Foreword

This document serves as a guideline only. Teachers are encouraged to explore Project lesson plans, platform content and learning journals themselves to figure out how to integrate each Project into their curriculum units. Although Projects offer a complete experience with their own self-contained content, we recommend that teachers look for areas where they can incorporate additional content that makes use of their own unique experience, knowledge and classroom learning objectives. If your curriculum is not yet included in one of these documents, that does not mean that this Project will not be suitable for your class. We recommend all teachers explore the Project content themselves before deciding how to integrate it into their curriculum as they know the requirements of their students and the topics they will find engaging better than anyone.

Table Key

The contents of this Project are well suited to delivering this aspect of the curriculum. As a teacher, you are free to skip over or de-emphasise content if this part of the curriculum is not something that you want to focus on.	**The contents of this Project can deliver part of this aspect of the curriculum.** This Project may require additional activities or discussions from the teacher to highlight key concepts of this aspect of the curriculum.	**The contents of this Project do not explicitly cover this aspect of the curriculum.** You can still use the simulations as a base for delivering your own content if you want to incorporate this aspect of the curriculum into the Project.

New Zealand

Technology Achievement Objectives & Progress Outcomes for levels 1 - 5

Achievement objectives (tasks)						
		Level 1	Level 2	Level 3	Level 4	Level 5
Technological practice	**Planning for practice**	Outline a general plan to support the development of an outcome, identifying appropriate steps and resources.	Develop a plan that identifies the key stages and the resources required to complete an outcome.	Undertake planning to identify the key stages and resources required to develop an outcome. Revisit planning to include reviews of progress and identify implications for subsequent decision making.	Undertake planning that includes reviewing the effectiveness of past actions and resourcing, exploring implications for future actions and accessing of resources, and consideration of stakeholder feedback, to enable the development of an outcome.	Analyse their own and others' planning practices to inform the selection and use of planning tools. Use these to support and justify planning decisions (including those relating to the management of resources) that will see the development of an outcome through to completion.
	Brief development	Describe the outcome they are developing and identify the attributes it should have, taking account of the need or opportunity and the resources available.	Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available.	Describe the nature of an intended outcome, explaining how it addresses the need or opportunity. Describe the key attributes that enable development and evaluation of an outcome.	Justify the nature of an intended outcome in relation to the need or opportunity. Describe the key attributes identified in stakeholder feedback, which will inform the development of an outcome and its evaluation.	Justify the nature of an intended outcome in relation to the need or opportunity. Describe specifications that reflect key stakeholder feedback and that will inform the development of an outcome and its evaluation.

	Outcome development and evaluation	Investigate a context to communicate potential outcomes. Evaluate these against attributes; select and develop an outcome in keeping with the identified attributes.	Investigate a context to develop ideas for potential outcomes. Evaluate these against the identified attributes, select, and develop an outcome. Evaluate the outcome in terms of the need or opportunity.	Investigate a context to develop ideas for potential outcomes. Trial and evaluate these against key attributes to select and develop an outcome to address the need or opportunity. Evaluate this outcome against the key attributes and how it addresses the need or opportunity.	Investigate a context to develop ideas for feasible outcomes. Undertake functional modelling that takes account of stakeholder feedback in order to select and develop the outcome that best addresses the key attributes. Incorporating stakeholder feedback, evaluate the outcome's fitness for purpose in terms of how well it addresses the need or opportunity	Analyse their own and others' outcomes to inform the development of ideas for feasible outcomes. Undertake ongoing functional modelling and evaluation that takes account of key stakeholder feedback and trialling in the physical and social environments. Use the information gained to select and develop the outcome that best addresses the specifications. Evaluate the final outcome's fitness for purpose against the brief.
Technological knowledge	**Technological modelling**	Understand that functional models are used to represent reality and test design concepts and that prototypes are used to test technological outcomes.	Understand that functional models are used to explore, test, and evaluate design concepts for potential outcomes and that prototyping is used to test a technological outcome for fitness of purpose.	Understand that different forms of functional modelling are used to inform decision making in the development of technological possibilities and that prototypes can be used to evaluate the fitness of technological outcomes for further development.	Understand how different forms of functional modelling are used to explore possibilities and to justify decision making and how prototyping can be used to justify refinement of technological outcomes.	Understand how evidence, reasoning, and decision making in functional modelling contribute to the development of design concepts and how prototyping can be used to justify ongoing refinement of outcomes.
	Technological	Understand that	Understand that there	Understand the	Understand that	Understand how

	products	technological products are made from materials that have performance properties.	is a relationship between a material used and its performance properties in a technological product.	relationship between the materials used and their performance properties in technological products.	materials can be formed, manipulated, and/or transformed to enhance the fitness for the purpose of a technological product.	materials are selected, based on desired performance criteria.
	Technological systems	Understand that technological systems have inputs, controlled transformations, and outputs.	Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems	Understand that technological systems are represented by symbolic language tools and understand the role played by the "black box" in technological systems.	Understand how technological systems employ control to allow for the transformation of inputs to outputs.	Understand the properties of subsystems within technological systems.
Nature of technology	Characteristics of technology	Understand that technology is purposeful intervention through design.	Understand that technology both reflects and changes society and the environment and increases people's capability.	Understand how society and environments impact on and are influenced by technology in historical and contemporary contexts and that technological knowledge is validated by successful function.	Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines.	Understand how people's perceptions and acceptance of technology impact on technological developments and how and why technological knowledge becomes codified.
	Characteristics of technological outcomes	Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.	Understand that technological outcomes are developed through technological practice and have related physical and functional natures.	Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.	Understand that technological outcomes can be interpreted in terms of how they might be used and by whom and that each has a proper function as well as possible alternative functions.	Understand that technological outcomes are fit for purpose in terms of time and context. Understand the concept of malfunction and how "failure" can inform future outcomes.

Progress outcomes (assessment)						
	Level 1	Level 2	Level 3	Level 4	Level 5	
Computational thinking for digital technologies	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).	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.		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).	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 programs 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.	In authentic contexts and taking account of end users, students independently decompose problems into algorithms. They use these algorithms to create programs with inputs, outputs, sequence, selection using comparative and logical operators and variables of different data types, and iteration. They determine when to use different types of control structures. Students document their programs, using an organised approach for testing and debugging.

			Students understand that digital devices store data using just two states represented by binary digits (bits).	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.	Students understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.
Designing and developing digital technologies	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.		In authentic contexts and taking account of end-users, students make decisions about creating, manipulating, storing, retrieving, sharing 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.	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 choose the most appropriate software and file types to develop and combine digital content.	
			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	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	

		system. They can select from an increasing range of applications and file types to develop outcomes for particular purposes.	understand that with storing data comes responsibility for ensuring security and privacy.