Years 3 to 6 Technologies

Australian Curriculum in Queensland — assessment and reporting advice and guidelines

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Queensland Government
Queensland Curriculum & Assessment Authority
150605
For all Queensland schools

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Contents

1 Assessment

This document includes:

Curriculum requirements	Advice, guidelines and resources
Achievement standards	Standards elaborations on a five-point scale
	Assessment advice and guidelines
	Reporting advice and guidelines
Requirements are taken directly from the Australian Curriculum: Technologies developed by the Australian Curriculum, Assessment and Reporting Authority (ACARA). This material is presented in blue text. Links to Australian Curriculum support materials are also provided where appropriate.	Advice, guidelines and resources are based on the Australian Curriculum band level descriptions and organisation sections. They have been developed by the Queensland Curriculum and Assessment Authority (QCAA) to assist teachers in their planning and assessment and include links to Queensland-developed supporting resources and templates.

Assessment is an integral part of teaching and learning. It is the purposeful collection of evidence about students' achievements. An awareness of what learning is assessed and how it is assessed helps both students and parents/carers develop an understanding of what is valued and where to focus attention.

Assessment is used for a variety of purposes, but its most important use is in supporting student learning.

Sufficient and suitable evidence is collected to enable fair judgments to be made about student learning. Once the evidence is collected and analysed, it is summarised and presented in ways that are meaningful and useful to:

- help students achieve the highest standards they can
- promote, assist and improve teaching and learning
- build a shared understanding of the qualities of student work and communicate meaningful information about students' progress and achievements to students, teachers, parents/carers and the system.

Principles of assessment for schools to use as a basis for local decisions about specific approaches to assessment are provided in Appendix 1: Principles of assessment.

Assessment of the Australian Curriculum: Technologies (F–10) takes place for different purposes, including:

- ongoing formative assessment to monitor learning and provide feedback to teachers to enhance their teaching, and for students to improve their learning
- summative assessment to assist schools in reporting the progress and achievement of students to parents and carers.

Teachers use the achievement standards during and at the end of a period of teaching to make on-balance judgments about the quality of learning students demonstrate.

1.1 Standards-based assessment

The Australian Curriculum is standards-based.

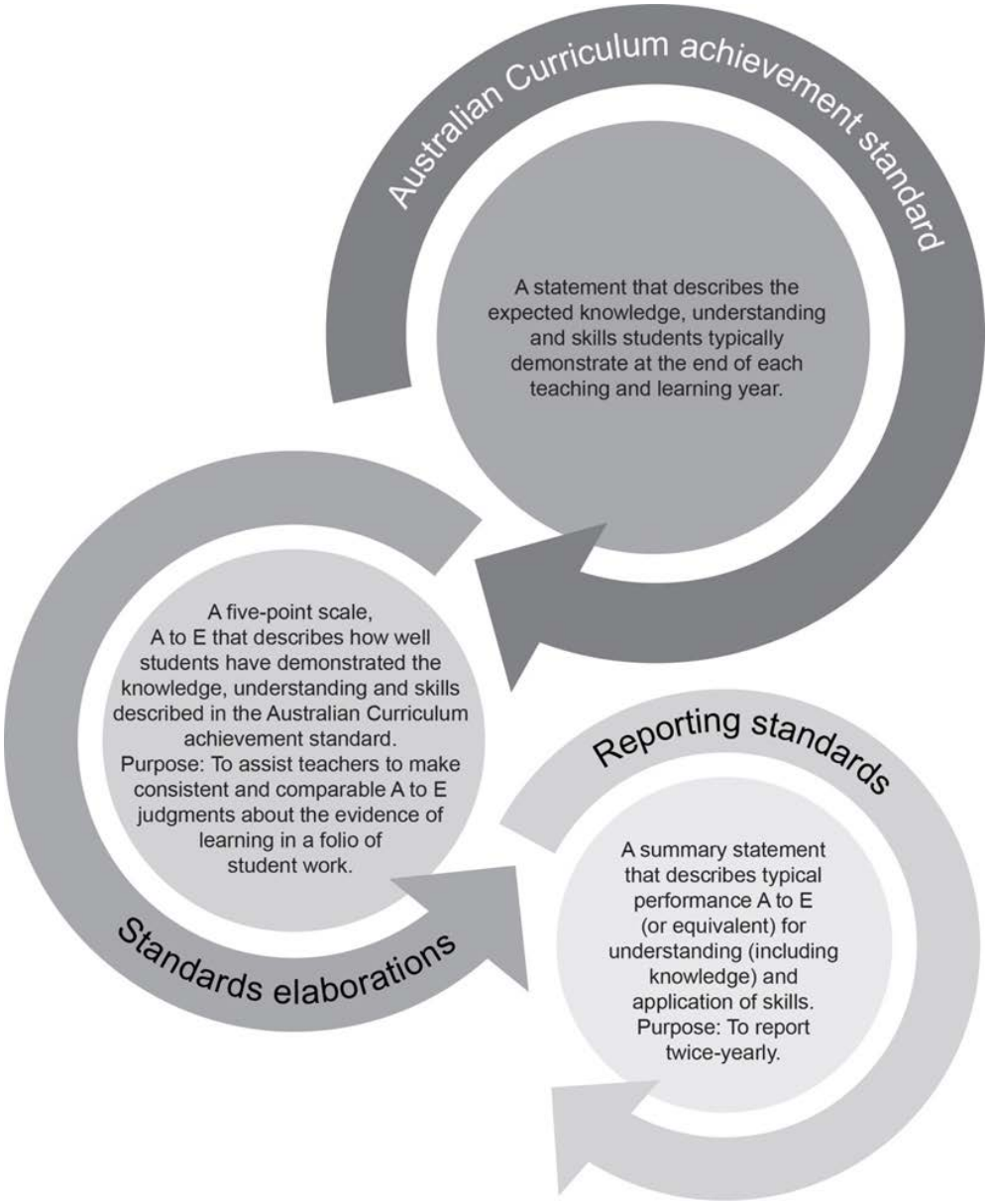
Teacher judgment is guided by achievement standards that are fixed reference points used to describe what is valued as important for young people to know, understand and do. The standards describe the expected qualities of student work and give a common frame of reference and a shared language to describe student achievement.

Standards-based assessment is an integral part of the teaching and learning process that is planned and ongoing.

The diagram below shows the relationship between the Australian Curriculum achievement standard, standard elaborations and the reporting standards.

1.1.1 Applying the Australian Curriculum achievement standards

Figure 1: The relationship between the Australian Curriculum achievement standard, standard elaborations and the reporting standards



1.1.2 Achievement standard

The Australian Curriculum achievement standards and the content descriptions are the **mandatory aspects** of the Australian Curriculum for schools to implement. They are organised under two dimensions, **understanding** and **skills**, and describe a broad sequence of expected learning across P–10.

The achievement standards describe expected student learning at each band level. They emphasise the depth of conceptual understanding, the sophistication of skills and the ability to apply essential knowledge expected of students.

Teachers use the achievement standards during and at the end of a period of teaching to make on-balance judgments about the quality of learning students demonstrate.

The achievement standards for Australian Curriculum: Technologies can be found for each subject in the relevant section. See subject- specific sections for:

- Digital Technologies (Section 3)
- Design and Technologies (Section 4).

1.1.3 Standard elaborations

The Technologies standard elaborations provide a basis for judging how well students have demonstrated what they know, understand and can do using the Australian Curriculum achievement standard. It is a resource to assist teachers to make consistent and comparable evidence-based A to E judgments.

The standard elaborations (SEs) use the two strands common to all Australian Curriculum: Technologies — Understanding and Skills. Within these, the SEs:

- identify the valued features of each Australian Curriculum learning area drawn from the achievement standard and the content descriptions
- describe the characteristics of student work to assist teachers to make judgments about the evidence of learning in student work.

The SEs have been developed using the Australian Curriculum achievement standard. In Queensland, the Australian Curriculum achievement standard represents a **C standard** — a sound level of knowledge and understanding of the content, and application of skills.

The SEs promote:

- alignment of curriculum, assessment and reporting, connecting curriculum and evidence in assessment, so that what is assessed relates directly to what students have had the opportunity to learn
- continuity of skill development from one band to another.

Subject-specific advice about the Technologies standard elaborations can be found for each subject in the relevant section. See subject-specific sections for:

- Digital Technologies (Section 3)
- Design and Technologies (Section 4).

1.2 School-based assessment

School-based assessment involves individual teachers or groups of teachers making informed decisions about what evidence of learning will be collected at suitable intervals as part of the teaching and learning program.

School-based assessment puts teachers' professional knowledge and practice at the centre of aligning what is taught, how it is taught, how student learning is assessed and how learning is reported.

1.3 Developing an assessment program

An assessment program is planned at the same time as the teaching and learning program and is developed using the achievement standard and the content descriptions.

A planned assessment program will:

- guide and support targeted teaching and learning
- ensure students have opportunities to demonstrate the depth and breadth of their learning in all aspects of the achievement standard
- provide regular feedback to students about how they can improve their learning
- clarify future teaching and learning needs
- ensure teachers have sufficient evidence of learning to make defensible on-balance judgments about the quality of students' work against the standard.

The assessment program includes:

- a range and balance of assessment categories, techniques and conditions appropriate for the learning area, the year level, the school context and the student cohort
- opportunities for students to become familiar with the assessment techniques and for teachers to monitor student achievement and provide feedback to students.

Table 1: Relationship between types and purposes of assessment

Types of assessment	Purposes of assessment
Diagnostic assessment	**Assessment *for* learning**
Provides opportunities to use assessment to determine the nature of students' learning as a basis for providing feedback or intervention, e.g. literacy and numeracy indicators	Enables teachers to use information about student progress to inform their teaching, e.g. using feedback from a previous unit to inform learning in the current unit
Formative assessment	**Assessment *as* learning**
Focuses on monitoring to improve student learning, e.g. practising an assessment technique	Enables students to reflect on and monitor their own progress to inform their future learning goals, e.g. opportunities to reflect on an inquiry process
Summative assessment	**Assessment *of* learning**
Indicates standards achieved at particular points for reporting purposes, e.g. an assessment that contributes to a reported result	Assists teachers to use evidence of student learning to assess student achievement against standards, e.g. the assessments contained in the targeted folio for reporting

1.4 Assessment folio

The planned assessment program specifies the evidence of learning that is summative assessment or assessment *of* learning and when it will be collected. This collection of student responses to assessments makes up a targeted assessment folio.

The targeted assessment folio contains sufficient evidence of learning on which to make a defensible on-balance judgment A to E (or equivalent five-point scale) about how well the evidence of student learning matches the standard for the reporting period.

For advice, see Section 2.2 Making an on-balance judgment on a folio and the video *Using the standards elaborations to assist in developing an assessment program* available at: www.qcaa.qld.edu.au/31525.html.

A Years 3 to 6 Technologies assessment folio includes student responses that demonstrate achievement in a range and balance of assessments designed to assess the identified knowledge, understandings and skills in the content and achievement standard.

Table 2: Range and balance

Range		Balance
Range is informed by:	**and**	**balance is achieved by including:**
• content descriptions		• all aspects of the curriculum content across the two strands — Knowledge and understanding and Processes and production skills
• categories of response: - written - spoken/signed - multimodal		• all aspects of the Australian Curriculum achievement standard
• assessment techniques: - projects (digital and design) - collection of work - subject-specific advice for ▪ Digital Technologies ▪ Design and Technologies		• a variety of assessment categories, techniques and conditions.
• assessment conditions: - supervised - open - subject-specific advice for ▪ Digital Technologies ▪ Design and Technologies.		

See subject-specific sections for advice about the range and balance of an assessment folio in Technologies:

- Digital Technologies (Section 3.2)
- Design and Technologies (Section 4.2).

1.4.1 Developing assessments

When developing assessment, teachers construct assessments that show the alignment between what has been taught (curriculum), how it is taught (pedagogy), how students are assessed and how the learning is reported. Figure 2 below shows the process of alignment.

Figure 2: Aligning assessment

What is taught — targeted curriculum (content and achievement standard)?

Teachers:

- provide opportunities for students to learn the targeted content, and review and consolidate content that students may not have engaged with recently
- provide learning experiences that support the format of the assessment, modelling the assessment technique where possible. This preparation should not involve rehearsal of the actual assessment.

What is assessed?

Teachers:

- identify the content and aspects of the achievement standard that will be the focus of the assessment
- identify the targeted valued features of the learning area to be assessed (see the standard elaborations that identify the valued features in the learning area).

What students are required to do in order to demonstrate what they know and can do?

Teachers:

- construct the assessment and consider:
  - face validity
  - content validity
  - authenticity
  - language and layout
  - equity
- determine the conditions for the task, e.g. time and resources.

What will be reported?

Teachers:

- identify the task-specific standards on which judgments about evidence in student work will be made (see the standard elaborations).

‘Working the assessment’ to confirm the alignment

The following characteristics of effective assessment can be used to assist and support schools with reviewing and evaluating their assessments.

Figure 3: Assessment evaluation using the characteristics of effective assessment

Check the assessment for:	
Face validity The extent to which an assessment appears to assess (on face value) what it intends to assess.	• Identify the specific content descriptions and aspects of the achievement standard being assessed to determine what is being assessed. • Consider whether student responses to the assessment will provide evidence of learning for the intended curriculum.
Content validity The extent to which the assessment measures what it claims to measure (either the subject-matter content or behaviour).	• Review the assessment to determine what is valued in the assessment. • Check that it is clear what students are expected to know and be able to do to complete this assessment. • Ensure students will be able to demonstrate the full range of standards A to E in their responses to the assessment. For example, does the assessment require sufficient depth and breadth of the targeted knowledge, understanding and skills? Does it encourage students to demonstrate a range of thinking skills? • Use the standard elaborations to confirm that the assessment provides opportunities for students to demonstrate their achievement in particular targeted aspects of the curriculum content and achievement standard.
Authenticity The extent to which students will find the assessment engaging.	• Use an appropriate and meaningful context to engage students. • Ensure the assessment is pitched appropriately for the year level.
Language and layout The extent to which the assessment clearly communicates to students what is needed for producing their best performance.	• Identify specific terms students are required to know and consider whether students are likely to understand the terms or not. • Check the level of language required to interpret the assessment and consider how well students will be able to understand what the assessment requires them to do. • Consider the clarity of the instructions, cues, format, diagrams, illustrations and graphics and how well they assist students to understand what they are required to do.
Equity The extent to which the assessment provides opportunities for all students to demonstrate what they know and can do.	• Check for any cultural, gender or social references and stereotypes. • List aspects of the task that might need adjusting for verified students (see Appendix 2: Educational equity). Note that adjustments to the task should not affect judgments made about student achievement.

Additional resources:

- Designing good assessment (video): www.qcaa.qld.edu.au/19788.html
- Scaffolding — supporting student performance: www.qcaa.qld.edu.au/downloads/p_10/as_scaffolding.docx
- Thinking like an assessor vs. activity designer: www.qcaa.qld.edu.au/downloads/p_10/as_assessor_vs_designer.docx.

1.5 Making judgments

When making judgments about the evidence in student work, teachers are advised to use task-specific standards. Task-specific standards give teachers:

- a tool for directly matching the evidence of learning in the student response to the standards
- a focal point for discussing student responses
- a tool to help provide feedback to students.

Task-specific standards are not a checklist; rather they are a guide that:

- highlights the valued features that are being targeted in the assessment and the qualities that will inform the overall judgment
- specifies particular targeted aspects of the curriculum content and achievement standard — the alignment between the valued feature, the task-specific descriptor and the assessment must be obvious and strong
- clarifies the curriculum expectations for learning at each of the five grades (A to E) and shows the connections between what students are expected to know and do, and how their responses will be judged
- allows teachers to make consistent and comparable on-balance judgments about student work by matching the qualities of student responses with the descriptors
- supports evidence-based discussions to help students gain a better understanding of how they can critique their own responses and achievements and identify the qualities needed to improve
- increases the likelihood of students communicating confidently about their achievement with teachers and parents/carers and asking relevant questions about their own progress
- encourages and provides the basis for conversations among teachers, students and parents/carers about the quality of student work and curriculum expectations and related standards.

The standard elaborations for Digital Technologies (Section 3.1.1) and Design and Technologies (Section 4.1.1) are a resource that can be used to inform the development of task-specific standards.

See the short videos:

- Developing task-specific standards
- Making an on-balance judgment on an individual assessment.

These videos are available at: www.qcaa.qld.edu.au/31525.html.

Task-specific standards can be prepared as a matrix or continua. Templates are available with features shown for all year levels and teachers select the relevant year:

- Continua:

  www.qcaa.qld.edu.au/downloads/p_10/ac_tech_digital_tss_continua.dotx
  www.qcaa.qld.edu.au/downloads/p_10/ac_tech_design_tss_continua.dotx

- Matrix:

  www.qcaa.qld.edu.au/downloads/p_10/ac_tech_digital_tss_matrix.dotx
  www.qcaa.qld.edu.au/downloads/p_10/ac_tech_design_tss_matrix.dotx.

1.6 Using feedback

Feedback is defined as the process of seeking and interpreting evidence for use by students and their teachers to decide where the students are in their learning, where they need to go and how best to get there.

Feedback gathered throughout the teaching and learning cycle informs future teaching learning and assessment. Its purpose is to recognise, encourage and improve student learning.

Assessment feedback is most helpful if the specific elements of the content (knowledge, understanding and skills) are identified and specific suggestions are provided. The standard elaborations for Digital Technologies (Section 3.1.1) and Design and Technologies (Section 4.1.1) provide a resource for developing specific feedback to students about the valued features in the content and achievement standards.

Assessment alone will not contribute to improved learning. It is what teachers and students do with assessment and other available information that makes a difference.

2 Reporting

Schools are required to provide parents/carers with plain-language reports twice a year. In most schools, this takes place at the end of each semester. The report must:

- be readily understandable and give an accurate and objective assessment of the student's progress and achievement
- include a judgment of the student's achievement reported as A, B, C, D or E (or equivalent five-point scale), clearly defined against the Australian Curriculum achievement standards.

2.1 Reporting standards

The reporting standards are summary statements that succinctly describe typical performance at each of the five levels (A to E) for the two dimensions of the Australian Curriculum achievement standards — understanding (including knowledge) and application of skills for the purpose of reporting twice-yearly.

Table 3: Reporting standards

A	B	C	D	E
Evidence in a student's work typically demonstrates a **very high level** of knowledge and understanding of the content (facts, concepts, and procedures), and application of skills.	Evidence in a student's work typically demonstrates a **high level** of knowledge and understanding of the content (facts, concepts, and procedures), and application of skills.	Evidence in a student's work typically demonstrates a **sound level** of knowledge and understanding of the content (facts, concepts, and procedures), and application of skills.	Evidence in a student's work typically demonstrates a **limited level** of knowledge and understanding of the content (facts, concepts and procedures), and application of skills.	Evidence in a student's work typically demonstrates a **very limited level** of knowledge and understanding of the content (facts, concepts and procedures), and application of skills.

The key purpose of reporting student achievement and progress is to improve student learning. The following principles underpin reporting school-based, standards-based assessment:

- alignment of teaching, learning, assessment and reporting: what is taught (curriculum) must inform how it is taught (pedagogy), how students are assessed (assessment) and how the learning is reported
- a collection of evidence or folio of student work: summative judgments for reporting purposes are based on a planned and targeted selection of evidence of student learning collected over the reporting period (see Section 1.4: Assessment folio)
- on-balance judgments: professional decisions made by teachers about the overall quality of a student's work in a range of assessments that best matches the valued features of a learning area described in the achievement standards at the time of reporting
- moderation: making consistent judgments about students' achievements within and between schools occurs when teachers develop shared understandings of the curriculum content and achievement standards. Moderation provides students and their parents/carers with confidence that the awarded grades are an accurate judgment of achievement and that the report is meaningful, professional and consistent.

Student achievement is reported against the Australian Curriculum achievement standard for the year level they are taught.

Teachers make reasonable adjustments during the cycle of teaching, learning and assessment to support the learning of students with disabilities, e.g. adjustments to presentation, response, timing, scheduling and location. In most instances, the required curriculum content, achievement and reporting standards will be used for these students. (See Appendix 2: Educational equity for inclusive strategies.)

School sectors and schools make decisions following negotiation with parents/carers about the provision of modified or accelerated learning and assessment programs to meet the learning needs of some students. Reporting achievement for these students should clearly indicate the year level of the curriculum content and the achievement standards against which judgments about student achievement have been made.

Achievement in a learning area is only one source of information on student achievement and progress. Schools may report on other important aspects of student engagement at school separate from achievement in a learning area such as:

- student participation and skills in school-based extracurricular activities
- student attributes such as effort, punctuality, and social and behavioural skills
- student attendance
- other school or system priorities.

2.2 Making an on-balance judgment on a folio

By the end of the year, a planned and targeted assessment program will result in an assessment folio of evidence of students' learning (summative assessment) on which the overall standard is awarded. (See Figure 4: Making on-balance judgments.)

The range and balance of assessment in the folio ensures there is sufficient evidence of achievement in both dimensions of the Australian Curriculum achievement standard — Understanding and Skills — to make an on-balance judgment for reporting.

An on-balance judgment involves a teacher, or a group of teachers, making a professional decision about how the pattern of evidence in the folio best matches the standards.

See the short video Making an on-balance judgment on a folio of student work, available at: www.qcaa.qld.edu.au/31525.html.

An on-balance judgment does not involve averaging grades across different assessments or ticking every box. Rather it is a professional judgment that considers all the evidence of achievement in the folio.

The standard elaborations (SEs) assist in making the on-balance decision. The SEs describe *how well* on a five-point scale students have demonstrated what they know, understand and can do using the Australian Curriculum achievement standard. The SEs assist teachers to make consistent and comparable evidence-based A to E judgments about the patterns of evidence in a folio of work. They provide transparency about how decisions about grades are made, and for conversations among teachers, students and parents/carers about the qualities in student work matched to the valued features in the curriculum expectations and the standards.

2.2.1 Making an on-balance judgment for mid-year reporting

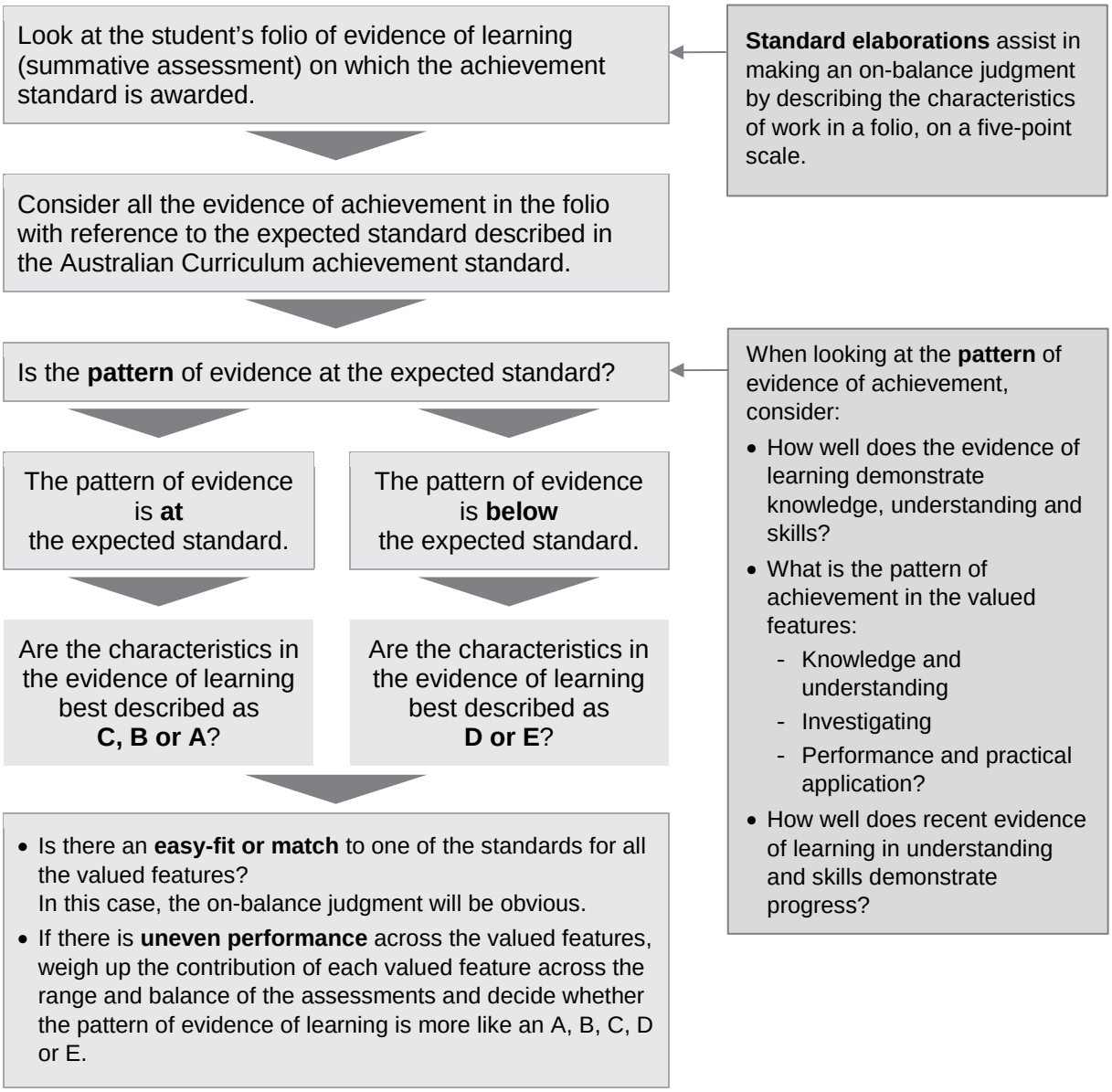
For mid-year reporting, the on-balance judgment is based on the pattern of evidence of student achievement and progress *at the time of reporting* and in relation to what has been taught and assessed during the reporting period.

The application of the Australian Curriculum achievement standard during the year requires a judgment based on matching qualities in student work rather than checking coverage.

The standard elaborations (see Section 1.1.3) assist in making an on-balance judgment for mid-year reporting.

The process for assessing and making judgments about student achievement may be assisted by progressively recording student achievement for each assessment on a student profile or similar.

Figure 4: Making on-balance judgments



2.2.2 Moderation

The achievement standards guide teacher judgment about how well students have achieved. The most effective way to build consistent and comparable on-balance teacher judgment is through planned activities when teachers — in a partnership or team situation — engage in focused professional dialogue to discuss and analyse the quality of student work, compare their judgments about student achievement and determine the match between the evidence in student work and standards. This process is known as moderation.

Professional dialogue increases teachers' awareness about the variety of ways in which students may respond to the assessment and the types of evidence that may be available to support teacher judgments. In this way, teachers gain valuable insights about how the standards can be demonstrated in student work. They build a shared understanding about the match of evidence to standards, enhancing classroom practice and supporting the alignment of curriculum and assessment.

Moderation provides students and their parents/carers with confidence that the standards awarded are defensible judgments of achievement and that the report is meaningful, professional and consistent.

See the following factsheets for more information:

- Consistency of judgments — Calibration model: www.qcaa.qld.edu.au/downloads/p_10/as_coj_calibration.doc
- Consistency of judgments — Conferencing model: www.qcaa.qld.edu.au/downloads/p_10/as_coj_conferencing.doc
- Consistency of judgments — Expert model: www.qcaa.qld.edu.au/downloads/p_10/as_coj_expert.docx.

3 Digital Technologies

3.1 Digital Technologies achievement standards

The Australian Curriculum achievement standards and content descriptions are the **mandatory aspects** of the Australian Curriculum for schools to implement. The achievement standards are organised under two dimensions, **understanding** and **skills**, and describe a broad sequence of expected learning across P–10.

The achievement standard should be read in conjunction with the content descriptions, available from: www.australiancurriculum.edu.au/technologies/digital-technologies/curriculum/f-10.

The achievement standards describe expected student learning at each band level. They emphasise the depth of conceptual understanding, the sophistication of skills and the ability to apply essential knowledge expected of students.

Teachers use the achievement standards during and at the end of a period of teaching to make on-balance judgments about the quality of learning students demonstrate.

Table 4: The Australian Curriculum achievement standard

Dimension	What students are expected to know and do	
	By the end of Year 4	**By the end of Year 6**
Understanding *the concepts underpinning and connecting knowledge in a learning area and the ability to appropriately select and apply knowledge to solve problems in that learning area*	Students describe how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes. They explain how the same data sets can be represented in different ways.	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.
	By the end of Year 4	**By the end of Year 6**
Skills *the specific techniques, strategies and processes in a learning area*	Students define simple problems, design and implement digital solutions using algorithms that involve decision-making and user input. They explain how the solutions meet their purposes. They collect and manipulate different data when creating information and digital solutions. They safely use and manage information systems for identified needs using agreed protocols and describe how information systems are used.	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.

3.1.1 Digital Technologies standard elaborations

The SEs have been developed using the Australian Curriculum: Digital Technologies achievement standard. In Queensland, the Australian Curriculum achievement standard represents a **C standard** — a sound level of knowledge and understanding of the content, and application of skills.

Teachers can use the SEs to:

- match the evidence of learning in a folio or collection of student work gathered over the reporting period to determine how well a student has achieved against the achievement standard on a five-point scale (see Section 2: Reporting)
- inform the development of an assessment program and individual assessments (see Section 1.4: Assessment folio)
- inform the development of task-specific standards (see Section 1.4: Assessment folio and Section 1.5: Making judgments).

Using the SEs

The valued features in the content descriptions and the achievement standards determine the structure of the SEs. (See Figure 5: The structure of the Digital Technologies standard elaborations for Years 3 to 10 excluding Years 5 and 6 and Figure 6: The structure of the Digital Technologies standard elaborations for Years 5 and 6.)

The Digital Technologies SEs for Year 3 and 4 and Years 5 and 6 are available from the QCAA website: www.qcaa.qld.edu.au/36096.html.

The QCAA have produced four short videos (available at www.qcaa.qld.edu.au/31525.html) which outline the purpose and use of the Australian Curriculum standards elaborations:

- Using the standards elaborations to assist in developing an assessment program
- Developing task-specific standards
- Making an on-balance judgment on an individual assessment
- Making an on-balance judgment on a folio of students work.

Figure 5: The structure of the Digital Technologies standard elaborations for Years 3 to 10 excluding Years 5 and 6

The **on-balance judgment** of how well the evidence in a folio of student work meets the standard.

Column 1

Two dimensions of the Australian Curriculum achievement standards.

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 a learning area

Skills:
specific techniques, strategies and processes in a learning area.

Column 2

The valued features of Digital Technologies are drawn from the strands and sub-strands of the curriculum and are organised as:

- Knowledge and understanding
  - Digital systems
  - Representations of data
- Processes and production skills
  - Creating digital solutions by:
    - Collecting, managing and analysing data
    - Defining
    - Designing and implementing
    - Evaluating
    - Collaborating and managing.

			A	B	C	D	E
			The folio of student work has the following characteristics:				
Understanding dimension	**Knowledge and understanding**	**Digital systems**	comprehensive description of how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes including the transmission of data	detailed description of how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes including the transmission of data	description of how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes	identification of digital systems (hardware and software) and their peripheral devices and how they can be used	statements about use of digital systems (hardware and software)
		Representation of data	comprehensive explanation of how the same data sets can be represented in different ways	detailed explanation of how the same data sets can be represented in different ways	explanation of how the same data sets can be represented in different ways	description of how data sets can be represented	statements about how data sets can be represented
Skills dimension	**Processes and production skills** Evidence of creating digital solutions	**Collecting, managing and analysing data**	considered collection and manipulation of different data when creating information and digital solutions	effective collection and manipulation of different data when creating information and digital solutions	collection and manipulation of different data when creating information and digital solutions	collection and manipulation of data when creating information and digital solutions	fragmented collection and manipulation of data
		Defining	considered definition of simple problems	informed definition of simple problems	definition of simple problems	partial definition of simple problems	fragmented definition of simple problems
		Designing and implementing	considered design and implementation of digital solutions using algorithms that involve decision-making and user input	informed design and implementation of digital solutions using algorithms that involve decision-making and user input	design and implementation of digital solutions using algorithms that involve decision-making and user input	partial design and implementation of digital solutions using algorithms that involve decision-making and user input	fragmented design and implementation of digital solutions
		Evaluating	considered explanation of how the solutions meet their purposes	informed explanation of how the solutions meet their purposes	explanation of how the solutions meet their purposes	description of how solutions meet their purposes	statements about solutions and purposes
			explanation of how information systems are used	detailed description of how information systems are used	description of how information systems are used	identification of how information systems are used	statements about use of information systems
		Collaborating and managing	safe use and considered management of information systems for identified needs using agreed protocols.	safe use and effective management of information systems for identified needs using agreed protocols.	safe use and management of information systems for identified needs using agreed protocols.	safe use and partial management of information systems for identified needs using protocols.	safe use and fragmented management of information systems using protocols.

Discernible differences or **degrees of quality** associated with levels of achievement in student work on which judgments are made.

Figure 6: The structure of the Digital Technologies standard elaborations for Years 5 and 6

Column 1

Two dimensions of the Australian Curriculum achievement standards.

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 a learning area

Skills:
specific techniques, strategies and processes in a learning area.

Column 2

The valued features of Digital Technologies are drawn from the strands and sub-strands of the curriculum and are organised as:

- Knowledge and understanding
  - Digital systems
  - Representations of data
- Processes and production skills
  - Creating digital solutions by:
    - Defining
    - Designing and implementing
    - Evaluating
    - Collaborating and managing
    - Collecting, managing and analysing data.

The **on-balance judgment** of how well the evidence in a folio of student work meets the standard.

			A	B	C	D	E
			The folio of student work has the following characteristics:				
Understanding dimension	**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
Skills dimension	**Processes and production skills** Evidence of creating digital solutions	**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
		Designing and implementing	considered design and proficient implementation of digital solutions, including a visual program, by developing algorithms to address defined problems, and incorporating decision-making, repetition (iteration) and user interface design	informed design and effective implementation of digital solutions, including a visual program, by developing algorithms to address defined problems, and incorporating decision-making, repetition (iteration) and user interface design	design and implementation of digital solutions, including a visual program, by developing algorithms to address defined problems, and incorporating decision-making, repetition (iteration) and user interface design	partial design and implementation of digital solutions, including a visual program, by developing algorithms to address problems	fragmented design and implementation of digital solutions, including a visual program and algorithms
		Evaluating	considered explanation of how information systems and their solutions meet needs and consider sustainability	informed explanation of how information systems and their solutions meet needs and consider sustainability	explanation of how information systems and their solutions meet needs and consider 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.

Discernible differences or **degrees of quality** associated with levels of achievement in student work on which judgments are made.

3.2 Digital Technologies assessment

3.2.1 Assessment techniques, assessment tasks/formats and categories of response

The following table provides information and examples about assessment techniques, tasks/formats and categories of response for developing a range and balance within an assessment program. The techniques, tasks/formats and categories of response used should consider the age and capacity of the student. Appendix 4: Glossary provides a glossary of terms used throughout the assessment techniques.

Table 5: Assessment techniques, tasks/formats and categories of response for Digital Technologies

Technique: Digital projects	Technique: Collection of work	Technique: Supervised assessment
To assess students' abilities to create digital solutions to problems by addressing specified content; creating, designing and producing a solution; and documenting the process.	To assess students' responses to a series of focused tasks, within a single or cohesive context.	To assess students' responses that are produced independently and in a set timeframe.
Description		
• Digital projects require students to apply their knowledge and understanding of data and digital systems to create digital solutions to problems. Digital projects should have: - a benefit, purpose or use - a user or audience who can provide feedback on the success of the solution - a real-world technologies context influenced by social, ethical and environmental issues - limitations to work within - criteria for success. • Students use a variety of processes and production skills when completing digital projects (see Appendix 3: Processes and production skills). • All practical work must be organised with students' safety in mind. Schools must ensure that their practices meet current guidelines. These are clearly explained at the Queensland Government, Department of Education, Training and Employment website: http://education.qld.gov.au/health/safety/index.html.	• A collection of work consists of students' responses to a small number of tasks, conducted in class over a series of lessons.	• Supervised assessment items require students to respond to questions, statements or other stimulus materials that are typically unseen. A supervised assessment ensures there is no question about authorship. • Depending on the age of the students, supervised assessments may require some teacher guidance, e.g. making the requirements of the assessment explicit, reading questions to students at class, group or individual levels.

Technique: Digital projects	Technique: Collection of work	Technique: Supervised assessment
Task/Format		
Examples of digital projects tasks/formats may include: • digital solutions - interactive adventures involving user choice - modelling simplified real world systems - simple guessing games - games and quizzes - interactive stories and animations - creating webcasts and podcasts.	Examples of collection of work tasks/formats may include: • descriptions of digital systems and their features: - annotated drawings and/or photographs - labelled diagrams - 3D models - oral and/or /written texts • collection and representation of data: - tallies - tables - graphs • explanations of steps and decisions: - flowcharts - diagrams - oral and/or written instructions - algorithms • using information systems to present data - PowerPoint presentations - iPad applications • evaluations of processes and products - reflective journal entries - analysis of digital solutions based on interactions with users.	Examples of supervised assessment tasks/formats may include: • short response[1] - true/false - multiple choice - single word - sentence - cloze passage • extended response - response to a stimulus - explanation of a process and/or practical activity - construction, interpretation and/or analysis of primary or secondary data.
Categories of response		
Responses can be physical, written, spoken/signed or multimodal (integrate visual, print and/or audio features).		

[1] These types of questions are useful for assessing content knowledge. They are difficult to construct if trying to elicit meaningful high-order cognitive responses.

Recording devices to gather evidence

Observation records allow teachers to record evidence of students' learning in a range of contexts. In Years 3 to 6, observation records may be particularly useful in enabling teachers to document the understanding and skills students demonstrate through the assessment techniques listed in Table 5: Assessment techniques, tasks/formats and categories of response for Digital Technologies. Additionally, observation records may be used to record evidence that students are only capable of demonstrating physically or verbally. Observation records may be digital and/or written. Example formats may include:

- teacher annotation of students' work samples
- anecdotal records/note-taking of observed behaviours
- whole class, small group and individual questioning
- informal and/or guided discussions with students about their work
- understanding and skills checklists.

3.2.2 Assessment conditions

The following table provides information and examples about assessment conditions, including suggested lengths for developing a range and balance within an assessment program.

Table 6: Assessment conditions for Digital Technologies

Open conditions	Supervised conditions
Digital projects and collections of work evidence can be: • undertaken individually and/or in groups • prepared in class time and/or in students' own time. **Suggested lengths Years 3 and 4:** • written responses 30–200 words* • spoken/signed or multimodal responses 1–2 mins* • continuous class time to develop the digital project.* **Suggested lengths Years 5 and 6:** • written responses 50–300 words* • spoken/signed or multimodal responses 2–3 mins* • continuous class time to develop the digital project.* **Ensuring authenticity** When using open conditions, teachers should ensure that students' work is their own, particularly where students have access to electronic resources or when preparing collaborative assessments. Methods teachers can use to monitor students' work for authenticity include requesting that students: • submit plans and drafts of their work • produce and maintain documentation that charts the development of responses • acknowledge resources used.	Supervised assessment items will typically: • be undertaken individually • be held under test/exam conditions • allow perusal time, if required • use stimulus materials that are succinct enough to allow students to engage with them in the time provided. (If stimulus materials are lengthy, they may need to be given to students prior to the administration of the supervised assessment) • be completed in one uninterrupted supervised session or a number of supervised sessions. **Suggested lengths Years 3 and 4:** • 10–35 mins • up to 150 words.* **Suggested lengths Years 5 and 6:** • 35–45 mins • up to 250 words.* *The length of student responses should be considered in the context of the assessment. Longer responses do not necessarily provide better quality evidence of achievement.

4 Design and Technologies

4.1 Design and Technologies achievement standards

The Australian Curriculum achievement standards and content descriptions are the **mandatory aspects** of the Australian Curriculum for schools to implement. The achievement standards are organised under two dimensions **understanding** and **skills** and describe a broad sequence of expected learning across P–10.

The achievement standard should be read in conjunction with the content descriptions, available from: www.australiancurriculum.edu.au/technologies/design-and-technologies/curriculum/f-10.

The achievement standards describe expected student learning at each band level. They emphasise the depth of conceptual understanding, the sophistication of skills and the ability to apply essential knowledge expected of students.

Teachers use the achievement standards during and at the end of a period of teaching to make on-balance judgments about the quality of learning students demonstrate.

Table 7: The Australian Curriculum achievement standard

Dimension	What students are expected to know and do	
	By the end of Year 4	**By the end of Year 6**
Understanding *the concepts underpinning and connecting knowledge in a learning area and the ability to appropriately select and apply knowledge to solve problems in that learning area*	Students explain how products, services and environments are designed to best meet needs of communities and their environments. They describe contributions of people in design and technologies occupations. Students describe how the features of technologies can be used to produce designed solutions for each of the prescribed technologies contexts.	Students describe some competing considerations in the design of products, services and environments taking into account sustainability. They describe how design and technologies contribute to meeting present and future needs. Students explain how the features of technologies impact on designed solutions for each of the prescribed technologies contexts.
Skills *the specific techniques, strategies and processes in a learning area*	**By the end of Year 4**	**By the end of Year 6**
	Students create designed solutions for each of the prescribed technologies contexts. They explain needs or opportunities and evaluate ideas and designed solutions against identified criteria for success, including environmental sustainability considerations. They develop and expand design ideas and communicate these using models and drawings including annotations and symbols. Students plan and sequence major steps in design and production. They identify appropriate technologies and techniques and demonstrate safe work practices when producing designed solutions.	Students create designed solutions for each of the prescribed technologies contexts suitable for identified needs or opportunities. They suggest criteria for success, including sustainability considerations and use these to evaluate their ideas and designed solutions. They combine design ideas and communicate these to audiences using graphical representation techniques and technical terms. Students record project plans including production processes. They select and use appropriate technologies and techniques correctly and safely to produce designed solutions.

4.1.1 Design and Technologies standard elaborations

The SEs have been developed using the Australian Curriculum: Design and Technologies achievement standard. In Queensland, the Australian Curriculum achievement standard represents a **C standard** — a sound level of knowledge and understanding of the content, and application of skills.

Teachers can use the SEs to:

- match the evidence of learning in a folio or collection of students work gathered over the reporting period to determine how well a student has achieved against the achievement standard on a five-point scale (see Section 2: Reporting)
- inform the development of an assessment program and individual assessments (see Section 1.4: Assessment folio)
- inform the development of task-specific standards (see Section 1.4: Assessment folio and Section 1.5: Making judgments).

Using the SEs

The valued features in the content descriptions and the achievement standards determine the structure of the SEs. (See Figure 7: The structure of the Design and Technologies standard elaborations for Years 3 to 10).

The Design and Technologies SEs for Year 3 to Year 6 are available from the QCAA website: www.qcaa.qld.edu.au/36096.html

The QCAA have produced four short videos (available at www.qcaa.qld.edu.au/31525.html) which outline the purpose and use of the Australian Curriculum standards elaborations:

- Using the standards elaborations to assist in developing an assessment program
- Developing task-specific standards
- Making an on-balance judgment on an individual assessment
- Making an on-balance judgment on a folio of student work.

Figure 7: The structure of the Design and Technologies standard elaborations for Years 3 to 10

The **on-balance judgment** of how well the evidence in a folio of student work meets the standard.

Column 1

Two dimensions of the Australian Curriculum achievement standards.

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 a learning area

Skills:
specific techniques, strategies and processes in a learning area.

Column 2

The valued features of Design and Technologies are drawn from the strands and sub-strands of the curriculum and are organised as:

- Knowledge and understanding
  - Technologies and society
  - Technologies contexts
- Processes and production skills
  - Creating designed solutions by:
    - Investigating
    - Generating
    - Producing
    - Evaluating
    - Collaborating and managing.

			A	B	C	D	E
			The folio of student work has the following characteristics:				
Understanding dimension	**Knowledge and understanding**	**Technologies and society**	comprehensive explanation of how products, services and environments are designed to best meet needs of communities and their environments	detailed explanation of how products, services and environments are designed to best meet needs of communities and their environments	explanation of how products, services and environments are designed to best meet needs of communities and their environments	description of how products, services and environments are designed to best meet needs of communities and their environments	statements about products, services and environments are designed to meet needs of communities and their environments
			comprehensive description of contributions of people in design and technologies occupations	detailed description of contributions of people in design and technologies occupations	description of contributions of people in design and technologies occupations	identification of contributions of people in design and technologies occupations	statements about people in design and technologies occupations
		Technologies contexts	comprehensive description of how the features of technologies can be used to produce designed solutions for each of the prescribed technologies contexts	detailed description of how the features of technologies can be used to produce designed solutions for each of the prescribed technologies contexts	description of how the features of technologies can be used to produce designed solutions for each of the prescribed technologies contexts	identification of features of technologies used to produce designed solutions for each of the prescribed technologies contexts	statements about the technologies used to produce designed solutions for each of the prescribed technologies contexts
Skills dimension	**Processes and production skills** Evidence of creating designed solutions	**Investigating**	comprehensive explanation of needs or opportunities for each of the prescribed technologies contexts	detailed explanation of needs or opportunities for each of the prescribed technologies contexts	explanation of needs or opportunities for each of the prescribed technologies contexts	description of needs or opportunities for each of the prescribed technologies contexts	statement about needs or opportunities for each of the prescribed technologies contexts
		Generating	considered development and expansion of design ideas	informed development and expansion of design ideas	development and expansion of design ideas	partial development and expansion of design ideas	fragmented expansion of design ideas
			comprehensive and effective communication of design ideas using models and drawings including annotations and symbols	effective communication of design ideas using models and drawings including annotations and symbols	communication of design ideas using models and drawings including annotations and symbols	partial communication of design ideas using aspects of models and partially labelled drawings	fragmented communication of design ideas using aspects of models and drawings
		Producing	proficient production of designed solutions: • demonstrating safe work practices • identifying appropriate technologies and techniques	effective production of designed solutions: • demonstrating safe work practices • identifying appropriate technologies and techniques	production of designed solutions: • demonstrating safe work practices • identifying appropriate technologies and techniques	partial production of designed solutions: • demonstrating safe work practices • identifying technologies and techniques	guided production of designed solutions: • demonstrating safe work practices • identifying aspects of technologies and techniques
		Evaluating	considered evaluation of ideas and designed solutions against identified criteria for success, including environmental sustainability considerations	informed evaluation of ideas and designed solutions against identified criteria for success, including environmental sustainability considerations	evaluation of ideas and designed solutions against identified criteria for success, including environmental sustainability considerations	explanation of ideas and designed solutions against identified criteria for success, including aspects of environmental sustainability considerations	statements about ideas and designed solutions against identified criteria for success
		Collaborating and managing	considered planning and comprehensive sequencing of major steps in design and production.	informed planning and detailed sequencing of major steps in design and production.	planning and sequencing of major steps in design and production.	partial planning and partial sequencing of steps in design and production.	fragmented planning and fragmented steps in design and production.

Discernible differences or **degrees of quality** associated with levels of achievement in student work on which judgments are made.

4.2 Design and Technologies assessment

4.2.1 Assessment techniques, assessment tasks/formats and categories of response

The following table provides information and examples about assessment techniques, tasks/formats and categories of response for developing a range and balance within an assessment program. The techniques, tasks/formats and categories of response used should consider the age and capacity of the student. Appendix 4: Glossary provides a glossary of terms used throughout the assessment techniques.

Table 8: Assessment techniques, tasks/formats and categories of response for Design and Technologies

Technique: Design projects	Technique: Collection of work	Technique: Supervised assessment
To assess student's abilities to plan, produce and evaluate design solutions by critiquing, exploring and investigating needs and opportunities; generating and developing ideas and safely applying appropriate technologies.	To assess students' responses to a series of focused tasks, within a single or cohesive context.	To assess students' responses that are produced independently and in a set timeframe.
Description		
• Design projects require students to use their knowledge, understanding and skills to safely and ethically design, plan, manage, produce and evaluate products, services and environments. They should have: - a need or opportunity to be resolved after some analysis, investigation and research - a user or audience who can provide feedback on the success of the solution - limitations to work within, e.g. timeframe, available resources - criteria for success. • Students use processes and production skills when completing design projects. See Appendix 3: Processes and production skills. • All practical work must be organised with student's safety in mind. Schools must ensure that their practices meet current guidelines. These are clearly explained at the Queensland Government, Department of Education, Training and Employment website: http://education.qld.gov.au/health/safety/index.html.	• A collection of work consists of students' responses to a small number of tasks, conducted in class over a series of lessons.	• Supervised assessment items require students to respond to questions, statements or other stimulus materials that are typically unseen. A supervised assessment ensures there is no question about authorship. • Depending on the age of the students, supervised assessments may require some teacher guidance, e.g. making the requirements of the assessment explicit, reading questions to student at class, group or individual levels.

Technique: Digital projects	Technique: Collection of work	Technique: Supervised assessment
Task/Format		
Examples of designed projects tasks/formats may include opportunities: • to meet local and community needs and current and future needs and use considering environmental and social sustainability factors • by the **end of Year 4**, create designed solutions at least once in the following three technologies contexts: - Engineering principles and systems - Food and fibre production - Materials and technologies specialisations • by the **end of Year 6**, create designed solutions at least once in the following four technologies contexts: - Engineering principles and systems - Food and fibre production - Food specialisations - Materials and technologies specialisations.	Examples of collection of work tasks/formats may include: • descriptions of materials, systems, tools and equipment for a range of purposes: - annotated drawings and/or photographs - labelled diagrams - 3D models - oral and/or/written texts • exploring and testing a variety of materials, components, tools and equipment and techniques to produce designed solutions: - tables - graphs • explanations of steps and design decisions: - flowcharts - diagrams - oral and/or written instructions • evaluations of processes and products - reflective journal entries - analysis of designed solutions that may consider aesthetic and functional requirements; ethical decisions about the use of design and technologies, considering health and sustainability implications.	Examples of supervised assessment formats may include: • short response[2] - true/false - multiple choice - single word - sentence - cloze passage • extended response - response to a stimulus - explanation of a process and/or practical activity - construction, interpretation and/or analysis of primary or secondary data.
Categories of response		
Responses can be physical, written, spoken/signed or multimodal (integrate visual, print and/or audio features).		

[2] These types of questions are useful for assessing content knowledge. They are difficult to construct if trying to elicit meaningful high-order cognitive responses.

Recording devices to gather evidence

Observation records allow teachers to record evidence of students' learning in a range of contexts. In Years 3 to 6, observation records may be particularly useful in enabling teachers to document the understanding and skills students demonstrate through the assessment techniques listed in Table 8: Assessment techniques, tasks/formats and categories of response for Design and Technologies. Additionally, observation records may be used to record evidence that students are only capable of demonstrating physically or verbally. Observation records may be digital and/or written. Example formats may include:

- teacher annotation of students' work samples
- anecdotal records/note-taking of observed behaviours
- whole class, small group and individual questioning
- informal and/or guided discussions with students about their work
- understanding and skills checklists.

4.2.2 Assessment conditions

The following table provides information and examples about assessment conditions, including suggested lengths for developing a range and balance within an assessment program.

Table 9: Assessment conditions for Design and Technologies

Open conditions	Supervised conditions
Design projects and collections of work evidence can be: • undertaken individually and/or in groups • prepared in class time and/or in students' own time. **Suggested lengths Years 3 and 4:** • written responses 30–200 words* • spoken/signed or multimodal responses 1–2 mins* • continuous class time to develop the design project.* **Suggested lengths Years 5 and 6:** • written responses 50–300 words* • spoken/signed or multimodal responses 2–3 mins* • continuous class time to develop the design project.* **Ensuring authenticity** When using open conditions, teachers should ensure that students' work is their own, particularly where students have access to electronic resources or when preparing collaborative assessments. Methods teachers can use to monitor students' work for authenticity include requesting that students: • submit plans and drafts of their work • produce and maintain documentation that charts the development of responses • acknowledge resources used.	Supervised assessment items will typically: • be undertaken individually • be held under test/exam conditions • allow perusal time, if required • use stimulus materials that are succinct enough to allow students to engage with them in the time provided. (If stimulus materials are lengthy, they may need to be given to students prior to the administration of the supervised assessment) • be completed in one uninterrupted supervised session or a number of supervised sessions. **Suggested lengths Years 3 and 4:** • 10–35 mins • up to 150 words.* **Suggested lengths Years 5 and 6:** • 35–45 mins • up to 250 words.* *The length of student responses should be considered in the context of the assessment. Longer responses do not necessarily provide better quality evidence of achievement.

Appendix 1: Principles of assessment

The following principles were developed to inform the policy context of the national curriculum and provide a basis on which local decisions about specific approaches to assessment can be built.

1. The main purposes of assessment are to inform teaching, improve learning and report on the achievement of standards.
2. Assessment is underpinned by principles of equity and excellence. It takes account of the diverse needs of students and contexts of education, and the goal of promoting equity and excellence in Australian schooling.
3. Assessment is aligned with curriculum, pedagogy and reporting. Quality assessment has curricular and instructional validity — what is taught informs what is assessed, and what is assessed informs what is reported.
4. Assessment aligned with curriculum, pedagogy and reporting includes assessment of deep knowledge of core concepts within and across the disciplines, problem solving, collaboration, analysis, synthesis and critical thinking.
5. Assessment involves collecting evidence about expected learning as the basis for judgments about the achieved quality of that learning. Quality is judged with reference to published standards and is based on evidence.
6. Assessment evidence should come from a range of assessment activities. The assessment activity is selected because of its relevance to the knowledge, skills and understanding to be assessed, and the purpose of the assessment.
7. Information collected through assessment activities is sufficient and suitable to enable defensible judgments to be made. To show the depth and breadth of the student learning, evidence of student learning is compiled over time. Standards are reviewed periodically and adjusted according to evidence to facilitate continuous improvement.
8. Approaches to assessment are consistent with and responsive to local and jurisdictional policies, priorities and contexts. It is important that schools have the freedom and support to develop quality assessment practices and programs that suit their particular circumstances and those of the students they are assessing.
9. Assessment practices and reporting are transparent. It is important that there is professional and public confidence in the processes used, the information obtained and the decisions made.

Appendix 2: Educational equity

Equity means fair treatment of all.

In developing teaching, learning and assessment programs, teachers provide opportunities for all students to demonstrate what they know and what they can do.

Catering for diversity

Schools and school sectors determine which students require special provisions, applying principles of participation and equity. Consideration should be given to:

- adjustments and supports for students who have been identified as having specific educational requirements to make participation possible in all or part of the teaching and learning experiences and assessments
- interpreter or educational devices (e.g. pictures, electronic whiteboards, interactive devices) to assist students for whom English is not their first language and who are assessed as not achieving a reading level appropriate to complete the assessment.

In exceptional circumstances, the school, in consultation with staff and parents/carers, may make decisions about the level of student engagement with a particular assessment, according to school sector policy.

Inclusive strategies

Adjustments to teaching, learning and assessment can be grouped into five broad areas: *timing, scheduling, setting, presentation* and *response*.

Teachers consider the inclusive strategies to make adjustments to teaching and learning experiences and assessments to enable all students to demonstrate their knowledge, skills or competencies.

The inclusive strategies should be considered in combination when planning, developing and documenting the adjustment of learning experiences and assessment. For example, when planning an assessment, the teacher may need to consider adjusting the timing, setting, presentation and response to ensure the student is given the opportunities to demonstrate their learning.

Evaluating the use and effectiveness of any adjustment is necessary to ensure meaningful student participation and achievement.

Further information

For further information and supporting resources, see:

- QCAA, Equity in education (includes QCAA's Equity statement): www.qcaa.qld.edu.au/10188.html
- QCAA, Catering for diversity: www.qcaa.qld.edu.au/18307.html
- ACARA, Student diversity: www.acara.edu.au/curriculum/student_diversity/student_diversity.html.

Appendix 3: Processes and production skills

Technologies processes and production skills enable students to:

- identify relationships between imagined and virtual worlds and the real world, between people and products, and between resources and environments (systems thinking)
- explore materials, tools and equipment and use drawing and modelling to communicate their design ideas
- engage in design thinking — where students learn about and experience connections between technologies and the designed world
- engage in computational thinking — where they begin to learn the importance of preparing precise instructions when solving problems using digital systems, creating ideas and information and sharing them online with known people.

Digital Technologies

Students use their knowledge and understanding of data and digital systems to apply processes and production skills as they create digital solutions. They apply the four-stage process of defining, designing, implementing and evaluating when individually or collaboratively managing projects to create digital solutions. Solutions may be developed using combinations of readily available hardware and software applications, and/or specific instructions provided through programming.

Evidence may include folios, e.g. storyboards, Y frames, reflection, journals or blogs.

Year 3 to Year 6

Students will:
• collect, manage and analyse data, this involves:
  - the nature and properties of data
  - how they are collected and interpreted
  - using a range of digital systems and peripheral devices
  - interpreting data when creating information
• define problems and design, implement and evaluate solutions that have been developed by students, and evaluate how well existing information systems meet different needs
• communicate ideas and information (Foundation to Year 4)
• manage, create and communicate ideas and information (Year 5 to Year 6), this involves:
  - creating and communicating information, especially online by creating websites
  - interacting safely using appropriate technical and social protocols
• progress from managing the independent creation of ideas and information to managing collaborative projects in online environments, this involves:
  - managing the independent creation of ideas and information — includes activities such as acquiring and checking data, considering and applying appropriate social and technical protocols, and selecting appropriate hardware and software
  - managing projects — includes identifying and sequencing tasks, determining the required resources (data and digital systems), considering economic, environmental and social factors and allocating the time to each task so that the project is completed on time.

Source: Australian Curriculum: Technologies

Design Technologies

By the end of each band students will:

- be actively involved in projects, this usually involves family, school and wider community; they develop a sense of social, ethical and environmental responsibility and are interested and concerned about the future
- work on design projects that develop processes and production skills in investigating, generating, producing, evaluating, and collaborating and managing
- consider the impact of their decisions and of technologies on others and the environment including in relation to preferred futures
- reflect on their participation in a design process
- focus on enterprise and marketing by orientating to the perspectives of others.

Year 3 to Year 6

Students will:

- investigate — involves critiquing, exploring and investigating needs, opportunities and information
  - critiquing encourages examining values, analysing, questioning and reviewing processes and systems; reflecting on how decisions may have implications for the home, and in local, national, regional or global communities
  - exploring and investigating technologies, systems, products, services and environments considering the needs of society; progressively developing effective investigation strategies and considering the contribution of technologies to their lives and make judgments about them
  - respond to design briefs[3] or develop design briefs in response to needs and opportunities
- generate — involves developing and communicating ideas for a range of audiences; creating changing, making choices, weighing up options, considering alternatives and documenting various design ideas and possibilities
  - developing ideas entails proposing new approaches to existing problems and identifying new design opportunities considering preferred futures; identifying various competing factors that may influence and dictate the focus of the idea; evaluating, justifying and synthesising what they learn and discover
  - communicating ideas requires using graphical representation techniques, such as drawing, sketching and modelling focusing on high-quality designed solutions; requires progress from basic drawing and modelling to using technical terms and techniques and using digital technologies to produce three-dimensional drawings and prototypes
- produce — involves learning and applying a variety of skills and techniques to make products, services or environments designed to meet specific purposes and user needs
  - applying a variety of skills and techniques requires applying knowledge about components, materials and their characteristics and properties to ensure their suitability for use; adopting safe work practices; developing accurate production skills to achieve quality designed solutions
  - developing the capacity to select and use appropriate materials, systems, components, tools and equipment; using work practices that respect the need for sustainability; the use of modelling and prototyping to accurately develop simple and complex physical models supports the production of successful designed solutions

[3] A design brief is 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, timeframe for the project and may include possible consequences and impacts.

- evaluate — involves making judgments throughout a design process and about the quality and effectiveness of their designed solutions
  - identifying criteria for success; progressively becoming increasingly more comprehensive; criteria maybe predetermined, negotiated with the class or developed by students
  - considering the implications and consequences of actions and decision making; determining effective ways to test and judge their designed solutions; reflecting on processes and transferring their learning to other design opportunities
- collaborate and manage — involves working collaboratively and managing time and other resources to effectively create designed solutions
  - progressively, developing the ability to communicate and share ideas throughout the process, negotiating roles and responsibilities and making compromises to work effectively as a team.

Source: Australian Curriculum: Technologies

Appendix 4: Glossary

Key assessment terms

Term	Description
assessment	the purposeful and systematic collection of evidence about students' achievements
assessment task	a tool or instrument to gather evidence of students' achievement
skills	the specific techniques, strategies and processes in a learning area
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

Terms used in assessment techniques

The following definitions help to clarify the terms used in the Prep Year to Year 2 Technologies assessment techniques. These definitions should be read in conjunction with ACARA's Technologies glossary: www.australiancurriculum.edu.au/technologies/glossary.

Key:

Digital Technologies term

Design and Technologies term

Common to both subjects

Term	Description
algorithm	the step-by-step procedures required to solve a problem; see also computational thinking
apply; applying	use or employ in a particular situation
collaborating and managing (design process)	students learn to work collaboratively and to manage time and other resources to effectively create designed solutions; to do this they: • work individually and in groups to plan, organise and monitor timelines, activities and the use of resources • progress from planning steps in a project through to more complex project management activities that consider various factors (e.g. time, cost, risk, quality control) • progressively develop the ability to communicate and share ideas throughout the process, negotiating roles and responsibilities and making compromises to work effectively as a team
collaborating and managing (technologies process)	creating and communicating information, especially online, by creating websites, and interacting safely using appropriate technical and social protocols;

Term	Description
collecting, managing and analysing data	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
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
communicate; communication	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
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
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
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 and different a new form or product
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
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	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
designing (technologies process)	states what is required of the solution

Term	Description
design processes	in Design and Technologies, *design processes* are: • investigating • generating • producing • 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;
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)
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 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)
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
environment	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; to do this they: • identify criteria for success (progressively students develop criteria which become increasingly more comprehensive) • consider the implications and consequences of actions and decision-making • determine effective ways to test and judge their designed solutions • reflect on processes and transfer their learning to other design opportunities
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
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)
generating (design process)	students develop and communicate ideas for a range of audiences; to do this they: • create change, make choices, weigh up options, consider alternatives and document various design ideas and possibilities • use critical and creative thinking strategies to generate, evaluate and document ideas to meet needs or opportunities that have been identified by an individual, group or wider community • evaluate, justify and synthesise what they learn and discover • use graphical representation techniques when they draw, sketch, model and create innovative ideas that focus on high-quality designed solutions; *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
graphical representations techniques	techniques used to communicate ideas and plans (e.g. sketching, drawing, modelling, making patterns, technical drawing, computer-aided drawing); in Design and Technologies Years 3 to 6, students: • clarify and present ideas, for example by drawing annotated diagrams • modelling objects as three-dimensional images from different views by visualising rotating images and using materials • recognise techniques for documenting design and production ideas such as basic drawing symbols, • use simple flow diagrams • draw, model and explain design ideas.
implementing	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

Term	Description
investigating (design process)	students critique, explore and investigate needs, opportunities and information; as creators and consumers they: • critically reflect on the intention, purpose and operation of technologies and designed solutions • examine values, analyse, question and review processes and systems • reflect on how decisions they make may have implications for the individual, society and the local and global environment, now and in the future • explore and investigate technologies, systems, products, services and environments as they consider the needs of society • progressively develop effective investigation strategies and consider the contribution of technologies to their lives and make judgments about them; students may respond to design briefs or develop design briefs in response to needs and opportunities
managed environments	environments coordinated by humans (e.g. farms, forests, marine parks, waterways, wetlands, storage facilities)
natural environments	environments in which humans do not make significant interventions (e.g. oceans, natural woodlands, national parks)
prescribed technologies contexts	see technologies contexts
processes and production skills	the skills needed to create designed solutions; see also technologies processes
processes and production skills	the skills needed to create digital solutions; see technologies processes
producing (design process)	actively realising (making) designed solutions using appropriate resources and means of production; in Design and Technologies, students learn and apply a variety of skills and techniques to make products, services or environments designed to meet specific purposes and user needs; to do this they: • apply knowledge about components, materials and their characteristics and properties to ensure their suitability for use • learn about the importance of adopting safe work practices • develop accurate production skills to achieve quality designed solutions • develop the capacity to select and use appropriate materials, systems, components, tools and equipment • use work practices that respect the need for sustainability; the use of modelling and prototyping to accurately develop simple and complex physical models supports the production of successful designed solutions
producing	actively realising (making) designed solutions using appropriate resources and means of production
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

Term	Description
production processes	in Design and Technologies, the technologies context-specific processes used to transform technologies into products, services or environments (e.g. the steps used for producing a product)
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
service	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
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 contexts	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; the prescribed *technologies contexts* are: • engineering principles and systems • food and fibre production (Prep Year to Year 4) • food specialisations (Year 5 to Year 10 only) • materials and technologies specialisations (Year 5 to Year 10 only)
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 Design and Technologies, *technologies processes* involve: • design processes • technologies-specific production processes

Term	Description
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 Digital Technologies, the *technologies processes* involve: • defining • designing • implementing • evaluating • collaborating and managing