



# Beyond Play: Learning Through Science Investigation

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## INTRODUCTION

This project examined how participating primary and secondary school teachers and their students conceptualise science investigations. The project explored how investigative work is currently implemented within the NZ science curriculum, and how its use might be improved. To achieve this, we investigated the perceptions of both teachers and students of the educational role and purpose of investigative work in the context of science teaching and learning. This provided the basis for focused reflection involving teachers, researchers and others on current practices and how these might be modified. We then collaboratively implemented some specific ideas that emerged from reflection to evaluate their effectiveness in promoting science learning through investigation.

## RESEARCH QUESTIONS

1. How do participating teachers conceptualise science investigation and its educational role within school science?
2. How do participating students conceptualise science investigation and its role within school science?
3. Which characteristics of science investigations, or ways of presenting science investigations, facilitate the development of students' substantive and epistemological understanding?

## METHODOLOGY: WHAT WE DID DO?

- Four cross-sectional, multiple case studies in primary, middle and secondary schools, and wharekura in 2014 & 2015
- Our participants were 9 teachers and their classes in each year and 4 researchers
- Data were collected through classroom observations, teacher and student interviews, student surveys, teacher reflections, school documentation including lesson and unit plans, assessment data, and examples of student work
- We looked for opportunities provided for students to carry out science investigations and what students learnt through doing these
- During interviews, we asked teachers and students what they thought science investigation is, why students should engage in it, and what they learn from it.

## RESULTS: WHAT DID WE FIND OUT?

- Science investigations were more than play: teachers and students saw learning to investigate as purposeful.
- Students experienced a variety of approaches to investigation.
- An explicit and planned focus on the Nature of Science strand of the curriculum and the science capabilities supported students' epistemological understanding.
- Limiting the range of intended learning outcomes for a practical lesson appeared beneficial for science learning.
- Wharekura teachers' belief in the researchers' respect for the philosophy and practices of the kura gave them confidence to teach science investigation alongside Putāiao.

## RECOMMENDATIONS FOR PRACTITIONERS

That teachers:

1. are clear about what they intend students to learn from doing a particular investigation and they share this with their students.
2. focus learning with fewer intended outcomes for each activity.
3. plan specifically for the development of Science Capabilities for Citizenship.

