NZASE resource

Schools in community science projects

Financial support and expertise is available for teachers wanting to develop more expensive learning projects for their students. NZASE Science Communicator Mike Stone found it is well worth investigating, as these case studies show.

Curious Minds funding

The MBIE's Curious Minds (CM) programme includes the Participatory Science Platform (PSP), which supports science-based projects in the community, with up to $20,000 available for any one project.

To receive funding, the project must be community-driven, educational, and connected with scientists.

CM funding can help with data collection and analysis, and sharing knowledge with the community. It can be used for travel and liaison as well as research tools and consumables.

Since 2015, the PSP has been run in the original three pilot regions. Up to six Curious Minds PSP projects will be funded in each region annually: Otago, Taranaki, and South Auckland.

Although the deadline for applications has passed in Taranaki, it is still open in Dunedin (to Māehe/March 9) and Auckland (Noema/Nov 27, Pēpuere/Feb 26 and Māehe 25).

Marine biosecurity

Three Northland schools have been part of a project about marine conservation: Whangarei Girls' High School, Whangaroa College and Bay of Islands College (BoIC). Erin Bomati, a scientist from Sails for Science NZ, has collaborated with Marine Biosecurity Toolbox to secure CM funding. They were supported by the Unlocking Curious Minds contestable fund, which provides $50,000-$150,000.

Vegetables germinating in the Waiuku College hydroponics system. Photo: Doug Johnson.

Jay Vijayakumar from BoIC was one of the teachers involved with this project in 2023. Keen to find hands-on experiences for his students, he has involved all the Yr 10 Science classes as well as his L1 Science class, who were piloting the new Science standards.

There were several elements to this project. In class, students learnt from Erin and Jay about ecology and genetics, with a focus on native and introduced marine species, biodiversity, biosecurity and marine conservation.

Erin also connected them with Robyn Willoughby (Ngāti Kuta), who led lessons on kaitiakitanga and rāhui, explaining how local iwi monitored the environment.

Jay said: "There was a great interplay of indigenous knowledge and science knowledge in this project". Robyn spoke with classes in Social Studies as well, and this whole project has been a catalyst for BoIC beginning to develop a relationship with Ngāti Kuta.

A BoIC student with a cruising speed net for collecting plankton. Photo: Erin Bomati.

The students then went on a series of field trips. They did a zonation study, sampling organisms on the rocky shore at Ōpito Bay, and went out on a boat to sample the sea water with a TORPeDNA device and a cruising speed plankton net.

Students identified species found on the shore using keys, and from the ocean samples extracted DNA using PCR. Some of the sample was sent away for eDNA analysis.

These findings were significant, as it was the first data set of its type. The project sampled three different areas where

invasive species were abundant; were present in small amounts; and barely present at all.

Their work found the invasive species they expected, and learnt more about where they had spread to.

The 133 BoIC students found the work engaging, and four girls continued working with Erin to develop a Science Fair project.

ROPS students placing the 2040 Bird Song Monitors on Maungakiekie. Photo: Robyn McConnell.

Monitoring birdsong

Royal Oak Primary School (ROPS) is across the road from Maungakiekie/One Tree Hill and Cornwall Park, which are a focus for their local curriculum.

This park is one of several across the Tāmaki Makaurau/Auckland isthmus that form a corridor for birds, stretching from the Hauraki Gulf to the Waitakere Ranges.

Robyn McConnell has a team of ecowarriors from Yrs 4-6, who meet one hour per week or per fortnight, depending on their syndicate. They look after several projects – managing the flower and vegetable gardens; litter collection; and Trees for Survival programme, nurturing 900 natives and planting them along waterways.

Robyn has developed a project monitoring birds in the area, to provide a baseline to measure the effectiveness of future predator control.

The Curious Minds funding purchased automatic birdsong monitors from 2040 Ltd, which the ecowarriors placed in the school grounds and on Maungakiekie. Powered by solar panels, the microphones detected and recorded birdsong on a cell phone for one minute an hour, every day.

The students used the 2040 app to analyse recorded data, identifying and counting the species of birds on Maungakiekie and in their kura. They were excited to capture ruru/morepork calls at night.

Along the way, ākonga learnt how to use binoculars and tally sheets, and solved a problem when the monitors stopped recording, finding and fixing the issue.

They learnt about how the Tupu Maunga Authority manages cultural issues on the maunga, and why the grass is being allowed to grow rather than being grazed. Students also learned that science investigations are not predictable and don't always go the way we expect.

The project also funded field trips. Year 6 did the Awesome Aotearoa programme at Auckland Zoo at the start of the year, to learn about the importance of birds to our ecology.

In term 4, Yr 5 students will go to Tiritiri Matangi, a local island sanctuary, as they get ready to take over the bulk of the ecowarrior work in 2024.

Robyn really appreciated the support from Curious Minds; staff helped her connect to local experts and understood the vagaries of school, which meant things sometimes do not go as planned.

CM PSP staff also helped Robyn find extra funding when she realised the students were going to need headphones to be able to listen to the recordings, and a 3D printer to help with the pest control part of the project.

Developing a hydroponics system

Doug Johnson at Waiuku College teaches two Primary Industry classes in Horticulture. This year he used CM funding to build a hydroponics garden to grow vegetable crops. Once the funding was received they used the two lessons on Thursday in terms 2 and 3 to work on the project.

His students and outside experts worked on sectioning off a shed, painting the interior, sourcing and installing solar panels and modules of PVC pipes, as well as lighting above the grow tubes.

Once these were built, students stuck the seeds in foam and sat them in the plastic cups in holes in the piping. Students also made the nutrient solution and added it to the water in the system.

PhD student Anthony Tang helped set up Arduino sensors to measure temperature and humidity every 30 minutes. Paea from Youthtown also helped with construction and with engaging the students.

ROPS students using binoculars on Maungakiekie. Photo: Robyn McConnell.

Then they found they needed to solve some problems to help keep the growing conditions optimal – balance the nutrient mix, eliminate algae and pests, and reduce the high pH.

Doug applied for

Waiuku College students striking their seeds. Photo: Doug Johnson.

funding with only a simple idea: to build a vertical grow garden. Once the application was accepted, CM PSP staff placed people around him to help make it happen. They planned and worked together to find the experts, trades people, and materials for the construction.

Other schools have also used this funding for horticulture. Manurewa Intermediate automated their school greenhouse to maintain constant light, temperature and humidity. Ōtāhuhu College developed a māra, growing taro and plantain, with chickens to eat the weeds and structures to keep out the pūkeko.

Science at home

Dr Rodrigo Martinez Gazoni from the University of Canterbury has used CM funding to develop the BIG SCIENCE! programme, which empowers students to do real science from home. The focus is on 11-15-year-olds and the physical sciences.

When participants register they get sent a kit, with instructions for putting it together. So far, BIG SCIENCE! has sent hundreds of kits for measuring forces, experimenting with atomic and crystallographic structures, tracking stars, and more.

Participants then investigate the parameters that affect the various experiments, as part of several projects exploring the world around them.

Big Science also has VR (virtual reality) experiences of scientists in action in the lab, and AR (augmented reality) experiences of a crystal lattice structure.

Registered students get access to an online hub, with a forum where they can get answers to their questions from scientists and other students, and weekly video conferences focussed on the progress of each project.

Ngā Kupu

Ao mariko – Virtual reality, virtual world
Ao niko – Augmented reality
Ine-tōpana – Force meter
Kaitiakitanga – Guardianship, stewardship
Kura – School, education; to be educated
Māra – Garden, cultivation
Maunga – Mountain, mount, peak
Pītau ira – DNA
Rāhui – Temporary prohibition
Tioata – Crystal
Tīpako – Sample; sampling
Tōpana – Force.

Te Aka Māori Dictionary and *Paekupu*

Left: The Big Science crystal-building kit.

Below left: The Big Science force measurement tool.

Below: The Big Science inclinometer.