



Overview

Where does power come from? Starting with some familiar electrical structures, the article traces the source of the power needed to charge an electric toothbrush. It follows the journey back from the power outlet in the wall, through roadside structures and transmission lines, to the waters of Lake Taupō. Each stage of the process is clearly and simply explained, with supportive photos, a map, and a linking graphic. The graphic on the right-hand margin of each spread shows the stages of power

transmission, providing support for the technical vocabulary as well as for understanding the sequence of the process.

“Reverse chaining” (where a process is described by starting with an end product and working backwards to its origin) may be confusing for some students. Provide extra support if necessary.

Texts related by theme

“Water Power” SJ 2.4.05 | “Wind Power” *Connected* 3 2010 |
“Jumping for Joules” *Connected* 3 2008

Text characteristics from the year 4 reading standard

some compound and complex sentences, which may consist of two or three clauses

some words and phrases that are ambiguous or unfamiliar to the students, the meaning of which is supported by the context or clarified by photographs, illustrations, diagrams, and/or written explanations



a straightforward text structure, such as a structure that follows a recognisable and clear text form

other visual language features that support the ideas and information, for example, text boxes or maps

Possible curriculum contexts

SCIENCE (Physical World)

LEVEL 2 – Physical inquiry and physics concepts: Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.

ENGLISH (Reading)

LEVEL 2 – Structure: Show some understanding of text structures.

ENGLISH (Writing)

LEVEL 2 – Structure: Organise texts, using a range of structures.

Possible reading purposes

- To learn about hydroelectric power and where it comes from
- To explore the way the author structures the article.

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

Possible writing purposes

- To write an explanation of another physical phenomenon in your everyday life
- To create a poster, brochure, or blog entry about a complex process.

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

Text and language challenges

VOCABULARY:

- Possible specialist or unfamiliar words and phrases, including “electricity”, “switches”, “automatically”, “prevent”, “meter”, “company”, “driveway”, “neighbours”, “buzzing”, “pylons”, “turbines”, “generate”, “concrete”, “backs up”, “crater”, “volcanic eruption”
- The series of specialist terms that are repeated, including “power outlet”, “fuse board”, “meter box”, “roadside power box”, “transformer”, “substation”, “transmission lines”, “power station”, “dam”, “river”.

Possible supporting strategies

Model and discuss the use of strategies such as using root words and suffixes and prefixes (“electricity”, “automatically”, “transformer”, “substation”, “eruption”); and the two parts of compound words (“roadside”, “driveway”) to work out the pronunciation and meanings of words.

Support students in selecting vocabulary they will focus on learning and provide opportunities for them to encounter and use the vocabulary over time and in a range of contexts. *The English Language Learning Progressions: Introduction*, pages 39–46 has useful information about learning vocabulary.

SPECIFIC KNOWLEDGE REQUIRED:

- Familiarity with the everyday use of electricity
- Familiarity with some of the structures in our neighbourhoods that transmit electricity
- Understanding that electricity is generated and distributed to our homes and schools
- Experience of tracking a process back to its source or starting point, step by step.

Possible supporting strategies

Review the students’ knowledge of the ways in which electricity is used in our houses, schools, and other familiar places. Probe for further information about where electricity comes from and how it gets into structures such as power outlets.

If students are not familiar with the structures used to distribute electricity, take them on a walk around the school and neighbourhood to identify these structures.

Ask any students who have different experiences of power supplies and uses (for example, they may come from another country, live on a farm, or generate their own power) to share their knowledge.

TEXT FEATURES AND STRUCTURE:

- The explanation of a process in reverse – from the end (electric toothbrush) to the beginning (Lake Taupō)
- The repetition of the phrase “gets its power from” (and similar phrases) and later, “gets its water from” to link structures that move power or water from the source
- The list of structures the power and water go through, supported by a process graphic on each spread and a zigzag graphic that links the photographs
- Language that can signal cause and effect relationships, such as “If our family is using too much electricity at once, the switches on the fuse board turn off automatically ...”
- A map with labels and a key
- The final sentence, which summarises the process by returning to the start of the article.

Possible supporting strategies

Skim-read the text with the students, focusing on the bolded words, the graphics, and the photos. At each stage of the process, ask the students to predict where the power or water comes from.

During reading, point out and discuss the repeated phrase “gets its power/water from” and similar phrases. Prompt the students to link these with the graphics.

Support the students to understand the reverse order of the explanation. Use a familiar example, such as where water comes from, to show how you can describe a process from the end result to the source.

Use the visuals (such as the flow charts and the pictures with sentences underneath) to support the students to notice the language we can use to signal cause and effect.

For students who need a lot of support with the language and prior knowledge, use some of the following strategies or activities (according to your students’ needs):

- Give pairs of students the pictures. Ask them to discuss what they see. Encourage them to use a first language other than English if appropriate.
- Give the pairs labels to match with the pictures. Provide dictionaries or definitions of the labels if appropriate. As a whole group, confirm what the labels mean. Discuss and record related vocabulary.
- Give each pair of students one of the text boxes. Have them read it and match it with a picture.

Instructional focus – Reading

Science (Physical World, level 2 – Physical inquiry and physics concepts: Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.)

English (Level 2 – Structure: Show some understanding of text structures.)

Text excerpts from “Power”

The meter box gets its power from the **roadside power box** at the start of our driveway. Our neighbours’ houses also get their electricity from this box.

Students (what they might do)

*The students draw on the words and photograph, and **make connections** with their own knowledge, to **infer** that the boxes are widely used in New Zealand.*

The students notice the phrase that is repeated from the previous paragraphs. They cross-check the bolded words with the chart in the graphic to confirm the order of the stages. They predict that these features will form the structure of the article, and they also predict the next stage in the process.

The transmission lines carry power from the **power station**. Inside the power station, water flows down huge pipes and rushes through turbines. The turbines spin fast and generate electricity.

*The students identify the power station in the small photo and use the words to **infer** that the larger photo shows turbines. They **make connections** between the text and what they know about water to **visualise** the movement of the water, and the force expressed in the verbs used. The students use their vocabulary knowledge and the context to work out word meanings. They **ask questions** and search for answers about terms or concepts they are not sure about.*

The water in the dam comes from the **river**. There are eight dams on the Waikato River.

*The students **make connections** between parts of the text and the photos to **visualise** the river water moving through each dam to the power station. They use their knowledge of maps to interpret information about the river and **ask and answer questions** about the Waikato River as a source of power.*

Teacher (possible deliberate acts of teaching)

ASK QUESTIONS to support the students to identify the structure of the text. The students can do this in pairs or groups, then share their findings.

- What does this part of the text explain?
- What do you notice about the structure of the sentences and the format of the article? What do you predict will come next?

TELL the students to confer with a partner to confirm their inferences.

- Do you have these boxes near your house? Share what you know about them, and suggest why you do or don’t have one where you live.

MODEL using clues to make connections within the text. For example:

- The zigzag line points to the small photo, so I infer that’s the power station. The bigger photo is an inside shot, and the text says “Inside the power station”.
- I inferred that the big object is a turbine. It’s hard to see how they work, but if they “spin fast”, then they must go round and round.
- I’ve seen the power of water in rivers and waterfalls, so when I read the words “rushes” and “spin fast”, I could imagine the way water must make the turbines spin.
- I wonder how turbines “generate electricity”? I’ll keep that question on hold until later. I might need to use the Internet to help me out.

TELL the students that asking questions as they read is an important strategy.

- By asking questions, you keep alert to places where you need to find out more.
- If your questions aren’t answered in the text, make a note of them and search for answers later.

PROMPT the students to ask questions about the Waikato River.

- Where in New Zealand is the river? Find it on a bigger map.
- From what you’ve read, what can you infer about the river?
- How many power stations does the river support? How can you check this?
- Where does the water come from? Where does it go to?

Some students may need support to identify the location of the river and to locate it in relation to places they know. Prompt them to share any knowledge they have of large rivers in other regions or countries and to compare the uses of rivers.

GIVE FEEDBACK

- I noticed you kept your finger on the line in the graphic and checked it every time you came to a new bolded term. Cross-checking and rereading like this is a good way of understanding a process.
- You wrote some questions as you were reading: that’s a good way to keep track of parts you’re not sure of. Where do you think you’ll find answers?

METACOGNITION

- Show me a place where you paused to ask yourself a question. How did this help you understand the explanations?
- Tell me about the reading strategies that were most useful for you as you read this article.
- Describe what you did to work out the connections within the text.

Reading standard: by the end of year 4

The Literacy Learning Progressions

Assessment Resource Banks

Instructional focus – Writing

Science (Physical World, level 2 – Physical inquiry and physics concepts: Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.)

English (Level 2 – Structure: Organise texts, using a range of structures.)

Text excerpts from “Power”

My toothbrush gets its power from the **power outlet**.

...

And that’s how the water from Lake Taupō cleans my teeth!

The power outlet gets its power from the **fuse board**. If our family is using too much electricity at once, the switches on the fuse board turn off automatically to prevent a fire from starting.

The fuse board gets its power from the **meter box**. Once a month, someone comes to read the meter. This tells the power company how much electricity we’ve used.

The power station gets its water from the **dam**. A large concrete wall is built across the river. Water backs up behind this dam.

Examples of text characteristics

STARTING AND ENDING

An explanation tells how or why something works or happens. Explanations usually start with a statement that gives the topic, process, or question, and they end with a statement that summarises or concludes the process.

ACTION VERBS

The explanation of the process includes a series of steps, often identified by the use of action verbs.

SEQUENCE

The actions or events in an explanation are organised in sequence or order. The sequence can be supported with graphic features.

METACOGNITION

- Turn to a partner and share the process you used to plan and write this. What can you learn from each other about planning for writing?
- Tell me about the challenges you had in your writing and how you overcame them.

Teacher

(possible deliberate acts of teaching)

PROMPT the students to ask themselves questions that will help them to structure their writing.

- Start by asking a “Why?” or “How?” question. This will help you to clarify what it is that you want to explain.
- Where will you start?
- How will you finish?
- What questions will your readers expect you to answer?
- How did the author bring the explanation back to the starting point? What is the impact of this?

MODEL identifying the action verbs that give the steps in the process.

- In this extract, the action verbs are “gets”, “is using”, “turn off”, “comes”, “tells”, “we’ve used”. These verbs give the main actions in the process.
- Look at your own writing and think about the verbs you’ve used to describe actions. Are they precise enough? You may want to change some of them so that they describe actions more clearly.

MODEL using a strategy to plan the explanation of a process.

In a shared writing session, show the students how to use a graphic organiser to plan the explanation. Use an electronic whiteboard or chart and the headings: “Question” and “Stages 1, 2 ...”. Start by identifying a question you want to answer (for example, How do I receive text messages?), then make brief notes for each stage of the sequence. Check the order and rearrange the stages if necessary.

With the students, list the action verbs that will give the main steps in each stage.

List signal words that will make the order clear, for example, “when”, “then”, “after that”, “next”.

Once the sequence is organised, ask the students to find places where extra detail, such as reasons and descriptions, will help to make the explanation clear.

GIVE FEEDBACK

- I can see that your planning helped you get the sequence in the right order before you started writing.
- The verbs you used to explain how clouds form helped me to visualise what happens and to understand the process better.

 Writing standard: by the end of year 4

 The Literacy Learning Progressions