Years 9 and 10 standard elaborations — Australian Curriculum: Design and 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 Design and 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 9 and 10 Australian Curriculum: Design and Technologies achievement standard
By the end of Year 10, students explain how people working in design and technologies occupations consider factors that impact on design decisions and the technologies used to produce products, services and environments. They identify the changes necessary to designed solutions to realise preferred futures they have described. When producing designed solutions for identified needs or opportunities, students evaluate the features of technologies and their appropriateness for purpose for one or more of the technologies contexts.   Students create designed solutions for one or more of the technologies contexts based on a critical evaluation of needs or opportunities. They establish detailed criteria for success, including sustainability considerations, and use these to evaluate their ideas and designed solutions and processes. They create and connect design ideas and processes of increasing complexity and justify decisions. Students communicate and document projects, including marketing for a range of audiences. They independently and collaboratively apply sequenced production and management plans when producing designed solutions, making adjustments to plans when necessary. They select and use appropriate technologies skilfully and safely to produce high-quality designed solutions suitable for the intended purpose.

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

Years 9 and 10 Design and Technologies standard elaborations

		A	B	C	D	E
		The folio of a student's work has the following characteristics:				
Knowledge and understanding	**Technologies and society**	comprehensive explanation of how people working in design and technologies occupations consider: • factors that impact on design decisions • the technologies used to produce products, services and environments	detailed explanation of how people working in design and technologies occupations consider: • factors that impact on design decisions • the technologies used to produce products, services and environments	explanation of how people working in design and technologies occupations consider: • factors that impact on design decisions • the technologies used to produce products, services and environments	description of how people working in design and technologies occupations consider: • factors that impact on design decisions • the technologies used to produce products, services and environments	statements about how people working in design and technologies occupations consider: • design decisions • the technologies used to produce products, services and environments
		identification and explanation of the changes necessary to designed solutions to realise preferred futures they have described	identification and description of the changes necessary to designed solutions to realise preferred futures they have described	identification of the changes necessary to designed solutions to realise preferred futures they have described	identification of aspects of the changes necessary to designed solutions to realise preferred futures they have described	statements about the changes necessary to designed solutions to realise preferred futures
	Technologies contexts	discerning evaluation of the features of technologies and their appropriateness for purpose for one or more of the technologies contexts when producing designed solutions for identified needs or opportunities	informed evaluation of the features of technologies and their appropriateness for purpose for one or more of the technologies contexts when producing designed solutions for identified needs or opportunities	evaluation of the features of technologies and their appropriateness for purpose for one or more of the technologies contexts when producing designed solutions for identified needs or opportunities	explanation of the features of technologies and their appropriateness for purpose for one or more of the technologies contexts when producing designed solutions for identified needs or opportunities	statements about the features of technologies for one or more of the technologies contexts when producing designed solutions for identified needs or opportunities

		A	**B**	**C**	**D**	**E**
Processes and production skills	**Investigating and defining**	creation of designed solutions for one or more of the technologies contexts based on a discerning critical evaluation of needs or opportunities	creation of designed solutions for one or more of the technologies contexts based on an informed critical evaluation of needs or opportunities	creation of designed solutions for one or more of the technologies contexts based on a critical evaluation of needs or opportunities	creation of partial designed solutions for one or more of the technologies contexts based on a partial evaluation of needs or opportunities	creation of fragmented designed solutions for one or more of the technologies contexts based on statements about needs or opportunities
	Generating and designing	• purposeful creation and connection of design ideas and processes of increasing complexity • discerning justification of decisions	• effective creation and connection of design ideas and processes of increasing complexity • informed justification of decisions	• creation and connection of design ideas and processes of increasing complexity • justification of decisions	• partial creation and connection of design ideas and processes • explanation of decisions	• fragmented creation of design ideas and processes • statement of decisions
	Generating and designing	comprehensive and effective communication and documentation of projects, including marketing for a range of audiences	effective communication and documentation of projects, including marketing for a range of audiences	communication and documentation of projects, including marketing for a range of audiences	partial communication and documentation of projects, including marketing for a range of audiences	fragmented communication and documentation of projects, including marketing for audiences
	Producing and implementing	proficient production of high quality designed solutions suitable for the intended purpose by selecting and using appropriate technologies skilfully and safely	effective production of high quality designed solutions suitable for the intended purpose by selecting and using appropriate technologies skilfully and safely	production of high quality designed solutions suitable for the intended purpose by selecting and using appropriate technologies skilfully and safely	guided production of designed solutions for the intended purpose by selecting and using technologies safely	guided production of designed solutions for a purpose by using technologies safely

		A	B	C	D	E
Processes and production skills	**Evaluating**	establishment of comprehensive and detailed criteria for success, including sustainability considerations	establishment of informed and detailed criteria for success, including sustainability considerations	establishment of detailed criteria for success, including sustainability considerations	establishment of criteria for success, including sustainability considerations	statements about criteria for success
		use of detailed criteria for success to make a discerning evaluation of: • their ideas • designed solutions • processes	use of detailed criteria for success to make an informed evaluation of: • their ideas • designed solutions • processes	use of detailed criteria for success to make an evaluation of: • their ideas • designed solutions • processes	use of detailed criteria for success to make a partial evaluation of: • their ideas • designed solutions • processes	use of detailed criteria for success to make a fragmented evaluation of: • their ideas • designed solutions • processes
	Collaborating and managing	application of sequenced production and management plans when producing designed solutions: • making discerning adjustments to plans when necessary • working independently and collaboratively	application of sequenced production and management plans when producing designed solutions: • making informed adjustments to plans when necessary • working independently and collaboratively	application of sequenced production and management plans when producing designed solutions: • making adjustments to plans when necessary • working independently and collaboratively	use of production and management plans when producing designed solutions: • making adjustments to plans • working collaboratively	use of plans when producing designed solutions

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 9 and 10 Design and Technologies SEs

These terms clarify the descriptors in the Years 9 and 10 Design and 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
apply; applying	use, utilise or employ in a particular situation
appropriate	fitting, suitable to the context
aspects	particular parts or features
clear	easy to perceive, understand, or interpret; without ambiguity
collaborating and managing (design process)	students learn to work collaboratively and to manage time and other resources to effectively create designed solutions; in Years 9 and 10, students: • work individually and collaboratively • develop plans using digital technologies to plan and manage projects, taking into consideration time, cost, risk and production processes
communicate; communication	conveying information or ideas to others through appropriate representations, text types and modes; in Design and Technologies, *communicate* means sharing of information and design ideas; includes using graphical representation techniques (e.g. drawing, sketching and modelling) to create innovative ideas that focus on high-quality designed solutions
comprehensive	detailed and thorough, including all that is relevant
consistent	regular in occurrence; in agreement and not self-contradictory; in Technologies, *consistently* refers to the production of effective, designed solutions repeatedly
constructed environments	environments developed, built and/or made by people for human and animal activity, including buildings, streets, gardens, bridges and parks; include natural environments after they have been changed by people for a purpose

Term	Description
creation; **create;** **creating**	putting elements together to form a coherent or functional whole; reorganising elements into a new pattern or structure through generating, planning, or producing; *creating* requires users to put parts together in a new way or synthesise parts into something new and different a new form or product; in Design and Technologies, *creating* involves bringing a solution (product, environment or service) into existence through the design process
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
demonstrate	give a practical exhibition or explanation
description; **describe**	give an account of characteristics or features
design brief	a concise statement clarifying the project task and defining the need or opportunity to be resolved after some analysis, investigation and research; it usually identifies the users, criteria for success, constraints, available resources and timeframe for the project and may include possible consequences and impacts
design process **(processes and** **productions skills** **strand)**	in Design and Technologies, *design process* means a process to create a designed solution that considers social, cultural and environmental factors and typically involves: • investigating and defining • generating and designing • producing and implementing • evaluating • collaborating and managing; see also technologies processes
designed solutions	the products, services or environments that have been created for a specific purpose or intention as a result of design thinking, design processes and production processes; in Years 9 and 10, students create *designed solutions* focused on *one or more* of the technologies contexts produce a range of types of designed solutions (products, services and environments)
detailed	meticulous; including many of the parts
digital environments	environments that are entirely presented or experienced with digital technologies; can be a situation, a sphere of activity, or a simulated place (e.g. a social network that provides a digital environment for communicating with friends, software that provides a digital environment for editing photographs)
discerning	showing good judgment to make thoughtful choices in Technologies, *discerning* includes informed
effective	meeting the assigned purpose in a considered and/or efficient manner to produce a desired or intended result
environment	one type of designed solution; a place or space in which technologies processes operate and/or one of the outputs of technologies processes; environments can be natural, managed, constructed or digital

Term	Description
evaluate; evaluating (design process)	examine and judge the merit or significance of something; students evaluate and make judgments throughout a design process and about the quality and effectiveness of their designed solutions and those of others; in Years 9 and 10, students evaluate design ideas, processes and solutions against comprehensive criteria for success recognising the need for sustainability
explanation; explain	provide additional information that demonstrates understanding of reasoning and/or application
features	a distinctive attribute, characteristic, property or quality of something (e.g. an object, material, living thing, system or event)
fragmented	disjointed, incomplete or isolated
generating and designing (design process)	students develop and communicate ideas for a range of audiences; *generating creative and innovative ideas* involves thinking differently; it entails proposing new approaches to existing problems and identifying new design opportunities considering preferred futures; *generating and developing ideas* involves identifying various competing factors that may influence and dictate the focus of the idea in Years 9 and 10, students: • develop, modify and communicate design ideas by applying design thinking, creativity, innovation and enterprise skills of increasing sophistication • use graphical representation techniques when they draw, sketch, model and create innovative ideas that focus on high-quality designed solutions
graphical representation techniques	techniques used to communicate ideas and plans (e.g. sketching, drawing, modelling, making patterns, technical drawing, computer-aided drawing); in Years 9 and10, students: • generate and represent original ideas and production plans in 2D and 3D representations • use a range of technical drawings including perspective, scale, orthogonal and production drawings with sectional and exploded views • produce rendered, illustrated views for marketing • use graphic visualisation software to produce dynamic views of virtual products
guided	visual and/or verbal prompts to facilitate or support independent action
identification; identify	to establish or indicate who or what someone or something is
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
investigating and defining (design process)	students critique, explore and investigate needs, opportunities and information; in Years 9 and 10, students: • critique needs or opportunities to develop design briefs • investigate and select an increasingly sophisticated range of materials, systems, components, tools and equipment to develop design ideas
judge	apply both procedural and deliberative operations to make a determination; *procedural operations* are those that determine the relevance and admissibility of evidence, whilst *deliberative operations* involve making a decision based on the evidence

Term	Description
justify; justification	show how an argument or conclusion is right or reasonable; provide sound reasons or evidence
managed environments	environments coordinated by humans (e.g. farms, forests, marine parks, waterways, wetlands, storage facilities)
materials	a substance from which a thing is or can be made; used to create products or environments and their structure can be manipulated by applying knowledge of the origins, structure, characteristics, properties and uses; natural materials (e.g. animals, food, fibre, timber) and fabricated materials (e.g. metals, alloys, plastics, textiles)
natural environments	environments in which humans do not make significant interventions (e.g. oceans, natural woodlands, national parks)
partial	attempted; incomplete evidence provided
prescribed technologies contexts	see technologies contexts
processes and production skills	the skills needed to create designed solutions; see also technologies processes
producing and implementing (design process)	actively realising (making) designed solutions using appropriate resources and means of production; students learn and apply a variety of skills and techniques to make products, services or environments designed to meet specific purposes and user needs; the use of modelling and prototyping to accurately develop simple and complex physical models supports the production of successful designed solutions; in Years 9 and 10, students work flexibly to effectively and safety test, select, justify and use appropriate technologies and processes to make designed solutions
product; products	one type of designed solution; 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
production processes	in Design and Technologies, *production processes* are the technologies context-specific processes used to transform technologies into products, services or environments (e.g. the steps used for producing a product)
proficient	competent or skilled in doing or using something; in Design and Technologies, *proficient* means using knowledge and understanding of technologies in a skilful and adept application to produce high-quality design solutions
project management	the responsibility for planning, organising and controlling resources, monitoring timelines and activities and completing a project to achieve a goal that meets identified criteria for judging success; students should also identify and establish safety procedures that minimise risk and manage projects with safety and efficiency in mind, maintaining safety standards and management procedures to ensure success
project plan	detailed project plans incorporate elements such as sequenced time, cost and action plans to manage a range of design tasks safely, and to enable changing direction when necessary to successfully complete design tasks

Term	Description
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
prototype; prototyping	a trial product or model built to test an idea or process to inform further design development; a *prototype* can be developed in the fields of service, design, electronics or software programming; its purpose is to see if and how well the design works; prototypes are tested by users and systems analysts; *prototyping* is the process of developing a prototype; it provides specifications for a real, working product or system rather than a virtual or theoretical one
purposeful	intentional; done by design; focused and clearly linked to the goals of the task
service	one type of designed solution; one of the outputs of technologies processes, the end result of processes and production; *services* are the less tangible outcome (compared to products) of technologies processes to meet a need or want; they may involve development or maintenance of a system and include catering, cloud computing (software as a service), communication, transportation and water management; services can be communicated by charts, diagrams, models, posters and procedures
statement	a sentence or assertion
suggestion	put forward for consideration
suitable	appropriate, fitting
sustainable; sustainability	supports the needs of the present without compromising the ability of future generations to support their needs
systems	the structure, properties, behaviour and interactivity of people and components (inputs, processes and outputs) within and between natural, managed, constructed and digital environments
technologies and society (knowledge and understanding strand)	technologies and society focuses on how people use and develop technologies taking into account social, economic, environmental, ethical, legal, aesthetic and functional factors and the impact of technologies on individuals; families; local, regional and global communities; the economy; and the environment − now and into the future; in Years 9 and 10, students: - critically analyse factors, including social, ethical and sustainability considerations, that impact on designed solutions for global preferred futures and the complex design and production processes involved; - explain how products, services and environments evolve with consideration of preferred futures and the impact of emerging technologies on design decisions

Term	Description
technologies contexts (knowledge and understanding strand)	in Design and Technologies, these are the contexts that students can focus on when using processes and production skills to design and produce products, services and environments; in Years 9 and 10, the prescribed *technologies contexts* are: • engineering principles and systems • food and fibre production • food specialisations • materials and technologies specialisations
technologies processes (processes and productions skills strand)	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 Design and Technologies, *technologies processes* involve: • design processes • technologies-specific production processes
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
use	to operate or put into effect