Overview

• Curriculum development process
• Australian Curriculum: Digital Technologies
• Implementation and resources
Curriculum development process
Learning for life

Australian governments committed to working in collaboration to promote equity and excellence in Australian schooling, with school sectors supporting all young Australians to become

• successful learners
• confident and creative individuals
• active and informed citizens.
Dimensions of the Australian Curriculum

Learning areas
- English
- Mathematics
- Science
- Humanities and social sciences – history, geography, economics and business, civics and citizenship
- Arts
- Languages
- Health and physical education
- Technologies – design and technologies, digital technologies

General capabilities
- Literacy
- Numeracy
- Information and communication technology capability
- Critical and creative thinking
- Personal and social capability
- Ethical understanding
- Intercultural understanding

Cross-curriculum priorities
- Aboriginal and Torres Strait Islander Histories and Cultures
- Asia and Australia’s engagement with Asia
- Sustainability
Australian Curriculum: Technologies, shaping process
Australian Curriculum: Technologies, writing process

Appointment of writers and advisory group

Writing

Consultation and trialling
Technologies

Available for use; awaiting final endorsement

Rationale

Technologies enrich and impact on the lives of people and societies globally. Australia needs enterprising individuals who can make discerning decisions about the development and use of technologies and who can independently and collaboratively develop solutions to complex challenges and contribute to sustainable patterns of living. Technologies can play an important role in transforming, restoring and sustaining societies and natural, managed, and constructed environments.

The Australian Curriculum: Technologies describes two distinct but related subjects:

- Design and Technologies, in which students use design thinking and technologies to generate and produce designed solutions for authentic needs and opportunities.
- Digital Technologies, in which students use computational thinking and information systems to define, design and implement digital solutions.

The Australian Curriculum: Technologies will ensure that all students benefit from learning about and working with traditional, contemporary and emerging technologies that shape the world in which we live. This learning area encourages students to apply their knowledge and practical skills and processes when using technologies and other resources to create innovative solutions, independently and collaboratively, that meet current and future needs.

The practical nature of the Technologies learning area engages students in critical and creative thinking, including understanding interrelationships in systems when solving complex problems. A systematic approach to experimentation, problem-solving, prototyping and evaluation instils in students the value of planning and reviewing processes to realise ideas.
Content structure

The Australian Curriculum: Technologies Foundation–Year 10 comprises two subjects:

- Design and Technologies
- Digital Technologies

The Australian Curriculum: Technologies is written on the basis that all students will study the two subjects from Foundation to the end of Year 8.

In Year 9 and 10, student access to technologies subjects will be determined by school authorities. These could include Design and Technologies and/or Digital Technologies as outlined in the Australian Curriculum: Technologies and/or subjects relating to specific technologies contexts, determined by state and territory school authorities or individual schools.

The curriculum for each of Design and Technologies and Digital Technologies describes the distinct knowledge, understanding and skills of the subject and, where appropriate, highlights their similarities and complementary learning. This approach allows students to develop a comprehensive understanding of traditional, contemporary and emerging technologies. It also provides the flexibility – especially in the primary years of schooling – for developing integrated teaching programs that focus on both Technologies subjects and other learning areas. Figure 1 shows the relationship between the overarching idea, key ideas and subjects of the Technologies learning area.
Design and Technologies

Foundation to Year 2

Foundation to Year 2 Band Description
Learning in Design and Technologies builds on concepts, skills and processes developed in the Early Years Learning Framework, revisiting, strengthening and extending these as needed.

By the end of Year 2 students will have had the opportunity to create designed solutions at least once in each of the following technologies contexts: Engineering principles and systems; Food and...

Read full description

Foundation to Year 2 Content Descriptions

Design and Technologies knowledge and understanding

Identify how people design and produce familiar products, services and environments and consider sustainability to meet personal and local community needs (ACTDEK001)

Explore how technologies use forces to create movement in products (ACTDEK002)

Explore how plants and animals are grown for food, clothing and shelter and how food is selected and prepared for healthy eating (ACTDEK003)

Explore the characteristics and properties of materials and components that are used to produce designed solutions (ACTDEK004)

Design and Technologies processes and production skills

Explore needs or opportunities for designing, and the technologies needed to realise designed solutions (ACTDEP005)

Visualise, generate, develop and communicate design ideas through describing, drawing and modelling (ACTDEP006)

Use materials, components, tools, equipment and techniques to safely make designed solutions (ACTDEP007)

Use personal preferences to evaluate the success of design ideas, processes and solutions including their care for environment (ACTDEP008)

Sequence steps for making designed solutions and working collaboratively (ACTDEP009)
Design and Technologies

Curriculum

Jump to:  F-2  3-4  5-6  7-8  9-10

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Foundation to Year 2 Content Descriptions

Design and Technologies knowledge and understanding

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Explore how plants and animals are grown for food, clothing and shelter and how food is selected and prepared for healthy eating (ACTDEK003)

Use personal preferences to evaluate the success of design ideas, processes and solutions including their care for environment (ACTDEP008)

Design and Technologies processes and production skills

Explore needs or opportunities for designing, and the technologies needed to realise designed solutions (ACTDEP005)

Visualise, generate, develop and communicate design ideas through describing, drawing and modelling (ACTDEP006)

Use materials, components, tools, equipment and techniques to safely make designed solutions (ACTDEP007)

Explore the characteristics and properties of materials and components that are used to produce designed solutions (ACTDEP004)
Australian Curriculum: Technologies
Technologies curriculum

Curriculum has been developed:

• from Foundation to Year 8 in two subjects: design and technologies, and digital technologies
• from Years 9 to 10 in two optional subjects: design and technologies, and digital technologies
Design and technologies

Comprises two related strands:

• Design and technologies knowledge and understanding – the use, development and impact of technologies and design ideas across a range of technologies contexts: engineering principles and systems; food and fibre production; food specialisations; materials and technologies specialisations

• Design and technologies processes and production skills – the skills needed to design and produce designed solutions.
Digital technologies structure

Comprises two related strands:

• Digital technologies knowledge and understanding – the information system components of data, and digital systems (hardware, software and networks)

• Digital technologies processes and production skills – using digital systems to create ideas and information, and to define, design and implement digital solutions, and evaluate these solutions and existing information systems against specified criteria.
ICT in the Australian Curriculum

- the capability assists students to become effective *users* of ICT
- the digital technologies curriculum assists students to become confident *creators* of digital solutions
Mitchel Resnick ...

“... most young people learn only to USE digital media, not to CREATE with digital media. It is as if they can ‘read’ but not ‘write’. They are not truly fluent with digital media. They browse websites but can't create their own. They play games, but can't create their own. They interact with simulations, but can't create their own.”
Key ideas
Key ideas

• Creating preferred futures
• Project management
• Types of thinking:
  ➢ design thinking
  ➢ computational thinking
  ➢ systems thinking
Systems thinking

- Holistic approach to the identification and solving of problems
- Components of a system, and their interactions and interrelationships
- When generating ideas and decisions made throughout design processes, students need to understand systems and work with complexity, uncertainty and risk.
- To design digital solutions students need to understand the complexity of information and digital systems and the interdependence of components.
Design thinking

- underpins learning in design and technologies and used in digital technologies
- involves strategies to support the design process
- processes and production skills strand reflects the design process:
  investigating, generating, producing, evaluating, collaborating and managing
Computational thinking

• underpins learning in digital technologies and is used in design and technologies

• problem-solving method that is applied to create solutions that can be implemented using digital technologies

• involves integrating strategies, such as organising data logically, breaking down problems into parts, interpreting patterns and models and designing and implementing algorithms.
Key concepts

A number of key concepts underpin the digital technologies curriculum:

• **Abstraction**, which underpins all content, particularly the content descriptions relating to the concepts of *data representation and specification, algorithms and implementation*

• **Data collection** (properties, sources and collection of data), **data representation** (symbolism and separation) and **data interpretation** (patterns and contexts)

• **Specification** (descriptions and techniques), **algorithms** (following and describing) and **implementation** (translating and programming)

• **Digital systems** (hardware, software and networks and the internet)

• **Interactions** (people and digital systems, data and processes) and **impact** (impacts and empowerment).
Implementation and resources
Implementation

• Facilitating implementation support discussions with stakeholders
• Developing work sample portfolios
• Working with ESA to identify resources on Scootle to support content descriptions
### Science / Year 8 / Science Understanding / Chemical sciences

<table>
<thead>
<tr>
<th>Content description</th>
<th>Elaborations</th>
</tr>
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<tbody>
<tr>
<td>The properties of the different states of matter can be explained in terms of the</td>
<td>• explaining why a model for the structure of matter is needed</td>
</tr>
<tr>
<td>motion and arrangement of particles</td>
<td>• modelling the arrangement of particles in solids, liquids and gases</td>
</tr>
<tr>
<td></td>
<td>• using the particle model to explain observed phenomena linking the</td>
</tr>
<tr>
<td></td>
<td>energy of particles to temperature changes</td>
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</tbody>
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**Code**

ACSSU151

**ScOT catalogue terms**

- States of matter
- Properties of matter
- Molecular motion

**General capabilities**

- Literacy
- Critical and creative thinking

**URL**

http://www.australiancurriculum.edu.au/Elements/ACSSU151

**Resources**

[View related resources](http://www.australiancurriculum.edu.au/Elements/ACSSU151)
Tai hao le! My house: contents and parts

Explore the names of objects in a house. Find objects such as a chair, table, television or door. This learning object is the first in a series of three objects. The series is also packaged as a combined learning object.

Tai hao le! My house: where coloured things are

Explore the location of objects around a wizard's table. Position objects around the table. Apply prepositions such as under, beside and behind. This learning object is the last in a series of three objects. The series is also packaged as a combined learning object.
Australian Councils for Computers in Education (ACCE)

• Grants for state and territory association activities have been distributed.
• For example, QSITE focused on fostering Digital Technologies champions
• ACEC Conference in Adelaide - October
Australian Computer Society

- Identified 200+ fellows interested in mentoring
- Involved with girls and computing project
- Identifying professional learning opportunities to enhance information available to careers advisors on digital technologies professions
Scientists in Schools welcomes you...

Scientists and Mathematicians in Schools is a national program that creates and supports long-term partnerships between primary or secondary school teachers and scientists or mathematicians. Partnerships are flexible to allow for a style and level of involvement that suits each participant. Check out the showcases to see what some partnerships have been doing.

Scientists

Information | Register

Teachers

Information | Register

We asked CSIRO: scientists in schools

Follow @CSIROiMSiS
Google

- CSER Digital Technologies MOOC F-6
- Expanding Computer Science for High Schools (CS4HS) workshop to primary teachers with a focus on the Australian Curriculum
- Member of Group X national steering committee
CSER Digital Technologies F-6 MOOC

- Commenced 24 March. 3000 teachers enrolled in the course.
- Modules reflect five threads in the digital technologies curriculum.
- Each module explores computer science and computational thinking concepts to provide foundational knowledge.
- Taught over 8 weeks, with a 2-week break at week 4.
- Teachers should expect to spend 2-3 hours per week on the course.
Schedule

<table>
<thead>
<tr>
<th>Unit</th>
<th>Title</th>
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<tbody>
<tr>
<td>Unit 1</td>
<td>Welcome and Introduction</td>
</tr>
<tr>
<td>Unit 2</td>
<td>Data - Patterns &amp; Play</td>
</tr>
<tr>
<td>Unit 3</td>
<td>Data - Representation</td>
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<tr>
<td>Unit 3</td>
<td>Classroom activity assessment</td>
</tr>
<tr>
<td>Unit 4</td>
<td>Digital Systems</td>
</tr>
<tr>
<td>Unit 5</td>
<td>Information Systems</td>
</tr>
<tr>
<td>Unit 6</td>
<td>Algorithms and Programming</td>
</tr>
<tr>
<td>Unit 7</td>
<td>Visual Programming</td>
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<td>Lesson Plan Portfolio</td>
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<tr>
<td>Unit 8</td>
<td>Resources</td>
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<tr>
<td>Unit 9</td>
<td>Certificate of Participation &amp; Reflection</td>
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Digital Careers: Group X National

• Commonwealth Department of Communications 4-year funded program
• Coordinated by NICTA
• Three pillars:
  – activities and events for students to inform, involve and engage
  – teacher professional development eg CSIRO, extending the MOOC, robotics outreach program
  – Promotion of the ICT industry
• Education advisory groups
Bebras

• International challenge
• Bebras Australia Computational Thinking Challenge
• Pre-pilot in Brisbane, 250 Years 3-7 students – very good engagement
• Pilot – 2 500 students across 40 schools (majority from Vic and QLD)
• Bebras Challenge late 2014.
Tech Girls movement

Are you an Australian school girl? Order your FREE book here!

Or buy a copy here to support the cause (and postage of free books)

http://www.techgirlsmovement.org/
Grok learning

• National Computer Science School
  https://groklearning.com/
Australian Curriculum connections

Food and fibre production
Engineering
Systems

Welcome to one of Australia’s first NBN-connected farms

The SMART Farm - UNE Rural Property 'Kirby'

SMART = sustainable, manageable and accessible rural technologies

The University of New England is transforming ‘Kirby’, its 7000 acre commercial farm located 10 km north west of the campus, into a SMART Farm. With a new SMART Farmhouse currently under construction, and linked via the national broadband network (fibre, terrestrial wireless AND satellite), the predominantly grazing SMART Farm will be a national demonstrator site showcasing the latest on-site technologies aimed at improving productivity, environmental sustainability, safety, workflow and social/business support networks on Australian farms.

If you’d like to learn more about the UNE SMART Farm, or if you are interested in deploying technologies on the farm or in supporting this initiative some other way, please contact Prof. David Lamb.
Do *you* follow?

<table>
<thead>
<tr>
<th>Platform</th>
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<tbody>
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<td>Twitter</td>
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</tr>
<tr>
<td>Instagram</td>
<td>ACARAeduau</td>
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Questions
More information

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