Digital Curriculum Review

Technology's strength is that it makes enterprising use of a range of skills and knowledge of practices for exploration and communication, some specific to areas within technology and some from other disciplines.

These include visual literacy; the ability to make sense of images and the ability to make images that make sense, digitally-aided design, programming, software development and other forms of technological modelling.

Thinking about your engagement with, and implementation of, our Digital tools and practices, please answer the following.

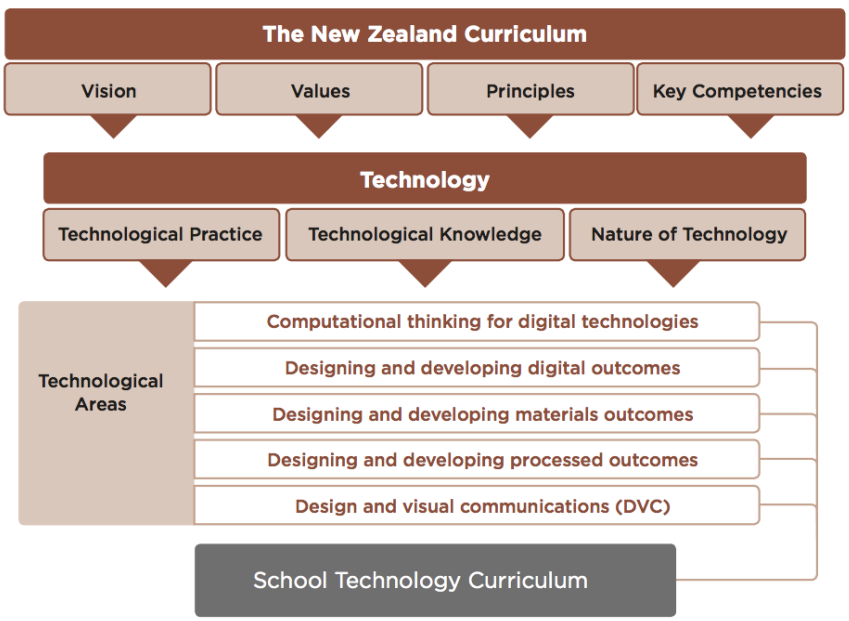
Please complete by Friday 21 June.

The New NZ Digital Curriculum

Previously, the Technology Learning Area was centred on three strands: Technological Practice, Technological Knowledge, and the Nature of Technology. This suggested that the three strands ought to be taught separately – when in reality, they are integral parts of all learning in Technology and are not readily separated. The reorganised Technology Learning Area recognises this. The three strands remain, but the Learning Area now also identifies five technological areas:

- Computational thinking for digital technologies
- Designing and developing digital outcomes
- Designing and developing materials outcomes
- Designing and developing processed outcomes
- Design and visual communication

These represent the contexts and settings in which students might learn about Technology. Each technological area describes unique learning – through the three strands will apply to all Technology learning, regardless of which area that learning is in.



Specific Area of Review

The focus of this review is to gather baseline information to support leadership to plan for the two new areas of Technology.

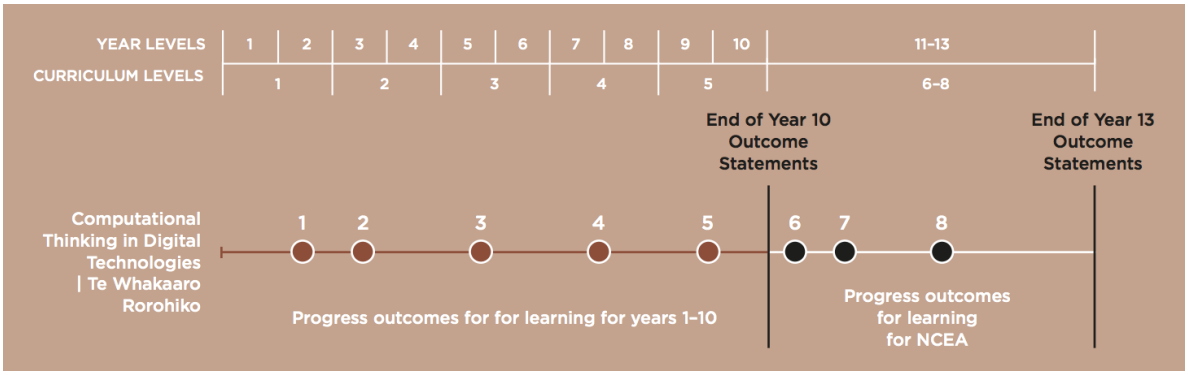
1. Computational Thinking for Digital Technologies
2. Designing and Developing Digital Outcomes

Please read these descriptors carefully and answer the survey questions for your specific year level(s).

1. Computational Thinking for Digital Technologies

Computational thinking enables a student to express problems, and formulate solutions in a way that means a computer (an information processing agent) can be used to solve them.

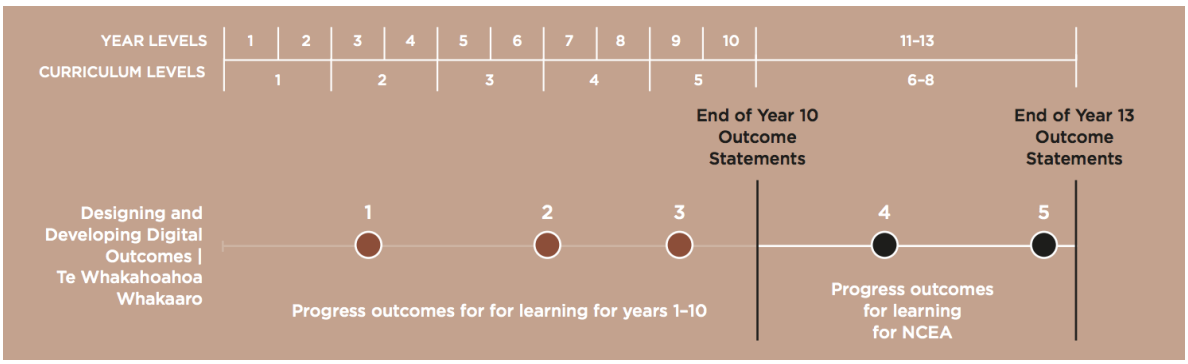
Students develop computational and algorithmic thinking skills and an understanding of the computer science principles that underlie all digital technologies. They become aware of what is, and is not, possible with computing, so they are able to make judgements and informed decisions as citizens of the digital world. Students learn core programming concepts and how to take advantage of the capabilities of computers so that they can become creators of digital technologies, not just users. They will develop an understanding of how computer data is stored, how all the information within a computer system is represented using digits, and the impact that different data representations have on the nature and use of this information.



2. Designing and Developing Digital Outcomes

Students understand that digital applications and systems are created for humans by humans. They develop increasingly sophisticated understandings and skills related to designing and producing quality, fit-for-purpose, digital outcomes.

They develop their understanding of the digital Information technologies that people need in order to locate, analyse, evaluate, and present digital information efficiently, effectively, and ethically. They become more expert in manipulating and combining data, using information management tools to create an outcome. They become aware of the unique intellectual property issues that arise in digital systems, particularly approaches to copyright and patents.



Year 1 and 2 Teams Review

This section is for our Year 1 and 2 Teams only.

Below is a description of the Progress Outcome along with a Progress Outcome Exemplar model.

Please read the sample lesson and reflect on how you have implemented this in your learning programme.

NB -- for question 2 the following may be as far as you go ---
• Identifying digital devices and their purpose and knowing that humans made them.

1. Computational Thinking for Digital Technologies

PROGRESS OUTCOME 1 EXEMPLAR

Bees

Progress Outcome 1

Students break down a simple non-computerised task into a set of precise, unambiguous, step by step instructions (algorithmic thinking). They are able to give these instructions, and identify if they have gone wrong and correct them (simple debugging). By doing this they show that they can use their decomposition skills to take a task and break it down into its smallest steps.

Annotation

Cheryl-Ann responds to the task of getting the bee to the hive by breaking the problem down into a set of precise of instructions. She tests these instructions with a peer to make sure they work.

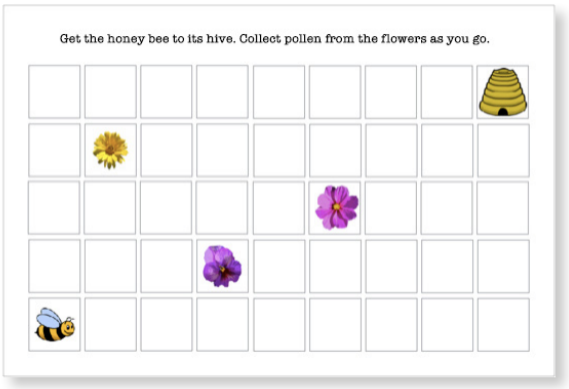
Background

The class is studying bees as part of a school-wide science inquiry about insects and have been investigating the way in which bees collect pollen from different plants and take it back to their hive. The teacher decides to link their study of bees to other work they have been doing on giving and following instructions.

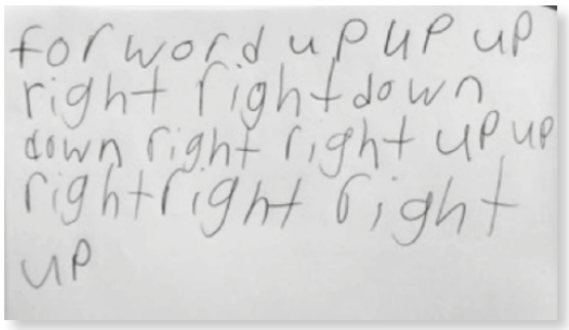
Task

The students are given a grid and asked to create a set of instructions for a bee to follow in order to collect pollen from each flower and take it to the hive. As a class, they compile a list of "direction" words that they can refer to.

The students then give their instructions to a peer to test.



Student response



Teacher: *What did you notice when Hemi tested your instructions?*

Cheryl-Ann: *They worked. He went to each plant and got to the beehive.*

1. **1. Provide examples of how you have implemented this in your learning programme.**

2. Designing and Developing Digital Outcomes

Students can participate in a teacher-led development to create, manipulate, store, retrieve and share content.
This will include:
• Identifying digital devices and their purpose and knowing that humans made them.
• Identify the inputs and outputs of a system.
• An awareness of some applications and their purpose (face-time, draw studio).
• An understanding that computers store content and we can retrieve it later.

2. **2. Provide examples of how you have implemented this in your learning programme.**

Year 3-4 Team Review

This section is for our Year 3-4 Team only.

Below is a description of the Progress Outcome along with a Progress Outcome Exemplar model.

Please read the sample lesson and reflect on how you have implemented this in your learning programme.

1. Computational Thinking for Digital Technologies

PROGRESS OUTCOME 2 EXEMPLAR

Repeating Bees

Progress Outcome 2

Students understand that an algorithm is a step-by-step process to solve a problem, that we can use these to write computer programs, and these programs need to have precise and unambiguous instructions so that the computer can follow them. Students can give, follow, and debug simple algorithms in both computerized and non-computerized environments. They can use these algorithms to create a simple program involving input, output and sequencing in an age-appropriate programming environment.

Annotation

The set of instructions that Harry creates demonstrates that he can break down the task of getting the bee to the hive and collect the pollen on the way into stages that include sequence and repetition.

Harry then tests his instructions on the template that his teacher has put into the introductory programming environment. He makes an input error in his initial attempt, so uses a simple debugging strategy by counting the squares to make it work.

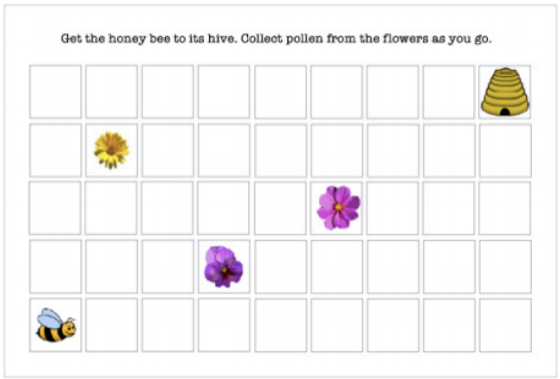
Background

The class is studying bees as part of a school-wide science inquiry about insects and have been investigating the way in which bees collect pollen from different plants and take it back to their hive. The teacher decides to link their study of bees to other work they have been doing on giving and following instructions.

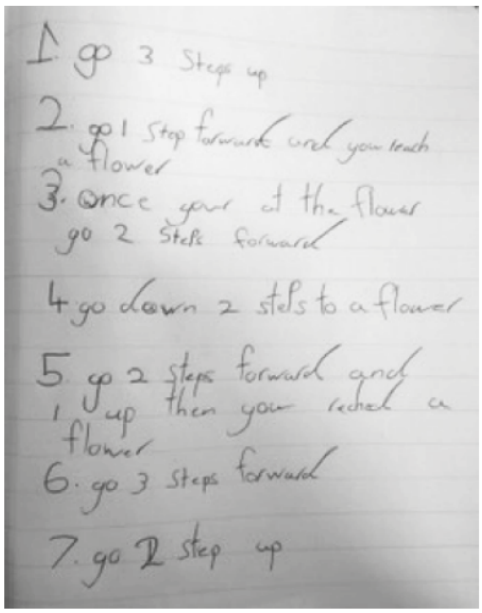
Task

The students are given a grid and asked to create a set of instructions for the bee to follow in order to collect pollen from each flower and take it to the hive. As a class, they create a list of "direction" words that they can refer to.

The teacher then puts a template of the grid into an introductory programming environment (Scratch Junior) so that the students are able to test their instructions.



Student response





Teacher: *What happened when you put your instructions into the program? Did your bee get to the hive?*

Harry: *My bee got to the hive. The first time I tried I didn't put it in properly so it didn't work. So I did it again.*

3. **1. Provide examples of how you have implemented this in your learning programme.**

2. Designing and Developing Digital Outcomes

Students can participate in a teacher-led development to create, manipulate, store, retrieve and share content.
This will include:
• Identifying digital devices and their purpose and knowing that humans made them.
• Identify the inputs and outputs of a system.
• An awareness of some applications and their purpose (face-time, draw studio).
• An understanding that computers store content and we can retrieve it later.

4. **2. Provide examples of how you have implemented this in your learning programme.**

Year 5-6 Team Review

This section is for our Year 5-6 Team only.

Below is a description of the Progress Outcome along with a Progress Outcome Exemplar model.

Please read the sample lesson and reflect on how you have implemented this in your learning programme.

1. Computational Thinking for Digital Technologies

PROGRESS OUTCOME 3 EXEMPLAR

Animation

Progress Outcome 3

Students understand what algorithms are, the difference between algorithms and programs, and that there can be more than one algorithm for the same problem. They are able to decompose problems into step-by-step instructions to create an algorithm for a computer program, and use logical thinking to predict the behaviour of these programs. They are able to develop and debug simple programs that use inputs, outputs, sequence and loops. Students understand that computers store data using just two states, represented by binary digits (bits).

Annotation

Sarah's response to the task demonstrated that she:

- could develop a basic computer programs in a block-based programming environment
- understood the need to be precise because computers cannot infer
- can make algorithms more efficient through the use of iteration (repeats/loops)
- understands that multiple algorithms can have the same outcome but are not necessarily equally efficient.

Background

The students have had some experience in working with a block-based programming (Scratch). They completed an activity that involved animating the individual letters of their name during which the teacher noticed that most students programmed the letters to activate only once and kept clicking the start button to repeat actions.

The teacher then facilitated a whole class discussion using examples of students' work from the animated letter activity. The students observe that it is frustrating to have to click the 'go' button or the individual sprites to make the letters animate each time. It is explained that loops are about seeing patterns. Students discuss everyday examples of loops such as daily routines. Working in pairs, they were given a pattern card similar to the following and asked to write as few instructions as possible for their partner to re-create the pattern.

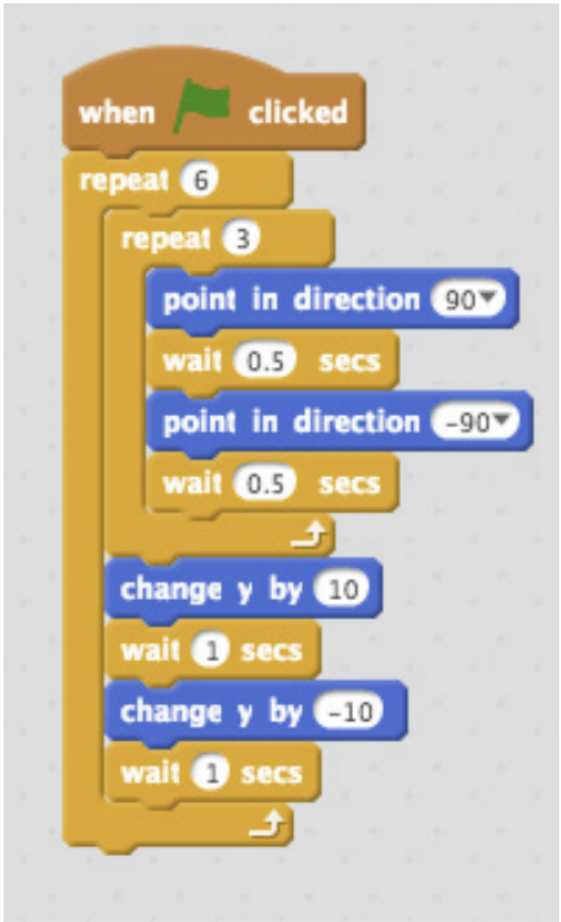


The students compared their answers to see how different people solved the same problem.

Task

Using their new knowledge of loops, the students are asked to create an animated character that moves to music using the block-based program, Scratch. The animation needs to show choreographed repetition of dance moves so that the same sequence of movements is shown for the chorus of the song.

Student response



5. **1. Provide examples of how you have implemented this in your learning programme.**

2. Designing and Developing Digital Outcomes

Given some parameters/criteria and tools and/or techniques, students are able to make decisions (largely independently) about creating, manipulating, storing, retrieving, sharing and or testing content (developed for a specific purpose) within a fundamental system.

This includes:
• Understanding that digital devices develop/change over time & the influence/impact they have on humans/society.
• Understanding the particular roles of components in a fundamental input, process, output system and how they work together.
• Understanding that inputs are transformed into outputs within a fundamental system and the “control” role that humans have in this.
• Purposefully use an increasing range of

6. **2. Provide examples of how you have implemented this in your learning programme.**

THANK YOU

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