The Long Pause

by Amber Aranui

Connected
Level 3
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The Literacy Learning Progressions: Meeting the Reading and Writing Demands of the Curriculum describe the literacy-related knowledge, skills, and attitudes that students need to draw on to meet the demands of the curriculum.

The Learning Progression Frameworks (LPF) describe significant signposts in reading and writing as students develop and apply their literacy knowledge and skills with increasing expertise from school entry to the end of year 10.

Overview

This article explores the mystery of the long pause between the two major periods of Pacific migration. It demonstrates how the science of archaeology can be used to explain and understand the world and how scientists provide evidence to support ideas.

A Google Slides version of this article including additional digital content is available at www.connected.tki.org.nz

Curriculum contexts

SCIENCE: Nature of Science: Understanding about science

Level 3 – Students will:

- appreciate that science is a way of explaining the world and that science knowledge changes over time
- identify ways in which scientists work together and provide evidence to support their ideas.

Key science ideas

- As scientists accumulate a range of evidence, they develop possible explanations.
- New explanations can be developed as new evidence comes to light or existing evidence is reinterpreted.
- Scientists sometimes interpret the same data or observations in different ways.

SOCIAL SCIENCES: Social Studies

Level 3 – Understand how the movement of people affects cultural diversity and interaction [in New Zealand].

Key social studies ideas

- Advances in technology affect how we live and how we understand things like our human past.
- People sometimes migrate over very large distances to find food, water, or shelter.

ENGLISH: Reading

Level 3 – Ideas: Students will show a developing understanding of ideas within, across, and beyond texts.

Indicators:

- uses their personal experience and world and literacy knowledge confidently to make meaning from texts
- makes meaning of increasingly complex texts by identifying main and subsidiary ideas in them
- starts to make connections by thinking about underlying ideas in and between texts
- recognises that there may be more than one reading available within a text
- makes and supports inferences from texts with increasing independence.

The New Zealand Curriculum

Meeting the literacy challenges

The instructional strategies below support students to meet the literacy challenges of this text. For each strategy, there are links to the relevant aspect of *The Learning Progression Frameworks* (Reading). The signposts on each of these aspects provide detailed illustrations on what to notice as your students develop their literacy knowledge and skills for different purposes in different curriculum areas.

The main literacy demands of this text lie in interpreting the abstract ideas about science and culture. It requires students to track and synthesise information to weigh up evidence and consider different possibilities. This reinforces the ideas about the nature of science that the article is intended to convey. Support is provided by the invisible narrator's use of rhetorical questions, the inclusion of statements that explicitly point out contradictions and missing evidence, and the use of modal verbs ("might", "could've"). The overall structure of the text is relatively straightforward.

There are some significant vocabulary challenges. Support is provided at the sentence level, with contextual clues, and in a glossary. Breakouts, maps, and diagrams help the reader understand technical information and visualise the achievement of the Pacific voyagers.

The following strategies will support students to understand, respond to, and think critically about the information and ideas in the text.

You may wish to use shared or guided reading, or a mixture of both approaches, depending on the reading expertise of your students and the background knowledge they bring to the text.

After reading the text, support students to explore the activities outlined in the following pages.

INSTRUCTIONAL STRATEGIES

Finding the main ideas

[LPF Reading: Acquiring and using information and ideas in informational text]

Have the students read the title and first page to establish what this article is about. **ASK QUESTIONS** to help them make connections to their prior knowledge and identify the purpose of the article.

- *What do you know about the migration of people across the Pacific?*
- *"Melanesia", "West Polynesia", "East Polynesia". Where are these places?*
- *Have you seen waka like these before? What do you know about them?*
- *What is this article going to be about?*
- *What does this page make you wonder?*

Using text structure and features

[LPF Reading: Reading to organise ideas and information for learning]

Have the students **PREVIEW** the text, reading the headings and looking at the text structure and features.

- *What clues do the headings give you about possible reasons for the long pause?*
- *There's lots of additional information in the visual text. How might these features help with your reading?*

Have the students read the text on page 26 and **DISCUSS** what it says about the work of scientists and of archaeologists in particular.

- *Scientists are like detectives looking for clues. They can suggest an explanation, but if new evidence comes up, they have to be ready to change their thinking.*

DISCUSS the way features of the text help to reinforce the message that the science is not settled. Point out the statement on page 26 that explicitly signals uncertainty ("What it doesn't show us is why such a delay occurred."). Give the students sticky notes to identify other signals of uncertainty. Students may not notice the modal verbs. Point them out if needed.

PROMPT the students to make connections to their ideas about why people migrate. *What are some of the factors that push people to migrate and what might be pull factors?* Have them chart the factors suggested in the article and add their own ideas.

Human migration	
Push factors	Pull factors

Using the visual features to clarify the text

[LPF Reading: Making sense of text: using knowledge of text structure and features]

Briefly **REVIEW** the purpose of each of the design features. Then have the students work in groups to unpack one of them, explaining:

- its purpose
- its relationship to the running text
- the information and/or ideas it conveys
- things it made them think about or wonder about
- what they had to do to make sense of it.

Have the groups present their explanations and offer each other feedback.

Meeting the literacy challenges

Exploring the nature of science
[LPF Reading: Reading to organise ideas and information for learning]

Have the students use a graphic organiser such as the one below to **RECORD** the explanations suggested for the long pause in the text and the evidence presented to support those explanations. The students should use the third column to record their own thinking about the evidence needed to prove the explanations. Have them share and debate their thoughts, first in groups and then as a class.

Suggested explanation for the long pause in eastward migration (from the text)	Evidence from the text that supports this explanation	Further evidence needed to prove this explanation is correct

Give the students the two Level 3 Nature of Science, Understanding about science statements. **DISCUSS** what they mean, referring to the students' shared experiences of science learning. Then have them go to the text to find evidence of these in the practice of archaeologists seeking to explain the long pause.

Nature of Science	Evidence from "The Long Pause"
Appreciate that science is a way of explaining the world and that science knowledge changes over time	
Identify ways in which scientists work together and provide evidence to support their ideas	

Dealing with unfamiliar vocabulary
[LPF Reading: Making sense of text: vocabulary knowledge]

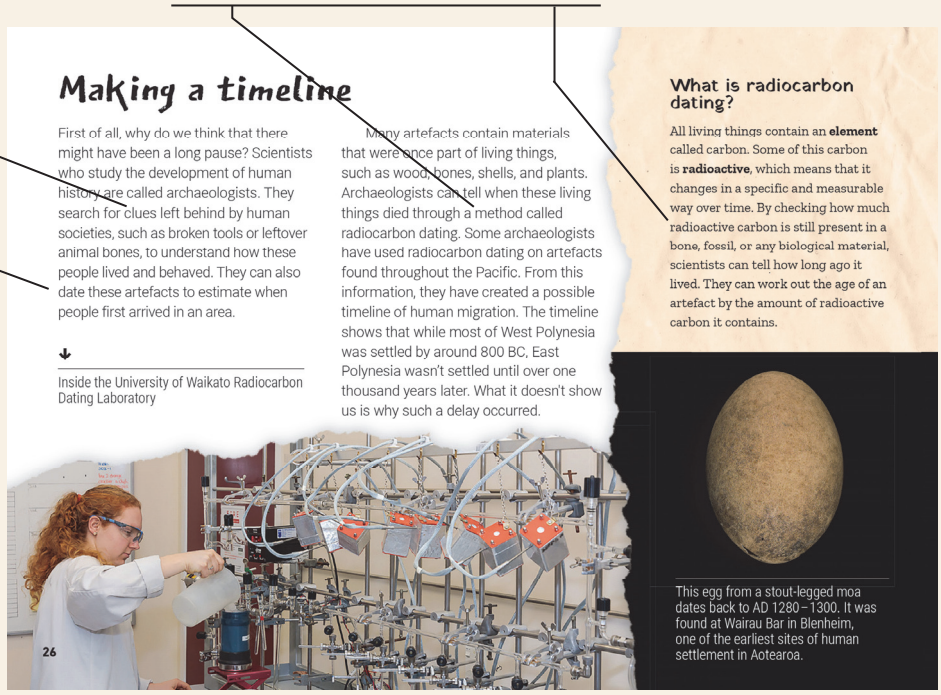
PROMPT the students to refer to the glossary on page 32 to deal with some of the unfamiliar vocabulary and to use the breakout text and visual images to explore the concepts of radiocarbon dating, waka technology, and the development of Polynesian culture.

The Learning Progression Frameworks
The Literacy Learning Progressions
Effective Literacy Practice: Years 5–8

Illustrating the key ideas

Advances in technology affect how we live and how we understand things like our human past.

As scientists accumulate a range of evidence, they develop possible explanations.



Making a timeline

First of all, why do we think that there might have been a long pause? Scientists who study the development of human history are called archaeologists. They search for clues left behind by human societies, such as broken tools or leftover animal bones, to understand how these people lived and behaved. They can also date these artefacts to estimate when people first arrived in an area.

Many artefacts contain materials that were once part of living things, such as wood, bones, shells, and plants. Archaeologists can tell when these living things died through a method called radiocarbon dating. Some archaeologists have used radiocarbon dating on artefacts found throughout the Pacific. From this information, they have created a possible timeline of human migration. The timeline shows that while most of West Polynesia was settled by around 800 BC, East Polynesia wasn't settled until over one thousand years later. What it doesn't show us is why such a delay occurred.

Inside the University of Waikato Radiocarbon Dating Laboratory

What is radiocarbon dating?

All living things contain an **element** called carbon. Some of this carbon is **radioactive**, which means that it changes in a specific and measurable way over time. By checking how much radioactive carbon is still present in a bone, fossil, or any biological material, scientists can tell how long ago it lived. They can work out the age of an artefact by the amount of radioactive carbon it contains.

This egg from a stout-legged moa dates back to AD 1280–1300. It was found at Wairau Bar in Blenheim, one of the earliest sites of human settlement in Aotearoa.

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Scientists sometimes interpret the same data or observations in different ways.

People sometimes migrate over very large distances to find food, water, or shelter.

New explanations can be developed as new evidence comes to light or existing evidence is reinterpreted.

Where there's a will ...

Try putting yourself in the place of the first Polynesians. What would motivate you to leave your friends and family in search of a place that might not exist? Throughout history, human migration has often been driven by a need for survival and a desire for discovery. The need for more resources or a better climate has encouraged people to leave their homes and settle in new places. Could this have been a factor in early Pacific migration too?

Did the need for more resources encourage further exploration?

Some researchers believe that the larger and more resource-rich islands of Fiji, Tonga, and Sāmoa reduced the need for further migration. The islands of East Polynesia are smaller and more isolated, making human settlement much harder. Polynesians might have even reached parts of East Polynesia, but turned back because the islands weren't as **hospitable**.

However, over the course of the long pause, life in West Polynesia may not have been so easy. **Computer models** show that drier weather and extreme droughts could have occurred in West Polynesia during the end of the long pause. This would have made it harder to grow food, leading to conflict between groups. Did this increased competition for resources encourage some Polynesians to search for a new home?

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Learning activities – Exploring the science and technology

The following activities and suggestions are designed as a guide for supporting students to explore and extend their content knowledge across the learning areas. Adapt these activities to support your students' interests and learning needs.

Activity 1 – Waka voyaging

Cultural importance

Show students the "He Waka He Tangata" and "Keeping Traditional Polynesian Navigation Alive" videos. Discuss why waka hourua are so important to people today and what we can learn from them.

- *Why do these people believe it is so important to pass on their ancestors' traditions?*
- *What is their message?*

Construction

Reread the section in the article on technology, and follow this up by reading the *Connected* articles "Giving the Ocean a Voice" and/or "Explorers of the Sunrise" listed in the resource links below. Students could also read the *School Journal* article "Where No Boats Could Live" to learn about the waka used by Moriori. Have the students use what they have read to develop a diagram that allows them to:

- compare the design of an outrigger canoe with a double-hulled waka hourua
- identify the specific features that enabled the waka hourua to travel so much farther than the single-hulled canoes.

Surface and record the students' questions about the construction of waka and the experience of sailing them. Discuss where and how they can find answers to their questions. If possible, invite a modern-day navigator for the students to interview or arrange for them to visit a real waka.

Use the suggestions in the TSM for "Giving the Ocean a Voice" as a springboard for the students to create, test, and compare their own models of the two waka.

Navigation

View "The Polynesian Wayfinders" to reinforce the magnitude of the achievement of the Polynesian navigators. Note the possibility that Polynesians may even have sailed to and traded with people in the Americas.

- *What evidence is provided for this?*
- *How does this connect with what we have been learning about how scientists work?*

Surface the students' questions about how Polynesians were able to navigate vast distances across the Pacific. Have the students work in groups to research, develop, present, and critique explanations of how this was achieved.

Extension

At the time of writing these TSMS, Ian Taylor was developing a resource to track the voyage of the Fa'afaite, a Tahitian ocean-going waka, from Tahiti to New Zealand. This Spinoff article is interesting for what it says about the neglect of the migration story. But the article also indicates that this will be part of a body of resources that will help us learn more about the story. As well as the article, you can link to the Tuia 250 Voyage website. This provides an opportunity to explore the feats of the Polynesian navigators and the role that digital technology can play in bringing their story to life.

Activity 2 – Science versus Disney

Have the students compare the story of the long pause as told in the article to the way it is told in the Disney film *Moana*. If they haven't seen the film, it may be enough to view the trailer.

- *Does the information here provide insights into the movie?*
- *Do the messages in the movie provide insights into the information in the article?*
- *Given what you have learned, how respectful do you think the movie is to Pacific people and the achievements of the first Polynesians?*

The article "How the Story of 'Moana' and Maui Holds Up Against Cultural Truths" explores interesting questions and ideas that could feed into this discussion.

Activity 3 – Archaeological adventures

Have the students reread the article to identify what it teaches them about the work of an archaeologist. Extend students' learning by using activities from Building Science Concepts: Book 41 – *Fossils: Digging up the Past* and by visiting a museum or local site where fossils can be found. Support them to understand that fossil records add to our understanding of the past, and how exciting this can be. You can find locations where significant fossils have been discovered on the GNS site, as well as images, videos, games, and other learning materials.

Have the students profile multi-talented archaeologists and researchers to find out about the diverse knowledge, skills, experiences, and opportunities offered by archaeology. Some examples are Dr Amber Aranui from Te Papa (the author of the article) and academic Atholl Anderson. Students could go on to create advertisements encouraging people to consider a career in archaeology.

RESOURCE LINKS

Connected and School Journals

"Giving the Ocean a Voice", *Connected* 2013, Level 2, I Spy …

"The Past Beneath Our Feet", *School Journal* Level 3, May 2016

"Explorers of the Sunrise", *School Journal Story Library*, Curriculum Level 4, January 2014

"Mary Anning Fossil Hunter", *School Journal* Level 3, September 2012

"Where No Boats Could Live", *School Journal* Part 3, Number 3 2010

Building Science Concepts

Book 41 – *Fossils: Digging up the Past*

Science Learning Hub

Rediscovering traditional Māori navigation: https://www.sciencelearn.org.nz/resources/597-rediscovering-traditional-maori-navigation

Waka revival: https://www.sciencelearn.org.nz/resources/632-waka-revival

Waka hourua: https://www.sciencelearn.org.nz/resources/633-waka-hourua

The Waka Tapu voyage: https://www.sciencelearn.org.nz/resources/619-the-waka-tapu-voyage

Navigating without instruments – introduction: https://www.sciencelearn.org.nz/resources/1910-navigating-without-instruments-introduction

Revitalising Māori astronomy: https://www.sciencelearn.org.nz/resources/1274-revitalising-maori-astronomy

The star compass: https://www.sciencelearn.org.nz/resources/622-the-star-compass-kapehu-whetu

Jack Thatcher: https://www.sciencelearn.org.nz/resources/634-jack-thatcher

Activities associated with navigation: https://www.sciencelearn.org.nz/resources/639-compass-treasure-hunt

https://www.sciencelearn.org.nz/resources/637-how-s-your-memory

https://www.sciencelearn.org.nz/resources/636-navigating-by-the-stars

https://www.sciencelearn.org.nz/resources/635-constellations-in-the-night-sky

Piecing it all together (Activity): https://www.sciencelearn.org.nz/resources/2427-piecing-it-all-together – relates to fossils and the nature of science

YouTube

He Waka He Tangata: navigating our past and future through science: https://www.youtube.com/watch?v=13e3r7d2emE

Keeping traditional Polynesian navigation alive aboard the Haunui: https://www.youtube.com/watch?v=_8F0sPIjSfU

The Polynesian wayfinders: https://www.youtube.com/watch?v=r4E00iQcuyE

LEARNZ

Matariki and navigation – Kupe, Cook and today: http://www.learnz.org.nz/location192

Tūhura ahuahu – cultural and ecological stories from Great Mercury Island: http://rata.learnz.org.nz/summary.php?vft=ahuahu193

Other sources

National Library: Curiosity cards for inquiry: https://natlib.govt.nz/schools/teaching-and-learning-resources/teaching-tools-resource-guides/curiosity-cards-for-inquiry

Australian Geographic: Polynesian migration mystery solved: https://www.australiangeographic.com.au/news/2014/10/polynesian-migration-mystery-solved/

Science: Unusual climate gave Polynesian explorers a boost: https://www.sciencemag.org/news/2014/09/unusual-climate-gave-polynesian-explorers-boost

The Conversation: What wind, currents, and geography tell us about how people first settled Oceania: https://theconversation.com/what-wind-currents-and-geography-tell-us-about-how-people-first-settled-oceania-67410

The New York Times: How ancient humans reached remote South Pacific islands: https://www.nytimes.com/2016/11/02/science/south-pacific-islands-migration.html

Living by the stars with Professor Rangi Matamua: https://www.facebook.com/Livingbythestars/

The Spinoff: The man hijacking the Cook commemorations to tell the story of Polynesian exploration: https://thespinoff.co.nz/atea/11-08-2019/the-man-hijacking-the-cook-commemorations-to-tell-the-story-of-polynesian-exploration/

Tuia 250 Voyage: https://www.tuia250.nz/tuia250-voyage/

How the story of "Moana" and Maui holds up against cultural truths: https://www.smithsonianmag.com/smithsonian-institution/how-story-moana-and-maui-holds-against-cultural-truths-180961258/

GNS science fossils: https://www.gns.cri.nz/Home/Learning/Science-Topics/Fossils

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