



# Science in secondary schools: a guide for leaders

Science is important – we rely on science and scientific thinking in almost every endeavour in our modern society. High quality science education at school is essential for learners who want a career in science, but it is also important for all learners to help them understand the scientific issues that whānau, communities, and nations face. Issues such as climate change, healthy living, and innovation all depend on science.

Critical to science education is the quality of teaching of science in schools, and the engagement of students with science. This guide sets out actions you can take to strengthen science teaching in your school.

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

ERO is concerned that recent national and international reports have indicated that New Zealand students may become less engaged with science as they move through school. While many students are engaged, the disengaged students have indicated that they are not learning much science, see little value in science learning, and have few aspirations for a career in science.

Local and international evidence shows New Zealand students are not achieving as well in science as we would like. It also shows students become less engaged in science over time, and fewer 15-year olds see value in science, compared with their international peers.

## **Supporting teaching science**

To support leaders and teachers to review and strengthen the science learning opportunities they provide, ERO explored the strategies and approaches that a selection of schools had taken to increase students' engagement in science.

Our report, *Growing Curiosity: Teaching Strategies to Engage Years 5 to 11 Students in Science*, goes into detail about these strategies and approaches, and shares examples of practice. This guide draws on the full report to help you think about how you can support stronger science teaching and learning in your school.

## Reviewing science programmes

Strengthening science programmes starts with leaders and teachers recognising the importance of science not only for students with future science careers, but also for investigating issues and solving problems in everyday life. Leaders can then work with teachers to review how well programmes support students to engage with science in ways that support their future pathways, and everyday problem solving. You could start with thinking about:

- what is the content of our science programme across year levels?
- how coherent is it?
- how do our science programmes provide opportunities for students to be critical and creative thinkers?
- where can we improve?

Where reviews were done well, they used information from a variety of sources, such as student surveys, individual teacher inquiries, and assessment information.

Once you have identified areas for improvement, leaders can support teachers to plan how best to implement any changes. This might involve creating action plans, or working to evolve the curriculum over time, taking note of what was successful, and responding to the needs and interests of the current cohort of students.

## Carefully structured learning

You can structure learning programmes in a way that builds on students' previous learning and introduces new knowledge and skills in manageable amounts. This contributes to successful learning for students. It is also helpful to plan opportunities to revisit key concepts and scientific skills. It can be useful to think about what students need to be successful in later school years and back-map a learning progression from there.

You can help teachers think about these things when designing the science curriculum in their school.

## Changing the focus

The *Nature of Science* is the unifying, overarching strand of science in the *New Zealand Curriculum*. Learning programmes focused on the *Nature of Science* support students to challenge their thinking, through asking questions, making predictions, and following wellconsidered scientific investigations. They help students develop the skills, competencies, dispositions, and knowledge required to participate successfully in science.

Leaders can support this through:

- signalling the importance of the *Nature of Science*
- providing guidelines and planning templates to help teachers maintain a focus on the *Nature of Science*
- prompting teachers to consider ways of assessing learning that align with this focus.

## Working across subject departments

Leaders can further support students' learning in science by facilitating links across subject departments. For example, teachers might introduce maths concepts in science when students are practicing the same concept in their mathematics class, or teachers might consider how assessment tasks could be used for students to gain credits across subjects. Working in this way can give students consistent strategies to improve their progress and achievement in science.

## Examples of good practice in leading science

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

- Developing a well-structured curriculum, p. 45
- Developing authentic, place-based science programmes, p. 54

- Developing responsive and well-structured science programmes, p. 62
- 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

### Where can you go to for more help?

Ministry of Education Science hub:

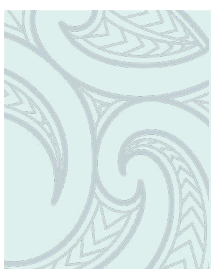
Science Online – [scienceonline.tki.org.nz](https://scienceonline.tki.org.nz)

NZCER: Science education publications–

[www.nzcer.org.nz/research/science-education](https://www.nzcer.org.nz/research/science-education)

Nation of Curious Minds Science Hub –

[www.sciencelearn.org.nz](https://www.sciencelearn.org.nz)



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



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