Captain Cook: Charting Our Islands
by Melanie Lovell-Smith

Overview

This article describes Captain Cook’s first visit to New Zealand where he charted the coastline. It focuses on Cook’s abilities as a skilled maker of charts and maps rather than as a great explorer. It also examines the maths involved in Cook’s chart making (a perfect, real-life example of maths in everyday life). This is very rich text that will stand up to repeated readings.

The text boxes, diagrams, captions, and illustrations are key components of the article. Students will need to draw out the extra information they contain and integrate it with the body text to fully understand the ideas.

This article:
- includes several early maps, charts, and illustrations
- contains substantial captions that hold extra information
- has diagrams to help explain some of Cook’s measuring techniques
- contains sidebars providing more detail about the transit of Venus, latitude and longitude, and taking soundings
- has a glossary.

There is a PDF of the text available at www.schooljournal.tki.org.nz

Text characteristics from the year 8 reading standard

- non-continuous text structures and mixed text types
- elements that require interpretation, such as complex plots, sophisticated themes, and abstract ideas
- academic and content-specific vocabulary
- illustrations, photographs, text boxes, diagrams, maps, charts, and graphs, containing main ideas that relate to the text’s content

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TEACHER SUPPORT MATERIAL FOR “CAPTAIN COOK: CHARTING OUR ISLANDS”, SCHOOL JOURNAL, LEVEL 4, MAY 2016
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**Mathematics (Geometry and Measurement)**
Level 4 – Measurement: Use appropriate scales, devices, and metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time; Use side or edge lengths to find the perimeters and areas of rectangles, parallelograms, and triangles and the volumes of cuboids; Interpret and use scales, timetables, and charts.

**English (Reading)**
Level 4 – Purposes and audiences: Show an increasing understanding of how texts are shaped for different purposes and audiences.

**English (Writing)**
Level 4 – Structure: Organise texts, using a range of appropriate structures.

- Language features: Use a range of language features appropriately, showing an increasing understanding of their effects.

**Possible Supporting Strategies**

- Examples of eighteenth-century language, including "ten fathom water"
- Collocations: "drop anchor," "run aground", "running survey".

- **Ask the students to identify difficult vocabulary as they read and add those words to the glossary.** It may be helpful to develop a chart of subject-specific vocabulary and definitions during the first reading so students can refer to it on subsequent readings.
- **In groups, have the students establish what strategies they can use to work out what a word means.** If necessary, remind them of useful strategies.
- **Use a globe to illustrate abstract concepts, such as latitude, longitude, and rotation.**
- **English language learners could make vocabulary cards for the mathematical and technical terms.** These cards should include a first language translation, a definition, a sentence using the word, and an illustration of the meaning.
- **To practise new vocabulary, English language learners could play matching games, such as Fish, using illustrated word cards.** See ESOL Online, Vocabulary for other vocabulary strategies.

**Specific Knowledge Required**

- **Understanding of technical information**, quite a lot of which is abstract, for example, information about the transit of Venus, soundings, latitude and longitude, and the running survey
- **Understanding of the solar system and what happens during an eclipse or a transit**
- **Knowledge of the location of Tahiti in relation to New Zealand and of the location of Greenwich in relation to New Zealand**
- **Knowledge of the “Great Southern Continent” theory**
- **Using quadrants to measure the angle between the sun and the horizon to determine latitude**
- **The relationship between longitude and time**
- **An understanding of the purpose and use of charts and maps and an awareness that the world was once not mapped.**

- **Discuss how maths is used in daily life (for example, knowing one street is parallel to another).**
- **Activate students’ prior knowledge about navigation techniques used by Pacific explorers.** Use real navigational tools when available or visual support from websites, books, and illustrations.
- **Link the navigation techniques used in the text to their modern-day equivalents (for example, GPS, Google Maps, looking at known landmarks to find your way home).**
- **Create a map of your own school using geometry and measurement.**
- **It may help to pull out the sidesbars explaining soundings and longitude and latitude prior to reading.** Draw out the students’ prior knowledge and write their questions about longitude and latitude on a chart or whiteboard to be reviewed after reading. As you read each section, new information could be added to the chart. Explore the diagrams, making sure the students use them to make sense of the explanations about soundings and longitude and latitude.
- **Find other examples of old charts and compare them with current-day nautical charts.** Ask students to think critically about why the original charts are not as accurate.
- **Look at the map on pages 28–29 and ask students to infer why scientists formed a theory for a “Great Southern Continent”.**

**Text Features and Structure**

- **Mixed text types**, including running text, sidebars, headings, diagrams, charts, and maps
- **Technical information and explanations of scientific and mathematical concepts**
- **Diagrams containing information that supports concepts described in the text**
- **Captions that contain additional information supporting the illustrations**
- **Title design.**

- **Explain that this text comprises different text types.** Let the students spend time familiarising themselves with the text. Discuss the purposes for the different text types. Encourage students to use the text design to distinguish between the running text (describing how Cook charted New Zealand) and the sidebars and captions (explaining some of the concepts). Make sure students realise that the running text from page 32 is continued on page 35, with page 33 containing a sidebar explaining longitude and latitude, and page 34 containing a chart and caption. **Where would you start reading? Which bits are important?**
- **Answer any questions students may have about the structure.**
**Instructional focus – Reading**

**Mathematics Geometry and Measurement** Level 4 – Use appropriate scales, devices, and metric units for length, area, volume and capacity, weight (mass), temperature, angle, and time; Use side or edge lengths to find the perimeters and areas of rectangles, parallelograms, and triangles and the volumes of cuboids; interpret and use scales, timetables, and charts.

**English** Level 4 – Purposes and audiences: Show an increasing understanding of how texts are shaped for different purposes and audiences.

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**First reading**

- Set the purpose for reading.
- Spend time going over the text features so that students understand the different text types before reading the article. Refer to the suggestions on page 2 for addressing text and vocabulary challenges.
- Encourage the students to come up with reasons why each section is included and why the different text types were used. Review their conclusions as a class.
- Information from each section could be summarised on a chart or graphic organiser by the students as they read.
- It may be appropriate to split the text into manageable chunks or, if necessary, the first reading could take place over multiple lessons.

**If the students struggle with this text**

This is a challenging text, and on the first reading, some students may require additional support. Remind them of different strategies they could use to interpret the text, such as asking questions, using knowledge of specific vocabulary, summarising, rereading, and making connections with their prior knowledge. It may be useful for them to use sticky notes to record words, sentences, or concepts that they don't understand and explore them with a partner or the rest of the class.

If they continue to struggle, intervene more directly. For example, you could:

- chunk the text into sections and share-read them
- use jigsaw reading, where small groups read one section each and then come together and explain their section to the other groups
- make diagrams as a class to break down difficult concepts
- ask them to retell explanations orally to a partner
- in groups, have students rehearse a “hot-seat” activity, preparing their “experts” to answer questions on one aspect of the text
- identify the sections that cause difficulty and share-read them together, then have students retell the explanations to a partner. Then allow the students to go back to the main text to continue reading independently.

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**Subsequent readings**

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

**The teacher**

Point out to the students that the second part of the title is “Charting Our Islands”. Explain that you want them to focus on that aspect of the text. Ask questions to draw out what the students would like to find out about Cook and chart making:

- What are you wondering about?
- Which sections are about the methods Cook used to make his charts?
- Which illustrations and diagrams will help you to understand Cook’s techniques for making charts?
- How did Cook use maths in his chart making? Why was maths important to him?

**The students:**

- generate questions about things they want to clarify or to explore in more depth
- identify the sections that are primarily concerned with how Cook used maths in his chart making
- integrate and synthesise information from the visual supports and the explanations in the texts to explain Cook’s chart-making techniques
- summarise information about how running surveys were carried out and use this information to explain the maths involved. The summaries could be used for a vanishing cloze activity which would reinforce the key language and concepts.

**The teacher**

Explain that there is competing information in the text that distracts from the main purpose for reading. Encourage the students to think critically about the text. Have them work in pairs or small groups to evaluate what are the most important parts of the text.

- Did the text answer your questions?
- Why were some sections included?
- Do you need to understand the transit of Venus to understand chart making?
- Do the sidebars contain the most appropriate information?

**GIVE FEEDBACK**

- I heard you reading out loud as you matched the information about soundings with the diagram of the lead line. When texts become more complex, it is a really good idea to slow down and even read out loud to make sense of the explanations.
- You gave good reasons to back up your opinion that the transit of Venus sidebar isn't needed to understand Cook's chart-making methods.

I agree with you. Have a think about why it was included in the text.

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**METACOGNITION**

- Could you have understood the section about soundings without the two diagrams? How did they help you to understand the ideas in that text box?
- How did explaining latitude and longitude to somebody else help you to understand it better yourself?
- What do you do if you can’t make sense of a diagram the first time you look at it?

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Reading standard: by the end of year 8

The Literacy Learning Progressions

Assessment Resource Banks
### Text excerpts from “Captain Cook: Charting Our Islands”

One of the crew’s first tasks was to take a sounding. This told the captain where it was safe to drop anchor … exact position in the world.

In Cook’s time, water depth was measured using fathoms (1.8 metre units). Depth was found using a lead line – a lead weight attached to a rope thrown overboard by a sailor called a leadsman.

Running survey diagram

### Examples of text characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Scientific Narrative</strong></td>
<td>In a scientific narrative, writers tend to use sparse, precise language as this allows for greater accuracy and avoids ambiguity.</td>
</tr>
<tr>
<td><strong>Language of Explanation</strong></td>
<td>The purpose of explanation is to communicate information. Writers need to be able to write objectively and clearly and may need to use highly detailed and technical language where appropriate. They often include diagrams and sidebars to aid understanding if an idea or process is complicated and difficult to follow.</td>
</tr>
<tr>
<td><strong>Visual Information</strong></td>
<td>Visual information such as diagrams, charts, maps, and illustrations can support the text and clarify an idea that may be hard to explain in words.</td>
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</tbody>
</table>

### Teacher (possible deliberate acts of teaching)

- Have the students research a topic and write a short scientific narrative about it. Ask them to focus on the precision of the nouns and verbs and on using non-emotive language.
- Asking English language learners to give an oral explanation before they write would help them develop the language needed. Demonstrate how to change written sentences from active to passive voice and discuss the purpose and effect of this.
- Have the students use a text box in their writing to explain a concept in greater detail.
  - Why does this concept need further explanation?
  - What details will you include in the text box, and what details will you include in the body text?
  - Is the information in the text box essential to understanding the main part of your writing?

- Ask the students to draw a diagram to explain an idea in their writing.
  - What is the difference between a picture and a diagram?
  - Explain what you have included in your diagram and say why you included those things.
  - Show your diagram to a partner and ask them if there is anything you could add to make the idea clearer.

- Have them explain one idea in three different ways (for example, in a text box, as a picture, or by using a diagram). Prior to drawing their own diagrams, you could have students work in pairs to solve barrier games using diagrams and illustrations from the text.
  - Which is the best way of showing your idea? Why?
  - Share it with your partner to see if they agree with you.
  - When deciding on the best way of explaining an idea, what do you need to think about?

<table>
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<tr>
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### METACOGNITION

- What helped you decide what information to put in the text box and what information to put in the body text?
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