KIWI CAN FLY - The America's Cup

For our Kaiako... WHY?

- Innovation skills - reflection, iteration - life long skills everyone should have

UNDERSTAND... The big ideas

DRIVING QUESTION	**How can we, as innovators, design a new method of sustainable transportation/movement?**
WHAT WE WANT FOR OUR ĀKONGA	• To understand and explore how sustainable transportation impacts our environment • To understand and explore how we can make things that move more sustainable (not travelling, using public services, How can we move less?, using zoom, lawnmowers,)

ENGLISH AO'S	**Processes and strategies –** • Integrate sources of information, processes, and strategies confidently to identify, form, and express ideas. **Ideas –** • Select, develop, and communicate ideas on a range of topics. • uses a range of oral, written, and visual features to create meaning and effect and to sustain interest	In **English**, students study, use, and enjoy language and literature communicated orally, visually, or in writing.
THE ARTS AO'S	**Understanding the visual arts in context** Investigate the purpose of objects and images from past and present cultures and identify the contexts in which they were or are made, viewed, and valued. **Communicating and interpreting** Explore and describe ways in which meanings can be communicated and interpreted in their own and others' work.	In **the arts**, students explore, refine, and communicate ideas as they connect thinking, imagination, senses, and feelings to create works and respond to the works of others.
HEALTH & PE AO'S	Access and use information to make and action safe choices in a range of contexts. Experience and demonstrate how science, technology and the environment influence the selection and use of equipment in a variety of settings.	In **health and physical education**, students learn about their own well-being, and that of others and society, in health-related and movement contexts.

	Describe and demonstrate a range of assertive communication skills and processes that enable them to interact appropriately with other people.	
Learning Languages AO's	**Cultural knowledge** Students will: • Make connections with known culture(s).	In **learning languages**, students learn to communicate in an additional language, develop their capacity to learn further languages, and explore different world views in relation to their own.
Maths AO's	**Patterns and relationships** • Generalise properties of multiplication and division with whole numbers. • Use graphs, tables, and rules to describe linear relationships found in number and spatial patterns. **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. • 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. **Statistical literacy** • Evaluate statements made by others about the findings of statistical investigations and probability activities.	In **mathematics and statistics**, students explore relationships in quantities, space, and data and learn to express these relationships in ways that help them to make sense of the world around them.

Science AO's	**Physical world** 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. **Nature of science** Appreciate that science is a way of explaining the world and that science knowledge changes over time.	In **science**, students explore how both the natural physical world and science itself work so that they can participate as critical, informed, and responsible citizens in a society in which science plays a significant role.
Social Science AO's	• Understand how exploration and innovation create opportunities and challenges for people, places and the environments. • Understand how producers and consumers exercise their rights and meet their responsibilities. • Understand how people participate individually and collectively in response to community challenges-(Sustainability links to global warming - how can we help future through our innovative transport ideas)	In the **social sciences**, students explore how societies work and how they themselves can participate and take action as critical, informed, and responsible citizens.
Technology AO's	**Technological Practice** *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. **Nature of Technology** Students will: 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. **DDDO: 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. In doing so, they identify digital devices and their purposes and understand that humans make them. They know how to use some applications, they can identify the inputs and outputs of a system, and they understand that digital devices store content, which can be retrieved later.	In **technology**, students learn to be innovative developers of products and systems and discerning consumers who will make a difference in the world.

KNOW . . . Rich contexts for exploring the big ideas

Local Contexts	Department of conservation Animation Research Limited - Not having to travel (impact on the environment) Space Nigel Davenport Asuma Bainbridge-Zafar Senior Communications & Engagement Advisor - Zero Carbon at Dunedin City Council Caroline Orchiston - Centre for Sustainability Otago University
Authentic Contexts - examples of resources	The power of transportation - National Geographic Developing the future of transportation - National Geographic Power the world with footsteps -PaveGen Perpetual free energy - is there such a thing? A video discussing this (to a high level) Creative dance to engage children in movement and flow Cities Rise to the Challenge - Sustainable Mobility Papatūānuku Breathes - This could spark discussion around sustainable transport. Great video that explains how to present the brief using designing a lawnmower as an analogy How can we reduce the cost of moving goods and products to consumers? What types of transport have the most effect on the environment and how can we change this? Reframing the problem: reducing traffic through incentives (rewards and punitive) BP challenge Lawn mower - looking at changes over time Teach Engineering flow - a STEAM based class activity
Mātauranga Māori	Look at natural fibres - look at harakeke - strength of natural fibres Design techniques of māori - waka hourua Part One Kiwi Can Fly Part Two Innovation is in our DNA Part Three Powered by youth Part Four Powered by nature Design of Waka Hourua - video Waka Taua - video Preserving Harakeke - how could this be used as a fibre? Taewa and psyllid - could potatoes be part of the solution? Reviving toheroa - What are some different ways we could look at sustainably harvesting, and transporting kaimoana? Kaitiaki of the kiwi - What possibilities are there for 'moving' pests that harm kiwi populations? Revisitilising Māori Astronomy - How could different types of navigation have an impact on our environment Insects and Forest ecosystems- Is there anything we can learn from insects about sustainable travel/movement? Restoring Māuri after the Rena disaster - If we had another disaster of this kind, how could we design a sustainable solution? What methods were used that were sustainable?

DO. . . Practices that bring rigour to learning

Assessment What or how will we assess?	See below
Relationships 4 Learning	Communicate the project and the purpose Who in our community can we reach out to - newsletter,seesaw,HERO Community invited to a showcase of the mahi Sharing learning progress along the way Inviting whānau along to zoom with experts, or come into school Find out what interests ākonga have in this space What expertise do you have within your school community? Connect with mana whenua - what stories from our area link to this kaupapa?
Inclusive content	Video ignitor - innovation of playgrounds so children in wheelchairs have access - changing the surrounding to meet the need so all can move School Journal Level 3 May 2020 - The Omeo Story - Kevin Halsall is an engineer and inventor who likes to solve problems. Over a four-year period, he designed and built the Omeo: a ground-breaking mobility device that gives people much greater freedom than a traditional wheelchair. Adaptive Bikes - less cars on the road - biking is more sustainable Different innovations to link people around the world without having to transport them over - everyone can get involved. Dr Bionics Show - How does the internet work? https://www.newzealand.com/sg/feature/inclusive-tourism/ - looking at ways to innovate travel options to be more inclusive Obstacles in public transports for those with a disability Data around access to inclusive travel in New Zealand
Inclusive delivery	Student voice and choice Visual aides around the workspace
Inquiry Skills, Design Thinking or Key Comps etc	**Inquiry skills -** - Creative problem solving - Learning how to give and receive feedback and iterate from this - Questioning and critical thinking **Key competencies -** - Thinking: Creative and critical thinking processes to make sense of questions, information and experiences. - Relating to others: This competency includes the ability to listen actively, recognise different points of view, negotiate, and share ideas. - Managing self: Maintaining a self motivation and can do attitude Design Process

LEARNING THAT MATTERS

CRITIQUE AND REFLECT

Explore/Ignite/Engage : What is sustainable transport? Explore current sustainable transportation options. Experts to visit, Zoom, consult to spark and ignite ideas

Driving Question:
Unpack the DQ, What are our need to knows? What skills am I going to need? Example - Compass thinking tool

Frontloading / Scaffold :(teacher led/lessons)
Sessions: eg What is sustainability? Energy sources - non renewable/renewable?
Forces and Motion- Aerodynamics? Biomiciary?
What modes of transport exist now? Possible future design options?
Narrow the focus - student choice of area of interest

Research / Embark: : (Independent inquiry)
Research sustainable transportation. Research ideas for their mode of transport- success, inventions, innovation - notes, images, sketch ideas, talking to experts, gathering information to support the design process.

Craft / Enrich /Critique : Plan, design and create a prototype for a new form of transport that is sustainable. Test and improve. Ideas based on key knowledge from front loading/scaffold sessions

Present : A Prototype using a chosen medium / movement (e.g. 3D model, makey makey, advert, slides, on air app, diorama, frame, dance, art, system etc)

Reflect / Evaluate:
NOTE: This needs to be ongoing throughout the process - students need to share, reflect, seek feedback on ideas throughout the process.
Does our product meet the need?
What changes have you made? How will you justify your idea using your scientific under-standing of forces and motion?

Curriculum Integration...

Literacy Integration...

Reading/Research skills - What types of sustainable transportation do we already have?
Design Pitch Document - Persuasive writing
Learning Journals
Writing - research reports/proposals
Book Clubs - researching other young innovators/case studies
Questioning - Tesla Zoom
Debates- Does everyone need a car? (socratic seminars could also work here)
Visual language - adverts

Numeracy Integration...

Statistical investigations - measuring and graphing speeds
Measurement - scale of prototypes/models - lengths
Gathering data - graphing
Mapping of local infrastructure - transportation options
Traffic flow - logic

Science Integration ...

Circuits/batteries
Energy - non vs renewable
Hydrogen Power
Science of wind power
Velocity/speed
How do air transport fly?
Aerodynamics (Body Design)
Dragons Den/Trade Fair
Carbon Cycle
Sustainability
Biomimicry Biomimicry 101 - Examples Of How We Copied Nature
Exploring flight- Play with flight equipment (vortex, frisbee, boomerang, kite)
- Create and test paper planes (distance and hang time)
- Launch home made rockets

Kiwi can fly

How can we, as innovators, design a new method of sustainable transportation?

Technology...

Test, prototype, modelling
Sphero challenge
Circuits/batteries
Vlog of design process throughout the project
Aerodynamics
Design Process Skills
3D printing
Cardboard construction opportunities
Field trips to businesses/groups that are using technology in innovative ways (experts/parents from the community could also come in to speak)
How has transport changed over time
Sustainable living
How technology contributes to sustainability
Creating a Google site to inform others
Looking at models of sustainability
Sustainable road marking - reflective materials etc.

			Intelligent traffic control systems Self driving cars
Arts Integration... Designing blueprints Creating models 3D Sketching Music - sounds of transportation/EV's Dance - movement in space (thinking/playing moving in space) Visual Art - create visual representation of transportation Create/organise images of transport over time Create a piece of background music for a presentation on how transport has changed over time	**Health & PE Integration ...** Healthy communities - active transport? Movement/aerodynamics sport/cars Well being systems in cars - Physical exercise - Walking , Cycling and non-powered wheels. Conserving energy to convert into electricity Throwing and catching - aerodynamics research	**Social Sciences ...** ANZH understanding the past for the future Impact on environment and change over time What changes have been made in the past? Case study of one mode of transport and innovation of time - ref Kiwi can fly video Americas cup to now. History - How many innovations do we now have from the Jetsons etc? Why don't we have flying cars yet? Compare and contrast past & present and explore changes over time Famous innovators research/Famous NZ innovators	**Languages...** Poetry Competition Māori - sustainable technologies, such as harakeke instead of carbon fibre for lightweight/strong materials.

My Classroom...

General Plan or Ideas to meet the needs of my Ākonga...	Ākonga Voice...

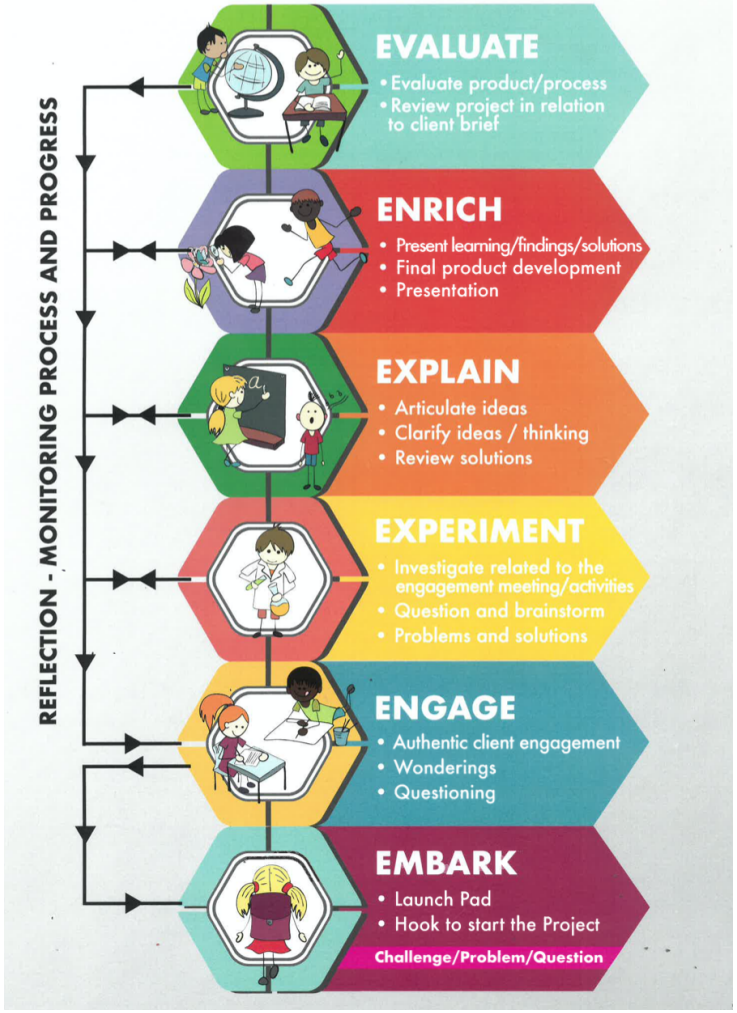
		I need support to:	I'm learning to:	I can:	I'm always:
Understand	**Explore/Ignite/Engage :** What is sustainable transport? Explore current sustainable transportation options. Experts	- Have a can do attitude and find tricky things exciting while teaching others to persevere - Be enthusiastic and passionate about learning and exploring new thing- complete see think wonder			
	Driving Question: Unpack the DQ, What are our need to knows? What skills am I going to need?	- Ask relevant and appropriate questions to reflect on and challenge my thinking and learning - Show understanding of central aspects of the Driving Question by identifying in detail what needs to be known to answer it and considering various possible points of view on it- complete compass task			
Know	**Research / Embark:** (Independent inquiry) Research sustainable transportation from other countries.	- Seek to understand: be critical in my approach to learning - Give an opinion about an idea and explain my thinking - Demonstrate an understanding of key knowledge			
Do	**Craft / Enrich /Critique :** Design and create a prototype for a new form of transport that is sustainable. Test and improve.	- Solve problems by selecting appropriate strategies and explain how they work - Explain the outcome I am developing and describe the attributes it should have, taking into account the opportunities and resources available - Implement changes to their design following feedback and critique - Justify their choices about their design idea - Problem solve and persevere - Organise my time effectively - Successfully craft my design using the skills I have learnt			
	Present : A Prototype using a chosen medium (e.g. 3D model, makey makey, advert, slides, on air app, diorama)	- Do the right thing, in the right way, for the right reasons - Clearly identify how my understanding of key concepts and skills has deepened during this project - Clearly communicate and justify their ideas - Effectively reflect on whether your prototype meets the needs			

Example of Project Plan

Critical Reflection/Feedback

Milestone 1 Ignitors	Milestone 2 Front Loading	Milestone 3 Scenarios Identify Problem	Milestone 4 Design Process	Milestone 5 Making and creating	Milestone 6 Balmac Trade Show
Introduction of driving question and project overview Complete Ignitor activities: -Ian Taylor presentation- Zoom/ in person. - Play with flight equipment (vortex, frisbee, boomerang, kite) - Create and test paper planes (distance and hang time) - Launch home made rockets	Students will develop their understanding of forces and motion and *why* and *how* we move through - Workspace tasks - Matauranga "Kiwis can Fly" - Biomimicry case studies Waka Kotahi Collisions Forces and motion posters. Force and motion research template page (blank space to write findings)	Develop '*Need to Know*' wall. Provide categories. - Scientific Knowledge - Introduction of Design Thinking Process- Identify problem Brainstorm need to know section Design thinking template Identify problem (refer to Research template T1 book) Space to answer questions	Initial designs, critical reflection and feedback - Sketch - Prototype - Critical reflection - Refine I used to think, now I think What makes you say that? Sketch pages, I used think now I think feedback template, Justification	Creation of final digital designs, prototypes and persuasive promo vlogs. Explicit teaching of digital tools to be used for design. Top tip page (page 22) Exploration of digital design tools (how you use this tool)	Presentation of digital designs, prototypes, scientific understanding and persuasive promo vlogs at Trade Fair. Evaluation- self, group critical reflection Evaluation page- student Teacher assessment Presentation page
Formative Assessment	Formative Assessment	Formative Assessment	Formative Assessment	Formative Assessment	Formative Assessment
See Think Wonder	Workspace activity "Kiwis can Fly"	Need to Know Wall	Peer feedback?		Self and group reflections.
Rite of Passage/Teacher Check	Rite of Passage/Teacher Check	Rite of Passage/Teacher Check	Rite of Passage/Teacher Check	Rite of Passage	Rite of Passage
Completion of "See think wonder" critical thinking task.		Class "need to know wall"	Group Claim, support, question critical reflection from prototype Video diary entries with justifications.		Completion of Self and group reflections.

MAORI HILL SCHOOL
PROJECT BASED LEARNING STAGES



Need to Knows

N. Need to Know

E. What excites you about this project?

W. What worries you about this project?

S. Stance