



## Overview

This report describes the use of solar panels to make electricity and includes an example of a school that has been using solar power since 2008. Students from the school share what they have learnt about solar power, including the fact that solar power is a form of renewable energy. (The concept of renewable energy is explored further in the article “Solar Power in Tokelau” and in the poem “Borrower” in this journal.)

A PDF of this text and an audio version as an MP3 file are available at [www.juniorjournal.tki.org.nz](http://www.juniorjournal.tki.org.nz)

The text requires students to “confidently use a range of processing and comprehension strategies to make meaning from and think critically about” text (from *The Literacy Learning Progressions*, page 14).

Note that the science content in this article is presented in terms accessible to level 2 students and does not provide detail about the process of converting sunlight into electricity. You can find further information in Building Science Concepts Book 20: *Our Star, the Sun* (Levels 1–2), Book 29: *Solar Energy* (Levels 2–4), and <http://scienceonline.tki.org.nz/What-do-my-students-need-to-learn>.

## Related texts

Other texts about solar power or other forms of electric power: “Solar Power in Tokelau” and “Borrower” (a poem), both in *JJ 57*; “Heat It Up” (*Connected L2 2015*: a text about making a simple solar oven)

Other texts about the sun: “Cool Facts about a Hot Place” (*SJ L2 Oct 2015*)

## Text characteristics

“Power from the Sun” includes the following features that help develop the reading behaviours expected at Gold.

The structure of the text as a report, with an introduction, a series of main points, and a conclusion

A mix of explicit and implicit content within text and visual language features that requires students to make connections between information in the text and their prior knowledge to ask questions, track information, and identify main ideas

Visual language features such as subheadings, text boxes, speech bubbles, and labelled photographs and illustrations

Some information that may be unfamiliar

Some vocabulary that may be unfamiliar, including subject-specific vocabulary, the meaning of which is supported by the context, the sentence structures, the visual language features, and/or definitions or explanations

A variety of sentence structures so that students are required to notice and use linking words and phrases (for example, “that”, “by”, “When”, “This”, “then”, “such as”, “because”, “the more panels we have, the more electricity we can make”, “Together”, “but”, “even”, “also”, “so”) and punctuation (including inverted commas and parentheses) to clarify the links between ideas

**Using solar energy at school**

More and more schools in New Zealand are putting solar panels on their roofs. Solar panels are ideal for schools because schools are open (and using electricity) in the daytime when the sun is shining.

Bayswater School in Auckland got solar panels in June 2008. The panels are arranged in groups called arrays.

Solar panels on the roof of Bayswater School

Our school has two solar arrays. The more panels we have, the more electricity we can make.

One of our solar arrays has 12 panels and the other has 16 panels. Together, they make six kilowatts of electricity per hour.

**Kilowatts**

A kilowatt is a measure of power. One kilowatt equals one thousand watts. A small long-life light bulb uses between 14 and 16 watts an hour.

Sections or paragraphs with clear lead sentences linked to subheadings and followed by sentences with supporting information

**English (Reading)**

Level 2 – Purposes and audiences:  
Show some understanding of how texts are shaped for different purposes and audiences.

Level 2 – Processes and strategies:  
Selects and reads texts for enjoyment and personal fulfilment.

**Science**

Levels 1 and 2 – Planet Earth and beyond:  
Astronomical systems: Share ideas and observations about the Sun and the Moon and their physical effects on the heat and light available to Earth.

**Technology Level 2**

Level 2 – Nature of technology:  
Characteristics of technology:  
Understand that technology both reflects and changes society and the environment and increases people's capability.

**Select from and adapt** the suggestions below according to your students' strengths, needs, and experiences – their culture, language, and identity (*Reading and Writing Standards for Years 1–8*, Knowledge of the Learner, page 6).

**Possible reading purpose**

(*What can the students expect to find out or think about as a result of reading this text?*)

- To find out how people can make “power from the sun”

**Possible learning goals**

(*What opportunities does this text provide for students to learn more about how to “read, respond to, and think critically” about texts?*)

This text provides opportunities for students, over several readings, to:

- **make connections** between information in the article and their prior knowledge
- **ask questions** and look for or think about possible answers
- identify main points and supporting information (**summarise**)
- **identify and discuss main ideas**
- **monitor** their own reading and, when something is unclear, take action to solve the problem, for example, by rereading a sentence or looking for clues close by.

**Text and language features****Possible supporting strategies**

(Use these suggestions before, during, or after reading in response to students' needs.)

**Vocabulary**

Possibly unfamiliar words and phrases, for example:

- “solar energy”, “electricity”, “Sol”, “Roman sun god”, “cultures”, “worshipped”, “panels”, “silicon”, “substance”, “power system”, “Bayswater”, “arrays”, “kilowatts”, “per hour”, “a measure of power”, “watts”, “renewable energy”, “hydro-electric power”, “detectives”, “corridors”, “monitor”, “continue”
- extended noun phrases (for example, “The energy from the sun”, “6 kilowatts of electricity per hour”, “a small long-life light bulb”)

- Prompt the students to remember the strategies they can use, often in combination, for example, when **decoding**:
  - recognising words, word chunks, or syllables within a word (for example: “sil-i-con”, “sub-stance”, “ar-rays”, “kilo-watts”, “Bays-water”, “re-new-able”, “mon-it-or”)
  - drawing on their knowledge of variations in the sounds of some letters or letter combinations (for example, “energy”, “electricity”, “worshipped”, “kilowatts”)
  - using context and sentence structure to confirm decoding attempts
- when **working out word meanings**:
  - using the context and/or structure of the sentence and paragraph (for example, to clarify that “measure” is being used as a noun rather than a verb on page 5)
  - looking for supporting information, such as text boxes, explanations, or photographs
  - reading on to look for further information, including looking at the next word or words to help clarify a noun phrase.

Have a dictionary available for students to confirm or clarify word meanings, but remind them that they can make a best attempt at a word and come back to it later.

**Introducing the text**

A short video on the importance of introducing the text is available at <https://vimeo.com/142446572>

Use your knowledge of your students to ensure that your introduction to the text is effective in activating their prior knowledge and providing appropriate support for a successful first reading. **Select from and adapt** the following suggestions.

For English language learners, before reading the article with the rest of the group, use the photographs and subheadings to clarify the context and introduce some of the subject-specific vocabulary. If possible, arrange for the students to see solar panels on local roofs or to view some online.

- Use the title and visual language features on pages 2 and 3 to confirm that this is a non-fiction text and generate discussion about what “power from the sun” might mean. Read the first two captions on page 3 and ask the students to share what they already know about solar power or solar panels – what they are and why people use them.
- Have the students read and discuss the first paragraph on page 2 to check their ideas. Draw attention to the words “solar energy” and “solar power” and explain that inverted commas are often used for important words that are explained in the text.
- Look through pages 3–5 together. Prompt the students to use the subheadings and photographs to predict what they will find out in each section. As part of the discussion, draw out or feed in subject-specific vocabulary, such as “silicon”, “arrays”, “kilowatts”.
- Encourage the students to ask questions based on what they have seen from this preview. You could record their questions on a chart to come back to after the reading.
- Together, set the reading purpose. Share the learning goal(s).
- Provide sticky notes for the students to mark information that answers any of their questions or aspects they might want to return to.

## Reading and discussing the text

Suggestions for ways that you can support the students to achieve the learning goals are in the right-hand column of the table below.

**Select from and adapt** the suggestions according to your students' needs.

Encourage the students to read the text by themselves, intervening only if it's clear a student needs help. Much of the processing that they do is "inside their heads" and may not be obvious until the discussion after the reading. There will be many opportunities to provide support with word-solving and comprehension on subsequent readings.

### Student behaviours

*Examples of behaviours that will help the students achieve their learning goal(s).*

### Deliberate acts of teaching

*Examples of how you can support individual students (if needed).*

#### The first reading

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|---|--|
| <ul style="list-style-type: none"><li>• The students keep the reading purpose (and any specific questions) in mind as they read. They note aspects that seem relevant or are of particular interest to come back to.</li></ul>  | <ul style="list-style-type: none"><li>• Remind students of their reading purpose and that they can note things they want to come back to or investigate further.</li></ul>   |
| <ul style="list-style-type: none"><li>• The students make connections between information in the article and their prior knowledge. Examples include:<ul style="list-style-type: none"><li>– on page 3, making connections to their knowledge of solar power (including ideas from the introductory discussion) and/or their experiences of using electrical appliances</li><li>– on page 4, making connections to what they know about "arrays" in maths</li><li>– on page 7, making connections to what they know about saving power, their own classroom uses of electricity, and classroom "monitors".</li></ul></li></ul>  | <ul style="list-style-type: none"><li>• Encourage the students to notice connections to things they already know to help them better understand the information in the article and its implications.</li></ul>                             |
| <ul style="list-style-type: none"><li>• They notice information that helps to answer their questions or that generates new questions (for example, about renewable energy).</li></ul>   | <ul style="list-style-type: none"><li>• Remind them that asking themselves questions (and writing them on their sticky notes) is a good way of thinking more deeply about the article (and that these can be followed up later).</li></ul> |
| <ul style="list-style-type: none"><li>• They identify main points and supporting information, including information in the text boxes, photographs, and illustrations. For example:<ul style="list-style-type: none"><li>– they use the headings and subheadings to clarify what each section is about and look for key words to help track the sequence of ideas</li><li>– they use the labelled illustration on page 3 to build their understanding of how and why people use solar panels</li><li>– they use the page 5 text box to clarify that a "kilowatt" is a measure of power</li><li>– they notice the use of inverted commas for "energy detectives" on page 7 and search for supporting information in the rest of the paragraph.</li></ul></li></ul> | <ul style="list-style-type: none"><li>• Remind the students that they can find supporting information in the visual language features.</li></ul>   |
| <ul style="list-style-type: none"><li>• They demonstrate self-monitoring and problem solving. For example:<ul style="list-style-type: none"><li>– they use a range of strategies to solve unfamiliar words</li><li>– they rerun sentences that include extended noun phrases to clarify the overall meaning of the sentence and check that their phrasing makes sense</li><li>– they note aspects they are not sure about.</li></ul></li></ul>  | <ul style="list-style-type: none"><li>• Prompt the students to think about the strategies they can use to solve words and clarify meaning, and remind them that they can note things they want to come back to.</li></ul>                  |
| <ul style="list-style-type: none"><li>• As the students finish reading, they think about what they've found out. They may check and reread sections they have marked or jot down ideas or new questions they have thought of.</li></ul>   | <ul style="list-style-type: none"><li>• Ask the students to think about the reading purpose (what they wanted to find out) and what they have learnt.</li></ul>  |

## Discussing the text

You can revisit this article several times, focusing on different aspects and providing opportunities for the students to build comprehension, vocabulary, and fluency and explore the connections to their own lives. **Select from and adapt** the following suggestions according to your students' needs and responses to the reading. Some of the suggestions overlap, and several can be explored further as "After reading" activities.

 For some suggestions, you may find it helpful to project the PDF of the article so that you can zoom in on relevant sections.

- The students share their initial responses to the information in the article.
- The students share any answers they have found, questions they still have, and/or new questions they thought of as they were reading.
- The students describe an example of how visual language features, such as the subheadings, photographs, captions, and text boxes, helped them to understand information in the article.
- With support, the students use the headings, other visual language features, lead sentences, and key words, along with their knowledge from the first reading, to identify (summarise) what each section is mainly about. They distinguish between main points and supporting information.
- The students think critically, making connections to their prior knowledge (for example, of environmental issues or about other forms of electric power) to identify the ideas that seem most important.
- Remind the students of the reading purpose and encourage them to share their responses. You could have them think, pair, and share one thing they found particularly interesting or surprising.
- Discuss any answers the students have found to their questions. *What helped you to find the information?* If necessary, support them to go back to the text to clarify.
- Explain that reading non-fiction texts often leads on to asking (and researching) further questions. Discuss ways of finding answers to new questions that are not answered in the article, for example, about sun gods or wind power or hydro-electric power. The students could follow up on this as an "After reading" activity (or, for some questions, by reading "Solar Power in Tokelau").
- Discuss why the visual language features are there and how they help. Ask questions (*What did the captions tell you about power from the sun? What helped you to understand arrays?*) or have the students identify particular examples.
- Have the students refer back to the article to identify (summarise) what each section is mostly about. Remind them to use the headings as a guide and to look for lead sentences, as well as information in the visual language features.
- Support the students in identifying main points and supporting information by using a teacher think-aloud. For example, model your thinking about page 3: *I think from the heading that this section will tell me about how solar power is made. I know that the main point is often in the first sentence ... yes [underline the first sentence] ... this first sentence tells me how solar power is made – by using solar panels. So now I'm looking for information that explains this. As you continue, talk aloud to yourself about the words or phrases you are choosing to underline. After a few sentences, you could invite the students to help. Draw out the link between keeping the "main point" in mind and looking for key words that provide further information. Draw attention to the captions beside the illustrations on this page that also serve as summary statements.*
- The students could work in pairs to summarise further sections as an "After reading" activity.
- Encourage the students to think critically: *This article tells us how solar power is made and about Bayswater School, but there are some other important ideas here too. Prompt them to identify and discuss the concepts of renewable energy and saving energy: I wonder why people choose to use solar power? You could have the students reread the second speech bubble on page 6. Prompt them to notice the reference to renewable energy and to consider the implications of using solar energy. (If necessary, clarify what is meant by wind power and hydro-electric power.)*

## How you can support your students to be metacognitive

Here are some ways you can build students' awareness of the processes and strategies they are using as they make meaning and think critically.

With support, the students reflect on their learning.

- The students talk with a partner about words, phrases, or ideas they found challenging and how they worked them out (or tried to).
- The students identify examples of how making connections to their prior knowledge helped them, for example, to understand what it meant by the panels being set out in "arrays" or the roles of the "energy detectives".
- Remind the students of the reading purpose and learning goal(s).
- Ask the students to talk with a partner about a challenge they had when reading and how they solved or attempted to solve it. Listen in and note anything you might want to follow up on.
- *How did thinking about what you already know help you understand ideas in this article?*

## After reading: Practice and reinforcement

After-reading tasks should arise from your monitoring of the students' needs during the lesson and provide purposeful practice and reinforcement. Where possible, make links to other texts, including texts generated by the students, and to the wider literacy programme (oral language, writing, handwriting, word games and activities) and other curriculum areas.

- Provide opportunities for students to reread this article and to read and discuss other texts with similar themes or topics (see Related texts). They could reread the article as they listen to the audio version. Audio versions also provide English language learners with good models of pronunciation, intonation, and expression.
- Print a photograph of each student and have them add a speech bubble stating one fact they found out about making power from the sun or about ways to save energy. (Ideas about saving energy could be displayed elsewhere in the school and/or published in the school newsletter.)
- The students could write a job description for an “energy detective”. They could include the tasks mentioned on page 7 as well as further ideas of their own for how they might save energy at school.
- Use the poem “Borrower” in this *Junior Journal* as a way to begin building knowledge of other forms of renewable energy. (Also see the teacher support material for “Solar Power in Tokelau”.)
- Use an interactive cloze activity (a form of cloze activity where selected words are omitted), as in the example below, to build students' understanding of subject-specific vocabulary and sentence structure.

More and more schools in New Zealand are putting \_\_\_\_\_ on their \_\_\_\_\_.

The panels are arranged in groups called \_\_\_\_\_.

Our solar panels work best on a \_\_\_\_\_ day, but they still make electricity on a \_\_\_\_\_ day.

Solar energy is a type of \_\_\_\_\_ energy.

\_\_\_\_\_ power and \_\_\_\_\_ power also use renewable energy.

**Word list:** cloudy, solar panels, roofs, arrays, sunny, renewable, wind, hydro-electric

- To provide further practice in summarising, have the students work in pairs to identify the purpose of some of the sections (what the section is mostly about) and identify three main points for each one. Some sections have more than three points so the students will need to negotiate their choices. They could highlight information on a printout of the text as they refine their ideas. The first row of the chart has been filled in here as an example.

Page	Heading	What is the purpose of this section? (What is this section mostly about?)	3 main points
2	Power from the Sun	Explains why the sun is important.	The sun gives us heat and light. We can make electricity from the sun. People used to worship the sun.
3	Making solar power		
4 and 5	Using solar energy at school		
6	Using solar energy at school (speech bubbles)		
7	Saving energy		

- The students could work with a partner to do further research on new questions arising from the reading, for example, about sun gods, silicon, or other forms of renewable energy, and create their own “text box” explanation. Students may be able to use the following websites to find further information: <https://anyquestions.govt.nz> or <https://natlib.govt.nz/schools/topics>
- DIGITAL TOOLS**  The students could use a Google Slide to create a text box explanation with images and text.
- Either before or after reading “Solar Power in Tokelau”, encourage the students to extend their understanding of solar power in their environment, for example, by finding out about local buildings that have solar panels or trying out a solar-powered object. A level 1 and 2 resource, “Solar data – What it can show us”, is available at: <http://www.schoolgen.co.nz/teach-and-learn/resource/>
  - Discuss the meaning of the prefix “kilo” (“thousand”) in “kilowatts”, making connections to other familiar words with this prefix (“kilograms”, “kilometres”) or words with the prefix “hydro” (water). Provide opportunities for students to explore other measurements of watts (“megawatts”, “gigawatts”, “terawatts”, “nanowatts”).
  - The students could select four or five topic words from the report and write their own definitions, based on information in the article.