



SUMMARY

# 2

## SCHOOLS & THE SCIENCE COMMUNITY

# SCHOOLS' GUIDE TO GETTING CONNECTED



## ABOUT THE RESEARCH

A research project for the Ministry of Education explored how connections between schools and the science community could support more future-oriented science learning for all New Zealand learners. The research comprised surveys of teachers and members of the science community; case studies; focus group interviews with scientists and science educators; and a synthesis of New Zealand and international literature. The project was carried out by the New Zealand Council for Educational Research (NZCER) in collaboration with Learning Media and the University of Waikato. The full report is available at [www.nzcer.org.nz/research/publications/strengthening-engagements-between-schools-and-science-community](http://www.nzcer.org.nz/research/publications/strengthening-engagements-between-schools-and-science-community)

## WHO IS PART OF THE “SCIENCE COMMUNITY”?

The “science community” broadly includes:

- working scientists and those who manage science organisations
- tertiary science educators and students
- science communicators
- professionals in science museums, science and technology centres, zoos, aquariums
- other people and groups that provide professional support for science or promote public science engagement.

The more inclusive term STEM (science, technology, engineering, and mathematics) is often used to represent the interconnected work of these different but overlapping communities.

## SUMMARY 2: GETTING CONNECTED

Schools' connections with the New Zealand science community already help to extend and enrich science teaching and learning. Our research suggests that stronger connections with the science community could help schools to provide more future-oriented science education for all learners.

### HOW ARE SCHOOLS CONNECTING WITH THE SCIENCE COMMUNITY?

There are many ways New Zealand schools already engage with the science community. Some engagements are geared towards primary students, others towards secondary students, and some are across all year levels. Some initiatives aim to support particular groups of learners, such as Māori or Pasifika students, or students in need of extension in science. Many provide professional support, resources, and advice for *teachers* as well as learners. Some engagements are short-term, one-off connections, while others involve learners, teachers, and people in the science community working together over a period of time. Support for schools to connect with the science community comes from many sources including the Ministry of Education, universities, Crown Research Institutes and other science research organisations, local or regional councils, business and philanthropic groups, and community trusts.

#### Some types of science community engagement initiatives

**One-off events:** Students visiting science workplaces or universities, career information days, open days, science fairs, road shows, visits to museums, science and technology centres, aquariums, zoos and planetariums, scientists visiting schools to give talks.

**Ongoing work with schools:** Students mentored by scientists or tertiary science students, internships, scientists working alongside schools in local projects. Hands-on programmes or intensive residential courses at universities or other science institutions.

**Web-based initiatives:** Virtual field trips, connecting with scientists online and the provision of science resources for schools (for example, through online portals such as the Science Learning Hub).

**Initiatives that support teachers:** Royal Society Teacher Fellowships, other forms of online or offline access to expert information, support, and resources.

Left: Students at Ngaio School learn about science with help from parents and scientists in the community. (The Clinic case study)

## GETTING CONNECTED: WHO ARE YOUR POTENTIAL PARTNERS?

The research suggested that schools and communities can work together to ensure that learners *across* the community—not just within some schools—can engage with the resources of the science community.

Our research suggests certain key people can play a significant role. These include:

- **teachers** who have existing connections with the science community and a special commitment or passion for science teaching (including some who have undertaken science-related teacher fellowships)
- **co-ordinators/science educators within the science community** who are expert in liaising between the worlds of science and education
- **scientists, tertiary science educators and tertiary science students** who are committed to supporting school science education, and see the return benefits of engaging with teachers and young people
- **family and whānau**
- **people with strong mana and leadership roles** in the community or particular sectors (philanthropic, health, business) who have the power to inspire and mobilise resources and support to connect schools with the science community
- **other people** within the wider community who provide practical and moral support for school-science community engagement initiatives.

Could your school be part of a network of supporters who can work together to help your learners experience the benefits of connection with the science community?



Scientists, parents, and students examine marine life at Ngaio School. (The Clinic case study)

As the examples below show, science community engagements can sit alongside opportunities for wider community connectedness.

### **The Clinic**

The Clinic is a small initiative driven by a group of parents at Ngaio School in Wellington. These parents organise scientists with links to the school to provide engaging science activities for students at lunchtime, held in the disused school dental clinic. The Clinic focuses on student engagement and also on building networks within the wider school community. It started as something independent of the school programme, but is already having some flow-on effects; for example, some of the parents have been invited by teachers to come into their classrooms to run science activities. The principal reports that this initiative has highlighted people resources that are available in the wider community, and has got her re-thinking what community engagement involves. The Clinic parents believe that deeper thought and investigation is required into how schools can best engage with their communities and utilise their knowledge, expertise and participation in the delivery and development of education. They suggested one of these ways could be for a community link worker to assist schools to develop strategies relevant to their own communities.

### **Health Science Academies**

The Health Science Academies initiative is designed to provide pathways for senior secondary Māori and Pasifika students into the health workforce in Counties Manukau/South Auckland. The programme currently operates in three secondary schools. Participants in the Health Science Academies case study believe the programme works because the schools in the programme share a common goal—increasing the number of Māori and Pasifika high school graduates entering tertiary health science degree programmes and subsequently employment as health professionals. A high level of trust has helped the teachers in these schools to successfully co-construct the Health Science Academy programme, and to understand and agree on its ongoing development. Students who opt into the Health Science Academies participate in a specifically designed science-based academic programme over Years 11–13. They are supported by after-school tutorials, the provision of free resources, career information, and opportunities to visit a range of health providers. A high level of family support for students who are selected for the Health Science Academies is also expected. This initiative has facilitated the development of more productive relationships between students, teachers, and families.

## WHAT ARE THE CHALLENGES FOR SCHOOLS?

### Access issues

Access to the science community and its resources are one issue. In a survey of science teachers in early 2011,<sup>[1]</sup> teachers in high-decile schools were more likely than those in low-decile schools to say they had ready access to:

- scientists who could talk to students about their work
- science museums or similar education outside the classroom (EOTC) opportunities
- a network of peer support (for example, local science teacher groups).

Teachers in urban schools were also more likely than their rural counterparts to say they had access to science community resources. These findings underscore the need for system-wide thinking to ensure that *all* learners, regardless of where they go to school, can benefit from connections with the science community. Some existing e-learning initiatives already work to support schools to overcome these challenges of distance and cost.

*We have a database of parent and community members with interest/passion/expertise in science. We use them on a topic/needs basis in the classroom or visit their workplace.*

(Primary teacher)

*We are an incredibly isolated area and do not get access to most of these types of support. For us to travel to get to such support is not possible due to the time and cost involved as it would be a full day out of school.* (Secondary teacher)

### Teachers' knowledge and confidence with the nature of science

Teachers also need knowledge and confidence to make effective use of the science community. Our research identified that teachers who were “active users” of the science community’s resources<sup>[2]</sup> were also more likely to:

- be confident in their ability to implement the Nature of Science strand of the science curriculum
- strongly agree that the Nature of Science strand is changing the way they teach science
- strongly *disagree* that the Nature of Science strand is too difficult or abstract for students
- strongly agree that engagement with people from the science community is essential for a 21st century education
- use a range of other science curriculum resources to support their teaching.

As a teacher or school leader, developing your knowledge and confidence with the Nature of Science strand of the curriculum may be an effective springboard into richer engagements with the science community and its resources.

## CONCLUSION: WHAT ENABLES SCHOOLS TO COLLABORATE WITH THE SCIENCE COMMUNITY?

This research suggests the following factors are important:

- connections with willing, able, and supportive partners in the science community who can assist learners and teachers to make *further* connections that support their learning needs
- strategies to minimise potential barriers to access (time, cost, distance, accommodation)
- people within (or closely connected to) the school who can co-ordinate between science partners and teachers/learners both *within* their school and, where appropriate, *across* schools
- partnerships into the wider community that support, extend, and enrich the value of schools' engagements with science community partners
- shared goals for supporting science education *across the community*, enabling schools to collaborate in a high-trust, non-competitive environment
- professional learning that develops teachers' understandings of the nature of science and the purposes for learning science in the 21st century
- a curriculum that is enabling, and assessment structures that can be used flexibly in service to future-oriented science learning



Students from James Cook High School learn first aid with support from the Pasifika Business Trust. (Health Science Academies case study)

## USEFUL LINKS

Science online: <http://scienceonline.tki.org.nz>

Science Learning Hub: [www.sciencelearn.org.nz](http://www.sciencelearn.org.nz)

LENScience: [www.lenscience.auckland.ac.nz/uo](http://www.lenscience.auckland.ac.nz/uo)

The Royal Society of New Zealand: [www.royalsociety.org.nz/teaching-learning](http://www.royalsociety.org.nz/teaching-learning)

The Sir Paul Callaghan Science Academy: [www.scienceacademy.co.nz](http://www.scienceacademy.co.nz)

The University of Otago Division of Sciences: [www.sciences.otago.ac.nz/teachers.html](http://www.sciences.otago.ac.nz/teachers.html)

Learning Experiences Outside The Classroom: <http://eotc.tki.org.nz/LEOTC-home>

Inspired by science: A paper commissioned by the Royal Society and the Prime Minister's Chief Science Advisor: <http://www.nzcer.org.nz/research/publications/inspired-science>

The Clinic blog: <http://theclinicngaio.wordpress.com>

Health Science at James Cook High School: [www.jchs.school.nz/academies/health](http://www.jchs.school.nz/academies/health)

Science Wānanga: <http://sciencewananga.otago.ac.nz>

### Notes

[1] The survey was completed by 343 teachers (primary and secondary) who taught science.

[2] "Active users" had used several different forms of science community support and resource within the last 12 months.



Parents and students explore electronics at Ngaio School. (The Clinic case study)