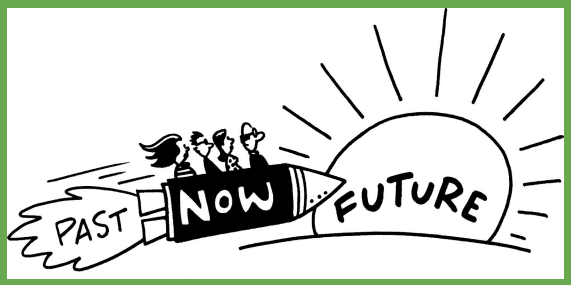


Lifting Digital Technology Practice In the Classroom

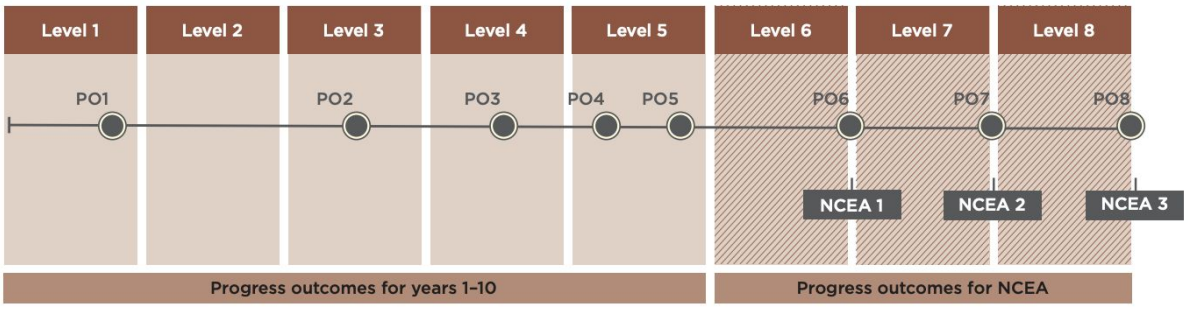
Developing a future ready classroom
With the 4 C's and Digital Technologies Curriculum

Term …., 201	Name…..	

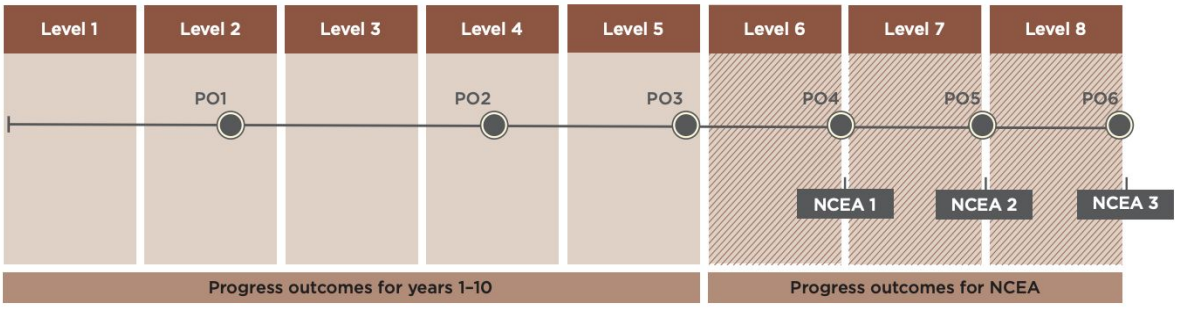
Curriculum Area Links

Technology

Computational thinking for digital technologies



Designing and developing digital outcomes



Digital Technologies Curriculum Link here
New Zealand Curriculum Link here

The 4 C's of 21st Century Learning
Give students the opportunity to explore and experiment with something new

Communication: *Sharing thoughts, questions, ideas and solutions*	***Collaboration***: *Working together to reach a goal - putting talent, expertise and smarts to work*	***Critical Thinking***: *Looking at problems in a new way, linking learning across subjects & disciplines*	***Creativity***: *Trying new approaches to get things done equals innovation & invention*

Key Terminology for what will be enhance and transformed in our learning skills:

Creative thinking	*Production*	*Peer Interaction*	*Multiple Audiences*
Articulation	*Student Ownership*	*Cultural Understanding*	*Student Centered*
Speaking and Listening	*Empathy*	*Digital Citizenship*	*Organization*

Links to the NZ Curriculum

NZC Principles		NZC Values		Key Competencies		Future Focus			
	High expectations		Excellence		Thinking		Problem Solving		Team Working
	Treaty of Waitangi		Innovation, inquiry & curiosity		Using language, symbols & text		Communication		Critical Thinking
	Cultural Diversity		Diversity		Managing Self		Creativity		Leadership
	Inclusion		Equity		Relating to others		Literacy		Digital Literacy
	Learning to Learn		Community & Participation		Participate and contribute		Foreign Language skills		Numeracy
	Community Engagement		Ecological Sustainability				Emotional Intelligence		Entrepreneurship
	Coherence		Integrity						
	Future Focus		Respect						

Activity Links and Deliberate Acts of Teaching
Digital Technologies

Computational Thinking

-*Progress Outcome 1*: In authentic contexts and taking account of end-users, students use their decomposition skills to break down simple non-computerised tasks into precise, unambiguous, step-by-step instructions (algorithmic thinking). They give these instructions, identify any errors in them as they are followed, and correct them (simple debugging).

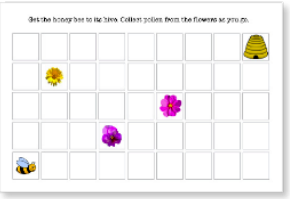
-*Progress Outcome 2*: In authentic contexts and taking account of end-users, students give, follow and debug simple algorithms in computerised and non-computerised contexts. They use these algorithms to create simple programs involving outputs and sequencing (putting instructions one after the other) in age-appropriate programming environments.

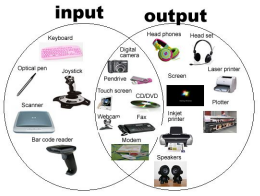
-*Progress Outcome 3*: In authentic contexts and taking account of end-users, students decompose problems into step-by-step instructions to create algorithms for computer programs. They use logical thinking to predict the behaviour of the programs, and they understand that there can be more than one algorithm for the same problem. They develop and debug simple programs that use inputs, outputs, sequence and iteration (repeating part of the algorithm with a loop). They understand that digital devices store data using just two states represented by binary digits (bits).

-*Progress Outcome 4*: In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programming: sequence, selection and iteration. They implement these algorithms by creating programs that use inputs, outputs, sequence, basic selection using comparative operators and iteration. They debug simple algorithms and programme by identifying when things go wrong with their instructions and correcting them, and they are able to explain why things went wrong and how they fixed them. Students understand that digital devices represent data with binary digits and have ways of detecting errors in data storage and transmission. They evaluate the efficiency of algorithms, recognising that computers need to search and sort large amounts of data. They also evaluate user interfaces in relation to their efficiency and usability.

Focus	WALHT's	Deliberate Acts of Teaching	Resources

Authentic contexts		Where to start:
		• Real world problems
		  ○ Something that is relevant in class
		  ○ Something that is relevant to the community
		  ○ Something that is relevant to the country
		• Open-ended inquiry that class might be exploring
			

		• Student interest areas of exploration • Project based learning contexts -Apply what they are learning with a problem that is relevant to students	
End users	WALHT create products for an end user WALHT cater for the end user	"the person who actually uses a particular product" Before beginning the learning, discussions around who the end user is/will be What they need, like, want, desire and how that fits into the problem or learning activity	
Simple non-computerised tasks	WALHT make decisions independently WALHT work collaboratively with a group WALHT understand the purpose of a computer WALHT follow simple non-computerised tasks WALHT follow instructions WALHT give instructions	Directions Whole class discussions and recapping on directions: left, right, up, down, forwards, backwards, stop, go, east, west, north, south Teacher model instructions with mazes and giving directions to get through a maze. What directions do we go? What comes next? Students could write down directions to solve the maze Students could create their own mazes and have others solve/write down the instructions to get to the end --- Algorithms and creating sets of instructions Giving precise instructions to get the bee to the hive Give students a grid and create a set of instructions for the bee to follow to collect pollen from all the flowers and get to the hive. As a class go through 'direction' words they can refer to Give instructions to a peer to test If you went wrong, how could you fix it? Creating their own problems on an unplugged grid Writing down the instructions to solve their problem Buddy check to solve or debug if their were bugs How could you fit it?	Coding Example  Coding Templates Osmo coding awbie Beebot app Scratch jr Coding Templates for unplugged CS Unplugged Curriculum Code like a pirate activity Beebot coding instructions Unit pack for coding --- Seesaw activity links - coding templates
Debugging	WALHT identify if I	Debugging	

	have gone wrong and correct it (simple debugging)	Explore debugging and what it means. Talk through class example finding the 'bugs' in the process. Talk through the steps you could do to fix it Whole class discussions and demonstrated on debugging Teacher providing examples for students to find the bugs and correct the algorithms	
Input vs Output	WALHT recognise and name input and output WALHT talk about the differences between input vs output WALHT explain how an input works WALHT explain how an output works	Discussions on Input vs Output What are the difference? What do they mean? Classroom or school search for different items that are input and output Categorise them Create display with pictures or explaining information for both Possible Responses Desktop: The following is a possible list of responses. • Inputs Keyboard, mouse, other buttons, camera, microphone • Outputs Screen, Speakers, Printer Possible Responses Laptop: The following is a list of responses. • Inputs: Camera, Microphone, USB port, trackpad, Wi-Fi, Bluetooth • Outputs: Screen, speakers, Wi-Fi, Bluetooth Possible Responses Smartphone: The following is a list of possible responses • Inputs: The following is a list of possible responses Touch screen, Buttons, Microphone, GPS, Motion sensor (e.g. to rotate the screen), Light sensor (e.g. to make screen dimmer at night), Camera, Stylus (on some phones), Internet connection • Outputs: The following is a list of possible responses Touch screen, Speakers, Headphones, Vibration, Internet connection, etc.	 Input vs Output activity from Curriculum Code Input vs Output from Twinkl Input vs Output from Twinkl Input vs output worksheet  Input vs output kahoot!
Computerised tasks	WALHT make decisions independently WALHT work collaboratively with a group WALHT understand the purpose of a computer WALHT follow simple non-computerised tasks	Practicing what they have learnt with instructions, algorithms and steps to create code on a computer or with a device. Explore lessons that are linked to teach website >>>>> Teacher can follow tasks or set assignments that students can follow to create an end product *Lesson plans for each specific website can be found on their links	Scratch Jr lesson plans Lesson plans #2 Scratch Code club Tynker: Coding for kids Code.org Hour of code Coding park

	WALHT follow instructions WALHT give instructions		Code combat Code monkey Code with Google Python Introduction
Software/Devices	WALHT use digital equipment WALHT use a digital device WALHT code digital devices	Explore the use of different devices with coding and creating computerised tasks Teacher modelling with student practice individual/small groups/large groups around context based problems Devices could include/not limited to: Spheros Beebots Go Robot Mouse Microbits Makey makey Ozobots Osmo coding Edison Lego mindstorms Dash & Dots *Lesson plans for each specific software or device can be found on their links	Spheros Beebots Go Robot Mouse Microbits Microbit lesson plans Makey makey Ozobots Osmo coding Edison robot Lego Mindstorms Dash & Dots
Binary Digits	WALHT understand binary WALHT show binary representations	Whole class discussions and demonstrations of binary code Where does it come from? Why is it relevant? Who uses it? Talk through 0 and 1/black and white representations Practice binary digits with practical activities involving whole class/groups/individuals	CS Unplugged - binary Binary code powerpoint Code your own name in binary Binary weaving Binary code alphabet Binary worksheets

Key Vocabulary:

- Algorithm - A list of steps to finish a task.
- Bug - Part of a program that does not work correctly.
- Debugging - Finding and fixing problems in an algorithm or program.
- Program - An algorithm that has been coded into something that can be run by a machine.
- Persistence - Trying again and again, even when something is very hard.
- Repeat - Do something again
- Loop - The action of doing something over and over again.
- Decompose - break a problem down into smaller pieces
- Input - A device or component that allows information to be given to a computer
- Output - Any device or component that receives information from a computer

Specific Models and Examples from NZ Curriculum

Progress Outcome 1	Progress Outcome 2	Progress Outcome 3	Progress Outcome 4
Exemplar 1 - Collecting pollen	Exemplar 3 - Getting to the hive	Exemplar 6 - Dance moves	Exemplar 9 - Robotics challenges

Exemplar 2 - Teaching robots to dance	Exemplar 4 - How Maui slowed the sun	Exemplar 7 - Climbing stairs	Exemplar 10 - Parity bit magic
	Exemplar 5 - Catching chickens	Exemplar 8 - Coded messages	Exemplar 11 - Beat the goalie
			Exemplar 12 - Comparing search algorithms

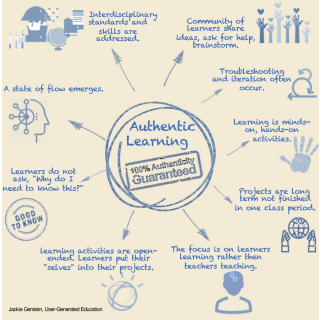
Designing and Developing Digital Outcomes

-*Progress Outcome 1*: In authentic contexts and taking account of end-users, students participate in teacher-led activities to develop, manipulate, store, retrieve and share digital content in order to meet technological challenges. In doing so, they identify digital devices and their purposes and understand that humans make them. They know how to use some applications, they can identify the inputs and outputs of a system, and they understand that digital devices store content, which can be retrieved later.

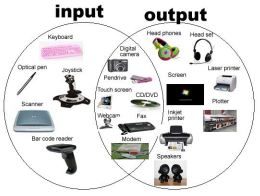
-*Progress Outcome 2*: In authentic contexts and taking account of end-users, students make decisions about creating, manipulating, storing, retrieving, share and testing digital content for a specific purpose, given particular parameters, tools and techniques. They understand that digital devices impact on humans and society and that both the devices and their impact change over time.
Students identify the specific role of components in a simple input-process-output system and how they work together and they recognise the "control role" that humans have in the system. They can select from an increasing range of applications and file types to develop outcomes for particular purposes.

-*Progress Outcome 3*: In authentic contexts, students follow a defined process to design, develop, store, test and evaluate digital content to address given contexts or issues taking into account immediate social, ethical and end-user considerations. They identify the key features of selected software and file types to develop and combine digital content.
Students understand the role of operating systems in managing digital devices, security and application software and are able to apply file management conventions using a range of storage devices. They understand that with storing data comes responsibility for ensuring security and privacy.

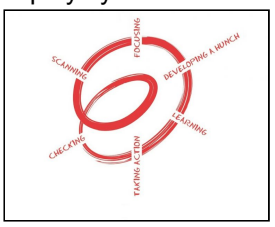
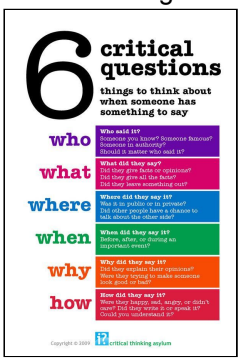
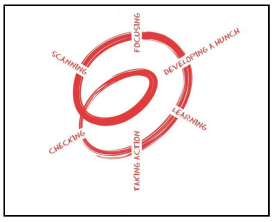
Focus	WALHT's	Deliberate Acts of Teaching	Resources

Authentic contexts		Where to start:
		• Real world problems
		  ○ Something that is relevant in class
		  ○ Something that is relevant to the community
		  ○ Something that is relevant to the country
		• Open-ended inquiry that class might be exploring
		• Student interest areas of exploration
		• Project based learning contexts
		
		-Apply what they are learning with a problem that is relevant to students
			

Develop, manipulate, store, retrieve and share digital content	WALHT understand the purpose of devices WALHT understand key terms	Explore differences between key words: manipulate, store, retrieve, share Highlight technology that might fall under each category and talk about the reasons why Name popular class/school technology that is currently used for each of those key terms Share examples of devices/software that	Computer skills pack Computer uses poster 

		can: Develop content Manipulate content Store content Retrieve content Share content Complete venn diagrams for comparisons on each part Share examples of current practice around each of them where possible	
Digital devices and their purposes	WALHT use a range of devices to develop digital content WALHT develop an understanding on a device purpose WALHT explain the purpose of a device WALHT be safe with devices WALHT share understandings of digital citizenship	Students are able to talk about their devices, why they are using them and the purpose Whole class brainstorm on a device and its purpose Labelled diagrams with information about their purpose and why students/teachers/users find them beneficial Venn diagrams comparing devices for purposes and activities at school Students building confidence over device choice and being able to explain why and its purpose --- Digital Citizenship/safety Unpacking key skills around being safe on devices Talking about device rules/safety tips Class create their own rules or guidelines when using devices to ensure they are being used for their purpose Complete activities that are linked to your class goals/rules/guidelines to enforce understanding of digital citizenship/safety	 Assistive technology Digital safety lesson pack Netsafe kit Teaching digital citizenship Be Internet Awesome
Inputs and Outputs	WALHT recognise and name input and output WALHT talk about the differences between input vs output WALHT explain how an input works WALHT explain how an output works	Discussions on Input vs Output What are the difference? What do they mean? Classroom or school search for different items that are input and output Categorise them Create display with pictures or explaining information for both Possible Responses Desktop: The following is a possible list of responses. • Inputs Keyboard, mouse, other buttons, camera, microphone • Outputs Screen, Speakers, Printer	 Input vs Output activity from Curriculum Code Input vs Output from Twinkl Input vs Output from Twinkl

		Possible Responses Laptop: The following is a list of responses. • Inputs: Camera, Microphone, USB port, trackpad, Wi-Fi, Bluetooth • Outputs: Screen, speakers, Wi-Fi, Bluetooth Possible Responses Smartphone: The following is a list of possible responses • Inputs: The following is a list of possible responses Touch screen, Buttons, Microphone, GPS, Motion sensor (e.g. to rotate the screen), Light sensor (e.g. to make screen dimmer at night), Camera, Stylus (on some phones), Internet connection • Outputs: The following is a list of possible responses Touch screen, Speakers, Headphones, Vibration, Internet connection, etc.	Input vs output worksheet  Input vs output kahoot!
Applications WALHT use a range of software to develop digital content WALHT share my learning WALHT share an idea or thought about my learning WALHT find a solution to a problem WALHT search for a solution through asking questions WALHT find a solution to my problem on social media WALHT use social media to help me communicate my ideas WALHT use social media to help me solve a problem WALHT work together on an idea WALHT publish our work using a	Specific applications with links to 4C's: **Communication** **-Seesaw**: Digital Journal >> Sharing work over the year, Seesaw blogs, purposeful learning experiences **-Twitter** >> Social media sharing in a safe setting (profile locked down), participating in a Twitter chat to learn from other students around the world; asking for ideas on a topic, asking for questions on a topic -**Google Forms** >> Gathering ideas and solutions to problems; sharing google forms to other classes/teachers/students/parents to get key ideas and feedback -**Google Sites** >> Create google sites to share key big projects or inquiry -**Parent knowledge** >> Upskill parents on using apps to interact and communicate their ideas back to their children; interacting on seesaw in communication **-Hapara** >> Using Hapara to share and communicate and share documents with children in class. Using workspace feature on Hapara to organise workflow, share rubrics, communicate learning outcomes and gather feedback. -**Google Classroom** >> Using Google Classroom to communicate and share documents with children in class. Using classroom feature to organise workflow, share rubrics, communicate learning outcomes and gather feedback. **-Skype** >> Communication tool for classrooms to	Twitter Seesaw Google Forms (in your google apps in google drive Google Sites Skype Google Apps for education Blogger Seesaw Google Sites Book Creator Padlet Youtube Quizzizz Hapara Mindmeister Key Competency Reflection Chart (all key competencies) Individual Key

form of digital media WALHT share our learning WALHT share my learning with others WALHT respond to learning experiences with others WALHT interact effectively to produce learning experiences --- WALHT think about my learning WALHT brainstorm key ideas, questions and thoughts WALHT add media to support my thinking WALHT use the inquiry cycle to explore my ideas or thoughts WALHT make reflections on my learning/work WALHT think about what I have worked on WALHT think about what I need to do next WALHT set goals for my future WALHT think critically about my learning WALHT respond to a key question to think critically about my work --- WALHT create a response for my learning WALHT be creative WALHT use media to share my ideas WALHT use		video or audio call and chat with other educators and students in NZ or around the world **-Hangouts** >> Using hangouts to video call and chat with different classes and students across the world. A mystery hangout is a great way to learn from other people in the world, fun and engaging activity	Competency Charts Writing Checklists 3 stars and a wish goal reflection Goal setting templates Inquiry cycle  Kahoot Padlet Critical Questions to help critical thinking  Quizzizz --- Google Apps for education Google Tour Builder Google Maps Google Sites Google Expeditions Inquiry cycle  Canva
	Collaboration	**-Google Apps** >> Interact, collaborate and publish with peers, buddies, experts or others from other classes Using a variety of digital environments and media - Google slides - Google docs - Google drawings - Google sites **-Apps** >> Interact, collaborate and publish work with peers, buddies, experts or others from other classes Using a variety of digital environments and media - Blogging - Seesaw - Book Creator - Padlet (app) - Youtube - Quizzizz **-Lessons** >> Activities that students can work on where they have opportunities to collaborate with each other digitally. This may be working on the initial stages of their work collaboratively, on the activity together or publishing in collaboration. **-Hapara** >> Teaching sharing templates, documents and online activities from Hapara **-Padlet** >> Collaborative mind mapping tool to gain ideas, gather ideas and create discussions. Whole class brainstorms, gathering ideas **-Mindmeister** >> Collaborative mind mapping tool to gain ideas, gather ideas and create discussions. Whole class brainstorms, gathering ideas	
	Critical Thinking	-**Mind mapping** >> Brainstorming key ideas, questions and thoughts they have about a theme or topic. Exploring the ways these can be steered in to explore more that link to those original ideas. Adding images, videos to support mind mapping - Knowledge recalling - Understanding - Analysing - creating **-Inquiry** >> Linking to mind mapping but around	

media to produce a result WALHT use different apps WALHT use different media to create WALHT build my knowledge of key apps to increase creativity		inquiry theme/idea Working through stages of inquiry -**Google Explore** >> Using Google Explore to find information to think critically about their ideas, thoughts or inquiry -**Reflection activities** >> Using google docs, reflection templates to think about their learning, describe progress in class and comment on learning. Charts, anchor charts, reflection templates to share progress and reflect Buddy checking on work or collaboration to think about progress, where to next Responding to feedback on Seesaw - using comments to add more ideas to their work after reflection **-Discussions** >> Use discussion forums or sharing to answer questions that require students to use lower-level and higher-level critical thinking Teachers can probe debate questions and children find/source information to support their answers - Kahoot quizzes - Google Forms - Padlet discussions - Quizzizz Some key critical thinking questions: ● Basic = What are the facts? Who? What? WHere? When? How? ● Understanding: What do you know about the facts? Can you explain….? Describe what….? What it mean ….? Give an example….? ● Apply: How do the facts affect you? How would you solve…? What would result if….? How would you use….? ● Analyze: What is the relationship between the facts? Why do you think….? What motive is there…..? What can you conclude….? ● Evaluate: Do you agree or disagree with the facts? Would it be better if…..? Why do you think about…..? What would you recommend…? ● Create: How could you create/improve the facts? What would it be like if……? Can you elaborate on the reason….? What would happen if…..?	Poster my wall Green Screen Ipad Pic Collage Imovie Photo booth app on macbook Powtoon Thinglink Toonytoo Stop motion Green screening
	Creativity	**-Google Apps** >> Using a variety of digital environments and media to create responses to activities on google - Google slides - Google docs - Google drawings - Google sites	

- Google maps
- Google Tour Builder
- Google Expeditions

-Inquiry >> Using and applying existing knowledge to generate new ideas, products or processes.
Researching ideas on google to then communicate further and create responses to share findings

-Creating >>
Creating responses to share ideas in posters, anchor charts or wall decorations

- Poster my wall
- Google Slides
- Google Drawings
- Canva
- Seesaw drawings

Creating digital responses in videos, pictures, augmented reality

- Imovie
- Photo booth (on mac)
- Pic collage
- Green Screen
- Youtube
- Powtoon
- Thinglink
- ToonyTool
- Google Story Builder
- AR/VR responses
- Quiver
- Stop Motion
- Green screening

Gamification creation

- Kahoot!
- GoNoodle
- Prodigy
- Classcraft
- ClassDojo

Flipped Learning

- Google Sites for flipped learning

Specific Models and Examples from NZ Curriculum

Progress Outcome 1	**Progress Outcome 2**	**Progress Outcome 3**
Exemplar 1 - Vacuum cleaners	Exemplar 5 - Video of a system	Exemplar 9 - Reflecting on a game design
Exemplar 2 - Turning on the TV	Exemplar 6 - Scavenger hunt	Exemplar 10 - Our changing digital society
Exemplar 3 - Animating a song	Exemplar 7 - Superhero robot	Exemplar 11 - Designing a logo and business card
Exemplar 4 - Bottle-cap music	Exemplar 8 - Digital Debate	Exemplar 12 - Designing a road safety game

Adaptations for Learners			
CWSA learner needs & abilities	CWSN learner needs & abilities	ESOL learner needs & abilities	Maori learner needs & abilities Pasifika learner needs & abilities
Talking about the next step in their learning (self assessment) Working on next learning steps Becoming self aware of their actions Being a buddy learner Helping others complete their activities	Buddy up with a more able student to assist when needed Use of visuals to follow Explanations Exemplars Modelling explicitly More teacher directed sessions Smaller group work Buddy interactions	Use of visuals to help with explanations Images Conversing with a buddy in native language to help translate to english	Inclusion of aspects of maori cultural events Meeting the needs of these learners Inclusion of aspects of pasifika cultural events Meeting the needs of these learners