

# One City – Two Earthquakes

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School Journal  
Level 3, November 2011  
Year 5



## Overview

This informative article answers commonly asked questions about earthquakes, with specific reference to the Christchurch earthquakes in September 2010 and February 2011. The text explains what liquefaction is and how earthquakes happen, and it includes instructions for what to do in an earthquake. Visual language features include a bulleted list, diagrams, photographs, and a glossary.

Some students may need support to interpret the scientific concepts.

**Be aware of possible sensitivities around this subject, especially for those who may have lost friends or relations in the February 2011 Christchurch earthquake.**

Texts related by theme

“Earthquake” SJ L3 Nov 2011

| “Making Lakes and Making Quakes” Connected 1 + 2 2008

## Text characteristics from the year 5 reading standard

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

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

Reading standard: by the end of year 5

# Possible curriculum contexts

## SCIENCE (Physical World)

LEVEL 3 – Physical inquiry and physics concepts: Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, ...

## 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 learn about the Christchurch earthquakes
- To understand how earthquakes are caused
- To identify and understand the definitions of subject-specific terms related to earthquakes.

See [Instructional focus – Reading](#) for illustrations of some of these reading purposes.

## Possible writing purposes

- To explain how earthquakes are caused
- To write a pamphlet to inform others about what to do in an earthquake
- To write a glossary to define earthquake subject-specific vocabulary.

See [Instructional focus – Writing](#) for illustrations of some of these writing purposes.

# Text and language challenges

## VOCABULARY:

- Possible unfamiliar and/or specialist words and phrases, including “Earthquake”, “magnitude”, “quake”, “devastating”, “aftershock”, “damaged”, “rubble”, “Cathedral”, “Dean”, “multi-storeyed”, “destructive”, “fault”, “populated”, “collapse”, “epicentre”, “kilometres”, “violently”, “shallower”, “compared”, “liquefaction”, “eastern suburbs”, “liquid”, “weakening”, “surface”, “sand volcanoes”, “outer”, “divided”, “plates”, “travelling”, “centimetres”, “pressure”, “crust”, “ruptures”, “Pacific Plate”, “Australian Plate”, “frequently”, “tremors”, “endure”, “severe”, “shelter”.

## Possible supporting strategies

Develop vocabulary lists or word webs associated with earthquakes, which can be added to during reading. Ask the students to note unfamiliar vocabulary for discussion after reading.

Identify the vocabulary that the students need support with in order to understand this text **and** the language that students are likely to encounter in many contexts. Focus vocabulary learning on the latter. Offer the students guidance on which words are most important for them to learn (and which are low frequency and not such a priority). *The English Language Learning Progressions: Introduction*, pages 39–46, has useful information about learning vocabulary.

## SPECIFIC KNOWLEDGE REQUIRED:

- Knowledge and experiences of earthquakes
- Experience in reading factual texts
- Knowledge and experience interpreting and using diagrams, glossaries, and maps.

## Possible supporting strategies

Link to the students’ prior knowledge about earthquakes. If the students have already read the “Earthquake” story in the same Journal, tell them that this text describes and explains the September 2010 earthquake.

Provide opportunities for students who share a first language other than English to discuss their ideas in this language.

## TEXT FEATURES AND STRUCTURE:

- Non-continuous texts and mixed text type (includes explanations and instructions)
- Headings – most written as questions
- Cross-section diagram
- Diagram containing maps of the Christchurch region and a key
- Reference to the “Earthquake” story in the same Journal
- Bulleted list
- Capitalised words within a list
- Language used to signal cause and effect relationships – “causes”, subordinate clauses with “when”
- Passive constructions – “was written”, “was feared”, “might have been buried”, “was later found”.

## Possible supporting strategies

Prompt the students to recall the features they would expect to find in factual texts and how they can help them as readers. Scan through the text to locate examples.

Support the students to notice that many of the headings are written in the form of a question. Explain that as readers we may use these headings to locate specific information we are interested in. You could give each pair of students one of the headings and ask them to predict what details they think will be in their section. You could then conduct a jigsaw reading. Ask each pair to read their section and prepare to summarise the main points. Have the pairs work in small groups to share their information with others who have read different sections. Repeat the process until each student has heard about each section. Alternatively, the pairs could share their predictions about the sections and then read the text together.

Encourage the students to use the visual features to support their understanding of the text. Explicit instruction may be needed to support them in the interpretation and use of the key and the cross-section diagram.

Ideas for helping the students with the language of instructing and explaining can be found in *Supporting English Language Learning in Primary Schools: A Guide for Teachers of Years 5 and 6*, pages 34–41 and 42–49.

# Instructional focus – Reading

**Science** (Physical World, level 3 – Physical inquiry and physics concepts: Explore, describe, and represent patterns and trends for everyday examples of physical phenomena, ...)

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

## Text excerpts from “One City – Two Earthquakes”

## Students (what they might do)

## Teacher (possible deliberate acts of teaching)

Liquefaction happens when soil, which is a solid, is shaken so hard that it loses its strength and behaves like a liquid.

In some areas of Christchurch, the soil is soft and sandy.

*Students make connections to their prior knowledge of the meanings of soil and solid. They visualise images of soil being shaken and make connections to their experiences of sand and how it can flow.*

**MODEL** how readers can visualise and connect to their prior knowledge to understand what they read.

- When I read this section about liquefaction, I thought about what I know about both soil and solids. By linking to my prior knowledge about soil and things that are solid, I was able to increase my understanding.
- I visualised how dirt might run like a liquid. I checked the photos to see if it would help me understand what was happening to the soil. I also linked the fact that the soil in some areas was “soft and sandy” with my knowledge of how sand “flows” to understand how it might act like a liquid.

When the earthquake struck, water forced its way to the surface, weakening the ground under some buildings and causing “sand volcanoes”.

*Students integrate information from the text with their prior knowledge of volcanoes to infer what a “sand volcano” might look like.*

**EXPLAIN** that the speech marks around “sand volcanoes” means they weren’t really volcanoes but just looked like them and behaved like them in that they pushed up through the earth.

**ASK QUESTIONS** to support the students’ understanding of “sand volcanoes”.

- What do you know from the text about what was happening in Christchurch?
- What do you know about volcanoes and how they are formed?
- What would it look like if water was forced up?
- How would the water cause “sand volcanoes”?
- What would they look like? What shape would they be?

When the edges of two plates push against each other, pressure builds up in the Earth’s crust near the plate boundary.

An earthquake occurs when the crust ruptures (breaks) and the rock on either side of this fault line suddenly moves, causing the ground to shake.

*Students make connections to their prior knowledge of the word “crust” to understand that the author is meaning the outer layer of the Earth.*

*They locate and evaluate information in both the text and the diagram and integrate this to understand how earthquakes happen.*

**ASK QUESTIONS** to support the students’ use of prior knowledge.

- I noticed the word “crust” was used twice in this section. What does crust mean?
- What else do you know of that has a crust?
- How do you think the word is being used in this instance?

**PROMPT** the students to clarify their understanding of how earthquakes happen.

- You’ll notice that there is information about earthquakes in both the text and the diagram. To get a full understanding, you will need to integrate the information from both sources.
- With your partner, fill in the cause-and-effect flow chart to clarify how earthquakes happen. Remember to use both the text and the diagram.
- Now use the flow chart to summarise the information.

## GIVE FEEDBACK

- I noticed you looking at the diagram as you read that part. It’s important to read the text and the diagram to get the full meaning.
- Your description of how lava flows from a volcano was a useful image to help us understand what a “sand volcano” might look like.
- Your connection to a “crust” on a loaf of bread helped you to understand what the crust of the Earth might be like. Making a connection to something you know is a good way of clarifying scientific ideas that you read about.

## METACOGNITION

- How did creating mental images help you to understand some of the information in the text?
- How did the diagram help you to understand how earthquakes occur?
- What strategies did you use to check your understanding of the text?

Reading standard: by the end of year 5

The Literacy Learning Progressions

Assessment Resource Banks

# Instructional focus – Writing

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

## Text excerpts from “One City – Two Earthquakes”

## Examples of text characteristics

## Teacher (possible deliberate acts of teaching)

- If you're inside, stay there until the shaking stops.
- Move away from outside walls or from heavy objects that might fall.
- If possible, take shelter under something solid.
- DROP to your knees.
- COVER your head with your hands.
- HOLD onto something strong, such as a table leg.

### BULLETED LISTS

*Authors use bulleted lists to convey information quickly and highlight key points.*

*The use of capitalised words within this list draws attention to the key words that people need to remember.*

The February quake was unusually destructive for its size. An earthquake is more devastating if the associated fault line runs through, or is close to, a heavily populated area. This is because there are more people around to get hurt and more buildings that could collapse or be damaged.

### PARAGRAPHS

*Authors organise related ideas into a paragraph. Paragraphs begin with a topic sentence and the following sentences add supporting detail.*

Often these ruptures are small and cause only very minor tremors, which most people do not even feel.

### SUBJECT-SPECIFIC

### VOCABULARY

*Writers use subject-specific vocabulary to add precision to their writing. In this instance, its use also creates a scientific and factual tone to the writing.*

### METACOGNITION

- How has the subject-specific vocabulary you have used added to the precision of your paragraph?
- Has your planning helped you to organise your paragraphs? How? What do you need to change? What was made easier by planning in this way?
- How has the use of a bulleted list helped to make the information easier to understand? What helped you decide which information to put in the list?

**ASK QUESTIONS** to support the students to articulate the strategies writers use.

- I've noticed the author used a bulleted list. Why do you think she made the decision to present the information in this way? Is it appropriate? How does it help us as readers?
- The last three bullets have the first words capitalised. What is the effect of this?
- What do you think the author thinks is the most important information in the list? What makes you say that?

For students who need support with writing instructions, you could point out the imperative verbs used in these instructions. Co-construct further examples and support the students with practising the structure (for example, with sentence starters or gap-fill sentences) before asking them to produce it independently. Students could innovate on the text by writing a bulleted list for “What should you do in a fire?” and include capitalised words for the key words “stop, drop, and roll”.

**PROMPT** the students to recognise the structure of a paragraph and how this supports the reader.

- What does the first sentence tell us?
- What kind of sentence is it? (topic)
- How do the other sentences link to the first sentence? What do they tell us? How do they relate to the topic sentence?
- As readers, we expect the following supporting sentences to tell us more about why the earthquake was unusually destructive.
- When we plan our writing, we need to think about the information we want to share with our readers. Our planning could include statements or information that could form topic sentences. Then we can elaborate on the topic sentence with extra detail or information. Have a look at your plan for your writing. Highlight key information that could become topic sentences for your paragraphs.

Some students may benefit from more practice in and support for constructing topic sentences and their supporting sentences. You could provide more scaffolding for students by using the following activities:

- match topic sentences with paragraphs of supporting sentences
- sequence chopped-up sentences from a short text into several paragraphs
- write topic sentences to suit paragraphs of supporting sentences
- write supporting sentences for topic sentences
- plan together and co-construct paragraphs with topic sentences and supporting sentences
- plan together and independently construct topic sentences and supporting sentences.

**EXPLAIN** why subject-specific vocabulary is used. Provide the students with a model of a sentence without subject-specific vocabulary, for example, “Often the cracks are small and make little shakes, which most people don't feel”.

- How do these sentences differ? One sounds clearer and more specific. When we write factual texts, the audience expects to read words that are precise and are the correct words for the subject.
- As writers we need to select the language we use carefully. We can use our word webs to remind us of the subject-specific vocabulary we know and can use. Have a look at your writing with a partner. Where could you introduce some subject-specific vocabulary to make your meaning clearer?

### GIVE FEEDBACK

- Your paragraphs are more organised, and it is clear how the following sentences add detail to the topic sentence. This helped me to understand your explanation.
- You have used a bulleted list to identify the main points. I think that works well as a way of concisely showing that information.

 Writing standard: by the end of year 5

 The Literacy Learning Progressions