Years 5 and 6 standard elaborations — Australian Curriculum: Digital Technologies

Purpose   The standard elaborations (SEs) provide additional clarity when using the Australian Curriculum achievement standard to make judgments on a five-point scale. They can be used as a tool for:

- making consistent and comparable judgments about the evidence of learning in a folio of student work
- developing task-specific standards for individual assessment tasks.

Structure   The SEs are developed using the **Australian Curriculum achievement standard**. The Digital Technologies achievement standard describes the learning expected of students at each band. Teachers use the achievement standard during and at the end of a period of teaching to make on-balance judgments about the quality of learning students demonstrate.

In Queensland the achievement standard represents the **C standard** — a sound level of knowledge and understanding of the content, and application of skills. The SEs are presented in a **matrix**. The discernible differences or degrees of quality associated with the five-point scale are highlighted to identify the characteristics of student work on which teacher judgments are made. Terms are described in the Notes section following the matrix.

Years 5 and 6 Australian Curriculum: Digital Technologies achievement standard
By the end of Year 6, students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks. They explain how digital systems use whole numbers as a basis for representing a variety of data types.   Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program. They explain how information systems and their solutions meet needs and consider sustainability. Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols.

Source	Australian Curriculum, Assessment and Reporting Authority (ACARA), *Australian Curriculum Version 8 Digital Technologies for Foundation–10*, www.australiancurriculum.edu.au/f-10-curriculum/technologies/digital-technologies

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

Years 5 and 6 Digital Technologies standard elaborations

		A	B	C	D	E
		The folio of a student's work has the following characteristics:				
Knowledge and understanding	**Digital systems**	comprehensive explanation of: • the fundamentals of digital system components (hardware, software and networks) • how digital systems are connected to form networks	detailed explanation of: • the fundamentals of digital system components (hardware, software and networks) • how digital systems are connected to form networks	explanation of: • the fundamentals of digital system components (hardware, software and networks) • how digital systems are connected to form networks	description of: • the fundamentals of digital system components (hardware, software and networks) • how digital systems are connected to form networks	statements about: • the fundamentals of digital system components (hardware, software and networks) • how digital systems form networks
	Representation of data	comprehensive explanation of how digital systems use whole numbers as a basis for representing a variety of data types	detailed explanation of how digital systems use whole numbers as a basis for representing a variety of data types	explanation of how digital systems use whole numbers as a basis for representing a variety of data types	description of how digital systems use whole numbers as a basis for representing a variety of data types	statements about digital systems using whole numbers as a basis for representing data types
Processes and production skills	**Investigating and defining**	considered definition of problems in terms of data and functional requirements	informed definition of problems in terms of data and functional requirements	definition of problems in terms of data and functional requirements	partial definition of problems in terms of data and functional requirements	fragmented definition of problems
	Generating and designing; producing and implementing	considered design of solutions by: • developing algorithms to address defined problems • incorporating decision-making, repetition (iteration) and user interface design	informed design of solutions by: • developing algorithms to address defined problems • incorporating decision-making, repetition (iteration) and user interface design	design of solutions by: • developing algorithms to address defined problems • incorporating decision-making, repetition (iteration) and user interface design	partial design of solutions by developing algorithms to address defined problems	fragmented design of solutions including algorithms
		proficient implementation of digital solutions, including a visual program	effective implementation of digital solutions, including a visual program	implementation of digital solutions, including a visual program	partial implementation of digital solutions, including a visual program	fragmented implementation of digital solutions, including a visual program

		A	B	C	D	E
Processes and production skills	**Evaluating**	considered: • explanation of how information systems and their solutions meet needs • consideration of sustainability	informed: • explanation of how information systems and their solutions meet needs • consideration of sustainability	• explanation of how information systems and their solutions meet needs • consideration of sustainability	description of how information systems and their solutions meet needs	statements about how information systems meet needs
	Collaborating and managing; Collecting, managing and analysing data	considered management of the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols	effective management of the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols	management of the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols	partial management of the creation and communication of ideas and information in collaborative digital projects using data and agreed protocols	fragmented management of the communication of ideas and information in collaborative digital projects using data and agreed protocols

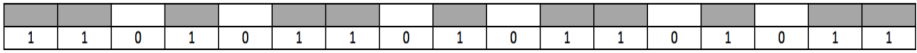| Key	shading emphasises the qualities that discriminate between the A–E descriptors

Notes

Australian Curriculum common dimensions

The SEs describe the qualities of achievement in the two dimensions common to all Australian Curriculum learning area achievement standards — understanding and skills.

Dimension	Description
understanding	the concepts underpinning and connecting knowledge in a learning area, related to a student's ability to appropriately select and apply knowledge to solve problems in that learning area
skills	the specific techniques, strategies and processes in a learning area

Terms used in Years 5 and 6 Digital Technologies SEs

These terms clarify the descriptors in the Years 5 and 6 Digital Technologies SEs. Definitions are drawn from the ACARA Australian Curriculum Technologies glossary (www.australiancurriculum.edu.au/f-10-curriculum/technologies/glossary) and from other sources to ensure consistent understanding.

Term	Description
algorithm	the step-by-step procedures required to solve a problem; see also computational thinking
apply; application	use or employ in a particular situation
binary	the use of two states or permissible values to represent data, such as the ON and OFF position of a light switch or the transistors in a computer silicon chip that can be in either the electrical state of ON or OFF; typically represented as a series of single digits referred to as binary digits (or bits) due to each taking on the value of either 0 or 1; the image below shows how a dashed line might be represented in binary **ON and OFF states for binary code** 1 1 0 1 0 1 1 0 1 0 1 1 0 1 0 1 1
collaborating and managing (technologies process)	creating and communicating information, especially online, by creating websites, and interacting safely using appropriate technical and social protocols; in Years 5 and 6, students plan, create and communicate ideas and information independently and with others, using validated data and applying agreed ethical and social protocols
collecting, managing and analysing data (processes and productions skills strand)	involves the nature and properties of data, how they are collected and interpreted using a range of digital systems and peripheral devices and interpreting data when creating information in Year 5 to Year 6, students manage, create and communicate ideas and information
comprehensive	detailed and thorough, including all that is relevant
computational thinking	a problem-solving method that involves various techniques and strategies that can be implemented by digital systems; techniques and strategies include organising data logically, breaking down problems into parts (decomposing), defining abstract concepts, and designing and using algorithms, patterns and models

Term	Description
considered	thought about deliberately with a purpose; in Technologies, *considered* includes informed
creation; create; creating	putting elements together to form a coherent or functional whole; reorganising elements into a new pattern or structure through designing, planning, or implementing; *creating* requires users to put parts together in a new way or synthesise parts into something new or different to form a new product: in Technologies, it involves bringing a solution into existence through the process of investigating and defining, generating and designing, producing and implementing, evaluating, and collaborating and managing
criteria for success	a descriptive list of essential features against which success can be measured; may be predetermined, negotiated with the class or developed by students; compilation of *criteria for success* involves: • literacy skills to select and use appropriate terminology • clarifying the project task and defining the need or opportunity to be resolved
critique; critiquing	a careful judgement in which opinions are given about the positive and negative aspects of something; considers good as well as bad performances, the individual parts, relationships of the individual parts and the overall performance; see also evaluating
data	the discrete representation of information using number codes; may include characters (alphabetic, numbers, symbols), images (still and moving), sounds and instructions that can be manipulated, stored and communicated by digital systems
decompose; decomposing	to separate a complex problem into parts to allow it to be more easily understood; see also computational thinking
defining (technologies process)	describes the problem and/or opportunity and states what is required of the solution
description; describe	give an account of characteristics or features
designing (technologies process)	states what is required of the solution
detailed	meticulous; including many of the parts
digital solution; digital solutions	the result (or output) of transforming data into information or action using digital systems, skills, techniques and processes to meet a need or opportunity; in Digital Technologies: • students create solutions that will use data, require interactions with users and within systems, and will have impacts on people, the economy and environments • solutions may be developed using combinations of readily available hardware and software applications, and/or specific instructions provided through programming (e.g. instructions for a robot, an adventure game, products featuring interactive multimedia including digital stories, animations and websites) in Years 5 and 6, students create a range of digital solutions such as games, quizzes, interactive stories and animations

Term	Description
digital systems	digital hardware and software components (internal and external) used to transform data into digital solutions; when digital systems are connected they form a network; for example: • a smartphone is a digital system that has software (apps, an operating system), input components (e.g. touch screen, keyboard, camera and microphone), output components (e.g. screen and speakers), memory components (e.g. silicon chips, solid state drives), communication components (e.g. SIM card, wi-fi, bluetooth or mobile network antennas), and a processor made up of one or more silicon chips • a desktop computer with specific software and hardware components for dairy farming; the computer is connected via cables to milking equipment and via wi-fi to sensors that read tags on the cows; through these hardware components the software records how much milk each cow provides; such systems can also algorithmically control attaching milking equipment to each cow, providing feed and opening gates
digital technologies	any technologies controlled using digital instructions, including computer hardware and software, digital media and media devices, digital toys and accessories, and contemporary and emerging communication technologies; these technologies are based on instructions given using *binary* (0 or 1) code that invariably mean one or more processors are present to respond to these instructions; computers, smartphones, digital cameras, printers and robots are all examples of digital technologies
discerning	showing good judgment to make thoughtful choices; in Technologies, *discerning* includes informed
effective	meeting the assigned purpose in a way that produces a desired or intended result
evaluate; evaluating (technologies process)	measures performance against established criteria; estimates the nature, quality, ability, extent or significance to make a judgment determining the value; see also critiquing; in Digital Technologies, *evaluating* includes: • solutions that have been developed by students • examining how well existing information systems meet different needs in Years 5 and 6, students explain how student solutions and information systems meet needs and considers sustainability
explanation; explain	provide additional information that demonstrates understanding of reasoning and/or application
fragmented	disjointed, incomplete or isolated
functional	design of products, services or environments to ensure they are fit for purpose and meet the intended need or market opportunity and identified criteria for success
identification; identify	to establish or indicate who or what someone or something is
implement; implementing; implementation	to put into effect by means of a plan or procedure; in Digital Technologies, *implementing* a solution involves using specific software functions and items of hardware
information systems	the combination of digital hardware and software components (digital systems), data, processes and people that interact to create, control and communicate information

Term	Description
informed	having relevant knowledge; being conversant with the topic; in Technologies, *informed* refers to the underpinning knowledge, understanding and skills of processes and production skills when solving problems and creating solutions
innovation	something newly introduced; a creation (a new device or process) resulting from study and experimentation
investigating and defining (technologies process)	describes the problem and/or opportunity and states what is required of the solution; in Years 5 and 6, students define problems in terms of data and functional requirements

iteration	repetition of a process or set of instructions in computer programming, where each repeated cycle builds on the previous; typically this uses a FOR loop command with a counter , e.g.
	    for number = 1 to 9
	    sum = sum + number

partial	attempted; incomplete evidence provided
plan; planning	a scheme of action or procedure; a detailed proposal for doing something
processes and production skills	the skills needed to create digital solutions; see technologies processes
producing and implementing (technologies process)	actively realising (making) digital solutions using appropriate resources and means of production; in Years 5 and 6, students implement digital solutions as visual programs with algorithms to address defined problems, incorporating decision making, iteration and user input
product; products	one of the outputs of technologies processes, the end result of processes and production; *products* are the tangible end results of natural, human, mechanical, manufacturing, electronic or digital processes to meet a need or want
proficient	competent or skilled in doing or using something; in Digital Technologies, *proficient* means consistently in all digital solutions
project	the set of activities undertaken by students to address specified content, involving: • understanding the nature of a problem, situation or need • creating, designing and producing a solution to the project task • documenting the process; a project has: • a benefit, purpose and use • a user or audience who can provide feedback on the success of the solution • limitations to work within • a real-world technologies context influenced by social, ethical and environmental issues • criteria for success to judge its success
representation of data (knowledge and understanding strand)	how data are represented and structured symbolically for use by digital systems; in Years 5 and 6, students explain how digital systems use whole numbers (binary) as a basis for representing a variety of data types

Term	Description
social protocols	generally accepted rules or behaviours for when people interact in online environments (e.g. using language that is not rude or offensive to particular cultures, not divulging personal details about people without their permission)
statement	a sentence or assertion
sustainability	supports the needs of the present without compromising the ability of future generations to support their needs
technologies	the materials, data, systems, components, tools and equipment used to create solutions for identified needs and opportunities, and the knowledge, understanding and skills used by people involved in the selection and use of these
technologies processes	the processes that allow the creation of a solution for an audience (end user, client or consumer) and involve the purposeful use of technologies and other resources and appropriate consideration of impact when creating and using solutions; typically require critical and creative thinking, such as computational, design or systems thinking; in Technologies, the *technologies processes* involve: • investigating and defining • generating and designing • producing and implementing • evaluating • collaborating and managing
user	one who uses a computer, computer program, or online service
visual programming	a programming language or environment where the program is represented and created visually rather than as text; a common visual metaphor represents statements and control structures as blocks that can be composed to form programs, allowing programming without having to deal with textual syntax Note: a visual programming language should not be confused with programming languages for creating visualisations or programs with user interfaces, such as Visual Basic