

# Draft Australian Curriculum: Digital Technologies

Robert Randall

CEO ACARA

8 July 2013

**acara** AUSTRALIAN CURRICULUM,  
ASSESSMENT AND  
REPORTING AUTHORITY

# Overview

- The Australian Curriculum
- Draft Australian Curriculum: Digital Technologies
- National consultation
- Implementation

# 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.

## Melbourne Declaration on Educational Goals for Young Australians

December 2008



# The Australian Curriculum

- Sets out what all students are to be taught (**content**) and what students are typically able to understand and able to do (**achievement standards**).
- Affirms the central importance of **discipline-based knowledge and skills** as well as **general capabilities** and **cross-curriculum priorities**.
- Acknowledges that **classroom teachers** are best placed to organise learning for students; they will make decisions about the **pedagogical approach** intended to achieve the best learning outcomes.



*A curriculum for all young Australians  
A world-class curriculum for  
the 21<sup>st</sup> century*

# 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*

## General capabilities

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

## Cross-curriculum priorities

- *Aboriginal and Torres Strait Islander Histories and Cultures*
- *Asia and Australia's engagement with Asia*
- *Sustainability*

# Draft Australian Curriculum: Technologies

# Technologies curriculum

Curriculum has been developed:

- from Foundation to Year 8 in two subjects: Design and Technologies and Digital Technologies
- in F–2 band and then in two year bands to Year 8
- from Years 9 to 10 in two optional subjects: Design and Technologies and Digital Technologies (states and territories will continue to offer Technologies subjects that do not duplicate those developed by ACARA)
- with two related strands – *Knowledge and understanding* and *Processes and production skills*.

# ICT in the Australian Curriculum

- ICT is the focus of two subjects: Digital Technologies and Media Arts
- ICT knowledge and skills are developed across all learning areas: ICT capability
- the capability assists students to become effective *users* of ICT
- the Digital Technologies curriculum assists students to become confident *developers* of digital solutions



# Elements of the capability



Organising elements of ICT capability

# ICT capability in English: Year 4

## Content description and elaboration

### LITERACY (INTERPRETING, ANALYSING, EVALUATING)

Use comprehension strategies to build literal and inferred meaning to expand content knowledge, integrating and linking ideas and analysing and evaluating texts

- making connections between the text and students' own experience and other texts
- making connections between information in print and images
- building and using prior knowledge and vocabulary
- finding specific literal information
- asking and answering questions
- creating mental images
- finding the main idea of a text
- inferring meaning from the ways communication occurs in digital environments including the interplay between words, images, and sounds**
- bringing subject and technical vocabulary and concept knowledge to new reading tasks, selecting and using texts for their pertinence to the task and the accuracy of their information

## ICT capability learning continuum

### Locating and accessing data and information

plan, locate (using search engines and basic search functions), retrieve and organise information in meaningful ways

# Digital Technologies curriculum

will enable students to:

- pursue specialist knowledge in the field of digital technologies
- precisely define problems
- identify the steps and processes required to create solutions
- realise solutions through the application of computational thinking and the use of information systems.

It will also contribute to students developing a set of critical thinking skills and ICT capability.

# 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).

# National consultation

# Timeline of key activities

Activity	When
National consultation on draft Australian Curriculum: Technologies and intensive engagement project	February-May 2013
Consultation report and recommendations for revision	May-June 2013
Revision of curriculum	June-July 2013
Validation of achievement standards	August 2013
Revised drafts available for viewing	August-September 2013
Publication online	Late 2013

# Consultation

- 19 February to 10 May 2013
- 300+ online survey respondents
- 80+ written submissions
- 20 focussed on Digital Technologies only
- Critical friend feedback

# Intensive engagement

- Digital: 34 schools, 56 teachers
- 70+ survey responses
- Wiki; Mapping document; Assessment tasks and work samples
- Validation of achievement standards
- Appendix 4: consultation report



# Key strengths

- rationale and aims of the learning area and subjects
- organisation of the learning area
- key ideas of creating preferred futures, systems thinking and project management for the learning area
- establishment of a developmental curriculum for Digital Technologies
- strong links between Mathematics and Science learning areas
- key concepts as a way to frame the Digital Technologies curriculum
- differentiation between ICT capability and Digital Technologies curriculum

# Matters for improvement

- balance between computational thinking, computer science and information systems
- volume of content for indicative writing time
- complexity of language:
  - description of key concepts
  - content descriptions
- creativity and design need to be more evident – '*design, development and critical analysis*' skills
- multimedia in the Australian Curriculum needs clarification

# Key directions for revision

## Revise:

- messaging about the intent of Digital Technologies
- description of key concepts
- content descriptions and elaborations for complexity
- consistency of terminology

## Strengthen:

- design, creativity, process and project management
- connections to other learning areas
- messages about multimedia in the Australian Curriculum

# Industry perspectives

- computer science
- higher education pathways
- implementation

# Computer science

- Shape of the Australian Curriculum: Technologies
- Key concepts provide framework
- English curriculum consultation data currently being reviewed
- Other international curriculum: US; Israel; Vietnam
- Resources: Scratch, Alice, Tynker, Raspberry Pi, CS unplugged, CS4HS

# Higher education pathways

- Senior secondary proposal for Ministers – end 2013
- VET and university pathways
- Computer science; information systems; multimedia

# Implementation

# Implementation discussion

- Australian Computer Society
- Australian Council for Computers in Education
- Australian Council for Deans of Education
- Australian Council of Deans of ICT
- Australian Institute for Teaching and School Leadership
- Information Technology Industry Innovation Council
- Queensland ICT Leaders Group
  
- National ICT Australia (NICTA)
- Australian Information Industry Association (AIIA)
- Education Services Australia



# Key implementation issues

- Professional development
- Initial teacher education
- Resources

How could implementation of Digital Technologies subject be supported?

What possible roles or strategies could be undertaken by participant organisations?

Australian Workforce and Productivity Agency

# Resources

- Education Services Australia has already started to identify resources to support content descriptions
- Links from content descriptions to Scootle portal

# Digital Technologies

Rationale/Aims

Organisation

Foundation to Year 10 curriculum

[Previous](#) | [F-2](#) | [3-4](#) | **[5-6](#)** | [7-8](#) | [9-10](#) | [Next](#)

## Years 5 and 6

### Years 5 and 6 Description








The Digital Technologies curriculum comprises two interrelated strands: Knowledge and understanding and Processes and production skills. Teaching and learning programs should balance and integrate both strands. Together the strands focus on developing students' knowledge, understanding and skills in computational thinking and on students considering the role and impact of information systems across local, national and global communities for a range of purposes and audiences.

In Years 5 and 6, students think computationally by using digital systems to automate tasks and analyse...

[Read full description](#)

### Years 5 and 6 Content Descriptions

#### Digital Technologies knowledge and understanding

	Elaborations
<p>6.1 Explain how digital systems represent whole numbers as a basis for representing all types of data</p>    	<ul style="list-style-type: none"><li>identifying that every type of data must be represented in digital systems as numbers, for example, a letter (or other character) is represented using a number and an image is represented using arrays of numbers</li><li>explaining that binary represents numbers using just 1s and 0s and these are represented as on and off electrical states in hardware</li><li>representing everyday numbers in binary, for example counting in binary from zero to 15, using the binary system to write a friend's birthdate in binary or using binary code to create secret messages</li></ul>
<p>6.2 Describe the internal and external components of common digital systems, their functions and interactions, and identify different connections for digital networks</p>   	<ul style="list-style-type: none"><li>describing digital systems as having internal and external components that perform different functions, for example, external components for inputting data include keyboard, microphone, stylus; internal processing components include the central processing unit and motherboard; external output components include speakers, projector, screen; and data and information storage components include cloud, hard drives, USB flash drive</li></ul>

## Science / Year 8 / Science Understanding / Chemical sciences

### Content description

The properties of the different states of matter can be explained in terms of the motion and arrangement of particles



### Elaborations

- explaining why a model for the structure of matter is needed
- modelling the arrangement of particles in solids, liquids and gases
- using the particle model to explain observed phenomena linking the energy of particles to temperature changes

### Code

ACSSU151

### General capabilities

-  Literacy
-  Critical and creative thinking

### ScOT catalogue terms

States of matter; Properties of matter; Molecular motion

### Resources

### URL

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



[View related resources](#)




**Search**

Advanced search

- Home
- Find by Australian Curriculum
- Map
- Timeline
- A to Z
- Learning paths
- Improve
- Community



←
[Back to search results](#)
+ Add this content description and selected items to my learning path

**Science / Year 8 / Science Understanding / Chemical sciences**
[View on Australian Curriculum website](#)
  Include in Learning Path



**Curriculum content descriptions**  
 The properties of the different states of matter can be explained in terms of the motion and arrangement of particles (ACSSU151)

**Elaborations**

- explaining why a model for the structure of matter is needed
- modelling the arrangement of particles in solids, liquids and gases
- using the particle model to explain observed phenomena linking the energy of particles to temperature changes

**General capabilities**

- Literacy
- Critical and creative thinking

**ScOT catalogue terms**  
 States of matter, Properties of matter, Molecular motion

**Refine search by**

**Year level**  
7-8

**Resource type**

- All types
- Learning objects

- View as gallery
- View as list
- View on map
- View on timeline

Classroom resources [86] | Teacher reference materials [2]

**Sort by:** Relevance | Title | Published date | Rating | Popularity

Sourced from: [The Le@rning Federation \[73\]](#) ; [Web resources \[15\]](#)

1 | 2 | 3 | 4 | 5 | **Next**

# Contact

For further information contact:

Julie King

Senior Project Officer Technologies

[Julie.king@acara.edu.au](mailto:Julie.king@acara.edu.au)