



THE SEA AND ME

BY DAVE LOWE

I lived near the beach when I was growing up. I spent hours exploring with my friends. There was so much to see and feel, especially on stormy days: the dark rain clouds as they raced to shore, the wind tearing at my clothes. I would turn to the weather and laugh. Back home, Mum would shake her head. “Take a raincoat next time,” she’d say.

Near the Water

When I was older, surfing became my favourite way to be near the water. I loved the salt spray on my face. I loved hearing other surfers shout above the ocean’s roar. I’d float on my board and look towards the horizon, where sea met sky. I imagined I could see the curve of the Earth.

Like all surfers, I watched for wavy lines in the distance – the ones that meant bigger waves coming. They were often made by storms thousands of kilometres away. I’d paddle quickly as the glassy wall came closer, then jump to my feet. What joy to feel part of the ocean. What a magical place! As my board flashed across the face of the big wave, I’d yell with excitement. The ocean seemed so vast, so powerful. It was impossible to imagine it could ever change ...

The 1960s

I grew up in the 1960s. I saw signs then of the damage people were doing to the environment. They threw rubbish out of car windows. They logged native bush. Occasionally, I even saw raw sewage in the sea. But the idea that we could drastically change the planet barely existed.

The part of the atmosphere we depend on is very thin. The layer that supports almost all life is only 5 kilometres thick. For the last 250 years, we’ve been filling this layer with a colossal amount of waste, including carbon dioxide and methane. We know now these greenhouse gases are making the atmosphere hotter. They’re also making the sea water more acidic. Yet at first, greenhouse gases didn’t seem like such a problem. They weren’t even called greenhouse gases.

Two Important Things

For a long time, very little was known about the carbon dioxide in our atmosphere. Then an American scientist named Dave Keeling discovered two important things. First, there was less carbon dioxide in late spring and much more in late autumn. Trees and plants grow quickly in spring, using a lot of carbon dioxide. By autumn, this growth has stopped and the trees and plants release their carbon dioxide back into the atmosphere. This natural process has been happening for millennia, yet Keeling finally understood that atmospheric carbon dioxide levels were seasonal. He'd found proof that our planet was breathing.

Keeling's second discovery was the opposite of natural. Over time, carbon dioxide had been *increasing* in the atmosphere, and he proved that this was caused by people using coal, oil, and gas – all fossil fuels that release carbon.

In the South

Keeling lived in the northern hemisphere. He'd taken measurements in Hawai'i, which is in the top half of the planet. He wondered what was happening in the south. His best guess was that the trend was the same. He also thought that a lot of carbon dioxide was probably dissolving in the Southern Ocean. But scientists don't like to guess. They like proof. Keeling needed help from scientists in the southern hemisphere – and one of those scientists was me.

Becoming a Scientist

I left high school because I was bullied, but I didn't want my education to stop. So I went to the library to read about the ocean I loved. I learnt how waves form. What makes the weather. How the ocean, land, and atmosphere are connected. Learning these things made me realise I wanted to be a scientist. I wanted to understand how our planet was changing, so I returned to school to study physics, chemistry, and maths. Then I went to university to get a degree so I could become a climate scientist.

Working on a Headland

Ōrua-pouanui/Baring Head is a piece of land that pokes into the sea near the entrance to Te Whanganui-a-Tara (Wellington Harbour). The wind screams in from the Southern Ocean – its force leaves you breathless. My equipment had to be bolted down to survive the southerly storms, which sometimes lasted a week or more.

In the 1970s, I spent many days on that headland. The measurements I took would confirm what's now considered to be fact: the increase in atmospheric carbon dioxide has been worldwide. Dave Keeling got his proof. The story *was* the same in both hemispheres.

Crystal Clear

Back in the 1970s, very few scientists understood what caused climate change. Now there are thousands of us – and almost every country agrees: people are responsible for the speed of rising temperatures. The evidence is crystal clear. Since I took those first measurements at Ōrua-pouanui fifty years ago, the concentration of atmospheric carbon dioxide has increased by more than 30 percent. Each year, our oceans are becoming warmer and more acidic, a huge problem for coral and sea creatures that have shells. In my lifetime, I've watched the situation become more serious.

Filled with Colour

I no longer surf, but I still live near a beach. It doesn't have the sand dunes from my childhood, the ones we'd slide down on pieces of cardboard. There was a rocky foreshore at the bottom, the tidal pools filled with colour: red, purple, green, and blue – it all depended on the creatures living in them.

We loved exploring those rock pools, but we never forgot the ocean. The constant roar of the waves as they broke over the reef. The salt spray. I remember the way the bright sun dazzled our eyes, the way the black sand burnt our feet if we stood in one place for too long.

NOTE: *Dave Keeling and Dave Lowe were the first people to measure carbon dioxide in the atmosphere. Dave Lowe was one of the lead authors on a report that won the Nobel Peace Prize for the United Nations Intergovernmental Panel on Climate Change in 2007.*

illustrations by Simon Waterfield

The Sea and Me

by Dave Lowe

The text is copyright © Crown 2023.

The images on pages 17–20 by Simon Waterfield are copyright © Crown 2023.

The image on page 16 by Tim Marshall/Unsplash from bit.ly/3MBcRaN (cropped and design elements added) is used under a Creative Commons licence (CC BY 1.0).

For copyright information about how you can use this material, go to:
<http://www.tki.org.nz/Copyright-in-Schools/Terms-of-use>

Published 2023 by the Ministry of Education,
PO Box 1666, Wellington 6140, New Zealand.
www.education.govt.nz

All rights reserved.
Enquiries should be made to the publisher.

ISBN 978 1 77690 974 2 (online)
ISSN 2624 3636 (online)

Publishing Services: Lift Education E Tū
Editor: Susan Paris
Designer: Jodi Wicksteed
Literacy Consultant: Melanie Winthrop
Consulting Editor: Helen Pearse-Otene, Emeli Sione, and Lisa Fuemana



SCHOOL JOURNAL LEVEL 3 JUNE 2023

Curriculum learning areas	Science (The living world) English
Reading year level	Year 6
Keywords	carbon dioxide, climate change, environment, greenhouse gases, ocean, responsibility, scientists, sea, surfing