

# The Australian Curriculum

<b>Learning areas</b>	Technologies
<b>Subjects</b>	Design and Technologies, Digital Technologies
<b>Year levels</b>	Year 7

## Years 7 and 8 Content Descriptions

### Design and Technologies Knowledge and Understanding

Investigate the ways in which products, services and environments evolve locally, regionally and globally and how competing factors including social, ethical and sustainability considerations are prioritised in the development of **technologies** and designed solutions for **preferred futures** ([ACTDEK029 - Scootle](#))



#### Elaborations

considering factors that influence the selection of appropriate materials, components, tools and equipment, for example Aboriginal and Torres Strait Islander Peoples' sustainable practices, custodianship and connection to Country



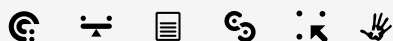
investigating how ethics, social values, profitability and sustainability considerations impact on design and technologies, for example animal welfare, intellectual property, off-shore manufacturing in Asia



critiquing competing factors that influence the design of services, for example a natural disaster warning system for a community



considering the rights and responsibilities of those working in design and technologies occupations, for example consideration of Aboriginal and Torres Strait Islander protocols



investigating traditional and contemporary design and technologies, including from Asia, and predicting how they might change in the future in response to factors such as social change and the need for more sustainable patterns of living



identifying needs and new opportunities for design and enterprise, for example promotion and marketing of designed solutions



Analyse how motion, force and energy are used to manipulate and control electromechanical systems when **designing** simple, engineered solutions ([ACTDEK031 - Scootle](#))



## Elaborations

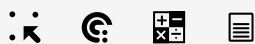
investigating influences impacting on manufactured products and processes such as historical developments, society, new materials, control systems and biomimicry, for example the development of velcro



experimenting to select the most appropriate principles and systems on which to base design ideas, for example structural components to be tested for strength



calculating an engineered system's outputs, for example speed, brightness of light, volume of sound



producing prototypes and jigs to test functionality, including the use of rapid prototyping tools such as 3D printers



using code to control systems, for example code to program a microcontroller or a simple, object-based coding application to program a system such as a remote-controlled car or simple robotic arm



investigating components, tools and equipment, for example testing the durability of batteries, determining the effective range of wireless devices



Analyse how food and [fibre](#) are produced when [designing](#) managed environments and how these can become more [sustainable](#) ([ACTDEK032 - Scootle](#) [↗](#))

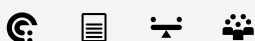


## Elaborations

comparing land and water management methods in contemporary Australian food and fibre production with traditional Aboriginal systems and countries of Asia, for example minimum-tillage cropping, water-efficient irrigation



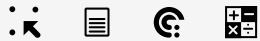
investigating the management of plant and animal growth through natural means and with the use of chemical products like herbicides and medicines when producing food and fibre products



recognising the need to increase food production using cost efficient, ethical and sustainable production techniques



describing physical and chemical characteristics of soil and their effects on plant growth when producing food and fibre products



investigating different animal feeding strategies such as grazing and supplementary feeding, and their effects on product quality, for example meat tenderness, wool fibre diameter (micron), milk fat and protein content when producing food and fibre products



recognising the importance of food and fibre production to Australia's food security and economy including exports and imports to and from Asia when critiquing and exploring food and fibre production

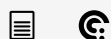


Analyse how [characteristics](#) and properties of food determine preparation techniques and presentation when [designing](#) solutions for [healthy eating](#) ([ACTDEK033 - Scootle](#) [↗](#))



#### Elaborations

planning and making quality, safe and nutritious food items, using a range of food preparation tools, equipment and techniques



examining the relationship between food preparation techniques and the impact on nutrient value, for example steaming vegetables



investigating how a recipe can be modified to enhance health benefits, and justifying decisions, for example by replacing full cream milk with skim milk

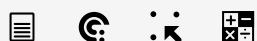


analysing food preparation techniques used in different cultures including those from the Asia region and the impact of these on nutrient retention, aesthetics, taste and palatability, for example stir-frying



explaining how food preparation techniques impact on the sensory properties (flavour, appearance,

texture, aroma) of food, for example the browning of cut fruit, the absorption of water when cooking rice

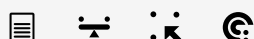


Analyse ways to produce designed solutions through selecting and combining **characteristics** and properties of materials, systems, **components**, tools and **equipment** (ACTDEK034 - Scootle [↗](#))



#### Elaborations

investigating aspects of technologies specialisations, for example in architecture, critiquing the design of an existing building to identify features of passive design or in fashion, evaluating the sustainability of different fibres



investigating and selecting from a broad range of technologies – materials, systems, components, tools and equipment – when designing for a range of technologies contexts



considering the ways in which the characteristics and properties of technologies will impact on designed solutions, for example the choice of building materials and housing design in Australia and the countries of Asia; the properties of textile fibres and fabrics determine end use



considering safe work practices, for example producing a safety information video that details risk management practices for using a piece of equipment in the classroom or within a community



evaluating products and services for the individual and the community considering ethics and social factors, for example a short video encouraging individuals to increase their use of public transport in the local area




evaluating environments that have been designed in consultation with community groups, for example a bush tucker community garden developed in consultation with local Elders



## Design and Technologies Processes and Production Skills

Critique needs or opportunities for designing and investigate, analyse and select from a range of

materials, [components](#), tools, [equipment](#) and processes to develop design ideas ([ACTDEP035 - Scootle](#) )



#### Elaborations

considering community needs when identifying opportunities for designing, for example gardens for a community centre, cost effective food service for a sport club



experimenting with traditional and contemporary technologies when developing designs, and discovering the advantages and disadvantages of each approach



investigating emerging technologies and their potential impact on design decisions, for example flame retardant fabrics or smart materials such as self-healing materials, digital technologies and agriculture



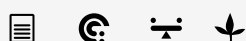
examining, testing and evaluating a variety of suitable materials, components, tools and equipment for each design project, for example the differences between natural hardwood and plantation softwood timbers, which determine their suitability for particular uses related to durability, for example interior or exterior use



evaluating the viability of using different techniques and materials in remote, isolated areas, or less developed countries



selecting appropriate materials to acknowledge sustainability requirements by using life cycle thinking



Generate, develop, test and communicate design ideas, plans and processes for various audiences using appropriate technical terms and [technologies](#) including graphical representation techniques ([ACTDEP036 - Scootle](#) )



#### Elaborations

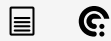
using a variety of critical and creative thinking strategies such as brainstorming, sketching, 3-D modelling and experimenting to generate innovative design ideas



considering which ideas to further explore and investigating the benefits and drawbacks of ideas, for example using digital polling to capture the views of different groups in the community



identifying factors that may hinder or enhance project development, for example intercultural understanding



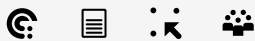
developing models, prototypes or samples using a range of materials, tools and equipment to test the functionality of ideas



producing annotated concept sketches and drawings, using: technical terms, scale, symbols, pictorial and aerial views to draw environments; production drawings, orthogonal drawings; patterns and templates to explain design ideas



documenting and communicating the generation and development of design ideas for an intended audience, for example developing a digital portfolio with images and text which clearly communicates each step of a design process



Select and justify choices of materials, **components**, tools, **equipment** and techniques to effectively and safely make designed solutions ([ACTDEP037 - Scootle](#))



#### Elaborations

developing technical production skills and safe working practices with independence to produce quality solutions designed for sustainability



practising techniques to improve expertise, for example handling animals, cutting and joining materials




identifying and managing risks in the development of various projects, for example working safely, responsibly, cooperatively and ethically on design projects, assessing uncertainty and risk in relation to long-term health and environmental impacts



developing innovative ways of manipulating technologies using traditional and contemporary materials, components, tools, equipment and techniques and considering alternatives including emerging technologies that could be substituted to reduce waste or time



Independently develop [criteria for success](#) to evaluate design ideas, processes and solutions and their sustainability ([ACTDEP038 - Scootle](#) )

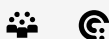


#### Elaborations

developing criteria for success to evaluate the success of designed solutions in terms of aesthetics, functionality and sustainability




considering how to improve technical expertise



evaluating designed solutions and processes and transferring new knowledge and skills to future design projects



Use [project](#) management processes when working individually and collaboratively to coordinate production of designed solutions ([ACTDEP039 - Scootle](#) )

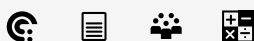


#### Elaborations

explaining and interpreting drawings, planning and production steps needed to produce products, services or environments for specific purposes



organising time, evaluating decisions and managing resources to ensure successful project completion and protection of the work space and local environment



identifying risks and how to avoid them when planning production



investigating the time needed for each step of production








## Years 7 and 8 Content Descriptions

### Digital Technologies Knowledge and Understanding

Investigate how data is transmitted and secured in wired, wireless and mobile networks, and how the specifications affect performance ([ACTDIK023 - Scootle](#) )



#### Elaborations

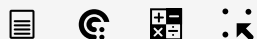
explaining that networks have components that control the movement of data, for example routers, hubs, switches and bridges manage data traffic and that the characteristics of these components impact on the operation (speed and security) of networks



explaining how cellular radio towers (transceivers) and mobile phones work together to create mobile networks




comparing the reliability and speed of transmitting data through wireless, wired and mobile networks



recognising that there are different communications protocols for transmitting data in networks, for example hypertext transfer protocol (HTTP) is used for transferring web page files in a browser, file transfer protocol (FTP) is used for sending and receiving any files over a network and transmission control protocol/internet protocol (TCP/IP) is used for controlling file transfers over the internet



Investigate how digital systems represent text, image and audio data in binary ([ACTDIK024 - Scootle](#) )

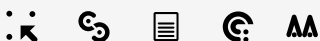


#### Elaborations

explaining that characters in text correspond to numbers defined by the character set, for example 'A' corresponds to 65 in the ASCII and Unicode character sets



recognising that Unicode attempts to represent the written symbols of every language; and using Unicode charts to look up characters from Asian writing systems



investigating the different representation of bitmap and vector graphics and its consequences, for example pixelation in magnified bitmap and vector images



investigating how colours are represented in images and videos, for example manipulating red, green and blue (RGB) colours in an image editor




converting between decimal and 8-bit (1 byte) unsigned binary, covering whole numbers typically used for characters and RGB, for example 65 in decimal is 01000001 in 8-bit binary



explaining ways media elements are presented, for example the difference between embedded and linked media elements



## Digital Technologies Processes and Production Skills

Acquire **data** from a range of sources and evaluate authenticity, accuracy and timeliness ([ACTDIP025 - Scootle](#) )

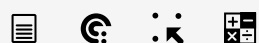


### Elaborations

designing a search engine query to find specific information on the web and checking its accuracy against information contained in other sources, for example entering instructions such as *intitle:* and *inurl:* prefixes to find information within a general directory, and comparing the results with information found in a wiki




acquiring data from a range of sources, for example people, websites, books, mobile phones, radiofrequency identification (RFID) and data repositories such as the Australian Bureau of Statistics datasets, and compiling these data into a digital format



checking authenticity of data, for example ensuring the source or author is a reliable individual or organisation

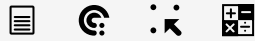


Analyse and visualise **data** using a range of software to create information, and use structured **data** to **model** objects or events ([ACTDIP026 - Scootle](#) )

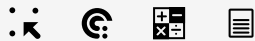


#### Elaborations

using features and functions of software to summarise data to create information, for example calculating a simple budget of income and payments and creating a summary table for analysis



visualising data to create information, for example identify trends and outlier data from spreadsheets using plots, or displaying geocoded data on a map



applying a set of conditions to a spreadsheet to organise and filter data, for example using conditional formatting to highlight the state of particular cells, and filtering and sorting categorical data using column filters



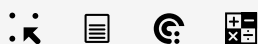
querying an existing database to extract data for analysis, for example devising multiple selection criteria or using simple structured query language (SQL) SELECT statements to select records and retrieve specified fields




describing the attributes of complex objects, for example defining the records, fields, formats and relationships of a simple dataset



modelling the attributes of real-world objects for a computer game



Define and **decompose** real-world problems taking into account functional requirements and economic, environmental, social, technical and usability constraints ([ACTDIP027 - Scootle](#) )



#### Elaborations

determining the factors that influence proposed solution ideas, for example user age affects the language used for instructions, dexterity affects the size of buttons and links, hearing or vision loss influence captioned or audio-described multimedia as alternative ways that common information is presented on a website



investigating types of environmental constraints of solutions, for example reducing energy consumption and on-screen output of solutions




identifying that problems can be decomposed into sub elements, for example creating a decision tree to represent the breakdown and relationships of sub elements to the main problem or identifying the elements of game design such as characters, movements, collisions and scoring



starting from a simplified system, gradually increase complexity until a model of a real-world system is developed, and record the difficulties associated with each stage of implementation



Design the user experience of a digital system, generating, evaluating and communicating alternative designs ([ACTDIP028 - Scootle](#) )



#### Elaborations

designing the user interface of a solution using a range of design tools, for example using a storyboard to explain the stages of a game, and wire-frames and mock-ups to describe the appearance of a solution



identifying features that make an effective game, such as storyline, goal, reward, gameplay and environment



identifying similar digital systems and their user interfaces, assessing whether user interface elements can be re-used




presenting and comparing alternative designs to a solution for a problem, for example presenting alternative design mock-ups to the class



applying the principles and elements of design to a series of solutions to evaluate the success of each solution to hold the viewer's attention, for example identifying which colour combinations or framing of visual elements keep different audiences engaged with on-screen activity



Design algorithms represented diagrammatically and in English, and trace algorithms to predict **output** for a given **input** and to identify errors ([ACTDIP029 - Scootle](#) )

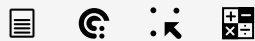


#### Elaborations

investigating and designing some common algorithms, such as to search, sequence, sort, merge, control data structures



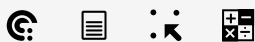
checking the accuracy of an algorithm before it is implemented, for example desk checking it with test data to see if the instructions produce the expected results




using diagrams to describe key decisions, for example creating flowcharts using digital systems to describe a set of computational instructions



using structured English to express algorithmic instructions, for example using conventional statements such as 'while' and 'endwhile' in a 'while loop' when describing interactive instruction

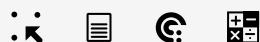


Implement and modify programs with user interfaces involving **branching**, **iteration** and functions in a general-purpose programming language ([ACTDIP030 - Scootle](#) )



#### Elaborations

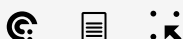
developing and modifying digital solutions by implementing instructions contained in algorithms through programs



developing a digital game that manipulates models of real-world objects




programming a robot to recognise particular objects and to treat them differently, for example choose objects based on colour



creating digital solutions that provide user navigation and prompts with controlled repetitions, for example an information kiosk that has layers of buttons and prompts the user three times before returning to the beginning



Evaluate how student solutions and existing information systems meet needs, are innovative, and take account of future risks and sustainability ([ACTDIP031 - Scootle](#) )



#### Elaborations

comparing student solutions with existing solutions that solve similar problems, for example identifying differences in the user interface of two adventure games and explaining how these differences affect the usability or appeal of the game



judging the quality of a student solution based on specific criteria such as meeting an economic need or contributing to social sustainability



investigating what features of touch input rather than keyboard or mouse input contribute to their success in meeting a wide range of needs, for example mimicking a common movement such as expanding or contracting a hand to change the size of an object on screen, suits users with a range of dexterity



evaluating the success of information systems in meeting an economic, environmental or social objective, for example interviewing a local business owner to find out how effectively their information system supports a business objective such as increasing market share



considering the effects of e-waste on societies and environments, for example the impacts of toxic chemicals when hardware is disposed of, and the practice of dumping unwanted digital systems overseas, particularly in the Asia region



comparing cloud-based information systems to client-based information systems



Plan and manage projects that create and communicate ideas and information collaboratively online, taking safety and social contexts into account ([ACTDIP032 - Scootle](#) )



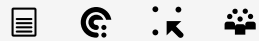
#### Elaborations

establishing a set of 'rules' about acceptable and unacceptable behaviour when collaborating online,

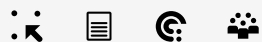
considering how different social contexts affect participation in global virtual spaces, including considering the use of language, acronyms and humour, for example only applying tags to images of other people with their permission or considering social protocols of Aboriginal and Torres Strait Islander Peoples



creating web-based information to meet specific needs, for example modifying an existing website template or using web-authoring software including using HTML and cascading style sheets (CSS) to create a website that allows customers to interact with an enterprising solution



discussing policies about the use of information systems in a range of settings, for example using mobile phones for learning and accessing social media websites at school



organising the instructions and files in readiness for implementation of a solution, for example applying a file naming convention to all data files that are going to be used to create solutions



documenting and sequencing the tasks that need to be done, and the resources that are needed to collaboratively create solutions including organising the timeline, devising file naming conventions and planning backup measures



devising and applying protocols to manage the collaborative creation of solutions, for example planning to use cloud computing to store common files and establishing virtual meetings that acknowledge time zone differences

