The AusVELS Curriculum

<table>
<thead>
<tr>
<th>Domain</th>
<th>Information and Communications Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level</td>
<td>Foundation level, Level 1, Level 2, Level 3, Level 4, Level 5 and Level 6</td>
</tr>
<tr>
<td>Dated</td>
<td>Wednesday, 3 September 2014</td>
</tr>
</tbody>
</table>

Excepting logos, trademarks or other third-party content as indicated, the F–10 AusVELS Curriculum content in this document is licensed Creative Commons 'Attribution-Non-Commercial-Share Alike' (3.0 Australia).

AusVELS 'Australian Curriculum' content (identified with AC), derives from the Australian Curriculum Assessment and Reporting Authority (ACARA).

AusVELS® and the ® logo are registered trade marks of the Victorian Curriculum and Assessment Authority.
Table of Contents

Overview .................................................................................................................. 2
  Introduction ............................................................................................................. 2
  Domain structure .................................................................................................... 2
  Stages of learning .................................................................................................. 4
  Diversity of learners ............................................................................................... 5

Curriculum F–10 ........................................................................................................ 7
  Foundation level ..................................................................................................... 7
  Level 1 ................................................................................................................... 8
  Level 2 ................................................................................................................... 9
  Level 3 ................................................................................................................... 10
  Level 4 .................................................................................................................. 11
  Level 5 .................................................................................................................. 13
  Level 6 .................................................................................................................. 15
Introduction to Information and Communications Technology

Information and communications technology (ICT) is the hardware and software that enables data to be digitally processed, stored and communicated. ICT can be used to access, process, manage and present information; model and control events; construct new understanding; and communicate with others.

ICT, an interdisciplinary domain, focuses on providing students with the tools to transform their learning and to enrich their learning environment. The knowledge, skills and behaviours identified for this domain enable students to:

- develop new thinking and learning skills that produce creative and innovative insights
- develop more productive ways of working and solving problems individually and collaboratively
- create information products that demonstrate their understanding of concepts, issues, relationships and processes
- express themselves in contemporary and socially relevant ways
- communicate locally and globally to solve problems and to share knowledge
- understand the implications of the use of ICT and their social and ethical responsibilities as users of ICT.

Learning in this domain enables students to focus on the task to be accomplished rather than on the technology they are using to do the work. Through the selection and application of appropriate equipment, techniques and procedures, they process data and information skilfully to create information products in forms that are meaningful for themselves and their audience. These products effectively demonstrate their knowledge and understanding of the concepts, issues, relationships and processes that are the subject of the task.

Students are provided with tools and strategies to monitor learning patterns and problem solving strategies. This provides a sound foundation for transforming personal learning. They gain an understanding of Internet protocols and strategies for exchanging information, which enables them to share and challenge their own and other people’s ideas and solutions with a global audience.

Structure of the Information and Communications Technology Domain

The Information and Communications Technology domain uses an eleven level structure to both reflect the design of the Australian Curriculum and to provide a consistent structure across all the AusVELS domains (for more details, please see Overview).

Each level includes a learning focus statement and where applicable, a set of standards organised by dimension. A glossary is included which provides definitions of underlined terms.

**Learning focus**

Learning focus statements are written for each level. These outline the learning that students need to focus on if they are to progress in the domain and achieve the standards at the levels where they apply. They suggest appropriate learning experiences from which teachers can draw to develop relevant teaching and learning activities.

**Standards**

Standards define what students should know and be able to do at different levels and are written for each dimension. In Information and Communications Technology standards for assessing and reporting on student achievement apply from Level 2. Standards are organised by dimensions from Level 4.

**Dimensions**
Standards in the Information and Communications Technology domain are organised in three dimensions:

- **ICT for visualising thinking**
- **ICT for creating**
- **ICT for communicating.**

**ICT for visualising thinking**

In the **ICT for visualising thinking** dimension students use ICT tools to assist their thinking processes and reflect on the thinking strategies they use to develop understanding.

ICT provides a rich and flexible learner-centred environment in which students can experiment and take risks when developing new understanding. Its extensive capabilities allow students, by visually coding and representing their thinking, to clarify thoughts, and to identify patterns and form relationships between new and existing knowledge.

ICT tools that facilitate visual thinking are ones that allow ideas and information in all areas of the curriculum to be easily and quickly drafted, filtered, reorganised, refined and systematically assessed in order to make meaning for students.

Students use linguistic and non-linguistic representations, such as graphic organisers, ICT-generated simulations and models and ICT-controlled models to help structure their thinking processes and assist in constructing knowledge.

Using ICT, students record their decisions and actions when solving problems and clarifying thoughts. They monitor the changes in their thinking and evaluate their own and others’ thinking strategies. Students review these records to assess their suitability for new situations.

**ICT for creating**

The **ICT for creating** dimension focuses on students using ICT tools for creating solutions to problems and for creating information products. Through the selection and application of appropriate equipment, techniques and procedures, students learn to:

- process data and information to create solutions to problems and information products that demonstrate their knowledge and understandings of the concepts, issues, relationships and processes related to all areas of the curriculum
- manage their files to secure their contents and enable efficient retrieval
- plan and monitor the progress of extended tasks.

Students learn to use ICT efficiently to capture, validate and manipulate data for required purposes. In order to improve the appearance and functionality of information products and solutions, they apply commonly accepted conventions. They examine the ethical and legal implications of using ICT in a range of settings such as the home, school and the workplace. Students evaluate the usefulness of ICT for solving different types of problems and reflect on the effectiveness of their own use of ICT.

**ICT for communicating**

The **ICT for communicating** dimension focuses on students using ICT to:

- present ideas and understandings to audiences
- communicate with known and unknown audiences
- support knowledge-building among teams.
Students use ICT to support oral presentations to live local audiences and to present ideas and understandings to unknown, remote audiences. They use ICT to communicate with others, both known and unknown, with the purpose of seeking and discussing alternative views, acquiring expert opinions, sharing knowledge and expressing ideas. Students also locate information from a range of online and multimedia resources to support their own learning.

ICT supports knowledge-building among teams and enables team members to collaborate, enquire, interact and integrate prior knowledge with new understanding.

Protocols for receiving, transferring and publishing ideas and information are needed to promote communication that respects intended audiences.

**Stages of Learning in Information and Communications Technology**

AusVELS takes account of the developmental stages of learning young people experience at school. While student learning is a continuum and different students develop at different rates, they broadly progress through three stages of learning.

The following statements describe ways in which these characteristics relate to learning experiences and standards in each of the three stages of learning in the Information and Communications Technology (ICT) domain.

Students begin using ICT to create simple information products and to access learning tools. By applying ICT in a range of contexts, students develop knowledge, skills and behaviours for the effective use of ICT for learning in all domains. They become critical users of ICT for learning and communicating, and creating information products. They learn to use ICT tools to visualise their thinking and record their thinking strategies for use in future problem-solving activities. They progress to maintaining a digital record of evidence of their learning in all domains that enables them to reflect on learning how to learn. Electronic communication tools are introduced in students’ first years at school and more complex, contemporary communication tools are gradually introduced until students become confident users of the technology for communicating with experts and participating in online forums as both contributors and beneficiaries of knowledge.

**Prep to Year 4 – Laying the foundations**

Early in this stage students become familiar with the main components of a computer and develop their hand-eye coordination by using a mouse to control the cursor/pointer on the screen. Students enter and manipulate data to create simple information products.

Students progress by using ICT to organise, revise and classify ideas to assist their thinking processes. They access published multimedia resources and are encouraged to think critically about how these resources support their learning.

Later in this stage students use ICT to solve problems, express ideas and present information to different audiences. They apply simple formatting and editing techniques in order to improve the appearance and accuracy of information they create for audiences. They experiment with simple ICT tools and strategies to make visual their thinking processes and begin to consider how these tools can be used for solving new problems. They locate and access information from online sources and they exchange electronic messages with other people. They begin to apply strategies to facilitate easy retrieval of their files.

**Years 5 to 8 – Building breadth and depth**

Early in this stage students become more proficient in the use of ICT for the purposes of sharing knowledge and acquiring information. They use ICT to visualise their thinking in order to make sense of ideas, concepts and issues from all domains, and to reflect on their learning.
Students progress by devising planned approaches to problem solving. This involves documenting the order of, and time allocation for, individual tasks within extended projects. Students use a wider range of ICT tools, techniques and functions to support their thinking processes, to model systems, to solve problems and to create information products for a variety of purposes. They use the equipment's operating system and software functions to manage their files.

Later in this stage, students become more proficient in the use of Internet research tools to locate and download information from a range of sources, and they judge the quality of information, based on set criteria. They conform to accepted codes of practice when using ICT, and discuss the consequences of ICT use in a range of environments and contexts in the community. Students create and maintain digital evidence of their learning in all domains, the evidence exemplifying the progress made in applying ICT knowledge and skills.

**Years 9 to 10 – Developing pathways**

In these years students use ICT to manage individual and collaborative projects. They initiate and engage in real and virtual teams and collaborative problem solving in local and global environments. They use ICT tools to record, organise and express their thoughts and communicate with others.

Students use a range of ICT tools and techniques to assist in monitoring, reflecting on and refining their thinking strategies when addressing complex issues and solving complex problems.

Students select appropriate ICT tools for research, modelling, publishing, decision making and problem solving, and assess the validity and appropriateness of these tools. They make judgments about the quality of their own and others’ work and act on them.

Students understand the need to protect data and they use ICT tools to protect their files and control access to them. They share ideas with others through a range of electronic media. They demonstrate and discuss appropriate ethical and social behaviours for users of ICT and analyse the impact of ICT in society.

**Diversity of Learners**

The AusVELS curriculum has been developed to ensure that curriculum content and achievement standards establish high expectations for all students. Every student is entitled to enriching learning experiences across all areas of the curriculum. Students in Australian classrooms have multiple, diverse and changing needs that are shaped by individual learning histories and abilities as well as cultural language backgrounds and socio-economic factors.

**Students with disabilities**

The objectives of the AusVELS are the same for all students. The curriculum offers flexibility for teachers to tailor their teaching in ways that provide rigorous, relevant and engaging learning and assessment opportunities for students with disabilities.

Most students with disabilities can engage with the curriculum provided the necessary adjustments are made to the complexity of the curriculum content and to the means through which students demonstrate their knowledge, skills and understanding.

For some learners, making adjustments to instructional processes and to assessment strategies enables students to achieve educational standards commensurate with their peers.
For other students, teachers will need to make appropriate adjustments to the complexity of the curriculum content, focusing instruction on content different to that taught to others in their age group. It follows that adjustments will also need to be made to how the student's progress is monitored, assessed and reported.

For a small percentage of students with disabilities, their learning will be well below the AusVELS Foundation standards. Most of these students have a significant intellectual disability. ‘Towards Foundation Level AusVELS’ provides this cohort of students with access to curriculum content that enables students to move toward the learning described at Foundation level.

‘Towards Foundation Level AusVELS – Information and Communication Technology’ (PDF) focusses on progressing students from a pre-intentional to intentional state, and for the non-Australian Curriculum domains, are set out in four stages. These stages are not associated with any set age or year level that links chronological age to cognitive progress. As student’s progress through these stages, the extent of support decreases as they proceed towards becoming independent learners.

For more advice in regard to curriculum provision and students with disabilities, please see the AusVELS Students with Disabilities Guidelines (PDF). Additional advice and support is also available from the DEECD Abilities Based Learning and Education Support (ABLES) website.

**English as an additional language**

Many students in Australian schools are learners of English as an additional language (EAL). Learners of EAL are students whose first language is a language other than Standard Australian English and who require additional support to assist them to develop English language proficiency. While many EAL learners do well in school, there is a significant group of these learners who leave school without achieving their potential.

EAL students come from diverse backgrounds and may include:

- children whose first language is a language other than English
- Aboriginal and Torres Strait Islander students whose first language is an Indigenous language, including traditional languages, creoles and related varieties, or Aboriginal English.

EAL learners enter Australian schools at different ages and at different stages of English language learning and have various educational backgrounds in their first languages. For some, school is the only place they use English.

The aims of the curriculum are ultimately the same for all students. However, EAL learners are simultaneously learning a new language and the knowledge, understanding and skills of the curriculum through that new language. They require additional time and support, along with informed teaching that explicitly addresses their language needs, and assessments that take into account their developing language proficiency.

A national EAL document is being produced to support the AusVELS curriculum. It will provide a description of how language proficiency develops, and will be a valuable reference for all teachers. It will allow teachers to identify the language levels of the EAL learners in their classrooms and to address their specific learning requirements when teaching, ensuring equity of access to the learning area for all.

In the interim, advice about how to use the curriculum with EAL students is available here.
Foundation level

Learning Focus

As students work towards the achievement of Level 2 standards in Information and Communications Technology (ICT), they learn the safe use of ICT tools, including leaving electrical connections alone, sitting upright in front of a computer, and handling storage devices such as disks and memory sticks carefully. They learn the correct terms to name ICT equipment and, through use, become familiar with common icons on the computer desktop. They develop hand–eye coordination through using a mouse to control the pointer on the screen.

With assistance, students work with different types of data, such as text, numbers and images, to create simple information products and share their ideas. They develop their navigation skills by responding to stimulus in multimedia resources that develop literacy and numeracy skills. They find and compare examples of ICT equipment at home and investigate the purpose of ICT symbols and icons.

Standards

In the Information and Communications Technology domain, standards for assessing and reporting on student achievement are introduced at Level 1. The learning focus statement for Foundation provides advice about learning experiences that will assist students to work towards the achievement of the standards at Level 2.
Level 1

Learning Focus

As students work towards the achievement of Level 2 standards in Information and Communications Technology (ICT), they use ICT to acquire new knowledge and skills in all areas of the curriculum and to create and present information in meaningful ways. For example, students access a website to participate in a food pyramid game, and then present their understanding of food groups in a slide show that contains an image of a lunchbox filled with the appropriate food items. When using multimedia resources, students begin to think critically about these resources and how they help learning.

In their learning of new material, students experiment with some simple ICT tools and techniques for visualising their thinking. They learn to organise and classify information and ideas, and present them in a manner that is meaningful to them. This may entail cutting and pasting, dropping and dragging, and colour coding in order to group similar items, to sequence events and to identify examples that illustrate key ideas.

To improve the presentation of text and images, students begin to apply simple techniques, such as bolding, centring and changing case. They explore a range of different information products and identify intended audiences. Students display their own information products in a way that suits different audiences.

Students develop an understanding of the importance of checking the accuracy of facts that are going to be processed; this being necessary for producing accurate output. Students collect first-hand data and, with assistance, enter it into their spreadsheet files and manipulate it. For example, after collecting the heights of fellow students or the number of classmates with particular eye colours, students manipulate the data by summing or colour-coding cells, and then present the processed data as a chart. Individually, and as a class, they make summary statements about the characteristics of the processed data.

Working in a networked environment, students develop the practice of using a file-naming system that is both meaningful to the students, and avoids confusion over who owns particular files.

Students begin to explore contemporary ways of communicating ideas and information by composing and sending simple electronic messages such as emails.

Standards

At Level 1, students are working toward the Level 2 standards (see below).
Level 2

Learning Focus

As students work towards the achievement of Level 2 standards in Information and Communications Technology (ICT), they use ICT to acquire new knowledge and skills in all areas of the curriculum and to create and present information in meaningful ways. For example, students access a website to participate in a food pyramid game, and then present their understanding of food groups in a slide show that contains an image of a lunchbox filled with the appropriate food items. When using multimedia resources, students begin to think critically about these resources and how they help learning.

In their learning of new material, students experiment with some simple ICT tools and techniques for visualising their thinking. They learn to organise and classify information and ideas, and present them in a manner that is meaningful to them. This may entail cutting and pasting, dropping and dragging, and colour coding in order to group similar items, to sequence events and to identify examples that illustrate key ideas.

To improve the presentation of text and images, students begin to apply simple techniques, such as bolding, centring and changing case. They explore a range of different information products and identify intended audiences. Students display their own information products in a way that suits different audiences.

Students develop an understanding of the importance of checking the accuracy of facts that are going to be processed; this being necessary for producing accurate output. Students collect first-hand data and, with assistance, enter it into their spreadsheet files and manipulate it. For example, after collecting the heights of fellow students or the number of classmates with particular eye colours, students manipulate the data by summing or colour-coding cells, and then present the processed data as a chart. Individually, and as a class, they make summary statements about the characteristics of the processed data.

Working in a networked environment, students develop the practice of using a file-naming system that is both meaningful to the students, and avoids confusion over who owns particular files.

Students begin to explore contemporary ways of communicating ideas and information by composing and sending simple electronic messages such as emails.

Standards

At this level standards are not organised by dimensions.

Information and Communications Technology

At Level 2, students manipulate text, images and numeric data to create simple information products for specific audiences. They make simple changes to improve the appearance of their information products. They retrieve files and save new files using a naming system that is meaningful to them. They compose simple electronic messages to known recipients and send them successfully. With some assistance, students use ICT to locate and retrieve relevant information from a variety of sources.
Level 3

Learning Focus

As students work towards the achievement of Level 4 standards in Information and Communications Technology (ICT), they develop skills in using ICT for problem solving, expressing ideas, and presenting information to different audiences. Working in all areas of the curriculum, students explore a range of ICT tools (for example, basic editing tools such as word processing) and simple techniques for visualising thinking. They also use simple graphic organisers such as concept maps and sequence charts to provide a framework for visualising thinking. In particular they use tools that assist in sequencing, and in identifying relationships between, ideas, facts and concepts. Students save their visualising thinking files to folders and when new but similar learning situations arise, they retrieve them and use them as a starting point for these situations. Students reflect on the usefulness of such tools and strategies in new circumstances.

Students compare the purposes and structures of information presented in different media, such as print, on-screen, or as an action; for example, a moving robot. Individually, students learn to process data in the form of text, images and sound to create planned information products, such as invitations, short stories, presentation files (for example, a Microsoft PowerPoint file), animations and title pages for books. Students begin to use manual (for example, proofreading) and electronic (for example, spellchecker) techniques to identify typographical errors and make appropriate corrections. They use criteria, such as the accuracy and attractiveness of their information products, to make judgments about how well they meet their purposes. Students use software tools to assist with problem solving. For example, students create a questionnaire using word-processing software to collect data about the ages and ethnicity of residents in their local area as part of their Humanities study. Their understanding of this data is then demonstrated in a presentation file. Students work collaboratively to develop their ICT skills.

When using ICT to assist with problem solving and for producing information products, students investigate and apply some practices that are ergonomically sound, such as adjusting the height of chairs to ensure that elbows are at an appropriate angle and using keying techniques that minimise wrist harm and maximise the efficiency of data entry.

Students begin to manage their files using simple ways of organising them for easy retrieval; for example, creating folders based on topics or forms such as stories, images, and projects. They compare their systems with those of other students and acknowledge and accept different approaches that work for the user. Students are introduced to the simple security strategy of using passwords to protect access to their files when working on a network.

Students continue to develop their skills in using ICT to communicate knowledge by exchanging email messages with others. When seeking new information on topics of importance or interest in all areas of the curriculum, students apply a set of procedures (such as simple key words) for locating information on the intranet and the Internet, and they determine the value of these resources by developing and applying simple criteria (for example, considering the age of the intended audience). They transfer this knowledge when they evaluate their own products.

Standards

At Level 3, students are working toward the Level 4 standards.
Level 4

Learning Focus

As students work towards the achievement of Level 4 standards in Information and Communications Technology (ICT), they develop skills in using ICT for problem solving, expressing ideas, and presenting information to different audiences. Working in all areas of the curriculum, students explore a range of ICT tools (for example, basic editing tools such as word processing) and simple techniques for visualising thinking. They also use simple graphic organisers such as concept maps and sequence charts to provide a framework for visualising thinking. In particular they use tools that assist in sequencing, and in identifying relationships between, ideas, facts and concepts. Students save their visualising thinking files to folders and when new but similar learning situations arise, they retrieve them and use them as a starting point for these situations. Students reflect on the usefulness of such tools and strategies in new circumstances.

Students compare the purposes and structures of information presented in different media, such as print, on-screen, or as an action; for example, a moving robot. Individually, students learn to process data in the form of text, images and sound to create planned information products, such as invitations, short stories, presentation files (for example, a Microsoft PowerPoint file), animations and title pages for books. Students begin to use manual (for example, proofreading) and electronic (for example, spellchecker) techniques to identify typographical errors and make appropriate corrections. They use criteria, such as the accuracy and attractiveness of their information products, to make judgments about how well they meet their purposes. Students use software tools to assist with problem solving. For example, students create a questionnaire using word-processing software to collect data about the ages and ethnicity of residents in their local area as part of their Humanities study. Their understanding of this data is then demonstrated in a presentation file. Students work collaboratively to develop their ICT skills.

When using ICT to assist with problem solving and for producing information products, students investigate and apply some practices that are ergonomically sound, such as adjusting the height of chairs to ensure that elbows are at an appropriate angle and using keying techniques that minimise wrist harm and maximise the efficiency of data entry.

Students begin to manage their files using simple ways of organising them for easy retrieval; for example, creating folders based on topics or forms such as stories, images, and projects. They compare their systems with those of other students and acknowledge and accept different approaches that work for the user. Students are introduced to the simple security strategy of using passwords to protect access to their files when working on a network.

Students continue to develop their skills in using ICT to communicate knowledge by exchanging email messages with others. When seeking new information on topics of importance or interest in all areas of the curriculum, students apply a set of procedures (such as simple key words) for locating information on the intranet and the Internet, and they determine the value of these resources by developing and applying simple criteria (for example, considering the age of the intended audience). They transfer this knowledge when they evaluate their own products.

Standards

<table>
<thead>
<tr>
<th>ICT for visualising thinking</th>
</tr>
</thead>
</table>

At Level 4, students use ICT tools to list ideas, order them into logical sequences, and identify relationships between them. Students retrieve their saved visualising thinking strategies and edit them for use in new, but similar situations. They explain how these strategies can be used for different problems or situations.

<table>
<thead>
<tr>
<th>ICT for creating</th>
</tr>
</thead>
</table>
At Level 4, students organise their files into folders classified in a way that is meaningful to them. Students explain the purpose of passwords for accessing files stored on networks. They follow simple plans and use tools and a range of data types to create information products designed to inform, persuade, entertain or educate particular audiences. They create information products to assist in problem solving in all areas of the curriculum. With minimal assistance, students use ICT tools to capture and save images. They use simple editing functions to manipulate the images for use in their products.

They make ongoing modifications to their work to correct the spelling of frequently used words and to rectify simple formatting errors. They evaluate the final information product and describe how well it meets its purpose. Students make adjustments to their equipment and apply techniques that are ergonomically sound.

ICT for communicating

At Level 4, students initiate and compose email messages to known and unknown audiences and, where appropriate, send replies. Students create folders in their mailbox to organise the storage of email messages they wish to keep. They locate information on an intranet, and use a recommended search engine and limited key words to locate information from websites. They develop and apply simple criteria to evaluate the value of the located information.
Level 5

Learning Focus

As students work towards the achievement of Level 6 standards in Information and Communications Technology (ICT), they apply known ICT tools for visualising thinking in new ways to make links between existing and new knowledge. They begin to use new tools, such as ict-controlled models, a programming language or simulation software, such as microworlds, spreadsheets and domain specific modelling software, to represent and explore processes, patterns, and cause-and-effect relationships. They learn to use tools, such as database software and graphic organisers, to organise and analyse data and information. For example, after interviewing people of Asian cultural backgrounds, students might identify similarities and differences between Australian and Asian customs by using a double-cell diagram, which forms a visual structure to aid thinking.

Students reflect on their experience in using such ICT tools, comparing how they learned with these tools with how they might learn from books, and comparing the virtual worlds created through these models with real life.

Students use ICT tools to produce information products that demonstrate their knowledge and skills for all areas of the curriculum. For example, based on the inferences drawn by using a double cell diagram to analyse the similarities and differences between Australian and Asian customs, students could present their new understanding in multimedia form (an information product).

Students develop their use of ICT to assist with problem solving. For example, when creating a model solar-powered boat that meets specified criteria, students support their problem solving strategies by using software to create alternative two-dimensional designs.

Students explore new software functions that promote efficiency and effectiveness. For example, students use the ‘find and replace’ function to locate and change repeated words or formats (efficiency) and they use borders to separate different sets of information (effectiveness). They develop skills in using three-dimensional multimedia tools for problem solving, discuss how the three-dimensional functions improve the effectiveness of solutions, and brainstorm situations in which these tools can be used. Students develop skills in using ICT systems for controlling events in a predetermined way by writing programs that, for example, control a turtle or robot, manipulate objects in a game or three-dimensional virtual environment, or respond to environmental changes captured by sensors.

Students use design tools, such as layout diagrams, annotated drawings and storyboards, to document solutions and the layout of information products. They begin to use ict presentation conventions, incorporating them into their solutions and information products where appropriate. They test their products against commonly accepted ICT evaluation criteria and, with assistance, refine their work to meet both the criteria and audience needs. They develop and maintain a digital bank of evidence (for example, an electronic portfolio), that demonstrates their learning. This requires students evaluating, selecting and organising files that showcase their learning and that are up-to-date and structured in an orderly way. Students apply file management procedures that assist in securing their files (for example, backing up on storage media such as disks or memory sticks), and in allowing the easy retrieval of files by using naming conventions that are meaningful. Students continue to use ergonomic practices that assist in minimising physical harm, such as doing exercise to reduce injury due to repetitive actions.
Students begin to work in a collaborative global environment. They share their developing knowledge with their peers through email, and seek advice from others through frequently asked questions (FAQs), websites or by directly emailing experts. Students consider these methods of sharing information with a wider audience, and develop knowledge of protocols for sending and receiving electronic information through the Internet by creating and sending emails with attachments and uploading files to protected public places on intranets or the Internet.

When problem solving, students use recommended search engines and begin to refine search questions to locate information quickly on the Internet. This involves applying criteria for assessing the integrity of information, such as the reliability of the web host and the accuracy of the information.

**Standards**

At Level 5, students are working toward the Level 6 standards.
Level 6

Learning Focus

As students work towards the achievement of Level 6 standards in Information and Communications Technology (ICT), they apply known ICT tools for visualising thinking in new ways to make links between existing and new knowledge. They begin to use new tools, such as ict-controlled models, a programming language or simulation software, such as microworlds, spreadsheets and domain specific modelling software, to represent and explore processes, patterns, and cause-and-effect relationships. They learn to use tools, such as database software and graphic organisers, to organise and analyse data and information. For example, after interviewing people of Asian cultural backgrounds, students might identify similarities and differences between Australian and Asian customs by using a double-cell diagram, which forms a visual structure to aid thinking.

Students reflect on their experience in using such ICT tools, comparing how they learned with these tools with how they might learn from books, and comparing the virtual worlds created through these models with real life.

Students use ICT tools to produce information products that demonstrate their knowledge and skills for all areas of the curriculum. For example, based on the inferences drawn by using a double cell diagram to analyse the similarities and differences between Australian and Asian customs, students could present their new understanding in multimedia form (an information product).

Students develop their use of ICT to assist with problem solving. For example, when creating a model solar-powered boat that meets specified criteria, students support their problem solving strategies by using software to create alternative two-dimensional designs.

Students explore new software functions that promote efficiency and effectiveness. For example, students use the ‘find and replace’ function to locate and change repeated words or formats (efficiency) and they use borders to separate different sets of information (effectiveness). They develop skills in using three-dimensional multimedia tools for problem solving, discuss how the three-dimensional functions improve the effectiveness of solutions, and brainstorm situations in which these tools can be used. Students develop skills in using ICT systems for controlling events in a predetermined way by writing programs that, for example, control a turtle or robot, manipulate objects in a game or three-dimensional virtual environment, or respond to environmental changes captured by sensors.

Students use design tools, such as layout diagrams, annotated drawings and storyboards, to document solutions and the layout of information products. They begin to use ict presentation conventions, incorporating them into their solutions and information products where appropriate. They test their products against commonly accepted ICT evaluation criteria and, with assistance, refine their work to meet both the criteria and audience needs. They develop and maintain a digital bank of evidence (for example, an electronic portfolio), that demonstrates their learning. This requires students evaluating, selecting and organising files that showcase their learning and that are up-to-date and structured in an orderly way. Students apply file management procedures that assist in securing their files (for example, backing up on storage media such as disks or memory sticks), and in allowing the easy retrieval of files by using naming conventions that are meaningful. Students continue to use ergonomic practices that assist in minimising physical harm, such as doing exercise to reduce injury due to repetitive actions.
Students begin to work in a collaborative global environment. They share their developing knowledge with their peers through email, and seek advice from others through frequently asked questions (FAQs), websites or by directly emailing experts. Students consider these methods of sharing information with a wider audience, and develop knowledge of protocols for sending and receiving electronic information through the Internet by creating and sending emails with attachments and uploading files to protected public places on intranets or the Internet.

When problem solving, students use recommended search engines and begin to refine search questions to locate information quickly on the Internet. This involves applying criteria for assessing the integrity of information, such as the reliability of the web host and the accuracy of the information.

**Standards**

<table>
<thead>
<tr>
<th>ICT for visualising thinking</th>
</tr>
</thead>
</table>

At Level 6, students apply ICT tools and techniques to represent and explore processes, patterns and cause-and-effect relationships. Students use ICT tools and techniques that support the organisation and analysis of concepts, issues and ideas and that allow relationships to be identified and inferences drawn from them.

Students review their stored thinking strategies in order to identify similarities and differences in their thinking patterns. They document in their bank of digital evidence how these visualising thinking strategies help them to understand concepts and relationships.

<table>
<thead>
<tr>
<th>ICT for creating</th>
</tr>
</thead>
</table>

At Level 6, students safely and independently use a range of skills, procedures, equipment and functions to process different data types and produce accurate and suitably formatted products to suit different purposes and audiences. They use design tools to represent how solutions will be produced and the layout of information products. Students select relevant techniques for minimising the time taken to process data, and apply conventions and techniques that improve the appearance of the finished product. Students modify products on an ongoing basis in order to improve meaning and judge their products against agreed criteria.

Students create and maintain an up-to-date, logically structured bank of digital evidence of their learning. They password protect and back up important files and use file naming conventions that allow easy retrieval.

<table>
<thead>
<tr>
<th>ICT for communicating</th>
</tr>
</thead>
</table>

At Level 6, students use email, websites and frequently asked question facilities to acquire from, or share information with, peers and known and unknown experts. When emailing, they successfully attach files and they apply protocols for sending and receiving electronic information. They successfully upload their work to a protected public online space. Using recommended search engines, students refine their search strategies to locate information quickly. They evaluate the integrity of the located information based on its accuracy and the reliability of the web host.