

## TERM 1 NEWSLETTER 2024

### President's Report

There are so many changes occurring in 2024, it could feel a little overwhelming. BEANZ is here to support you with your endeavour to embed new Achievement Standards into your refreshed NCEA program. This term we have been running webinars on Mondays or Tuesdays and the recordings can be found on the [BEANZ website](#) or on the Ministry of Education (MoE) website. We have also published the BEANZ version of the [Subject Learning Outcomes](#) (SLOs). These mirror the MoE version but are bullet pointed for ease of reading.

BEANZ continues to talk with the MoE about the CB standards, and they have been very responsive to our recommendations. Although it is unlikely that there will be major changes to the CB standards in 2024, we do have commitment from the MoE that they will continue to engage with us to make improvements. Should you have any issues, please contact [biologynz@gmail.com](mailto:biologynz@gmail.com) and we will respond to you AND if required, add your suggestions to our own list.

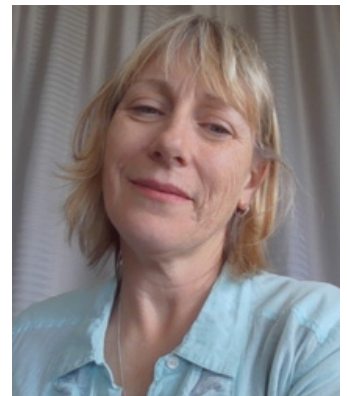
Speaking of refresh... what do you think about our new logo and the refreshed website? The BEANZ executive really wanted a website that worked for our users. This included no more than three clicks to get to a teaching/learning tool and keyword search facility. Like all new digital tools, it's not perfect yet, but I think you would all agree that Ben Himme and the teams from Warp Speed and Digital Cactus have done a great job.

Nga mihi

Erica Jar  
President.

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## BEANZ AGM

Brentwood Hotel,  
Sat April 6th  
9.00-10.30am

**All BEANZ members are  
invited to attend by Zoom.**

**Join Zoom Meeting Meeting ID: 826 5393 6350  
Passcode: bw91vN**

## Students Read Articles

### New Release by BEANZ

With the support of our tertiary liaison Associate Professor Nic Rawlence, BEANZ is proud to bring teachers of Aotearoa New Zealand this series of six articles. With names like 'Land of the Chonky Birds' and 'It's Hard Being a Male Moa', Nic has created engaging and educational activities for students to engage with.



'Students Read Articles' is a literacy resource, a biology learning resource, and a tool for teaching students how to read journal articles. These articles are either modified from published journal articles or are a meta-analysis created to introduce students to funky concepts in biology. The articles are written for year 10 or 11 students, come with a glossary and a set of questions that cover 'understand, know, do'. You can find the articles [here](#).

## Clarification for Standard: CB1.1 (92020) : Demonstrate understanding of the relationship between a microorganism and the environment.

After a lengthy discussion with the NCEA team at the Ministry of Education on Thursday 15th February, I would like to make the following clarification for this standard:

Although a student needs to only demonstrate understanding of one life-process, it is expected that more than one life-process will be required for the impact of that life-process to affect abiotic or biotic factors in the environment. For example: anaerobic respiration by bacteria produces lactic acid, which must be excreted for there to be an effect on pH in the environment. Anaerobic respiration would be the primary life-process a student would demonstrate understanding of (equation, lower energy production, toxic waste products produced), but acknowledgement that the lactic acid requires the life-process excretion is acceptable for a drop in pH (abiotic) of the environment, resulting in coagulation of milk proteins (biotic) to reach Excellence.

## Expected Student Responses

The Ministry has developed Expected Student Responses (ESR) to guide assessor judgements for two Level 1 Chemistry and Biology standards – CB1.1 (92020) and CB1.2 (92021). There is an ESR for each of Achieved, Merit and Excellence and each includes a short commentary indicating why it would be judged at A, M or E. The ESRs are available on [ncea.education](https://www.ncea.education) on the Unpacking tab for each of these two standards (scroll to bottom of the page).



# Check out our new website

[www.beanz.org.nz](http://www.beanz.org.nz)

## SEARCH FUNCTIONS

Better organisation and searchability of BEANZ resources. Click on 'Members Resources / All resources. You'll be blown away at the stuff that is in there.

Making it better and better...

## MEMBER CONTRIBUTIONS

Members can now contribute resources through the website too! Your best activities / projects / units of work could be made available to the whole New Zealand community of biology teachers. Please note that resources go through a moderation process, and it may take several weeks before they are visible to other members online.

## POLLS

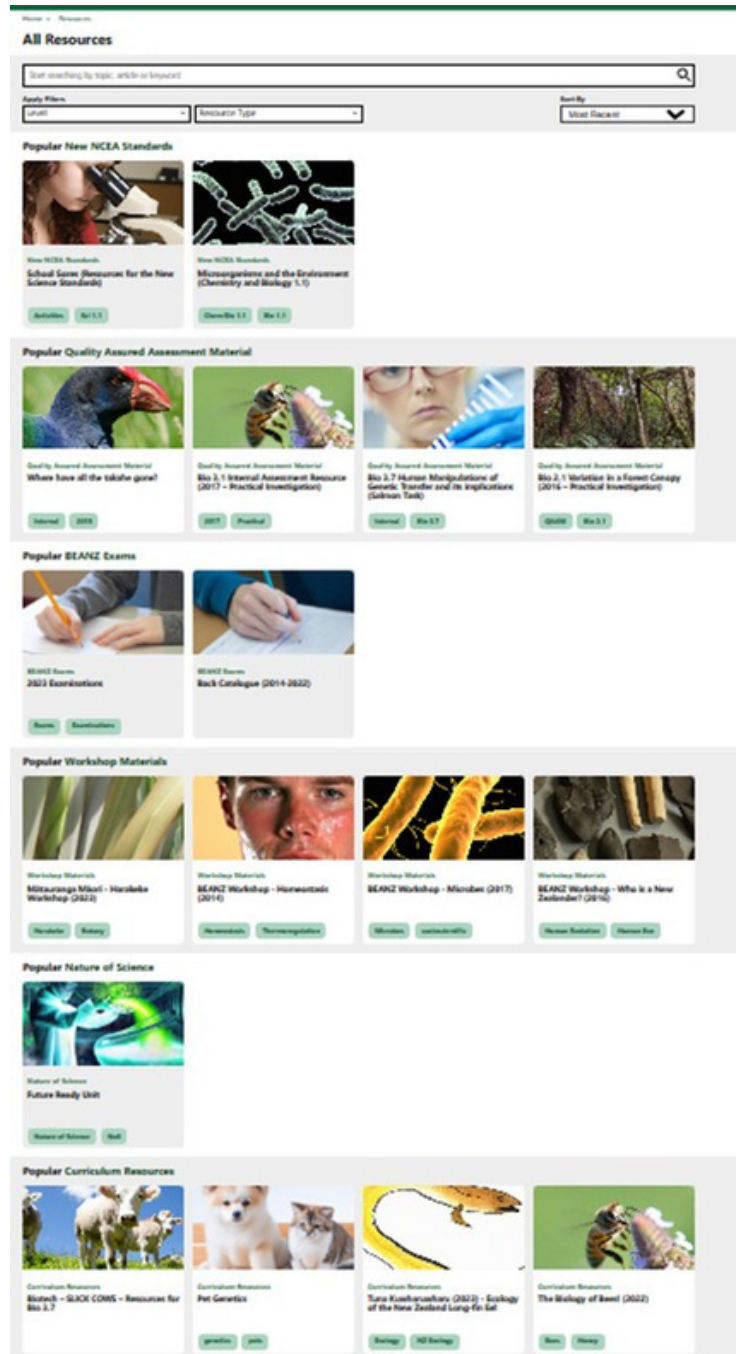
The new website will have live polls so we can learn more about our network and give our members greater voice. We haven't published a poll yet, but watch this space in 2024.

## REGIONAL REPS

Our regional representatives can now communicate more easily manage and communicate with the members in their region.

## HAVING ISSUES?

Every major website development always comes with some bugs attached. Please let us know if you are having any issues accessing your account. Send inquiries to: [biologynz@gmail.com](mailto:biologynz@gmail.com).







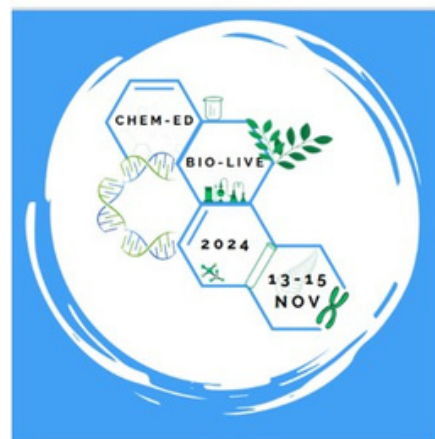
# BioLive ChemEd Conference 2024

## Save the date -

From the evening of **Wed 12th**  
to lunchtime on **Fri 14th Nov**

## Venue and hosts:

Victoria University, Wellington



## Keynote speakers:

**Ian Shaw.** A popular and entertaining Science lecturer at University of Canterbury and  
**Peter Mahaffy.** USA based expert on Systems Thinking in Chemistry education.  
*There will be a third Keynote speaker*

## Other speakers will include:

**Dave Lowe.** Recently retired, internationally renowned Wellington based climate scientist,  
**Martyn Reynolds.** Expert in the education of Pacific students.  
**Findal Proebst.** Soil scientist and 'Future Farmers' leader  
**Nic Rawlence.** Palaeontologist and Tertiary Representative for BEANZ  
..... and many more from Chemistry and Biology fields.

## The conference will include:

**Field Trips.** Thursday afternoon, to a choice of (mostly) science - based local research institutes / Zealandia / other places of interest including one of Wellington's renowned craft breweries.

**Quiz Night and a Conference Dinner.**

## Watch out for the website going live very soon.

and have a think about whether you'd be willing to offer a workshop. What have you been doing in your teaching that has perhaps been novel / a bit different / or just works well?

We look forward to inviting you to Wellington for our uplifting biennial gathering of enthusiastic Chemistry and Biology teachers from around Aotearoa New Zealand.



## Congratulations Nic Rawlence

As you will know, Nic is our tertiary representative on the BEANZ Exec. He is the author of the feature articles that we include in our newsletter.

We would like to congratulate Nic on being promoted to the role of Associate Professor.

Nic features in the following: [How to become a palaeontologist](#) - we hear from 12 professionals about their careers.



Nic is a bit of a 'rock star palaeontologist' with all his achievements.

For your interest, here are some links to his science communication works:

- [Lost worlds](#)
- [The Conversation](#)
- [Strangers from Paradise](#) – a great story in the New Zealand Geographic
- [The Big Question](#) – From Aptornis to Zosterops. What can be done about an extinction crisis 50 000 years in the making?

## Peter Sutton – BEANZ Treasurer retiring

BEANZ wishes to give a big thank you to Peter for years of service as BEANZ treasurer. His thorough and meticulous attention to the exacting requirements of the role has resulted in the highest degree of professionalism in the maintaining of BEANZ financial affairs.

Peter had a teaching career spanning nearly 40 years, in a variety of schools in various parts of the motu, mainly teaching Biology and Science but also Physics, Computer Studied and Education for Sustainability. The last 20 years he held positions of Head of Faculty for Sciences at two of these schools, the last being Marlborough Boys College. In addition to this core business, he has had a variety of roles including national biology moderation panel member, NCEA marking panel leader and participation in a variety NQF and NCEA assessment guide writing groups. Since retiring from full time teaching in 2015 Peter has been working in the digital fluency professional development space, for Microsoft and as a PLD facilitator. For the last ten years Peter has been the BEANZ treasurer over an exciting period during which the organisation has matured from an energetic standing committee of NZASE, to a well-structured and resourced independent professional association that has become increasingly effective at supporting the biology teachers of Aotearoa.



We wish Peter all the best for his next steps where he lives in 'semi-retirement' beautiful Kaikoura. This will include a part-time position as Laboratory Manager at Kaikoura High School (a role, as HOF, he swore he would never take but thoroughly enjoys). He is also a member of several local organizations mainly focused on the protection and enhancement of the coastal environment, and the safety of those that enjoy it.



# BEANZ Feature Article



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*Reprinted with permission from [The Conversation](#)*

**Takahē** are a striking bird and a national treasure in Aotearoa New Zealand. But the history and origin story of this flightless swamp hen have become a point of scientific debate.

Our [latest research](#) uncovered the significant impact of humans and past climate change on takahē. Genetic analysis has also revealed that takahē are closely related to their extinct North Island cousin, the [moho](#), contrary to previous research and established ideas.

So what is the story behind this large, prehistoric bird, [once believed to be extinct](#)? And how might this new knowledge improve efforts to protect the unique species?

## A debated origin story

The evolutionary history of takahē and moho has long puzzled scientists. Previous [genetic analysis](#) of small fragments of DNA suggested they were not close relatives. Instead, it was believed they descended from two separate arrivals to New Zealand by an ancient species of swamp hen.

This evolutionary history has become [conventional wisdom](#). But it's different to the origin story of the majority of New Zealand's birds with related species in the North and South Islands (such as [tīeke](#) and [kōkako](#)). Most New Zealand birds descend from a single colonisation event, not two.

*Read more: [How did ancient moa survive the ice age – and what can they teach us about modern climate change?](#)*

Our new research has upended the takahē origin story. Using [palaeogenetic techniques](#) we sequenced takahē and moho DNA from fossil, archaeological, historical and living individuals to reconstruct their evolutionary history.

Our findings suggest the Australian or Pacific swamp hen ancestor of takahē and moho arrived in New Zealand four million years ago, as the previously forested landscape began to open up with a cooling climate.

Around 1.5 million years ago, a [land bridge between the North and South Islands](#) allowed the now possibly flightless swamp hen to evolve into takahē in the south, and the taller and slither moho in the north. This land bridge eventually eroded with the development of Cook Strait around 500,000 years ago.



Purple swamp hens like the pūkeko are great dispersers, having colonised isolated islands throughout the Pacific four million years ago. Kathrin & Stefan Marks/flickr

## Ice ages and human arrival

Our genetic analyses and the fossil records show takahē were restricted to isolated areas in the northwestern and perhaps southern South Island at the height of the last ice age – 29,000 to 19,000 years ago.

As the climate warmed, takahē shifted their distribution to eastern and southern regions. The takahē in the northwest South Island (where the Heaphy Track is today) went locally extinct.

However, the biggest impact on takahē came with the arrival of East Polynesian colonists in the late 13th century. Over-hunting, [habitat destruction](#) and predation from kiore (Polynesian rats) and [kurī](#) (Polynesian dogs) resulted in the loss of takahē everywhere except Fiordland.

This dramatic contraction and population bottleneck resulted in a small and inbred population with little to no genetic variation. There is no evidence of the genetic lineage (a series of mutations or changes in the genetic code which connect an ancestor to its descendants) of living takahē in any archaeological or fossil specimens we examined.

This lineage may have only occurred in Fiordland, or was extremely rare in takahē and swept to dominance in this small population.

*Read more: [The legend of Pōuwa: ancient myths of New Zealand's black swan confirmed by fossil DNA](#)*

Another possibility suggests this lineage occurred spontaneously – much like the [genetic mutation in Queen Victoria](#) that gave rise to haemophilia in members of Europe's royal families.

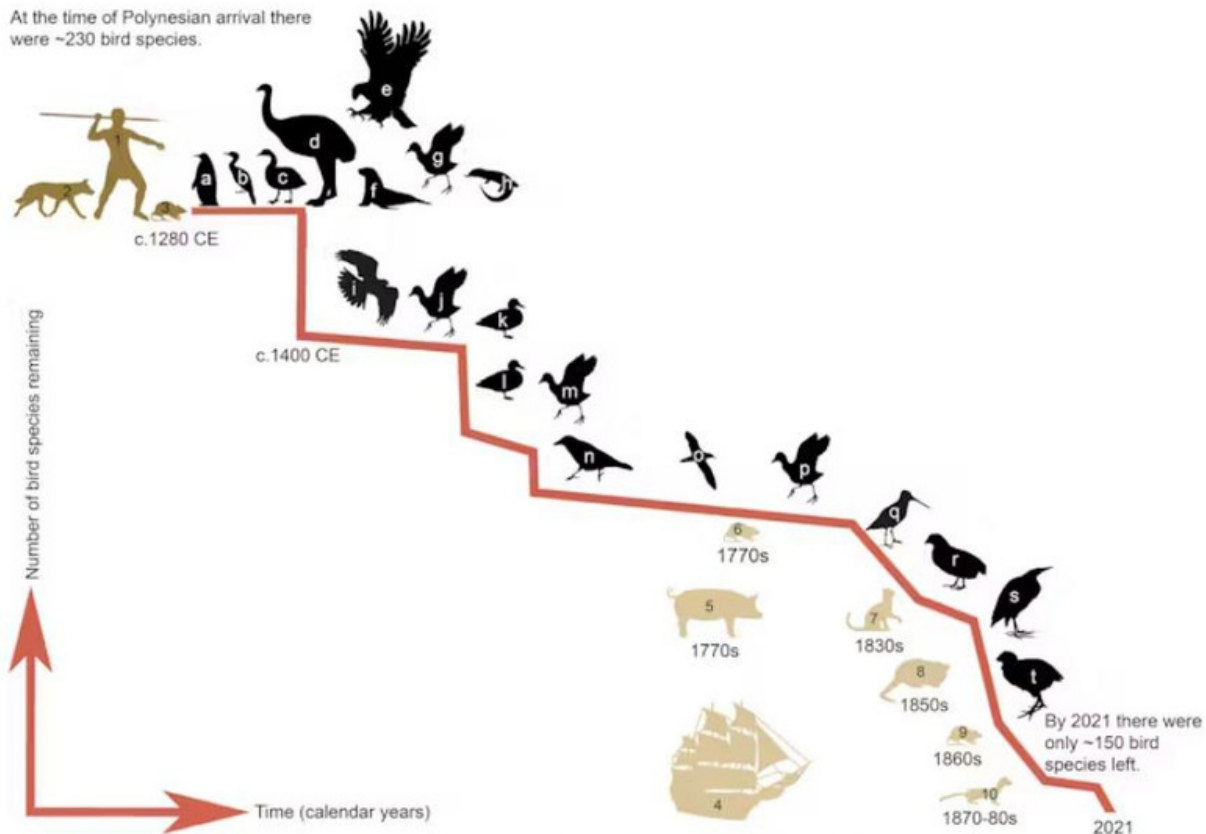
We know from historical records that the arrival of Europeans and their furry companions no doubt resulted in further restriction of already rare takahē to the Murchison Mountains in Fiordland. However, we don't see any further genetic bottleneck at this point, as the damage had already been done by earlier human activity.

The moho suffered the same fate as takahē, with the last probable sighting in the late 1800s. The demise of moho and the near extinction of takahē opened up a [job vacancy in the ecosystem](#), allowing the pūkeko to colonise New Zealand from Australia [around 500 years ago](#).





At the time of Polynesian arrival there were ~230 bird species.



## Improving conservation management

The growing field of conservation palaeontology uses the fossil record to inform conservation management decisions. It is especially important for endangered animals where human impact has masked their true biological heritage.

*Kea*, despite appearances, are **not an alpine bird**. Likewise, the ideal habitat of takahē is not tussock. Rather, the fossil record suggests takahē preferred border habitats such as the edges of forests, grasslands and shrublands, where one habitat transitions to another.

Conservation palaeontology can and should be used to determine the range of suitable habitats across the country, based on the preferences of prehistoric takahē. This can be married with effective predator control to support takahē populations.

It has long been known that takahē underwent a population bottleneck upon human arrival, but what surprised us was its scale. Our research highlights the need for conservation efforts to maximise the amount of genetic variation passed down to each generation, and to minimise the amount and consequent impacts of inbreeding.

Although threats to our native wildlife exist in the here and now, the past can be a key to future efforts to conserve our precious biodiversity.

## Associate Professor Nic Rawlence

BEANZ Tertiary Representative  
Director - Otago Paleogenetics Laboratory  
Associate Professor in Ancient DNA  
Department of Zoology  
University of Otago, Dunedin







# Tiakitanga

**NZASE  
PLD  
resource**

*Puketoki  
Scenic  
Reserve,  
Whaka-  
marama,  
Bay of  
Plenty.*

*Many schools use the term kaitiakitanga to mean caring for our environment as a responsible NZ citizen. While a worthwhile aspiration, nevertheless it can unintentionally ride roughshod over a Māori tikanga with deeper meanings which need to be considered. In consultation with Nick Bryant (Ngāpuhi, Ngāti Whatua) Mike Stone learns more about kaitiakitanga and tiakitanga.*

## What is kaitiakitanga?

Kaitiakitanga is often translated as guardianship – caring for and protecting the environment – and is associated with conservation. It is seen as a way of managing the environment based on a traditional Māori worldview.

But it is more than that. This term also has relational, spiritual and political connotations.

You may have come across the word mātaia- hikā in the new curriculum, which is linked with “connecting with place and community – learning through local relationships with tangata whenua and the community”. The term ahi kā means home fires burning and can reflect a connection to home or where your people belong.

If an iwi maintains ahi kā in a space continuously and for a long time, it makes them responsible for that place, and mana whenua by definition. This does not give them ownership in a western sense; it is about responsibility for, and connection with, the land.

Mana whenua hold rights as kaitiaki, responsible to ensure the mauri (life force) of the things within that area is nurtured and sustained, a spiritual as much as a physical role.

This role may be held by individuals representing the iwi or by the iwi itself. So a particular person may be kaitiaki of the shellfish of an area; for example, able to put a rāhui in place to stop harvesting. Kaitiaki may also be a real creature or an imagined one, a spiritual entity that acts as a

guardian of the forest or river.

As land ownership can be contested, this role also has political ramifications about who has the right to be kaitiaki.

The underlying framework of kaitiakitanga (Browning, 2022) includes :

- Whakapapa, a long-standing relationship to the land, its people and their ancestors.
- Mauri being safeguarded and sustained.
- Rangatiratanga being connected to and supported
- Mana (prestige, authority, status, spiritual power).

So to be kaitiaki we need to whakapapa to the land we are caring for, which applies only to Māori. Del Wihongi says, “Everybody on this planet has a role to play as a guardian. But if you use the word kaitiaki, that person must be Māori because of the depth and meaning of the word, and the responsibilities that go with it” (Roberts et al., 1995).

## Illustrations of kaitiakitanga

A traditional pūrakau tells the story of Rata, a young leader on a journey to avenge his father and in need of a waka. He goes into a forest, chooses a majestic totara and fells it after a day’s hard labour. But in his haste, he has not thanked the guardians as tikanga requires.

When he returns at day break he finds the totara standing whole, with no evidence of his work. He fells it again but the totara is restored again the next morning. So he tries again on the third day but hides and waits.

He sees Tāne guardians, te tini o Hākuturi, emerge, sweep up the chips, and make the tree whole again. Rata acknowledges his wrong, asks their blessing and rests while the guardians fell the tree and hew out the waka in a single night.

The moral of this story can be explained as the importance of tikanga Māori, the process to follow to make it right. But it also illustrates kaitiakitanga, caring for a precious taonga, and shows that



**NZASE**

Representing the needs of science teachers

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kaitiaki are all around us.

The way harakeke flax is collected also shows kaitiakitanga. Weavers and harvesters' customary practices for gathering and sustaining the harakeke include cutting carefully to guard the precious shoots budding at the centre of the plant, and leaving leaf remnants around the plant to compost and replenish it at the roots.

This central part of the flax is explained as the child sheltered by its parents on either side, with the composted soil maintaining the whānau or tribal base. Te Arawa kuia Huhana Mihinui describes this as a flaxroots, hapū-centred understanding of resource management (Browning, 2022).

Both the pūrakau and harakeke practice show an ancestral presence in precious resources, a concern for practical survival and an underlying obligation to care for hapū in Māori relationship with resources. Kaitiakitanga over the hapū resources is an act of connection with family and with ancestors.



Harvesting harakeke, Te Papa MA\_I278676.

ownership and ahi kā. It is just about caring for living things, all living things, equally.

The land, and the things living on the land, are what is important. As the whakataukī says: Whatungarongaro te tangata, toitū te whenua; as people disappear from sight, the land remains.

## Tiakitanga

Kaitiakitanga is a term not much used before the RMA was enacted in 1991 (Browning, 2022). The act defines kaitiakitanga as “the exercise of guardianship by the tāngata whenua of an area in accordance with tikanga Māori in relation to natural and physical resources.” So the responsibility is enshrined in law.

The word kaitiakitanga has three parts. Tiaki can mean to guard, preserve, keep, conserve, nurture, protect and watch over. The prefix kai is about who is doing the work, or who ‘feeds’ the kaupapa. Just like the kaikōrero is the person who speaks on marae, the kaitiaki is the one who has the role of caring for tribal resources. The suffix tanga turns the word into a noun – preservation, conservation, protection.

Tauīwi cannot be kaitiaki, as defined in tikanga and in law. Tauīwi can, however, engage in **kaitiakitanga**, which is work done under the guidance of mana whenua.

Without meaningful engagement with mana whenua, a safer way of describing the work that many teachers and students do is **tiakitanga**. This role of tiaki is removed from the spiritual dimension and from political discussions of land

## References

- Browning, C. R, 2022, *The woven Treaty – kaitiakitanga as a theory of the guardian relationships and principles of te Tiriti o Waitangi/the Treaty of Waitangi* (PhD dissertation, University of Otago).  
[The Resource Management Act 1991](#).  
Roberts, Norman, Minhinnick, Wihongi, & Kirkwood, 1995, Kaitiakitanga: Maori perspectives on conservation. *Pacific Conservation Biology*, 2(1), 7-20.  
Science Learning Hub, [Understanding kaitiakitanga](#).

## Ngā Kupu

- Iwi** – Tribe, large group with a common ancestor. **Pūrākau** – Myth, ancient legend, story. **Rāhui** – Temporary ritual prohibition, closed season, ban, reserve. **Rangatiratanga** – Chieftainship, right to exercise authority, chiefly autonomy. **Tangata whenua** – people born of the whenua; ie, local people, hosts, indigenous people. **Tauīwi** – Pākehā and other non-Māori, foreigner, person from afar, outsider, stranger. **Whakapapa** – Genealogy, genealogical table, lineage, descent. **Whenua** – Land, domain; placenta, afterbirth.

Te Aka Māori Dictionary

Nick is not claiming to speak for his iwi, nor does his opinion carry more or less weight than others' contributions. He is giving the opinion of a Māori science teacher in this national conversation of mana orite mo te mātauranga Māori.

This article has been checked by Pauline Waiti.



# NZASE

Representing the needs of science teachers





The NZASE NZ School's Animal Ethics committee (AEC) (Animal Ethics) was set up in 2005 to help students and teachers to meet their legal obligations under the Animal Welfare Act 1999 and to make it easier for school students and teachers to gain understanding of the use of animals in research, testing and teaching and the consideration of three R's (replacing, reducing, and refining)

The committee members are people with a variety of expertise in animal welfare and teaching including animal welfare officers, vets and teachers. They meet several times a year to consider applications.

Under the Animal Welfare Act 1999, research, testing and teaching involving using live animals may require ethics approval.

This requirement also applies to animals used in schools, on-school farms and school activities. The Schools Animal Ethics Committee was set up to help schools, home schools and early childhood centres meet those legal requirements.

[View the NZASE Code of Conduct for the use of animals.](#)

Attitudes towards animals are formed early in life. For many students school may be the first place where they gain experience on how to handle and look after animals.

Most animal related projects will require approval and proof of approval is usually required for entry into Science Fairs. For more information about whether a project requires approval click [here](#).

What does the AEC do?

- Considers applications to use animals in teaching projects led by teachers and/or students
- Sets appropriate conditions on approved projects
- Monitoring of approved projects
- The ability to refuse approval, set conditions, approve, suspend or revoke approval for applications to manipulate animals for teaching
- Communicating to teachers and students the requirements of the Act, and the need to seek approval under Part 6 of the Act to manipulate animals for the purposes of teaching
- Answering questions from teachers and students; thereby guiding their project design to meet animal welfare best practice standards
- Establishing that all manipulations of animals have oversight of suitably qualified persons
- Reviewing the results of approved projects

The AEC has a strong educational role, most applicants are young school children. Where appropriate applicants will be offered help with science and animal welfare aspects of the proposed applications.

We are here to help. If you are not sure whether you need animal ethics approval, please send us an email to ask.

What's the process?

School AEC application forms for students and teachers can be downloaded from the schools AEC website <https://animaethics.org.nz/>. Be sure to complete the entire form with information and detail about the project. Incomplete applications will lead to delays in obtaining approval.

Teachers and students apply to the schools AEC for ethics approval for investigations involving animals that they might be planning. Under the Animal Welfare Act 1999, 'animal' means any live member of the animal kingdom that is a mammal, bird, reptile, amphibian, fish (bony or cartilaginous), octopus, squid, crab (including half crab), lobster or crayfish (including freshwater crayfish), and includes any marsupial pouch young or mammalian foetus, or any avian or reptilian pre-hatched young, that is in the last half of its period of gestation or development.

If teachers apply for project approval for an investigation that is going to be repeated, e.g. the three-year approval then there should be at least two teachers from the school on the approval application just in case a teacher leaves the school.



Note: Also for all teachers that are intending to carry out investigations during Term 1 of 2024, e.g. mud crabs or, they need to have applied for ethics approval in Term 4 of 2023.

Retrospective approval cannot be given.

Under the Animal Welfare Act 1999 any project or teaching that might affect an animal's normal physiology, behaviour, anatomy or practices outside their usual care requires ethics approval. Science and Technology Fairs will not accept projects that do not have approval from an Animal Ethics Committee.

Do School Farms need AEC approvals?

Those schools who keep animals (eg outdoor chickens, school farm) written operating procedures (OPs) need to be approved by AEC.

The OPs should describe:

- the qualifications of the person in charge,
- husbandry of the animals,
- emergency management plans
- management/handling of animals by students and teachers.

OPs will be reviewed every three years.

What are the outcomes for students ?

Applying for animal ethics approval can be a valuable educational experience and learning opportunity for young students, teaching them about responsible research and ethical considerations.

Young students develop a sense of responsibility and compassion for animals by understanding the importance of their welfare.

The process of animal ethics consideration

- Instils the value of respecting all forms of life, and
- Fosters empathy and kindness towards animals. It also
- Demonstrates a commitment to the ethical treatment and welfare of animals, and this
- Promotes responsible project practices.
- Assists the understanding the importance of following the law introduces students to legal and regulatory requirements for working with animals.
- Encouraging young students to apply for animal ethics approval can be a valuable step in nurturing their curiosity and guiding them toward becoming responsible, ethical, and compassionate individuals.

By going through the approval process, students can ensure the safety of both themselves and the animals involved in their projects and are also held accountable for the well-being of animals. We expect a zero-death outcome in all school projects.

Ethical research practices encourage young students to apply the scientific method properly, which is a valuable skill for academic development.

The AEC are happy to be contacted to answer questions and provide guidance. We encourage teachers to contact the AEC if they are unsure of the requirements prior to allowing students to start their projects.

Please visit the Animal Ethics website to apply for approval: [Animal Ethics](#)

For more information or if you have any questions please email: [animaethicscommitteenz@gmail.com](mailto:animaethicscommitteenz@gmail.com)

## Regional Representatives 2024

### North Island

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Wellington Central	<b>Rep needed</b>	
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## Regional Representatives 2024

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BIOLOGY EDUCATORS OF AOTEAROA NZ

TE RŌPŪ WHAKAAKO KOIORA O AOTEAROA

## BEANZ Executive

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Senior Vice-President	Chantal Hillier
Treasurer	Peter Sutton
Website Coordinator	Ben Himme
Assessment Coordinator	Ken Loh
Curriculum Development	Penny Daddy Heidi Brown Jessica Richards
Executive	Gerd Banke Jennie Merchant Lila Beneteau
Tertiary Representative	Nic Rawlence
National Administrator	Allan Smith

**For more information contact [biologynz@gmail.com](mailto:biologynz@gmail.com)**