing an emerging confidence in their ability to explore and use computer-based technologies, with assistance, to create text, images and play games.

Students show growing awareness of the appropriate use and maintenance of a range of classroom equipment. They give reasons for safe working practices and organisational procedures related to the use of equipment, resources and materials. Students develop ideas through the use and manipulation of concrete materials as a means of progressing towards abstract thought.

Stage 1 – Science and Technology

Students who have achieved Stage 1 are developing an awareness of the wider world and are applying their scientific and technological understanding to new and different situations. They are starting to develop the social skills required to investigate, design and make products and services.

Students are starting to appreciate the interdependence of living things and their environments. They recognise that people create products, services and environments to meet their own needs. They build on their existing understanding of some of the forms of energy.

Students are able to interpret information and make predictions based on their own observations. They are better able to accept that the result of a test may be different from what was originally expected.

Students are able to recognise the purpose of an investigation and seek further information as a result of their own curiosity. They begin to see that an investigation is a series of orderly steps. They use their senses to identify similarities and differences. Students show curiosity about natural and made environments and seek explanations that allow them to interpret their observations.

Using plans, drawings and models, Stage 1 students begin to generate and select ideas to best meet design task objectives, and give simple explanations of why they have chosen a certain idea. Students in this stage can draw plans for a design and can explain some of the features and materials to be used. They can write labels and simple explanations when creating images.

Students recognise and discuss with others some of the strengths and limitations of what they have done and identify some changes that could be made to improve plans or models, for example in appearance. They make comparisons about what they like and dislike about familiar products, systems or environments.

Students effectively manipulate materials that are available in the classroom environment, and show a growing awareness of the different properties of such materials and how they affect the way in which the materials are used. They recognise that some materials occur naturally, while others are made.

Students have a developing awareness of a range of media and information products. They are able to use computer technology to start and open files or applications, save and shut down. They are able to use computer-based technologies where appropriate for a given task.

They are able to identify the different forms of technology in their immediate environments and explain how they help us. They safely use, maintain and store equipment such as scissors, magnifying glasses, computers and disks.

Stage 2 – Science and Technology

Students who have achieved Stage 2 are able to initiate their own investigations as a result of something that has aroused their curiosity. They ask perceptive questions and respond to design tasks in innovative ways. They identify ways of improving their own scientific and technological activities by considering issues such as how well something works, its appearance and how it might affect the environment.

Students develop the capacity to ask questions to clarify understanding. They predict outcomes by proposing explanations and testing to see if their predicted outcomes eventuate. As students develop skills in predicting, testing, recording results and drawing conclusions, they begin to form understanding about 'fair testing' that takes into account the need for consistent conditions combined with one variable, in order to ensure accurate results.

Students who have achieved Stage 2 are able to explore ideas for investigations and their design proposals in order to identify where decisions still need to be made, and to suggest possible courses of action. Students may suggest modifications to improve their initial proposals, including the selection of different solutions to arrive at a suitable outcome.

Students are able to explore the properties, capabilities and working characteristics of both natural and manufactured materials and components. They recognise that materials are varied and have different properties that affect their use. They can select, maintain and safely use classroom tools and equipment, hardware and software, and justify their selection for particular tasks.

Students give consideration to issues such as function and aesthetics when designing and evaluating products, services and environments. They can identify some limitations when carrying out a design task. Students develop plans that show some consideration of the types and quantities of materials required and an awareness of the need for accuracy in a plan for production purposes.

Students recognise the function of some hardware and software and are able to select and use these to meet the requirements of a task. They can discuss the possibilities and limitations of using a range of technology including computer-based technology.

Students are developing a capacity to understand relationships in the natural world. They can identify and describe some aspects of the structure and function of living things and some of the ways living things interact. They can also identify and describe some of the interactions of the Earth with other parts of the solar system. Students in this stage devise systems that inform or utilise their understanding of some forms of energy.

Students also demonstrate a greater understanding of and control over a design process. They recognize the importance of evaluation throughout a design cycle.

Stage 3 – Science and Technology

Students who have achieved Stage 3 are able to undertake investigations independently in order to satisfy their own curiosity. They demonstrate a willingness to initiate their own investigations; this might include designing appropriate fair tests to evaluate a range of possible explanations for the results of their investigations.

Students select and use appropriate language, structures and media and demonstrate skills in critically examining and communicating scientific and technological ideas and issues. Students can relate their scientific and technological understanding to new tasks or different situations.

Students research and investigate to identify phenomena and processes that have influenced Earth over time. They build on their existing understanding of forms of energy.

Students are aware of the skills and processes involved in designing and making, investigating and using technology. They manage the design process including aspects of time management, design constraints and needs of the target audience. At this stage, they can make decisions involving some conflicting interests or issues, for example ethical, aesthetic, environmental and cultural.

Students use two- and three-dimensional drawings and models to develop and modify their design ideas and to communicate details to others. They recognize and use some conventions and symbols related to developing plans and diagrams, such as measurements and some use of scale. They can observe the form and detail of objects carefully in order to produce accurate drawings from different views and they reflect on their drawings, sketches or computer models.

Students are aware of a range of issues related to scientific and technological achievements. They are capable of acquiring information from a variety of sources and are able to experiment with new techniques and skills as technologies change. Students identify emerging trends by using data, diagrams and a range of tools and equipment to assist with observations.

Students recognise that computer-based technologies have a wide range of applications in society and can identify and describe some of the effects of such technologies on individuals and communities. Students who have achieved Stage 3 can confidently and competently use a range of computer-based hardware and applications. Students at this stage can identify alternative uses and can be creative in adapting available software to the requirements of a task.

Students reflect on the methods used and positive and negative results of technological and scientific activity both throughout their own projects and in personal, local and global contexts.

Stage 4 – Technology (Mandatory)

Students at Stage 4 are able to independently initiate design projects and investigations that reflect an understanding of needs and opportunities. They demonstrate the ability to research and extract information from a variety of sources and a willingness to use experiments and tests to enhance the development of a design project. They describe factors that influence design.

Students select and use a broad range of media and method and appropriate language and structures to accurately communicate design ideas to a diverse audience. This may include recounting the process of designing, producing and evaluating used when developing design projects. Students are aware of the skills and processes involved in designing and are able to generate and communicate design ideas and solutions. They develop knowledge and understanding of a range of design processes, roles of designers and associated work opportunities. They can identify what makes good design and are able to creatively develop quality design projects.

Students responsibly, safely, confidently and accurately apply a range of contemporary and appropriate tools, materials and techniques and understand the implications and applications of these in the wider community. Students demonstrate competence when using a range of ICTs and have the ability to select and use them appropriately in developing design projects.

Students recognise the importance of safety, quality and management in the design and production of design projects. They learn to manage their own time by sequencing processes of designing, producing and evaluating to plan ahead. They work collaboratively and learn to work safely with others in technological environments.

Throughout the design process students reflect on and evaluate their design projects. They consider the impact of innovation and emerging technology on society and the environment and identify and explain ethical, social, sustainability and environmental considerations related to design projects.

10 Assessment

10.1 Standards

The Board of Studies *K–10 Curriculum Framework* is a standards-referenced framework that describes, through syllabuses and other documents, the expected learning outcomes for students.

Standards in the framework consist of two interrelated elements:
- outcomes and content in syllabuses showing what is to be learnt
- descriptions of levels of achievement of that learning.

Exemplar tasks and student work samples help to elaborate standards.

Syllabus outcomes in Technology (Mandatory) contribute to a developmental sequence in which students are challenged to acquire new knowledge, understanding and skills.

The standards are typically written for two years of schooling and set high, but realistic, expectations of the quality of learning to be achieved by the end of Years 2, 4, 6, 8, 10 and 12.

Using standards to improve learning
Teachers will be able to use standards in Technology (Mandatory) as a reference point for planning teaching and learning programs, and for assessing and reporting student progress. Standards in Technology (Mandatory) will help teachers and students to set targets, monitor achievement, and, as a result, make changes to programs and strategies to support and improve each student's progress.

10.2 Assessment for Learning

Assessment for learning in Technology (Mandatory) is designed to enhance teaching and improve learning. It is assessment that gives students opportunities to produce the work that leads to development of their knowledge, understanding and skills. *Assessment for learning* involves teachers in deciding how and when to assess student achievement, as they plan the work students will do, using a range of appropriate assessment strategies including self-assessment and peer assessment.

Teachers of Technology (Mandatory) will provide students with opportunities in the context of everyday classroom activities, as well as planned assessment events, to demonstrate their learning.

In summary, *assessment for learning*:
- is an essential and integrated part of teaching and learning
- reflects a belief that all students can improve
- involves setting learning goals with students
- helps students know and recognise the standards they are aiming for
- involves students in self-assessment and peer assessment
- provides feedback that helps students understand the next steps in learning and plan how to achieve them
- involves teachers, students and parents in reflecting on assessment data.

Quality Assessment Practices

The following *Assessment for Learning Principles* provide the criteria for judging the quality of assessment materials and practices.

Assessment for learning:

- **emphasises the interactions between learning and manageable assessment strategies that promote learning**
  In practice, this means:
  - teachers reflect on the purposes of assessment and on their assessment strategies
  - assessment activities allow for demonstration of learning outcomes
  - assessment is embedded in learning activities and informs the planning of future learning activities
  - teachers use assessment to identify what a student can already do.

- **clearly expresses for the student and teacher the goals of the learning activity**
  In practice, this means:
  - students understand the learning goals and the criteria that will be applied to judge the quality of their achievement
  - students receive feedback that helps them make further progress.

- **reflects a view of learning in which assessment helps students learn better, rather than just achieve a better mark**
  In practice, this means:
  - teachers use tasks that assess, and therefore encourage, deeper learning
  - feedback is given in a way that motivates the learner and helps students to understand that mistakes are a part of learning and can lead to improvement
  - assessment is an integral component of the teaching-learning process rather than being a separate activity.

- **provides ways for students to use feedback from assessment**
  In practice, this means:
  - feedback is directed to the achievement of standards and away from comparisons with peers
  - feedback is clear and constructive about strengths and weaknesses
  - feedback is individualised and linked to opportunities for improvement.

- **helps students take responsibility for their own learning**
  In practice, this means:
  - assessment includes strategies for self-assessment and peer assessment emphasising the next steps needed for further learning.

- **is inclusive of all learners**
  In practice, this means:
  - assessment against standards provides opportunities for all learners to achieve their best
  - assessment activities are free of bias.

10.3 Reporting

Reporting is the process of providing feedback to students, parents and other teachers about student progress.

Teachers use assessment evidence to extend the process of *assessment for learning* into their *assessment of learning*. In a standards-referenced framework teachers make professional judgements about student achievement at key points in the learning cycle. These points may be at the end of a year or stage, when schools may wish to report differentially on the levels of knowledge, understanding and skills demonstrated by students.

Descriptions of student achievement in Technology (Mandatory) provide schools with a useful tool to report consistent information about student achievement to students and parents, and to the next teacher to help to plan the next steps in the learning process.

The A-E grade scale or equivalent provides a common language for reporting by describing observable and measureable features of student achievement at the end of a stage, within the indicative hours of study. Teachers use the descriptions of the standards to make a professional, on-balance judgement, based on available assessment information, to match each student's achievement to a description. The Common Grade Scale (A-E) or equivalent is used by teachers to report student levels of achievement from Stages 1-5.

For students with special education needs, teachers may need to consider, in consultation with their school and sector, the most appropriate method of reporting student achievement. It may be deemed more appropriate for students with special education needs to be reported against outcomes or goals identified through the collaborative curriculum planning process.

10.4 Choosing Assessment Strategies

Planning for assessment is integral to programming for teaching and learning. In a standards-referenced framework, teachers assess student performance on tasks in relation to syllabus outcomes and make on-balance judgements about student achievement. Assessment relies on the professional judgement of the teacher and is based on reliable data acquired in a fair and challenging environment, from multiple performances in a variety of contexts. Assessment is fundamental for furthering student learning.

In planning programs, teachers, individually and collaboratively, review the syllabus and standards materials. They use these materials to describe for themselves what students should know and be able to do at a particular stage, and they consider the kinds of evidence their students could produce to show they have learnt what they needed to learn.

Students are provided with a description of the learning expected to be accomplished, opportunities to discuss the criteria on which judgements will be based, time to learn, and where possible, examples of what that learning looks like.

Assessment is used to determine the students' initial knowledge, understanding and skills, to monitor student progress and to collect information to report student achievement. The assessment cycle is continuous; students receive and give themselves feedback on what they have learnt, and what needs to be done to continue their learning. Students gain information about their learning through feedback from teachers and from self-assessment and peer assessment. The challenge and complexity of assessment tasks increase to enable students to develop evaluative independence as they assess their own knowledge, understanding and skills, and determine ways to improve their learning.

Teachers of Technology (Mandatory) should employ a range of assessment strategies to ensure that information is being gathered regarding the knowledge and understanding that are being acquired, and the skills that are being developed. Strategies should be appropriate to the outcomes being addressed, be manageable in number and be supportive of the learning process. Teachers could work collaboratively in planning appropriate assessment strategies. Working collaboratively leads teachers to develop a shared understanding of the syllabus standards and also supports teachers in making consistent and comparable judgements of student achievement in relation to these standards.

In planning for assessment in Technology (Mandatory) it is important for teachers to consider:

- the requirements of the syllabus
- the accessibility of the proposed activity in terms of language requirements
- the appropriateness of the challenge presented to individual students
- resource availability
- how the task will be administered
- the way in which feedback will be provided.

In planning for assessment, teachers of Technology (Mandatory) need to consider how results will be recorded, with a view to ensuring that there is sufficient and appropriate information collected for making an on-balance holistic judgement of the standard achieved by the student at the end of the stage. The evidence collected should enable teachers of Technology (Mandatory) to make consistent judgements to meet the various reporting requirements that the system, school and community may have.

Technology (Mandatory) particularly lends itself to the following assessment techniques, keeping in mind that a range of strategies should be used to assess the outcomes of the course. Teachers working collaboratively can plan teaching and learning programs that incorporate appropriate assessment strategies for different projects.

As design-related content and technologies-specific content are integrated into design projects, it follows that much of the assessment for this course will take place in the context of design projects. A design project involves the design, production and evaluation of quality solutions and a design folio. Assessment of design projects can involve an overall evaluation of the practical skills and documentation required.

Assessment activities related to the design, production and evaluation of quality solutions could be used to assess students on their ability to:

- produce solutions that respond to needs and opportunities either self-generated or presented by the teacher
- apply results of experiments to produce quality solutions
- competently apply a broad range of tools, materials and techniques
- apply risk management practices and work safely
- develop quality solutions within a limited time frame

Assessment activities related to the development of a design folio provides the opportunities for students to record aspects of project work. When assessing the design folio students could be assessed on their ability to:

- record the development of the design process followed in their design project
- draw, sketch and model design ideas
- compose a design folio for a specific audience
- communicate information appropriate to specified audiences
- use ICTs to present ideas, concepts and models of design project solutions

Observation of demonstrated skills

When students are working on design projects in class, the teacher has the opportunity to observe and note aspects of student learning. Students could be assessed on their ability to:

- manage risk when developing design solutions
- apply action plans
- competently manipulate materials and techniques
- manage time effectively
- competently and safely use equipment

Research Activities

Research activities form part of the design process when students develop design projects. They might include using information drawn from the library and Internet searches to support the processes of designing and producing. When students undertake research tasks, they could be assessed on their ability to:

- use appropriate research methods that are suitable to obtain the information required.
- select and interpret relevant information from research
- present information from research and experimentation in a logical manner

Presentations
Assessment activities might include prepared and impromptu oral presentations, role-plays, poster presentations, prepared video/audio tapes and displays in relation to design projects. When this technique is used for assessment purposes students could be assessed on their ability to:

- select and apply appropriate research and experimentation
- present information in a creative and logical manner
- apply ICT skills to communicate information appropriate to specified audiences
- present research and experimentation.

Journals
Journals provide opportunities for students to write personal reflections when developing a design project. They allow students to develop knowledge, skills and abilities to make informed, responsible choices. They also develop in students, self-awareness and critical thinking skills. When using journals as an assessment technique, students could be assessed on their ability to:

- record and reflect on design ideas and decision-making.

Written responses and reports
These may include listening and viewing tasks: for example: responses to taped stories, film and television programs about designers; surveys; evaluation reports and interviews. When students produce written responses and reports, they could be assessed on their ability to:

- summarise key points
- use appropriate detail
- use appropriate language.

Peer assessment
Technology (Mandatory) encourages the active involvement of students in the learning process. Opportunities exist for individual and collaborative work. Activities involving peer assessment might include evaluating the contribution of individuals to a group task, and reflecting on a peer presentation.

Self-assessment
In Technology (Mandatory) students are encouraged to acquire basic skills to become self-directed learners. Opportunities exist for students to reflect on their progress towards the achievement of the syllabus outcomes. This reflection provides the basis for improving their learning. Developing self-assessment skills is an ongoing process, becoming increasingly more sophisticated and self initiated as a student progresses.