Integrating Curriculum with a Technology lens

Sarah Washbrooke Dr. Kerry Lee Lisa Switalla-Byers



He Karakia Tīmatanga

Mauri ora ki a mātou

Wellbeing to us all

Arahina mātou i a mātou mahi

Help us with our responsibilities

Kimihia he huarahi mō te kaupapa o te mātauranga hangarau

Seek a pathway for the understanding of technology

Awhina atu, awhina mai

To give help and receive help

Te pou e here nei i a mātou

The virtue that binds us as one

Hui e, tāiki e

Bind us together







Sarah Washbrooke

sarah.washbrooke@tenz.org.nz TENZ Heamana Tuarua | DeputyChair Kia ora,

Tēnā koutou, tēnā koutou katoa.

Ko Ingarangi te whakapaparanga mai, Ko Lincolnshire te whenua tapu, Nō Scunthorpe au, Ko Aotearoa te kāinga, Kei Tahuna au e noho ana, Ko Sarah Washbrooke tōku ingoa.

Nō reira, tēnā koutou, tēnā koutou, tēnā Tātou katoa.



Dr. Kerry Lee

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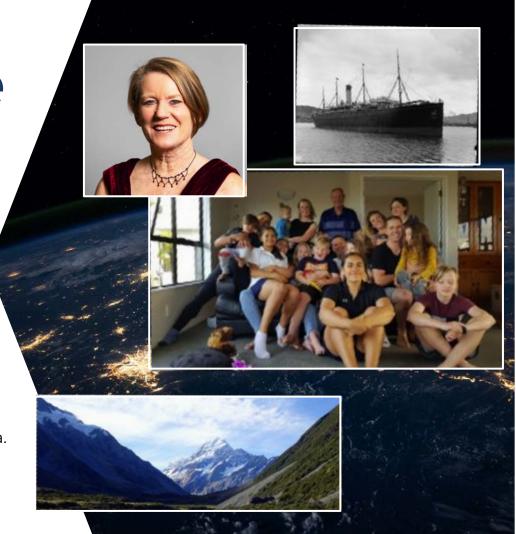
Haere Mai,

Tēnā koutou, tēnā koutou, tēnā koutou katoa.

Ko Aoraki tōku maunga Ko Rangitata tōku awa Ko Ionic tōku waka Ko Kerry Lee tōku ingoa Kei Long Bay ahau e noho ana

Nō reira, tēnā koutou, tēnā koutou, tēnā Tātou katoa.





Lisa Switalla-Byers

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Nau Mai,

Tēnā koutou, tēnā koutou katoa.

Ko Hiki ro roa te mauka

Ko Waikouaiti te awa

Ko Araiteuru rāua ko Waitaha ngā waka

Ko Puketeraki te marae

Ko Kai Tahu te iwi

Ko Hui-a-rapa te hapu

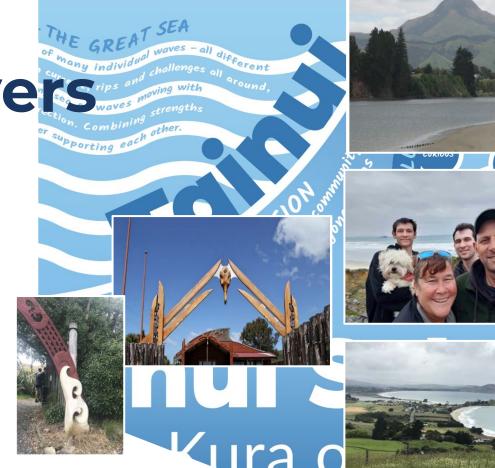
No Brinn's Point ahau

Kei te Ōtepoti tōku kainga inaianei

Ko Lisa tōku ikoa

Nō reira, tēnā koutou, tēnā koutou, tēnā Tātou katoa.





Today's workshop

An exploration of integration with different technological areas and connection to curriculum subjects for engaging & authentic programmes of learning.



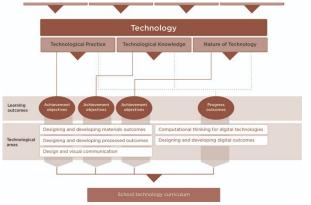
How can we weave authentic contexts & local curriculum?



How can we integrate digital technologies into our normal Technology programs?

How can we develop deep learning through curriculum integrated projects?







Ideas

Background





Extra Support

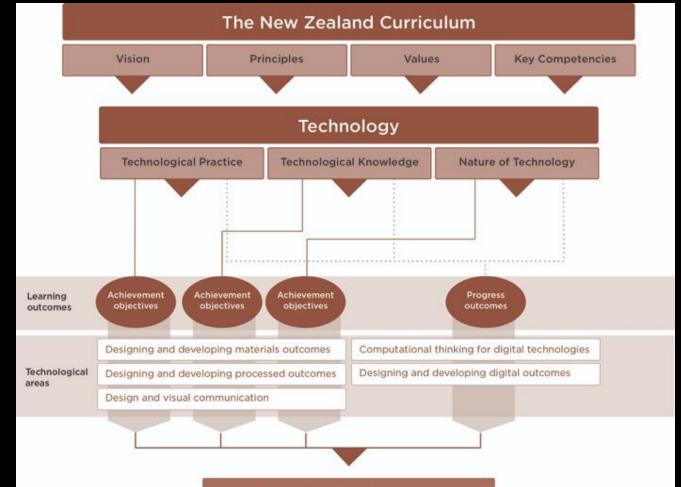
Workshop

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.

Design is characterised by **innovation** and **adaptation** and is at the heart of technological practice. It is informed by critical and creative thinking and specific design processes. Effective and ethical design respects the unique relationship that New Zealanders have with their physical environment and embraces the significance of Māori culture and world views in its practice and innovation.

Technology makes enterprising use of knowledge, skills and practices for exploration and communication, some specific to areas within technology and some from other disciplines. These include digitally-aided design, programming, software development, various forms of technological modelling, and visual literacy – the ability to make sense of images and the ability to make images that make sense."







NCEA Level 1 - Connections

Materials and Processing Technology by its very nature has strong connections with all other subjects in the Technology Learning Area and vice versa.

The subjects of History, Pacific Studies, Geography, and Health Studies will support the aningfully incorporate their learning of place into their design ideas.

others' wellbeing and that keep considerations of design ideas that seek to improve

Numeracy

All Day has a distinct glossary and way The subjects of History, Pacific Studies, Geography, and Social Studies will support others' wellbeing and that keep considerations of people at the centre of their design logy has a distinct glossary and way of Numeracy - shared compet numerical skills to mai communicating about the subject and an inga learning. .crances, Social Studies Literacy — Materials and Processing and measurement and the application of about the commental decisions. on society, and we the physical and social environment



Visual Arts — shared topics include electrical and concept design presentation. Chemistry and Biology, and Physica. Lioping fit-for-purpose outcomes that functional attributes of mate function in the real world as linended.

Te Mātaiaho Curriculum Integration

MĀTAIAHO | Weaving learning within and across learning areas

The purpose, big ideas, knowledge, and practices for each of the eight learning areas

Mātai rangaranga te aho tū, te aho pae. | Weave the learning strands together.

Taratara-a-kae niho notches represent diversity, resilience, and mana.



While the learning areas are presented as distinct, this should not limit the ways in which schools structure learning experiences offered to ākonga. All learning should make use of the natural connections that exist between learning areas. The common UKD structure across the learning areas facilitates integration while retaining the integrity of each area. It is a future-focused approach that supports ākonga to take a critical view of information and make sense of it in an increasingly digital world.



Te Mātaiaho Key competencies & Values

Key competencies

Competencies are ways of being and acting in the world. *Te Mātaiaho* identifies five key competencies:

- Thinking
- · Using language, symbols, and texts
- · Managing self
- · Relating to others
- · Participating and contributing.

All ākonga arrive at school with a rich set of competencies. They have already learned ways of thinking; of using language, symbols, and texts; of managing themselves; of relating to others; and of participating and contributing. These competencies continue to evolve over time, both within and beyond school. Ākonga use them in different ways and in different combinations, according to the context and purpose.

The five key competencies are the same as they were in the New Zealand Curriculum (2007) and are now woven within UKD in the learning areas. They are foregrounded in the disciplinary practices associated with each learning area – that is, the discipline-specific ways of thinking; using language, symbols, and texts; managing oneself; relating to others; and participating and contributing. These practices are typically found in the statements for 'Do'.

Ākonga might be learning how to think like a scientist or historian – or as a member of kapa haka, the enviro-team, or the student council. Ākonga come to understand the similarities and differences between these different ways of thinking. They can use this understanding to make informed decisions when, for example, solving complex problems.

Also foregrounded are the social and emotional learning aspects within each learning area - that is, ways of using the key competencies to enhance learners' engagement in daily tasks and challenges, both within and beyond school.

Ākonga might be learning to recognise and manage their emotions and to make responsible decisions; to develop concern for others, establish positive relationships, and handle challenging situations; to establish and negotiate learning relationships with people and places (the living and non-living world); manaakitanga, whanaungatanga, and mahi ngātahi; to value and recognise who stood before, who stands here now, and who is yet to be; to grow their sense of self as they progress towards mana motuhake. These examples encompass each learner's capabilities as part of a whānau (with whakapapa), a wide and diverse community, and te taiao, the natural world.



Therefore literacy, numeracy, key competencies, and values are explicitly integrated within each learning area's content.

- While English and mathematics and statistics anchor literacy and numeracy, each learning area describes the discipline-specific literacy and numeracy practices that enable ākonga to make connections, think critically, and communicate their ideas.
- Each learning area supports ākonga to progress in the key competencies through the disciplinary practices, social emotional learning, and selfmonitoring practices.
- Values those that are universal and those particular to each learning area

 are reflected in the big ideas of Understand, the knowledge statements
 of Know, and the practices of Do that enable ākonga to explore their values
 and the values of others.



STEM STEAM STREAM

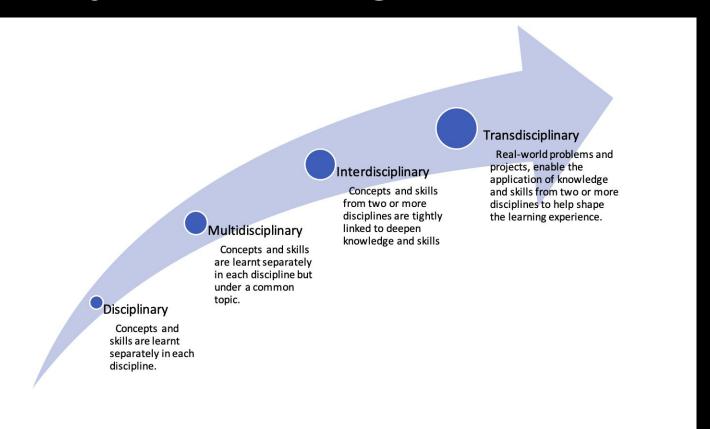
Science Technology Engineering Mathematics

Science
Technology
Engineering
Arts
Mathematics

Science
Technology
Reading
Engineering
Arts
Mathematics



Ways STEM is integrated





Theories about integration of learning

Theories which have informed integration of learning include the famous works by Lao Tzu, Buddha, Dewey, Piaget, Vygotsky, Rogers, Montessori, and Maslow

(Prince & Felder, 2006; Ultanir, 2012)

- **Discovery methods**
- Inquiry-based learning
- > Project methods
- Discussion methods,
- Peer teaching,
- Integrated multicultural pedagogies,
- The use of tools as inquiry,

- Cognitive development theory,
- Bloom's taxonomy
- Problem-based learning
- Fischer's skill theory
- Practice theory
- SOLO taxonomy
- Just-in-time teaching
- Transfer of learning



Advantages

Research has shown integration provides

- Increased performance
- Authenticity
- **Learner-centred approaches**
- Powerful learning experiences
- "Border-crossing" allowslearners to make linkages
- Integration of theory and practical work which can optimize delivery time

- Interconnectedness between STEM disciplines
- Learners to make linkages
- Exposure to multiple perspectives
- Awareness of self and others
- An opportunity to improve and develop critical thinking,
- Increased motivation and engagement



TRYING TO FIT THE GURRICULUM



If well planned
STEM integration
has the potential to
pull learning
together into a
meaningful way.

INTO A SINGLE SCHOOL-YEAR...



Issues & Considerations

- Authentic contexts
- Resourcing
- Timetabling
- Time
- Expertise
- Discipline priorities
- Buy-in & understanding
- Community engagement
- ???









Collaboration

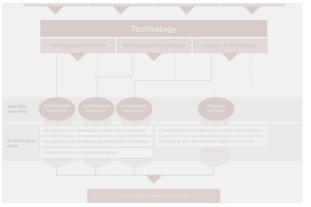


Confidence



Community







Ideas

Background





Workshop

Extra Support

Year 8: Augmented Reality Technological Outcomes

- Materials Technology soft
- Digital Technologies (CT & DDDO)
- Visual Art
- Literacy

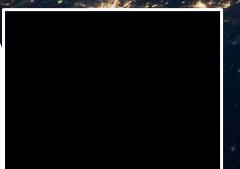














Year 6: Plushie with a purpose

- Materials Technology soft
- Electronics
- Maths
- Science
- Literacy









Year 6: LUMA

- Materials Technology hard
- Digital Technologies
- Maths
- Science
- Visual Art
- Social Studies
- Literacy





















Year 6: Landmark Design

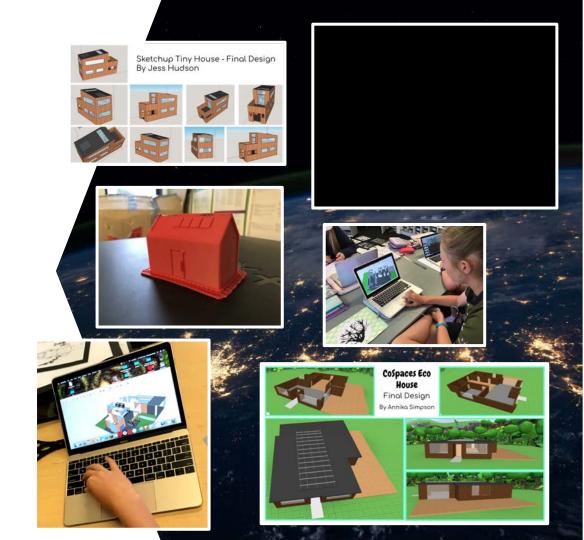
- Materials Technology hard
- Digital Technologies
- DVC
- Maths
- Science
- Visual Art
- Social Studies
- Literacy





Year 6: Architectural Design with local contexts

- Materials Technology hard
- Digital Technologies
- DVC
- Maths
- Science
- Social Studies
- Literacy





Year 8: Sustainability focused Technological Outcomes

- Materials Technology hard
- Digital Technologies
- DVC
- Maths
- Science
- Social Studies
- Literacy





Year 5-6: Creating a learning environment in our (school) bush

- Materials Technology hard
- Digital Technologies
- DVC
- Maths
- Science
- Literacy



















Connections:

IDEAS

- Living World Science
- Technology: Biodiversity, Materials
- Literacy
- Mathematics Measurement



Bird Friendly Urban Gardens				
Bird Friendly Features	Garden 1	Garden 2	Garden 3	Instructions
Open, gravey areas and leaf litter to scratch around in for fixed				Walk around your neighborhoo and look into pardens. These
A watering place for driving and betting				could also be friends or families
Tail trees that will be eate for moting and singing in				gardens. 2. Draw a star on the worksheet t
Thick or prickly shrubs for neeting and shaller				record bird friendly habitats that you observed in each garden
Hedges and other hely prents for hiding in				 Record the total star count for each property
Other bird Hendly features like bird feeders.				

If you were a bird, which garden would you prefer to live in?











Year 3-4 Journeys

- Aotearoa NZ Histories
- Social Sciences
- Literacy storytelling
- Drama
- Music
- Mathematics position & orientation







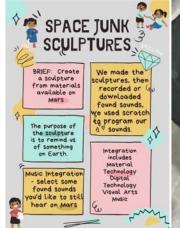






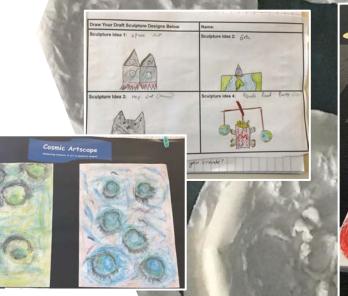
Year 3-4 Journey's Mission To Mars: What do we value?

- Digital Technology Scratch, Makey makey
- Technology Design Process
- Science
- Literacy
- Visual Arts sculpture
- Music soundscapes









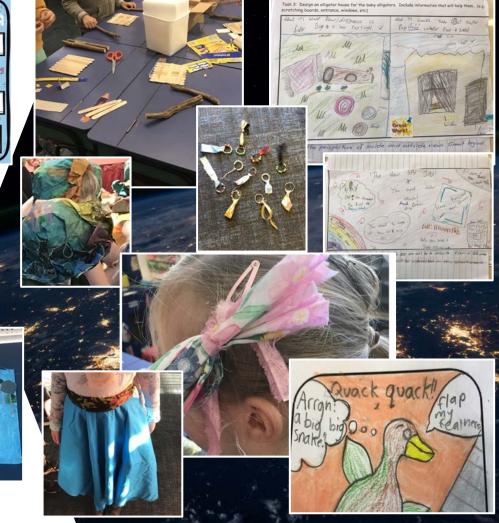




STERMS

Year 3-4 STEAM Discovery Time

- Materials Technology
- Literacy
- DVC
- Social Sciences



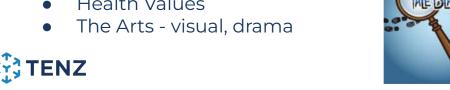






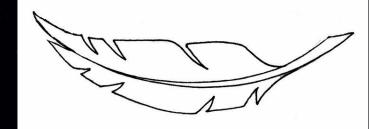
Year 3-4 Integrating Storytelling and Digital Technology

- Digital Technology Beebots, Stop motion, Augmented Reality
- Literacy storytelling, Visual language - static images
- Mathematics
- Materials Technology
- Health Values









Year 2-3 We are all connected

- Languages pēpeha
- Literacy
- Health Values
- Social Sciences
- Digital Technology
- Design Process













Draw Your Draft Playground Designs Below	Name:
Playground Equipment Idea 1	Playground Equipment Mea 2:
Playground Equipment Idea 3:	Playground Equipment Idea 4:

Draw Your Chosen Playground Design	Name of Playground Equipment:
	Why should you make this design?
	Materials Used in my model

Papa Tākaro	- The Playground
porowhawhe	merry-go-round
retireti	slide
pouaka kirikiri	sandpit
tārere	swings
tūtakarau	jungle gym

sandpit swings jungle gym

seesaw

taura rere flying fox

Ko wai kei te papa tākaro? Who is at the playground? Ko wai kei runga i te? Who is on the? Ko te tama kei runga i te A boy is on the Ko te kotiro kei runga i te A girl is on the Ko ngā tamariki kei runga i te Children are on the

Year 2-3 Technology In The Playground

Connections:

- Science: Physical World
- Literacy
- Languages
- Materials technology
- **Design Process**













- Visit the various areas of the playground and talk about how the different objects move straight line, circular movement. How do you use the equipment e.g. swing, slide, tree, bars, seesaw, whirlie gig etc ...
- Use images of the objects and label the forces as a push or a pull etc how can we start a movement, speed it up or slow it
- o Local Playgrounds visit some playgrounds and explore the equipment present hopefully we have some more information of the physics of force and motion and teachers can help learners explore and describe with more understanding.
- Some possible questions
 - Do these objects look like any that you have at school?
 - What are some interesting things about these playground objects?
 - How you would play with each of these playground objects?
 - What would you need to do to make each playground object move?
 - What are some ways that you would sort these playground objects into different groups?

Playground Equipment:

- · What is a push? What is a pull? What is a twist?
- . Do any of these playground equipment need to be pushed or pulled when played with?
- . Do we need to twist any of these playground equipment when playing with them?
- Explain how we would start the movement of each of these playground objects?.
- For each object explain how, once it's moving, it can be slowed down or stopped?

Elaborate - possible learning activities

- . Integration with Technology: Design a prototype of playground equipment
 - Using construction materials available in the classroom, instruct students to draw and build a piece of playground equipment that needs to have a push or pull applied to make it work. (look at tech online)
 - Students may offer a verbal explanation to the class about how they can play with this toy to start and stop its movement. Encourage the students to use the words push and pull in their verbal descriptions.
 - o use the engineers design process to solve the following problem using what you know about various playground equipment. Which piece of equipment would be a good addition to our playground at Tainui School?
 - Explain the forces of motion that are used when playing on this piece of playground equipment



Year 3 and 4: Tree Houses

- Mathematics
- Te Tiriti o Waitangi
- Literacy
- Technology:





Year 3 and 4: The gift of giving

- Mathematics measurement, 3D shapes
- Science
- Technology



















IDEAS

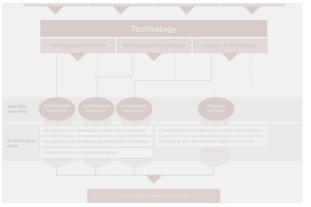
Samsung Solve for Tomorrow Competition



Cameron's invention of a 'Humane Trap for Wallabies'.



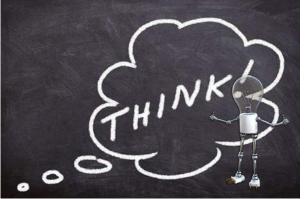






Ideas

Background





Workshop

Extra Support

Learning & Contexts

Think of a context.

This is your overarching 'umbrella'.

It can link to local curriculum, student/whānau voice, national & global issues - AUTHENTIC

What opportunities for learning can you think of linking to curriculum subjects & key competencies?

Add ideas to post its and place on wall.





Brainstorming Activity

In groups, think of authentic projects that can weave and integrate two or more technological areas.

SPEED DUMP!

Write ideas on post it notes & add to our ideas wall.

Example: Cookie making kit for school carnival

Hard Materials: Cookie cutters (plastic/metal), rolling pins, chopping board, recipe holder etc

Soft Materials: Apron, oven gloves, tea towel, etc

DVC: Recipe cards, How to use, package, etc

| Food Tech: Cookie recipe, batch production

DDDO: Recipe app, AR code with how to use the kit

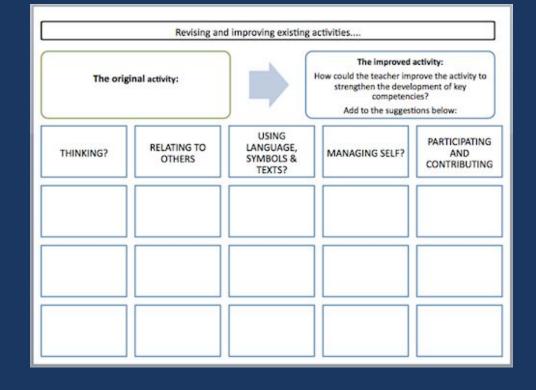


Revising existing activities

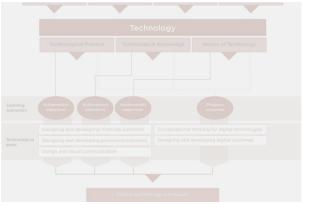
Revising activities with more focus connecting to key competencies.

Template:

https://nzcurriculum.tki.org .nz/Key-competencies/Tool s/Key-competencies-in-act ivities





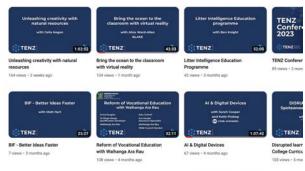




Ideas

Background





Workshop









Extra Support

STEM/STEAM Webinar

STEM / STEAM

Wednesday 24th June 2020, 7.30pm



A professional development webinar for New Zealand teachers



TENZ YouTube Channel





TENZ Resource Store















































TENZ Authentic Contexts



Inspirational ideas for projects from teachers across Aotearoa

Aim of the resource

TENZ is committed to developing and sharing educational resources that support Technology education across Aotearoa New Zealand. This particular resource has been developed with support from educators from across the motu and aims to support kalako with:

- · Local curriculum links
- · Ideas for authentic contexts
- Inspiration for planning programmes, units & lessons

All aspects of NZC Technology can be taught through this resource including, but not limited to, technological practice & the design process, brief development, making connections with stakeholders and linking to the community. Plus it can support problem and place based learning, inquiry, STEM by providing ideas for teaching and learning.

Access Now

Full Member Access Now \$0.00

This document is a 'LIVE' teaching resource which is regularly updated & educators of Technology. an idea to this resource ple in the resource to a good! your ideas. Included in the resourc . The "LIVE" Auther document with On slide 14 you will fir the classroom to sup For more in ENZ

TENZ Competitions







techweek2021

TENZ Design Competition

Want to promote Technology in your classroom as part of Techweek 2021? Haven't really had a chance to prepare anything? Read on.



The Competition:

Students can practice the Technological Practice skills by designing an outcome for an authentic need.

Context: in April. Speaker of the House Trevor Malland unveiled details of

a number of new Parlamentary buildings which will be erected to house.

MP and ministers. The Beshive is traditionally the home of the executive
wrig. One of the new buildings is new ministerial offices for MP's pointing the Beshive and Parlament House.

- Owen Brief: You are to design a new building for the MPs and ministers.

 It must:

 replace the old press gallery offices, which were vacated in 2017 due to earthquake strength issues.
- replace the out press gamery criticals, errich were vacation or 2017 oue to earthquiste strength resides.
 be a three-story building, complementary to the existing Executive wing, with a link to Parliament House.
 have a Green Star rating of 6.
- Students can use a variety of skills and techniques to communicate their idea to the judges includ
 - Annotated drawings



What I have completed so far

Brainstorm and created a initial brief -

I need to design and make a product to help stop native birdlife flying and crashing into our dining room windows.

- Research the brief
- · Written attributes for my outcome
- Initial concept ideas for my outcome
- · Development of an idea
- Final design
- · Made and tested the prototype









Linking to DDDO



Julie McMahon

TRCC/Digital Technologies PLD

https://docs.google.com/presentation/d/lg7OTaOv XYpqw-2YZwdsfB8tmX21DhjGEjuGYzjV3CKE/edit? usp=sharing



He Karakia Whakamutunga

Ki a mātou katoa

To those of us gathered

Kua mutu mātou i a mātou mahi,

i a mātou kaupapa hoki

Arahina mātou,

kia kawe mātou i a mātou haepapa

Kia whakatapua mātou ki ngā kaupapa me ngā mea e whakapono.

Manaakitia mai mātou.

We have finished our work and

practices

Once again help us with our

responsibilities

We are dedicated to the things we do

and believe

Bless us all





Ngā mihi Thank You



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tenz.org.nz

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Click on the logos to visit our pages.

