iworld™

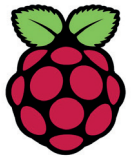
THE LEADERS IN STEM EDUCATIONAL PRODUCTS

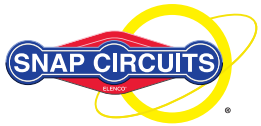
NEW ZEALAND STEAM PRODUCT CURRICULUM MAP

be a maker STEAM

science technology engineering art mathematics

BRANDS ALIGNED TO THE NEW ZEALAND CURRICULUM





NEW ZEALAND STEAM PRODUCT CURRICULUM MAP

be a maker STEAM

science technology engineering art mathematics

CURRICULUM ALIGNMENT SNAP SHOT NEW ZEALND

STEAM PRODUCT	TECHNOLOGY		MATHEMATICS	SCIENCE	SOCIAL SCIENCE
	DIGITAL TECHNILOGIES PO'	TECHNOLOGY AO'S			
3 DOODLER	FALSE	TRUE	TRUE	TRUE	FALSE
3 DUX DESIGN	FALSE	TRUE	TRUE	FALSE	FALSE
CIRCUIT SCRIBE	TRUE	TRUE	FALSE	TRUE	FALSE
CURSICOPE	FALSE	FALSE	FALSE	TRUE	FALSE
INTELINO	TRUE	TRUE	TRUE	TRUE	FALSE
KANO	TRUE	TRUE	TRUE	TRUE	FALSE
LITTLE BITS	TRUE	TRUE	FALSE	TRUE	FALSE
MAKEY MAKEY	TRUE	TRUE	FALSE	TRUE	FALSE
MERGE VR/AR	TRUE	TRUE	TRUE	TRUE	TRUE
MICROBITS	TRUE	TRUE	FALSE	TRUE	FALSE
OZOBOT	TRUE	TRUE	TRUE	TRUE	FALSE
PRIMO - CUBETTO	TRUE	TRUE	TRUE	TRUE	FALSE
RASPBERRY PI	TRUE	TRUE	FALSE	FALSE	FALSE
ROBOBLOQ	TRUE	TRUE	TRUE	TRUE	FALSE
SMARTIVITY	FALSE	FALSE	TRUE	TRUE	FALSE
SNAP CIRCUIT	FALSE	TRUE	FALSE	TRUE	FALSE
STRAWBEES	TRUE	TRUE	TRUE	TRUE	FALSE

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CURRICULUM LEVEL ALIGNMENT NEW ZEALND

STEAM PRODUCT	1	2	3	4	5	6	7	8
3 DOODLER	FALSE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE
3 DUX DESIGN	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE
CIRCUIT SCRIBE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE
CURSICOPE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE
INTELINO	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE
KANO	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
LITTLE BITS	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
MAKEY MAKEY	FALSE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE
MERGE VR/AR	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
MICROBITS	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
OZOBOT	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE
PRIMO - CUBETTO	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE	FALSE
RASPBERRY PI	FALSE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE
ROBOBLOQ	TRUE	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE
SMARTIVITY	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE
SNAP CIRCUIT	FALSE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE	FALSE
STRAWBEES	TRUE	TRUE	TRUE	TRUE	TRUE	FALSE	FALSE	FALSE

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NEW ZEALND STEAM RESOURCES CATALOGUE

CONTENTS

3Doodler	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1						
Level 2			Planning for practice Develop a plan that identifies the key stages and the resources required to complete an outcome. Brief development Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. Outcome development and evaluation 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. Technological modelling 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. Technological products Understand that there is a relationship between a material used and its performance properties in a technological product.	Shape Sort objects by their spatial features, with justification. Identify and describe the plane shapes found in objects.	Properties and changes of matter Observe, describe, and compare physical and chemical properties of common materials and changes that occur when materials are mixed, heated, or cooled. Chemistry and society Find out about the uses of common materials and relate these to their observed properties.	
Level 3			Planning for practice 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. Brief development 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. Outcome development and evaluation 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. Technological products Understand the relationship between the materials used and their performance properties in technological products. Characteristics of technological outcomes Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.	Shape Classify plane shapes and prisms by their spatial features. Represent objects with drawings and models.	Properties and changes of matter Group materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials. Compare chemical and physical changes. Chemistry and society Relate the observed, characteristic chemical and physical properties of a range of different materials to technological uses and natural processes.	
Level 4			Technological modelling 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. Technological products Understand that materials can be formed, manipulated, and/or transformed to enhance the fitness for purpose of a technological product.	Measurement Use side or edge lengths to find the perimeters and areas of rectangles, parallelograms, and triangles and the volumes of cuboids. Shape Identify classes of two- and three-dimensional shapes by their geometric properties. Relate three-dimensional models to two-dimensional representations, and vice versa.		

3Dux Design	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1			**Planning for practice** Outline a general plan to support the development of an outcome, identifying appropriate steps and resources. **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. **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. **Technological modelling** Understand that functional models are used to represent reality and test design concepts and that prototypes are used to test technological outcomes. **Technological products** Understand that technological products are made from materials that have performance properties. **Characteristics of technology** Understand that technology is purposeful intervention through design. **Characteristics of technological outcomes** Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.	**Measurement** Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. **Shape** Sort objects by their appearance.		
Level 2			**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are developed through technological practice and have related physical and functional natures.	**Measurement** Create and use appropriate units and devices to measure length, area, volume and capacity, weight (mass), turn (angle), temperature, and time. **Shape** Sort objects by their spatial features, with justification. Identify and describe the plane shapes found in objects.		
Level 3			**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological products** Understand the relationship between the materials used and their performance properties in technological products. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.	**Measurement** Find areas of rectangles and volumes of cuboids by applying multiplication. **Shape** Classify plane shapes and prisms by their spatial features. Represent objects with drawings and models.		
Level 4				**Measurement** Use side or edge lengths to find the perimeters and areas of rectangles, parallelograms, and triangles and the volumes of cuboids. **Shape** Identify classes of two- and three-dimensional shapes by their geometric properties. Relate three-dimensional models to two-dimensional representations, and vice versa.		

Circuit Scribe	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1	**P01** - 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).				**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. **Chemistry and society** Find out about the uses of common materials and relate these to their observed properties.	
Level 2			**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product.			
Level 3	**P02** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological products** Understand the relationship between the materials used and their performance properties in technological products. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures."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.	
Level 4			**Technological modelling** 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. **Technological products** Understand that materials can be formed, manipulated, and/or transformed to enhance the fitness for purpose of a technological product.		**Brief development** 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** 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 modelling** 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.	

Curioscope	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1					**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Life processes** Recognise that all living things have certain requirements so they can stay alive.	
Level 2						
Level 3					**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Communicating in science** Begin to use a range of scientific symbols, conventions, and vocabulary. Engage with a range of science texts and begin to question the purposes for which these texts are constructed. **Life processes** Recognise that there are life processes common to all living things and that these occur in different ways.	
Level 4					Understanding about science Appreciate that science is a way of explaining the world and that science knowledge changes over time. **Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Life processes** Recognise that there are life processes common to all living things and that these occur in different ways.	
Level 5					**Life processes** Identify the key structural features and functions involved in the life processes of plants and animals. Describe the organisation of life at the cellular level.	
Level 6					**Life processes** Relate key structural features and functions to the life processes of plants, animals, and micro-organisms and investigate environmental factors that affect these processes.	

Intelino	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1	**PO1** 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).	**PO1** 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.	**Planning for practice** Outline a general plan to support the development of an outcome, identifying appropriate steps and resources. **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. **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. **Technological products** Understand that technological products are made from materials that have performance properties. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs.	**Number strategies** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **Measurement** Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. **Shape** Sort objects by their appearance. **Position and orientation** • Give and follow instructions for movement that involve distances, directions, and half or quarter turns. • Describe their position relative to a person or object. **Statistical investigation** Conduct investigations using the statistical enquiry cycle: • posing and answering questions • gathering, sorting and counting, and displaying category data • discussing the results. **Probability** Investigate situations that involve elements of chance, acknowledging and anticipating possible outcomes.	**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Participating and contributing** Explore and act on issues and questions that link their science learning to their daily living. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.	
Level 2			**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems.	**Measurement** Create and use appropriate units and devices to measure length, area, volume and capacity, weight (mass), turn (angle), temperature, and time. **Shape** Sort objects by their spatial features, with justification. **Position and orientation** • Create and use simple maps to show position and direction. • Describe different views and pathways from locations on a map. **Statistical investigation** Conduct investigations using the statistical enquiry cycle: • posing and answering questions • gathering, sorting, and displaying category and whole-number data • communicating findings based on the data. **Probability** Investigate simple situations that involve elements of chance, recognising equal and different likelihoods and acknowledging uncertainty.		
Level 3	**PO2** 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.	**PO2** 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. 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.		**Measurement** Use linear scales and whole numbers of metric units for length, area, volume and capacity, weight (mass), angle, temperature, and time. **Position and orientation** Use a co-ordinate system or the language of direction and distance to specify locations and describe paths. **Statistical investigation** Conduct investigations using the statistical enquiry cycle: • gathering, sorting, and displaying multivariate category and whole-number data and simple time-series data to answer questions • identifying patterns and trends in context, within and between data sets • communicating findings, using data displays. **Probability** Investigate simple situations that involve elements of chance by comparing experimental results with expectations from models of all the outcomes, acknowledging that samples vary.	**Understanding about science** Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** • Build on prior experiences, working together to share and examine their own and others' knowledge. • Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations. **Participating and contributing** Explore various aspects of an issue and make decisions about possible actions.	
Level 4	**PO3** 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).		**Planning for practice** 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. **Technological systems** Understand how technological systems employ control to allow for the transformation of inputs to outputs.	**Measurement** • Use appropriate scales, devices, and metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time. • Interpret and use scales, timetables, and charts. **Position and orientation** Communicate and interpret locations and directions, using compass directions, distances, and grid references. **Statistical investigation** Plan and conduct investigations using the statistical enquiry cycle: • determining appropriate variables and data collection methods • gathering, sorting, and displaying multivariate category, measurement, and time-series data to detect patterns, variations, relationships, and trends • comparing distributions visually • communicating findings, using appropriate displays. **Probability** • Investigate situations that involve elements of chance by comparing experimental distributions with expectations from models of the possible outcomes, acknowledging variation and independence. •Use simple fractions and percentages to describe probabilities.	**Understanding about science** Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** • Build on prior experiences, working together to share and examine their own and others' knowledge. • Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Participating and contributing** Explore various aspects of an issue and make decisions about possible actions. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	

Level 5	**P04** In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. **P05** 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.			**Measurement** Select and use appropriate metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time, with awareness that measurements are approximate. **Probability** • Compare and describe the variation between theoretical and experimental distributions in situations that involve elements of chance. • Calculate probabilities, using fractions, percentages, and ratios.	**Understanding about science** Understand that scientists' investigations are informed by current scientific theories and aim to collect evidence that will be interpreted through processes of logical argument. **Physical inquiry and physics concepts** Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe energy changes and conservation of energy, simple electrical circuits, and the effect of contact and non-contact on the motion of objects. **Using physics** Explore a technological or biological application of physics.	
Level 6	**P06** In authentic contexts and taking account of end-users, students determine and compare the "cost" (computational complexity) of two iterative algorithms for the same problem size. They understand the concept of compression coding for different media types, its typical uses, and how it enables widely used technologies to function. Students use an iterative process to design, develop, document and test basic computer programs. They apply design principles and usability heuristics to their own designs and evaluate user interfaces in terms of them.			**Probability** Investigate situations that involve elements of chance: • comparing discrete theoretical distributions and experimental distributions, appreciating the role of sample size • calculating probabilities in discrete situations.	**Understanding about science** Understand that scientists' investigations are informed by current scientific theories and aim to collect evidence that will be interpreted through processes of logical argument. **Physical inquiry and physics concepts** • Investigate trends and relationships in physical phenomena (in the areas of mechanics, electricity, electromagnetism, heat, light and waves, and atomic and nuclear physics). • Demonstrate an understanding of physical phenomena and concepts by explaining and solving questions and problems that relate to straightforward situations. **Using physics** Investigate how physics knowledge is used in a technological or biological application.	
Level 7				**Probability** Investigate situations that involve elements of chance: • comparing theoretical continuous distributions, such as the normal distribution, with experimental distributions • calculating probabilities, using such tools as two-way tables, tree diagrams, simulations, and technology.		

Kano	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1						
Level 2		**PO1** -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.	**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs. **Characteristics of technology** Understand that technology is purposeful intervention through design. **Characteristics of technological outcomes** Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.	**Shape** Sort objects by their spatial features, with justification. Identify and describe the plane shapes found in objects.	**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.	
Level 3	**PO2** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.	**Shape** Classify plane shapes and prisms by their spatial features. Represent objects with drawings and models.	**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	

Kano	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 4	**PO3** - 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).	**PO2** - 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. 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.	**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that materials can be formed, manipulated, and/or transformed to enhance the fitness for purpose of a technological product. **Technological systems** Understand how technological systems employ control to allow for the transformation of inputs to outputs. **Characteristics of technology** Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines. **Characteristics of technological outcomes** 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.	**Shape** Identify classes of two- and three-dimensional shapes by their geometric properties. Relate three-dimensional models to two-dimensional representations, and vice versa.	**Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 5	**PO4** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. PO5 - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.	**PO3** - 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 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.	**Planning for practice** 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** 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** 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 modelling** 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 systems** Understand the properties of subsystems within technological systems. **Characteristics of technology** 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 fit for purpose in terms of time and context. Understand the concept of malfunction and how "failure" can inform future outcomes.	**Shape** Deduce the angle properties of intersecting and parallel lines and the angle properties of polygons and apply these properties. Create accurate nets for simple polyhedra and connect three-dimensional solids with different two-dimensional representations.		
Level 6	**PO6** - In authentic contexts and taking account of end-users, students determine and compare the "cost" (computational complexity) of two iterative algorithms for the same problem size. They understand the concept of compression coding for different media types, its typical uses, and how it enables widely used technologies to function. Students use an iterative process to design, develop, document and test basic computer programs. They apply design principles and usability heuristics to their own designs and evaluate user interfaces in terms of them.	**PO4** - In authentic contexts, students investigate and consider possible solutions for a given context or issue. With support, they use an iterative process to design, develop, store and test digital outcomes, identifying and evaluating relevant social, ethical and end-user considerations. They use information from testing and apply appropriate tools, techniques, procedures and protocols to improve the quality of the outcomes and to ensure they are fit-for-purpose and meet end-user requirements.				

Kano	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 7	**P07** - In authentic contexts and taking account of end-users, students analyse concepts in digital technologies (for example, information systems, encryption, error control, complexity and tractability, autonomous control) by explaining the relevant mechanisms that underpin them, how they are used in real world applications, and the key problems or issues related to them. Students discuss the purpose of a selection of data structures and evaluate their use in terms of trade-offs between performance and storage requirements and their suitability for different algorithms. They use an iterative process to design, develop, document and test advanced computer programs.	**P05** - In authentic contexts and with support, students investigate a specialised digital technologies area (for example, digital media, digital information, electronic environments, user experience design, digital systems) and propose possible solutions to issues they identify. They independently apply an iterative process to design, develop, store and test digital outcomes that enable their solutions, identifying, evaluating, prioritising and responding to relevant social, ethical and end-user considerations. They use information from testing and, with increasing confidence, optimise tools, techniques, procedures and protocols to improve the quality of the outcomes. They apply evaluative processes to ensure the outcomes are fit-for-purpose and meet end-user requirements.				
Level 8	**P08** - In authentic contexts and taking account of end-users, students evaluate concepts in digital technologies (for example, formal languages, network communication protocols, artificial intelligence, graphics and visual computing, big data, social algorithms) in relation to how key mechanisms underpin them and how they are applied in different scenarios when developing real world applications. Students understand accepted software engineering methodologies and user experience design processes and apply their key concepts to design, develop, document and test complex computer programs.	**P06** - In authentic contexts, students independently investigate a specialised digital technologies area and propose possible solutions to issues they identify. They work independently or within collaborative, cross-functional teams to apply an iterative development process to plan, design, develop, test and create quality, fit-for-purpose digital outcomes that enable their solutions, synthesising relevant social, ethical and end-user considerations as they develop digital content. Students integrate in the outcomes they develop specialised knowledge of digital applications and systems from a range of areas, including: network architecture; complex electronics environments and embedded systems; interrelated computing devices, hardware and applications; digital information systems; user experience design; complex management of digital information; and creative digital media.				

Little Bits	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1						
Level 2	**PO1** - 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.	**PO1** - 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.	**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are developed through technological practice and have related physical and functional natures.		**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. Seek and describe simple patterns in physical phenomena.	
Level 3	**PO2** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand the relationship between the materials used and their performance properties in technological products. **Technological systems** Understand that technological systems are represented by symbolic language tools and understand the role played by the "black box" in technological systems. **Characteristics of technology** 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. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.		**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Communicating in science** Begin to use a range of scientific symbols, conventions, and vocabulary. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	

Little Bits	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 4	**P03** - 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).	**P02** - 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. 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.	**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that materials can be formed, manipulated, and/or transformed to enhance the fitness for purpose of a technological product. **Technological systems** Understand how technological systems employ control to allow for the transformation of inputs to outputs. **Characteristics of technology** Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines. **Characteristics of technological outcomes** 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.		**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Communicating in science** Begin to use a range of scientific symbols, conventions, and vocabulary. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 5	**P04** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. nary digits, and they develop programs considering human-computer interaction (HCI) heuristics. P05 - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.	**P03** - 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 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.	**Planning for practice** 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** 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** 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 modelling** 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 products** Understand how materials are selected, based on desired performance criteria. **Characteristics of technological outcomes** 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.		**Understanding about science** Understand that scientists' investigations are informed by current scientific theories and aim to collect evidence that will be interpreted through processes of logical argument. **Investigating in science** Develop and carry out more complex investigations, including using models. Show an increasing awareness of the complexity of working scientifically, including recognition of multiple variables. **Communicating in science** Use a wider range of science vocabulary, symbols, and conventions. **Physical inquiry and physics concepts** Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe energy changes and conservation of energy, simple electrical circuits, and the effect of contact and non-contact on the motion of objects.	

Little Bits	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 6		**PO4** - In authentic contexts, students investigate and consider possible solutions for a given context or issue. With support, they use an iterative process to design, develop, store and test digital outcomes, identifying and evaluating relevant social, ethical and end-user considerations. They use information from testing and apply appropriate tools, techniques, procedures and protocols to improve the quality of the outcomes and to ensure they are fit-for-purpose and meet end-user requirements.	**Planning for practice** Critically analyse their own and others' past and current planning practices in order to make informed selection and effective use of planning tools. Use these to support and justify ongoing planning that will see the development of an outcome through to completion. **Brief development** Justify the nature of an intended outcome in relation to the need or opportunity and justify specifications in terms of key stakeholder feedback and wider community considerations. **Outcome development and evaluation** Critically analyse their own and others' outcomes to inform the development of ideas for feasible outcomes. Undertake ongoing experimentation and functional modelling, taking account of stakeholder feedback and trialling in the physical and social environments. Use the information gained to select, justify, and develop a final outcome. Evaluate this outcome's fitness for purpose against the brief and justify the evaluation, using feedback from stakeholders. **Technological systems** Understand the implications of subsystems for the design, development, and maintenance of technological systems. **Characteristics of technology** Understand the interdisciplinary nature of technology and the implications of this for maximising possibilities through collaborative practice.		**Understanding about science** Understand that scientists' investigations are informed by current scientific theories and aim to collect evidence that will be interpreted through processes of logical argument. **Investigating in science** Develop and carry out more complex investigations, including using models. **Communicating in science** Use a wider range of science vocabulary, symbols, and conventions. **Physical inquiry and physics concepts** Investigate trends and relationships in physical phenomena (in the areas of mechanics, electricity, electromagnetism, heat, light and waves, and atomic and nuclear physics).	
Level 7		**PO5** - In authentic contexts and with support, students investigate a specialised digital technologies area (for example, digital media, digital information, electronic environments, user experience design, digital systems) and propose possible solutions to issues they identify. They independently apply an iterative process to design, develop, store and test digital outcomes that enable their solutions, identifying, evaluating, prioritising and responding to relevant social, ethical and end-user considerations. They use information from testing and, with increasing confidence, optimise tools, techniques, procedures and protocols to improve the quality of the outcomes. They apply evaluative processes to ensure the outcomes are fit-for-purpose and meet end-user requirements.	**Outcome development and evaluation** Critically analyse their own and others' outcomes and evaluative practices to inform the development of ideas for feasible outcomes. Undertake a critical evaluation that is informed by ongoing experimentation and functional modelling, stakeholder feedback, and trialling in the physical and social environments. Use the information gained to select, justify, and develop an outcome. Evaluate this outcome's fitness for purpose against the brief. Justify the evaluation, using feedback from stakeholders and demonstrating a critical understanding of the issue. **Characteristics of technological outcomes** Understand that technological outcomes are a resolution of form and function priorities and that malfunction affects how people view and accept outcomes.		**Investigating in science** Develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models. **Communicating in science** Use accepted science knowledge, vocabulary, symbols, and conventions when evaluating accounts of the natural world and consider the wider implications of the methods of communication and/or representation employed. **Physical inquiry and physics concepts** Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of unfamiliar situations. Analyse data to deduce complex trends and relationships in physical phenomena.	
Level 8		**PO6** - In authentic contexts, students independently investigate a specialised digital technologies area and propose possible solutions to issues they identify. They work independently or within collaborative, cross-functional teams to apply an iterative development process to plan, design, develop, test and create quality, fit-for-purpose digital outcomes that enable their solutions, synthesising relevant social, ethical and end-user considerations as they develop digital content. Students integrate in the outcomes they develop specialised knowledge of digital applications and systems from a range of areas, including: network architecture; complex electronics environments and embedded systems; interrelated computing devices, hardware and applications; digital information systems; user experience design; complex management of digital information; and creative digital media.			**Investigating in science** Develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models. **Communicating in science** Use accepted science knowledge, vocabulary, symbols, and conventions when evaluating accounts of the natural world and consider the wider implications of the methods of communication and/or representation employed. **Physical inquiry and physics concepts** Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of complex situations. Analyse and evaluate data to deduce complex trends and relationships in physical phenomena.	

Makey Makey	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1						
Level 2			**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology is purposeful intervention through design. **Characteristics of technological outcomes** Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.		**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. **Chemistry and society** Find out about the uses of common materials and relate these to their observed properties.	
Level 3	**P02** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures."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.		**Investigating in science** Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations. **Properties and changes of matter** Group materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials.	

Makey Makey	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 4	**PO3** - 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).	**PO2** - 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. 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.	**Brief development** 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** 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 modelling** 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.		**Investigating in science** Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations. **Properties and changes of matter** Group materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials.	
Level 5	**PO4** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. **PO5** - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.				**Physical inquiry and physics concepts** Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe energy changes and conservation of energy, simple electrical circuits, and the effect of contact and non-contact on the motion of objects.	

Merge	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1			**Technological modelling** Understand that functional models are used to represent reality and test design concepts and that prototypes are used to test technological outcomes. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs.	Position and orientation Give and follow instructions for movement that involve distances, directions, and half or quarter turns. Describe their position relative to a person or object.	**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Life processes** Recognise that all living things have certain requirements so they can stay alive. **Ecology** Recognise that living things are suited to their particular habitat. **Evolution** Recognise that there are lots of different living things in the world and that they can be grouped in different ways. Explain how we know that some living things from the past are now extinct. **Earth systems** Explore and describe natural features and resources. **Interacting systems** Describe how natural features are changed and resources affected by natural events and human actions. **Astronomical systems** Share ideas and observations about the Sun and the Moon and their physical effects on the heat and light available to Earth. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. Seek and describe simple patterns in physical phenomena. **Properties and changes of matter** Observe, describe, and compare physical and chemical properties of common materials and changes that occur when materials are mixed, heated, or cooled. **Chemistry and society** Find out about the uses of common materials and relate these to their observed properties.	
Level 2		**PO1** -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.	**Technological modelling** 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. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems.			
Level 3			**Technological modelling** 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. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability.		**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Communicating in science** Begin to use a range of scientific symbols, conventions, and vocabulary. Engage with a range of science texts and begin to question the purposes for which these texts are constructed. **Life processes** Recognise that there are life processes common to all living things and that these occur in different ways. **Ecology** Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced. **Evolution** Begin to group plants, animals, and other living things into science-based classifications. Explore how the groups of living things we have in the world have changed over long periods of time and appreciate that some living things in New Zealand are quite different from living things in other areas of the world. **Earth systems** Appreciate that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources. **Interacting systems** Investigate the water cycle and its effect on climate, landforms, and life. **Astronomical systems** Investigate the components of the solar system, developing an appreciation of the distances between them. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations. **Properties and changes of matter** Group materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials. Compare chemical and physical changes. **Chemistry and society** Relate the observed, characteristic chemical and physical properties of a range of different materials to technological uses and natural processes.	

Merge	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 4		**PO2** - 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. 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.	**Technological modelling** 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. **Characteristics of technology** Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines.		**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Communicating in science** Begin to use a range of scientific symbols, conventions, and vocabulary. Engage with a range of science texts and begin to question the purposes for which these texts are constructed. **Life processes** Recognise that there are life processes common to all living things and that these occur in different ways. **Ecology** Explain how living things are suited to their particular habitat and how they respond to environmental changes, both natural and human-induced. **Evolution** Begin to group plants, animals, and other living things into science-based classifications. Explore how the groups of living things we have in the world have changed over long periods of time and appreciate that some living things in New Zealand are quite different from living things in other areas of the world. **Earth systems** Develop an understanding that water, air, rocks and soil, and life forms make up our planet and recognise that these are also Earth's resources. Interacting systems Investigate the water cycle and its effect on climate, landforms, and life. **Astronomical systems** Investigate the components of the solar system, developing an appreciation of the distances between them. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	Understand how exploration and innovation create opportunities and challenges for people, places, and environments. Understand that events have causes and effects.
Level 5	**PO4** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. **PO5** - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.	**PO3** - 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 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.	**Technological modelling** 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.		**Investigating in science** Develop and carry out more complex investigations, including using models. Show an increasing awareness of the complexity of working scientifically, including recognition of multiple variables. Begin to evaluate the suitability of the investigative methods chosen. **Communicating in science** Use a wider range of science vocabulary, symbols, and conventions. Apply their understandings of science to evaluate both popular and scientific texts (including visual and numerical literacy). **Life processes** Identify the key structural features and functions involved in the life processes of plants and animals. Describe the organisation of life at the cellular level. **Ecology** Investigate the interdependence of living things (including humans) in an ecosystem. **Evolution** Describe the basic processes by which genetic information is passed from one generation to the next. **Earth systems** Investigate the composition, structure, and features of the geosphere, hydrosphere, and atmosphere. Interacting systems Investigate how heat from the Sun, the Earth, and human activities is distributed around Earth by the geosphere, hydrosphere, and atmosphere. **Astronomical systems** Investigate the conditions on the planets and their moons, and the factors affecting them. **Physical inquiry and physics concepts** Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe energy changes and conservation of energy, simple electrical circuits, and the effect of contact and non-contact on the motion of objects.	Understand how people's management of resources impacts on environmental and social sustainability. Understand how the ideas and actions of people in the past have had a significant impact on people's lives.
Level 6					**Investigating in science** Develop and carry out more complex investigations, including using models. Show an increasing awareness of the complexity of working scientifically, including recognition of multiple variables. Begin to evaluate the suitability of the investigative methods chosen. **Communicating in science** Use a wider range of science vocabulary, symbols, and conventions. Apply their understandings of science to evaluate both popular and scientific texts (including visual and numerical literacy). **Life processes** Relate key structural features and functions to the life processes of plants, animals, and micro-organisms and investigate environmental factors that affect these processes. **Earth systems** Investigate the external and internal processes that shape and change the surface features of New Zealand. **Interacting systems** Develop an understanding of how the geosphere, hydrosphere, atmosphere, and biosphere interact to cycle carbon around Earth. **Astronomical systems** Investigate the interactions between the solar, lunar, and Earth cycles and the effect of these on Earth. **Physical inquiry and physics concepts** Investigate trends and relationships in physical phenomena (in the areas of mechanics, electricity, electromagnetism, heat, light and waves, and atomic and nuclear physics). Demonstrate an understanding of physical phenomena and concepts by explaining and solving questions and problems that relate to straightforward situations. **Using physics** Investigate how physics knowledge is used in a technological or biological application.	**Geography** Understand that natural and cultural environments have particular characteristics and how environments are shaped by processes that create spatial patterns. Understand how people interact with natural and cultural environments and that this interaction has consequences.

Merge	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 7					**Communicating in science** Use accepted science knowledge, vocabulary, symbols, and conventions when evaluating accounts of the natural world and consider the wider implications of the methods of communication and/or representation employed. **Life processes** Explore the diverse ways in which animals and plants carry out the life processes. **Ecology** Explore ecological distribution patterns and explain possible causes for these patterns. **Earth systems and interacting systems** Develop an understanding of the causes of natural hazards and their interactions with human activity on Earth. **Physical inquiry and physics concepts** Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of unfamiliar situations. Analyse data to deduce complex trends and relationships in physical phenomena.	**Geography** Understand how the processes that shape natural and cultural environments change over time, vary in scale and from place to place, and create spatial patterns. Understand how people's perceptions of and interactions with natural and cultural environments differ and have changed over time.
Level 8					**Investigating in science** Develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models. **Communicating in science** Use accepted science knowledge, vocabulary, symbols, and conventions when evaluating accounts of the natural world and consider the wider implications of the methods of communication and/or representation employed. **Life processes, ecology, and evolution** Understand the relationship between organisms and their environment. Explore the evolutionary processes that have resulted in the diversity of life on Earth and appreciate the place and impact of humans within these processes. Understand how humans manipulate the transfer of genetic information from one generation to the next and make informed judgments about the social, ethical, and biological implications relating to this manipulation.	

Micro:bit	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1						
Level 2			**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs. **Characteristics of technology** Understand that technology is purposeful intervention through design. **Characteristics of technological outcomes** Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.		**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. **Chemistry and society** Find out about the uses of common materials and relate these to their observed properties.	
Level 3	**P02** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.		**Investigating in science** Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations. **Properties and changes of matter** Group materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials.	
Level 4	**P03** - 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).	**P02** - 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. 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.	**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.		**Investigating in science** Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations. **Properties and changes of matter** Group materials in different ways, based on the observations and measurements of the characteristic chemical and physical properties of a range of different materials.	

Micro:bit	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 5	**PO4** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. PO5 - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.	**PO3** - 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 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.	**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that materials can be formed, manipulated, and/or transformed to enhance the fitness for purpose of a technological product. **Technological systems** Understand how technological systems employ control to allow for the transformation of inputs to outputs. **Characteristics of technology** Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines. **Characteristics of technological outcomes** 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.		**Investigating in science** Develop and carry out more complex investigations, including using models. **Physical inquiry and physics concepts** Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe energy changes and conservation of energy, simple electrical circuits, and the effect of contact and non-contact on the motion of objects.	
Level 6	**PO6** -In authentic contexts and taking account of end-users, students determine and compare the "cost" (computational complexity) of two iterative algorithms for the same problem size. They understand the concept of compression coding for different media types, its typical uses, and how it enables widely used technologies to function. Students use an iterative process to design, develop, document and test basic computer programs. They apply design principles and usability heuristics to their own designs and evaluate user interfaces in terms of them.	**PO4** - In authentic contexts, students investigate and consider possible solutions for a given context or issue. With support, they use an iterative process to design, develop, store and test digital outcomes, identifying and evaluating relevant social, ethical and end-user considerations. They use information from testing and apply appropriate tools, techniques, procedures and protocols to improve the quality of the outcomes and to ensure they are fit-for-purpose and meet end-user requirements.	**Planning for practice** 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** 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** 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 modelling** 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 systems** Understand the properties of subsystems within technological systems. Characteristics of technological outcomes 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.		**Investigating in science** Develop and carry out more complex investigations, including using models. **Physical inquiry and physics concepts** Investigate trends and relationships in physical phenomena (in the areas of mechanics, electricity, electromagnetism, heat, light and waves, and atomic and nuclear physics).	
Level 7		**PO5** - In authentic contexts and with support, students investigate a specialised digital technologies area (for example, digital media, digital information, electronic environments, user experience design, digital systems) and propose possible solutions to issues they identify. They independently apply an iterative process to design, develop, store and test digital outcomes that enable their solutions, identifying, evaluating, prioritising and responding to relevant social, ethical and end-user considerations. They use information from testing and, with increasing confidence, optimise tools, techniques, procedures and protocols to improve the quality of the outcomes. They apply evaluative processes to ensure the outcomes are fit-for-purpose and meet end-user requirements.	**Technological products** Understand the concepts and processes employed in materials evaluation and the implications of these for design, development, maintenance, and disposal of technological products. **Technological systems** Understand the concepts of redundancy and reliability and their implications for the design, development, and maintenance of technological systems. **Characteristics of technological outcomes** Understand that technological outcomes are a resolution of form and function priorities and that malfunction affects how people view and accept outcomes.		**Investigating in science** Develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models. **Physical inquiry and physics concepts** Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of unfamiliar situations. Analyse data to deduce complex trends and relationships in physical phenomena.	
Level 8		**PO6** - In authentic contexts, students independently investigate a specialised digital technologies area and propose possible solutions to issues they identify. They work independently or within collaborative, cross-functional teams to apply an iterative development process to plan, design, develop, test and create quality, fit-for-purpose digital outcomes that enable their solutions, synthesising relevant social, ethical and end-user considerations as they develop digital content. Students integrate in the outcomes they develop specialised knowledge of digital applications and systems from a range of areas, including: network architecture; complex electronics environments and embedded systems; interrelated computing devices, hardware and applications; digital information systems; user experience design; complex management of digital information; and creative digital media.	**Technological products** Understand the concepts and processes employed in materials development and evaluation and the implications of these for design, development, maintenance, and disposal of technological products. **Technological systems** Understand operational parameters and their role in the design, development, and maintenance of technological systems. .		**Investigating in science** Develop and carry out investigations that extend their science knowledge, including developing their understanding of the relationship between investigations and scientific theories and models. **Physical inquiry and physics concepts** Investigate physical phenomena (in the areas of mechanics, electricity, electromagnetism, light and waves, and atomic and nuclear physics) and produce qualitative and quantitative explanations for a variety of complex situations. Analyse and evaluate data to deduce complex trends and relationships in physical phenomena.	

Ozobot	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1	**PO1** - 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).		**Planning for practice** Outline a general plan to support the development of an outcome, identifying appropriate steps and resources. **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. **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. **Technological modelling** Understand that functional models are used to represent reality and test design concepts and that prototypes are used to test technological outcomes. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs. **Characteristics of technology** Understand that technology is purposeful intervention through design.	**Position and orientation** Give and follow instructions for movement that involve distances, directions, and half or quarter turns. Describe their position relative to a person or object.	**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. Physical inquiry and physics concepts Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. Seek and describe simple patterns in physical phenomena.	
Level 2	**PO1** - 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).	**PO1** - 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.	**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems.	**Measurement** Create and use appropriate units and devices to measure length, area, volume and capacity, weight (mass), turn (angle), temperature, and time. **Shape** Sort objects by their spatial features, with justification. **Position and orientation** Create and use simple maps to show position and direction. Describe different views and pathways from locations on a map.	**Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 3	**PO2** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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.	**Measurement** Use linear scales and whole numbers of metric units for length, area, volume and capacity, weight (mass), angle, temperature, and time. Position and orientation Use a co-ordinate system or the language of direction and distance to specify locations and describe paths.	**Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	

Ozobot	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 4	**P03** - 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).	**P02** - 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. 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.	. **Technological systems** Understand how technological systems employ control to allow for the transformation of inputs to outputs. **Characteristics of technological outcomes** 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.	**Measurement** Use appropriate scales, devices, and metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time. Convert between metric units, using whole numbers and commonly used decimals. Use side or edge lengths to find the perimeters and areas of rectangles, parallelograms, and triangles and the volumes of cuboids. **Position and orientation** Communicate and interpret locations and directions, using compass directions, distances, and grid references.	**Physical inquiry and physics concepts** Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe energy changes and conservation of energy, simple electrical circuits, and the effect of contact and non-contact on the motion of objects.	
Level 5	**P04** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. **P05** - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.					

Cubetto	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1	**P01** - 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.		**Planning for practice** Outline a general plan to support the development of an outcome, identifying appropriate steps and resources. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs. **Characteristics of technology** Understand that technology is purposeful intervention through design.	**Number strategies** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **Number knowledge** Know the forward and backward counting sequences of whole numbers to 100. **Equations and expressions** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **Patterns and relationships** Generalise that the next counting number gives the result of adding one object to a set and that counting the number of objects in a set tells how many. Create and continue sequential patterns. **Measurement** Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. **Position and orientation** Give and follow instructions for movement that involve distances, directions, and half or quarter turns. Describe their position relative to a person or object.	**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. Seek and describe simple patterns in physical phenomena.	
Level 2		**P01** - 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.	**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems.	**Number strategies** Use simple additive strategies with whole numbers and fractions. **Number knowledge** Know forward and backward counting sequences with whole numbers to at least 1000. Know the basic addition and subtraction facts. **Equations and expressions** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols. **Measurement** Create and use appropriate units and devices to measure length, area, volume and capacity, weight (mass), turn (angle), temperature, and time. **Position and orientation** Create and use simple maps to show position and direction. Describe different views and pathways from locations on a map.		
Level 3	**P02** - 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.					

Raspberry Pi	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1						
Level 2		**PO1** -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.	**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs. **Characteristics of technology** Understand that technology is purposeful intervention through design. **Characteristics of technological outcomes** Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.			
Level 3	**PO2** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.			
Level 4	**PO3** - 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).	**PO2** - 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. 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.	**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that materials can be formed, manipulated, and/or transformed to enhance the fitness for purpose of a technological product. **Technological systems** Understand how technological systems employ control to allow for the transformation of inputs to outputs. **Characteristics of technology** Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines. **Characteristics of technological outcomes** 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.			

Raspberry Pi	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 5	**PO4** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. **PO5** - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.	**PO3** - 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 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.	**Planning for practice** 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** 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** 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 modelling** 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 systems** Understand the properties of subsystems within technological systems. **Characteristics of technology** 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 fit for purpose in terms of time and context. Understand the concept of malfunction and how "failure" can inform future outcomes.			
Level 6	**PO6** - In authentic contexts and taking account of end-users, students determine and compare the "cost" (computational complexity) of two iterative algorithms for the same problem size. They understand the concept of compression coding for different media types, its typical uses, and how it enables widely used technologies to function. Students use an iterative process to design, develop, document and test basic computer programs. They apply design principles and usability heuristics to their own designs and evaluate user interfaces in terms of them.	**PO4** - In authentic contexts, students investigate and consider possible solutions for a given context or issue. With support, they use an iterative process to design, develop, store and test digital outcomes, identifying and evaluating relevant social, ethical and end-user considerations. They use information from testing and apply appropriate tools, techniques, procedures and protocols to improve the quality of the outcomes and to ensure they are fit-for-purpose and meet end-user requirements.	**Planning for practice** Critically analyse their own and others' past and current planning practices in order to make informed selection and effective use of planning tools. Use these to support and justify ongoing planning that will see the development of an outcome through to completion. **Brief development** Justify the nature of an intended outcome in relation to the need or opportunity and justify specifications in terms of key stakeholder feedback and wider community considerations. **Outcome development and evaluation** Critically analyse their own and others' outcomes to inform the development of ideas for feasible outcomes. Undertake ongoing experimentation and functional modelling, taking account of stakeholder feedback and trialling in the physical and social environments. Use the information gained to select, justify, and develop a final outcome. Evaluate this outcome's fitness for purpose against the brief and justify the evaluation, using feedback from stakeholders. **Technological modelling** Understand the role and nature of evidence and reasoning when managing risk through technological modelling. **Technological products** Understand how materials are formed, manipulated, and transformed in different ways, depending on their properties, and understand the role of material evaluation in determining suitability for use in product development. **Technological systems** Understand the implications of subsystems for the design, development, and maintenance of technological systems. **Characteristics of technology** Understand the interdisciplinary nature of technology and the implications of this for maximising possibilities through collaborative practice. **Characteristics of technological outcomes** Understand that some technological outcomes can be perceived as both product and system. Understand how these outcomes impact on other outcomes and practices and on people's views of themselves and possible futures.			

Raspberry Pi	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 7	**PO7** - In authentic contexts and taking account of end-users, students analyse concepts in digital technologies (for example, information systems, encryption, error control, complexity and tractability, autonomous control) by explaining the relevant mechanisms that underpin them, how they are used in real world applications, and the key problems or issues related to them. Students discuss the purpose of a selection of data structures and evaluate their use in terms of trade-offs between performance and storage requirements and their suitability for different algorithms. They use an iterative process to design, develop, document and test advanced computer programs.	**PO5** - In authentic contexts and with support, students investigate a specialised digital technologies area (for example, digital media, digital information, electronic environments, user experience design, digital systems) and propose possible solutions to issues they identify. They independently apply an iterative process to design, develop, store and test digital outcomes that enable their solutions, identifying, evaluating, prioritising and responding to relevant social, ethical and end-user considerations. They use information from testing and, with increasing confidence, optimise tools, techniques, procedures and protocols to improve the quality of the outcomes. They apply evaluative processes to ensure the outcomes are fit-for-purpose and meet end-user requirements.	**Planning for practice** Critically analyse their own and others' past and current planning and management practices in order to develop and employ project management practices that will ensure the effective development of an outcome to completion. Brief development Justify the nature of an intended outcome in relation to the issue to be resolved and justify specifications in terms of key stakeholder feedback and wider community considerations. **Outcome development and evaluation** Critically analyse their own and others' outcomes and evaluative practices to inform the development of ideas for feasible outcomes. Undertake a critical evaluation that is informed by ongoing experimentation and functional modelling, stakeholder feedback, and trialling in the physical and social environments. Use the information gained to select, justify, and develop an outcome. Evaluate this outcome's fitness for purpose against the brief. Justify the evaluation, using feedback from stakeholders and demonstrating a critical understanding of the issue. **Technological products** Understand the concepts and processes employed in materials evaluation and the implications of these for design, development, maintenance, and disposal of technological products. **Technological systems** Understand the concepts of redundancy and reliability and their implications for the design, development, and maintenance of technological systems. **Characteristics of technology** Understand the implications of ongoing contestation and competing priorities for complex and innovative decision making in technological development. **Characteristics of technological outcomes** Understand that technological outcomes are a resolution of form and function priorities and that malfunction affects how people view and accept outcomes.			
Level 8	**PO8** - In authentic contexts and taking account of end-users, students evaluate concepts in digital technologies (for example, formal languages, network communication protocols, artificial intelligence, graphics and visual computing, big data, social algorithms) in relation to how key mechanisms underpin them and how they are applied in different scenarios when developing real world applications. Students understand accepted software engineering methodologies and user experience design processes and apply their key concepts to design, develop, document and test complex computer programs.	**PO6** - In authentic contexts, students independently investigate a specialised digital technologies area and propose possible solutions to issues they identify. They work independently or within collaborative, cross-functional teams to apply an iterative development process to plan, design, develop, test and create quality, fit-for-purpose digital outcomes that enable their solutions, synthesising relevant social, ethical and end-user considerations as they develop digital content. Students integrate in the outcomes they develop specialised knowledge of digital applications and systems from a range of areas, including: network architecture; complex electronics environments and embedded systems; interrelated computing devices, hardware and applications; digital information systems; user experience design; complex management of digital information; and creative digital media.	**Planning for practice** Critically analyse their own and others' past and current planning and management practices in order to develop and employ project management practices that will ensure the efficient development of an outcome to completion. **Brief development** Justify the nature of an intended outcome in relation to the context and the issue to be resolved. Justify specifications in terms of key stakeholder feedback and wider community considerations. **Outcome development and evaluation** Critically analyse their own and others' outcomes and fitness-for-purpose determinations in order to inform the development of ideas for feasible outcomes. Undertake a critical evaluation that is informed by ongoing experimentation and functional modelling, stakeholder feedback, trialling in the physical and social environments, and an understanding of the issue as it relates to the wider context. Use the information gained to select, justify, and develop an outcome. Evaluate this outcome's fitness for purpose against the brief. Justify the evaluation, using feedback from stakeholders and demonstrating a critical understanding of the issue that takes account of all contextual dimensions. **Technological modelling** Understand the role of technological modelling as a key part of technological development, justifying its importance on moral, ethical, sustainable, cultural, political, economic, and historical grounds. **Technological products** Understand the concepts and processes employed in materials development and evaluation and the implications of these for design, development, maintenance, and disposal of technological products. **Technological systems** Understand operational parameters and their role in the design, development, and maintenance of technological systems. **Characteristics of technology** Understand the implications of technology as intervention by design and how interventions have consequences, known and unknown, intended and unintended. **Characteristics of technological outcomes** Understand how technological outcomes can be interpreted and justified as fit for purpose in their historical, cultural, social, and geographical locations.			

Robobloq	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1			**Technological products** Understand that technological products are made from materials that have performance properties. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs. **Characteristics of technology** Understand that technology is purposeful intervention through design.	**Number strategies** Use a range of counting, grouping, and equal-sharing strategies with whole numbers and fractions. **Number knowledge** Know the forward and backward counting sequences of whole numbers to 100. Know groupings with five, within ten, and with ten. **Equations and expressions** Communicate and explain counting, grouping, and equal-sharing strategies, using words, numbers, and pictures. **Measurement** Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. **Position and orientation** Give and follow instructions for movement that involve distances, directions, and half or quarter turns. Describe their position relative to a person or object.	**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. Seek and describe simple patterns in physical phenomena.	
Level 2		P01 -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.	**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs. **Characteristics of technology** Understand that technology is purposeful intervention through design. **Characteristics of technological outcomes** Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.	**Number strategies** Use simple additive strategies with whole numbers and fractions. **Number knowledge** Know forward and backward counting sequences with whole numbers to at least 1000. Know the basic addition and subtraction facts. **Equations and expressions** Communicate and interpret simple additive strategies, using words, diagrams (pictures), and symbols. **Measurement** Create and use appropriate units and devices to measure length, area, volume and capacity, weight (mass), turn (angle), temperature, and time. **Position and orientation** Create and use simple maps to show position and direction. Describe different views and pathways from locations on a map.		
Level 3	**P02** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.	**Measurement** Use linear scales and whole numbers of metric units for length, area, volume and capacity, weight (mass), angle, temperature, and time. **Position and orientation** Use a co-ordinate system or the language of direction and distance to specify locations and describe paths.	**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Communicating in science** Begin to use a range of scientific symbols, conventions, and vocabulary. Engage with a range of science texts and begin to question the purposes for which these texts are constructed. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 4	**P03** - 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).		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological systems** Understand how technological systems employ control to allow for the transformation of inputs to outputs. **Characteristics of technology** Understand how technological development expands human possibilities and how technology draws on knowledge from a wide range of disciplines. **Characteristics of technological outcomes** 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.	**Measurement** Use appropriate scales, devices, and metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time. Convert between metric units, using whole numbers and commonly used decimals. **Position and orientation** Communicate and interpret locations and directions, using compass directions, distances, and grid references.	**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Communicating in science** Begin to use a range of scientific symbols, conventions, and vocabulary. Engage with a range of science texts and begin to question the purposes for which these texts are constructed. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 5	**P04** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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. **P05** - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.		**Planning for practice** 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** 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. **Technological systems** Understand the properties of subsystems within technological systems.	**Shape** Deduce the angle properties of intersecting and parallel lines and the angle properties of polygons and apply these properties.	**Investigating in science** Develop and carry out more complex investigations, including using models. Show an increasing awareness of the complexity of working scientifically, including recognition of multiple variables. Begin to evaluate the suitability of the investigative methods chosen. **Communicating in science** Use a wider range of science vocabulary, symbols, and conventions. Apply their understandings of science to evaluate both popular and scientific texts (including visual and numerical literacy). **Physical inquiry and physics concepts** Identify and describe the patterns associated with physical phenomena found in simple everyday situations involving movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe energy changes and conservation of energy, simple electrical circuits, and the effect of contact and non-contact on the motion of objects.	
Level 6	**P06** - In authentic contexts and taking account of end-users, students determine and compare the "cost" (computational complexity) of two iterative algorithms for the same problem size. They understand the concept of compression coding for different media types, its typical uses, and how it enables widely used technologies to function. Students use an iterative process to design, develop, document and test basic computer programs. They apply design principles and usability heuristics to their own designs and evaluate user interfaces in terms of them.		**Technological systems** Understand the implications of subsystems for the design, development, and maintenance of technological systems.		**Investigating in science** Develop and carry out more complex investigations, including using models. Show an increasing awareness of the complexity of working scientifically, including recognition of multiple variables. Begin to evaluate the suitability of the investigative methods chosen. **Communicating in science** Use a wider range of science vocabulary, symbols, and conventions. Apply their understandings of science to evaluate both popular and scientific texts (including visual and numerical literacy). **Physical inquiry and physics concepts** Investigate trends and relationships in physical phenomena (in the areas of mechanics, electricity, electromagnetism, heat, light and waves, and atomic and nuclear physics). Demonstrate an understanding of physical phenomena and concepts by explaining and solving questions and problems that relate to straightforward situations. **Using physics** Investigate how physics knowledge is used in a technological or biological application.	

Smartivity	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1				Shape Sort objects by their appearance.	Physical inquiry and physics concepts Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.	
Level 2				Shape Sort objects by their spatial features, with justification. Identify and describe the plane shapes found in objects.		
Level 3				Shape Classify plane shapes and prisms by their spatial features. Represent objects with drawings and models.	Physical inquiry and physics concepts Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 4				Shape Identify classes of two- and three-dimensional shapes by their geometric properties. Relate three-dimensional models to two-dimensional representations, and vice versa.	Physical inquiry and physics concepts Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	

Snap Circuits	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1						
Level 2			**Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that technological systems have inputs, controlled transformations, and outputs. **Characteristics of technology** Understand that technology is purposeful intervention through design. **Characteristics of technological outcomes** Understand that technological outcomes are products or systems developed by people and have a physical nature and a functional nature.		**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.	
Level 3			**Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product. **Technological systems** Understand that there are relationships between the inputs, controlled transformations, and outputs occurring within simple technological systems. **Characteristics of technology** Understand that technology both reflects and changes society and the environment and increases people's capability. **Characteristics of technological outcomes** Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.		**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. **Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 4					**Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	

Strawbees	Digital Technologies Progress Outcomes		Technology	Mathematics	Science	Social Science
	Computational Thinking	Designing and Developing Digital Outcomes				
Level 1	**P01** - 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).		**Planning for practice** Outline a general plan to support the development of an outcome, identifying appropriate steps and resources. **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. **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.	**Measurement** Order and compare objects or events by length, area, volume and capacity, weight (mass), turn (angle), temperature, and time by direct comparison and/or counting whole numbers of units. **Shape** Sort objects by their appearance.	**Understanding about science** Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation. **Investigating in science** Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models. **Communicating in science** Build their language and develop their understandings of the many ways the natural world can be represented. **Physical inquiry and physics concepts** Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.	
Level 2		**P01** -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.	**Planning for practice** Develop a plan that identifies the key stages and the resources required to complete an outcome. **Brief development** Explain the outcome they are developing and describe the attributes it should have, taking account of the need or opportunity and the resources available. **Outcome development and evaluation** 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. **Technological modelling** 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. **Technological products** Understand that there is a relationship between a material used and its performance properties in a technological product.	**Shape** Sort objects by their spatial features, with justification. Identify and describe the plane shapes found in objects.		
Level 3	**P02** - 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.		**Planning for practice** 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. **Brief development** 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. **Outcome development and evaluation** 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. **Technological products** Understand the relationship between the materials used and their performance properties in technological products. Characteristics of technological outcomes Understand that technological outcomes are recognisable as fit for purpose by the relationship between their physical and functional natures.	**Shape** Classify plane shapes and prisms by their spatial features. Represent objects with drawings and models.	**Understanding about science** Appreciate that science is a way of explaining the world and that science knowledge changes over time. Identify ways in which scientists work together and provide evidence to support their ideas. Investigating in science Build on prior experiences, working together to share and examine their own and others' knowledge. Ask questions, find evidence, explore simple models, and carry out appropriate investigations to develop simple explanations. **Physical inquiry and physics concepts** Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 4	**P03** - 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). **P04** - In authentic contexts and taking account of end-users, students decompose problems to create simple algorithms using the three building blocks of programing: 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. 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.	**P02** - 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. 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.	Technological modelling 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. Technological products Understand that materials can be formed, manipulated, and/or transformed to enhance the fitness for purpose of a technological product.	**Shape** Identify classes of two- and three-dimensional shapes by their geometric properties. Relate three-dimensional models to two-dimensional representations, and vice versa.	**Investigating in science** Build on prior experiences, working together to share and examine their own and others' knowledge. Physical inquiry and physics concepts Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat. For example, identify and describe the effect of forces (contact and non-contact) on the motion of objects; identify and describe everyday examples of sources of energy, forms of energy, and energy transformations.	
Level 5	**P05** - 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. They understand how computers store more complex types of data using binary digits, and they develop programs considering human-computer interaction (HCI) heuristics.			**Shape** Deduce the angle properties of intersecting and parallel lines and the angle properties of polygons and apply these properties. Create accurate nets for simple polyhedra and connect three-dimensional solids with different two-dimensional representations.		

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