



## Overview

This is a profile of Māori archaeologist Atholl Anderson, which looks at his work, the methods he uses, and the importance of his field. It includes text boxes and quotes that contextualise his work (for example, explaining who the first ancestors were, where they came from, and what their society was like).

Ross Calman brings the topic alive through the inclusion of Atholl's comments and stories. The links Atholl makes to his dream of becoming a palaeontologist will resonate with students.

This article:

- includes a map of southern Polynesia that contextualises the places mentioned in the article and reveals the likely origins of the early migrants to New Zealand
- includes extracts from an interview that adds extra detail and information
- includes a text box about radiocarbon dating, photos that provide visual examples, and a glossary.

A PDF of the text is available at [www.schooljournal.tki.org.nz](http://www.schooljournal.tki.org.nz)

**Texts related by theme** “Richard Owen’s Giant Mystery” SJ L3 Aug 2015 | “Explorers of the Sunrise” SJSL L4 2014 | **The Rēkohu Journals:** SJ 2.2.10, SJ 3.3.10, SJ 4.3.10 | “The Tsunami That Time Washed Away” *Why Is That?* Connected L3, 2014

## Text characteristics from the year 6 reading standard

Archaeologists also use **genetics** to prove connections between different groups of people. They are especially interested in dentine, a source of **DNA** found in human teeth. They compare DNA from teeth found in archaeological sites in Aotearoa with DNA from sites in East Polynesia. Genetic similarities can prove that people were related.

Another area that provides valuable information is palaeoclimatology. This is looking at climate change over the centuries. Because the first migrants arrived here by boat, studying wind patterns is especially valuable. It can tell us where people came from as well as when.

some ideas and information that are conveyed indirectly and require students to infer by drawing on several related pieces of information in the text

Radiocarbon dating is a method used to determine the age of organic material – something many artefacts are made of. This material, such as wood, shell, and bone, was once part of a living thing, so it contains an **element** called carbon. As they grow, living things absorb a form of carbon from the atmosphere known as radioactive carbon. When an animal or a plant dies, it stops absorbing radioactive carbon. Because radioactive carbon decays at a known rate, scientists can work out when the living thing died. They can tell how old an artefact is by the amount of radioactive carbon it contains.

Radiocarbon dating can tell us when the first people arrived but it can't tell us where they came from. So how do we know the first New Zealanders came from East Polynesia? Again, Atholl says that artefacts provide an important link.

mixed text types (for example, a complex explanation may be included as part of a report)

There was one snag. Dinosaurs had yet to be discovered in New Zealand. (Joan Wiffen didn't find New Zealand's first dinosaur fossil – a **vertebra** from a theropod – until 1975.) It was a big snag, so Atholl thought maybe he wouldn't be a palaeontologist after all. Luckily, he was also interested in history. He could be an archaeologist!

Palaeontologists and archaeologists do pretty much the same thing. We excavate material that gives us information about the past. The main difference is that palaeontologists are interested in people, animals and plants, whereas archaeologists are interested in people. We want to know how people lived, what they ate, what they did each day. To find answers, we dig at the sites where people once lived. We also look for middens. These ancient rubbish dumps contain fish bones, bird bones, shells, broken tools – all kinds of treasure!

A midden unearthed in Takapuna

a significant amount of vocabulary that is unfamiliar to the students (including academic and content-specific words and phrases), which is generally explained in the text by words or illustrations

arrived in New Zealand between 1270 to 1300 AD. We know this because archaeologists have used radiocarbon dating to work out the age of **artefacts** found at the Wairau Bar site.

Two fish-bone middens at Wairau Bar  
Archaeologists digging at Wairau Bar in the 1960s



illustrations, photographs, text boxes, diagrams, maps, charts, and graphs that clarify or extend the text and may require some interpretation



# Possible curriculum contexts

## SOCIAL SCIENCES

Level 3 – Understand how early Polynesian and British migrations to New Zealand have continuing significance for tangata whenua and communities.

– Understand how people remember and record the past in different ways.

**SCIENCE (Nature of Science)** Level 3 – Understanding about science. **(Material World)** Level 3 – Properties and changes of matter.

## ENGLISH (Reading)

Level 3 – Ideas: Show some understanding of ideas within, across, and beyond texts.

## ENGLISH (Writing)

Level 3 – Ideas: Select, form, and express ideas on a range of topics.

## Possible first reading purpose

- To explore early Polynesian migration and the factors impacting on it (for example, the role of weather patterns).

## Possible subsequent reading purposes

- To understand how scientists gather and collate information to support a theory
- To identify the features and purposes of different text types
- To explore the differences between fact and theory.

## Possible writing purposes

- To interview somebody about their career (what they do, how they work)
- To write a diary from the point of view of a palaeontologist or archaeologist about what it might be like to make a discovery
- To write your own theory about why dinosaurs were not found in New Zealand until 1975
- To write a factual report about something you know a lot about, using evidence and examples to support what you write.



The New Zealand Curriculum

# Text and language challenges

(Some of the suggestions for possible supporting strategies may be more useful before reading, but they can be used at any time in response to students' needs.)

## VOCABULARY

### Possible supporting strategies

- Technical and scientific terms: “archaeologist”, “excavating”, “palaeontologist”, “vertebra”, “theropod”, “biological”, “artefacts”, “palaeoclimatology”
- Names: “Tupaia”, “Roy Chapman Andrews”, “Joan Wiffen”
- Place names: “Mongolia”, “Whenuahou”, “Foveaux Strait”, “Rēkohu”, “Madagascar”, “Galapagos Islands”, “Gobi Desert”, “Wairau Bar”
- Te reo Māori: “Ngāi Tahu”, “whakapapa”
- Introduce and unpack key terms (for example, archaeologist, artefact) before reading. Draw on students' prior knowledge of prefixes and suffixes, such as “bio-”, “palaeo-”, “-ogist”, and “-ical”, to help them develop a definition. The terms “archaeology” and “palaeontology” provide a good opportunity for exploring scientific vocabulary and the ways prefixes and suffixes provide clues about word meanings.
- Use the map to introduce some of the place names. Look up the locations on Google Maps to contextualise them.
- *The English Language Learning Progressions: Introduction*, pages 39–46, has useful information about learning vocabulary.
- See also *ESOL Online, Vocabulary*, for examples of other strategies to support students with vocabulary.

## SPECIFIC KNOWLEDGE REQUIRED

### Possible supporting strategies

- Some familiarity with archaeology and palaeontology
- An understanding that we use evidence of past human habitation to learn about the people living at that time
- An understanding that scientists can use the remains of previous civilisations to predict the age of artefacts.
- Ask the students to share what they know, or give their theories, about how early Polynesians migrated to New Zealand. As you read the text, have them re-evaluate their knowledge.
- Take students to a local museum to look at objects from the past from their own area.
- Explain the concept of migration in greater detail and link to modern day immigration and what makes groups of people move. If you have students who have come to New Zealand from other countries, you could draw on their experiences.
- Show appropriate online material and video clips that explore the work of archaeologists more deeply and reinforce the technical and scientific vocabulary. For example, the NZ Transport Agency video about the [Rangiriri archaeological dig](#); an introduction to archaeology “[What is Archaeology?](#)”; or the [National Geographic Kids series about archaeology](#).

## TEXT FEATURES AND STRUCTURE

### Possible supporting strategies

- Mixed text types – long quotes spliced with the running text
- A text box about radiocarbon dating
- Maps, photographs, and illustrations that support and extend the text
- A glossary
- Complex sentences.
- Skim and scan the text to identify the different text types.
- Point out that the difference between quotes and running text is clearly signalled in the design.
- Discuss the supporting visual features (photos, maps) and identify how they provide additional context when reading the text.
- Support students to use the map (for example, explaining that this is only a section of Earth).
- Explain that this text has elements of a report. Discuss the features of a report. See the [English Language Intensive Programme: Primary Resource](#) (ELIP) for text structure and typical language features of reports. You could also use this to determine an appropriate language focus for your English language learners.
- Point out that there are some complex sentences in this text. You could pull some of them out and write them on the whiteboard. Model how to deconstruct the sentence by using your knowledge of sentence structure to find the main idea, supporting clauses, and/or phrases that give more information about the verbs and nouns. English language learners might match cards with selected beginnings and endings of sentences.
- Share-read the text box about radiocarbon dating. Create a diagram to help students to unpack the concepts. Remind students they can come back to the text box later if they don't understand it right away.
- Remind students that bolded words have a glossary definition at the end of the article.



Sounds and Words

# Instructional focus – Reading

**Science Material World** Level 3 – Properties and changes of matter; **Nature of Science** Level 3 – Understanding about science.

**Social Sciences** Level 3 – Understand how early Polynesian and British migrations to New Zealand have continuing significance for tangata whenua and communities; Level 3 – Understand how people remember and record the past in different ways.

**English** Level 3 – Ideas: Show a developing understanding of ideas within, across, and beyond texts.

## First reading

- Set the purpose for reading.
- Refer to “Text and language challenges” on page 2 for ways to activate the students’ prior knowledge.
- Have the students scan the text to identify the different text types and the purposes for using them.
- Review the information students gained from their first skim and scan of the text. Prompt them to identify the key ideas of archaeology and migration by locating key words and discuss these further if necessary.
- Have the students read the first two pages with a partner and then discuss the new information they have learnt. *What do you think it would have been like for Atholl after discovering he couldn’t be a palaeontologist?*
- Ask the students to predict what further information they will find in the article. Draw out their questions about the article that they think might be answered as they read. You may need to clarify that this text will not be about dinosaurs.
- Ask the students to review their predictions. *What sentence or paragraph supported your predictions?*

### If the students struggle with this text

- Identify and discuss information that describes the differences between an archaeologist and a palaeontologist. Draw out how Atholl’s perspective shifted from wanting to be a palaeontologist to wanting to be an archaeologist, and that this article will be about archaeology.
- Read the section on radiocarbon dating together. You may want to create a diagram or flow chart to better demonstrate this process.
- Chunk the text by theories and related information.

## Subsequent readings

How you approach subsequent readings will depend on your chosen reading purpose.

### The teacher

Direct the students to the sentence structures used in the text.

- *Scientists use particular ways of communicating ideas and information. They tell you what they think, what they based their ideas on, and why they think it. Often they use phrases or linking words to help us follow their ideas.*
- *How do the sentence structures help to organise the author’s argument?*
- *Who or what does the word “they” refer to? Which other words refer to the scientists?*

### The teacher

With the students, create a mind map to illustrate the evidence Atholl has discovered and show how it supports his theory.

- *How do you know it is a fact or a theory?*
- *What are the clues in the text to help you make this distinction?*

### The teacher

Ask students to evaluate the importance of each piece of evidence Atholl has presented. Remind them that they need to look at the quotes as well as the text to find the evidence.

- *What information do you think is the most valuable in supporting Atholl’s theory? Why?*

### The teacher

Have the students look at the map on pages 12–13 and relate it to what they have learnt about early Polynesian voyages.

### GIVE FEEDBACK

- *You did a good job of backing up your perspective with evidence from the text. Each piece was relevant, and you were able to integrate it into your own understanding.*
- *I saw that you looked at the map again to clarify how the direction of the wind in the 1200s affected the direction from which the early Polynesians sailed. Knowing how to use the information provided in maps is important for reading texts like this.*
- *Finding evidence in the quote from Atholl about artefacts on page 11 was a useful way of confirming what the author said in the running text. Knowing how to link different types of information is an important skill.*

### METACOGNITION

- What helped you distinguish fact from theory?
- How did you use your own experiences or prior knowledge to help you understand this article? How did it help you?

### The students:

- identify leading sentences and reflect on how these structure their thinking into cause and effect (for example, “We know this because ...”, “Radiocarbon dating can tell us ...”, “So how do we know ...?”)
- English language learners may benefit from tracking and highlighting reference chains within and across paragraphs (for example, scientists, they, their ...). See [ELIP, Stage 2 Reading](#), section 11(c) for an example of a reference chain.

### The students:

- create a list classifying the information in the article as fact or theory.

### The students:

- identify and evaluate the evidence that Atholl presents and support their conclusions with valid reasons
- locate and evaluate words and phrases across the text to distinguish between fact and theory (for example, “I think”, “we believe”, and “suggests” are used to signal a theory, and statements are used to signal a fact)
- integrate information across the text to draw their own conclusions about what is important and why.

### The students:

- make connections between the map and the information they have read to clarify and interpret the information Atholl presents.



Reading standard: by the end of year 6



The Literacy Learning Progressions



Assessment Resource Banks

# Instructional focus – Writing

**Science Material World** Level 3 – Properties and changes of matter; **Nature of Science** Level 3 – Understanding about science.

**Social Sciences** Level 3 – Understand how early Polynesian and British migrations to New Zealand have continuing significance for tangata whenua and communities; Level 3 – Understand how people remember and record the past in different ways.

**English** Level 3 – Ideas: Select, form, and express ideas on a range of topics.

## Text excerpts from “The Past beneath Our Feet”

“Some of the things found at Wairau Bar ... clues from the past.”

Archaeologists also use genetics ...

Another area that provides valuable information is ...

## Examples of text characteristics

### USING QUOTES

*Writers often use a quote to back up information in an article because it shows the reader exactly what the person said. You can see whether the writer has reported the information fairly and accurately.*

### REPORT WRITING

*Reports include factual information and are written in the present continuous tense. The information is organised around the various ideas contained in the report. Terminology is often passive or generalised. Linking phrases, such as “this means...” and “because...”, create a cause-and-effect structure.*

## Teacher (possible deliberate acts of teaching)

Prompt the students to consider what questions the interviewer asked Atholl and how they might use these as models for their own interviews.

- What questions might have generated the answers in the text?
- Can you use or adapt some of them for your own interview?

Ask them to select appropriate quotes that they could include in their article.

- Find words in your interview that support your article. Use them in the article as a direct quote to provide additional evidence.

Encourage the students to use the article as a model for their own report writing.

- Go through your article and highlight the features that make the text a report.
- Make sure you have used the same structure and language in your report as is used in “The Past beneath Our Feet”.

English language learners could complete a chart like the one below based on this reading. They can then use it to help write a report. The headings can be changed according to your reading and writing purposes.

See ELIP for models of report structures and typical language features that may need to be explicitly taught to English language learners.

3 new scientific words	3 other new words	3 facts	3 theories

### GIVE FEEDBACK

- The quote you included about Jim’s experience of flying in a storm helped to back up what you said about how his work as a helicopter pilot can be dangerous.
- The linking phrases you used were very effective because they made your writing very clear and easy to follow.

### METACOGNITION

- What would you see in a report that you wouldn’t see in a fictional story?
- Was it easy to select the quotes? How did you decide which ones to use?
- What helped you organise the information from the interview so it made sense in your report?

Writing standard: by the end of year 6

The Literacy Learning Progressions