



# Science in primary schools: a guide for leaders

Science is a way of making sense of the world and the universe beyond it. Science involves systematically making and testing ideas, collecting evidence through a variety of methods, problem-solving, and creating new knowledge. Scientific knowledge and ways of thinking help to inform technological innovations and creative solutions to problems.

## **Achievement and engagement in science declines as students progress through school**

Local and international evidence shows a decrease in New Zealand student achievement and engagement as they progress from Year 4/5 to Year 8/9. NMSSA (2017) found 94 percent of students in Year 4 were achieving at or above curriculum expectations while only 20 percent were achieving at or above curriculum expectations in Year 8. Year 8 students were also less positive about science and had lower levels of confidence in relation to science.

## **Supporting teaching science**

To help support teaching science in primary schools, ERO wanted to understand more about what was happening for children's learning in science, and to share examples where it is happening well.

We share our findings in detail in two new reports:

- *Science in the Early Years: Early Childhood and Years 1-4*
- *Growing Curiosity: Teaching Strategies to Engage Years 5 to 11 Students in Science.*

This short guide for leaders draws from the full reports to help you:

- understand how leadership impacts on science in primary schools
- identify how you could strengthen science teaching and learning in your school.

We hope you find this guide useful to reflect on how you currently provide for science, and for ideas you can build on when providing children with science learning opportunities.

## What we found impacts on science in primary schools

### Knowledgeable and enthusiastic science leaders are important for driving and sustaining improvement

Science leaders might be a school leader, age-group leader, curriculum leader or someone in an informal role.

Passionate, knowledgeable science leaders consider the big picture when planning and leading changes in a school. They are aware of how science learning can extend students' curiosity and interest in the world around them, and support teaching to plan programmes that actively engage students in meaningful and purposeful science learning.

You can help science leaders be successful by:

- enabling the science leader to engage in relevant professional learning and development (PLD) opportunities
- allowing time for the science leader to review schoolwide science teaching practice
- allocating time for the science leader to share their knowledge and skills with other teachers.

### Leaders can use documentation to show a clear direction and expectations for science

There is an opportunity for leaders to signal the importance of science, and the expectations for science teaching and learning, by being explicit about this in school documents. When doing so, it is important to consider how to present the expectations, so leaders can usefully guide teachers' decision-making.

For example, action plans to guide change in science teaching and learning might include:

- providing clear descriptions of the roles, responsibilities and timelines for change
- documenting what was learnt through implementing the plan.

### Supporting professional learning and development in science can support teachers' confidence

There are many ways to provide PLD in science for teachers. It is helpful when the PLD aligns with teacher and student needs. Internal evaluation of science teaching and learning can help you identify these needs.

There are a variety of external PLD opportunities on offer, from short, single sessions on a particular topic, to long-term science PLD running for a term or longer.

You might also consider accessing PLD with others in your Kāhui Ako | Community of Learning.

There are many experts in the community; think about asking for input from iwi, museums, your local council, industries and conservation groups. They are often keen to share their knowledge and insights.

Internal PLD might be facilitated by science leaders, and involve things like:

- introducing research for teachers to critique and discuss
- explaining the *Nature of Science* strand and the *Science Capabilities*, and teaching strategies to focus students on what science involves and how science works
- modelling hands-on experiments at staff meetings or in classes that teachers could use in their own class
- assisting teachers and/or teaching teams when planning integrated science units
- sharing on-line resources, science teaching workbooks, and science equipment teachers could use.

### Internal evaluation can usefully support leaders to identify what is working, and opportunities to improve science teaching and learning

Internal evaluation in this context means reviewing practice, and how well it meets akonga needs, and identifying areas for improvement.

When done well, internal evaluation successfully contributes to improvements. It draws on multiple perspectives, such as those of students, parents and whānau, and teachers.

When planning for internal evaluation of science, consider things such as:

- the coverage of different areas of science in the curriculum
- teachers' confidence and knowledge in science
- students' engagement and enjoyment of science learning
- how effectively teachers promote students' learning in science.

### Examples of good practice in leading science

- We share an example of good practice in science leadership to support teachers' knowledge and confidence to teach science on page 32 of our report *Science in the Early Years: Early Childhood and Years 1-4*.

The report, *Growing Curiosity: Teaching Strategies to Engage Years 5 to 11 Students in Science*, contains the following examples of good practice for science leadership:

- Engaging students in multiple and rich local learning opportunities, p. 17

- Growing leaderships to improve students' learning in science, p. 21
- Reviewing and improving students' engagement in science, p. 25
- Growing curious minds, p. 31
- Improving students' engagement in and perceptions about science, p.36
- Ensuring all student engage in high quality science programmes, p. 40
- Developing a well-structured curriculum, p. 45
- Developing responsive and carefully structured science programmes, p. 61

### Where can you go for more help?

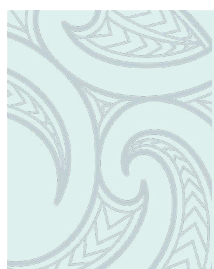
Ministry of Education Science hub:

Science Online – [scienceonline.tki.org.nz](http://scienceonline.tki.org.nz)

The Science Learning Hub from the Nation of Curious Minds – [www.sciencelearn.org.nz](http://www.sciencelearn.org.nz)

NZCER: Making progress in science from Levels 1 to 4 – [www.nzcer.org.nz/science-progress-workshops](http://www.nzcer.org.nz/science-progress-workshops)

NZCER: Science education publications – [www.nzcer.org.nz/research/science-education](http://www.nzcer.org.nz/research/science-education)



We appreciate the work of all those who supported this evaluation, particularly the children, leaders, and teachers who shared with us about what science looks like in their school. Their experiences and insights are at the heart of what we have learnt. You can find the full reports on science in primary schools, along with a short summary of the findings, on ERO's website [www.ero.govt.nz](http://www.ero.govt.nz).



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