The New Zealand Curriculum
LEVEL 2

Junior Journal

57

The *Junior Journal* is for students who are working at early level 2 in the New Zealand Curriculum and reading Ready to Read texts at Purple and Gold. The *Junior Journal* supports students to make the transition from reading individual Ready to Read texts to reading the level 2 *School Journal*.

TITLE	GUIDED READING LEVEL
Power from the Sun	**Gold 1**
Solar Power in Tokelau	**Gold 2**
Rātā me te Rākau	**Purple 2**
Professor Clever	**Gold 1**

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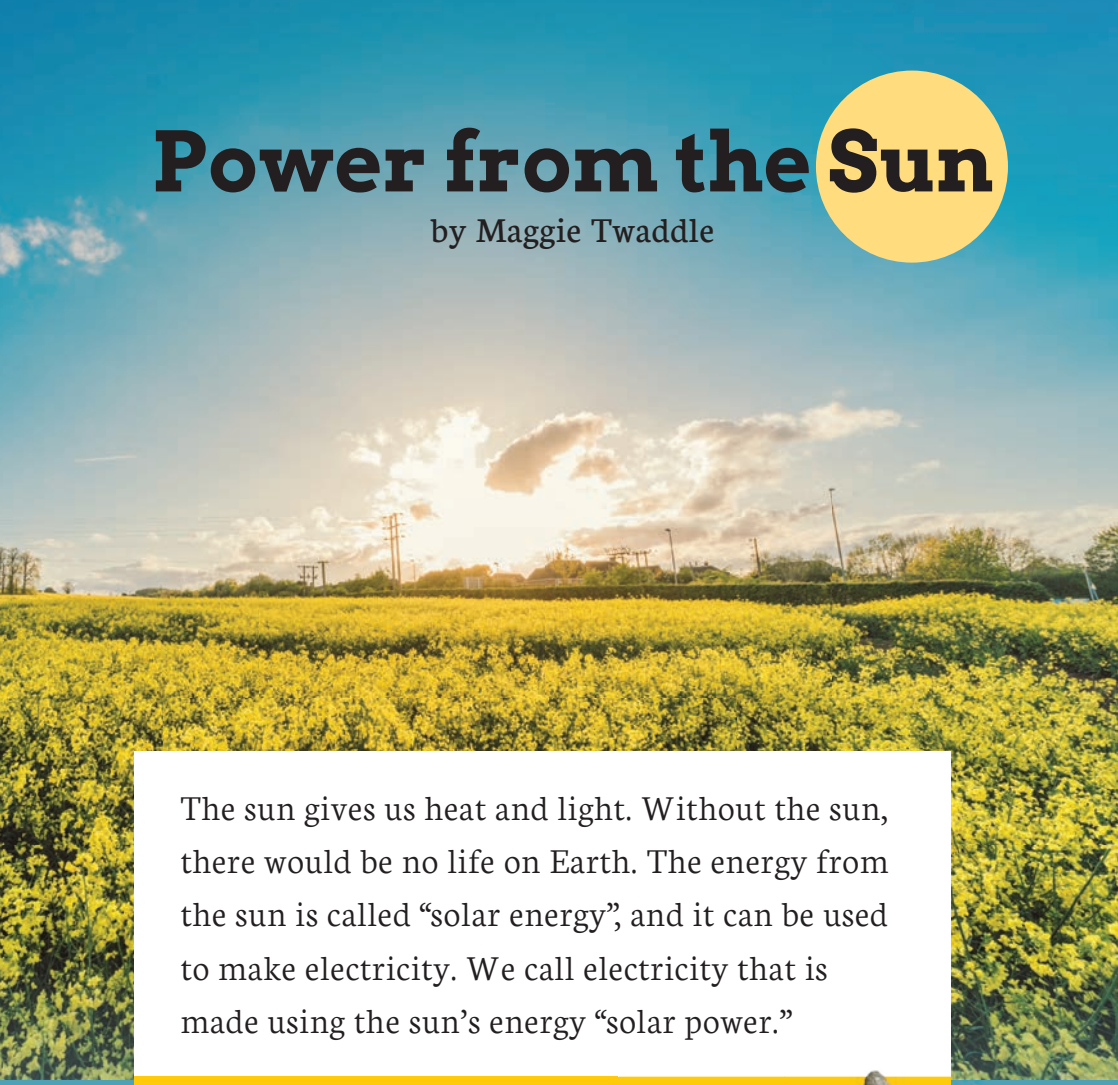
Ministry of Education

Power from the Sun

by Maggie Twaddle



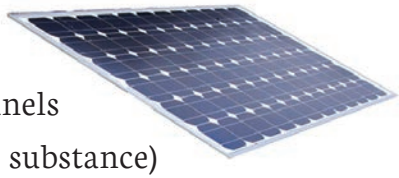
The sun gives us heat and light. Without the sun, there would be no life on Earth. The energy from the sun is called "solar energy", and it can be used to make electricity. We call electricity that is made using the sun's energy "solar power."

Sol, the sun god

The word "solar" comes from the name of the Roman sun god, Sol. In very early times, people from many cultures worshipped the sun.

A statue of the Roman sun god, Sol

Making solar power



A solar panel

Electricity from the sun can be made by using solar panels. Solar panels are flat pieces of silicon (a dark grey substance) covered with glass. The panels have wires inside them that are connected to a power system.

The panels are usually placed on the roofs of buildings. When the sun shines on the solar panels, the sunlight makes electricity inside the panels. This electricity then travels through wires to where it can be used to power things such as lights, ovens, fridges, and televisions.

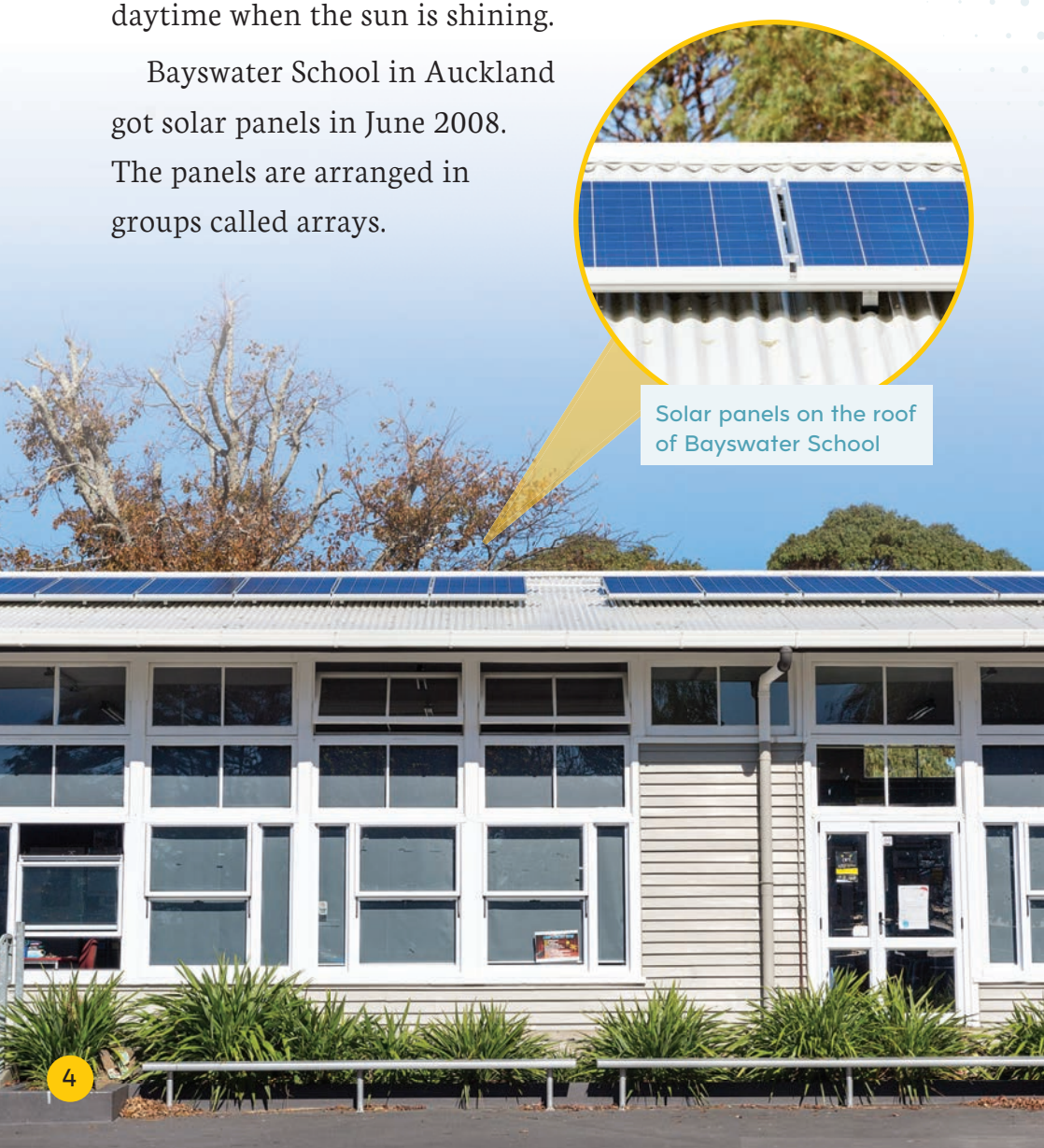
The sun shines on the solar panels, and the sunlight makes electricity inside the panels.

The electricity travels through wires inside the walls to where it is needed.

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 6 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.

The students at Bayswater School have been learning a lot about solar energy.

Our solar panels work best on a sunny day, but they still make electricity on a cloudy day. They even work when it's raining.

We've learnt that solar energy is a type of renewable energy. That means it will never run out, no matter how much people use. Wind power and hydro-electric power also use renewable energy.

The panels only make some of the electricity the school uses, so we work hard to save power.

Saving energy

The students have been working hard to make sure that electricity isn't wasted. Every year, about ten students are chosen to be "energy detectives".

They check that the lights are switched off in the corridors and the hall when nobody is using them. In winter, they make sure that the classroom doors are closed at morning tea and lunchtime so that the heat stays in the classrooms. In summer, they open the doors and windows so that the air in the classrooms is cooler.

Every class also has an energy monitor. They check that the lights, the computers, and other things that use electricity are switched off when everyone leaves the classroom.

Energy for the future

The students of Bayswater School are proud of having solar panels at their school. They know the panels will continue to make electricity for many years to come.

Borrower

I want to borrow the sun
and cook a feast with its sparks.
I want to borrow the wind
and fly the skies with its force.

I want to borrow the tide
and sail the oceans with its current.
I want to borrow the river
and run a city with its power.

Greg O'Connell

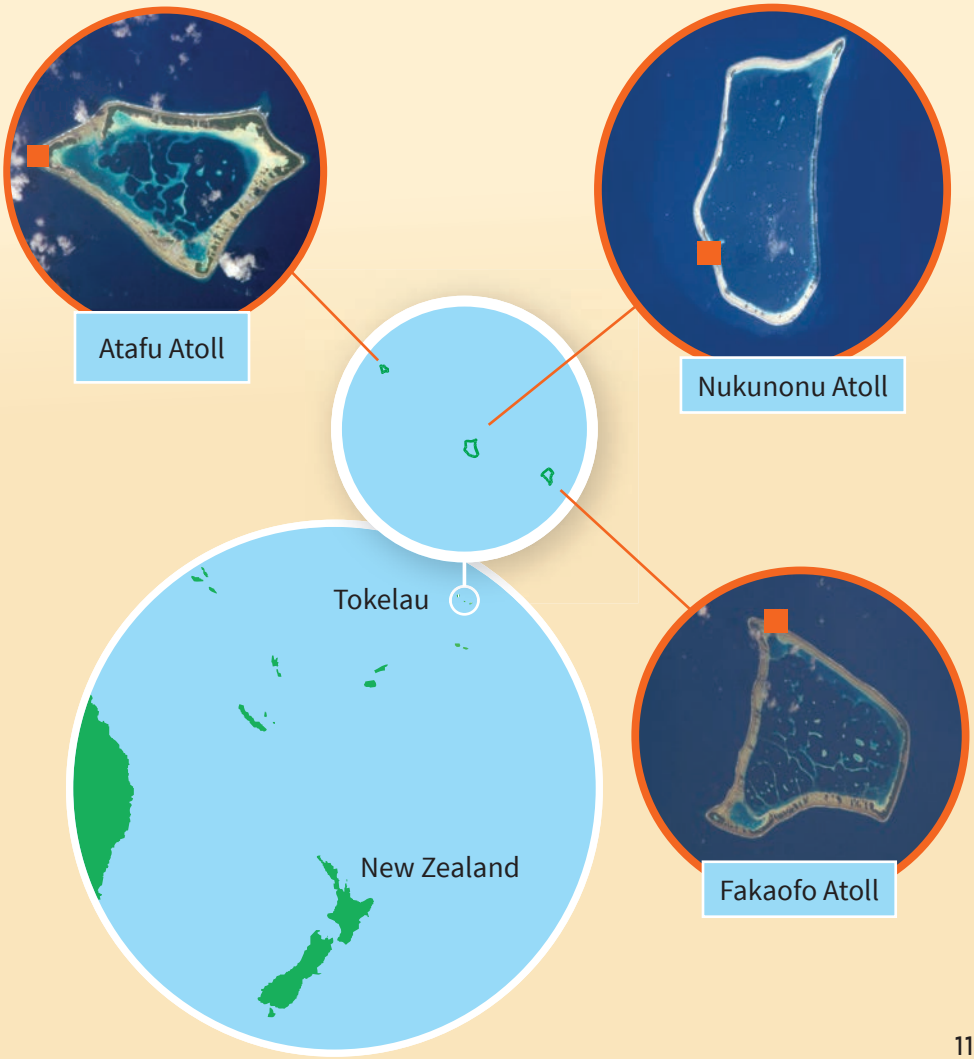
Solar Power in Tokelau

by Iona McNaughton

Tokelau is a very small and very sunny country in the middle of the Pacific Ocean. Tokelau is also a very special country because it uses only renewable energy. It gets nearly all of its electricity from the sun.

Tokelau is made up of three atolls. An atoll is a ring of small islands with seawater in the middle. The photo on page 10 shows one of the small islands.

Each atoll has a **power station**. This square ■ shows where the power station is on each atoll. New Zealand engineers helped build the power stations.



Why did Tokelau start using renewable energy?

Tokelau used to burn **diesel** to make electricity, but in 2012, it decided to stop using diesel. There were four main reasons.

1. Diesel is made from oil, which is a fossil fuel.
2. Burning diesel to make electricity is bad for the environment because the diesel produces a lot of poisonous gases as it burns.
3. The diesel had to be brought to Tokelau by ship, and that cost a lot of money.
4. The supply of diesel was not reliable. The power would often stop, and sometimes people weren't allowed to use things like electric ovens or air conditioning because they used too much power.

So Tokelau decided to change. Now solar power provides most of Tokelau's electricity, and the rest comes from coconut oil.

Power from coconuts

Tokelau has a lot of coconut trees. The coconuts from the trees produce coconut oil, which can be burnt to produce electricity. Coconut oil is a renewable fuel because the people of Tokelau can grow more coconut trees.

Fossil fuels

Oil, coal, and natural gas are fossil fuels. Scientists believe these fuels have been made underground over millions of years.

Like the sun, fossil fuels can be used to make electricity. But if countries keep using fossil fuels to make electricity, one day these fuels will run out. Once they are used, they can't be replaced – they are not "renewable".

Natural gas plant

Oil rig

Coal mine

Power stations in Tokelau

In 2012, New Zealand engineers began building three power stations in Tokelau, one station on each atoll. These power stations have solar panels (more than 4,000 altogether) that use sunlight to make electricity. The electricity from the panels can be stored in huge batteries. It can then be used during the night or when it's cloudy or rainy and there isn't much sunlight.

Inside the power station

Some of the solar panels

Living in Tokelau

Hilivelio lives on the atoll of Nukunonu. Two of his grandparents live in New Zealand, and Hilivelio likes to talk to them on the internet every week with his mother and his brothers and sisters. He tells his grandparents about school and about some of the other things he's been doing, such as playing kilikiti, going fishing, swimming, and feeding the pigs.

The power station on Nukunonu is only a five-minute walk from Hilivelio's school. The students visit the power station when they are learning about solar energy.

"At school, we learn about how we can use the sun to make electricity," Hilivelio says. "The sun shines a lot in Tokelau, and we can use solar panels to make the sunlight into electricity. The sun's energy is called solar energy, and it's renewable. Tokelau is the first country in the world to use renewable energy to make all its electricity. Everyone in Tokelau is very proud that such a small country has done such a big thing."

Reliable, renewable energy

Hilivelio's mother

Hilivelio's mother is very pleased, too. "Now, everyone is very happy because we have power twenty-four hours a day," she says, "and we have done something good for the environment too."

And now that Tokelau has all the electricity it needs, Hilivelio can talk to his grandparents in New Zealand on the internet any time he wants to.

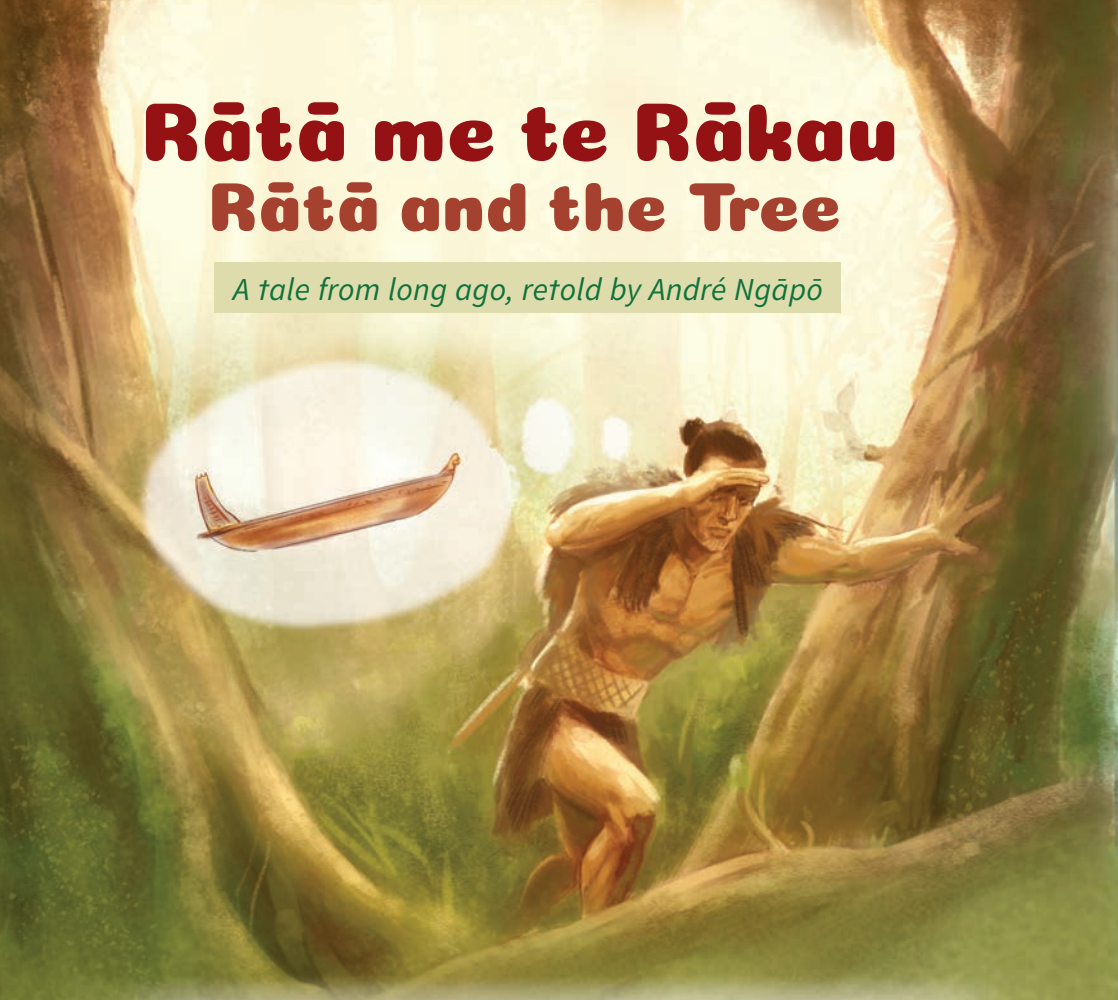
Glossary

diesel: a fuel made from oil (a fuel is something that is burnt to make heat or power)

power station: a place where electricity is made

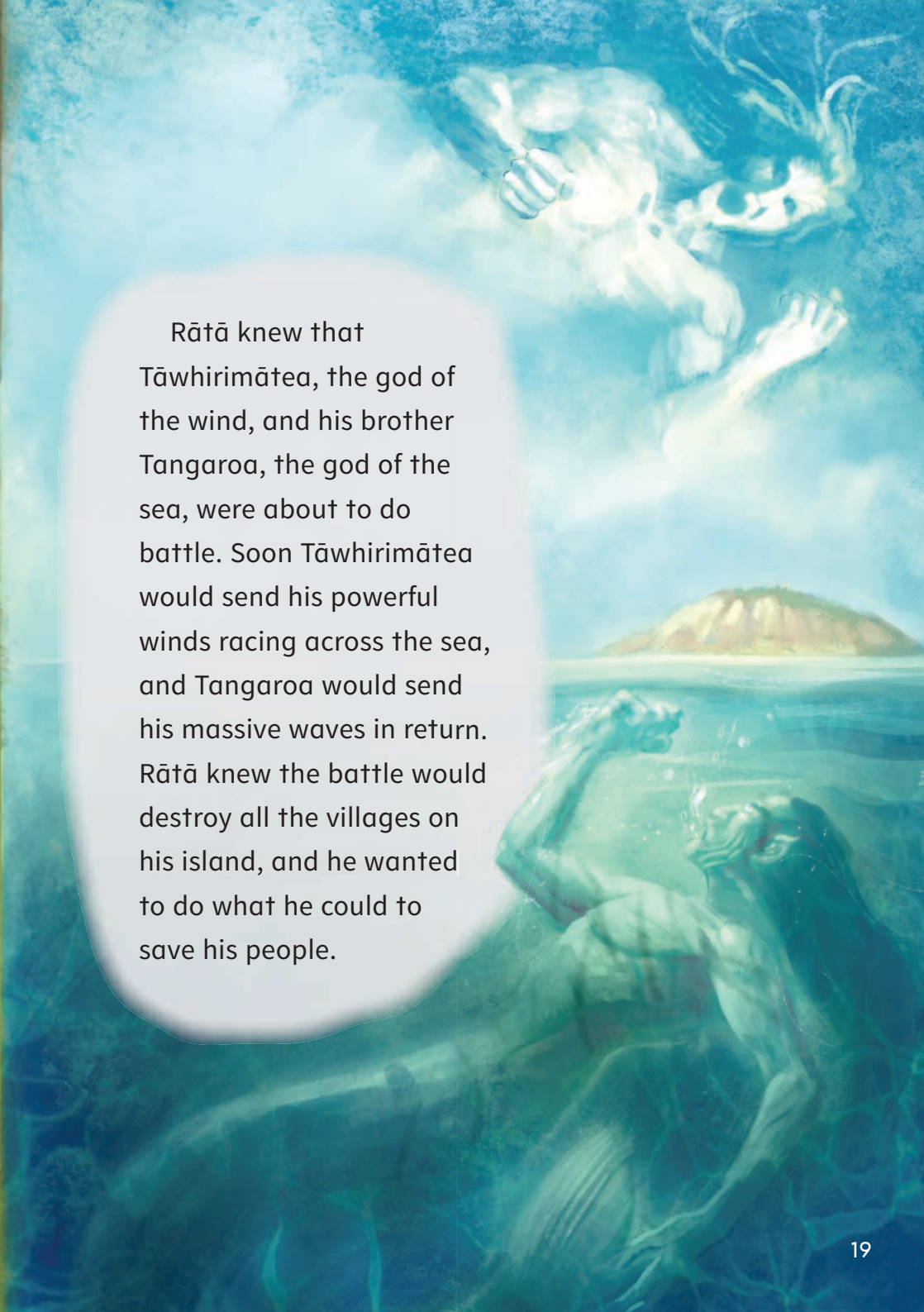
Rātā me te Rākau
Rātā and the Tree

A tale from long ago, retold by André Ngāpō



Rātā was very tired. He had been searching the forest for many days to find the right tree to make a waka. Some trees were not tall enough. Other trees were not straight enough.

"There must be a rākau tall enough and straight enough for me to use to carve a giant waka," he said. "The waka must be big enough to carry my people away from this island.



Rātā knew that Tāwhirimātea, the god of the wind, and his brother Tangaroa, the god of the sea, were about to do battle. Soon Tāwhirimātea would send his powerful winds racing across the sea, and Tangaroa would send his massive waves in return. Rātā knew the battle would destroy all the villages on his island, and he wanted to do what he could to save his people.

Rātā searched, growing more and more weary. Then, at last, he saw it – the perfect tree!

Rātā got straight to work. "Everyone in the village will be so happy," he said to himself. "Finally we will be able to leave and be safe."

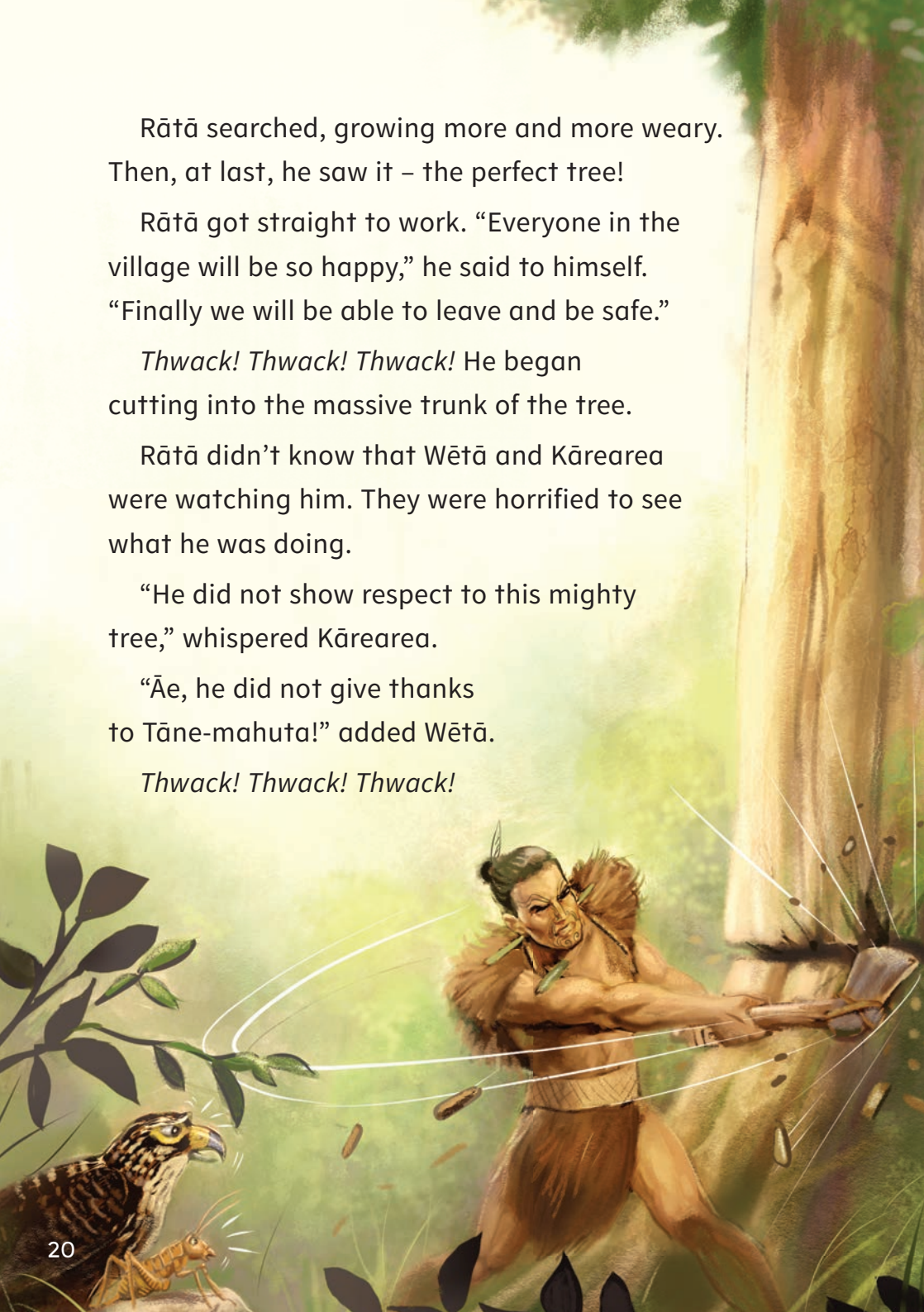
Thwack! Thwack! Thwack! He began cutting into the massive trunk of the tree.

Rātā didn't know that Wētā and Kārearea were watching him. They were horrified to see what he was doing.

"He did not show respect to this mighty tree," whispered Kārearea.

"Āe, he did not give thanks to Tāne-mahuta!" added Wētā.

Thwack! Thwack! Thwack!



The sound of Rātā striking the tree was heard by every creature in the forest.

"What's that?" cried the forest creatures, moving closer. "What is he doing?"

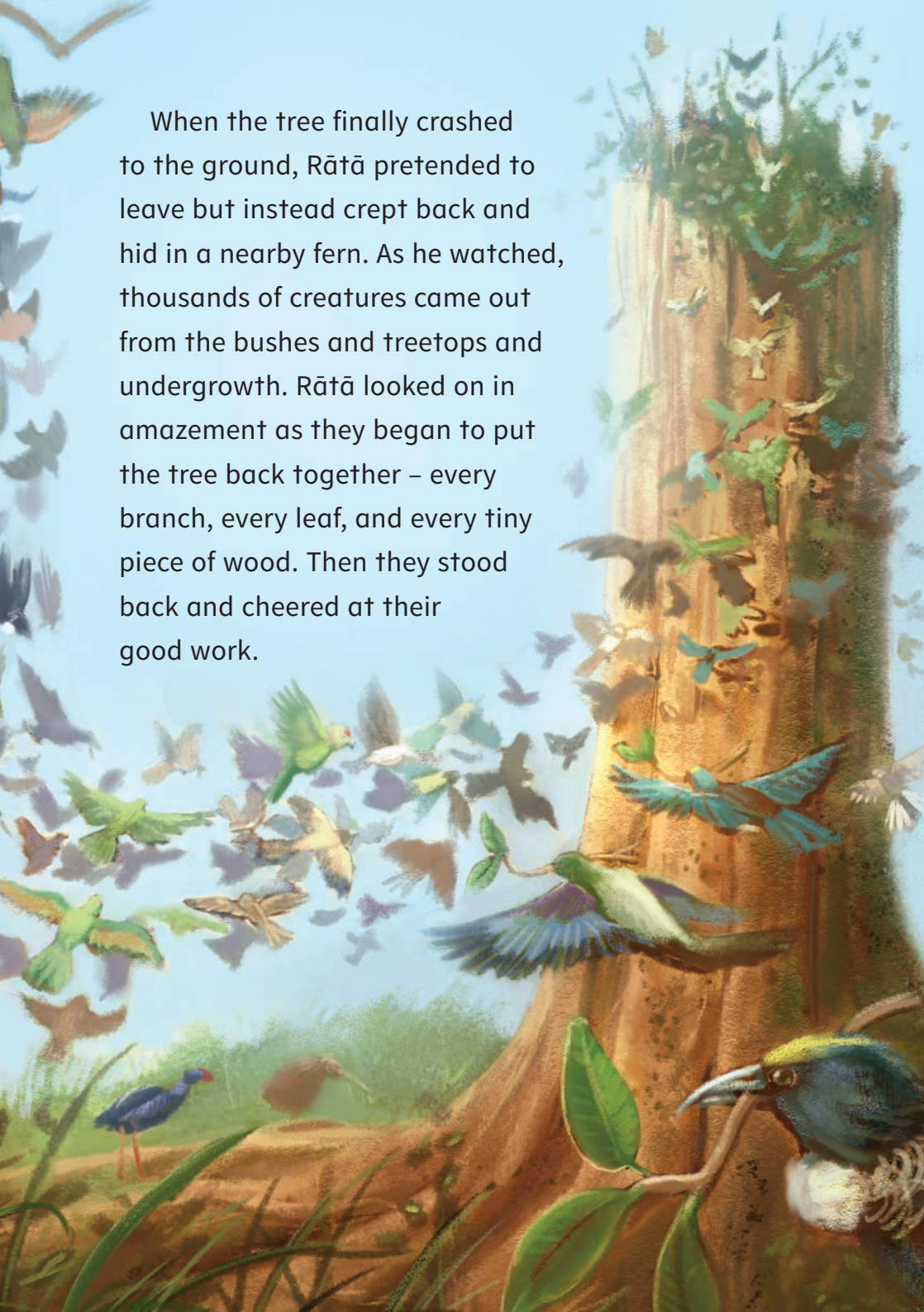
Rātā couldn't hear the creatures over the noise of his chopping. The tree fell at last with a thunderous crash. "Ah," said Rātā. "Now I can rest. Tomorrow, I will start carving the waka."

But the next morning, when Rātā returned, he couldn't believe his eyes. The tree was standing again, tall and straight! What magic was this? He looked around in wonder, but the forest was silent. He shook his head and looked at the blisters on his hands. No, it had not been a dream. But there was nothing else for it. He would have to cut the tree down again.

The birds and insects of the forest watched Rātā as he started work. Again, Rātā failed to give thanks to Tāne-mahuta. He chopped all day, and as the sun set, the huge tree fell to the ground once more.

Next morning, Rātā returned to hollow out the fallen log and again saw that the tree was standing straight and tall. He yelled out in anger, "Who did this?" Again, the forest was silent.

"Whoever you are, this time I will catch you," Rātā said to himself, and for the third time, he started to chop down the tree.



When the tree finally crashed to the ground, Rātā pretended to leave but instead crept back and hid in a nearby fern. As he watched, thousands of creatures came out from the bushes and treetops and undergrowth. Rātā looked on in amazement as they began to put the tree back together – every branch, every leaf, and every tiny piece of wood. Then they stood back and cheered at their good work.

Rātā jumped out from the fern. He was furious. "Why do you cheer and make fun of me?" he screamed. "You have ruined all my hard work!"

"Make fun of *you*?" said Wētā. "We wonder why you make fun of our guardian, Tāne-mahuta, by not showing respect to him and this rākau?"

Rātā was shocked. He looked up at the beautiful tree. He felt very embarrassed. He had been so desperate to save his people that he had forgotten to show respect. He had forgotten to explain why he needed this tree.

"Please forgive me," he said. "I was desperate. I needed to make a waka to take my people away from the angry storms of Tāwhirimātea and the wild waves of Tangaroa." His eyes filled with tears, and he turned and went back to his village.

Next morning, Rātā was woken by shouting. He looked up to see a very strange sight. A giant waka was sailing through the air towards his village! It was being carried on the backs and wings of thousands of insects and birds.

"Rātā," said Wētā. "Your heart was in the right place, even if your mind wasn't. Please take this waka as a gift to your people."

Rātā felt as if his heart would explode with joy.

"All we ask," said Kārearea, "is that you show respect and give thanks to Tāne-mahuta for the gifts of the forest and that you teach others to do the same."

"I will," promised Rātā. "I will."

And so he did.

Illustrations by Andrew Burdan

Professor Clever

by Trish Puharich

ASSISTANT TWO **DEBRA** (daughter) **TREVOR** (son)

Scene one. *The professor's laboratory.* **PROFESSOR CLEVER** *is looking out the window and scratching his head.* **ASSISTANT ONE** *and* **ASSISTANT TWO** *are working on inventions.*

PROFESSOR CLEVER (*sounding cross*). What a mess out there in the yard. It's those stupid trees! They're a real problem!

ASSISTANT ONE. Why are they a problem, Professor?

PROFESSOR CLEVER. They're always dropping their leaves and making a mess.

ASSISTANT TWO (*looking out the window, too*). I see what you mean. Someone should do something about them.

PROFESSOR CLEVER (*suddenly smiling*). I have a great idea. (*He shouts.*) Trevor! Debra!

TREVOR *and* **DEBRA** *arrive on skateboards.*

TREVOR and **DEBRA.** Yes, Dad?

PROFESSOR CLEVER. I want you to go outside and rake up the leaves.

TREVOR and **DEBRA.** Yes, Dad.

They go to rake up the leaves.

ASSISTANT ONE. Was that your great idea?

PROFESSOR CLEVER. No, I have a brilliant idea for a new invention. I'm going to get rid of one of the biggest problems around.

ASSISTANT ONE. Are you going to find a cure for hiccups?

PROFESSOR CLEVER. No, better than that.

ASSISTANT TWO. Are you going to save all the endangered animals in the world?

PROFESSOR CLEVER (*looking smug*). No, better than that, too.

ASSISTANTS ONE and **TWO** (*sounding hopeful*). Are you going to sort out global warming?

PROFESSOR CLEVER. Nope. Even better than that. I am going to rid the world of those messy trees!

ASSISTANTS ONE and **TWO.** **What**?

PROFESSOR CLEVER. You heard me. I'm going to get rid of trees. They never do anything anyway. They just stand there dropping leaves everywhere – and they block out the sun, too. Here's my idea. (*He picks up a notepad and starts drawing in it. The assistants huddle round and watch.*)
What do you think?

ASSISTANT ONE (*frowning*).
Well …

ASSISTANT TWO (*also frowning*). Ummm …

PROFESSOR CLEVER (*not listening to his assistants*). Right, let's get to work. This is what we'll need.

He shows them a list.

ASSISTANT ONE. If you say so. I'll go and get started.

ASSISTANT TWO. I'll help you.

The **ASSISTANTS** *hurry off.*

Scene two. *A few days later. The* **PROFESSOR** *and his* **ASSISTANTS** *are looking proudly at their work.*

ASSISTANT ONE. Hey, this is looking really good. Just like the real thing.

ASSISTANT TWO. Only better. And it was so quick to make.

TREVOR *and* **DEBRA** *come in on their skateboards.*

TREVOR. Hi, Dad, we've come to see what you're doing. (*He stops and stares.*) What are you making, Dad?

DEBRA. That looks like a concrete tree!

ASSISTANT ONE. That's exactly what it is.

ASSISTANT TWO. It's looking fabulous, don't you think?

PROFESSOR CLEVER. I have created the perfect tree.

TREVOR. The perfect tree?

PROFESSOR CLEVER. Yes, the perfect tree. This tree will never drop leaves, so I'll never have to rake them up.

TREVOR and **DEBRA.** You always make **us** do that anyway!

PROFESSOR CLEVER. This tree will never die. It won't rot. It won't grow any new branches to block my sunshine.

ASSISTANT ONE. You don't have to plant a seed and wait for it to grow.

ASSISTANT TWO. And it's strong. The branches won't break off in a cyclone.

PROFESSOR CLEVER. My concrete tree will be famous. People won't need real trees any more.

TREVOR. But, Dad, people **will** need real trees.

PROFESSOR CLEVER (*sounding really surprised*). Whatever for?

DEBRA. Trees are really important.

PROFESSOR CLEVER and **ASSISTANTS ONE** and **TWO.** Really?

DEBRA. Yes, Dad. Trees give us food to eat. They make oxygen for us to breathe.

TREVOR. And they give us shade.

DEBRA. And we can climb them.

TREVOR. And they give us wood.

DEBRA. And they look good.

TREVOR and **DEBRA.** Trees help the planet!

PROFESSOR CLEVER (*putting his hands up*). OK! OK! Perhaps my concrete tree isn't such a good idea after all. I'll get rid of it.

He picks up a hammer and walks towards the tree, but he stands on one of the skateboards and falls over.

PROFESSOR CLEVER. How many times have I told you not to leave those things around?

TREVOR. Sorry, Dad.

DEBRA. Are you all right?

PROFESSOR CLEVER. Yes, I am, luckily. (*He smiles.*) And I've just had another brilliant idea.

ASSISTANT TWO. What's that then?

PROFESSOR CLEVER. Wheels! They're a real nuisance. Look how I fell over when I stood on that skateboard. It's got me thinking. Why are wheels always round? Why do they roll everywhere when you don't want them to?

ASSISTANTS ONE and **TWO** (*nodding*). Good point.

PROFESSOR CLEVER. So what we need is something like this. (*He picks up his pencil and starts drawing again.*) My design for a new wheel – look!

ASSISTANTS ONE and **TWO** (*looking over his shoulder*). A square wheel! That's really clever, Professor.

PROFESSOR CLEVER. That's why they call me Professor Clever. Now, let's get to work!

illustrations by Ned Wenlock

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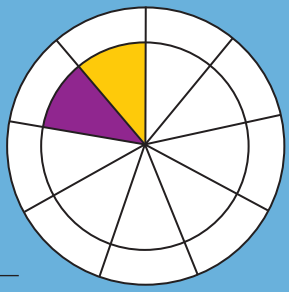

	TSM	Audio
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