

The revised technology learning area

Understanding the curriculum change, including the strengthening of digital technologies in *The New Zealand Curriculum*

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In this presentation, explore:

1. Why the change is important for our learners and Aotearoa
2. What the changes are and the structure of the revised learning area
3. Contexts for rich technology learning in Aotearoa

Kaua e rangiruatia te hāpai o te hoe; e kore tō tātou waka e ū ki uta.

Do not lift paddle out of unison or our canoe will never reach the shore.



1. Why is the change to the technology learning area important?

Why is technology education important?

With its focus on design thinking, technology education supports students to be innovative, reflective, and critical in designing new models, products, software, systems, and tools to benefit people while taking account of their impact on cultural, ethical, environmental, and economic conditions.

[The New Zealand Curriculum, Technology](#)

Listen

- [Indigenous AI, Caleb Moses on the Bleeding Edge](#)

Caleb Moses describes technologies being used to support te reo Māori revitalisation and new ways of interacting with te Ao Māori.

Read

- [E-Tangata, Maru Nihoniho: How years of playing spacies finally paid off](#)

Maru Nihoniho shares her experiences of school and describes her awards and game company.

Consider

- What impact has technology had on you today?

Our purpose: Developing technological thinkers and citizens?

Students and future citizens need to be **critically informed creators of technological outcomes, not just consumers**. This includes the ever changing digital technology landscape and tools.

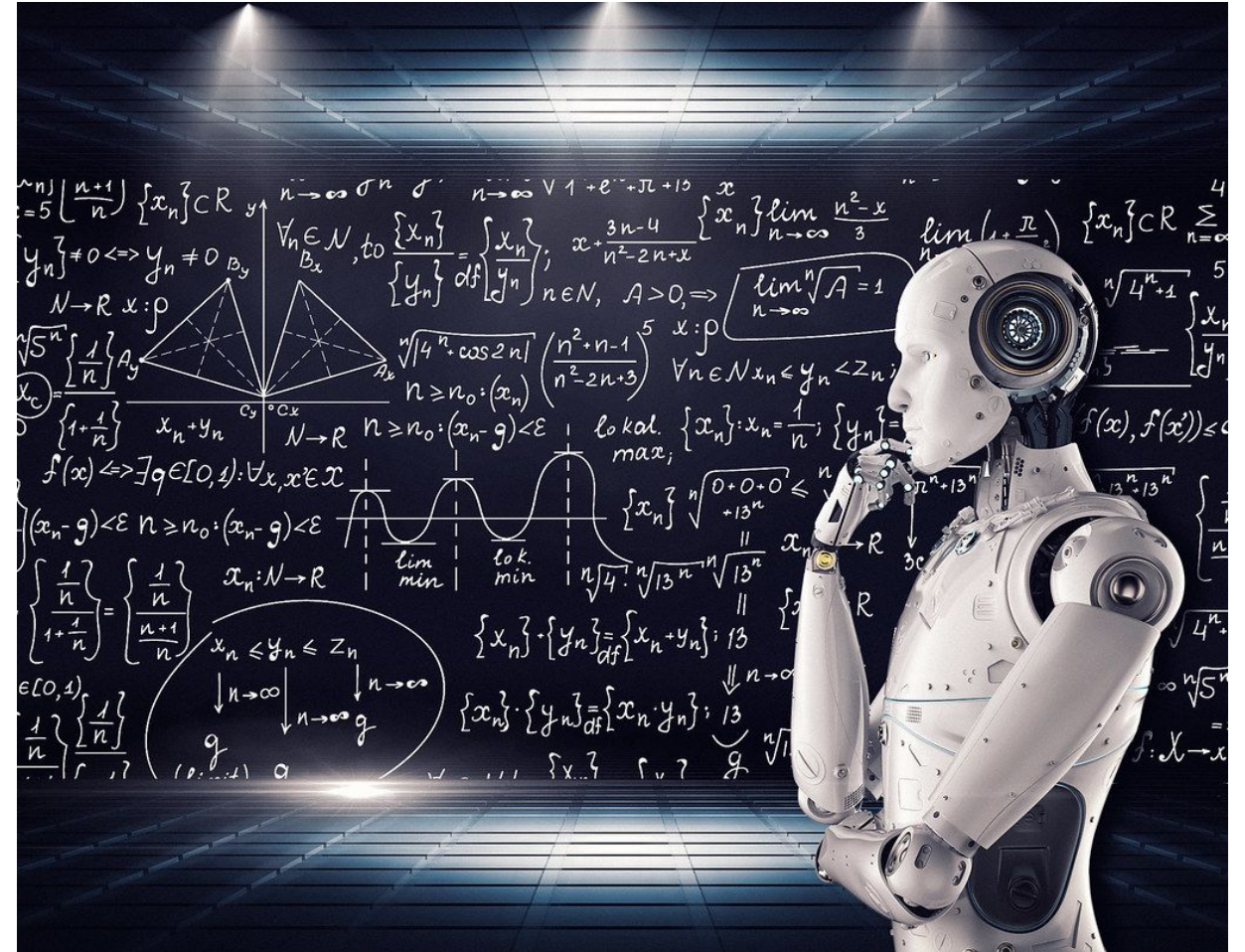


Image from www.vpnrsus.com

2. What has changed and what is the revised structure?

What is technology?

The focus of the technology learning area remains the same.

Technology is intervention by design. It uses intellectual and practical resources to create technological outcomes, which expand human possibilities by addressing needs and realising opportunities.

[The New Zealand Curriculum, Technology](#)

See the structure of the learning area at [Technology Online – Technology in the NZC.](#)



The strands: The three strands remain the same

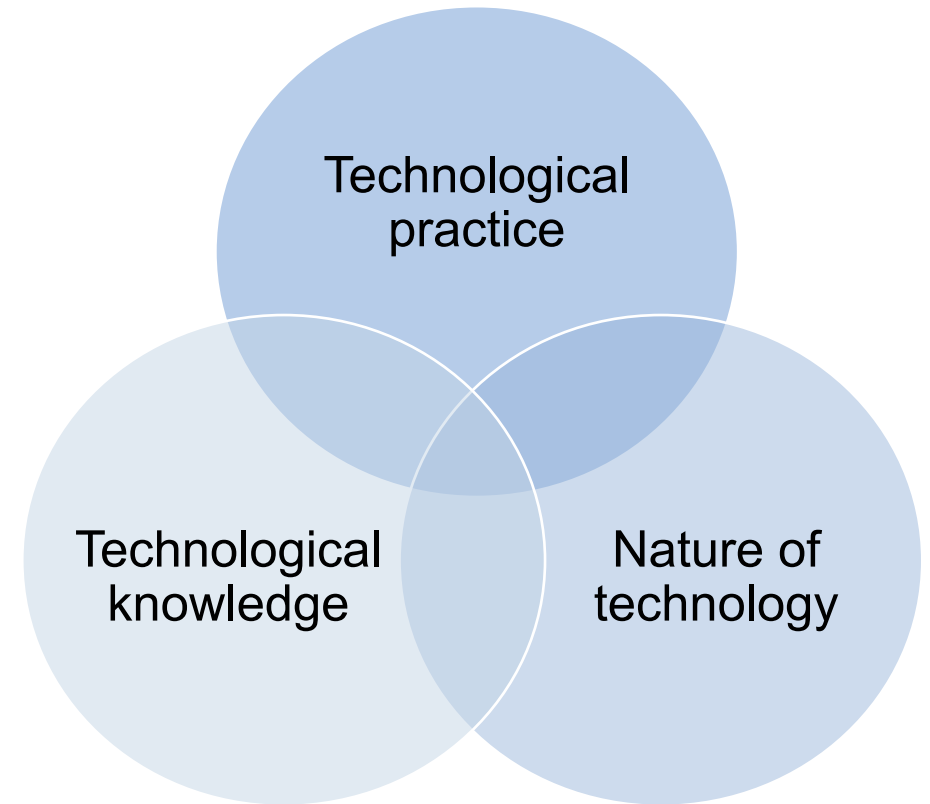
The strands interact to develop student capability, dispositions, and understandings. The intersection of the strands is where students develop and demonstrate increased technological capability.

Technological practice – know how

Technological knowledge – know what

Nature of technology – know why

- The strands are not optional in a programme of learning.
- They are described separately, but are almost always integrated.
- They are embedded within an authentic context in all five technological areas.



Five technological areas

There are now five technological areas that give the context for learning in technology and are enacted through the strands:

- computational thinking for digital technologies – new
- designing and developing digital outcomes – new
- designing and developing materials outcomes
- designing and developing processed outcomes
- design and visual communication.



Exploring the revised technological areas

- These areas provide a context for the learning in technology.
- Each technological area has its own knowledge base and skill set developed through the three strands and building student capability.
- **All** are connected to the strands of technology, which provide overarching structure for planning and progression.
- They can be combined in authentic technology learning opportunities.

Read

- Explore the technological areas – [NZC Online Technology– Learning area structure](#).

Consider

- Identify possible teaching and learning experiences in your area of expertise.
- How could you collaborate with teachers in other technological areas to expand the learning opportunities?

How do we consider progress in the revised technology learning area?

- Strands provide the unifying structure for all five areas of technology learning.
- Learner progress is monitored against the strands, with opportunities to learn in all five areas over time.
- Teachers' judgements consider progress made towards both achievement objectives and progress outcomes.



What are the achievement objectives?

The achievement objectives are not new.

They describe:

- the significant learning and progression over time
- learning processes, knowledge, and skills relative to eight levels of learning.

Teachers select appropriate achievement objectives to fit the learning needs of students and the context.

Read

- You can read about the achievement objectives at [NZC Online Technology – Achievement objectives](#).
- The achievement objectives are unpacked further in the [indicators of progression](#).

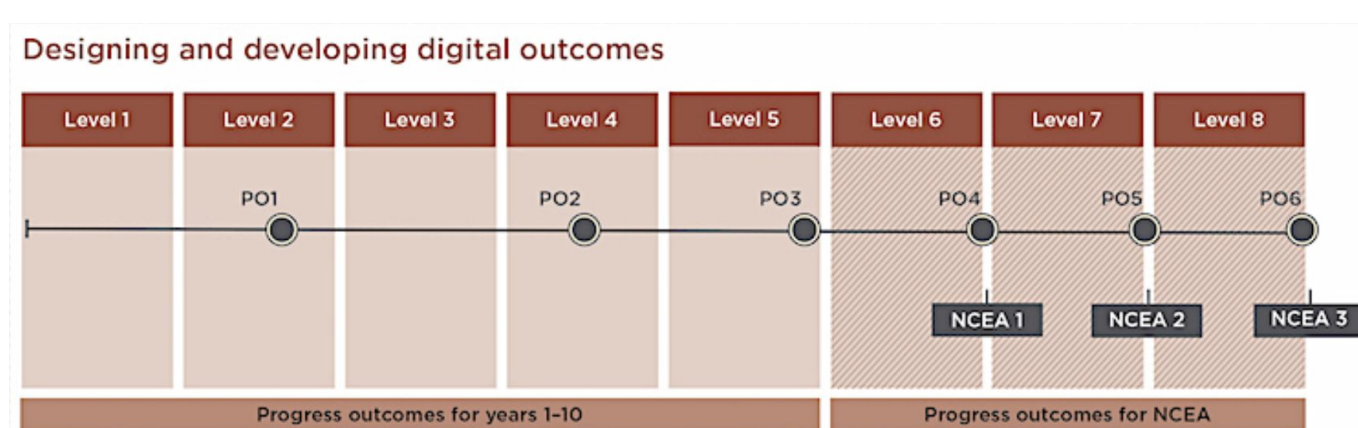
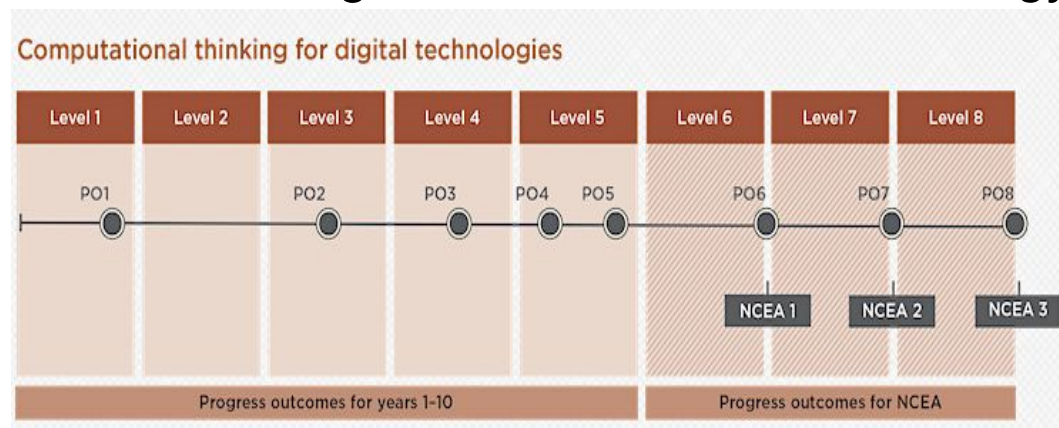
What are the progress outcomes?

The progress outcomes are new. They:

- sit within the strands of technology
- describe the significant learning steps students take as they develop their expertise in computational thinking (CT) and designing and developing digital outcomes (DDDO) over time
- are not reporting tools nor a recipe for what to teach, they are guides rather than maps.

Read

Select an image to read more on *Technology Online*.



How do the DDDO progress outcomes fit with the strands?

Read

[Designing and developing digital outcomes progress outcome 1](#)

Consider

How could this relate to the technology learning area strands or strand components?



How can you see the strands in this DDDO progress outcome?

[Designing and developing digital outcomes progress outcome 1](#)

In authentic contexts and taking account of end-users, students participate in teacher-led activities to develop, manipulate, store, retrieve, and share digital content in order to meet technological challenges. Children 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.

Strand:
Technological
practice

Strand: Nature
of technology
Component:
characteristics
of
technological
outcomes

Discipline
knowledge

Strand : Technological
knowledge
Component:
technological systems

How could they be combined in practice?

Authentic need: Design and develop a presentation to introduce our new principal to our school stories that has images of our area, the school poster, and narration.

Technological area

- Designing and developing digital outcomes

Technological practice

- describe that they are making a movie that has set of attributes that link to being fit for purpose. (They can sequence the steps and can draw their system, based on the devices they are using, and label the main parts.)

Nature of technology

- investigate remote controls for the TV, iPads, and other devices to understand their uses and how and why we create and use them

Technological knowledge

- identify the inputs and outputs of the TV system
- understand that digital devices store content, which can be retrieved later (They will apply this to the inputs and outputs of the device they are using to make their movie and create a successful presentation that is fit for purpose.)

How do the CT progress outcomes fit with the strands?

Read

[Computational thinking progress outcome 1](#)

Consider

How could this relate to the technology learning area strands or strand components?



How can you see the strands in this CT progress outcome?

Computational thinking progress outcome 1

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

Strand: Technological practice, component: brief development, planning for practice

Computational thinking and technological area specific content

Strand: Technological practice, component: planning for practice

Slides 15 and 18 are based on slides in a presentation by Associate Professor Wendy Fox (PhD) Deputy Head of School, Te Kura Toi Tangata School of Education, University of Waikato in February 2019.

How could they be combined in practice?

Authentic need: We need to create a map and directions to help us get safely from one side of the road to the other. Using the map, write a simple set of instructions to get our humanbots across the road. Then test and debug the instructions to keep our humanbots safe.

Nature of Technology

- Students will understand products and systems are designed and made by people to meet a need. The products and systems create the human made world we interact with every day.

Technological Practice

- Students can describe what they are producing. They know the attributes needed so the product meets the need.
- Students have more than one idea about what the final product could look like or materials to use.
- They can choose one idea that will meet the need. They describe the steps and resources needed to create it so the finished product has the attributes identified at the beginning of the process.

For more information see the [indicators of progression](#) for the achievement objectives.

Key points

- Technology understandings are important for all students' futures and that of Aotearoa New Zealand.
- The strands of the technology learning area all interact to develop students' capability.
- The five revised technological areas fit within the context of the strands.
- Combining achievement objectives and progress outcomes can provide rich learning opportunities across the breadth of the learning area.



3. What are contexts for learning in Aotearoa?

Changes to the technology learning area and programme design

Consider

- What do the changes mean for programme design and learning experiences?
- What needs to be done in your school?



What do the changes mean for programme design and learning experiences?

- Local curriculum and planning rich learning opportunities in a connected curriculum is key to authentic learning in technology.
- It is the intent that the revised digital content be taught within the framework of the technology learning area, which connects with and draws on knowledge from multiple disciplines.
- Students are given opportunities to develop strand knowledge through the technological areas.
- Technological areas can be combined to give create rich learning opportunities that support students to build capabilities and discipline and wider knowledge within authentic contexts.
- The strands and technological areas can be integrated with other learning areas in a primary context (for example, maths), but it is essential to maintain the integrity of the learning area outcomes.

Teaching for progression

- Over years 1–10, students learn in all five technological areas, developing their knowledge and skills in context and through strand understandings.
- The strands are required learning. Schools emphasise technological areas, achievement objectives, and progress outcomes related to their local curriculum and in balance over time.
- By offering a variety of contexts, teachers help their students to recognise links between technological areas and develop their capability.
- Teachers encourage students to access relevant knowledge and skills from other learning areas and to build on their developing key competencies.

The following six slides give some snapshot examples of what a coherent technology programme could include.

Years 1 and 2

Context	Technological Area	Strands	Achievement Objectives	Progress Outcomes	Activities
Matariki: Celebrating the stars with our whānau	Computational thinking (CT) and Designing and developing digital outcomes (DDDO) DVC	Technological practice, Technological knowledge	Outcome development, Technological modelling, Technological systems	CT progress outcome 1, DDDO progress outcome 1	<ul style="list-style-type: none"> • Creating circuits and a constellation of Matariki with conductive tape and LEDs to demonstrate the constellations at our celebration of Matariki with whānau • Designing the template for the circuit
Our school story	CT and DDDO DVC	Technological practice, Technological knowledge	Planning for practice, Outcome development, Technological systems	DDDO progress outcome 1	<ul style="list-style-type: none"> • Creating a presentation for our new school principal introducing school stories in presentations • Claymation, understanding systems, digital creation, manipulation, storage retrieval, and sharing via website and Seesaw
Breakfast: Bread and butter in our dairying region	Designing and developing materials outcomes, Designing and developing processed outcomes, DDDO	Technological knowledge, Nature of technology	Technological products, Technological systems, Characteristics of technological outcomes	DDDO progress outcome 1	<ul style="list-style-type: none"> • Identifying how the materials (cream to butter, bread making) have been manipulated to make the product • Identifying the physical and functional attributes of technological outcomes • What is a system? • Understanding inputs, outputs, and transformations

Years 3 and 4

Context	Technological Area	Strands	AOs	POs	Activities
Matariki: Celebrating the stars with our whānau	Computational thinking (CT), Designing and developing digital outcomes (DDDO), Designing and developing processed outcomes, Designing and developing materials outcomes DVC	Technological practice, Technological knowledge	Brief development, Planning for practice, Outcome development, Technological modelling, Technological systems	CT progress outcome 1 DDDO progress outcome 1	<ul style="list-style-type: none"> • Creating and decorating Matariki celebration biscuits • 3D cookie cutters – modelling them in plastic or card, then creating the design and refining it so it can be 3D printed and used to create the biscuits • Describe transformations within a system
Time Travellers: Social change and our made world		Nature of technology	Characteristics of technology		<ul style="list-style-type: none"> • How have things changed Exploring how phones have changed

Year 5 and 6

Context	Technological Area	Strands	AOs	POs	Activities
Games for learning: Commemorating Tuia 250	Computational thinking (CT), Designing and developing digital outcomes (DDDO)	Technological practice Technological knowledge Nature of Technology	Planning for practice, Outcome development, Technological modelling, and Technological systems Characteristics of technology and Characteristics of technological outcomes	CT progress outcome 1 DDDO progress outcome 1	<ul style="list-style-type: none"> Scratch game development Hard copy games 3D printed merchandising The ways technologies have impacted on our world and our lives Exploring games – how they were developed and why, and what has changed?

Years 7 and 8

Context	Technological Area	Strands	AOs	POs	Activities
Developing our school playground	Computational thinking (CT), Designing and developing digital outcomes (DDDO), Designing and developing materials outcomes, Design and visual communication	Technological practice, Technological knowledge	Outcome development, Technological modelling, Technological products, Technological systems	DDDO progress outcome 2	<ul style="list-style-type: none"> • Creating a new playground design • Interactive pou traversing the journey from new entrant to graduation (developing the pou to stand in the grounds) and the content to link to the QR codes • QR codes, SketchUp, and drawing skills in a modelling context • Systems, inputs, outputs, and transformations • Understanding “black box” in technological systems
Educational games	Computational thinking (CT), Designing and developing digital outcomes (DDDO)	Technological practice	Planning for practice, Outcome development	CT Progress outcome 3 DDDO progress outcome 2 working towards 3	<ul style="list-style-type: none"> • Scratch and Gamefroot • Understanding how data is created, stored, and shared, computers have languages – what do they look like? • Bits and bytes

Year 7 and 8

Context	Technological Area	Strands	AOs	POs	Activities
Our world: Tūrangawaewae	Designing and developing digital outcomes (DDDO), Designing and developing materials outcomes, Designing and developing processed outcomes	Technological knowledge, Nature of technology	Technological products, Technological systems, Characteristics of technological outcomes	DDDO progress outcome 1–2	<ul style="list-style-type: none"> • Creating a presentation, instructional movies for our visit to the local marae • 3D printing models • Using movies and green screens • Creative pepeha presentations using iMovie, voice overs, understanding file types, and managing original content creation, manipulation, and storage • Being a responsible digital citizen, safety, copyright, and sharing
Time traveller: Past present and future	Designing and developing digital outcomes, Designing and developing materials outcomes, Designing and developing processed outcomes	Nature of technology	Characteristics of technology, Characteristics of technological outcomes	DDDO Progress outcome 2	<ul style="list-style-type: none"> • Change over time • Technological development impact on us and our world and in turn we shape them to meet needs • Digital debate: is our world changing for the better or not? <i>Using The Internet is like a Puddle</i> by Shona Innes as a stimulus

Years 9 and 10

Context	Technological Area	Strands	AOs	POs	Activities
Our local marae	Designing and developing digital outcomes (DDDO), Designing and developing materials outcomes, Designing and developing processed outcomes	Technological knowledge, Nature of technology	Technological products, Technological systems, Characteristics of technological outcomes	DDDO progress outcomes 2–3	<ul style="list-style-type: none"> • Creating a presentation, instructional movies for our visit to the local marae • 3D printing models • Using movies and green screens • Creating digital pepeha • Using binary digits to create a personal coded message in te reo Māori • Using block based programming to create a game showing Kupe's voyage to Aotearoa New Zealand • How do computers work (Android/ IOS) • Savvy tech – data security, privacy, and safety

Year 10

Context	Technological Area	Strands	AOs	POs	Activities
Programmable robots	Designing and developing digital outcomes (DDDO), Computational thinking (CT)	Nature of technology	Characteristics of technology and technological outcomes	DDDO progress outcome 3 CT progress outcome 4-5	<ul style="list-style-type: none"> • Exploring technological change over time and how technological developments impact on us and our world and in turn we shape them to meet needs • Using micro:bits and Mindstorm to write algorithms creating programs with comparative and logical operators and data types, differentiation • Testing their algorithm by translating it to LEGO MINDSTORMS® EV3 code, using the algorithm as code comments and checking to see their program works when downloaded to the robot • Collecting, using, and interpreting data to show change over time

How can we achieve a robust and rich technology programme in our school?

- Balance all technological areas to give a broad experience in technology.
- Ensure progression and build conceptual understanding in technology.
- Connect and integrate learning experiences and technological areas.
- Ensure learners achieve all significant learning steps to build context specific knowledge and skills and curriculum conceptual understanding.

In years 11–13 students generally specialise in one or more technological areas.



Linking the digital content and the strands

Watch

[Webinar recording: Getting started with years 9 and 10 digital technologies programmes](#)

Find out about how a school planned a connected approach to incorporating digital content into the strands, combining achievement objectives and progress outcomes to create rich learning opportunities in years 9 and 10.

Getting started with years 9 and 10 digital technologies programmes



MINISTRY OF EDUCATION
TE TĀHURU O TE MĀTAURANGA

Technology Online

*Kaua e rangiruatia te hāpai o te hoe;
e kore to tātou waka e ū kī uta*

Engaging in authentic learning opportunities

Watch

[Engagement in technology through authentic learning opportunities at Waitaki Valley School](#)

Consider

- How do we use our vision to create coherent learning pathways?
- How do we ensure our school is ready to provide rich learning for all learners?
- How do we know we have prepared all our students for their next learning step as they transition from our school?

[*Local curriculum: Designing rich opportunities and coherent pathways for all learners*](#)

What are examples of contexts for technology learning in Aotearoa?

The key to a successful context is finding one that is authentic and comprises a real issue that engages students in solving problems or needs in their world.

Watch and/or read

- [How two surfers are cleaning up the ocean](#)
- [The Kiwi start up turning milk bottles into fence posts](#)
- [Good sorts: New Plymouth students put classroom learning into community use](#)
- [Creating night lights and understanding systems](#)
- [Captivating contexts](#)

Consider

How will you engage your students in authentic and rich learning opportunities?

Key points

- Strands interact and are not optional.
- Technological areas can be discrete or combined.
- Achievement objectives and progress outcomes can be selected and combined.
- Progression in understanding and capability is developed over time.
- Students need broad experiences in all technological areas over time (years 1–10).
- When linking or integrating across learning areas, the intent of the strands, achievement objectives, and progress outcomes is maintained to develop technological understanding.



Resources

- [NZC Online – Technology revised curriculum statement](#)
- [Technology in the NZC – Achievement objectives, Indicators of progression, and Progress outcomes](#)
- Digital technologies exemplars: [Computational thinking](#) and [Designing and developing digital outcomes](#)
- [Technology Online](#): Teaching snapshots, webinars, videos, and more
- [Kia Takatū ā-Matihiko](#): The National Digital Readiness Programme
- [Technology Online – Digital technologies support](#)
- [ERO – Oratia School's story](#): Local curriculum development
- [Pōtiki poi](#)
- [Girl boss awards celebrate NZ's trailblazing young women](#)
- [Kiwi teen eyeing large-scale production of her edible food wrap](#)
- [Student led projects in digital technologies](#)
- Coming Soon: A Curriculum Guide for Technology

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