

# Digital Technologies – 5 and 6\_ Collaboration



STRAND	Knowledge and understanding		Processes and production skills																		
	Digital Systems	Representation of data	Collecting, managing and analysing data	Creating Digital Solutions by:																	
				Investigating and defining	Generating and designing			Producing and implementing			Evaluating			Collaborating and managing							
Content Description	Examine the main components of common digital systems and how they may connect together to form networks to transmit data (ACTDIK014 )	Examine how whole numbers are used to represent all data in digital systems (ACTDIK015 )	Acquire, store and validate different types of data, and use a range of software to interpret and visualise data to create information (ACTDIP016)	Define problems in terms of data and functional requirements drawing on previously solved problems (ACTDIP017 )	Design a user interface for a digital system (ACTDIP018)	Design, modify and follow simple algorithms involving sequences of steps, branching, and iteration (repetition) (ACTDIP019)			Implement digital solutions as simple visual programs involving branching, iteration (repetition), and user input (ACTDIP020)			Explain how student solutions and existing information systems are sustainable and meet current and future local community needs (ACTDIP021)			Plan, create and communicate ideas and information, including collaboratively online, applying agreed ethical, social and technical protocols (ACTDIP022 )						
Sequence of Lessons / Unit	Approx. time req'd (hrs)	Year 5 or 6	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	CD	Achievement standard #	
Collaborative project	7	6	<input checked="" type="checkbox"/>	1	<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	3	<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		<input checked="" type="checkbox"/>	5	<input checked="" type="checkbox"/>	6	

Years 3 and 4 Achievement Standard	Years 5 and 6 Achievement Standard	Years 7 and 8 Achievement Standard
<p>By the end of Year 4:</p> <ul style="list-style-type: none"> <li>Students describe how a range of digital systems (hardware and software) and their peripheral devices can be used for different purposes.</li> <li>They explain how the same data sets can be represented in different ways. (2)</li> <li>Students define simple problems, design and implement digital solutions using algorithms that involve decision-making and user input. (3)</li> <li>They explain how the solutions meet their purposes. (4)</li> <li>They collect and manipulate different data when creating information and digital solutions. (5)</li> <li>They safely use and manage information systems for identified needs using agreed protocols and describe how information systems are used. (6)</li> </ul>	<p>By the end of Year 6:</p> <ul style="list-style-type: none"> <li>Students explain the fundamentals of digital system components (hardware, software and networks) and how digital systems are connected to form networks. (1)</li> <li>They explain how digital systems use whole numbers as a basis for representing a variety of data types. (2)</li> <li>Students define problems in terms of data and functional requirements and design solutions by developing algorithms to address the problems. (3)</li> <li>They incorporate decision-making, repetition and user interface design into their designs and implement their digital solutions, including a visual program. (4)</li> <li>They explain how information systems and their solutions meet needs and consider sustainability. (5)</li> <li>Students manage the creation and communication of ideas and information in collaborative digital projects using validated data and agreed protocols. (6)</li> </ul>	<p>By the end of Year 8</p> <ul style="list-style-type: none"> <li>Students distinguish between different types of networks and defined purposes.</li> <li>They explain how text, image and audio data can be represented, secured and presented in digital systems. (2)</li> <li>Students plan and manage digital projects to create interactive information. (3)</li> <li>They define and decompose problems in terms of functional requirements and constraints. (4)</li> <li>Students design user experiences and algorithms incorporating branching and iterations, and test, modify and implement digital solutions. (5)</li> <li>They evaluate information systems and their solutions in terms of meeting needs, innovation and sustainability. (6)</li> <li>They analyse and evaluate data from a range of sources to model and create solutions. (7)</li> <li>They use appropriate protocols when communicating and collaborating online. (8)</li> </ul>

**Collaborative project**

Year Level 6

TOPIC Digital systems

Time: 7 HOURS

Using a relevant context such as disaster management, students evaluate existing information systems, examine approaches to make information available to the public and assess how well they meet community needs. Students can examine the functioning of one type of information system that could be applied in a new way to meet a community or national need in terms of disaster management. A focus of this inquiry is to collaborate with others to create a digital solution, using agreed protocols.

Flow of activities				
Short text	An information system Examine an information system such as an early response warning system for a natural disaster.	Data requirements Examine what data an information system would need to operate.	Potential uses for a smartphone Investigate the ways in which a smart phone can be used to access early warning information.	Early warning system Design an early warning system for a particular disaster
Questions to guide exploration	<i>How can technology help to warn communities of a natural disaster?</i>	<i>What data and information is required to make the system work?</i>	<i>What functions are available in existing technologies?</i>	<i>How do you create an early warning system?</i>
AC Alignment	<i>Digital systems (ACTDIK014) Investigating and defining (ACTDIP017) Collaborating and managing (ACTDIP022 )</i>	<i>Digital systems (ACTDIK014) Investigating and defining (ACTDIP017) Collaborating and managing (ACTDIP022 )</i>	<i>Digital systems (ACTDIK014) Investigating and defining (ACTDIP017) Collaborating and managing (ACTDIP022 )</i>	<i>Digital systems (ACTDIK014) Investigating and defining (ACTDIP017) Collaborating and managing (ACTDIP022 )</i>
What's this about?	A disaster information system is an example of an emerging information system designed to protect communities.  Generally, the process to develop these systems includes describing the problem, gathering information, specification of the system requirements, design, construction and implementation of the system, followed by review.	An information system for a warning system typically requires users to access information in a relevant format, often transmitted from a central location. The system includes computer hardware and software, telecommunications, databases and storage, people and procedures.  Maps with overlays of spatial information provide data that enable patterns and trends to be identified more easily than numerical data on its own.	Smart phones can be used for a range of purposes. Messaging apps enable text messages and images to be sent and received. Mobile phone data provides information about the user's location through the built-in GPS receiver. Another program is the phone's voice-activated assistant, which translates words into a digital signal. Smart phones also have email capabilities. Social media apps enable immediate updates of information and can be used to locate missing people (eg using the 'Find my phone' app) or the location sharing feature in SnapChat.	Students design a digital solution, applying their understandings by first empathising with the target audience, going through a process of ideation and then designing.
The focus of the learning (in simple terms)	Students conduct an inquiry related to an information system; for example, an early response warning system for a particular disaster such as a bushfire alert, Australian Tsunami Warning System, or emergency social media platform.  Use a collaborative tool such as Padlet or OneNote to brainstorm ideas about ways to warn people about an impending disaster. Consider the needs of the user; what information is most useful and what is the best way to provide that information?  Students investigate existing early warning systems and technologies and summarise the pros and cons of each; eg <ul style="list-style-type: none"> <li>• satellite communication technology</li> <li>• mobile phone technology</li> <li>• remote sensing and geographic information systems applications.</li> </ul>	View images of maps or similar spatial information to identify the reach and coverage of the impact of a disaster such as a bushfire, flood or cyclone.  Relate the impact zone to communities that might be affected and what technologies could be used to warn communities.  Look at existing solutions such as SMS messages, which can be sent to people's phones if they are within the boundary of an impending disaster.  What information would the system need to operate? How would this information be developed, stored, transmitted, accessed and protected? Use a collaborative tool to share and refine ideas.	Examine the smart phone as a form of technology. What role can it play in information systems?  Investigate the ways in which a smart phone can be used to access early warning information. Read examples of authentic scenarios where social media platforms have been used effectively during severe weather events (eg Queensland Police has used Facebook).  Use a collaborative tool such as Google Docs to share and refine ideas. What considerations should be made to cater for people without up-to-date technology or people with special needs?	Design an early warning system for a particular disaster. Visually present your ideas showing the flow of information, data requirements and ways that the information is managed. A good way to do this is as a paper prototype.  Consider the ways personal data would need to be protected. Consider the sustainability of this system. How will it meet future local community needs? Students can present their ideas in the form of a paper prototype rather than as a digital solution if time does not permit.  This project should be undertaken by students working collaboratively in teams. They develop file management systems, allocate tasks and responsibilities, set timelines and determine other 'rules' or protocols.
Supporting resources and tools	<a href="#">Bushfire alert</a> Communities can set up their own bushfire alert such as broadcasting important information to large numbers of people by telephone, email and SMS for \$20 per telephone number per year.  <a href="#">Tsunami alert</a>	<a href="#">The Australian National Map</a> Browse a data catalogue and add data sets. Visualise data on a map of Australia.  <a href="#">FloodCheck map</a> View flood lines, imagery, and data and the extent of floodplains in Queensland.  <a href="#">Queensland Globe</a>	<a href="#">Queensland police are pioneers in social media</a> and <a href="#">Facebook the first stop for Queensland Police in floods</a> Police used social media during a Queensland flood disaster to inform the community.  <a href="#">Flooding Facebook: The use of social media during the Queensland and Victorian floods</a>	<a href="#">Developing early warning systems: A checklist</a> This site provides background information that can be used to help students create their own checklist for an early warning system.  <a href="#">Early warning of disasters: Facts and figures</a> This article looks at early warning systems for disasters, their uses and limits, and what accounts for the gap between warning and action.
Purpose/context for use				

	<p>The Australian Tsunami Warning System delivers timely and effective tsunami warnings to the Australian population</p> <p><a href="#">Queensland alert</a> The Queensland Government website provides information about disasters and alerts.</p>	<p>View location-based information for Queensland.</p> <p><a href="#">Map of bushfire-prone areas</a> This map identifies land falling within, or partially within, a bushfire-prone area of Western Australia as designated by the Fire and Emergency Services Commissioner.</p>	<p>Social media has been used in disasters such as flooding.</p>	
Assessment	<p><b>Suggested approaches</b></p> <ul style="list-style-type: none"> <li>• Presentation or demonstration</li> <li>• Adapted worksheet</li> <li>• Artefact analysis</li> <li>• Labelling diagram</li> <li>• Text</li> <li>• Digital capture</li> <li>• Design plan</li> </ul> <p><b>Achievement standard</b> <b>Explain</b> how information systems and their solutions meet needs and consider sustainability.</p> <p><b>Manage</b> the <b>creation</b> and <b>communication</b> of ideas and information in collaborative digital projects <b>using</b> validated data and agreed protocols</p>	<p><b>Suggested approaches</b></p> <ul style="list-style-type: none"> <li>• Presentation or demonstration</li> <li>• Adapted worksheet</li> <li>• Artefact analysis</li> <li>• Labelling diagram</li> <li>• Text</li> <li>• Digital capture</li> <li>• Design plan</li> </ul> <p><b>Achievement standard</b> <b>Explain</b> how information systems and their solutions meet needs and consider sustainability.</p> <p><b>Manage</b> the <b>creation</b> and <b>communication</b> of ideas and information in collaborative digital projects <b>using</b> validated data and agreed protocols</p>	<p><b>Suggested approaches</b></p> <ul style="list-style-type: none"> <li>• Presentation or demonstration</li> <li>• Adapted worksheet</li> <li>• Artefact analysis</li> <li>• Labelling diagram</li> <li>• Text</li> <li>• Digital capture</li> <li>• Design plan</li> </ul> <p><b>Achievement standard</b> <b>Explain</b> how information systems and their solutions meet needs and consider sustainability.</p> <p><b>Manage</b> the <b>creation</b> and <b>communication</b> of ideas and information in collaborative digital projects <b>using</b> validated data and agreed protocols</p>	<p><b>Suggested approaches</b></p> <ul style="list-style-type: none"> <li>• Presentation or demonstration</li> <li>• Adapted worksheet</li> <li>• Artefact analysis</li> <li>• Labelling diagram</li> <li>• Text</li> <li>• Digital capture</li> <li>• Design plan</li> </ul> <p><b>Achievement standard</b> <b>Explain</b> how information systems and their solutions meet needs and consider sustainability.</p> <p><b>Manage</b> the <b>creation</b> and <b>communication</b> of ideas and information in collaborative digital projects <b>using</b> validated data and agreed protocols</p>