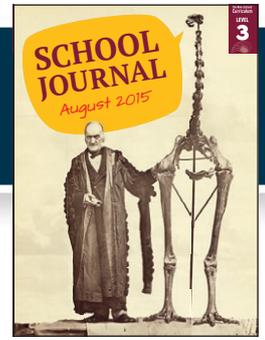


Richard Owen's Giant Mystery

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School Journal
Level 3, August 2015
Year 6



Overview

Richard Owen was a British scientist of the early nineteenth century, most famous for his identification and naming of dinosaurs. This article reports on the role he played in unravelling the mystery of the moa and in identifying it as the largest bird ever known to humans. The nature of scientific endeavour is conveyed well, from the initial presentation of a bone fragment and through the research needed to have a new species recognised.

The article is at the upper end of year 6 ability, but the topic and its engaging retelling will make it of high interest to students. Most students will know something about the (extinct) moa and the article also contains much contextual learning (for example, about science and travel in the Victorian era). It may require numerous rereadings and teacher support.

The article links well with the fictional "Spirit of the Bird" in this Journal, as well as the texts listed below.

This article:

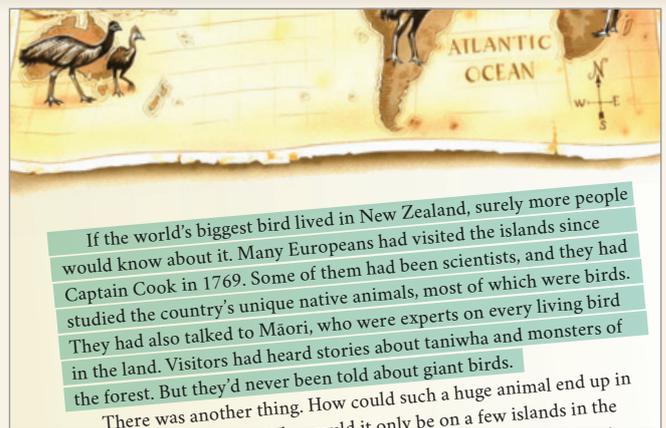
- recounts the identification of the moa
- refers to the scientific processes of observation, comparison, and classification
- requires students to keep track of many different pieces of information throughout the story
- contains explanations and poses questions that provoke thinking.

Texts related by theme "Up the Pipe" SJ L3 Nov 2014 | Why Is That? Connected L3 2014 | Believe It or Not! Connected L3 2015 | "Mary Anning: Fossil Hunter" SJ L3 Sep 2012 | "The Dinosaur Hunter" SJ L3 Sep 2012

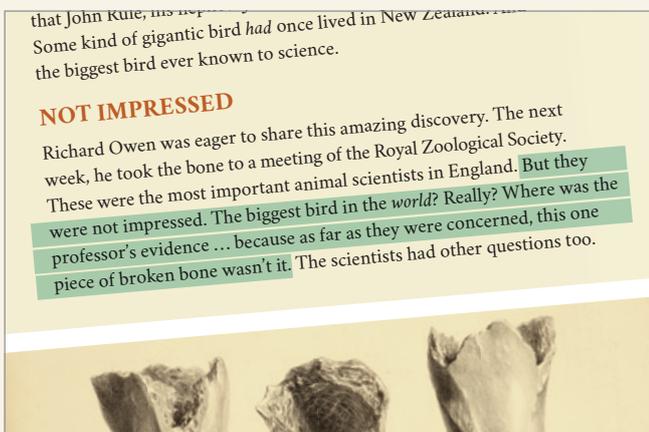
Text characteristics from the year 6 reading standard



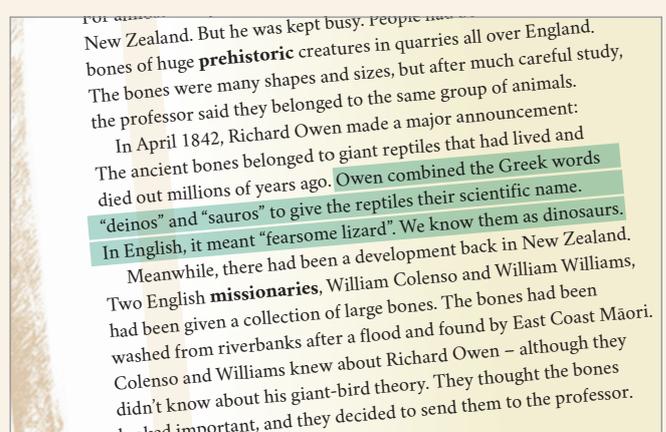
abstract ideas, in greater numbers than in texts at earlier levels, accompanied by concrete examples in the text that help support the students' understanding



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



sentences that vary in length and in structure (for example, sentences that begin in different ways and different kinds of complex sentences with a number of subordinate clauses)



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

Reading standard: by the end of year 6

Possible curriculum contexts

SCIENCE (Nature of Science)

Level 3 – Understanding about science.

ENGLISH (Reading)

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

ENGLISH (Writing)

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

Possible reading purposes

- To identify the challenges involved in the discovery and identification of moa bones
- To find out how persistence resulted in the identification of moa
- To identify and describe the processes used in scientific research
- To find out about the work of an important scientist.

Possible writing purposes

- To research and report on how Richard Owen discovered and identified dinosaurs
- To investigate and report on a famous New Zealand scientist
- To interview a scientist about their work
- To make a poster that illustrates the steps or stages involved in proving that moa existed.



The New Zealand Curriculum

Text and language challenges

VOCABULARY

- Possibly unfamiliar words and terms, including “laboratory”, “mysterious”, “exotic”, “tatty”, “nephew”, “trader”, “significant”, “honeycomb”, “mammals”, “creature”, “breakthrough”, “ostrich”, “convinced”, “Royal Zoological Society”, “impressed”, “evidence”, “taniwha”, “flightless”, “continents”, “rhea”, “emu”, “cassowary”, “fragment”, “official”, “quarries”, “persisted”, “colleagues”, “dismissed”
- The glossary, which includes “deoxyribonucleic acid”
- The derivation and root words of “dinosaur” and the scientific name for moa, *Dinornis novaezealandiae*.

Possible supporting strategies

Some of these suggestions may be more useful before reading, but they can be used at any time in response to students’ needs.

- Review students’ familiarity with the use of a glossary, providing a demonstration if necessary.
- Review students’ knowledge of words and terms that relate to scientific investigations, including the use of Latin words to name living things. Link this to activating prior knowledge as described in the next section.
- If necessary, provide support for the pronunciation of Latin words and the complex word, “deoxyribonucleic”. You could carry out a separate word study of the way scientific terms can be constructed from parts with individual meanings (morphemes) that together have a new meaning.
- *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

- Knowledge about the moa and its extinction
- Familiarity with and ability to understand comparisons between other large animals, including very large birds
- Knowledge about the discovery of proof of prehistoric dinosaurs
- Understanding of the nature of science and work of scientists, including the use of observation, theory, evidence, and proof
- Some knowledge of the classification system used to identify and name living things
- Some knowledge of life in mid-19th century Britain and New Zealand.

Possible supporting strategies

- Ask students to share what they know about the nature of science: *How do scientists make new discoveries?* Direct them to focus on the scientists who discover ancient bones: *How do you think they proved what they were?* English language learners could discuss the topic in their home language before sharing their ideas with the class.
- Use a concept map to chart information, ideas, and words associated with the article. Use other resources as necessary to help build the specific knowledge students will need for understanding the article.
- Prompt students to locate and use the clues in the text that show life 175 years ago was very different from nowadays.
- Provide information as necessary to support students to understand life, travel, and technologies in nineteenth century New Zealand and Britain.

TEXT FEATURES AND STRUCTURE

- Non-fiction text that contains a lot of competing information
- Use of headings that indicate the theme of each section
- The use of explanations
- The need to make inferences, including between paragraphs and sections of the text
- The informal expressions: “It all began ...”, “It went like this ...”, “knew a thing or two”, “How could he not be?”, “Really?”
- Speaking to the reader: “Remember that this was only 1839.”
- Varied sentence structures, including questions
- Rhetorical questions: “How could he not be?”; “The biggest bird in the world? Really?”
- Use of italics for stress: “bone *did* look like”; “in the *world*”; “*had* once”
- The use of illustrations, photographs, and a map.

Possible supporting strategies

- Spend time reading the text yourself to identify words, sentence types, or sections that may need support. For example, note the use of the informal expressions that may not be understood by English language learners. Introduce or teach these before or during reading.
- With the students, list some of the text features they notice before, during, and after reading. These can be discussed later and the list used as a resource for the students’ own writing.
- As they read, students could complete a 4 by 3 information grid like the one below. After reading, they can use the grid as a prompt and scaffold for writing a text summary. You can change the headings and the size of the matrix to suit your teaching purposes.

Main Characters	Three Main Ideas	Three Scientific Facts	Three New Words



Sounds and Words

Instructional focus – Reading

Science: Nature of Science (Level 3 – Understanding about science.)

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

First reading

- Share the purpose for reading with the students.
- Explain to the students that this text concerns the discovery and identification of moa bones. Ask them to turn to a partner and share briefly what they know about moa. *What will you expect to see, read, and learn in this article? What questions do you have as you read this article?*
- Skim and scan the text together, asking the students to use the text features to gain an overall idea of what they will be reading. *Are there any surprises so far? What more can you say about what will be in the text?*
- Direct the students to work in pairs and read one section at a time, stopping to discuss each section, summarise the events, and clarify meaning before moving on.

If the students struggle with this text

- Skim and scan the text as described, then read the introduction (page 28) aloud. Discuss the setting and the two characters, and prompt the students to ask questions of the text. You may need to model this first. They may also be ready to form some hypotheses about what will happen next.
- List the title and the section headings on a whiteboard. For each section, ask the students to use the heading to predict what they will read, then change or confirm their predictions after reading the section.
- If necessary, use a framework and support the students to clarify and record information as they read. Discuss the ideas they suggest to ensure that students get the gist of each section.

Heading	Who?	What?	Where?	When?	How?	Why?
An Amazing Story	John Harris	– was given a bone	on the East Coast	early 1800s	by local Māori	as a gift
Waste of Time	John Rule	– told Richard Owen the bone was like a bird's bone				because he wanted Owen to find out more about the bone
Like No Other Animal	Richard Owen	– compared the bone with many other bones – found that it was like an ostrich bone, but much bigger	in the Hunterian Collection			to see if it was like any other kind of animal

Subsequent readings

The teacher

Check that students understood the overall idea of the article.

- *Why didn't Owen believe Rule when he saw the first bone fragment?*
- *Why did Owen finally agree that the bones he received came from a bird, not any other animal?*
- *Why did it take so long to prove it was from a moa?*
- *What was special about the moa?*

The teacher

With the students, review the section "Not Impressed" or direct them to think, pair, share these questions:

- *What do the many questions in this section tell you about the way scientists work?*
- *What answers could Owen give them?*
- *Was it fair of the Royal Zoological Society to turn down his discovery? Why do you think that?*
- *What kind of evidence would they accept?*
- *How do you think Owen felt after the meeting?*

The teacher

Direct the students to work in pairs or small groups to identify the qualities of a good scientist.

- *Using your own knowledge, ideas from this text, and ideas you've read or seen elsewhere, list some important qualities and abilities of a scientist.*
- *We don't know if John Rule was actually a scientist, but what characteristics of his showed he might be?*
- *How does Richard Owen match up to your list?*
- *In your own science work, which qualities do you think you possess? What evidence would support this?*

GIVE FEEDBACK

- *Making notes under the headings as you read helped you locate information later when you wanted to answer a question with finer details.*
- *You identified the information about Owen's work on dinosaurs as interesting but not directly relevant to his work on moa bones. You also inferred that his work on dinosaurs might have made it more likely he would be believed the second time around.*

The students:

- reread and integrate information across the article to determine the main idea: that by carefully studying old bones sent to him in the 1830s and 1840s, the English scientist Richard Owen eventually proved that giant birds (moa) had existed in New Zealand
- use their own experiences of impatient people to infer that Owen's initial rejection of Rule's claim was based on his quick but incorrect assumption that the bone was a cow bone
- locate and evaluate information to answer questions
- identify the difference between animal bones and bird bones.

The students:

- use the questions and their own understanding of science to identify the kind of evidence that "counts" in science, such as first-hand observation or more concrete examples
- evaluate Owen's evidence and the Society's rejection to form and justify an opinion about the Society's fairness
- use the Society's questions to infer the kind of evidence required, such as first-hand reports or a proven theory that might account for other large birds arriving in New Zealand
- make inferences about Owen, based on what they have learnt in the text and their own experience.

The students:

- share their ideas about scientists based on their own knowledge, information in the text, and information from other sources they have read or seen
- draw on their shared ideas to infer that John Rule was a good observer, had an open mind, was persistent, and used a reliable method (comparisons) to come up with a theory
- compare and contrast what they have read about Owen with their shared ideas, then evaluate him as a scientist.

METACOGNITION

- What reading strategies were most useful to you as you read this article? Tell me how you used them and why they were useful.
- How does reading about the work of famous scientists like Owen help you understand the nature of science? How can you relate this to your own life?



Reading standard: by the end of year 6

The Literacy Learning Progressions

Assessment Resource Banks

Instructional focus – Writing

Science: Nature of Science (Level 3 – Understanding about science.)

English (Level 3 – Ideas: Select, form, and communicate ideas on a range of topics.)

Text excerpts from “Richard Owen’s Giant Mystery”

Examples of text characteristics

Teacher (possible deliberate acts of teaching)

Before Professor Owen could complain about the interruption, John Rule begged him to listen to his story. It went like this: John Rule had a nephew in New Zealand named John Harris. He was the first European trader to live on the East Coast. Local Māori had given Harris the bone, saying it was very special and had come from a giant bird. Harris then gave it to his uncle John Rule in Sydney, and now Rule had sailed halfway round the world to show it to the professor.

MAIN IDEA, SUPPORTING DETAILS

The details that support or give evidence for a big idea add authenticity to non-fiction writing.

ENGAGING THE AUDIENCE

Writers consider their audience as they select details to use. Details that help readers make connections add interest and help them stay engaged.

You may wish to project this extract onto a whiteboard and use highlighting to identify the details in John Rule’s story.

- *The main idea is that Rule’s nephew gave him a special bone.*
- *What does each detail in this extract add to his story? How do they help readers understand and believe the main idea?*
- *As you write and revise, check to see if you have enough (or too many) details to support your main ideas.*
- *What do the details add? Try leaving some out – is the meaning still clear?*
- *Are there some details you’ve left out? Check with a partner to make sure your ideas are clearly supported.*

Explain that writers also consider how relevant details are to their audience. Although your readers will want to know about the important details, sometimes an interesting detail can help keep them engaged. For example, telling us that Harris lived on the East Coast helps us locate the area.

- *Share a section of your writing with a partner. Review the details you’ve used in your writing and ask for feedback: Do the details add something of interest to the story? What connections help you to understand or engage with the main ideas?*

There was another thing. How could such a huge animal end up in such an isolated place? Why would it only be on a few islands in the South Pacific? ... None of these birds could fly or swim, so how could a similar species make it all the way to New Zealand?

USING QUESTIONS

Writers use questions for a variety of reasons, depending on their purpose. Questions can:

- *add drama or suspense*
- *suggest alternative ideas or interpretations*
- *prompt readers to think.*

Model by rewriting the extract using direct statements instead of questions:

A huge animal could not come from an isolated place in the South Pacific. It is unlikely such birds would be on some islands and not on others. Other large flightless birds can’t fly or swim, so they could not reach New Zealand.

- *What has more impact on you: questions or statements? Why?*
- *Does it encourage you to think more about why moa were in New Zealand? Why?*
- *As you review your own writing, think about the way you convey or imply ideas. What do you want your readers to think as they read?*
- *Try writing in different ways, for example, using questions for your readers to think about instead of telling them what to think.*
- *Test your different versions on one or two readers. Which version has the most impact? Why?*

All Owen could do was hope that someone, somewhere, would find more evidence of this mystery giant.

LINKING PARAGRAPHS AND SECTIONS

In a long article, writers maintain coherence by linking ideas from one section to the next. This helps readers follow the ideas or events. Headings, connecting words or phrases, and continuity of ideas all help to maintain the coherence of the writing.

A Long Wait

For almost four years, Richard Owen heard nothing from New Zealand ...

Meanwhile, there had been a development back in New Zealand.

Have the students work with a partner or small group. Alternatively, ask volunteers to offer their work and use it for shared writing as described here.

- *Choose any two consecutive sections of the article. How has the writer helped you follow the ideas from one section into the next?*
- *How does the heading help link the ideas? Which words, phrases, or ideas help link the sections?*
- *Now share and review parts of your own writing. You could use projected images of the writing to make it easy to see and revise the texts together.*
- *Are the links between sections clear? If the writing describes a process or sequence of events, are the stages easy to follow? Are they in the best order?*
- *Support each other to revise by using linking words, headings, or ideas. You might need to rearrange the order of some sections to make them clearer.*
- *Does the revised writing flow better now?*

GIVE FEEDBACK

- *Checking your use of details is a bit like telling the story of a movie you’ve seen: if you give too much detail, your listeners lose interest; if you don’t give enough detail, they won’t be able to follow what happened. You’ve managed to add and subtract just enough details to make your writing interesting and easy to follow.*
- *You’ve replaced some statements of fact about the narwhal with questions that made me think about possible answers. This section is much more engaging now – I’m wondering how narwhals ...*

METACOGNITION

- *As a group, tell the rest of us about your revising session. How useful was it to work together on each other’s writing? What advice would you give to other groups about revising writing together?*
- *How do you decide which ideas you will write about? When you have the big idea, how do you decide what aspects or parts of the idea to focus on? Tell me what processes you go through as you plan your writing.*

Writing standard: by the end of year 6

The Literacy Learning Progressions