The Dinosaur Hunter
by Norman Bilbrough

Overview
This article tells the story of a New Zealand woman who, like Mary Anning (see “Mary Anning: Fossil Hunter”), had a great curiosity about rocks and the fossils in them. The article continues the theme of change over time. Joan Wiffen’s story parallels Mary’s, giving students opportunities to make interesting comparisons between:

- fossil hunting in different times and places
- women’s lives – then and now
- scientific knowledge of the value of fossils – then and now.

The article will engage students through the detective-like search for dinosaur fossils.

Texts related by theme

Text characteristics from the year 5 reading standard

- 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
- some information that is irrelevant to the identified purpose for reading (that is, some competing information), which students need to identify and reject as they integrate pieces of information in order to answer questions
- figurative and/or ambiguous language that the context helps students to understand
- some ideas and information that are conveyed indirectly and require students to infer by drawing on several related pieces of information in the text
- illustrations, photographs, text boxes, diagrams, maps, charts, and graphs that clarify or extend the text and may require some interpretation
- 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)

At the time, scientists believed that New Zealand broke off from Gondwanaland long before dinosaurs ruled the planet. But in 1967, the palaeontologist Charles Fleming said that although there was no evidence dinosaurs had lived in New Zealand, perhaps it was simply because no one had found any yet. This was exactly what Joan Wiffen wanted to hear.

Joan started to think of likely places to search. One day, she spotted the words “reptilian bones” on a map of a riverbed in the hills of Hawke’s Bay. When she tramped into the remote Te Hoe Valley, Joan and her husband, Pont, discovered that the rocks in the river contained shark’s teeth, fish scales, and many kinds of shells. The rocks were then lugged back to the Wiffens’ workshop. There, the fossils were extracted by dissolving the rock with chemicals. It was awkward work, which took a lot of time and effort.

Over the following months, Joan and Pont continued to explore the Te Hoe River. The area was rugged, and any interesting finds had to be cut out of the rocks with a special saw or blasted out using explosives. The rocks were then logged back to the car and driven to the Wiffens’ workshop. There, the fossils were extracted by dissolving the rock with chemicals. It was awkward work, which took a lot of time and effort.

Slowly, Joan collected many fossils, including the bones of prehistoric sea creatures such as the fierce mosasaur, which lived in the ocean around New Zealand during the Late Cretaceous period.* Like Mary Anning, Joan was learning alone, teaching herself a difficult subject that was dominated by well-educated scientists. It was exciting, but so far, all of Joan’s fossils were of reptiles that had lived in the sea. What about creatures that had lived on land? What about dinosaurs?

* Between 100 million and 65 million years ago.
**Possible curriculum contexts**

<table>
<thead>
<tr>
<th><strong>SCIENCE (Living World)</strong></th>
<th><strong>Possible reading purposes</strong></th>
<th><strong>Possible writing purposes</strong></th>
<th><strong>Text and language challenges</strong></th>
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| LEVEL 3 – Evolution: Explore how the groups of living things we have in the world have changed over long periods ... | To learn about New Zealand’s own fossil hunter and her important discoveries | To write about another person who made scientific discoveries | **VOCABULARY:**
| **ENGLISH (Reading)** | To understand how fossils are discovered and identified | To compare the work of Joan Wiffen with that of Mary Anning | - Possible unfamiliar words and phrases, including “night school”, “geology”, “ammonite”, “squid-like”, “extinct”, “Gondwanaland”, “palaeontologist”, “evidence”, “likely”, “reptilian”, “riverbed”, “tramped”, “remote”, “fossilised”, “rugged”, “rugged”, “prehistoric”, “Cretaceous”, “dominated”, “breakthrough”, “armoured”, “honorary doctorate”, “self-taught”
| LEVEL 3 – Structure: Show a developing understanding of text structures. | To learn about New Zealand’s ancient history. | - The metaphors “I was hooked”, “dinosaurs ruled the planet”, “to reach back in time ...”
| **ENGLISH (Writing)** | **Possible supporting strategies** | To write a fictional story inspired by the article, for example, an adventure set in the time of the dinosaurs. | - The idiomatic expression “most wanted list”
| LEVEL 3 – Structure: Organise texts, using a range of appropriate structures. | If students have read “Mary Anning: Fossil Hunter”, they will be familiar with much of the specialist vocabulary in this article. Use charts (for example, of dinosaur names) made while reading the previous article and have students add information to the chart as they read. Students can also explore more Greek and Latin root words as they research the derivations of the specialist vocabulary. | - The time periods, such as “65 million years ago”
|                          | Identify words or terms that will be unfamiliar. Make decisions on how to address them based on: | - The names of prehistoric creatures. | - Whether or not each word will create a barrier to overall meaning
|                          | - Whether students can work out the meaning using strategies | **SPECIFIC KNOWLEDGE REQUIRED:** | - Prioritising the most useful vocabulary for your students to learn
|                          | - Prioritising the most useful vocabulary for your students to learn | - The students’ level of vocabulary knowledge. | - The names of prehistoric creatures...
|                          | - The metaphors “I was hooked”, “dinosaurs ruled the planet”, “to reach back in time ...” | **TEXT FEATURES AND STRUCTURE:** | **Possible supporting strategies**
|                          | - The idiomatic expression “most wanted list” | - Historical recount, told chronologically through Joan Wiffen’s life | Review what the students already know about fossils and their importance, including information they gained if they read “Mary Anning: Fossil Hunter”.
|                          | - The time periods, such as “65 million years ago” | - The introduction, which gives the topic focus and creates reader interest | If necessary, support students to comprehend the extremely long time frames involved. This timeline is useful: http://science.nationalgeographic.com/science/prehistoric-world/prehistoric-time-line
|                          | - The names of prehistoric creatures. | - Photos, illustrations, and a map | **Possible supporting strategies**
|                          | **Possible supporting strategies** | - The skeleton images with related photos of bones and with scales to gauge relative sizes | If necessary, support the students to identify the structure of the text, skimming the article to notice its features. Prompt them to examine the photographs and the captions as well as the text.
|                          | If students have read “Mary Anning: Fossil Hunter”, they will be familiar with much of the specialist vocabulary in this article. Use charts (for example, of dinosaur names) made while reading the previous article and have students add information to the chart as they read. Students can also explore more Greek and Latin root words as they research the derivations of the specialist vocabulary. | - Questions that reflect Joan’s own questioning and that prompt students to make predictions | Students may need support to make the connections in pages 22-23 between the body text, the illustrations, the photos, and the scale measures. Work through one slowly or ask the students to work in pairs, taking turns to explain one example each. Create a timeline, adding the times and the main events in sequence.
|                          | Identify words or terms that will be unfamiliar. Make decisions on how to address them based on: | - Direct quotes from Joan | **Possible supporting strategies**
|                          | - Whether or not each word will create a barrier to overall meaning | - A footnote to explain a term | If necessary, support the students to identify the structure of the text, skimming the article to notice its features. Prompt them to examine the photographs and the captions as well as the text.
|                          | - Whether students can work out the meaning using strategies | - A definition in brackets after a technical word | Students may need support to make the connections in pages 22-23 between the body text, the illustrations, the photos, and the scale measures. Work through one slowly or ask the students to work in pairs, taking turns to explain one example each. Create a timeline, adding the times and the main events in sequence.
|                          | - Prioritising the most useful vocabulary for your students to learn | - The pull-out quote in upper-case letters | **Possible supporting strategies**
|                          | - The students’ level of vocabulary knowledge. | - Time and sequencing language. | If necessary, support the students to identify the structure of the text, skimming the article to notice its features. Prompt them to examine the photographs and the captions as well as the text.

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**Possible reading purposes**
- To learn about New Zealand’s own fossil hunter and her important discoveries
- To understand how fossils are discovered and identified
- To learn about New Zealand’s ancient history.

**Possible writing purposes**
- To write about another person who made scientific discoveries
- To compare the work of Joan Wiffen with that of Mary Anning
- To write a fictional story inspired by the article, for example, an adventure set in the time of the dinosaurs.

**Possible supporting strategies**
- If students have read “Mary Anning: Fossil Hunter”, they will be familiar with much of the specialist vocabulary in this article. Use charts (for example, of dinosaur names) made while reading the previous article and have students add information to the chart as they read. Students can also explore more Greek and Latin root words as they research the derivations of the specialist vocabulary. Identify words or terms that will be unfamiliar. Make decisions on how to address them based on:
  - whether or not each word will create a barrier to overall meaning
  - whether students can work out the meaning using strategies
  - prioritising the most useful vocabulary for your students to learn
  - the students’ level of vocabulary knowledge.

Discuss the pronunciation of the words “rugged” and “lugged”. If “rugged” is used as a verb (“She rugged up warmly”), the pronunciation changes. The English Language Learning Progressions: Introduction, pages 39–46, has some useful information about learning vocabulary.

**Possible supporting strategies**
- Review what the students already know about fossils and their importance, including information they gained if they read “Mary Anning: Fossil Hunter”.

If necessary, support students to comprehend the extremely long time frames involved. This timeline is useful: http://science.nationalgeographic.com/science/prehistoric-world/prehistoric-time-line

**Possible supporting strategies**
- If necessary, support the students to identify the structure of the text, skimming the article to notice its features. Prompt them to examine the photographs and the captions as well as the text.

Students may need support to make the connections in pages 22-23 between the body text, the illustrations, the photos, and the scale measures. Work through one slowly or ask the students to work in pairs, taking turns to explain one example each. Create a timeline, adding the times and the main events in sequence.
Unlike Mary Anning, who explored the cliffs along the beach at Lyme Regis, Joan Wiffen often came across shells buried in hillsides a long way from the sea. As a young girl, she was very curious about these discoveries. Shells but no ocean – how could that be? “I would run my finger over the shells and wonder how they got there,” Joan said.

She had found a tail bone from a theropod – a two-legged, meat-eating dinosaur.

**Text excerpts from “The Dinosaur Hunter”**

**Students (what they might do)**

Assuming students have read “Mary Anning: Fossil Hunter”, they will make connections between the two articles, comparing the places the women lived. They ask and answer questions about the reasons each started to collect shells, drawing on knowledge of the time to infer that for Mary it was initially for money but for Joan it was curiosity. The students will use the photo to infer that this article is about a living person. They make connections between the text and knowledge they have of finding shells a long way from the sea. They compare their thoughts with Joan’s and form hypotheses about the origins of the shells.

The students integrate information across the text and make connections with their knowledge of the way a detective story builds suspense to infer that the bone is probably from a dinosaur. They make further connections between their own questions and Joan’s to form hypotheses about identifying dinosaur bones.

The students make connections between the words in the main text, the theropod skeleton, the blue circle, the photo of the bone, and the same mm scale to understand where the bone came from and how big it was. They integrate this information and their own knowledge of bones (for example, animal tail bones they may have seen) to visualise the size of the theropod and where the bone fitted. They make connections between the text, the illustration, and what they know about animals such as kangaroos to infer that the theropod’s tail enabled it to walk on two legs.

**Teacher (possible deliberate acts of teaching)**

**DIRECT** the students to work in pairs as they draw on what they already know about fossils and dinosaurs, including new information they have gained from reading “Mary Anning: Fossil Hunter”.

**PROMPT** the students to compare Joan and Mary.

- Make a two-column chart headed “Mary” and “Joan”.
- While you’re reading, pause where you can compare Mary Anning and Joan Wiffen and their discoveries.
- Share these comparisons with your partner and make notes on the chart.
- When you’ve finished reading, summarise your comparisons.

**DIRECT** the students to work in pairs to find clues.

- Go back to the start of the article. Find all the clues that led Joan to believe dinosaurs once lived in New Zealand.
- Ask each other questions about her find and form hypotheses about why she thought this bone was from a dinosaur.
- How do you think she can prove it is a dinosaur bone?

**ASK QUESTIONS** and prompt to support the students.

- Have you ever seen a bone this shape? Think about skeletons of dead animals you might have seen.
- How big was the theropod’s tailbone? Compare it with a bone you’ve seen. What does that tell you about the way the animal used its tail?
- What animals have long tails and walk on two legs?
- Look at the illustration of a sauropod on page 23. It has a long tail. Why do you think it walked on four legs?
- How are these ancient animals similar to animals today? How are they different?

**GIVE FEEDBACK**

- You’ve compared Joan with Mary Anning and connected this with your own interests in collecting shells. Making connections between texts and your own experiences helps to fill in information that authors don’t always give us.
- Integrating information from the diagram, and from the words in the text, to work out what the diagram shows was a good way of working out what the author was trying to convey.

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**METACOGNITION**

- Tell me what you were thinking as you read about Joan’s search for dinosaurs. What were you wondering? How does thinking like that help your reading?
- How often do you make notes when you’re reading? Why do you do this? Is it helpful?
- How do you read pages 22–23? What strategies help you understand the information?
**Instructional focus – Writing**

**Science** (Living World, level 3 – Evolution: Explore how the groups of living things we have in the world have changed over long periods …)

**English** (Level 3 – Structure: Organise texts, using a range of appropriate structures.)

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**Text excerpts from “The Dinosaur Hunter”**

You might think that by the 1930s, when Joan Wiffen first became interested in fossils, there was nothing more to discover. So much had been found already. But up until 1980, experts said there had never been dinosaurs in New Zealand. They were wrong. And Joan Wiffen, who thought differently, was determined to prove it.

On a visit to Australia, Joan was given the fossil of an ammonite (an extinct squid-like sea creature). Slowly, Joan collected many fossils, including the bones of prehistoric sea creatures such as the fierce mosasaur, which lived in the ocean around New Zealand during the Late Cretaceous period.*

“Between 100 million and 65 million years ago”

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**Examples of text characteristics**

**INTRODUCTIONS**

Introductions serve many different purposes. In factual texts, introductions give the topic and context and, usually in the last sentence, the specific focus of the text – as well as stimulating interest.

**SPECIALISED LANGUAGE**

Using accurate, specialised words gives writing interest and authenticity. It helps readers understand connections (for example, “saur” words indicate a lizard-shaped animal). It also helps readers make connections with related vocabulary so they can add to their knowledge.

**SUPPORTING UNFAMILIAR VOCABULARY**

Authors often give explanations for specialised words. They can:
- give details in the text, close to the word
- supply details in a clause (“which lived …”)  
- use a footnote, indicating this with an asterisk or a number
- explain the word in a glossary (not used in this article, but see page 14).

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**Teacher (possible deliberate acts of teaching)**

**MODEL**

the way the author might have made decisions about this article.

- I can see he hasn’t used headings, but the piece of text that starts it is different from the rest: this is the introduction. He starts by using the pronoun “you” to show he is talking to us, the readers. Then he tells us the name of the dinosaur hunter.
- Think about your own writing and how you can use an introduction to give the topic and focus of your text and catch your readers’ interest.

Students who find constructing an introduction challenging may benefit from using a writing frame (like the example below).

**Introduction**

<table>
<thead>
<tr>
<th>Topic</th>
<th>Who? Where? When?</th>
<th>Specific focus</th>
</tr>
</thead>
</table>

**ASK QUESTIONS**

to help the students consider their vocabulary choices.

- Make a list of all the specialised words you’ve used.
- Are they specific enough? For example, instead of saying “animal”, could you be more specific and name the family or species?
- Are the specialised words accurate? Check each one to make sure you’ve used it correctly.
- Will your readers need help to understand any of the words? Check each word again and mark those that will be tricky for your readers.
- How can you support your readers? Look for models in this and other articles, then add information that will help your readers.

Some students may benefit from support in writing definitions. One way to do this is to supply a writing frame like the one below. Sentences that give definitions often use relative clauses. Some students will benefit from explicit teaching and practice with using relative clauses.

**Definitions sentence frame**

<table>
<thead>
<tr>
<th>Item</th>
<th>Am/is/are/was/were</th>
<th>Category</th>
<th>Who/that/which</th>
<th>Characteristic or action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dinosaurs</td>
<td>are</td>
<td>animals</td>
<td>that</td>
<td>lived millions of years ago</td>
</tr>
</tbody>
</table>

**GIVE FEEDBACK**

- Adding the introduction helped pull your structure together: I can see where the article is taking me now.
- You’ve used accurate words and terms about …, and the glossary helped me understand the unfamiliar words.
- Your use of a simile allowed me to gain a better understanding of … It showed me what she thought and felt and allowed me to make a connection to my own feelings.
- This works well as a graphic novel. The format limits the amount of writing, so every word has to count. You’ve trimmed your sentences down to short, vivid statements.

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**METACOGNITION**

- How did planning with a graphic organiser help you put your information into a logical order?
- How do you make decisions about the structure and language that will best suit your audience?
- Show me where you found this information. Which sources have been most useful? Why is that?